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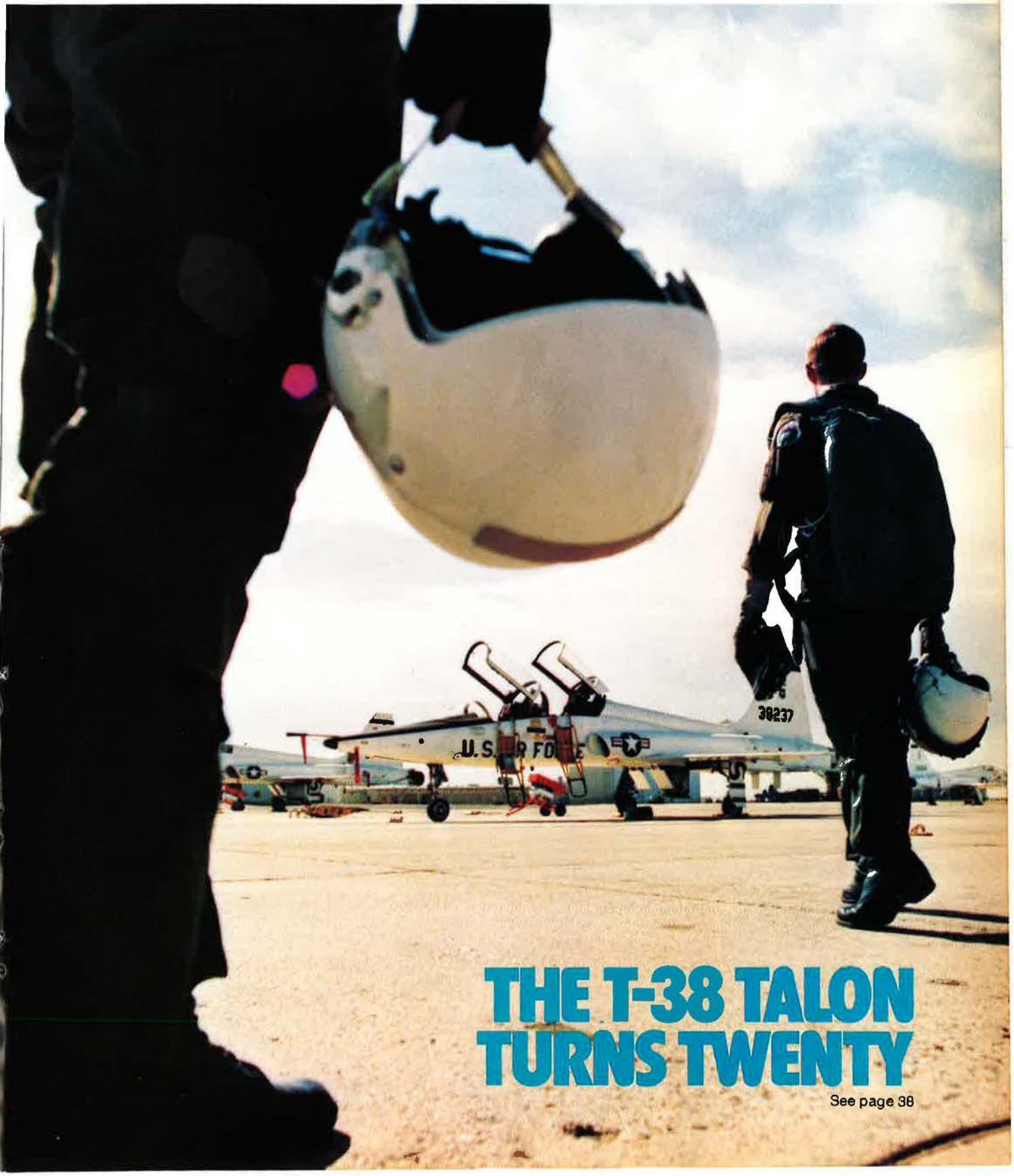
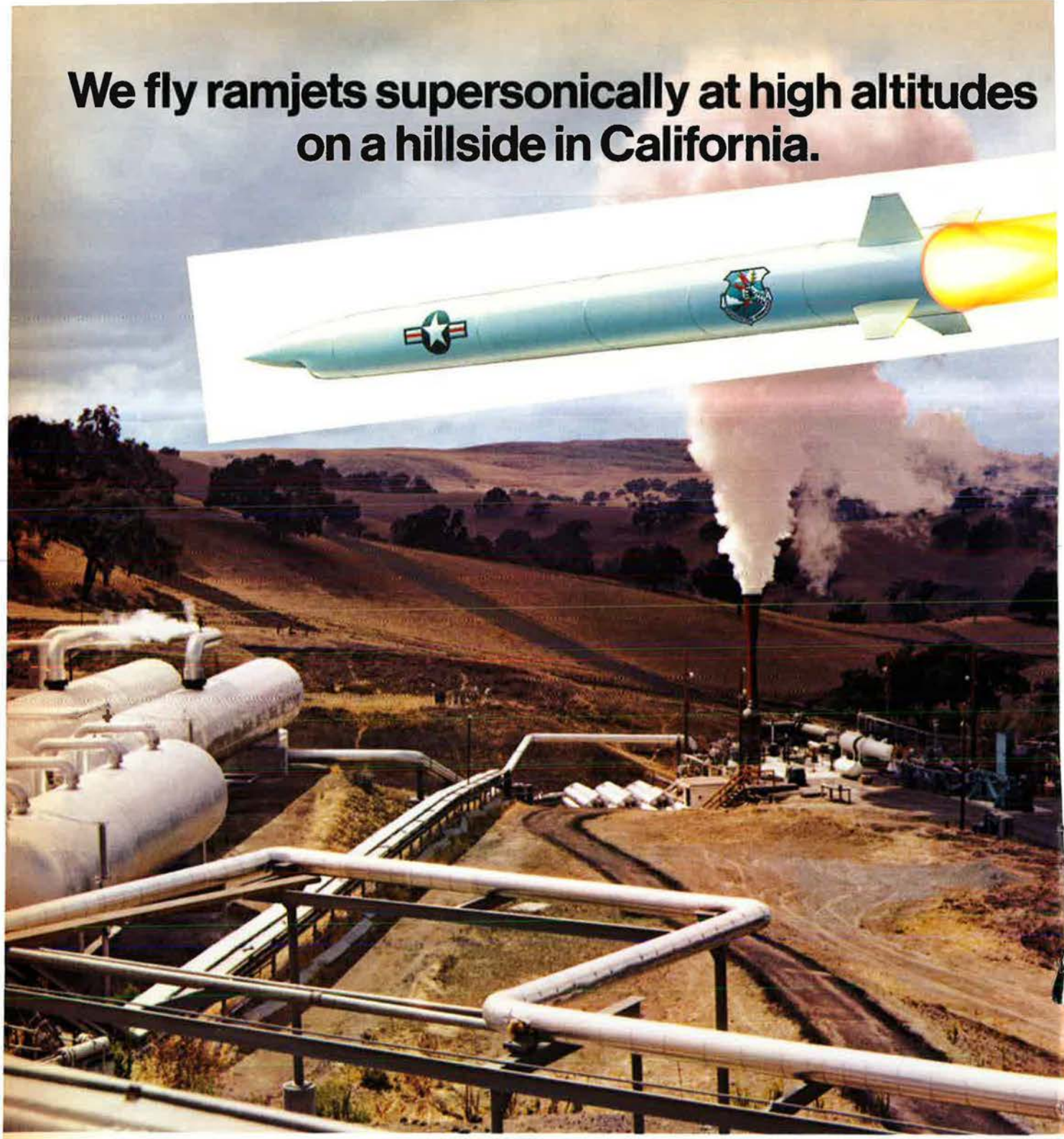



# THE T-38 TALON TURNS TWENTY

See page 38

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PUBLISHED BY THE AIR FORCE ASSOCIATION

OCTOBER 1978
VOLUME 61, NUMBER 10

## This Month



**ABOUT THE COVER**


*Versatile, economical, safe: All these words can be used to describe USAF's supersonic T-38 Talon trainer, which this year celebrates its twentieth anniversary. Of the 1,187 Talons built by Northrop, more than 1,000 still serve. For a report on this remarkable aircraft and its many uses, see p. 38.*

## Departments





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AN EDITORIAL

# That Veto Vote

THERE can be no disagreement about it. When the chips were down on September 7, President Carter won a big victory. The margin of the vote in the House of Representatives to uphold his veto of the defense authorization bill came as a badly needed shot in the arm to his faltering prestige and the public confidence and popularity that go hand in hand with it.

There are many who say that the need for such reinforcement was the main purpose behind the veto, which some of the critics say was masterminded by White House image expert Gerald Rafshoon as a daring public test of Presidential muscle. Whatever the motive, the President won a big one—and it wasn't even close.

Our concern here is not so much over the effect the successful veto will have on the defense authorization and appropriations acts as finally written for Fiscal Year 1979. These ramifications will have been hashed and rehashed again and again between the time this is written and when it is read—a handicap under which editorialists for monthly magazines inevitably must chafe. Our concern is rather with the longer range ramifications of a reassertion of a Presidential leadership which, on its record, seems likely to take us down a path where we really would rather not go.

It may be, as some perhaps wishfully think, that Mr. Carter has expended more of his political capital than was prudent and that his victory, while decisive on the specific issue, may in the long view prove a pyrrhic one. Certainly, he probably lost more powerful friends on Capitol Hill than he gained, regardless of the size of his margin, including many in the Senate who had no opportunity to vote this round, but who will remember the veto as a humiliating kick in the teeth.

On the other hand, Mr. Carter, whatever his deficiencies in other areas, thus far has pretty much had his worrisome way on a long list of defense projects. The list was spelled out well in a letter to the President opposing the veto by House Armed Services Committee Chairman Melvin Price (D-Ill.), who said in part:

"You may recall that I wrote to you a year ago expressing my concern about the impact on national defense capability of a series of decisions which include the cancellation of the short-range attack missile (SRAM), the termination of the production of the Minuteman III missile, and the slowdown of the development funding for the MX missile system. At that time, I expressed the hope that the Congress could work with the Administration to provide necessary defense systems. Since that time, we have had the cancellation of production of the enhanced radiation weapon, the indecision in response to the demonstrated need to protect the vulnerability of our land-based ICBMs, the proposed withdrawal of forces from Korea, and now the veto of a defense authorization bill and a determined effort to stop another large aircraft carrier."

So it is not the fate of one nuclear aircraft carrier, more or less, that troubles us. What does trouble us is the notion that critical national defense issues can be debated and decided in a factual vacuum—almost as if no threat even exists.

For while the political battles rage in Washington, the Soviet Union's quest for military superiority proceeds apace. Not parity, not sufficiency, not deterrence, not détente—but clear-cut and unequivocal superiority in all meaningful aspects of military power. That is the Soviet goal, and they are well on the way to achieving it.

Part and parcel of Soviet strategy are their participation in the Strategic Arms Limitation Talks (SALT) II, and their desire to hasten their progress toward military superiority by devious political means.

There is a close linkage, of course, between decisions as to hardware, force levels, and deployments and the negotiating process. What we invest in the former can be thrown away at the green baize tables, a temptation American bargainers have, in the past, found difficult to resist and to which the less than fortuitous outcome of SALT I stands as testimony.

Now there reportedly is a move to put forward, as an executive agreement rather than as a treaty, whatever terms come out of the SALT II negotiations. Likewise being considered is the thought that a Comprehensive Test Ban (CTB), which would in effect jeopardize effectiveness of the nuclear weapons we now have stockpiled and prevent them from being tested against the ravages of time, improved, or added to, would have a better chance of surviving the legislative obstacle course if it were presented as a moratorium agreement and not as a treaty.

The strategy is as transparent as it is simple. A treaty, according to the Constitution, requires approval by a two-thirds majority of the United States Senate. SALT I had rough going there, you will recall, and made it only through the addition of the so-called Jackson amendment. And there have been strong signals from the Senate that any attempt to subvert or circumvent its Constitutional prerogative to advise and consent to treaties will be fiercely resisted.

In effect, in the case of treaties, the veto power resides at the legislative end of Pennsylvania Avenue, where the votes of only thirty-four senators are all that is needed. This is why it is so critical that neither SALT II nor any effort at a comprehensive test ban be permitted to enter the legislative arena as anything except what they are—treaties.

The tests are not likely to come this session. But come they will. Not until that time will the full impact of the Carter veto become manifest.

Not until then will it be clear whether the President squandered his political capital for a transient political advantage or whether the reins of power are more firmly than ever ensconced in the White House.

—JOHN F. LOOSBROCK, EDITOR IN CHIEF

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# Airmail

**Policy Gone Astray**

General Kuter's article, "George C. Marshall, Architect of Airpower" (August '78), is a welcome addition to Air Force history. I wonder, however, if General Marshall's unique position in the history of the armed forces in general warrants attention in connection with an important policy issue now under consideration.

Had today's personnel policies been in effect during the '30s, General Marshall would have been involuntarily retired from active duty in 1931—as a colonel with thirty years' service after graduation from VMI. Had he known he faced such compulsory retirement, is it not likely he would have sought other employment in the '20s, thereby making himself a "double-dipper"?

There is other evidence, moreover, that Messrs. Arnold and Spaatz, worrying about the future of the air forces, very nearly became the founders of what later became Pan American Airways, an airline that owes its initial existence to some American efforts to counteract the northern expansion of a German-controlled Colombian airline, which very nearly was awarded a US contract for airmail operations.

It is when we forget such relationships that our analysis of policy options tends to go astray.

Frederick C. Thayer
Pittsburgh, Pa.

**Freedom to Comment?**

In regard to General Milton's article, "Freedom of Speech and the Military," in the July issue, it seems that his brief overview of the conflict between military obedience and political wisdom is a bit superficial, if not misleading. As I read his comments, I could not help but reflect on such sources as Clausewitz, S. P. Huntington, and even B. Catton (*U. S. Grant and the American Military Tradition*). These and others present in "theory" the responsibilities and even duties of both the military and civilian sector, yet none is able to clearly dissect that gray area where policy and strategy intermingle and/or overlap.

General Milton's reference regarding General Singlaub's "unlucky press coverage" seems to be a catch-all in today's modern high-speed news reporting. In retrospect, there was obviously a misunderstanding. To the most casual political observer this has been the rule and not the exception of numerous actions from Washington over the past eighteen months. Huntington, in *Soldier and the State,* writes, ". . . it is the duty of the statesman to formulate a clear, concise and unambiguous declaration of national policy to guide the military. The latter cannot operate in a policy vacuum." Under different circumstances, with clear policy guidelines, General Singlaub's passing comments would have never even become a matter of record!

Finally, General Milton chose his words with the care of a briefing officer in Saigon during the later 1960s, when referring to "someone in authority" making a public denunciation during the Vietnam War. Oddly enough, little mention is ever made of General Lavelle's recall or of the B-52 crews who were gingerly processed back Stateside for refusing to fly missions over "ambiguous" targets in North Vietnam. Policy vs. strategy again was difficult to discern as we reached for a solution to the problem in SEA. Notwithstanding, we are fortunate to have a nation where such questions can be discussed openly.

John A. Adams, Jr.
College Station, Tex.

In response to General Milton's article, in my "hesitant opinion," I admire General Singlaub for his expert opinion. I am not a military strategist, but I was stationed in Korea and agree with his statement. We place a man with rank and years of service, like General Singlaub, in a position, ask him his evaluation of the situation, and ignore him. If he had been the only one to disagree with the President, it would be reasonable, but he was not.

I do not profess total freedom of speech for the military, but it is a shame when a military man expresses his qualified opinion and then is required to retire or resign. If there is a disagreement between the military opinion and executive opinion, the people have the right to know.

If we want military personnel to mindlessly follow orders and never disagree, we need programmed robots. Today's service is a highly qualified group that is expected to keep their mouths closed even if there could be a better way. A waste of talent. I don't advocate action by that individual, but he should have the right to express his opinion without fear of being blackballed.

I say "Hurrah!" for General Singlaub and better luck in the civilian sector.

SSgt. Harry B. Green
Mather AFB, Calif.

**A Broadside at the VA**

In preparing his article on the Veterans Administration for the August issue ["The VA's Bountiful Benefits"], it is a pity Ed Gates chose to avoid talking with veterans themselves. Instead, he offhandedly dismissed criticism of the VA as "irresponsible salvos" and then reprinted the VA line.

During the ten years since I left the Air Force, I have had many dealings with the VA. I find it to be the most overbearing, pompous, paper-laden, form-ridden bureaucracy I ever have encountered. The majority of VA people with whom I have dealt act as though the veteran is a charity case and the bureaucrat personally is doing him a great favor. In general, they are rude and insulting—and try dealing with the VA without knowing the multidigit number they assign you.

On only two occasions have I known any *person* at the VA to write a letter. The computer writes letters and the computer answers veterans' letters; the answer, by the way, does not necessarily have to have any bearing on the question.

In fairness to Max Cleland, I have had no dealings with that bureaucracy-gone-wild since he took office. I hope he has cleaned house there. But I suspect that, if President Carter's Civil Service reform allowing firing of incompetents is approved by Congress, at least half the VA will be looking for work.

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**Pap Smears 'Misclassified'**

— Page 2 —

Delayed Plan Reinstated for 1st Termers

NCO Hikes: One of Biggest In Long Time — Page 8 —

Baggers May Get Pay Law Exemption — Page 4 —

What Future Holds for Nav Careers — Page 2 —

'20' In the Air: It Was Worth All the Sweat — Page 31 —

Reuters

Rundown of Officer, NCO Graduates At Many Academies

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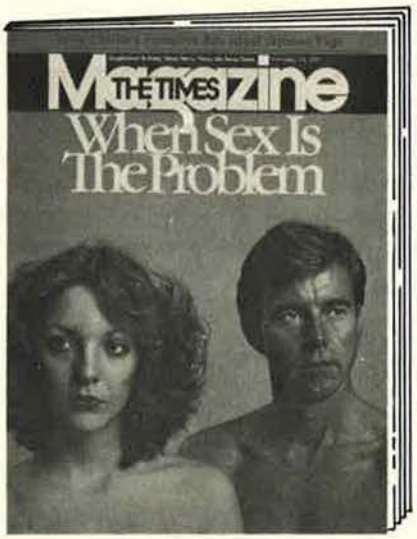


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AFM 1

# Airmail

They might find employment at HEW, but I doubt they could survive anywhere else.

J. J. McGrath
Florissant, Mo.

**Clay vs. Tunner**

In the August issue you carried a letter from Lt. Gen. W. H. Tunner in which he stated that General Clay had nothing to do with the origins of the Berlin Airlift.

It is Tunner who is in error. It is true that General Clay wanted to clear the tracks into Berlin with an armored train. However, it was after he was told that this would not be done that he and General LeMay discussed the bringing of supplies to the beleaguered city by air. I happened to have been present at one of those discussions—*before* the airlift came into being. It was General Clay who gave the "go ahead" on the airlift. Tunner himself came on the scene as Airlift Task Force commander after the airlift was under way. One need look only to General LeMay for corroboration.

To say that "General Clay had nothing to do with the origins of the airlift 'as they came out'" (whatever that means) is not only historically inaccurate but does disservice to one of our great military leaders. There has never been any doubt as to the origin of the airlift over these many years; hence, it is surprising that Tunner has waited until after General Clay's death to make such an inaccurate, albeit controversial, statement.

Col. Joseph C. Padjan,
USAF (Ret.)
Monterey, Calif.

**Neglected Navigators**

Bonner Day's article "Simulators: A Mixed Blessing?" in the July issue was a disappointment. It was a very thorough overview of pilot simulators; however, the main body completely neglected navigators. How the $30 million complex at Mather AFB, Calif., or the woeful condition at Castle AFB, Calif., could have been overlooked is beyond my understanding.

True, you do throw us a crumb in the box at the end when discussing the KC-135/B-52 sims. However, the quote, "The Air Force plans also call for cuts in flight hours for . . . KC-135 tanker crews," is absurd when later it is noted that three sims are to be built. That will not make a dent for dozens of bases and hundreds of crews worldwide.

In short, the article is at best incomplete and at worst blatant discrimination against navs. The total lack of mention of the Mather sim, a computer capable of simulating four different missions to sixteen student consoles simultaneously, is a perfect example of the second-class status navs are afforded in today's Air Force. That a magazine of your caliber, which claims to represent the needs of today's officers, could neglect more than one-third of all rated officers is shameful, and I hope to see a future article to correct this situation.

1st Lt. Wayne Close
Pease AFB, N. H.

**It's the Arabs' Turn**

Bonner Day's August article entitled "New Role for Israeli Air Force?" is a very perceptive analysis of the problem faced by Israel and helpful to anyone reflecting upon the future of the Middle East.

Now, I think it would be of benefit to fellow readers to have an article on the various Arab air forces, and how they view the problems that face them. The Arab states, particularly Saudi Arabia, Jordan, and Egypt, are becoming increasingly important allies of the US as we seek to restrain Russia from control of the sea and air lanes around the Arabian Peninsula.

Fortunately, President Carter has been willing to face substantial political risks at home in order to move toward a more even-handed treatment of the Middle East situation. It is incumbent upon each of us to become more familiar with the twenty-two Arab countries, their history, culture, and religion. Certainly, they are moving onto the center stage of world affairs. It is a time when they could move more strongly into the orbit of the Western World.

So, we would like to know more about their air forces—equipment, manpower, training, strategies, and tactics of employment.

Incidentally, Mr. Day's article says that Middle East peace initiatives are being stalled by Syria. Actually, peace moves are being frustrated by the intransigence of Israel. Prime Minister Begin, who is facing increasing opposition on the home front, is seemingly doing his very best to antagonize Israel's best friend, the US. He continues the illegal settlements and ignores the rights of the Palestinians to a homeland.

Also, Mr. Day, it is the "October War," not the Yom Kippur War.

Maj. H. H. Rosenheim,
USAF (Ret.)
Park Ridge, Ill.

**A Democratic Objection**

The editorial comment at the bottom of Congressman Carr's letter, "Potential Double-Cross?" [August '78, p. 6] described the Congressman as "Democrat Congressman" instead of Democratic Congressman, the grammatically correct terminology (Random House dictionary).

This would usually be considered as nit-picking except for the fact that many Republican politicians of the past decade have used your incorrect terminology in a nasty, disdainful, and contemptuous way on public television.

Ex-President Ford used this phrase until he was televised before the Senate Committee prior to his confirmation for the Vice Presidency. Senator Goldwater continues to use it. Many other Republican politicians have publicly used this term in a contemptuous manner.

But to see an editor of AIR FORCE Magazine use it makes many Democrats, such as myself, lose faith in the veracity of the rest of this fine magazine.

Maj. Ned Heilig, USAF (Ret.)
Inverness, Calif.

• *No slight intended. In context, we think our usage is grammatically justified, but in view of the possible pejorative connotations we wish we hadn't used it.*—THE EDITORS

**He's REALLY Tired**

I am an Air Force Academy graduate, a pilot, I have an excellent career record, and by all accounts "I've got it made." But after ten years of active duty, I am separating from the Air Force. My basic reason for leaving is that I'm just plain tired—tired of it all.

Unfortunately, I am not alone. The Air Force is now facing a very

real and very serious pilot retention problem—a problem that cannot be blamed on the airlines. The current airline hiring spree is not the *cause* of pilots leaving in many cases; it is merely an outstanding *opportunity* for leaving. Military people, specifically those of us charged with doing the actual fighting in event of war, are being increasingly attacked—both from without and within.

Congress begrudges us our pay, benefits are being continuously scrutinized and eroded, and it's impossible to predict with any certainty the far, or even near, term quality of military life. A newspaper carries the story of how legislation is being introduced to prevent military retirees from "double-dipping," while the headline in the same paper tells us how effectively the latest congressional scandal is being covered up. I am being used as a whipping boy and I'm being sold a bill of goods, and I'm just plain tired of it.

For a service whose supposed motto is "To Fly and Fight," it is pathetic to see how much emphasis is placed on additional duties and master's degrees, and how little attention is given to how well a man can fly and use his machine. (Maybe, when the Russians finally confront us, the plan is to talk them out of war and challenge them to a "G. E. College Bowl" instead.) I'm a part of an organization that has lost all perspective of why it's in existence, and I'm just plain tired of it.

Many flying unit commanders are "mickey mousing" their people to death. Initiative is squelched and oversupervision prevails. It's frustrating to see officers rise to positions of command who specialize in leading by fear, or who are solely interested in not making waves and preserving their own careers. In this kind of environment one's sense of patriotism is overridden by a genuine survival instinct—both for physical and emotional survival. I'm a thirty-one-year-old man and I resent being treated like a five-year-old child; fact of the matter is, I'm just plain tired of it.

Those of us who know we are worth more than what we are being given credit for are shedding the military security blanket and heading for the civilian job market. Because of our exodus, a lot of pilots who could, and should, be RIFed will be able to hang on for twenty (or however long it takes to retire).

I write this not to grind an axe, or throw stones, but instead to cast some light on a situation that concerns me as an American citizen. As one fellow pilot so aptly put it, "A species that feeds on its own young does not last long." It's about time for Congress and military leaders to wake up to the real reasons why so many of us who are responsible for defending this country are saying, "I'm just plain tired of it."

Capt. Michael J. Karaffa
Panama City, Fla.

• *Captain Karaffa's letter has already appeared in at least one other publication, but we feel it's worth repeating for a larger audience. He and all others interested in the problems the Air Force has keeping good people will want to read the article on p. 70 of this issue, "Why They're Leaving the Air Force."*—THE EDITORS

**Also "Mighty"**

The "Mighty Eighth" has been glorified in motion pictures, television, books, and media. Fine. They deserve it. But—how about a little credit occasionally for the "Mighty Twentieth" under the command of brilliant Gen. Curtis LeMay? He changed the B-29 from an ineffective weapon into a destroyer of the Japanese Empire. Japan was on the verge of surrender even before the bomb was dropped on Hiroshima.

I am proud to have served with the B-29s of the Twentieth Air Force, in the 485th Bomb Squadron (VH), 501st Bomb Group, 315th Bomb Wing.

Murray Singer
Brooklyn, N. Y.

**Prolific Author**

My thanks for your mention of *Cowboys and Indians* in the July issue of AIR FORCE Magazine. I have received several orders for the book in the past week due to that kindness.

I am writing once again for help. I have just signed two contracts with Ian Allan/Scribner's to write *B-52 Stratofortress* and *F-15 Eagle* for their new "Modern Combat Aircraft" series. Bill Gunston's *F-4 Phantom* was the first in the series.

I would like to contact anyone with personal experience related to either aircraft, both personal recollections and photos. I particularly would like to contact people who were with the B-52 during its combat tours in Southeast Asia, since the major portion of the B-52 book will recount its combat history. The F-15, of course, is relatively new but personal accounts and photos would be welcome.

My thanks, as always, for your help. *Komet: The Messerschmitt 163* has been released in the UK and is doing well. *P-38 Lightning at War* is due out this summer as well.

Jeffrey L. Ethell
2403 Sunnybrook Rd.
Richmond, Va. 23229

**WW II Movies**

I am compiling material for a book on the aviation films of WW II and would like to hear from any officers and enlisted men who participated in making the following Hollywood films:

*Test Pilot* (1938), *I Wanted Wings* (1941), *Keep 'em Flying* (1941), *Thunderbirds* (1942), *Aerial Gunner* (1943), *Air Force* (1943), *A Guy Named Joe* (1943), *Bombardier* (1943), *Thirty Seconds Over Tokyo* (1944), *Winged Victory* (1944), *God Is My Co-Pilot* (1945), *Fighter Squadron* (1948), *Command Decision* (1949), *Twelve O'Clock High* (1950), *Above and Beyond* (1953).

Any and all information would be gratefully appreciated. Those who wish may call collect.

Bruce W. Orriss
705½ W. Hillcrest
Inglewood, Calif. 90301
Phone: (213) 677-4965

**Hey, Fellas, Where Are You?**

The Air Reserve Personnel Center (ARPC), Denver, Colo., received a request recently by way of the American Embassy in France.

Thirty-four years ago, in enemy-occupied France, a Frenchman, with disregard of his own welfare, helped Americans to escape to neutral countries. Now, Xavier Watremez, the Frenchman, is trying to locate four of them. As he said in his letter to the Embassy, "I would be very glad to see them again, to receive them with their wives now that it is possible to get reunited without any kind of fear."

Mr. Watremez enclosed with his

*We suggest that readers keep their letters to a maximum of 500 words. The Editors reserve the right to excerpt or condense as required in the interest of space or good taste. Names will be withheld on request, but unsigned letters are not acceptable.*

# Blinding force.
# The U.S. Air Force EF-111.


To defeat an enemy, first you have to reach him—undetected. The EF-111, the world's most powerful airborne ECM system, overwhelms and blinds ground radars to incoming aircraft.

And even if multiple, hostile radars switch to a variety of frequencies, the EF-111's broad range of jamming capabilities can handle them immediately.

Adaptable—the EF-111's system is designed to convert quickly and economically to new electronic threats. Compatible—its speed and maneuverability complement any strike aircraft. And versatile—it's ready for standoff, close air support or escort missions. The EF-111 will be the most advanced electronic warfare aircraft to join the U.S. Air Force Tactical Air Command.

GRUMMAN AEROSPACE CORPORATION

letter a photo of one of the pilots and first and last names and home addresses of the four at the time of entry on duty. Americans, though, are a mobile society. Authorities have been handicapped in their search because of missing data. ARPC and the National Record Center in St. Louis were unsuccessful because of missing Social Security numbers and middle initials.

Enclosed with his letter was a copy of a presidential citation given Mr. Watremez by the then Commanding General of the US Forces, European Theater, Dwight D. Eisenhower, in "gratitude and appreciation of the American people for gallant service in assisting the escape of Allied soldiers from the enemy."

So—Charles Strockbine, John Bear, Floyd Nouillet, and John Lawther—where are you?

Information regarding their whereabouts should be forwarded to

ARPC (OI)
7300 East 1st Ave.
Denver, Colo. 80280

In February 1944, two P-39 fighter aircraft midaired near Harding Lake, Alaska. Recently, the wrecks were rediscovered, and it was learned that both pilots escaped the mishap with minor injuries. As a professional writer/pilot, I am interested in doing a feature article on this event, but have not been able to locate the two pilots for interview purposes.

The names of the men are: Lt. Steven van Nostrand and Lt. Paul E. Collins. I would like to correspond with one or both pilots, explain my needs, and enlist their help.

James Greiner
7 Mile Chena Ridge Rd.
Fairbanks, Alaska 99701

Our museum is researching some thirty-one fighter aces from the State of Oregon. One of the results of this research is 2′ x 3′ oil paintings of their actual aircraft. To date, some sixteen have been completed.

To further our research we would like to contact the following individuals and/or persons who served with them:

Capt. Thomas A. White (ex-RCAF), 97th Fighter Squadron, 82d Fighter Group; Lt. Thomas F. Miller, 354th Fighter Group; and Capt. Merle M. Coons, 38th Fighter Squadron, 55th Fighter Group. All were units of the Eighth Air Force.

Capt. Terrill M. Aitken, ORARNG
Curator
Oregon National Guard Military
Museum & Resource Center
Camp Withycombe
Clackamas, Ore. 97015

Can anyone help me? I am seeking information on Lt. Burton Stitt on a matter of extreme importance. Last-known whereabouts was Saint-Étienne, France, with a fighter unit in June 1945. Any assistance will be appreciated.

Col. Richard W. Koester, USAF (Ret.)
321 Calle Felicidad
San Clemente, Calif. 92672

For purposes of a literary research project, we are trying to locate Col. Kenneth Gantz and Col. Loy Singleton. Information on their whereabouts would be appreciated.

Matthew J. Bruccoli
Jefferies Professor of English
University of South Carolina
Department of English
Columbia, S. C. 29208

I wish to contact, as soon as possible, an old friend, Maj. Earl Muchway, who is now probably retired from the USAF. I last knew of his whereabouts in the early 1960s when he was assigned to Barksdale AFB, La., and later to Wichita, Kan.

Lt. Col. Lionel A. Proulx, USAF (Ret.)
251 W. Dayton-Yellow Spring Rd., Apt. 323
Fairborn, Ohio 45324

**Anyone With the 438th?**

I would like to get in touch with anyone who was stationed at the 438th Reserve Training Base Unit at Reading Municipal Airport, Reading, Pa., during the years 1947–48.

Richard L. Musick
1313 Termino Ave.
Long Beach, Calif. 90804

**Patch Collectors**

I am a collector of US Elite (Air Commando, 1st SOW, Ranger, etc.) and NASA items (headdress, patches, wings, especially USAF metal paraphernalia, flags, etc.) and would like to trade with any readers who may be so interested. In trade I have to offer British/Canadian and other foreign Elite/Air Force items.

Leonard Peltier
644 Isbister St.
Winnipeg, Manitoba
R2Y 1R1, Canada

I am an ardent collector of military patches of all types. With expectations of becoming a future Air Force officer, I have recently embarked on a project of collecting a majority of patches of USAF units, large and small.

In my collecting efforts, I am looking for as many new and unusual additions as I can find. Anyone who would like to sell, give, or trade these types of patches is invited to correspond with me.

Cadet Kevin Born
AFROTC Det. 465
623 S. 18th St., #27
Lincoln, Neb. 68508

**CZ Aviators**

I am doing research on the Army Air Corps in the Canal Zone during the years 1935-40. I would like to contact former aviators who were stationed there during those years.

Rick Brewer
58 River St.
Batavia, N. Y. 14020

## UNIT REUNIONS

**36th Fighter Group**

The 8th annual reunion of the 36th Fighter Group, 22d, 23d, and 53d Fighter Squadrons, will be held in Louisville, Ky., this October. Exact date and further information from

George Brooks
4710 Marigold Ave.
Louisville, Ky. 40213
or
Ernest Hess
1116 S. Chesley Dr.
Louisville, Ky. 40219

*Missed September issue deadline:*

**Air Commandos.** Reunion at Fort Walton Beach, Fla., October 6–8. Write Air Commando Association, P. O. Box 7, Mary Esther, Fla. 32569.

**USAF Security Service Officers**

18th annual reunion, Andrews AFB Officers' Club, October 7, from 1800 to 2100 hours. Contact Virgil M. Heistand, P. O. Box 238, Annapolis Junction, Md. 20701, (301) 796-6143 or (301) 530-2879; or E. J. White (703) 533-3303 or (703) 548-8128.

ACT 01/182

# WITHOUT SENTRY WE ONLY GET PART OF THE BIG PICTURE.

The air defense of the United States has long relied on the surveillance capability of ground-based radar.

But since ground-based radars cannot detect low-flying aircraft, they've always had a blind spot.

That's one of the reasons why "Sentry," the USAF's airborne warning and control system, was developed.

Sentry sees over 250 miles beyond the horizon and can spot low flying aircraft over any type of terrain. It provides instantaneous television "Big Picture" information to ground control centers.

And in case of attack, Sentry becomes a highly mobile and survivable command and control center. Able to direct friendly fighters and coordinate operations of our defense forces.

Sentry has already proven itself in over 5000 hours of inflight testing, including several Air Force tactical exercises. Fourteen Sentry systems will be delivered to the Tactical Air Command by the end of 1978, which will greatly improve our air defense system.

The Air Force sees a need for a total of 34 Sentry systems.

And when they're all in service, we'll have a better picture of what's going on than ever before.

BOEING

# Capitol Hill

**By the Air Force Association Staff**

Washington, D. C., Sept. 7

**Authorization Veto**

President Carter's veto of the defense procurement authorization bill—and the House's failure to override the veto—have set Congress back several weeks, and will delay final defense funding decisions well into the fall.

The President said he vetoed the bill because it included $2 billion for a nuclear carrier he did not want, taking funds, he said, from areas he feels are more critical. The last President to veto a major defense authorization bill was James K. Polk in the late 1840s.

Because the House fell short of the two-thirds vote needed to override the veto (today's roll call on overriding the veto: 191 for, 206 against), Congress is back to square one. President Carter has promised to deliver to Congress an itemized list of those projects he would like funded in lieu of the nuclear carrier. The new authorization bill must follow the same route as the vetoed bill: The House and Senate Armed Services Committees must draft the new legislation, then each house of Congress must consider the bill. Differences between the two versions must be ironed out in conference committee, and the House and Senate must ratify the compromise. Then the President must sign the legislation.

The defense appropriations process also must start anew. Work on the appropriations bill stopped immediately when President Carter announced his veto. Military procurement and research and development must be authorized before money actually is appropriated. The House had completed action on the military appropriations bill, and the Senate Appropriations Committee was marking up its version when the President announced the veto.

Considerable controversy has surrounded the President's decision. Some observers—including some Congressmen—believe the move was designed to show the President as a strong leader willing to stand up to Congress. Critics note that the President justified the veto using figures from the military construction bills and from a draft of the appropriations bill rather than from the completed authorization bill he was rejecting. Some feel the President would have done better to warn Congress that he would sign the authorization bill for expedience, but would veto the appropriations bill if it funded the nuclear carrier. Such action still would have shown the President as decisive, but would have prevented some ruffled congressional feathers and would have caused less of a legislative logjam. The President's preference for a conventional carrier in the FY '80 budget also disturbed some Congressmen who feel that, in the long run, a conventional carrier would be as expensive but less effective.

The President's veto probably will force Congress into passing a continuing resolution to allow the Department of Defense to operate in the new fiscal year at current fiscal-year funding levels. It also increases the likelihood that Congress will be called back into session after the November elections.

**Military Construction**

After slicing $372 million from the Administration's request, Congress has voted to appropriate $3.9 billion for military construction. Most of the cuts came from NATO projects. Despite the Administration's insistence that those projects are essential, both the House and the Senate balked, saying that the US was paying disproportionately for facilities in Europe. The bill awaits the President's signature.

**Civil Service Reform**

There's mixed news from the Senate, which has passed a Civil Service reform bill similar to that proposed by the Administration.

The Senate voted to keep the current system of veterans' preference in government hiring and retention, with one key exception: Retired field grade and general officers will not be given the preference. The House is considering putting a time limit on using the preference for all vets, but the White House apparently is backing away from its even stronger position on limiting veterans' preference.

The Senate bill also includes some bad news for "double dippers"—retired military people who work for the federal government. The bill contains a provision similar to one being considered in the House that would restrict total government payments to such people to an amount equal to the pay of the top Civil Service pay grade (currently $47,500).

**DOPMA**

The Senate Armed Services Committee has given up consideration of the Defense Officer Personnel Management Act for this year. As a result, Sen. Sam Nunn (D-Ga.), Chairman of the Subcommittee on Manpower and Personnel, has introduced a bill to extend the Officer Grade Limitation Act (OGLA) one more year. The full Committee has agreed.

**Survivors' Benefits**

The Senate has passed a bill that would improve the Survivors' Benefit Plan and Retired Serviceman's Family Protection Plan. It differs in several respects from a similar bill passed by the House.

The Senate bill, like the House version, provides for cost-of-living adjustments for RSFPP participants. The Senate also voted to extend SBP coverage to Reservists, an issue not addressed by the House. (The House passed a separate bill that would accomplish the same thing.) The Senate chose not to go along with the House in reducing the Social Security offset of SBP payments from 100 to fifty percent.

**Special Days**

President Carter has signed two joint resolutions of Congress. One proclaims October 7, 1978, "National Guard Day." The other designates July 18, 1979, "National POW-MIA Recognition Day." The President said he was "proud to sign a bill honoring these Americans who have given so much and endured so much. . . . I join all Americans in gratefully recognizing their sacrifices." ■

# The Fairchild A-10 revolutionizes close air support tactics.

1977 saw the Fairchild A-10 perform in some of the most important and rigorous battle exercises ever developed.

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The A-10 flew against simulated armor threats and proved it can work with the Army to provide responsive, effective close air support against a variety of targets.

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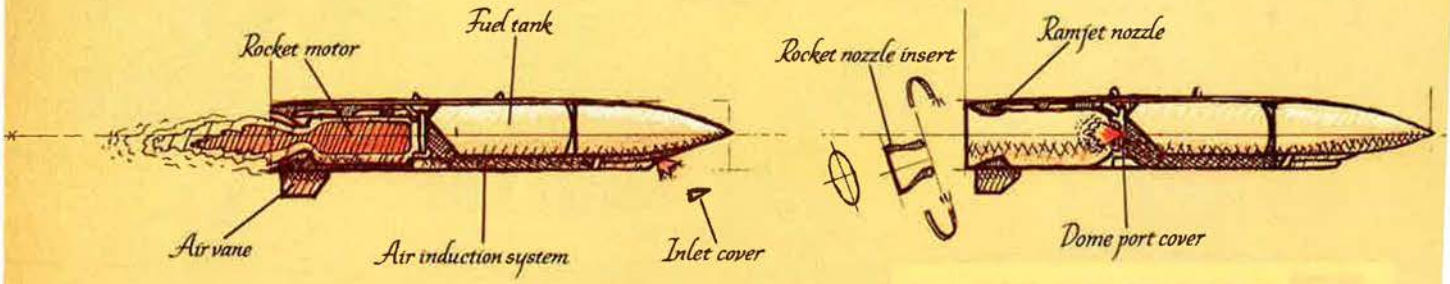
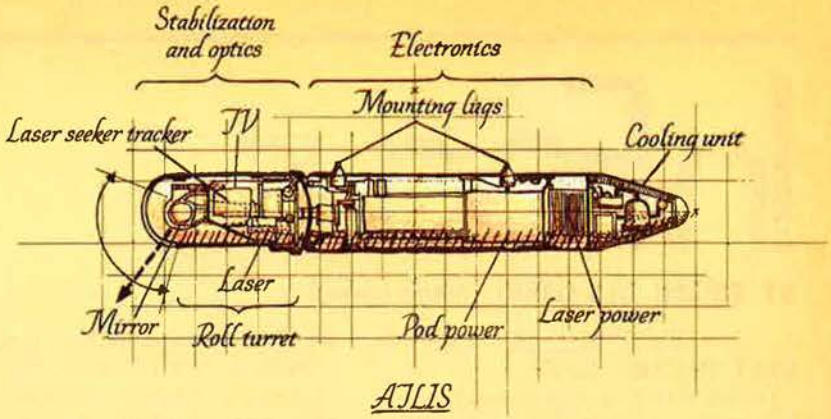



Booster tailoff

Transition

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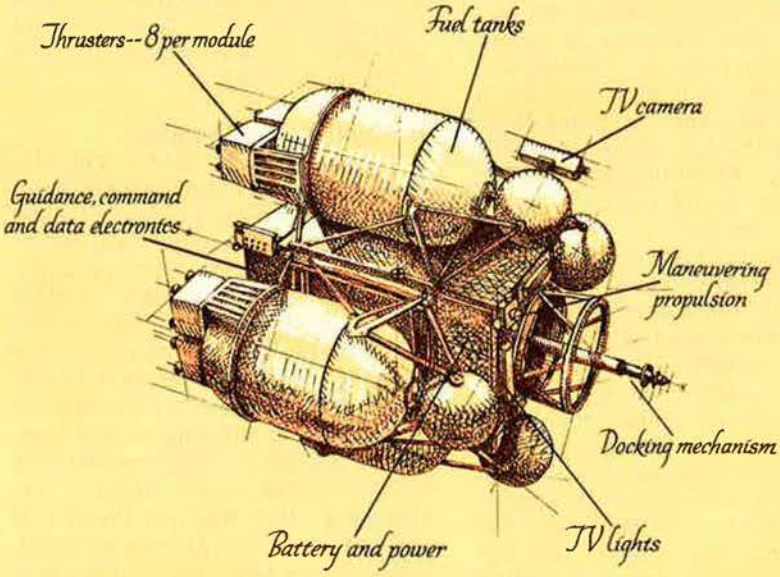
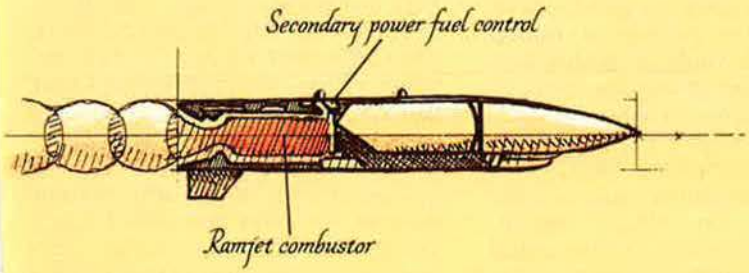



Teleoperator




Ramjet

At Martin Marietta we encourage our people to seek future challenges in space and defense. By perceiving such needs and finding solutions to them, we have advanced our technology in many disciplines while building an inventory of capabilities for the development of new systems when they are required.

As we perceived a growing need for higher performance missile systems, we began extensive research and built special laboratories and facilities to explore and test advanced concepts. For example, in the late 1960s, when the advantages of a supersonic cruise missile became apparent, we were able to utilize these capabilities. By combining advanced rocket-ramjet technologies with our prior work in hot structures and controls, we developed a supersonic integral rocket-ramjet, survivable cruise missile. This system, an Advanced Strategic Air Launched Missile known as ASALM, is currently in a technology development and flight test program.

This approach has proven equally valuable in space systems. For the Space Shuttle we saw a need for a small, reusable craft, controlled from the Shuttle, that can survey and maneuver space objects. By using concepts developed for such space projects as Skylab and Viking, we built a maneuverable space tug called Teleoperator. It's now scheduled for an early Shuttle mission.

Building from proven concepts in airborne trackers, we developed an Automatic Tracking Laser Illumination System (ATLIS) that gives a single-seat aircraft pilot a total fire control system.

Perceiving needs and developing the capability to solve them has made us a leader in space and defense systems. And a company well prepared to meet the challenges of the future.

**MARTIN MARIETTA**

Martin Marietta Aerospace
6801 Rockledge Drive, Bethesda, Maryland 20034

# In Focus...

**BY EDGAR ULSAMER, SENIOR EDITOR**

Washington, D. C., Sept. 6

## SALT II/CTBT Link

The Administration's somewhat turbid policy concerning a Comprehensive Test Ban Treaty/Moratorium (CTBT would outlaw the testing of all nuclear weapons) has taken a new turn. White House strategists now have decided to present SALT II and CTBT as a "package" to the Senate as a public-relations gambit, assuming that current negotiations with the Soviets on both topics can be wrapped up late this year or early next. The White House concern is that if one or the other pact is presented first, it might "poison the other's well" in terms of congressional and public reaction.

Another change in tactics involves how the Administration is presenting the case for CTBT to Congress. The State Department's Director of Politico-Military Affairs, Leslie H. Gelb, and the US Arms Control and Disarmament Agency's Rear Adm. Thomas Davies, USN (Ret.), told the House Armed Services Committee's SALT/CTBT Panel on August 15 that a key benefit the US would derive from CTBT is perpetuation of its "advantage over the Soviet Union in nuclear weapons designs." This assertion was challenged immediately by the panel and contradicted by subsequent witnesses, who concurred with what has been the view of the intelligence and technical communities for some time, *i.e.*, that there is *no* evidence that the Soviet Union lags behind this country in nuclear-weapons technology. The panel viewed as preposterous the notion that the Soviet Union would consent to remain inferior in this crucial field. (The panel was struck by the irony that the hearings were attended by a representative of Tass, the Soviet news agency, and a suspected KGB member with diplomatic status.)

At the same hearings, the panel heard contradictory testimony from Administration witnesses in other key areas, this column learned from congressional sources. The State Department and ACDA witnesses testified that a "zero-yield" test ban could be verified adequately, would not jeopardize the reliability and safety of the US nuclear weapons stockpile, and would greatly inhibit proliferation of nuclear weapons by third countries. They were contradicted by experts from the Departments of Energy and Defense. Donald M. Kerr, then the Acting Assistant Secretary of Energy for Defense Programs, demolished all three contentions. Nuclear tests, he said, "are essential for determining the proper functioning of nuclear explosives; calculations do not suffice, and there is no way to experimentally 'simulate' the performance of a nuclear weapon." Verifying a zero-yield test ban, he made clear, is beyond the ken of the technical community. According to the DoE official, the Soviet Union, if determined to deceive US monitoring, "could conduct tests of higher yield with every expectation that these would either evade detection entirely or leave the United States unable to prove whether an 'ambiguous event' was a test or an earthquake. . . . The Soviet Union could test underground on the territory of allies, in remote or unwatched areas of the atmosphere, or even in outer space" without real risk of detection. Debunking the "fond belief" that optical detection of cave-ins, called subsidence craters, is possible, Secretary Kerr testified that "our studies have shown that tests above ten kilotons can be conducted in the Soviet Union and there will be no subsidence crater to be photographed."

A CTBT, said Secretary Kerr, "has no direct effect on the proliferation of nuclear weapons. Testing is not essential for designing and building the simple, first-generation fission devices that a would-be proliferator is likely to want at the beginning of a nuclear weapons program."

The former Director of ACDA, Dr. Fred C. Iklé, warned the HASC panel that the Administration's plan to seek a moratorium on nuclear testing, rather than a permanent treaty, would lessen this country's leverage "for inducing the Soviet Union to agree to adequate verification measures. And if at the end of such a moratorium the Administration or Congress decided that the ban should not be continued, the resumption of testing would certainly hurt nonproliferation more than if we had never entered into such a moratorium."

Congressional sources report evidence that the Administration plans to exert tighter discipline over government witnesses to reduce the risk of contradictory testimony on SALT and CTBT. Attempts by Sen. Edward M. Kennedy (D-Mass.) and Rep. Bob Carr (D-Mich.) to get the Administration to take action against Assistant Secretary Kerr because of his independent testimony allegedly fizzled because Energy Secretary Dr. James Schlesinger fully supported his subordinate's action. Meanwhile, the HASC panel plans to probe alleged orchestration of government witnesses by the Administration in a forthcoming hearing.

## Neutron Bomb Impasse

The so-called neutron bomb, officially known as the enhanced radiation/reduced blast weapon, remains in limbo awaiting Soviet "restraints" being sought by the Administration. Early in August, Secretary of State Cyrus Vance and Secretary of Defense Harold Brown coauthored a ten-page letter to President Carter that lists a number of options for filling the void but, surprisingly, contains no specific recommendations. Congressional experts found it "astonishing" that high on the list of options are two approaches previously rejected because of unacceptably high collateral damage to the NATO member nations on whose territory they could be used. One is the all-fission ten-kiloton artillery shell that as long as five years ago was deemed unusable because of its brutal effects on friendly civilians. The other option cited prominently by the letter is the high-yield Lance warhead, also characterized by a high collateral damage potential.

Senior military leaders of NATO have indicated repeatedly that, because of the collateral damage trait, use of these weapons is basically unthinkable and, thus, their deterrence value essentially nil. The Vance/Brown letter, this column learned, did offer one specific suggestion concerning Soviet concessions in response to the US offer of foregoing deployment of en-

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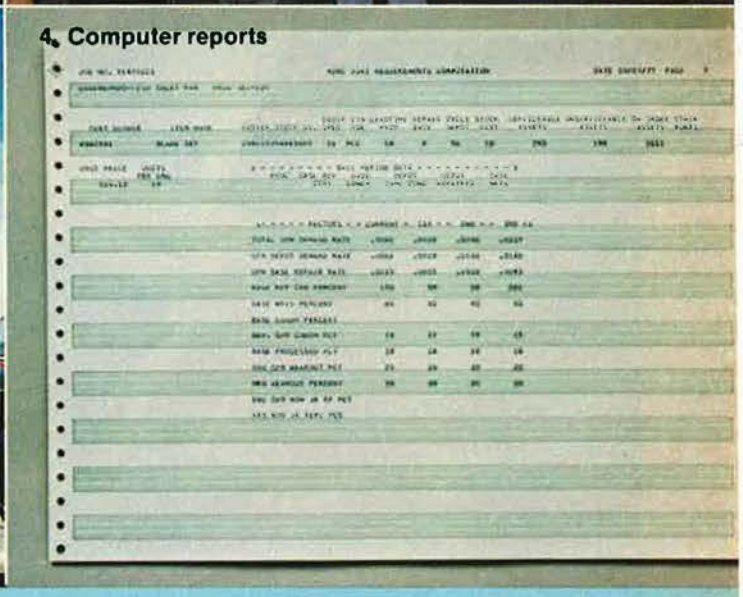
4. Computer reports

1. Our Accelerated Mission Testing (AMT) program predicts engine performance five years ahead of flight line aircraft. This allows us to identify and solve problems on the ground before they happen in service.

2. The Air Force "Pacer Century" program compares AMT predictions to designated high-time flight engines which are about a year ahead of the fleet. This confirms or adjusts AMT predictions on a running basis.

3. P&WA representatives at Air Force depots keep track of real-time parts usage—both recoverables and consumables—which we analyze, interpret and feed into an on-going data bank.

4. On a regular basis, we then prepare computer reports patterned after the USAF computerized order processing system. These help the Air Force anticipate changing parts requirements so the right part will be in the right place at the right time.

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**UNITED TECHNOLOGIES**

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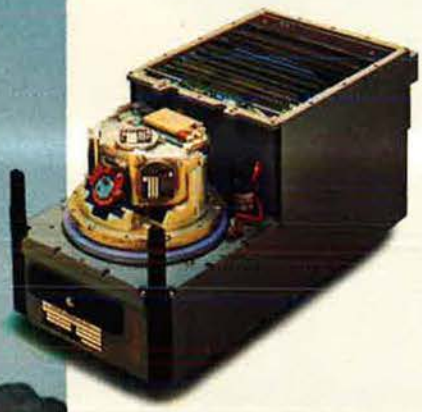

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Rockwell is proud to be part of this program, which has as its goal the standardization of navigation systems to achieve low life cycle costs.

For more information, write: N73 Program Manager, Autonetics Strategic Systems Division, Rockwell International, 3370 Miraloma Avenue, Anaheim, CA 92803.

Rockwell International

hanced radiation/reduced blast weapons: That the Soviets be invited to strip the Warsaw Pact forces of all offensive chemical warfare capabilities. That the Soviets—who lead the rest of the world in offensive CW by a wide margin—would seriously entertain such a tradeoff seems farfetched.

Another impasse on nuclear weapons—the tug of war over a new strategic bomb—may be headed for resolution. The Administration has yielded to the congressional mandate to build such a new weapon and included funds for a modified version of the B77 strategic bomb. The B77's yield can be adjusted to different requirements and its design permits safe release from extremely low altitudes. The Administration proposes to build 400 of these weapons for $700 million. The original cost had been given at $1.1 billion but included features subsequently found to be expendable.

### The Road to MAP

Major defense improvements planned by the Administration for FY '80 and beyond center on what a senior Defense official, who declined identification, terms the retention by the US "of equivalence in thermonuclear weapons with the Soviet Union through the 1980s." Other key areas stressed in the FY '80 POM (Program Objective Memorandum)—the Defense Department's summary of goals for the next budget cycle—he told this column, involve improved, more rapid ways to reinforce NATO, with emphasis mainly on the Central Region but "some attention also to the flanks"; boosts in "survivable" command and control capabilities; continued modernization of tactical air and ground forces; and enhancement of US sea-control capabilities, "particularly antisubmarine warfare."

The Defense Department, at this writing, is uncertain about its ability to enter a survivably based ICBM system—either a new weapon or a modified Minuteman—into full-scale engineering development this year or next. The congressional request for a specific DoD plan concerning development and deployment of such a system by September 30, 1978, will "almost certainly" not be met, this column has learned.

Defense Secretary Harold Brown stated recently that the Administration remains undecided about "whether or not to deploy mobile ICBM systems, like the alternate launch point system [referred to also as the multiple aim point or MAP system]."

Any US move toward deploying an advanced, survivably based ICBM obviously must allow for attendant verification problems, especially so far as the Soviet potential for end-running bilateral arms limitation agreements is concerned. As Secretary Brown points out, "the United States will not deploy a mobile ICBM system that would not permit adequate verifications of the number of launchers deployed [and] we will insist that any Soviet system meet the same verification standards." The verification problem of MAP systems probably can't be solved through SALT II or any arms limitation accords. The reason is that multiple aim point ICBM systems are not designed to assure survivability in absolute terms. All they are meant to do is to "soak up" a number of enemy warheads that is greater than any rational attacker would want to "trade" for the destruction of the US ICBM force.

Put another way, theoretically MAP systems deter attack for two principal reasons: First, the aggressor, after taking them out, would be weaker in relation to the victim than he was before the attack. Secondly, in purely economic terms, any MAP system worth its salt must force the potential attacker to spend more on the number of weapons required for a successful raid than it costs the defender to enlarge the system to a level sufficient to thwart such a raid. But there is a catch. Underestimating the aggressor forces against which a given MAP system is plotted could be disastrous.

As a senior Defense official put it, if the US were to be off by a factor of ten concerning the number of warheads the Soviet Union had available for attack on a specific MAP configuration, the system would cease to be survivable. But if the US underestimation can be held to below fifty percent, survivability, and therefore effective deterrence, remain intact, most defense analysts believe.

The prevailing Defense Department view is that if the US—independent of SALT II—can gauge the Soviet inventory of MIRVs (multiple independently targetable reentry vehicles) within the permissible margin of error, MAP makes sense. If that is not the case, however, and the only way to assure survivability is by reshaping the terms of SALT II, the luster of MAP fades considerably. The Defense Department leans toward the belief that mobile ICBM systems can be verified "to a degree" through this country's ability to gauge Soviet production levels as well as by observing essential support structures.

While present US efforts to inhibit steep, further MIRVing of the Soviet ICBM force through revised SALT II terms, if successful, might ease the problem, such measures should not be expected to solve it. The so-called fractionation limit would prohibit either side from increasing the number of MIRVs carried by various ICBM and SLBM types beyond specific levels. The US proposal seeks to freeze the numbers of warheads carried by the USSR's large and medium throw-weight weapons—the SS-18 and SS-19—at present levels and offers to do the same in the case of the US advanced mobile ICBM, generally called the MX. The obvious trap inherent in a Soviet MAP system is, however, the possibility of the Soviets deploying more concealed ICBMs than is permitted. The end result, therefore, would be a significantly greater Soviet force than this country's MAP system is prepared for. The Air Force tends toward a more sanguine view than the Office of the Secretary of Defense (OSD) and the National Security Council concerning this country's ability to detect Soviet wholesale cheating, if Russia were to develop its own MAP system. It is tempting to suggest that the Administration is looking for excuses for not building a new strategic weapon system. But it is also undeniable—although such a "worst-case" notion is farfetched, even quixotic—that if introducing a MAP system following codification by SALT II were to help the Soviet Union more than the US, the very concept should be buried at once.

Common sense would seem to be on the side of such congressional critics of the Administration's eagerness on SALT as Sen. Sam Nunn (D-Ga.), who charges that the nation's strategic goals and arms control objectives are "out of synch. We shouldn't let the negotiations

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GENERAL ELECTRIC

drive our strategic programs. Right now we are desperately negotiating the multiple aim point concept when we don't know where we are going with this system and what we ultimately want." Rather than let the rapid pace of SALT drive the technical community toward a MAP system "that we might regret," the US should slow down or suspend SALT negotiations until US strategic options are sufficiently understood and refined to support a logical and mature negotiating posture, he believes.

There is, however, another less categoric way of appraising the relative merit of MAP-based ICBMs. Beginning with the credible assumption that it costs the defender less to build additional "holes" than it costs the attacker to build additional RVs, a senior Defense official argued that if the US were to deploy a MAP system consisting of 10,000 "holes" or aim points, and if the Soviet Union wanted to take out that system with any degree of confidence, it would then have to assign "probably around 1.5 RV" per US aim point. Applying present intelligence estimates of Soviet RV costs, it can be assumed that it would cost the Soviet Union the equivalent of about $30 billion to produce the required 15,000 warheads. "And after they have spent all this money, they still won't have won the game because they haven't gotten near our air-breathing capability [bombers and cruise missiles] and our SLBMs, and they can't be sure that we won't launch our ICBMs under attack," without waiting for the arrival of the bulk of the Soviet RVs, the senior Defense official pointed out.

The Defense Department, and by extension presumably the Administration, doesn't seem to feel the costs associated with modernizing the ICBM force are prohibitive:

"Every time I see MX mentioned I see mention of its $30 billion to $50 billion price tag [and no mention] that so far as we can tell the Soviets spend about $30 billion *every year* on their strategic forces. So while a survivable ICBM system may be pretty expensive, it is affordable," the senior Defense official asserts.

Current Administration reviews of Pentagon proposals for a survivably based ICBM include the possibility of adapting Minuteman missiles for that role even though "I think that there are some problems. Minuteman was not made to be moved around," the senior Defense official suggested. The Defense Department, he confirmed, is examining the possibility of a "common missile, perhaps with some variations," serving both the Air Force and the Navy. The Navy's D-5 SLBM, a proposed successor to the Trident fleet's C-4 SLBM, is considered a promising dual-role candidate. The official confirmed that the C-4 SLBM, too, is under consideration, but added that "it wouldn't be the last missile in either case. So there will be something beyond that, for Trident and for MX, such as the D-5. We have spent, however, quite a lot more money on MX than we have for Trident II [the D-5] so far."

### Washington Observations

• The Air Force has lost what political insiders termed a "pitched battle" with the Office of the Secretary of Defense (OSD) and the latter's congressional allies over how to modernize the Defense Support Program (DSP) Early Warning Satellites. USAF's Mosaic Sensor Program (MSP), considered a technologically safe, evolutionary means for modernizing the over-age (seven years) DSP satellites, lost out to a highly ambitious approach, the Mini-HALO and HALO program, favored by the OSD. That technology won't be ready for operational deployment for many years, conceivably opening a performance gap for the nation's most important and most versatile military spacecraft. The three DSP satellites, backed up by two less-advanced on-orbit standby spacecraft, are the nation's first line of defense against nuclear war. Their onboard sensors can detect ballistic missile and space-booster launches as well as nuclear explosions in space and in the atmosphere. DSP's nuclear detection capability—NUDET—is the keystone of the so-called "launch under attack" option since it provides the most rapid and reliable means of establishing that nuclear weapons are detonating on US territory.

• A discarded internal USAF study probing the potential of a low-cost tank-killer, dubbed the Blitz Fighter, is threatening the programmed buy of A-10 aircraft. The Blitz Fighter, envisioned as a propeller-driven aircraft equipped with the A-10's GAU-8 antitank gun, has won powerful friends in Congress even though the Air Force study was dropped because of lack of merit.

• The High Energy Laser (HEL) weapons program, plagued by slow progress and recent recognition that it isn't as much of a military bonanza as the scientific community originally thought it to be, has lost its principal advocate in the Defense Department with the departure of Dr. Robert A. Greenberg, Director of Space and Advanced Systems for the Under Secretary for Research and Engineering. The HEL program has been transferred to the Deputy Under Secretary for Research and Advanced Technology, Dr. Ruth M. Davis, and combined with the Particle Beam program.

• There is almost universal resentment in the Senate of Administration attempts to treat SALT II as an "agreement" and not as a treaty, thereby obviating the need for approval by two-thirds of the Senate. Senate Majority Leader Robert C. Byrd (D-W. Va.) wrote President Carter on August 15 "strongly urging" against what he views as an unconstitutional end run of the Senate's prerogatives. If the Administration is not considering submitting SALT II as an agreement, he requested that a public statement to that effect be made by the White House. To date, the White House has not replied to the Majority Leader's letter even though the joint text, at US insistence, uses the term "Treaty/Agreement."

• A detailed letter to President Carter, the Secretaries of Defense and of the Air Force, and a number of members of Congress signed purportedly by "all enlisted airmen" of the Weapons Loading Section, 50th Aircraft Generation Squadron at Hahn Air Base, Germany, on alleged readiness reporting irregularities and deficiencies in combat readiness has created a furor in the White House and the Pentagon.

• Sen. Sam Nunn (D-Ga.), widely considered the Congress's foremost NATO expert, told this column that most of the US tactical nuclear weapons in Europe are situated in a way that makes them highly vulnerable to preemptive conventional or nuclear attack by the Warsaw Pact and that about fifty percent of them have such short range—less than twenty kilometers—to make them practically useless. ■

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# Aerospace World News, Views & Comments

By William P. Schlitz, ASSISTANT MANAGING EDITOR

Washington, D. C., Sept. 7

★ The lead item in this column is usually devoted to some major aerospace development or a far-reaching decision concerning the nation's defense.

This time we'll report on an event the like of which hasn't captivated the imagination since George Willig climbed to the top of New York's World Trade Center from the outside.

First, though, let's put things in perspective. This is, after all, the seventy-fifth year of powered flight, and just how far and fast we've come in that wink of eternity is sometimes hard to grasp. Last January, during the flight of a jetliner to a winter resort on the West Coast, the pilot was kind enough to point out a landmark made famous by Lewis and Clark. Gazing earthward, a passenger remarked: "I wonder what those two would have thought if they knew we would cover the distance of their cross-continental journey in a matter of hours—*just to go skiing!*"

And while man's powered aerial machines can carry him quickly to most places on earth and even into space, other forms of flight also continue to provide challenges and obstacles to be overcome.

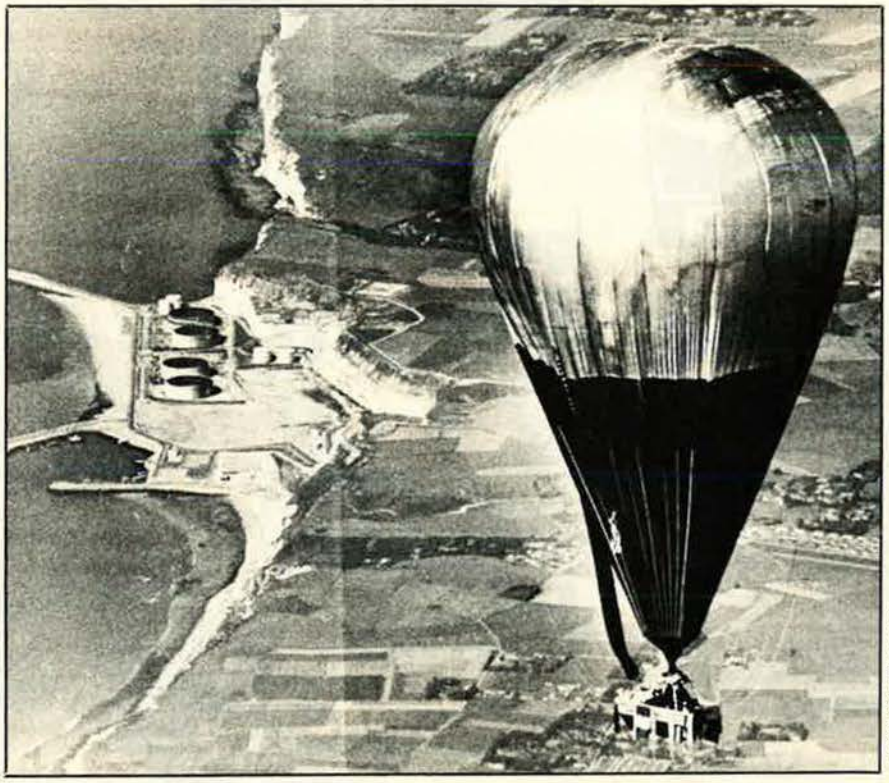
Last year, for example, the man-powered *Gossamer Condor* was the first to fly a designated mile-and-a-quarter course.

In the news over the years have been the attempts to conquer the Atlantic via lighter-than-air balloon. Some of these expeditions were elaborately equipped, with modern electronics and communications gear. All failed, and a number of lives were lost.

That brings us to Max Anderson, forty-four, and Ben Abruzzo, forty-eight—no spring chickens. The two tried a balloon crossing last year and went into the drink in freezing waters off Iceland.

And, as the world knows, Anderson and Abruzzo—accompanied by thirty-one-year-old Larry Newman—


—Wide World Photos



—Wide World Photos

*Above, from left, Ben Abruzzo, Max Anderson, and Larry Newman are hailed as triumphant heroes on landing in France following the first Atlantic crossing by balloon. A historic moment, right, as the* Double Eagle II *passes the coast of France near Le Havre to set down later some sixty miles from Paris.*

lifted off from Maine in a helium-filled balloon, *Double Eagle II,* in early August in a second attempt and came down heroes in France six days later. What is left of the balloon and other equipment after French souvenir-seekers got through has earned its place in the National Air and Space Museum's Milestones of Flight gallery.

But the three are not resting on their laurels, and are already talking about a balloon bigger than their eleven-story-high *Double Eagle II* and a thirty-day circumnavigation of the world. Others are eyeing that challenge, too.

★ In another contest between man and gravity in August, a German, Dieter Schmitt, flew his single-engine Beechcraft Bonanza solo nonstop from Anchorage, Alaska, over the North Pole to Munich. A la Charles Lindbergh, whom he admires, Herr Schmitt took off with a heavy overload of fuel. The Heidelberg native flew the first three hours in darkness.

But Herr Schmitt's hopes for a "first" were dashed when he learned that Brig. Gen. Charles Blair, USAF (Ret.), had been the first to fly solo over the pole from Norway to Alaska in May 1951, a feat that earned him the Harmon Trophy. His P-51 Mustang, *Excalibur III,* was later donated to the Smithsonian's National Air and Space Museum, Washington, D. C. (Early in September, General Blair, the husband of actress Maureen O'Hara and a long-time member of AFA, died in an aircraft accident in the Virgin Islands. He was sixty-nine years old.)

★ After "intense debate within the Administration," President Carter denied Iran's request for the purchase of thirty-one F-4G "Wild Weasel" Phantoms.

President Carter came down on the side of the State Department rather than DoD, which had urged the sale. The apparent clincher was that the "G's" advanced electronic warfare equipment is thought to be too "sensitive" to be given to another country.

To compensate, the US has offered Iran an equal number of F-4Es, an older and less-sophisticated version of the "G," and 1,000 Shrike air-to-ground missiles. Iran opted for procurement of the radar-homing Shrikes, but delayed a decision on the F-4Es. The Administration hasn't yet decided on Iran's bid for seventy F-14 Tomcat and 140 F-16 fighters.

★ Pioneer Venus-2, the second of two spacecraft designed to study earth's closest planetary neighbor, was launched into "nearly perfect" trajectory from Cape Canaveral, Fla., in mid-August, as scheduled. The first began its multimillion-mile journey last May. *(See July '78 issue, p. 25.)*

Because of their differing trajectories, both are to arrive in the vicinity of Venus in December.

Pioneer Venus-1 is to orbit the planet for eight months, mapping its surface and conducting other investigations. Pioneer Venus-2 is made up of four probes and a transporter "bus"—itself a probe—that will descend through the Venusian atmosphere, sampling and measuring its characteristics in different areas.

While the Venus atmosphere is believed to be ninety-seven percent carbon dioxide, it is shrouded in clouds formed primarily of sulfuric-acid droplets. Because of the "hothouse effect," surface temperatures reach 480 degrees Celsius and atmospheric pressure is 100 times that of earth's, the most hostile environment that any US space probe has yet sought to penetrate. Thus, the elements of Pioneer Venus-2—the first time a single spacecraft has separated into multiple probes—have not been designed to survive impact on the surface.

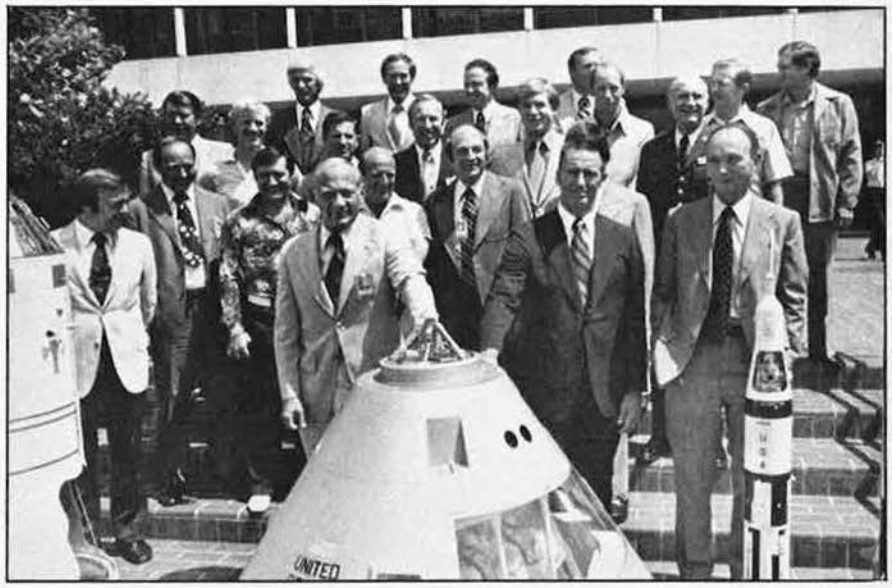
Analyzing data returned by the Pioneer Venus craft, scientists hope to learn more about the planet's atmosphere, what happened to the planet's water, if any ever existed, and if a similar "hothouse" situation could occur on earth.

★ Also launched in August was International Sun Earth Explorer-3, destined to go into orbit at the sun-earth libration point—where the gravitational pull of the sun equalizes that of earth/moon—some 1,000,000 miles (1,609,347 km) from earth.

The first craft to be placed in such an orbit, ISEE-3's thirteen experiments will study the earth's magnetic field and solar activity that affects its climate and weather, including sunspots and solar flares.

NASA's ISEE-1 and the European Space Agency's ISEE-2 were launched into looping trajectories around the earth last October. They are studying the effects of solar phenomena on the near-earth environment.

★ The latest version of Britain's V/STOL—the Sea Harrier PRS Mk 1—was first flown in late August and shortly thereafter made its



—Wide World Photos

*A group of former astronauts returned in August to the Johnson Space Center in Houston for a series of technical briefings on current and future NASA programs, including proposed Space Shuttle and Skylab missions.*

Gould Government Systems
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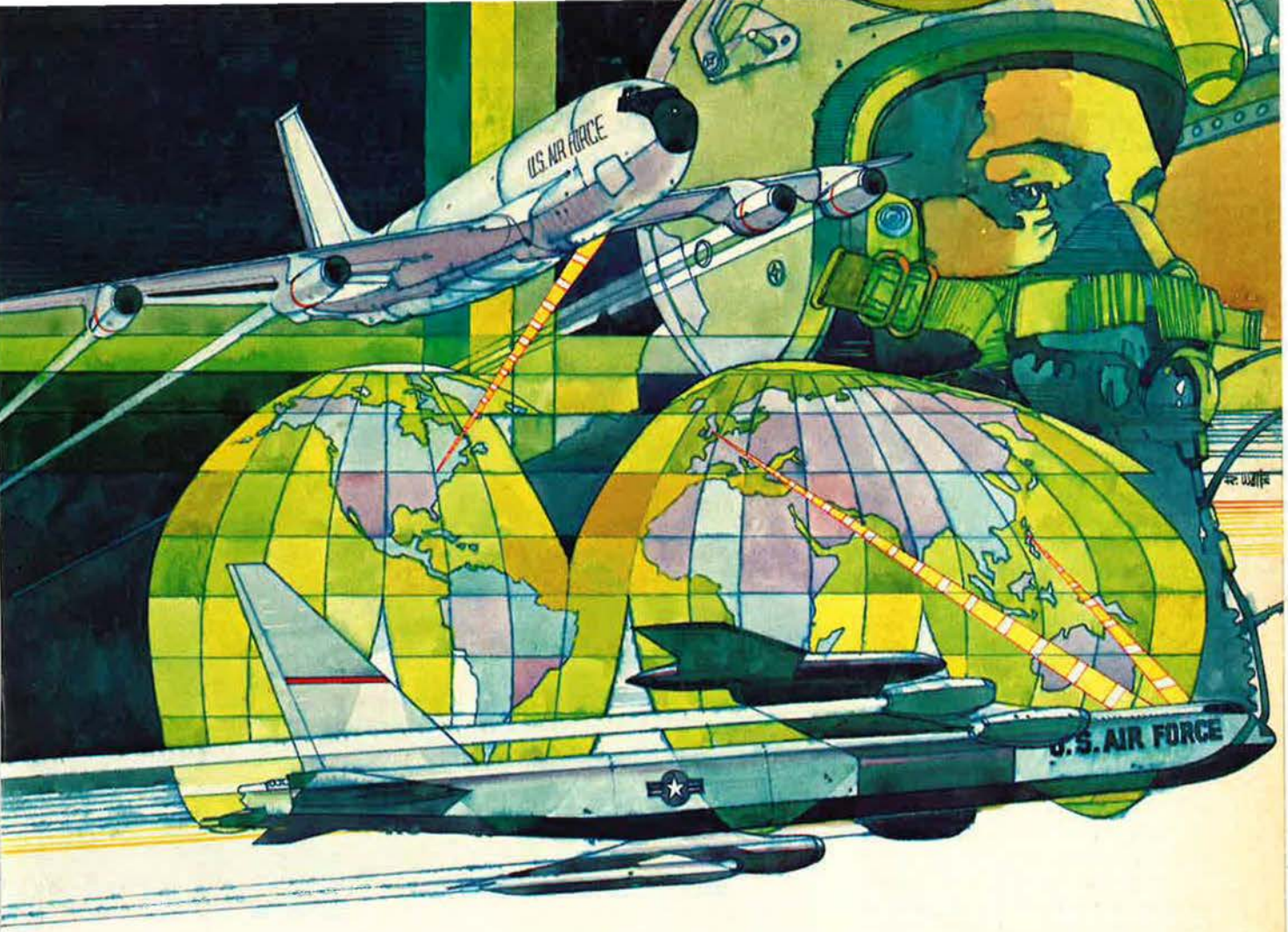
# HF communications is now Gould's business

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# Gould Government Systems: where total systems responsibility means everything

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international debut at the Farnborough Air Show in Great Britain.

Radar-equipped, Sea Harrier has been fitted with upgraded avionics, and exterior changes include a raised cockpit for improved visibility.

The Royal Navy has ordered thirty-four Sea Harriers, which are scheduled to begin entering service in the latter half of 1979. In fleet operations, the aircraft will perform reconnaissance and strike roles.

The Sea Harriers are to fly from a new class of *Invincible* command cruisers currently under construction. These ships will be equipped with a bow-mounted "ski-jump" ramp that boosts takeoff performance.

★ The Carter Administration is getting heat from the aerospace industry and other quarters for blocking American industry and military service participation in international expositions and conferences.

## Open House at Ramstein Draws Half a Million

The annual open house and air show at Ramstein AB, Germany, has become an "event." This past summer's was exceptional in that it marked the base's twenty-fifth anniversary, and very exceptional in the number of visitors it attracted: more than 500,000.

On static display were sixty-plus aircraft from the US, Norway, UK, Austria, Spain, Italy, Germany, Belgium, Holland, France, Canada, and Denmark, as well as US Army aircraft and tactical weapons.

In an air show that lasted more than three hours, six aerial demonstration teams from as many countries dazzled the crowd. There also were solo performances by an F-15 Eagle, French Mirage F-1, US Navy F-14 Tomcat, British Harrier, and French Jaguar. The US Army Special Forces, Europe, Jump Team demonstrated precision parachuting from 13,000 feet (3,962 m).

A number of military bands played throughout the day.

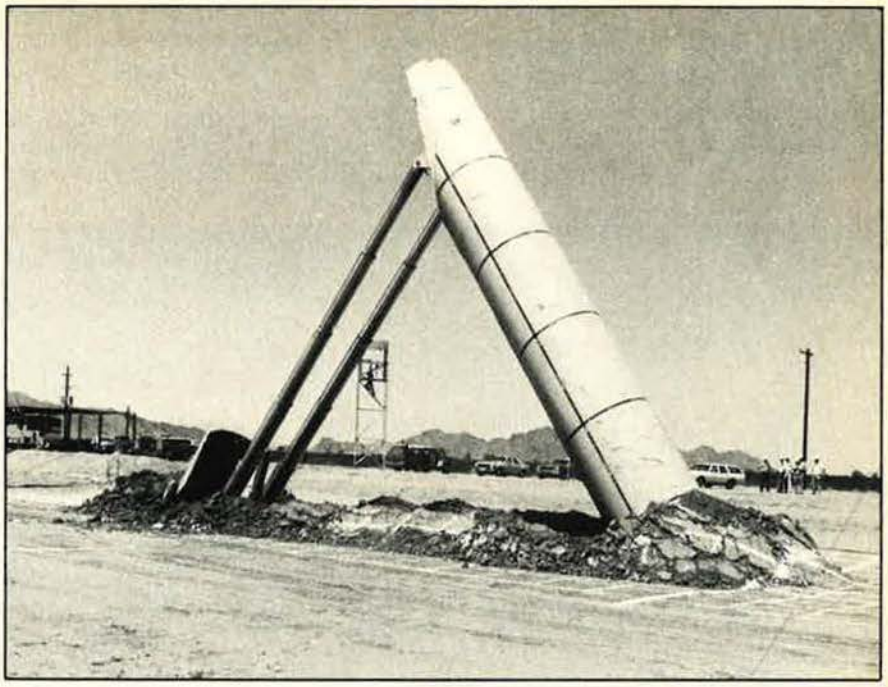
*The Red Arrows, an aerial demonstration team from the United Kingdom, were among the attractions at Ramstein AB's "Flugtag '78" open house.*

*Currently under consideration is an Air Force bid to produce the Lockheed TR-1, a tactical—battlefield surveillance—version of the U-2R high-altitude recce look-alike shown above.*

The Administration's policy, reflected in actions by DoD and the State Department, is aimed at reducing international trade in arms. But not clearly enunciated, the policy has led to considerable confusion.

According to a German English-language publication, *Military Technology,* just prior to the world's first international naval exposition and conference in Rotterdam in June, DoD forbade any US military or civil servant to attend, or papers to be presented by US companies if the hardware to be discussed was developed under US government contract. Scheduled as a principal speaker had been Vice Adm. Joseph E. Moorer, Commander in Chief of US Naval Forces in Europe. Several USN ships were to have participated. On short notice, US firms canceled the reading of eight papers.

In August, Sen. Barry Goldwater (R-Ariz.), in a letter to President Carter published subsequently in the *Congressional Record,* berated



*In the Arizona desert in mid-August, USAF successfully tested the effectiveness of the MX missile trench breakout and erection mechanism. Punching upward through ten inches of concrete and five feet of dirt, the test proved feasible one method of storage for the proposed new ICBM.*

## Military Airlift Command: The Emergency Airline

In crises around the world, the US Air Force's Military Airlift Command (MAC) is setting an impressive record as the international emergency airline.

- In Zaire, US Air Force planes rushed supplies in May to support French and Belgian troops sent to evacuate European civilians during a guerrilla invasion of Shaba Province from Angola. MAC planes in June then brought in troops from Morocco and four other African countries to monitor the border, and took home the French and Belgian forces that protected the evacuation.
- In Lebanon, Military Airlift Command planes in March began a three-month airlift of troops and equipment from six different nations to serve in a UN international force aimed at restoring peace.
- In what could be the biggest operation of all this year, the US has been asked to stand by in case the UN needs airlift assistance in its efforts to preserve order in Namibia (South West Africa) after the scheduled withdrawal of South African forces in October.

In all three cases, the US has been asked to make the flights without charge. Now the Carter Administration must calculate whether it has enough money in contingency accounts, or must go to Congress for an emergency appropriation.

The planes and pilots were furnished by the Air Force, but the Defense Department has strict directives requiring an exact accounting of such expenses.

The State Department, which speaks for the US on requests from foreign countries and international organizations, has a $2.35 million emergency fund for Fiscal Year 1978, but it would not cover the costs of the flights.

Regardless of who pays the bill, the Military Airlift Command again demonstrated in the two airlifts its ability to quickly and safely handle some of the world's most difficult air transport jobs.

The first stage of the airlift in the Zaire rescue was reported in the July issue of AIR FORCE Magazine. In the second stage, Air Force planes flew French and Belgian troops and equipment home and helped in airlifting a multination force from five African states as replacements. Troops brought in to police the border included 1,415 Moroccans, 314 Senegalese, 105 from Ivory Coast, 149 from Togo, and forty-seven from Gabon. The Military Airlift Command also delivered weapons, jeeps, trailers, tents, field kitchens, and other gear.

The second phase of the Zaire airlift began June 7 and was completed June 18. For this phase, nine C-5 and forty-eight C-141 missions were flown. The flights were in response to requests by the Belgian, French, and Zaire governments, which did not have planes large enough and with enough range to do the job. The two phases of the airlift cost $19.5 million.

In the Lebanon crisis, the Military Airlift Command began flying UN forces on March 31 and completed its operations June 11. Some eighty-eight missions were flown, including forty-one C-141 and forty-seven C-5 flights. First to arrive were Norwegian troops, followed by Gurkhas from Nepal, Senegalese, Irish, Iranians, and Fijis. Iran flew in most of its own people, but received help in airlifting vehicles. Total cost of the US air operation was $8 million.

In the case of the Namibia operation, the UN is preparing to move in a multinational force to maintain peace while the new nation holds elections, scheduled for December 31.

The present plan is to save on transportation costs by sending in the international force by ship. But the US has been asked to provide planes if the present timetable collapses. The Military Airlift Command already has flown a UN survey team into the new nation to assess how many troops will be required.

If the US is asked to make a major airlift to Namibia, it will be in part because no other airline, civilian or military, has demonstrated it can do the job as quickly and as efficiently.

—BONNER DAY

# Aerospace World

1.0 sq. mi. (2.6 sq. km), compared with the approximately 30 sq. mi. (78 sq. km) noise footprint of comparable aircraft of today."

The aircraft's high performance is due to the hybrid upper-surface-blowing propulsive-lift concept, which has the plane's four jet engines mounted on top of the wing so that their fan air is directed across the upper wing and flaps to boost lift. Engine-compressed air is also fed through an ejector system to provide boundary layer control


*Taking off on a first flight this past summer is a de Havilland of Canada Buffalo extensively modified by NASA as an experimental Quiet Short-Haul Research Aircraft. See item below for details.*

the Administration for blocking US government and industry participation in the Farnborough Air Show.

The Senator cited increased foreign competition and reduced sales of US airframes abroad for "our declining balance of payments." He said, ". . . I don't think the decline in our airframe, avionics, and engine sales are matters that can be blithely ignored."

★ Following initial flight tests at the Boeing facility in Seattle, Wash., the Quiet Short-Haul Research Aircraft (QSRA) is currently at NASA's Ames Research Center, Mountain View, Calif. There it will engage in a flight research program to develop technology "applicable to design and operation of future quiet, short-haul transports," officials said.

QSRA is the first jet aircraft designed specifically for quiet flight.

QSRA combines high performance with special treatment of its engines and nacelles to combat noise, so that "even when scaled up to the equivalent of a 150-passenger aircraft, the 90-decibel noise impact area is still less than

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blowing at the wing leading edges and ailerons.

With attention centered on noise abatement, QSRA has great potential. Aircraft the size of a Boeing 727 could haul the same payload at the same speeds but operate from runways much shorter than currently required and not disturb local communities with noise.

*Jimmy Doolittle, right, and former Lockheed test pilot Bob Hanson at the presentation of the only remaining Lockheed Orion—an aircraft type Jimmy once flew—to the Swiss Museum of Transportation this past August.*

★ **NEWS NOTES**—The **E-3A**—USAF's new airborne warning and control system (AWACS) aircraft—has officially been named "**Sentry.**"

The **only flyable Zero** of the 10,000 or so built by Japan between the mid-1930s and the end of WW II flew again over the island nation in August in demonstration flights during ceremonies commemorating the cessation of the war thirty-three years ago. The plane, owned by Planes of Fame Air Museum, Chino, Calif., was piloted by **Don Lykins**, a museum director.

In late August, Soviet spacecraft **Soyuz-31**, manned by **Valeri Bykovski** and **Sigmund Jaehn**, the first East German cosmonaut, linked up with orbiting Salyut-6 space lab and later returned safely to earth.

**Died: Col. Willis Fitch, USAF (Ret.),** an aviator who served on the Italian front in WW I, in the Pentagon in WW II, and was briefly AFA's first Executive Director, of a heart ailment in Washington, D. C., in August. He was eighty-two.

**Died: Col. Harry A. Halverson, USAF (Ret.),** one of the pilots of the *Question Mark,* which set an air-refueled endurance record of nearly seven days in January 1929, and who led the HALPRO Detachment that flew the first AAF mission against a European target at Ploesti on June 12, 1942. The long-time AFA member was eighty-two.

**Died: Col. Artie L. Revert, USAF (Ret.),** aviation pioneer and thirty-three-year veteran, in Tucson, Ariz., in late August. The AFA charter member was seventy-six.

**Died: Maj. Gen. Karl Truesdell, Jr., USAF (Ret.),** long-time AFA member, who, during WW II, led the first daylight bombardment of Berlin, of a heart ailment in Phoenix, Ariz., in late August. He was seventy. ■

## USAF's Accounting Efficiency

Among the services, the Air Force has a reputation for efficient management. It is by no means immune from error. But many observers of the military services consider the Air Force the best run of the services.

The reason? Some chalk it up to a new service's focus on modern technology and less concern for tradition.

Others say the reason is much deeper. When the Air Force was established in 1947, the question was raised whether the new service would be allocated some of the industrial facilities developed by the other two services for World War II. It was decided that the Air Force would depend upon private industry rather than run its own munitions plants. As a result, the Air Force has been oriented toward business practices.

Some see the reports this year of the Navy's settlement of shipbuilding claims and the Army's destruction of aged food rations as reinforcing the Air Force management image.

Another example recently surfaced in the July 24 issue of *Business Week* magazine.

Defense officials, according to the magazine, "have lost track" of up to $30 billion in undelivered foreign orders for weapons, equipment, and US support services. The magazine writes:

"What they do not know, because their books are so fouled up, is whether the unaccounted-for money is the result of a series of ghastly accounting errors, whether they have spent a lot of it for something else, or whether they have been undercharging foreign customers—or a combination of all three."

The problem is basically one of accounting. But when AIR FORCE Magazine looked closer into the story, it found that the Air Force had its accounts in order. The Army and the Navy, however, had been charged with not having made sufficient distinction between the US Foreign Military Sales Trust to buy weapons for foreign governments, and the authority the services annually receive from Congress to purchase weapons for US units.

It is a huge accounting task that apparently has swamped the Army and the Navy. The Air Force avoided the problem by working closely with aerospace firms and requiring estimates of projected sales and delivery. This alerted the Air Force to sales up to ninety days in advance and gave its accountants sufficient time to respond. As a result, when a series of audits on the foreign military sales program began uncovering problems in the early 1970s, the auditors recommended that the Air Force take over the accounting job for all the services.

A consolidation order in June 1975, by then Deputy Defense Secretary William P. Clements, Jr., was delayed at the request of the Navy, which argued against centralization and for standardized accounting, based on Air Force procedures. The Army and Navy were given a January 1976 deadline to straighten their books, and in mid-January were granted an extension to June 1976.

By August 1976, Defense officials decided the books were in such bad shape that there was no alternative but to centralize. The following month, Mr. Clements ordered the books centralized and named the Air Force as the executive agency.

The Security Assistance Accounting Center was established on January 1, 1977, at Lowry AFB, Denver, Colo. Since the center took over responsibility, Air Force accountants have caught and corrected $5 billion in billing errors.

There is still a backlog to review. The Defense Department has set a September 30 deadline for the services to transfer all their records to a centralized accounting center for foreign military sales.

As for the Air Force, *Business Week* says its only concern about the Pentagon's order is that it has meant a mountain of additional work.

It is good to hear such comments from a neutral source. But it comes as no surprise to friends of the Air Force.

—BONNER DAY


# THE T-38 TALON TURNS TWENTY

This past August marked the twentieth anniversary of USAF's T-38 supersonic trainer *(see front cover)*.

In bridging the gap between the Air Force's subsonic trainer aircraft and high-performance tactical fighters, the Talon has been instrumental in training more than 40,000 pilots, including USAF's first women pilots. With the Talon, future fighter pilots are able to fly a training aircraft at altitudes and speeds they'd be experiencing in a combat environment.

Of the 1,187 T-38s that Northrop built from 1958 through 1972, more than 1,000 are still in service. Besides basic flying training through the years, they've been used to check out astronauts' flying proficiency, as NASA chase planes, as "aggressor" aircraft in realistic combat flight-training, by the Navy and Air Force in test-pilot training, and, last but not least, as the latest "showcase" aircraft flown by USAF's Thunderbirds aerial demonstration team.

The twin-engine T-38's safety record is unsurpassed: just 2.2 accidents per 100,000 flying hours—nearly five times less than that for the Air Force's fighter aircraft and about half the rate for all USAF aircraft.

The T-38 is also regarded as a money-saver, throughout the acquisition program and in terms of maintenance economies and fuel conservation. For example, the Thunderbirds claim they can fly four T-38s on the amount of fuel required by a single F-4 Phantom, their previous demonstration aircraft; and maintenance crew manning has been reduced by half. ■


*Capt. Connie J. Engel, the first woman instructor pilot in the Air Force, briefs student prior to a flight in a T-38. The versatile aircraft has been instrumental in training some 40,000 pilots.*

# Perspective
## Comment & Opinion

**By Lt. Gen. W. D. Johnson, USAF (Ret.), DEERFIELD, ILL.**

### The Test Ban Treaty

Edgar Ulsamer's column "In Focus" in the August 1978 issue of AIR FORCE Magazine was written with his inevitable excellence. I was particularly interested in that portion dealing with the Test Ban Treaty, having served as the Director of the Defense Nuclear Agency from October 1973 until my retirement in June 1977.

I was disturbed by the statement "that essential information concerning the effects of halting all nuclear testing had not reached the President. . . ." I can attest to the fact that this information had been thoroughly briefed to congressional committees, and had been furnished in detail to several elements in the governmental hierarchy whose job it is to assure that the facts do reach the President. Frankly, I believe those facts were deliberately screened. Probably one of two things happened:

- (A) Some overzealous individual figured he had some information the President did not want to hear and simply decided to make it more palatable, or;
- (B) Someone figured he was smarter than the experts and simply discounted those facts with which he did not agree. This is not uncommon in Washington, as we know.

Apparently the Weapons Lab Directors (Dr. Harold Agnew and Dr. Roger Batzel) presented the technical side in Dr. Schlesinger's session with the President. Both are highly dedicated, competent, and articulate. However, I wonder whether they made it sufficiently clear that our capability to respond to a Soviet abrogation of a Test Ban Treaty has seriously, drastically, eroded over the years, and that we would be placed at tremendous disadvantage if such a treaty is ratified.

As Mr. Ulsamer stated: "It took the US more than a year to resume full-scale testing after the Soviets renounced the bilateral test moratorium in 1961. . . ." At that time, we still had most of the equipment at hand. We had a fleet of instrumented aircraft, extensive facilities in the Pacific, and a large force of people who had recent and intimate knowledge of nuclear weapons and how to test them. Today we have no aircraft, no equipment, and very few people who know anything about testing nuclear weapons in the atmosphere. While facilities for *underground* testing still exist at the Nevada Test Center, we have no facilities for testing in the atmosphere.

Moreover, we have an army of environmentalists who would launch a major "war" to prevent testing in the atmosphere even if the Soviets were blatantly doing so. Our will to counter any Soviet abrogation of a Test Ban Treaty would be undermined by those environmentalists.

The national will to counter Soviet abrogation would also be severely tested by the enormous costs to rebuild the capability for US tests. In fact, several years ago I recommended that we stop kidding ourselves that we were maintaining a capability to return rapidly to testing in the environments prohibited under the original Test Ban Treaty, and that the funds then being spent on a fictitious capability would best be spent elsewhere.

As a condition to the ratification of the original treaty, the Senate had insisted on the so-called "Third Safeguard," which provided that the US would maintain such a capability. That task was assigned primarily to the Defense Nuclear Agency (at that time the Armed Forces Special Weapons Project).

DNA (AFSWP) was to work closely with the Atomic Energy Commission. Originally, we had a Joint Task Force that was exercised periodically. The equipment, the aircraft, the instrumentation (and the people) were taken out of mothballs and sent to the Pacific. Soon, however, costs and apathy caused cancellation of such exercises. Equipment deteriorated, facilities were dismantled, and people scattered.

Still, we maintained some capability. Periodically, we managed to assemble a joint team for other reasons, *e.g.,* monitoring the French nuclear tests at Muruora in the South Pacific. With underground testing, we still had the nucleus of a scientific force (the most important element in the capability to resume testing in the prohibited environments). With the cessation of underground testing, even that small remaining nucleus will be lost.

The point should be clear. When the original Test Ban Treaty was ratified in 1963, the US firmly promised itself that (having been made a fool by the Soviet) we would establish and maintain a capability to return promptly to testing in the environments prohibited by that Treaty. Correctly, the Congress and the President assumed that such a capability would deter the Soviets from a second abrogation. We did not keep our promise to ourselves and inevitably any such safeguard under a new Treaty would similarly erode. Such safeguards would indeed be only cosmetic, hiding the fact we would not maintain them.

It should be remembered that in 1961 Russia resumed testing in deliberate disregard of the bilateral agreement then in existence. They had planned their perfidy well and secretly. They conducted a series of very successful and very high yield

**HOW TO SHARE YOUR PERSPECTIVE**

The purpose of this department is to encourage the presentation of novel ideas and constructive criticism pertinent to any phase of Air Force activity or to national security in general. Submissions should not exceed 1,000 words. AIR FORCE Magazine reserves the right to do minor editing for clarity, and will pay an honorarium to the author of each contribution accepted for publication.

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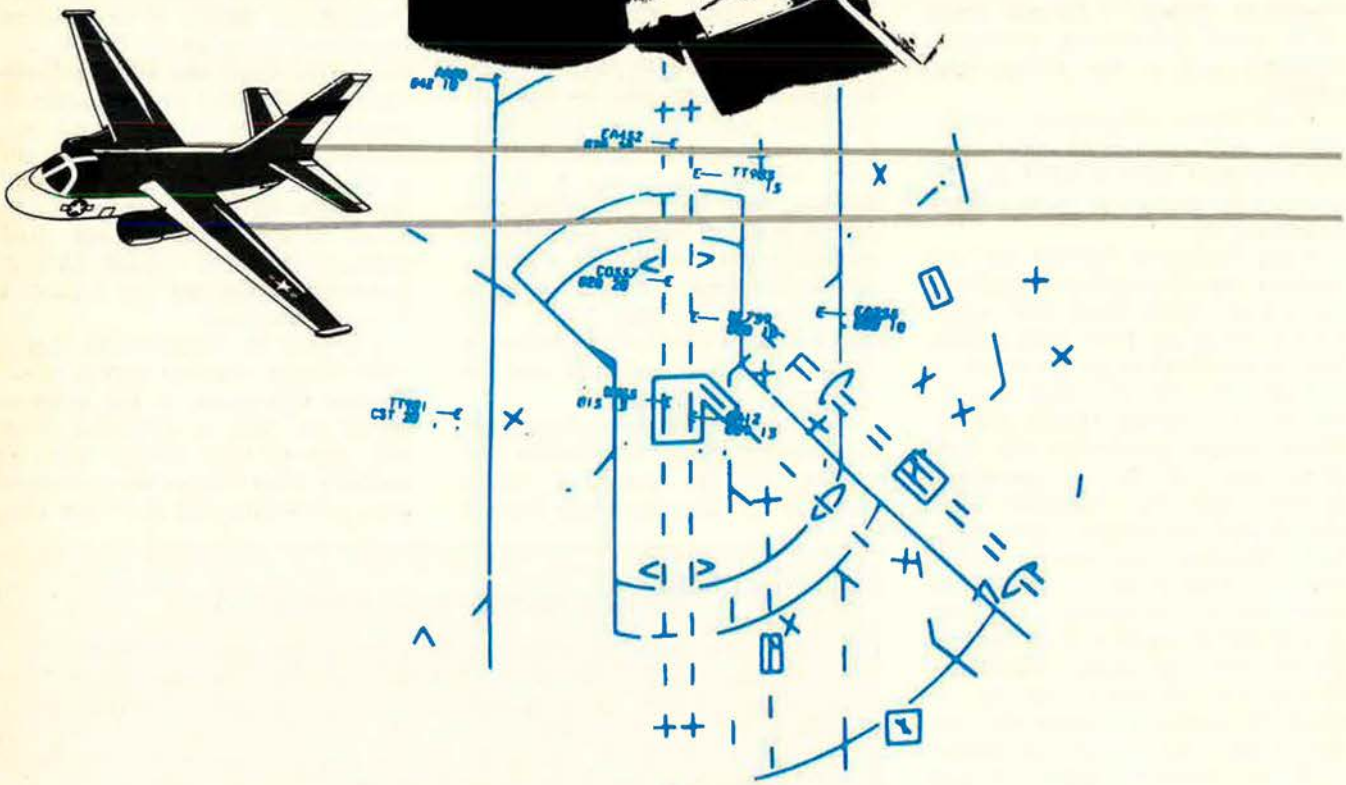

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# Perspective

tests. They gained valuable data that I do not believe we have attained even to this day.

Our Intelligence Community had failed us. Even if it had been more perceptive, I doubt anyone would have reacted. We did not want to believe the Soviets would "cheat." We still do not want to believe that today. Of course, there are many who are seriously concerned. But considering that the facts are not relayed to the President, one wonders whether those who do care can make themselves heard.

In your column, the strong evidence was cited that we cannot adequately monitor low-yield underground tests using seismology—the only known method available today: "Even the full complement of arrays coupled with on-site inspections could not detect low-yield Soviet testing in the view of congressional experts. . . ." Some would say: "But the Russians are honorable, decent people. They wouldn't cheat." I say nonsense: They have cheated and they will cheat. Their morality compels them to cheat!

In fact, I am convinced they deliberately did so as recently as 1976 after having agreed to limit yields to 150 KT on underground tests pending ratification of the Limited Test Ban Treaty. In response, we meekly admitted that our seismological data was so subject to interpretation that we really couldn't challenge the Soviets. I believe they were actually testing to see how accurately we could measure and to determine whether we had the guts to complain. I am sure the Kremlin was delighted with our futile response.

We have a different morality. Immediately after signing the Limited Test Ban Treaty, we became overcautious in our effort to assure no possibility of an inadvertent violation. Our open society would preclude cheating and would correctly react violently to anyone who attempted to do so.

I do not recommend we unilaterally return to testing in the atmosphere. I do not even recommend we attempt to rebuild a standby capability to do so. I do not recommend we renounce the Limited Test Ban Treaty, limiting testing to 150 KT (though I had serious personal reservations about that treaty, too).

I *do* recommend we *do not* sign a treaty banning all nuclear testing in today's circumstances!

- First, the Soviets have much more to gain than we. They depend on high yields and heavy throwweights, with less concern for accuracy and the more advanced technology that is so dependent on testing.
- Their weapons and supporting systems are much less vulnerable to nuclear effects such as electromagnetic pulse and communications blackout.
- We *know* we would not launch a first strike. While I do not believe the Soviets presently contemplate or would plan a nuclear strike against the US as circumstances exist today, I do believe they would launch a first strike, *if* they perceived the necessity and if they *perceived* they have a sufficient advantage. Perception is the key: It wouldn't matter whether their perception was correct. Our systems, subjected to a first strike, would clearly be highly vulnerable to nuclear effects. Their systems need not be hardened against a first strike. Our need for testing is thus far more acute.
- Finally, assuming the Soviets would be tempted to cheat, and knowing we cannot accurately monitor low-yield tests, they could accumulate significantly important nuclear weapons development data and data on nuclear weapons effects, while we sat idly by.

I sincerely hope Dr. Schlesinger did convince the President. However, I realize the last expert to see Mr. Carter may well leave the more lasting impression—especially since he obviously wants and is committed to a total Test Ban Treaty.

Thus, I hope others will make the facts clear to the President. If he *will listen to the facts,* we will not sign a Test Ban Treaty! ■

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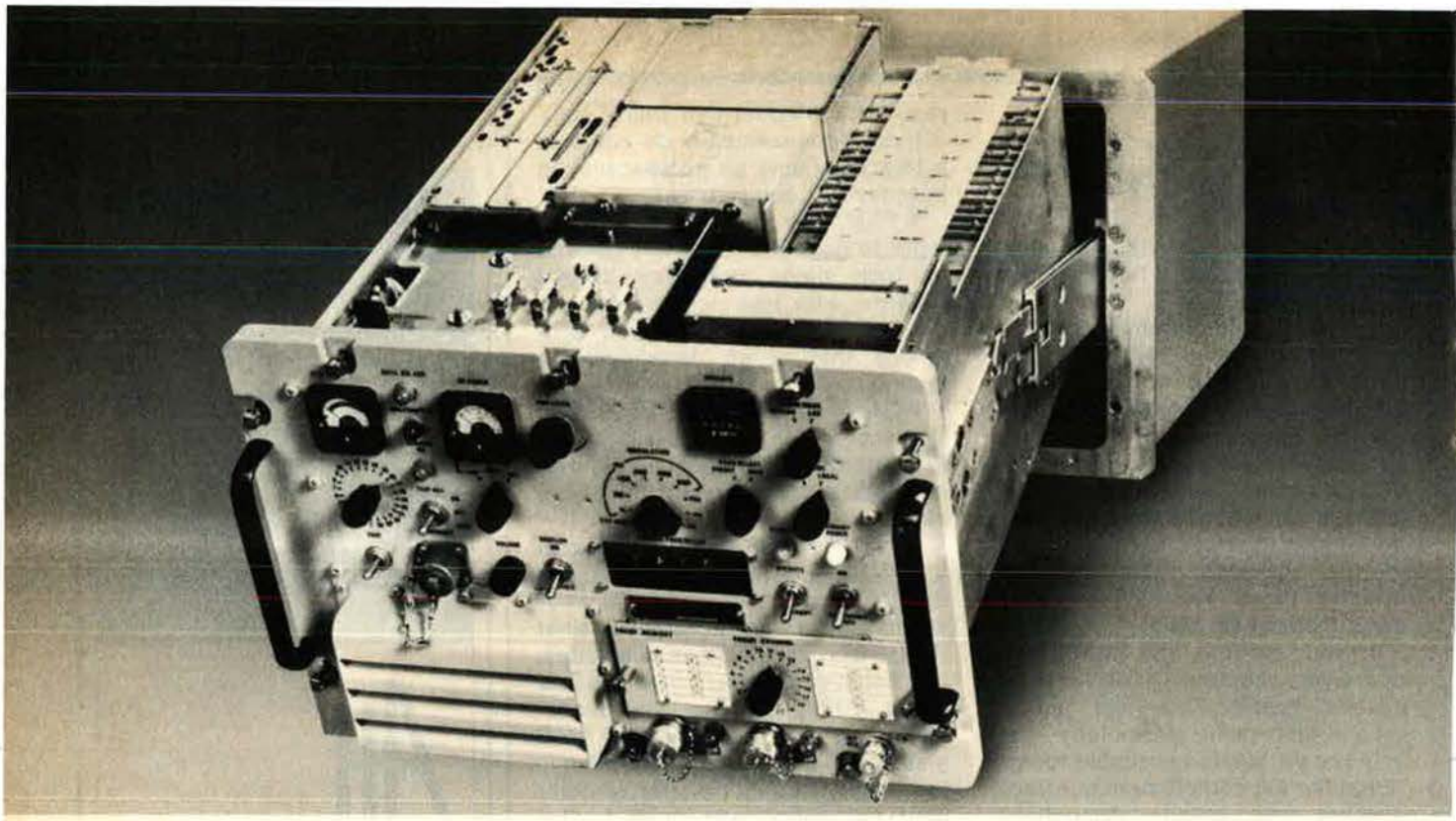
*Warren D. Johnson was Director of the Defense Nuclear Agency from 1973 to 1977, before retiring as an Air Force lieutenant general. A one-time B-47 commander, Johnson had a long association with SAC, and became Chief of Staff at Hq. SAC. He was commissioned in 1942 through OCS and graduated from flight school the following year. Since 1977, General Johnson has been a vice president for Baxter Travenol Laboratories, Inc., Deerfield, Ill.*



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**ECI's AN/WSC-3 (Whiskey-3) UHF terminal, another element of total communications systems capability at E-Systems.**

The nation's strategic deterrent forces are in danger of obsolescence because of "fiddling around" over how best to modernize them while worsening manpower problems of the Reserve Forces are sapping the strength of US ground forces, in the view of the former Chairman of the Joint Chiefs of Staff . . .

# General Brown's Farewell 'Posture Statement'

**BY EDGAR ULSAMER, SENIOR EDITOR**

*In a thirty-seven-year career of distinguished service that led from heroic airmanship in World War II's daring Ploesti raids to the highest military position in the land—Chairman of the Joint Chiefs of Staff—Gen. George S. Brown never minced words. His commitment to unalloyed candor, to portraying issues the way he sees and feels about them, continues now that he is retired. AIR FORCE Magazine presents herewith General Brown's reflections on US defense policies and issues—as expressed in an exclusive interview.*

—THE EDITORS

WITH increasing frequency and stridency, critics of both pro- and antidefense persuasion are taking aim at alleged flaws in the independence, and willingness to assert that independence, of the nation's senior military leadership. Gen. George S. Brown, USAF (Ret.), obviously has thought long and hard about the propriety and advisability of quitting in order to express public disapproval of action—or inaction—by the executive branch of government in the field of national security:

"I have never been given a definition of how far I could go before I would have to leave, but I was always prepared to leave and never had any hangups about it. On the other hand, one needs to ask himself the questions, 'What good is it going to do? Is my action going to bring about a reversal of the decision that I oppose?' If it is, then quitting—and I believe this applies mainly to members of the Joint Chiefs or maybe some CINCs, and not to division commanders or staff officers—may be the right thing to do. Most senior people, I assume, share my view that there's more to be gained for the cause of national defense by staying on and continuing to advocate that cause in the hope that you will be able to temper the civilian decision."

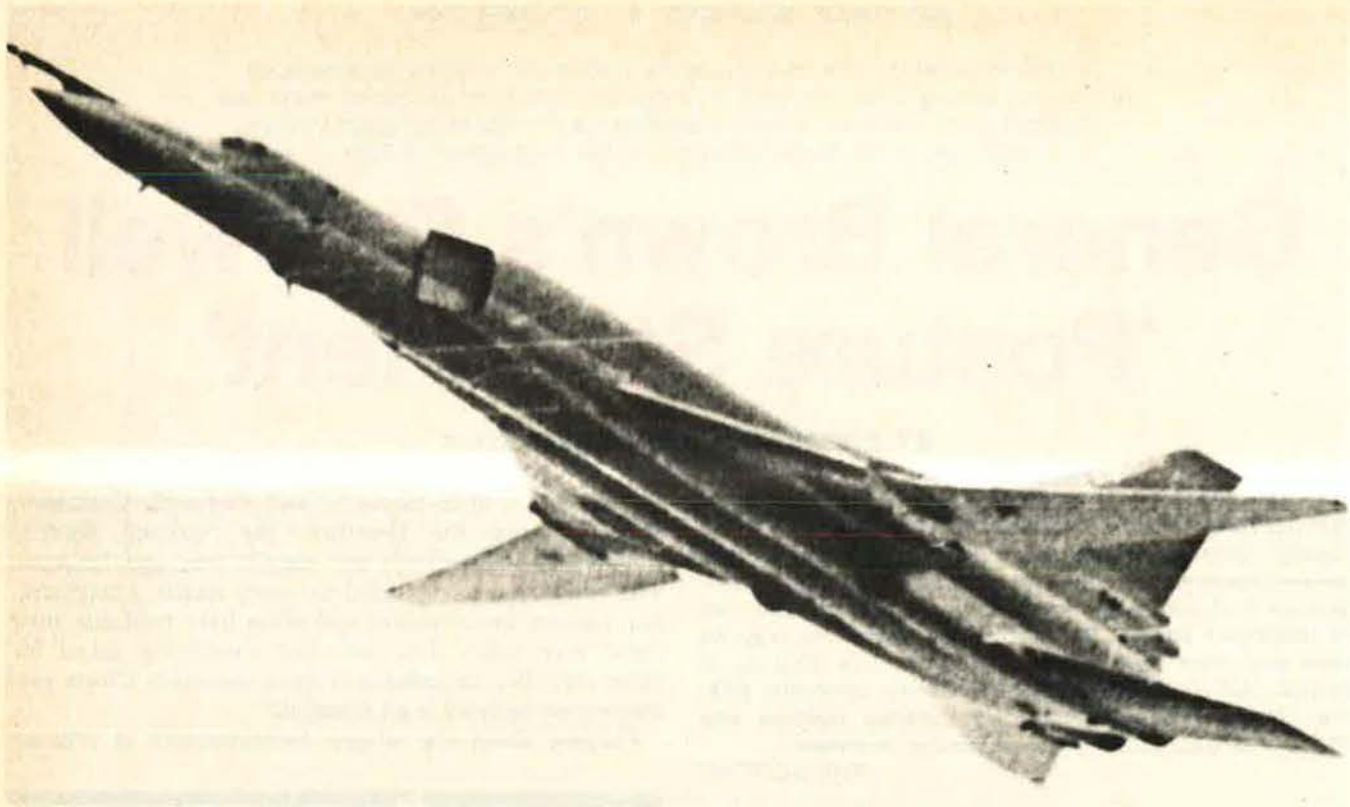
General Brown went on to say that the members of the Joint Chiefs and, in certain instances, the Commanders in Chief of unified or specified commands, have an obligation to present their case to the Secretary of Defense and, if necessary, to the President and appropriate congressional committees. He stressed, however, that advocacy of military requirements by senior military leaders up to the point when a binding decision is made by the civilian leadership "has always been tolerated under our system."

The often-heard contention that the military is not being given a chance to present its case is "utter nonsense. The contact between the Chiefs and the Secretary of Defense is both extensive and thorough. Communications among the President, the National Security Council, and the Chiefs are equally free and frequent. The Chiefs have responded to every recent Administration request for comment and often have provided their views even when they were not specifically asked for them. The B-1 cancellation [which the Joint Chiefs recommended against] is an example."

Carping about the alleged ineffectiveness of military

—USAF Photo by SSgt. Bill Thompson

*The former Chairman of the Joint Chiefs of Staff, Gen. George S. Brown, giving his farewell address at Andrews AFB, Md.*



*The severe threat posed by Backfire, the USSR's new strategic bomber, would be eased by upgrading US air defenses.*

advice often is predicated on misunderstandings of the "basics of our system of government. The law is very clear about the responsibility of the Chiefs, which is to give advice to the civilian leaders. But the law is silent about what, if anything, the civilian leadership does about this advice, and that of course is the crux of the matter," General Brown pointed out with feeling. Feeding current skepticism further is the tendency to compare the influence of contemporary members of the Joint Chiefs to the demonstrably far greater power of military leaders during World War II, the former Chairman explained: "The country was mobilized and motivated, the President dealt with the military leaders directly, there was no Secretary of Defense, and the Secretaries of the Navy and of War had sharply circumscribed influence and powers."

A step toward improving the civilian/military interface, in General Brown's view, would be adoption of recommendations concerning the role and authority of the Chairman of the Joint Chiefs of Staff contained in a recent Defense Department study of the "National Military Command Structure," carried out by Richard C. Steadman, a senior Pentagon official in the Johnson Administration. The Steadman study is considered a pivotal element of a pending broad reexamination of the country's top command structure requested by the President. One recommendation would make the Chairman "responsible for providing military advice from a national viewpoint on program and budget issues," give him voting membership in the DSARC (Defense Systems Acquisition Review Council that has life or death powers over all major weapons programs), provide him the necessary staff support to carry out these functions, and spell out his responsibilities in relation to the CINCs.

While Defense Secretary Harold Brown already has informally assigned some of these functions to the Chairman, General Brown said, "I didn't have the staff assistance that the job required." Equally important, he said, would be an attendant improvement in the personnel situation for the Joint Staff. "We have good people there, but the promotion picture leaves much to be desired. The proposed changes [in the Steadman study] would give the Joint Staff its fair share of promotion opportunities, especially in the flag ranks," General Brown said. He rejected as groundless the concern that increased authority of the Chairman/JCS would politicize the job: "All we are proposing in the Steadman study is to formalize facts of life. The Chairman represents the CINCs. No CINC worth his salt—and they all are—could be stopped by the Chairman. In the case of a dispute, the CINC simply would go to the Secretary of Defense directly, as is his right."

Adding further weight to the Steadman study's recommendation for suitable staff support, General Brown said, is the fact that over a period of several years various Secretaries of Defense have tended to cut the military manpower and overhead of both the Joint Staff and of services' headquarters staffs while increasing the size and scope of the Office, Secretary of Defense (OSD) staff: "This expanding, centralized civilian structure creates ever more work for the military staffs that have to respond to OSD's requests for studies, information, and various reports, yet there aren't enough people to do the work."

### Backfire Gets a Free Ride

The Strategic Arms Limitation Talks (SALT), now in a crucial, near-final stage, clearly are of overriding

concern to the former Chairman, especially so far as the decision not to count the Soviet Backfire bomber is concerned. The Joint Chiefs, General Brown told AIR FORCE Magazine, "always have recognized that both the cruise missile and the Backfire are of extreme importance. As a result, we have insisted that Backfire be counted as a strategic weapon against the limits allowed under the proposed treaty. We realized also that the US would have to pay a price, in one form or another, in order to get the Soviets to agree to letting these bombers be counted. That is the reason why we consented to certain curtailments in cruise-missile capabilities. We, therefore, agreed to a range limit [initially 2,500 kilometers or about 1,500 miles] below what we wanted as a means of getting constraints on Backfire. But the Soviets have tried to drop Backfire out of SALT while holding on to the cruise-missile restrictions. As it turns out, the US cruise-missile programs aren't along far enough to be affected significantly during the currently planned protocol period. What happens thereafter remains to be seen."

Backfire, "beyond the shadow of a doubt, is capable of serving in an important strategic role," according to General Brown. With between 400 and 500 Backfires expected to be in the Soviet inventory by the mid-1980s, General Brown urged reactivating and modernizing US air defense capabilities to deny the Russians unhindered access to the US: "We need at least enough air defense—through a combination of E-3As and interceptors—to force Backfire to come down low to penetrate the North American land areas. This would eliminate Backfire as a strategic threat unless the Soviets refuel the bomber while it is still offshore. As it stands now—and that is the reason why Backfire is such a concern at the moment—the bomber could come in at high altitude where it has good range capability because we have nothing to force it down with."

Acknowledgment of this requirement, albeit grudgingly and premised on political motives, came from two unexpected sources shortly after General Brown's comment to this reporter. Two of the staunchest proponents of reduced defense spending in Congress, Rep. Bob Carr (D-Mich.) and Rep. Thomas J. Downey (D-N. Y.), in a formal position paper entitled "Programmatic Response to the Backfire Bomber," advocated, in order to quiet "the anxieties of US hawks," the deployment of a "medium-cost" air defense network for the 1980s.

Messrs. Carr and Downey built their case for a $4 billion boost in US air defense capability on a mixture of pragmatism and political expediency. Clearly in the former category is their assertion that the Administration's plan to keep Backfire outside of the SALT limits would create an obstacle to ratification of SALT II of "probably prohibitive magnitude." Their claim that Backfire, from the US point of view, is a "self-created problem" and that its only utility in case of nuclear war would be to "bounce the rubble" many hours after Soviet ballistic missiles have obliterated the United States may be good rhetoric but lacks logic. (Their argument ignores Soviet strategic doctrine, which holds that nuclear war is winnable and therefore likely to be protracted.)

The Carr/Downey proposal envisions deploying about 100 new interceptors—derived from either the F-14 or F-15—along with upgraded command-and-control systems, "because it is a small price to pay for SALT ratification." The two congressmen do concede that "by merely forcing the Backfires to go low in their effort to reduce attrition, much of the United States which would otherwise be within range with one refueling becomes no longer within range. This includes the northern Midwest industrial heartland of the country."

—USAF Photo by SSgt. Bill Thompson

*The outgoing Chairman, JCS, Gen. George S. Brown and his successor, Gen. David C. Jones, during the former's retirement ceremony on June 30, 1978, at Andrews AFB, Md.*

Even though concerned about unilateral concessions by the Administration on cruise-missile performance, the former Chairman pointed out this new weapon is not the "ultimate" strategic deterrent that civilian government leaders often portray it. "Not only is it just another weapon but there can't be much doubt that there will be defenses against it. This, I think, will be true even if the second- and third-generation cruise missiles turn out to be as good as the R&D community predicts they will be."

In principle, the Joint Chiefs favor SALT, as long as it meets three stringent criteria: "The agreement must be fair and evenhanded; it must be fully verifiable to the extent that we can police compliance with high confidence; and it should lead to some mutual reductions in strategic weapons." Because SALT II is still being negotiated, General Brown declined to comment on whether or not its final terms would meet these standards.

Eventually, the former Chairman predicted, "SALT will have to deal with the so-called forward-based systems [nuclear-capable aircraft and missiles in Europe]. Personally, I certainly wouldn't object as long as it's done equitably. However, we should categorically reject the thought that because some of our weapons in Europe can reach Russia they should be counted. Conversely, it's being contended that Soviet theater nuclear weapons can't reach the US—even though all of NATO is within their range—

and, therefore, should not count under SALT. This is fallacious reasoning that disregards the need for even-handed trade-offs."

### New Strategic Weapons Needs

The Joint Chiefs, General Brown pointed out, never entertained the illusion that SALT, of itself, could bring about a strategic balance: "We must, within the terms of SALT, modernize our strategic forces. With the exception of the sea-based missile force, we have not done this. Beyond question, the nation needs a new manned penetrating bomber, just as there is a firm requirement for a modern ICBM."

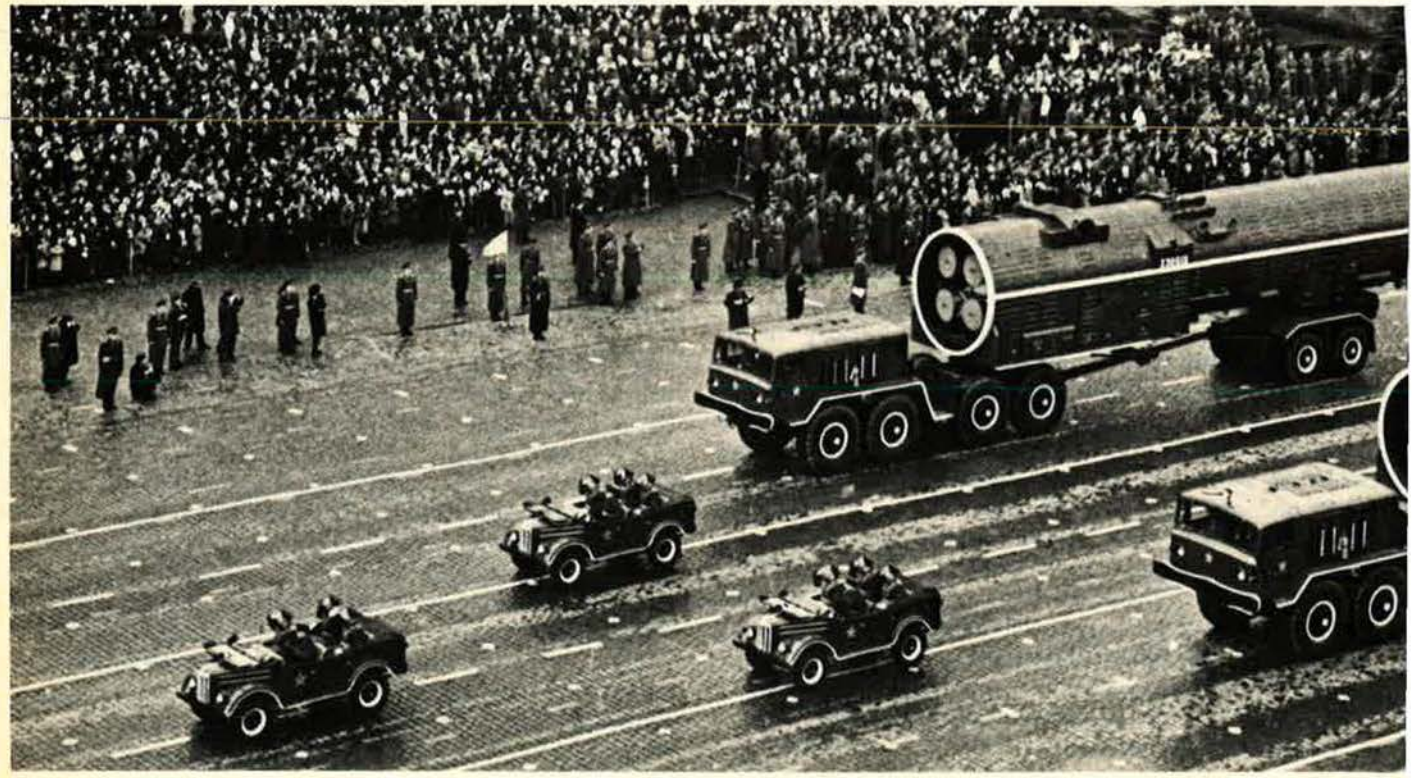
The former Chairman was not prepared to advocate any specific basing mode or missile design for a modern, survivably based ICBM. But he described as categoric the need to replace Minuteman "which, like the B-52, is aging and must be modernized." Although not opposed to current efforts to find a common design from which both a new Trident SLBM and new ICBM can evolve, he expressed apprehension about "all the fiddling around that we engage in concerning MX. We have been at this program for seven years or more and have spent millions of dollars on it. Now it seems we are going to quit and start on something else. It makes you wonder whether there is any genuine intent to buy such a weapon in the first place."

The time to start work on a survivable ICBM force, he stressed, is "*now*, even if we have to confine ourselves at first to just providing additional, alternate launch points for Minuteman as some people have proposed."

The former Chairman thinks that missile throw-weight may be less important than survivability: "Beyond a certain point I just don't know how important a throw-weight imbalance really is. There is no good measure for establishing the point beyond which the ability to inflict additional casualties ceases to represent a decisive deterrent factor. In other words, is it important that we be able to kill 160,000,000 people as compared to, say, 90,000,000? At the same time, of course, we must be able to dig out hardened Soviet missile silos and similar targets in order to limit damage to ourselves, and a modern ICBM with increased throw-weight would enhance this form of deterrence. But we must not forget that even MX, the largest ICBM under US consideration, would not redress the vast Soviet throw-weight lead."

There is some merit, in the former Chairman's view, in considering advanced ballistic missile defense (BMD) systems to enhance the survivability of ICBMs deployed in fixed silos, but "there are major unresolved questions about whether or not it would be cost-effective to defend ICBM silos with such a force. There must not be any doubt, however, about the need to carry out research and development on ballistic missile defense. The Soviets have taken full advantage of all permissible R&D, including test firings of antiballistic weapon systems while we virtually ceased all research in this area with the signing of SALT I. The result is that the Russians now are years ahead of us in BMD technology even though at the time the ABM [antiballistic missile] treaty went into effect seven years ago we were far ahead of the Soviets in this field. Even though advanced BMD systems appear to be more costly than other options for increasing the survivability of ICBMs, we can't afford to lose all competence in this technology."

General Brown expressed deep concern about increasing tendencies within the Administration and in Congress to scuttle the strategic triad in favor of more limited forms of deterrence: "Why anybody would want to discard a force structure that has worked so well for so long, in my opinion, defies good sense. Why should this country abandon clearly effective deterrence in favor of a new,



unproven approach, especially when the Soviets are building up their own strategic triad?"

### Theater Ballistic Missiles vs. Cruise Missiles

General Brown thinks it is essential that the US and NATO counter the new Soviet SS-20 MIRVed IRBM (intermediate-range ballistic missile) by modernizing US nuclear theater weapons. At the same time, he warns that developing a US IRBM—as sought by the Armed Services Committees of Congress—"is not tantamount to our ability to deploy such a weapon in Europe. It must be remembered that we and NATO succumbed to the Soviet Union's psychological campaign against the so-called neutron bomb, an essential and major step toward modernizing theater nuclear forces. The same thing could happen if we tried to field US IRBMs in Europe, even though an all-weather tactical nuclear weapons delivery capability is recognized as a most persuasive deterrent of Warsaw Pact aggression."

### Manpower Problems

General Brown's "main worry" about a possible NATO/Warsaw Pact conflict stems from the fact that the all-volunteer force has failed "to meet the manpower needs of the Guard and Reserves, especially so far as the Army is concerned. As a result, a portion of our ground forces—those divisions consisting of two active-duty and one reserve brigade—actually is under strength. Also, the all-volunteer force is not providing us with an individual Ready Reserve that we can use to meet the manpower needs of the active-duty force caused by combat attrition. We simply don't have an adequate Ready Reserve, and, unfortunately, there just isn't any way of fighting wars without casualties."

A related problem, affecting especially the Army, is caused by what may be an "excessive rate" of converting support spaces to combat spaces in Europe, according to General Brown: "The [Sen. Sam] Nunn [D-Ga.] Amendment aimed at improving the teeth-to-tail ratio of US forces assigned to NATO, in my opinion, has led to a situation where we may not be able to sustain our combat forces because of inadequate support capabilities. The condition becomes a vicious circle because most of our support in Europe is programmed to come from the Guard and Reserves," whose understrength condition *a priori* puts their availability in question.

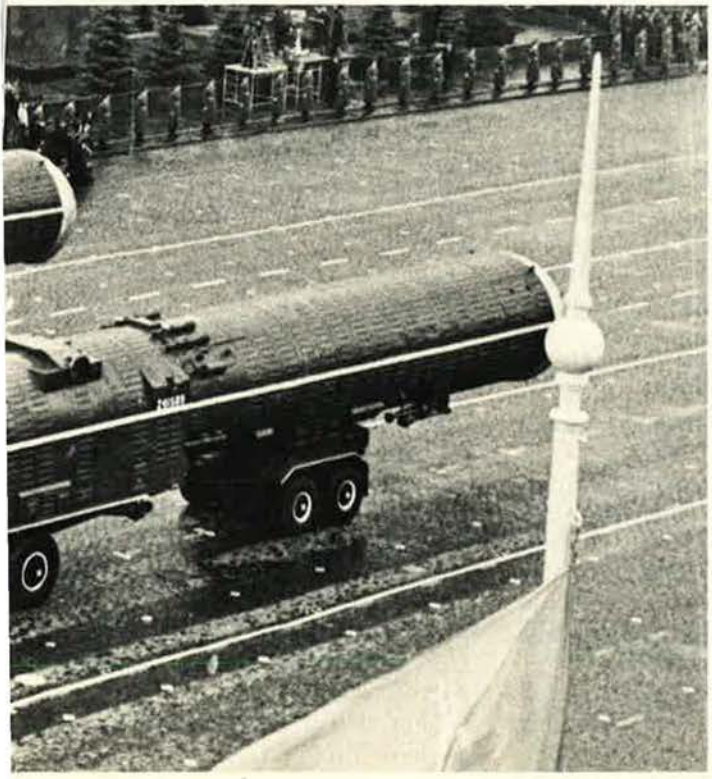
Another deficiency affecting mainly the forces assigned to NATO is caused by a broad disparity in chemical warfare (CW) capability between US and Soviet forces, according to General Brown. The imbalance in offensive as well as defensive capabilities between the NATO and Warsaw Pact forces is worsening and "nobody in this country seems willing to do anything about it except for speeches bemoaning the problem. The result is that in war our forces could be neutralized by Soviet CW," he said.

The principal problem of the US Navy, in the view of the former Chairman is "that it's simply too small. We don't have sufficient forces to do all the things that need to be done in wartime. I am not a naval expert, but I am willing to suggest that if it's possible to operate [combat aircraft] from smaller decks [carriers], then by all means let's do it because we would get greater numerical presence. I am also convinced that the country can't afford further slowdowns in the Trident program.

"If I have a concern about the Air Force, and I do, it is my worry about people. I hear of too many junior officers who wind up with no intention to make the service their career. It's one thing to attract people and another to keep them. We train good people and then they leave. We must work harder at making life in the Air Force—and to some extent the problem applies to the other services—more attractive and satisfying," General Brown told this reporter.

Inadequate job satisfaction, he pointed out, appears to be an additional reason behind the officer retention problem of the Air Force and the other services. "Many of our younger people seem to develop real doubts about how serious we are as a country in our commitment to national security. From the B-1 cancellation and reductions in naval shipbuilding to the delay in the neutron bomb, the troop withdrawal from Korea, and the Panama Canal action—and in my view some of these steps, such as Panama, were defensible—the trends today cause people to wonder whether military service is really worthwhile," General Brown suggested.

In an even broader context, General Brown, on closing out his active-duty service, leaves with grave concern for the nation's will to pay the price of fundamental military strength and of maintaining parity with the Soviet Union: "If the Soviets continue to build their forces at their present rate and we at ours, the result would be an intolerable imbalance." Clearly, the General is deeply troubled about the state of national defense. ■



*A ring of sixty-four Galosh ballistic missile defense systems surrounds Moscow to provide protection for the Soviet leadership from nuclear attack. The SALT I ABM accord caused the US to slip from undisputed superiority in ABM technology to clear inferiority, in the view of General Brown.*

Vietnamese troops are shooting at Chinese border guards. Cambodia is raiding villages in Vietnam and Thailand. Communist guerrillas, supported by Vietnam, Cambodia, and Communist China, terrorize Thai villagers. US troops are gone, but the fighting never stopped.

# Southeast Asia: War Without End

BY BONNER DAY
SENIOR EDITOR

As THE US saw its efforts in Southeast Asia unravel on the negotiating table, there was hope that there would at least be an end to the killing and suffering.

And with that hope, US political leaders also suggested the Communists would be reluctant to invade other Southeast Asian countries. It was argued that the sheer length of the US military effort and continued logistic and financial support of South Vietnam would show the extent of the US commitment to the region, and thus forestall Communist aggression.

But, today, three years after the fall of Saigon, the killing and suffering continue. Mass executions occur daily in Vietnam, Cambodia, and Laos. At the same time, Cambodia and Vietnam are fighting each other along their mutual borders. Shooting has broken out between Vietnam and China. The threat to neighboring countries is as great as it ever was. Cambodia and Vietnam support guerrilla attacks on villages in neighboring Thailand. And the whole region waits anxiously to see whether China and the Soviet Union will restrain their client-states or let the current fighting escalate into a full-scale war.

Already, the non-Communist states in the region are adjusting their foreign policies. Back of their efforts to improve relations with neighboring Communist states is an unspoken fear of the expansionist appetites of those states.

Currently under the greatest threat is Thailand. It shares long borders with Laos and Cambodia, and is within marching distance of Vietnam's veteran regiments.

After its Vietnam experience, the US commands little attention in the region. It is expected to continue to be a source of economic aid to non-Communist and Communist countries alike. But its military influence is shrinking, and its value as an ally is discounted.

Instead, it is the Soviet Union and the People's Republic of China (PRC), sponsors of the successful 1975 Communist takeovers, who are considered in control of Southeast Asia's future. Vietnam and Laos appear to be under the influence of Soviet advisors, while Communist China has a strong voice in Cambodia.

For US military men, the turn of events has to be a bitter one. While the deterioration in Indochina since 1973 has proven the valuable role the US military men played there, the proof comes too late to have any effect on events today.

### The Noose Around Thailand

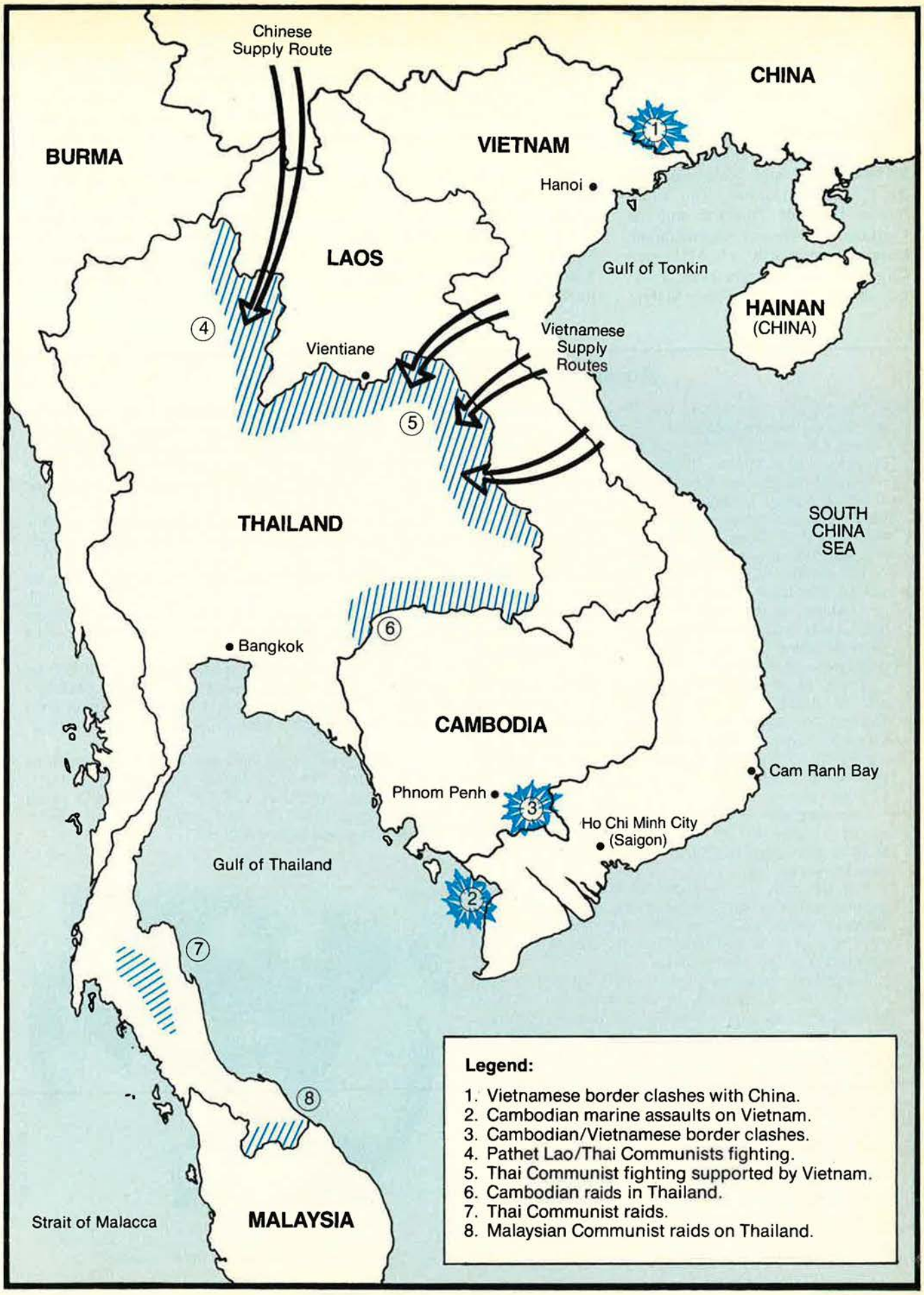
Like a giant rope, Communist guerrillas have surrounded Thailand.

In north Thailand, along the Laos border, approximately 3,000 Communist insurgents, recruited from Meo tribes, make raids on border villages. Leading them are Thai and Thai-Chinese members of the Communist Party of Thailand. Also among the leaders are some 200 soldiers from the PRC Army. These veterans infiltrated from South China in 1971 to counter Vietnamese influence among insurgent groups in Thailand. Guerrillas are armed with light weapons and a few antiaircraft guns.

On the northeast border with Laos operate another 3,000 insurgents recruited from the local Lao ethnic population. This faction is led by Thai-Chinese cadres of the Communist Party of Thailand, and is supported by Vietnam.

In the southeast, on Cambodia's northern border, Thai villages are attacked regularly by guerrilla units directed by the Pol Pot government in Phnom Penh. In response to Thai protests, the Cambodian regime denies it has any control over the guerrillas.

Now that it is conducting a war against Vietnam, Cambodia has


Chinese Supply Route
CHINA
BURMA
VIETNAM
Hanoi
LAOS
Gulf of Tonkin
HAINAN (CHINA)
Vietnamese Supply Routes
Vientiane
THAILAND
SOUTH CHINA SEA
Bangkok
CAMBODIA
Cam Ranh Bay
Phnom Penh
Ho Chi Minh City (Saigon)
Gulf of Thailand
Strait of Malacca
MALAYSIA
Legend:
1. Vietnamese border clashes with China.
2. Cambodian marine assaults on Vietnam.
3. Cambodian/Vietnamese border clashes.
4. Pathet Lao/Thai Communists fighting.
5. Thai Communist fighting supported by Vietnam.
6. Cambodian raids in Thailand.
7. Thai Communist raids.
8. Malaysian Communist raids on Thailand.

transferred some of its military units from Thailand to the Vietnamese border. As a result, Cambodian raids on the Thai border, once occurring at the rate of 100 a month, have averaged fifty to sixty a month since the redeployment.

The insurgency in South Thailand involves Thais and Malaysians led by Communist cadres. The Communist Party of Thailand and the Communist Terrorist Organization, composed primarily of Malaysian Chinese Communist guerrillas, number about 1,500 each. These Malaysian guerrillas were driven across the Thai border by Malaysian troops in the 1950s.

Within the interior of Thailand, there are several hundred insurgents who launch periodic raids on villages from their jungle and mountain camps.

Most of the Thai military response has been in the north and northeast. Against the Cambodian troops in the east, Thai forces are fighting a defensive campaign while Thai diplomats work at defusing the unofficial war. Malaysia is doing most of the fighting on the southern border, but some joint operations of Malaysian and Thai units have been launched over the past year.

Thailand is pretty much on its own. In the past ten years, the US has given or sold more than $445 million in arms to Thailand. But Thailand has been left to fight on its own, and there are no plans for US assistance. Likewise, Thailand's non-Communist neighbors—Burma and Malaysia—have their own problems and lack the resources to provide substantial help.

## Moving Toward Recognition of Vietnam

The US and Vietnam, at war for thirteen years, now are moving toward diplomatic recognition.

And it is Vietnam, with good reason, that is eager for the benefit of relations with the US.

Rep. G. V. (Sonny) Montgomery (D-Miss.), following a trip in August to Vietnam and Laos, said: "Vietnam wants diplomatic relations so it can get the US trade embargo lifted. The country needs to expand its trade. It needs food, equipment, and technical help."

The Soviet Union, the major economic and military aid supplier during the Vietnam War, has been unable, or unwilling, to marshal the assistance needed to raise the country from the debris of war. Also, Vietnam apparently wants US aid so that it will not become too dependent on the Soviet Union.

China, the other major Vietnamese source during the war, is at odds with the Hanoi regime. Chinese and Vietnamese troops are shooting at each other on the common border. Chinese advisors have left, or were kicked out, and thousands of resident Chinese are fleeing Vietnam because of property confiscations and personal persecution.

Two congressional groups went to Vietnam in August to get a close look at the country. And Vice Foreign Minister Phan Hien has publicly announced his willingness to visit the US.

The US, with the remnants of anti-Vietnam feeling generated by the war, has been less aggressive in developing relations. Negotiations with the Vietnamese were broken off at one point, but the US has since announced plans to resume talks.

A four-man study team sent by Sen. Edward M. Kennedy (D-Mass.) reported its findings in August to a Senate Judiciary Committee. Tufts University President Jean Mayer, heading the team, said it is ethically as well as politically in the US interest to normalize relations with Vietnam, and to supply the country with aid.

Dr. Mayer said such action would reestablish the moral authority of the US in Asia, and ensure the independence of Vietnam from China and Russia. During the trip, the team helped negotiate the return of twenty-nine Vietnamese relatives with American families.

The second delegation, a group of eight congressmen, headed by Mr. Montgomery, has issued a report recommending the State Department resume talks with Vietnam to discuss a restoration of diplomatic relations. Mr. Montgomery said Hanoi's leaders no longer want the US to pay war reparations before such discussions.

The Montgomery delegation returned with the remains of fifteen Americans, eleven found in Vietnam and four found in Laos. Montgomery pointed out that for the first time the Laotian government had cooperated in the search for remains.

The arguments for diplomatic recognition of Vietnam, as well as US aid, are expected to find a rough reception in Congress.

Commercial opportunities are unclear. Vietnam is not expected to become a major market for US goods, with Japan and other Asian countries offering most of the same products at cheaper prices. And there is little in Vietnam that the US needs.

As for aid, and its humanitarian aspects, it will be difficult to justify US economic aid to an increasingly budget-conscious Congress as long as Vietnam is waging war on Cambodia and supporting a military insurrection in Thailand.

Mr. Montgomery says talks between the two countries should resume, but as for actually establishing relations: "The decision should be made in light of what is in the best interests of the US." That guarded opinion reflects the attitude of many in Congress.

—B.D.

—Wide World Photos

*Rep. G. V. Montgomery, heading an eight-member US congressional delegation to Vietnam, shakes hands with Premier Pham Van Dong outside his official Hanoi residence.*

Thailand's policy generally has been to promote friendly diplomatic relations with its neighbors while its soldiers fight a holding action on the border.

But the tense border situation, plus upheaval in the three Communist countries, has generated a serious refugee problem that threatens to swamp the Thai economy.

Refugees in Thai camps now total more than 160,000, and the figure is growing. Most are Cambodians, followed by Vietnamese and some Laotians. US officials hoped that the refugee tide would end within a few months after the Communist takeovers in Vietnam, Cambodia, and Laos. But today, three years later, there is still a steady stream fleeing the oppressive regimes.

In addition to imposing a heavy financial burden on the government, the refugees are considered security risks as they come from countries controlled by unfriendly governments.

Added to pressures created by insurgents and refugees is the fear that the war between Vietnam and Cambodia will spill over into Thailand.

*Refugees in the Mekong Delta. After three years of Communist control, Vietnamese, Cambodians, and Laotians continue to flee from their homelands.*

### The Viet-Cambodian War

Cambodia's war with Vietnam started with a series of Cambodian border raids in 1975, shortly after the Communist regime took power. Vietnam has retaliated, and now there is continual fighting along the border. Most of the fighting is in the Cambodian salient into Vietnam called the Parrot's Beak, and Tay Ninh, the adjacent Vietnamese province. Along the border, an estimated 75,000 Cambodian soldiers engage in frequent cross-border attacks, while some 100,000 opposing Vietnamese soldiers conduct search-and-destroy operations.

The raids launched by Cambodia reflect long-harbored resentment over the borders drawn during the French rule of Indochina. Asian experts also say Cambodia, a nation of about 8,000,000, is just preempting Vietnam, a nation of 45,000,000, and its dream of establishing control over all of Indochina.

Though overwhelmingly outnumbered, the ruling power in Cambodia seems bent on backing its border claims. Adding to the rage of the Cambodian rulers is the continued presence of Vietnamese military camps dating from the Vietnam War. Communist Vietnamese set up the bases to conduct their war against South Vietnam, but have remained ever since. The first assaults in 1975 were attempts to push these Vietnamese units out of Cambodian territory.

Last year in May, Cambodia stepped up its efforts by attacking villages along Vietnam's southwest coast, including Ha Tien and Chao Doc. Viet forces reacted immediately with air and ground assaults, but were repulsed. Ha Tien and other nearby Viet towns were evacuated and remain abandoned.

From mid-September to November, Cambodian pressure on the frontier increased. Troops encroached several miles into Vietnam's Tay Ninh Province and inflicted heavy casualties on villagers. In November, some new Vietnamese settlements, part of that government's New Economic Zone program, were abandoned along the border.

Then, in the first week of December, Vietnamese military units, massed in Tay Ninh Province, opened an offensive with infantry, armored units, and artillery. Vietnamese pilots, flying captured US planes and Soviet-supplied jets, provided air support. The effort forced Cambodian troops back and captured positions as much as fifteen miles inside Cambodia.

Disturbed that two of its Communist neighbors were at war with each other, China, in January 1978, sent a senior delegation to Cambodia, led by the late Premier Chou En-lai's wife, Teng Ying-chao.

Though clearly outnumbered, Cambodia has refused to give up the struggle. As the Vietnamese forces gradually withdrew from all but one of their advanced positions, Cambodian forces resumed their cross-border terrorism of Vietnamese villagers.

This past July, Vietnam responded with a second punitive expedition, launching an invasion of the Parrot's Beak area with 70,000 troops backed with planes, tanks, and artillery.

Hanoi repeatedly has called for negotiations to end the fighting, but Cambodia insists that Vietnamese soldiers first must leave Cambodian territory.

### The Cambodian Madness

For three years, the Cambodian regime has been inflicting a policy of mass extermination on its people. It appears that between 500,000 and 2,000,000 Cambodians, out of a total population of 8,000,000, have been executed, starved, or worked to death.

In the days immediately after the Communist takeover, 4,000,000 Cambodians were ordered on death marches into the countryside from the capital and other population centers. Patients were ordered out

of their hospital beds to join the aged and children on the killing march. Those unable to keep up were shot or clubbed to death. Others died of exposure and exhaustion. The survivors were put in work camps, where death by exhaustion and starvation is frequent.

At least two major execution programs were conducted over the same period. The first, shortly after the Communist takeover, rid the country of what were considered the elements most dangerous to the new regime—military officers and leaders of the previous Lon Nol government. The second, in 1976, included soldiers and civil servants of the Lon Nol period plus large segments of the middle class. A third purge is now in progress, aimed at officers of the Communist forces and others who are not considered reliable.

Meanwhile, executions in the work camps continue. A person late for work is clubbed to death. The same penalty is exacted for conversing with friends or even wives during work hours.

Sen. George McGovern, a member of the Senate Foreign Relations Committee, said recently that perhaps as many as 2,500,000 Cambodians have been killed by the Pol Pot regime.

**US Military Grant Aid in Southeast Asia**
(thousands of dollars)

| Country | FY '68 | FY '72 | FY '77 |
|---|---|---|---|
| Burma | $ 2,933 | $ 393 | (none) |
| Indonesia | 2,351 | 5,564 | $ 7,693 |
| Philippines | 29,755 | 15,936 | 6,999 |
| Taiwan | 109,740 | 20,928 | 8,346 |
| Thailand | 49,262 | 68,083 | 10,964 |
| TOTALS | $194,041 | $110,904 | $34,002 |

—Source: Defense Department

### The Vietnamese Method

The leaders now ruling Vietnam have been less blatant than their Cambodian counterparts in purging non-Communist elements. But Hanoi has been no less effective in gagging dissent.

South Vietnam has been all but sealed off from the rest of the world to hide the Communist regime's methods. Refugees report that mass executions, while neither as extensive nor as mindless as in Cambodia, nevertheless are an integral part of the "social reconstruction" in progress.

Thousands have been sent to concentration camps, which the Communists call "reeducation camps." Some are never heard from again. Others are known to be alive, but their sentences have been extended indefinitely.

As in Cambodia, there is a massive population relocation program in Vietnam. The purpose of the New Employment Zone program is to force city dwellers into the countryside to increase farm production and to create a security belt of population centers along the Cambodian border.

In South Vietnam, the program involves about 5,000,000 people going to an estimated 500 separate locations. Eventually several million more will be moved from North Vietnam to South Vietnam as the country's leaders forcibly equalize Vietnam's population density.

At the same time, Vietnam's leaders continue their class war on businessmen, military men, professionals, and those with higher educations. They are denied work, their wives are not allowed to buy medicines and other essentials, and their children are expelled from school. This discrimination extends to such racial groups as resident Chinese.

Communist China has announced that more than 160,000 resident Chinese have fled Vietnam after having their shops closed. Refugees say they are fleeing also because they fear a war between Vietnam and China.

Tension between the two countries caused fighting to break out along their common border in April 1978, and exchanges of fire, including tank assaults, have been reported since.

It is estimated that executions in South Vietnam have numbered at least 100,000. There are an estimated 500,000 South Vietnamese in prison, out of a total population of about 19,000,000 in the south. In addition, several hundred thousand have fled the country, and refugees continue to escape at the rate of 1,500 a month.

Those who remain are suffering from a severe economic depression. Food and medicine are scarce and rationed. Several million people are unemployed. Personal property has been confiscated. Inflation has crippled efforts at recovery.

Still, even the threat from China, with the world's largest population, has had no apparent effect on Hanoi's aggressive plans. That nation's leaders are training large numbers of Cambodian guerrillas and conducting a massive propaganda offensive in an effort to replace the regime in Cambodia. US officials say Hanoi apparently has determined that a direct invasion, because of the historic enmity between the two racially different peoples, would be less effective than an insurgency led by Cambodians allied to the Hanoi regime.

To arm guerrillas, Vietnam has some $5 billion in captured US equipment, plus a pipeline from the Soviet Union if more weapons should be needed. It is estimated that stockpiles of US supplied weapons included 1,600,000 rifles, 130,000 tons of ammunition, 550 tanks, 2,200 howitzers, seventy-three Northrop F-5 jet fighters, and several hundred other military aircraft including more than 400 helicopters.

### New Masters in Laos

Vietnam's leaders already are in control of Laos, except for pockets of resistance by Royalist troops and Meo tribesmen. Some 35,000 Vietnamese troops are stationed in Laos, though some may have been redeployed since the stepped-up tempo of fighting on the Cambodian border.

Life in Laos under the Communist regime is not much different

from life in Vietnam. Since the Communist takeover in 1975, as many as 200,000 have fled Laos across the Mekong River into Thailand. They have been crossing at the rate of 3,000 a month.

In Vientiane, the Laotian capital, and other towns, Vietnamese military officers and political cadres are in charge. Aiding them are several hundred political and technical advisors from the Soviet Union. China early this year withdrew most of the troops that were building and guarding roads south from the Chinese border.

Laotian pilots and others have been training in the Soviet Union. Recently, when Moscow gave ten MiG-21 jets to Laos, they were shipped by sea to the port built by the US at Da Nang and assembled by Soviet technicians before being flown to Vientiane.

Of a population of 4,000,000, about 50,000 are thought to be in concentration camps patterned after Vietnam's "reeducation camps."

And with the population relatively under control, Laotian leaders are directing propaganda attacks at neighboring Thailand, accusing Bangkok of helping Laotian insurgents to seize border strongholds along the Mekong River.

### The US Role

Since withdrawing from Vietnam, the US has been playing a spectator's role, encouraging non-Communist countries to resist Communist military advances, but being careful to avoid any new commitments.

The US still has a number of mutual security treaties with Asian countries, including Japan, South Korea, Taiwan, and the Philippines. On a trip to Bangkok in May, Vice President Walter Mondale announced that the US would honor treaty commitments to defend Southeast Asia against Communist aggression, but area statesmen place little value on the pledge. SEATO, the Southeast Asia Treaty Organization that tied the US to the security of Southeast Asia, was disestablished last year.

**US Arms Deliveries to Thailand**
(thousands of dollars)

| Fiscal Year | Sales | Assistance |
|---|---|---|
| 1968 | $ 15 | $ 80,213 |
| 1969 | 332 | 81,707 |
| 1970 | 5 | 87,531 |
| 1971 | 12,863 | 73,687 |
| 1972 | 12,344 | 95,948 |
| 1973 | 3,499 | 40,593 |
| 1974 | 5,376 | 29,167 |
| 1975 | 9,720 | 27,580 |
| 1976 | 26,872 | 16,196 |
| 1977 | 17,722 | 16,000 |
| TOTALS | $88,748 | $548,622 |

—Source: Defense Department

Meanwhile, the US over the years has been cutting back its forces in the area. US forces in Taiwan are in a caretaker status. Plans to cut forces in Korea have been announced by the Carter Administration. At the same time, the Administration has continued US efforts begun under President Nixon to improve relations with the People's Republic of China.

The effect of the cutbacks was noted in a recent Defense Department report stating that about 140,000 US military are stationed west of Hawaii today, as compared to 160,000 in the Pacific prior to World War II. The present total, moreover, includes a squadron of Strategic Air Command B-52s and ballistic missile submarines based on Guam, which are designed to deter war with the Soviet Union, rather than provide conventional military strength to Asian allies.

But while US might in the area declines, the Soviet Union has been increasing its presence, to the concern of the US, China, and some of the Southeast Asia countries.

Vietnam and Laos have both become Soviet client-states. In Vietnam, the Soviet Union is making a big economic investment. Soviet economic and technical assistance is to involve some forty projects, including a Black River dam, a coal mine, and assistance in prospecting for oil, gas, and other resources. Several thousand Soviet advisors are in Vietnam, and the number is expected to increase as the aid programs proceed.

The Soviet Union has kept its military presence relatively low, though there have been several visits to Laos and Vietnam of high-ranking Soviet officers. Also, the Soviet Navy's Pacific Fleet routinely deploys to the East and South China Seas.

The obvious next step, say US officials, is for the Kremlin to arrange to use some of the military bases left by the US in Vietnam—notably Cam Ranh Bay—to add to the ones recently established further west in East Africa.

What leaders in Thailand and other non-Communist states in the region fear is that Vietnam, pushed or helped by the Soviet Union, will force a confrontation with Cambodia's ally, China, and set off a major war.

As it is, the non-Communist states look at the present battle between Cambodia and Vietnam as a breathing period. They are hopeful that their efforts at improving relations with China and Vietnam will prevent them from becoming the next victim, should Cambodia fall under Vietnam's control.

Of the two countries, however, non-Communist leaders most fear a Vietnam victory. Such a victory, it is thought, would be a big step toward making Hanoi the dominant power in the entire region.

But regardless of who emerges as the predominant power, it is now clear that the end of the US role in Southeast Asia did not bring an end to the suffering of the people. Instead, the suffering has increased. And the stream of refugees and the continued executions show there is no end in sight. ■

In the old and simple days before Vietnam, we knew with certainty who were our friends in the Pacific and who were our enemies. Now the picture is muddled . . .

# A Time of Transition in the Pacific

**By Gen. T. R. Milton, USAF (Ret.)**

IT WAS reassuring to see so little change at Camp Smith in Hawaii, headquarters of the Commander in Chief Pacific. The view is as splendid as ever, and CINCPAC himself is, as always, an admiral. The telescope mounted on its tripod by his office window is doubtless the same one another CINCPAC peered through to discover I was playing tennis when, in his judgment, I should have been reading messages. At any rate, the telescope is a pleasant anachronism in this electronic age.

Adm. Maurice F. Weisner, an affable if cautious conversationalist, is the current CINCPAC. And while his headquarters at Camp Smith may seem unchanged from past eras, it is a misleading symbol of permanence, for a great deal has changed since the pre-Vietnam days.

In the accustomed manner of military commands, the briefing officer describes CINCPAC's area of responsibility. It encompasses, he says, more than one-half the earth's surface. So far, no change. It always did take in everything from the US West Coast to the Indian Ocean.

In the old and simple days before Vietnam, the next part of the briefing would then lay out in unequivocal terms who were our friends and who the enemy. There was no problem of identification beyond the occasionally fuzzy images of Sukarno's Indonesia, Burma, and Cambodia. The Communists were the enemy. The members of SEATO—Thailand, Pakistan, the Philippines, Australia, New Zealand, along with the British and French—were our formal allies in regional security, although the commitment of the French and Pakistanis was always suspect. Others, like Nationalist China, the Republic of Korea, South Vietnam, and Japan, were allies on a bilateral basis and, after a fashion, protectorates of the United States.

In those long gone days SEATO, now dead, buried, and almost forgotten, added a considerable luster to the function of CINCPAC. It was he who took the lead in SEATO planning. The British Far East Commander in Singapore, also an admiral, had too little in the way of forces to make a contest for the leadership. In the late 1950s and early 1960s, our Commander in Chief Pacific was the powerful proconsul of a powerful nation.

The British have, of course, withdrawn from the Far East to their home islands and NATO. With their departure there no longer is anyone else with pretensions to wide responsibilities, at least not on our side, nor is there any remaining semblance of regional military cohesion. Instead, we have some individual arrangements with various countries, arrangements that generally inhibit any notion of multilateral security against a common enemy.

Take Japan, for instance. The only US combat forces now located on Japanese soil are at Okinawa, where we have, besides a Marine brigade and some shore-based naval aviation, four squadrons of the USAF 18th Tactical Fighter Wing. Presumably the 18th Wing is out there to take part in the defense of Taiwan, or in the defense of South Korea. It is also a fair assumption that there will be no combat operations out of Okinawa in either case. That is not part of the Japanese deal. Even the occasional typhoon deployments of B-52s from Guam to Okinawa cause a commotion.

Our two squadrons of F-4s at Clark Air Base in the Philippines are there, we can suppose, for our own regional US interests as well as to contribute to the defense of the Philippines. Similarly, the great complexes of Clark and Subic Bay are only justifiable as US bases if they serve our own national interests.

Perhaps that is well understood and accepted by the Philippine government and, then again, perhaps it is not. The fact that the Philippines are pursuing their own national interests quite independently of us is a new factor in our relationship. They are, for instance, laying claim to the Spratly Islands in the South China Sea, a group of atolls suspected of having oil. Vietnam and the People's Republic of China also claim these islands. It is their dispute, not ours.

Then there is the perennial Moslem trouble on Mindanao, something we stopped worrying about when we gave the Philippines their independence. We do not stand air defense alert any longer in the Philippines, a matter that is viewed by some Philippine officials as an indication of our diverging interests. It is, in short, no longer clear we and the Philippines necessarily share the same friends and enemies.

A holocaust, one to rival Hitler's, is going on in Cambodia. There also is war between Cambodia and Vietnam. We remain detached, still suffering from our Vietnam hangover.

The Republic of China on Taiwan was for years our favorite showpiece. There, under the protection of the Seventh Fleet and USAF airpower, we helped create a formidable military force. Their bases were available to us, and no questions asked. Now, as we tiptoe away from Taiwan and draw closer to Communist China, our whole military posture in the Western Pacific becomes questionable. Essentially an air and naval posture, it is worth wondering as to its purpose.

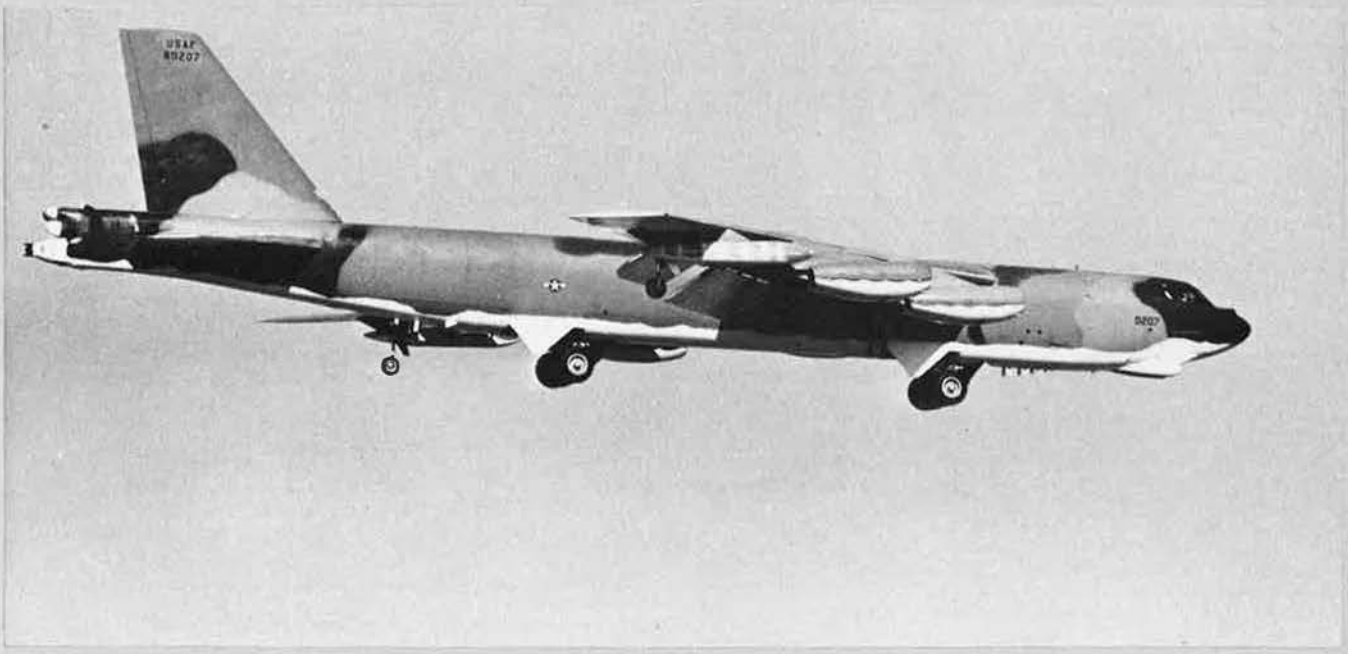
If there is another Korean war, and that is as likely as anything else, we will have some air and naval power to lend a hand. There are, altogether, ten USAF fighter squadrons in the Western Pacific and a depleted but still respectable Seventh Fleet, enough to be of considerable and immediate help. But as for the rest of our Pacific obligations and our capabilities to discharge them, the picture is not so clear.

Still, if our Pacific military aims appear muddled in this post-Vietnam era, it is some comfort to know the Soviet view of the Pacific cannot be very clear either. Their own allies are uncertain, and their Chinese enemy seems implacable.

It is clearly a transition period in the Pacific, and the shifting of power and relationships is still not over. ■

# JANE'S

## ALL THE WORLD'S AIRCRAFT SUPPLEMENT



*Boeing B-52G Stratofortress of Strategic Air Command, showing undernose EVS and modified tail configuration*

**BOEING**
*BOEING WICHITA COMPANY; Address: 3801 South Oliver, Wichita, Kansas, USA*

**BOEING B-52 STRATOFORTRESS**

Originally designed as an intercontinental, high-altitude nuclear bomber, the B-52, which first entered US Air Force service in 1955, has undergone numerous improvement programmes over the years to ensure that its operational capabilities meet changing defence needs. These have included low level flights, conventional bombing, extra-long endurance missions, extended range, and improved defensive and offensive equipment including supersonic air-to-surface missiles. Now in its third decade of operational service with Strategic Air Command, it continues to perform a valuable strategic deterrent role, and no bomber in US military history has been required to remain operational for the length of time expected of the B-52: the USAF expects that more than 300 B-52s will remain in its active inventory for the remainder of this century.

The early development history of the B-52 has been recorded in previous editions of *Jane's*, and a structural description can be found in the 1964–65 edition. The three versions still in squadron service (other than the B-52F, which is used for training) are the B-52D, G, and H, of which a combined total of 465 was built. Some 352 of these remain operational, serving with the 2nd, 7th, 19th, 42nd, 68th, 97th, 379th, 410th, and 416th Bomb Wings of the Eighth Air Force; the 5th, 22nd, 28th, 92nd, 93rd, 96th, 319th, and 320th Bomb Wings of the Fifteenth Air Force; and the 43rd Strategic Wing of the 3rd Air Division of SAC.

Under a USAF programme called Pacer Plank, 80 **B-52Ds** were updated and restructured during 1975–77, to extend their service life. They received new upper and lower wing skin panels, modified wing leading-edges, and new trailing-edge assemblies, modified engine nacelle pylons, new fuselage side skins and electrical wiring, and reinforced flight deck windows. The last was returned to Air Force duty on 25 February 1977. These aircraft have an MA-6A bombing/navigation system and A-3A or MD-9 fire control for the tail guns. Their conventional warfare capability is greater than that of the G and H models, and they will be retained at least until the mid-1980s.

Several improvement programmes involving the **B-52G** and **H** have been undertaken or are now in progress to improve the electronics, equipment, and operational capability. Under a 1971 contract, 281 of these two models were modified to carry the Boeing SRAM (short range attack missile). The first

of these modified aircraft became operational on 4 August 1972, and this weapon has now completely replaced the underwing Hound Dog missiles formerly carried.

The USAF's Rivet Ace programme, initiated in 1974, is progressively updating about 270 B-52Gs and B-52Hs with what are known as 'Phase VI' ECM (electronic countermeasures). These aircraft have already an AN/ASQ-151 Electro-optical Viewing System (EVS) to improve low level penetration capability, the EVS sensors being housed in two steerable, side-by-side chin turrets. The starboard turret houses a Hughes Aircraft AAQ-6 forward-looking infra-red (FLIR) scanner, while the port turret contains a Westinghouse AVQ-22 low light level TV camera. The first EVS-equipped B-52 was re-delivered to SAC on 24 June 1973, and the last in the early part of 1976.

By 1981 the B-52G and H will be fitted with Motorola ALQ-122 SNOE (Smart Noise Operation Equipment) countermeasures, and Northrop AN/ALQ-155(V) advanced ECM; between 1978–82 with an AFSATCOM kit permitting worldwide communications via satellite; and by 1984 with a Northrop ALT-28 updated transmitter and power management system, to provide automated control of radio frequency power to reduce the effectiveness of enemy radar. Other Phase VI electronics include an ALR-46 digital radar warning receiver, and two tail-mounted ITT Avionics ALQ-117 noise/deception jammers. Development and testing are nearing completion of an RCA ALQ-127 pulse-Doppler tail warning radar system, which will be able to detect an enemy aircraft approaching from the rear and dispense, automatically, the appropriate countermeasures. Procurement of this system could begin in late 1978.

For completion in late 1978, Sedco Systems has an Air Force contract to design and develop the prototype of an electronically steerable antenna system (ESAS) for the B-52G and H, to improve their defensive electronics (jamming) capability. Boeing Wichita has a USAF contract to define and design an Offensive Avionics System (OAS) to upgrade the navigation and weapons delivery of the B-52G and H. At a significantly reduced life-cycle cost, this will be a digital (instead of analogue) based, solid-state system, and will include Tercom (terrain comparison) guidance. During 1978 and 1979, Westinghouse is to ground and flight test an Electronic Agile Radar (EAR) as a possible replacement for the present B-52G/H bombing and navigation radar. A Singer-Kearfott or Teledyne Ryan Doppler navigation system is also to be installed.

In addition, whatever the result of the 1979 'fly-off' between Boeing's ALCM-B and the General Dynamics Tomahawk cruise missile, the B-52G and H will be adapted as carrier aircraft for the selected weapon, and their development for this role is continuing in support of the cruise missile programme. Full-scale development of B-52 carrier aircraft equipment, as an integral part of the cruise missile programme, began in early 1978, and four B-52Gs were being modified during the Summer of 1978 for use in the fly-off programme at Edwards AFB, California.

In late 1977 a B-52G was used in tests at the Tonopah Test Range in Nevada of a low level delivery system developed by Sandia Laboratories for the BL77 nuclear bomb. The inert test weapon carried by the B-52G was dropped successfully from an altitude of only 46 m (150 ft).

At an estimated cost, in 'then-year' dollars, of $1.4 billion, a second development phase in updating the B-52G and H is scheduled to take place between FY 1979 and 1983, with procurement of production items following in FY 1983 or 1984 and completion of equipment fits by about 1990. This phase will be devoted to a continued updating of the aircraft's electronics equipment as a cruise missile carrier, and to its penetration ability as a bomber, and will probably include such items as new forward-looking radar, automatic terrain-following guidance, and a new flight control system.

POWER PLANT (B-52D): Eight 44.5 kN (10,000 lb st) Pratt & Whitney J57-P-19W or -29W turbojet engines. Fuel capacity 135,140 litres (35,700 US gallons) internally, plus two 11,355 litre (3,000 US gallon) underwing drop-tanks.

POWER PLANT (B-52G): Eight 61.2 kN (13,750 lb st) J57-P-43WB turbojet engines. Fuel capacity 174,130 litres (46,000 US gallons) internally, plus two 2,650 litre (700 US gallon) underwing drop-tanks.

POWER PLANT (B-52H): Eight 75.6 kN (17,000 lb st) Pratt & Whitney TF33-P-3 turbofan engines. Fuel capacity as for B-52G.

ACCOMMODATION (B-52D/G/H): Crew of six (pilot and co-pilot, side by side on flight deck, navigator, radar navigator, ECM operator, and gunner).

ARMAMENT (B-52D): Four 0.50 in machine-guns in occupied tail turret. Up to eighty-four 500 lb bombs in fuselage weapons bay, and a further twenty-four 750 lb bombs on underwing pylons: total bomb load 27,215 kg (60,000 lb).

ARMAMENT (B-52G): Four 0.50 in machine-guns in tail turret, remotely operated by AGS-15 fire control system, remote radar control, or closed circuit TV. Up to 20 Boeing AGM-69 SRAM short-range attack missiles: eight on rotary launcher in internal weapons bay, and six under each wing, plus nuclear free-fall bombs.

ARMAMENT (B-52H): As B-52G, except for single 20 mm Vulcan multi-barrel cannon in tail turret instead of four machine-guns.

DIMENSIONS, EXTERNAL:

| | |
|---|---|
| Wing span | 56.39 m (185 ft 0 in) |
| Wing area, gross | 371.6 m² (4,000 sq ft) |
| Length overall: G, H | 48.77 m (160 ft 0 in) |
| Height overall: | |
| D | 14.74 m (48 ft 4½ in) |
| G, H | 12.40 m (40 ft 8 in) |
| Tailplane span | 19.00 m (62 ft 4 in) |
| Wheel track (c/l of shock-struts) | 2.51 m (8 ft 3 in) |
| Wheelbase | 15.16 m (49 ft 9 in) |

DIMENSION, INTERNAL:

| | |
|---|---|
| Weapons bay volume | 29.53 m³ (1,043 cu ft) |

WEIGHTS:

| | |
|---|---|
| Max T-O weight: | |
| D | 204,115 kg (450,000 lb) |
| G, H | 221,350 kg (488,000 lb) |

PERFORMANCE (B-52G/H):

| | |
|---|---|
| Max level speed at high altitude | Mach 0.90 (516 knots; 957 km/h; 595 mph) |
| Cruising speed at high altitude | Mach 0.77 (442 knots; 819 km/h; 509 mph) |
| Penetration speed at low altitude | Mach 0.53 to 0.55 (352–365 knots; 652–676 km/h; 405–420 mph) |
| Service ceiling | 16,765 m (55,000 ft) |
| T-O run: | |
| G | 3,050 m (10,000 ft) |
| H | 2,900 m (9,500 ft) |
| Range with max fuel, without in-flight refuelling: | |
| G | 6,513 nm (12,070 km; 7,500 miles) |
| H | 8,685 nm (16,093 km; 10,000 miles) |

## DSI

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### DSI MARS ASTROPLANE

Among concepts being studied by NASA for future exploration of the planet Mars is one for a series of recoverable, remotely controlled small aircraft able to photograph terrain, take atmospheric soundings, and acquire other useful data. DSI has submitted proposals to NASA for an aircraft, the Mars Astroplane, capable of meeting such a requirement. A one-tenth-scale deployable model of the Astroplane has been built, together with a full-size fuselage section for demonstration of the potential payload capacity.

Applications for such an aircraft include:

(1) gathering widely-dispersed samples and delivering them to a central site for pickup;

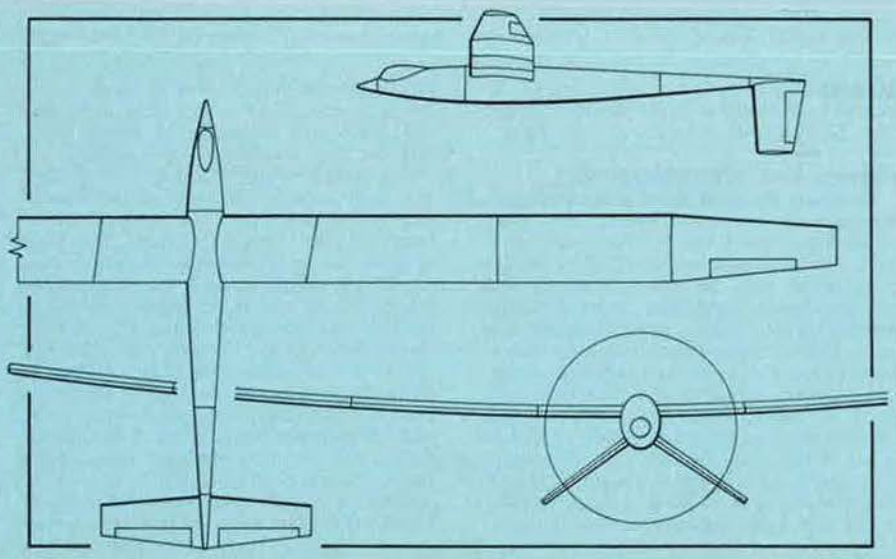
(2) deploying seismometers, meteorology stations, and other scientific apparatus at preselected sites within an accuracy of a few kilometres;

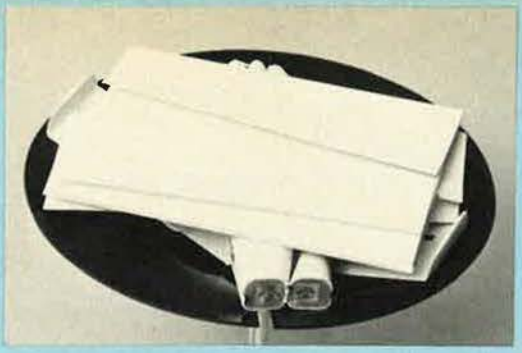
(3) performing high-resolution imaging, magnetic, gravity, and geochemical aerial surveys;

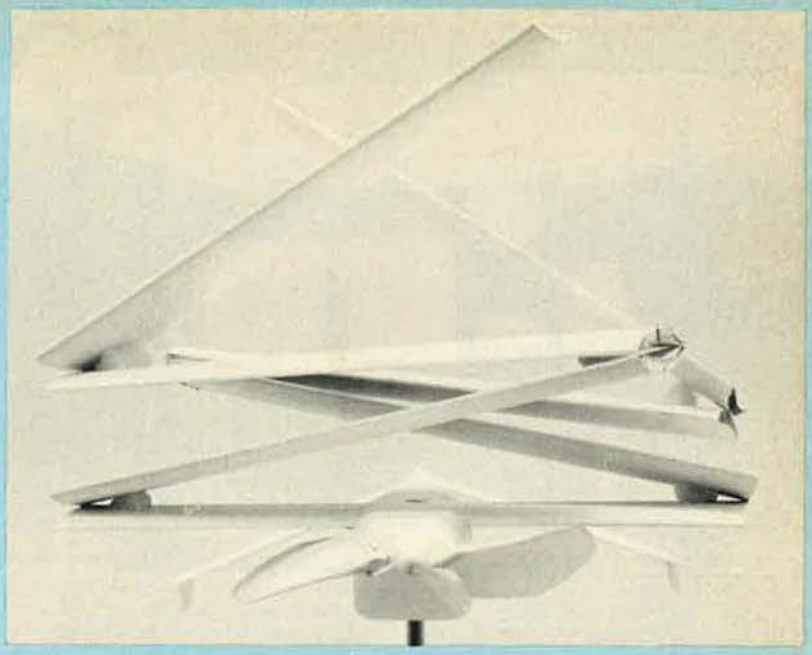
(4) performing aerial search for subsurface water, geothermal fields, and active volcanos;

(5) soft-landing experiment packages for

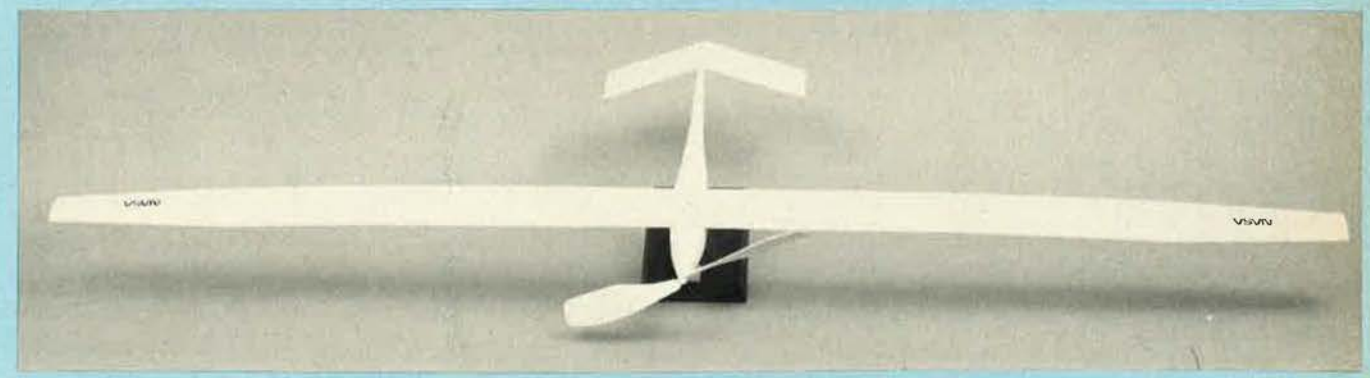
*DSI Mars Astroplane for pilotless survey of the planet Mars* (Michael A. Badrocke)







*This series of photos is of a one-tenth-scale model of the DSI Mars Astroplane. The model is deployable, as shown in the photo above, in which the aircraft is folded. The photo at right shows the model unfolding, as it would do while descending by parachute from its spacecraft/aircraft carrier. The photo below shows the aircraft completely deployed for flight. The Astroplane is designed to fly for up to 25½ hours and to have a range of 6,700 km (4,163 miles)*



in situ elemental and mineral phase analysis or biological exploration at selected sites, within an accuracy of a few kilometres;

(6) performing atmospheric sounding for meteorology or air constituent analyses, up to 7.5 km (4.7 miles) above the surface;

(7) soft-landing mini-rover vehicles;

(8) performing site selection surveys for Mars spacecraft; and

(9) deploying navigation aids at distributed points on the Martian surface.

The options for the aircraft are either a powered vehicle which performs aerial surveys, atmospheric sounding, or deployment of network science, and then crashes; or one equipped with a variable-thrust rocket installation, like the Viking lander, so that it may soft-land itself and take off. The most important question is to define the role of an aeroplane in exploration of the planet. It is, clearly, a versatile means of transportation that can carry experiment packages or otherwise play an important support role in Mars exploration; the technological feasibility of the aircraft has been studied and found to be favourable, and it is as ready as any other current means of delivering payloads to Mars.

The basic elements of the technology required for the Mars Astroplane—ultra-light airframe, flight control and navigation, engine, landing rockets, and entry system—have already been developed in other military, space, or aeronautical research programmes, and no new technology is required. A three-year plan of component evaluation, system design, prototype fabrication, and flight test has been outlined; at the end of this period a prototype, fully flight-tested by balloon drops from a 33,525 m (110,000 ft) altitude on Earth, could provide the basis for full-scale project design, manufacture, and test.

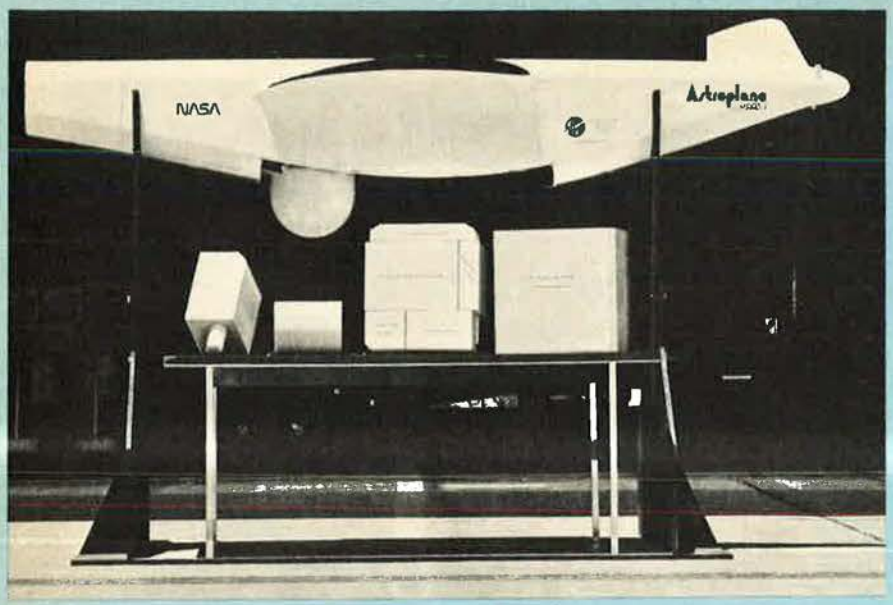
Although still in the design definition stage, and thus liable to change, the following description applies to the Mars Astroplane prototype as envisaged by DSI in the Summer of 1978:

TYPE: Remotely controlled Mars exploration aircraft.

AIRFRAME: Cantilever high-wing monoplane, made of carbon fibre composites. High aspect ratio wings, of low Reynolds number and with marked dihedral from roots. Ailerons at trailing-edges of tapered outer panels. Entire wing hinged at six points, at 3 m (9 ft 10 in) intervals, enabling it to fold for stowage inside a Viking-type aeroshell container. Fuselage also is hinged to fold for stowage, at mid-point and just forward of tail unit. Payload compartment in mid-fuselage, with access via door on underside. A 0.165 m (6½ in) radius transparent bubble protrudes from the bottom of this door, to provide a full hemispherical clear field of view for imaging while in flight or on the surface. The bottom of the payload bay is 0.61 m (2 ft) above the surface when the aircraft is on the ground. Instruments which require isolation from the fuselage, such as magnetometer sensors, can be mounted on or in the wings if of modest mass. Heavier instruments may also be mounted on the wings, but must be sufficiently inboard to avoid excessive structural loads on the wing, and mass unbalance. The payload compartment would be thermally controlled to acceptable limits for payload operation when the door is closed. When open, no compartment thermal control is provided, and instruments must be controlled individually. Tail surfaces comprise inverted-Vee fins and inset rudders, with included angle of approx 110°.

POWER PLANT: For cruising flight, one 11.2 kW (15 hp) non-air-breathing engine is mounted in the nose, driving a two-blade foldable propeller. Hydrazine monopropellant for this engine is contained in two fuselage tanks, one forward and one in centre of fuselage, each of 80 litres (17.6 Imp gallons; 21.1 US gallons) capacity. For soft-landing and take-off, two variable-thrust Viking lander rockets (0.27–2.85 kN; 60–640 lb st) can be mounted in the fuselage, one forward and one aft of the wing and each supplied by a 20 litre (4.4 Imp gallon; 5.3 US gallon) fuel tank.

LAUNCH, RECOVERY, GUIDANCE, AND CONTROL: The basic mission concept for the Mars aeroplane is to de-orbit 12 aircraft from three spacecraft/aircraft carriers, from a 500 km (310 mile) altitude periapsis by 1 sol orbit, similar to that of Viking. Each spacecraft/aircraft carrier would carry four aeroplane/entry units; these would be de-orbited one at a time on successive orbits, or at will. After all aircraft were de-orbited, the spacecraft/aircraft carriers would be manoeuvred into 1 sol synchronous circular orbits, 120° apart in longitude and at 28° inclination, to form




*Full-scale partial fuselage mockup of the DSI Mars Astroplane*

a Mars Comsat network with 100% global coverage. These Comsats would have very long life, typical of Earth Comsats; they would serve as high-capacity communications relay satellites to Earth for all Mars vehicles, including sample return, geochemical orbiter, rovers, balls, etc. After release from its parent carrier, each Astroplane would descend by entry parachute at 3,600 m (11,810 ft)/min, unfold, detach from the parachute, and fly off. The proposed flight control and navigation system consists of a strapdown inertial system, Doppler radar, radar altimeter, and terrain avoidance radar. Outputs of the inertial and Doppler systems are optimally mixed to provide navigation steering signals. Position fixes are obtained by the range-range method, using turnaround ranging measurements to the Comsats. Specified navigation accuracy is 1% of the distance travelled from the last position fix. Power is obtained from a 300W samarium cobalt alternator driven by the hydrazine engine; a companion 28V rechargeable battery is also used. (Under consideration is the use of a lithium primary battery to power an electric motor.) Communication between Astroplane and Comsats is via a 60W UHF transmitter: the transmit antenna is a 0.8 x 3.1 m (2 ft 7½ in x 10 ft 2 in) 2 x 8 element microstrip steerable array, mounted on one wing panel. Broadside gain is 14 dB, and 9 dB at an elevation angle of 30°. When the Comsat is overhead, the aircraft can transmit 5 Mbps imaging data, permitting a pixel resolution of 12.7 cm (5 in) if flying at 762 m (2,500 ft) altitude. A single-element 42 x 42 cm (16.5 x 16.5 in) patch antenna provides hemispherical coverage for receiving from the Comsat. There is no direct link with Earth.

SPECIAL EQUIPMENT: Typical mission equipment includes Apollo/LPO-type gamma ray spectrometer on port wing, 4 m (13 ft 1½ in) from fuselage; Earth Telescopes/LPO-type 400-channel reflectance spectrometer; Terrestrial Applications electromagnetic sounder, with 20 m (65 ft 7½ in) antenna on underside of wings; military/LPO-type gravity gradiometer; dual Pioneer Venus/LPO/Voyager-type magnetometers on starboard wing, one at two-thirds span and one at tip; MVM-73 infra-red radiometer; Viking-type gas chromatograph/mass spectrometer; Galileo-type f/1.8 multispectral camera/imager; and Viking/Surveyor-type deployable seismometer/meteorology package. Each instrument must provide its own data processing services. The aircraft will provide only a telemetry commutator to sample instrument bit streams periodically, and will have no data storage capability. Commands will be demodulated by the aircraft's radio subsystem and put into a common bus for transmission to, and decoding by, each instrument.

DIMENSIONS, EXTERNAL:

| | |
|---|---|
| Wing span | 21.00 m (68 ft 10¾ in) |
| Wing chord (inboard, constant) | 1.00 m (3 ft 3¼ in) |
| Wing chord at tip | 0.655 m (2 ft 1¾ in) |
| Wing area | 20.00 m² (215 sq ft) |
| Length overall | 6.40 m (21 ft 0 in) |
| Tailplane span (projected) | 3.00 m (9 ft 10 in) |
| Tail chord at root | 1.00 m (3 ft 3¼ in) |
| Tail chord at tip | 0.60 m (1 ft 11½ in) |
| Propeller diameter | 2.00 m (6 ft 6¾ in) |

DIMENSIONS, INTERNAL:

| | |
|---|---|
| Payload compartment (mid-fuselage): | |
| Length | 1.00 m (3 ft 3¼ in) |
| Width | 0.50 m (1 ft 7⅝ in) |
| Height | 0.45 m (1 ft 5¾ in) |
| Volume | 0.20 m³ (7.06 cu ft) |
| Electronics compartment (aft of wing): | |
| volume | 0.03 m³ (1.06 cu ft) |

WEIGHTS:

| | |
|---|---|
| Weight empty | 36.3 kg (80 lb) |
| Max all-up weight | 300 kg (661 lb) |

PERFORMANCE: With a 40 kg (88 lb) payload, the Astroplane can fly at altitudes from 500 m (1,640 ft) to 15,000 m (49,200 ft) for 25 h 30 min, and for a 6,700 km (4,163 mile) range before crashing. If a soft-landing system is installed, it can fly 4,800 km (2,982 miles) in 17 h 6 min, then land. Speed varies from 175 knots (324 km/h; 201 mph) at start of flight to 116 knots (216 km/h; 134 mph) at fuel depletion. If de-orbited near the equator, and at selected longitudes, it could go anywhere on Mars.

## TRANSALL

*ARBEITSGEMEINSCHAFT TRANSALL; Head Office: Hünefeldstrasse 1-5, 28 Bremen 1, Federal Republic of Germany*

The Transall (Transporter Allianz) group was formed in January 1959 by Messerschmitt-Bölkow-Blohm, Aérospatiale and VFW-Fokker, to undertake joint development and production of the C-160 twin-turboprop military transport for the French and German air forces. Others were built for the air forces of South Africa and Turkey. Production ended in 1972, but was reinstated in 1977 in order to meet an additional French order as well as requests from a number of other countries.

### TRANSALL C-160

The Transall C-160 was developed to meet the specific requirements of the Federal German and French governments for a military transport aircraft capable of carrying troops, casualties, freight, supplies, and

*Recent demonstration of the capability of the Transall C-160 to perform water-bombing missions*

vehicles, and of operating from semi-prepared surfaces.

Initial production of the C-160 D (90), C-160 F (60), C-160 T (20), and C-160 Z (9), was shared between the three participating companies and ended in 1972, as described in earlier editions of *Jane's*.

An industrial agreement was signed on 29 October 1976, sharing the work on future production between Aérospatiale (50%) and the two German companies (50%), with a single final assembly line at Toulouse. Aérospatiale would build the wings and undertake final assembly; VFW-Fokker the central fuselage and tail unit; and MBB the cockpit and rear fuselage. The engines, as before, would be manufactured jointly by Rolls-Royce, SNECMA, MTU, and FN.

In July 1977 the French government gave its approval to the launching of a new production series, primarily to satisfy a requirement of the French Air Force for 25–30 additional aircraft. The main improvements in this new batch are updated electronics equipment, increased max T-O weight, and extended range resulting from a reinforced wing with an optional additional fuel tank in the centre-section. New-series production began on 1 October 1977.

The following details refer to the new French Air Force/export C-160:

TYPE: Twin-engined turboprop transport.

WINGS: Cantilever high-wing monoplane. Dihedral on outer wings 3° 26′. All-metal two-spar structure designed on fail-safe principles. Wing in three sections, comprising a centre-section, which carries the engines, and two outer panels. All-metal ailerons and hydraulically-operated double-slotted flaps. Hydraulically-operated airbrakes (inboard, above and below wings) and spoilers (outboard) forward of flaps on each wing. Pneumatic de-icing of leading-edges.

FUSELAGE: Aluminium alloy (2024-T3) semi-monocoque structure of circular basic section, flattened at the bottom, and designed on fail-safe principles. Underside of upswept rear fuselage lowers to form loading ramp for vehicles.

TAIL UNIT: Cantilever aluminium alloy (2024-T3) structure.

LANDING GEAR: Retractable tricycle type of Messier design. Hydraulic retraction and hydraulic/pneumatic shock-absorption. Each main unit comprises two pairs of wheels in tandem and is mounted inside a fairing on the side of the fuselage. Wheels can be raised to lower the fuselage for loading. Steerable twin-wheel nose unit. Main wheel tyres size 15.00 x 16; nosewheel tyres size 12.5 x 16. Tyre pressure 3.79 bars (55 lb/sq in) on main units, 3.14 bars (45.5 lb/sq in) on nose unit. Messier brakes.

POWER PLANT: Two 4,549 kW (6,100 ehp) Rolls-Royce Tyne RTy.20 Mk 22 turboprop engines, each driving a Ratier Forest-built HSD Type 4/8000/6 four-blade constant-speed fully-feathering reversible-pitch propeller. Single-point pressure refuelling; gravity refuelling available optionally. Fuel in four integral wing tanks with total capacity of 19,050 litres (4,190 Imp gallons). Additional wing centre-section tank optional, capacity 9,000 litres (1,980 Imp gallons). Provision for in-flight refuelling. Water-methanol usable capacity 318.5 litres (70 Imp gallons). Oil capacity (total) 68.4 litres (15 Imp gallons).

ACCOMMODATION: Pressurised accommodation for crew of three, comprising pilot, co-pilot, and flight engineer. Typical payloads include 93 troops or 61–88 fully-equipped paratroops; 62 stretchers and four attendants; armoured vehicles, tanks, and tractors not exceeding 17,000 kg (37,478 lb) total weight. Flight deck and cargo compartment air-conditioned and pressurised in flight and on the ground. Power-assisted controls. Paratroop door on each side immediately aft of the landing gear fairings; hydraulically-operated rear loading ramp. The floor and all doors are at truckbed height. The floor is provided with lashing points of 5,000 kg (11,023 lb) capacity, arranged in a 51 cm (20 in) grid, and 12,000 kg (26,455 lb) capacity on the sidewalls, and is stressed to carry large military vehicles. Loads which cannot be driven in can be taken on board rapidly by an automatic translation and stowing system. Individual loads of up to 8,000 kg (17,637 lb) can be air-dropped.

SYSTEMS: Normalair pressurisation and air-conditioning system, differential 0.302–0.322 bars (4.38–4.67 lb/sq in). Two separate primary hydraulic systems, pressure 175 bars (2,538 lb/sq in), for flying controls, loading ramp, landing gear, wheel brakes, flaps, spoilers, air brakes, nosewheel steering, and other auxiliaries. Two more systems, pressure 175 bars (2,538 lb/sq in), for emergency and ground services, as well as a hand-pump driven emergency system. AC electrical system includes two 60kVA 380–580Hz generators, one 60kVA 400Hz generator, and two 9kVA 400Hz generators. 28V DC system and 40Ah batteries. AiResearch GTCP-85-160A APU in forward part of port main undercarriage fairing.

ELECTRONICS AND EQUIPMENT: Socrat TRAP-138 or King KTR-9100A VHF; TRT TRAP-139 or EAS ERM-710 UHF; LMT 3527C or Collins 628T-1 HF; TEAM AS-1227B PA system; TEAM TF-AP 14 intercom; EAS RNA-720 or Collins 51RV-4 VOR/ILS; Collins NRAN-19 or DF 206 ADF; LMT DM-820 or Collins 860E-5 (without Micro-Tacan) DME; LMT-3560 or Collins 621A-6A ATC transponder; Omera ORB-37 or Bendix RDR-1400 weather radar; TRT AHV-6 radio altimeter; EAS RM-671 or Collins 51Z-4 marker beacon; Jaeger 60571 alticoder; SFIM-51 or SFENA Minitapir autopilot; and Crouzet Nadir Doppler radar. Export version also has Sperry C-9 heading system; EMD NRAP-1A Micro-Tacan; Collins DF-301E UHF/DF (with UHF com system); Sercel Crouzet type Equinox Omega; and SAGEM MGC-30 or SAGEM Kearfott SNI-45 INS.

DIMENSIONS, EXTERNAL:

| | |
|---|---|
| Wing span | 40.00 m (131 ft 3 in) |
| Wing chord at root | 4.84 m (15 ft 10½ in) |
| Wing chord at tip | 2.428 m (7 ft 11½ in) |
| Wing chord (mean) | 4.176 m (13 ft 8½ in) |
| Wing aspect ratio | 10 |
| Length overall | 32.40 m (106 ft 3½ in) |
| Height overall | 11.65 m (38 ft 2¾ in) |
| Tailplane span | 14.50 m (47 ft 7 in) |
| Wheel track | 5.10 m (16 ft 9 in) |
| Wheelbase | 10.48 m (34 ft 4½ in) |
| Propeller diameter | 5.486 m (18 ft 0 in) |
| Propeller ground clearance | 1.30 m (4 ft 3¼ in) |
| Distance between propeller centres | 10.90 m (35 ft 9¼ in) |
| Crew door (fwd, port): | |
| Height | 1.22 m (4 ft 0 in) |
| Width | 0.62 m (2 ft 0½ in) |
| Paratroop door (each side): | |
| Height | 1.90 m (6 ft 2½ in) |
| Width | 0.90 m (3 ft 0 in) |
| Rear landing ramp: | |
| Length | 3.70 m (12 ft 1½ in) |
| Width | 3.15 m (10 ft 3½ in) |
| Emergency exits: | |
| Main hold, fwd, stbd side (one): | |
| Height | 0.88 m (2 ft 10½ in) |
| Width | 0.54 m (1 ft 9¼ in) |
| Flight deck roof (one): roof of main hold, fwd (one); and two in roof of main hold at rear (one each side of dorsal fin): | |
| Height | 0.54 m (1 ft 9¼ in) |
| Width | 0.64 m (2 ft 1¼ in) |

DIMENSIONS, INTERNAL:

| | |
|---|---|
| Cabin, excl flight deck and ramp: | |
| Length | 13.51 m (44 ft 4 in) |
| Max width | 3.15 m (10 ft 3½ in) |
| Max height | 2.98 m (9 ft 8½ in) |
| Floor area | 42.6 m² (458.5 sq ft) |
| Volume | 115.0 m³ (4,061 cu ft) |
| Cabin, incl ramp: | |
| Length | 17.21 m (56 ft 6 in) |
| Floor area | 54.25 m² (584 sq ft) |
| Volume | 140.0 m³ (4,944 cu ft) |

AREAS:

| | |
|---|---|
| Wings, gross | 160.00 m² (1,722 sq ft) |
| Ailerons (total) | 6.88 m² (74.06 sq ft) |
| Trailing-edge flaps (total, extended) | 34.54 m² (371.8 sq ft) |
| Spoilers (total) | 0.80 m² (8.61 sq ft) |
| Fin: | |
| excl dorsal fin | 29.50 m² (317.5 sq ft) |
| incl dorsal fin | 36.00 m² (387.5 sq ft) |
| Rudder | 10.20 m² (109.8 sq ft) |

*Transall C-160, restored to production in improved form in October 1977*

Tailplane 43.80 m² (471.5 sq ft)
Elevators 10.30 m² (110.9 sq ft)
WEIGHTS AND LOADINGS:
Weight empty, equipped 27,782 kg (61,250 lb)
Min operating weight empty 28,000 kg (61,729 lb)
Typical operating weight empty 29,000 kg (63,934 lb)
Max payload 17,000 kg (37,478 lb)
Max T-O weight 51,000 kg (112,435 lb)
Max zero-fuel weight 45,000 kg (99,208 lb)
Max landing weight 47,000 kg (103,617 lb)
Max wing loading 319 kg/m² (65.34 lb/sq ft)
Max power loading 5.61 kg/kW (9.22 lb/ehp)
PERFORMANCE (at max T-O weight except where indicated, ISA):
Never-exceed speed (4,875–9,145 m; 16,000–30,000 ft) Mach 0.64
Max level speed at 4,875 m (16,000 ft) 277 knots (513 km/h; 319 mph)
Stalling speed, flaps down 95 knots (177 km/h; 110 mph)
Max rate of climb at S/L 396 m (1,300 ft)/min
Rate of climb at S/L, one engine out 91 m (300 ft)/min
Service ceiling at 45,000 kg (99,208 lb) AUW 8,535 m (28,000 ft)
Service ceiling, one engine out at 45,000 kg (99,208 lb) AUW 3,050 m (10,000 ft)
T-O run, 20° flap 730 m (2,395 ft)
T-O to 15 m (50 ft) 990 m (3,248 ft)
Landing from 15 m (50 ft), 40° flap, at max landing weight without propeller reversal 869 m (2,850 ft)
Landing run, normal 550 m (1,800 ft)
Min ground turning radius 28.60 m (93 ft 10 in)
Range, with 5% initial fuel and allowance for 30 min hold at S/L, OWE of 29,000 kg (63,934 lb):
with 8,000 kg (17,640 lb) payload 2,750 nm (5,095 km; 3,166 miles)
with 16,000 kg (35,275 lb) payload 1,000 nm (1,852 km; 1,151 miles)
Max ferry range with centre-section wing tank 4,780 nm (8,858 km; 5,504 miles)

## DORNIER

*DORNIER GmbH; Head Office: Postfach 1420, 7990 Friedrichshafen/Bodensee, German Federal Republic*

To supplement its familiar Do 28 D-2 Skyservant STOL transport and utility aircraft, Dornier is testing a turboprop version and plans to develop a somewhat larger advanced technology aircraft, of which a model was exhibited last spring at the 1978 Hannover Air Show.

### DORNIER Do 28 D-5 TURBO-SKYSERVANT

Among new aircraft exhibited at the 1978 Hannover Air Show was the prototype Do 28 D-5 Turbo-Skyservant (D-IBUF) which had flown for the first time two weeks earlier, on 9 April. The airframe, built originally for the second prototype of the basic Do 28 D Skyservant, was relatively easy to convert to turboprop power. Two Avco Lycoming LTP 101-600s could be installed on the stub-wings without requiring any modification to the main wing or fuselage structure. Available power is increased only slightly, as each turboprop is derated from 482 kW (646 shp) to 298 kW (400 shp), compared with the 283 kW (380 hp) piston engines fitted to the current production Skyservant.


*Prototype Dornier Do 28 D-5 Turbo-Skyservant*


*Dornier LTA twin-turboprop light transport project*

Emphasis is placed on the improved economy, low noise levels, and low smoke emission of the new engines. Overall performance is slightly improved, but accommodation is unchanged at present, with seats for two on the flight deck and seats for from ten to twelve people in the main cabin. Three-blade Hartzell constant-speed propellers are retained.

On completion of flight testing, Dornier expects to offer the Turbo-Skyservant as supplementary to the piston-engined range, rather than as a replacement.

DIMENSIONS, EXTERNAL (unchanged):
Wing span 15.55 m (51 ft 0¼ in)
Wing area, gross 29.00 m² (312.2 sq ft)
Length overall 11.41 m (37 ft 5¼ in)
Height overall 3.90 m (12 ft 9½ in)
WEIGHTS AND LOADINGS:
Weight empty, with long-range tanks 2,224 kg (4,903 lb)
Max T-O weight 4,015 kg (8,851 lb)
Max wing loading 138 kg/m² (28.35 lb/sq ft)
Max power loading 6.74 kg/kW (11.06 lb/shp)
PERFORMANCE (at max T-O weight):
Max cruising speed at 3,050 m (10,000 ft) 180 knots (335 km/h; 208 mph)
Service ceiling 9,400 m (30,840 ft)
Service ceiling, one engine out 5,220 m (17,125 ft)
STOL T-O run 260 m (853 ft)
Max range with long-range tanks 1,240 nm (2,300 km; 1,430 miles)

### DORNIER LTA

Advanced technology features of the LTA (Light Transport Aircraft) include a high-efficiency wing of supercritical section, which is to be flight tested initially on a Skyservant in 1979; extensive use of lightweight composite materials in the airframe; optional pressurisation; and application of OLGA gust absorption techniques developed jointly by Dornier and the DFVLR under the ZKP research programme.

Two versions of the LTA are proposed:

**Basic LTA.** With accommodation for a crew of two and nineteen passengers, with toilet and wardrobe, in a non-pressurised fuselage.

**Commuter LTA.** With accommodation for a crew of two or three, and 24 passengers, without toilet and wardrobe. Seven pairs of seats on starboard side of cabin, row of four seats at rear of cabin, and six single seats on port side, with an aisle 0.45 m (1 ft 5¾ in) wide. Pressurised fuselage optional.

TYPE: Twin-turboprop light transport.

WINGS: Cantilever high-wing monoplane. Dornier Do A-5 supercritical wing section. Dihedral outboard of engines. Wing leading-edge and raked and cambered wingtips of glassfibre/Kevlar composites. Fowler-type slotted trailing-edge flaps and ailerons of carbon fibre composites. Ailerons can be drooped symmetrically to augment trailing-edge flaps, and are operated differentially to serve as conventional ailerons. Remainder of wing of light alloy construction.

FUSELAGE: Semi-monocoque light alloy structure of circular cross-section. Nose, tailcone, and main landing gear housings have glassfibre/Kevlar composite skins.

TAIL UNIT: Cantilever T-tail of basic light alloy construction, with sweptback vertical surfaces. Fin and tailplane leading-edges of glassfibre/Kevlar composite construction; elevators and rudder of carbon fibre composites.

LANDING GEAR: Retractable tricycle type, with single wheel on each unit. Main units retract forward and inward into fairings built on to the lower fuselage. Nosewheel retracts forward.

POWER PLANT: Two Garrett-AiResearch TPE331-5 or -8 (541 kW; 725 shp) or TPE331-10 (652 kW; 875 shp) turboprop engines, each driving a Hartzell metal four-blade constant-speed and reversible-pitch propeller. Alternative engines are the Avco Lycoming LTP 101-700A2 (548 kW; 735 shp), and Pratt & Whitney Aircraft of Canada PT6A-34 (567 kW; 760 shp).

ACCOMMODATION: Crew of two or three, and 19–24 passengers, as described under model listings. Seat pitch 76 cm (30 in). Door on port side, at forward end of cabin. Baggage space aft of cabin rear bulkhead, with external access door on port side. Baggage space in nose. Provision for toilet and wardrobe in 19-seat version.

SYSTEM: Pressurisation optional in Commuter version.

DIMENSIONS, EXTERNAL:

| | |
|---|---|
| Wing span | 17.81 m (58 ft 5¼ in) |
| Wing aspect ratio | 9.32 |
| Length overall | 16.60 m (54 ft 5½ in) |
| Height overall | 5.55 m (18 ft 2½ in) |
| Propeller diameter | 2.73 m (8 ft 11½ in) |

DIMENSIONS, INTERNAL:

| | |
|---|---|
| Cabin: length | 6.63 m (21 ft 9 in) |
| Max width | 2.31 m (7 ft 7 in) |
| Max height | 1.80 m (5 ft 10¾ in) |
| Floor area | 11.9 m² (128 sq ft) |
| Volume | 23.6 m³ (833 cu ft) |

AREA:

| | |
|---|---|
| Wings, gross | 33.93m² (365.2 sq ft) |

WEIGHTS AND LOADINGS (estimated. A: Basic LTA; B: Commuter LTA):

Manufacturer's weight, empty:

| | |
|---|---|
| B | 3,544 kg (7,813 lb) |

Max T-O weight (unpressurised):

| | |
|---|---|
| A | 6,500 kg (14,330 lb) |
| B | 6,850 kg (15,102 lb) |

Max wing loading:

| | |
|---|---|
| A | 191.6 kg/m² (39.24 lb/sq ft) |
| B | 201.9 kg/m² (41.35 lb/sq ft) |

PERFORMANCE (estimated, with TPE331-8 engines):

Max level speed:

| | |
|---|---|
| A, B | 241–243 knots (445–450 km/h; 277–280 mph) |

Max cruising speed (80% power) at 3,000 m (9,850 ft):

| | |
|---|---|
| A, B | 216–221 knots (400–410 km/h; 249–255 mph) |

Climb to 3,050 m (10,000 ft) from 5.7 to 7.14 min

Service ceiling 8,000–10,000 m (26,250–32,810 ft)

Service ceiling, one engine out 2,500–5,000 m (8,200–16,400 ft)

T-O run, at 6,000 kg (13,227 lb) AUW 675 m (2,215 ft)

T-O run, at 7,500 kg (16,535 lb) AUW 950 m (3,117 ft)


*Model of the Boeing 767-200 in the insignia of United Air Lines, the first customer*

Range with max fuel:

| | |
|---|---|
| A, with 15 passengers | 810 nm (1,500 km; 930 miles) |
| B, with 20 passengers | 430 nm (800 km; 495 miles) |
| B, with 24 passengers | 215 nm (400 km; 250 miles) |

## BOEING

*BOEING COMMERCIAL AIRPLANE COMPANY; Head Office: PO Box 3707, Seattle, Washington 98124, USA*

### BOEING MODEL 767

In the early months of 1978, The Boeing Company announced its intention to develop a new family of advanced technology commercial aircraft, to which it gave the Model designations 757, 767, and 777. The 757 was intended to differ considerably from the other two, being based on a lengthened Boeing 727 fuselage to provide accommodation for 137 to 186 passengers according to seat layout. Improved performance would come from new high bypass engines, and an advanced technology wing; a modified aft fuselage section and lower portion of the vertical fin would carry an otherwise-conventional 727 tail unit. Design range of the Model 757 is 1,400 nm (2,594 km; 1,612 miles). The Models 767/777 had a new and wider fuselage, basically common to both. The former was proposed in 767-100 and 767-200 versions, the 767-100 with accommodation for approximately 180 passengers, the latter seating from 197 to 252, according to configuration. The 777-100 differs from the 767 versions primarily in having three turbofan engines, and accommodation for 212 or 205 passengers over medium and long ranges respectively.

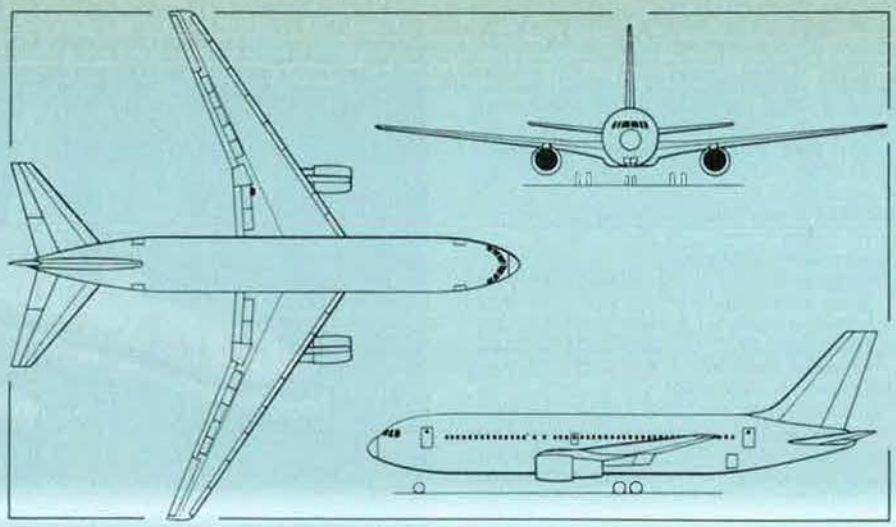
On 14 July 1978, Boeing announced its intention to launch full-scale development and production of the Model 767, following receipt of an order from United Air Lines for 30 767-200s, with initial deliveries scheduled for mid-1982. This airline has participated actively in defining the design of the Model 767, as it did with the design of the Model 727 in 1959–60. It is estimated that

*Model of the Boeing 757*

when these aircraft enter service with United, they will be 35% more fuel-efficient than the aircraft they will replace, and will comply also with the stringent noise regulations which are foreseen for 1984.

The advanced design wing will include high-lift leading-edge slats and trailing-edge flaps which will provide outstanding take-off and landing performance. The fuselage will be 1.24 m (4.1 ft) wider than that of the Model 727, permitting a two-aisle seating layout which follows that of the original wide-body Model 747. Tricycle-type landing gear, with twin nosewheels, and a four-wheel main-gear bogie on each side, will ensure weight distribution adequate to permit non-stop flights from the pier-supported runway at New York's LaGuardia Airport to Dallas and Miami. Power plant of the United Air Lines 767s will comprise two 197 kN (44,300 lb st) Pratt & Whitney JT9D-7R high bypass ratio turbofan engines, in pods pylon-mounted on the wing leading-edges. Alternative engines by General Electric and Rolls-Royce will be available optionally for other customers.

A normal operating crew will be accommodated on the flight deck, with basic seating for 197 passengers in a typical mixed-class configuration, with 18 first class passengers forward on six-abreast seating at 96.5 cm (38 in) pitch, and 179 tourist class on mainly seven-abreast seating at 86 cm (34 in) pitch. Type A exits are provided at both the front and rear of the cabin on each side of the fuselage, with a Type III emergency exit over the wing on each side. A total of four toilets are installed, centrally in the main cabin, and between the tourist and first class sections. Galleys are situated at the forward and aft ends of cabin. Alternative layouts provide for 205 tourist passengers, seated mainly seven-abreast at 86 cm (34 in) pitch; 225 passengers seated seven-abreast at 81 cm (32 in) pitch, or 252 passengers mainly eight-abreast (two-four-two) at 81 cm (32 in) pitch. Underfloor cargo holds can accommodate, typically, up to 22 LD-3A or 11 LD-3 containers. Forward and aft cargo doors of equal size are standard, but a larger (1.75 by 3.40 m; 5 ft 9 in by 11 ft 2 in) forward cargo door is optional, to permit loading of Type 2 pallets.

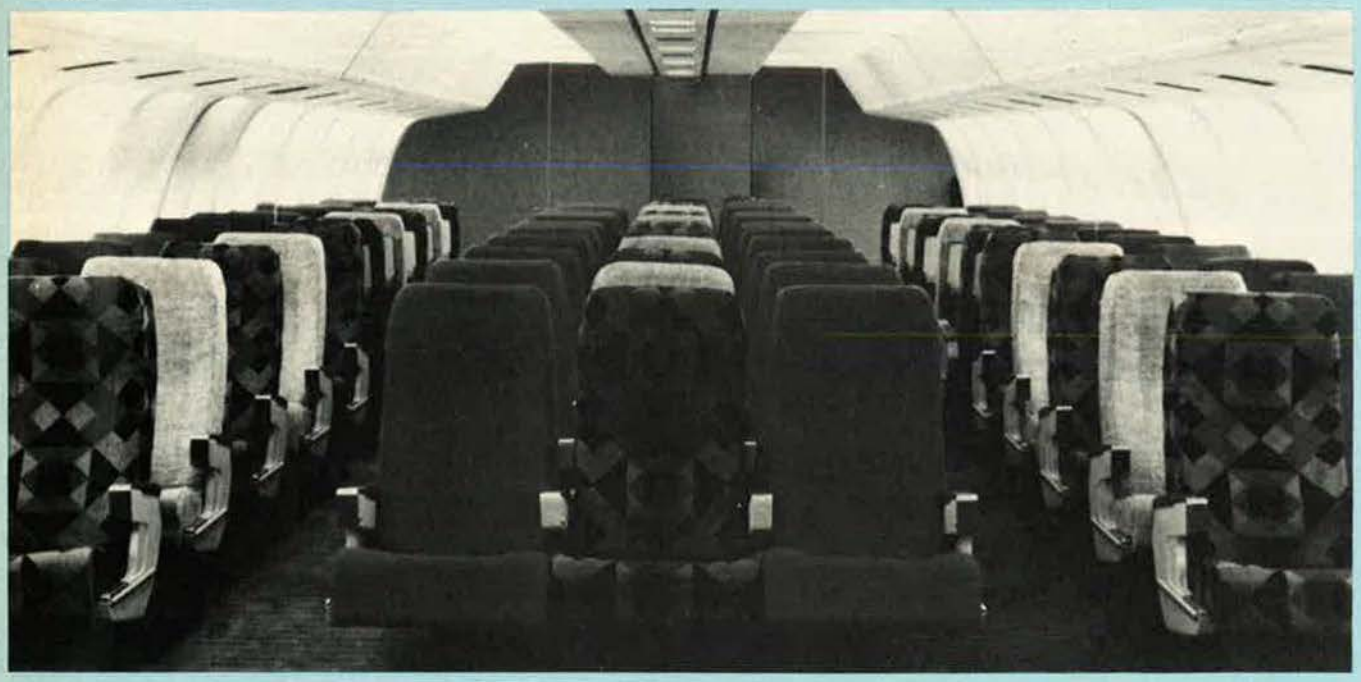


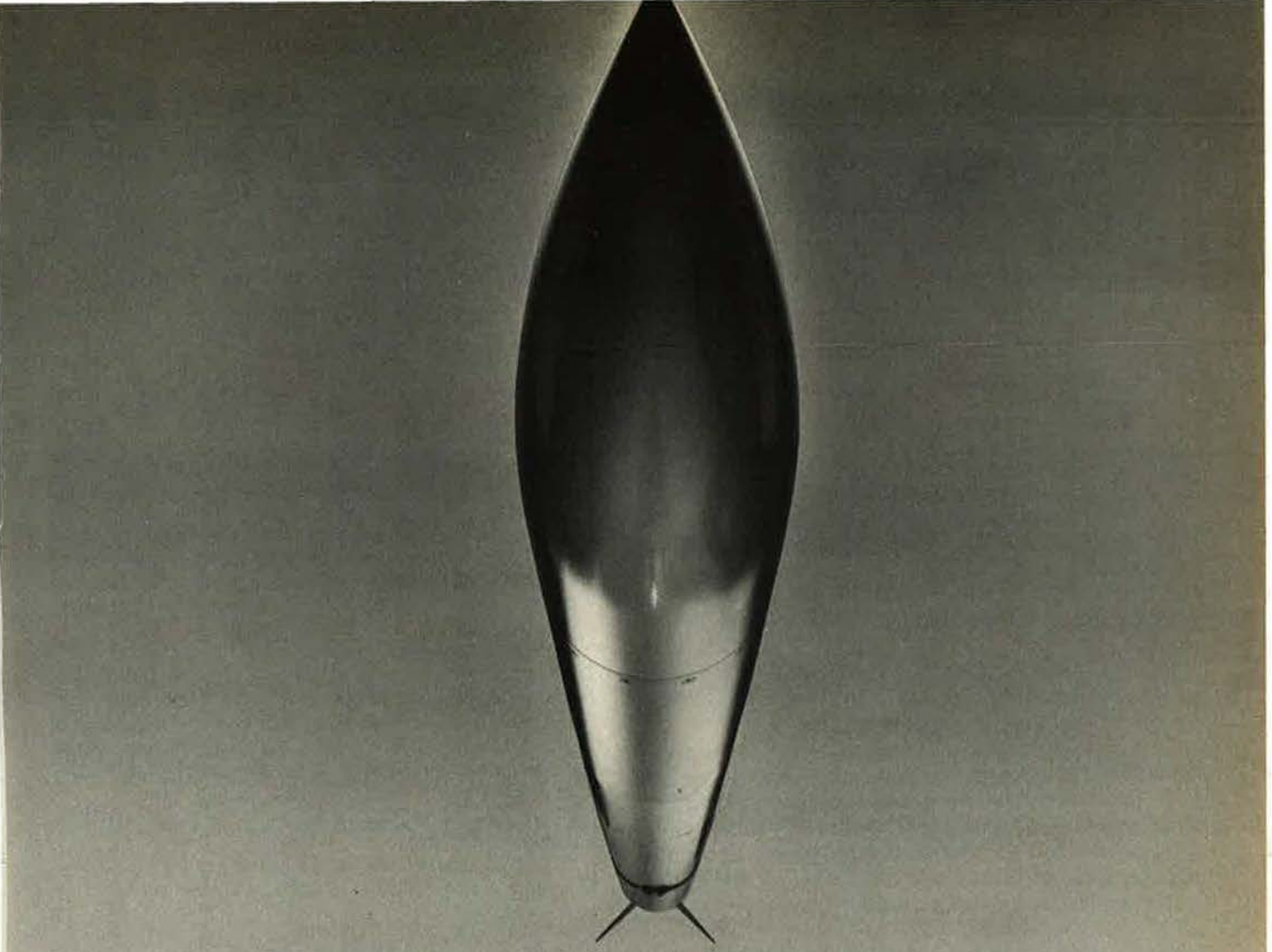
*Boeing Model 767-200 twin-turbofan medium-range transport* (Pilot Press)

Electrical and electronics equipment racks are mounted in an underfloor compartment, which is located forward of the front cargo hold, and an APU is mounted in the fuselage tailcone.

| | |
|---|---|
| DIMENSIONS, EXTERNAL: | |
| Wing span | 47.24 m (155 ft 0 in) |
| Length overall | 48.29 m (158 ft 5 in) |
| Length of fuselage | 47.24 m (155 ft 0 in) |
| Fuselage width, max | 5.03 m (16 ft 6 in) |
| Height overall | 15.37 m (50 ft 5 in) |
| Tailplane span | 18.62 m (61 ft 1 in) |
| Wheel track | 8.64 m (28 ft 4 in) |
| Wheelbase | 19.69 m (64 ft 7 in) |
| Passenger doors (two, port, each): | |
| Height | 1.88 m (6 ft 2 in) |
| Width | 1.07 m (3 ft 6 in) |
| Service doors (two, stbd, each): | |
| Height | 1.83 m (6 ft 0 in) |
| Width | 1.07 m (3 ft 6 in) |
| Emergency exits (two, each): | |
| Height | 0.97 m (3 ft 2 in) |
| Width | 0.51 m (1 ft 8 in) |
| Cargo doors (two, fore and aft): | |
| Height | 1.75 m (5 ft 9 in) |
| Width | 1.78 m (5 ft 10 in) |
| Optional cargo door (fwd, port): | |
| Height | 1.75 m (5 ft 9 in) |
| Width | 3.40 m (11 ft 2 in) |
| DIMENSION, INTERNAL: | |
| Lower deck volume | 87.84 m³ (3,102 cu ft) |
| WEIGHTS (estimated): | |
| Weight empty | 71,967 kg (158,660 lb) |
| Operating weight empty | 78,758 kg (173,630 lb) |
| Max T-O weight | 126,940 kg (279,850 lb) |
| Max zero-fuel weight | 108,862 kg (240,000 lb) |
| Max landing weight | 115,666 kg (255,000 lb) |
| PERFORMANCE (estimated, at max T-O weight unless detailed otherwise): | |
| Normal cruising speed at 11,885 m (39,000 ft) | Mach 0.80 |
| Approach speed at max landing weight | 134 knots (248 km/h; 154 mph) |
| T-O field length | 2,315 m (7,600 ft) |
| Design range | 2,110 nm (3,910 km; 2,430 miles) |

*Mockup of Boeing 767-200 tourist class cabin arrangement*





# AMRAAM

Distinctive body-lift, tail-control design of Northrop's Advanced Medium Range Air-to-Air Missile (AMRAAM) reduces aerodynamic drag now limiting usefulness of winged missiles.

The result: greater firepower because more missiles can be carried without degrading aircraft performance. Also, wingless missile can attain higher average velocity for quicker intercept at greater distance.

AMRAAM is first radar-guided missile specifically for tactical use by newest U.S. fighters (F-14, F-15, F-16, F-18) against superior numbers of highly maneuverable targets. Smaller, lighter, more accurate, more reliable, more maintainable than current radar-guided missiles. And designed to cut cost by half.

Northrop teamed with Motorola for joint U.S. Air Force/Navy program to select contractor to develop and produce AMRAAM. Northrop/Motorola team has proven experience in advanced tactical aircraft total weapon system integration, active seeker technology, RF signal processing, precision inertial guidance and control, fuze and warhead technology, ECCM.

**NORTHROP**

Making advanced technology work.

If SALT II provisions do not result in essential equivalence, they should be resisted. The US should abandon the talks when they are no longer constructive, these two experts contend.

# SALT: A GLOOMY FUTURE

BY BEN T. PLYMALE AND THOMAS P. RONA

FROM the ten years of strategic arms limitation talks, two conclusions have emerged:

• SALT I has caused, or at least has failed to preclude, major adverse changes in the United States posture vs. that of the Soviet Union.

• SALT II, by pursuing essentially the same approach as SALT I, is likely to produce more adverse posture changes.

If those changes can be used by the USSR for political leverage, it is conceivable that cumulative degradation of the US strategic posture may become irreversible.

In this article we examine the extent to which specific features of the currently pursued SALT negotiations support our stated foreign policy objectives and describe how this support could be enhanced, particularly in relation to strategic stability. Broader geopolitical issues are omitted in order to focus on the weapon technology and performance aspects of stability and deterrence.

### Strategic Arms Control and US Policy Objectives

The basic US policy objective of strategic nuclear forces is to maintain essential equivalence with the Soviet Union. This objective was explicitly stated by Defense Secretary Harold Brown in the February 2, 1978, military posture hearings of the House Armed Services Committee, in these words:

> ". . . But if deterrence of nuclear war is our most fundamental defense objective—and it surely is—what counts is what Soviet civilian and military leaders believe. On that score, unfortunately, we face another uncertainty. What we see as sufficient for security may appear as quite inadequate to them. What would deter us might not deter them. What some of us consider credible as a deterrent, they may dismiss as a bluff. Great caution and careful hedging are essential in the face of these uncertainties. Basically, they require us to insist on *essential equivalence* with the Soviet Union in strategic nuclear forces. *Because of the stakes, no lesser requirement will do.* (Emphasis added)
>
> "We do not propose to plan against total irrationality. Rather, the issue is how to make it clear to the Soviets that they cannot gain any military or political advantage from their strategic forces. Insistence on essential equivalence guards against any danger that the Soviets might be seen as superior—even if the perception is not technically justified.
>
> "By essential equivalence, we mean the maintenance of conditions such that:
>
> • "Soviet strategic nuclear forces do not become usable instruments of political leverage, diplomatic coercion, or military advantage;
>
> • "Nuclear stability, especially in a crisis, is maintained;
>
> • "Any advantages in force characteristics enjoyed by the Soviets are offset by US advantages in other characteristics; and
>
> • "The US posture is not in fact, and is not seen as, inferior in performance to the strategic nuclear forces of the Soviet Union.
>
> "These conditions exist today, and our objective in the current SALT II negotiations is to maintain them in the future. . . ."

This look at the past and currently proposed SALT provisions will help determine the extent to which they support the Defense Secretary's four conditions, referred

to as *deterrence, stability, asymmetries,* and *perceptions.*

In view of the fundamentally different Soviet national goals and policy objectives, the US can only rely on explicit, mutually binding, and specific treaty provisions if the outcome of arms-control negotiations is to serve as a significant component of our strategic posture. Declarations of principles, of intent, or of unilateral "understandings" may be interesting as elements of a negotiating process but cannot form the basis for a serious comparison of the relative US/Soviet strategic postures, except insofar as we unilaterally elect to observe such provisions. Indeed, one may surmise that some of the distrust surrounding the SALT negotiations originates in the multiplicity of imprecise and often superficially stated commitments of SALT I by which, as events to date have proven, only the US has demonstrated self-restraint.

It is the *binding* SALT treaty clauses, past and proposed, that need to be assessed in terms of their implications for our longer-term strategic posture and the policy objectives listed above.

### Deterrence

Deterrence has been the chosen instrument of the US to prevent the Soviets from using their military power as "instruments of political leverage, diplomatic coercion, or (for securing further) military advantage." In the context of a major nuclear exchange directly involving the US and its allies, deterrence means that if the Soviets escalate hostilities to the point where our vital interests are clearly threatened, we will respond by inflicting unacceptable damage on both military and civilian sectors of their society. The US strategic forces must therefore be capable of targeting, or holding at risk, an adequate number of Soviet societal elements whose loss would not be worth the gain the Soviets might expect by employing their military forces.

Our vital interests in this formulation include the sovereignty and integrity of the US as well as the preservation of its social structure and form of government against changes involving the use of force. They also cover, within the limits of mutual defense treaty stipulations, the sovereignty, integrity, and safety of our allies. The credibility of our commitment to protect the vital interests of our allies is one of the fundamentals of global stability as seen by senior US policymakers of the past three decades; it is unlikely that this credibility will be allowed to deteriorate further in the foreseeable future.

The specific targets for a US strike following failure of deterrence are to some extent scenario-dependent; our concept of "unacceptable damage" has also changed as the Soviets have acquired respectable (and many say superior) nuclear forces of their own. The massive Soviet investment in air defense, their suspected progress in antiballistic missile defense, and their intensified civil defense since the 1972 SALT I treaty have introduced additional elements of uncertainty into US force requirements. It is, however, generally accepted that credible and effective deterrence of a superpower, such as the Soviet Union, requires the capability of destroying the targets associated with the civilian government apparatus, the military command and control structure, and, more generally, with the ability to survive as a viable national entity in the economic or military sense.

The projection capability of nuclear or conventional military power and the recovery of the economy following a nuclear exchange are considered important elements at risk in this context. (This is quite in contrast to a popular, but quite erroneous, association with deliberate and indiscriminate destruction of cities and civilian populations.) To retain its credibility against the evolving Soviet target set, the US strategic deterrence mission thus requires:

- A total strategic nuclear weapon throw-weight sufficient to ensure coverage of several, and perhaps many, thousands of aim points forming part of the Soviet target set;
- The throw-weight to be *deliverable, i.e.,* available, survivable, and capable of penetrating the enemy defenses;

**"The Soviet target set is increasingly dispersed and protected; our nuclear forces are de facto throw-weight constrained."**

- Small enough nuclear warheads to accommodate the limited throw-weight of the bulk of US launchers while satisfying the aim-point coverage requirements;
- Relatively high accuracy in view of the increasing level of passive protection of the Soviet military and industrial targets.

The SALT I and II agreements attempt to impose an equal ceiling on the number of launchers or strategic nuclear delivery vehicles (SNDVs), including ICBMs, SLBMs, and manned strategic aircraft carrying air-launched weapons. In fact, the agreements heavily penalize the US in terms of total deliverable throw-weight, since our average throw-weight per launcher projected for the 1982–1986 period is less than one-half of the corresponding Soviet value. Even assuming that US nuclear forces are not degraded by preemptive attacks, the SALT-imposed ceilings on launchers render our deterrent capability questionable. The Soviet target set is increasingly dispersed and protected; our nuclear forces are *de facto* throw-weight constrained.

The Soviets, on the other hand, with large average launcher throw-weights and high-accuracy MIRV technology available in the near term can easily target unprotected US military and industrial assets, and at the same time present a major and growing threat to the US ICBMs and strategic bombers. (The Soviet threat against the US urban/industrial and unhardened military targets comprises the Soviet submarine- and aircraft-launched nuclear offense weapons in addition to their ICBMs.) The SALT agreements as currently being nego-

tiated do not preclude further growth of this threat since only the launcher *numbers* are to be limited. Under this growing threat, the expected number of surviving US ICBMs decreases to the point of becoming marginal. Even worse, the effects of uncertainty regarding accuracy and reliability of the Soviet weapons may well *exceed* the nominal estimates of the number of surviving ICBMs.

One must conclude that equal "ceilings" on SNDVs, without concomitant limits on total throw-weight, is contrary to US policy objectives that stress deterrence. Other policy considerations may outweigh this argument, but from the viewpoint of deterrence by means of the "assured unacceptable damage" threat, it requires a serious reappraisal of our negotiating posture.

### Stability

The basic idea of stability/instability is very simple. Two sides face each other; they are both powerfully armed and significantly vulnerable. If he who shoots first wins (or thinks he has a high probability of winning), the situation is *unstable*. Indeed, even if he is only *afraid* that not shooting first may place him at serious disadvantage, he may feel compelled to shoot first. Since there is an obvious advantage to such an initiative, any confrontation contains the distinct possibility of escalation to shooting. On the other hand, if he who shoots first loses (or at least sees no military advantage to shooting first), the situation is *stable*; there is an obvious incentive for both sides to hold their fire and to try something else. This offers reasonable probability of avoiding a nuclear exchange in a conflict situation. Whether a balance of forces is stable or unstable depends on the technical characteristics of the weapons and targets as well as on the levels of actual deployment.

To ensure stability from the US viewpoint, the Soviets must clearly perceive that, following any nuclear strike and in particular one aimed at preempting our strategic forces, their relative post-strike posture vs. the US will be less favorable. If causing such a perception, which is the essence of stability, is beyond our reach, we should at least ensure a large measure of uncertainty. In no case should a situation be permitted to arise where the potential payoff of a preemptive first strike is so high that taking a calculated risk might appear reasonable.

A blatant deficiency of the past and current strategic arms control process is the disregard of stability criteria in negotiating terms acceptable to the US.

The technical aspects of stability between two opposing ICBM forces are in general poorly understood and have often been misrepresented. This stability is conditioned by two factors:

- The preemptive first-strike *margin* which each combatant possesses over his opponent. This margin is the numerical ratio of effective warheads to credible aim points to be covered by a completely exhaustive first strike. (The term "effective warheads" means the total number of warheads adjusted for reliability and kill probability when targeted at the enemy's launcher. Accuracy, yield, and target hardness are the primary factors in target kill probability, but if active defense is used, the effective number of warheads must also account for losses to the defense.)
- The *incentive* to strike first is the number of his launchers an "aggressor" can protect against the enemy's first strike by a preemptive attack on an opponent's missile force with warheads carried by *one* of the aggressor's launchers.

The preemptive first-strike margin is a measure of superiority in terms of the total force exchange outcome accruing to the initiator of a first strike. If the margin is favorable, (the ratio of effective warheads to aim point is larger than one), the aggressor wins; he will have destroyed all the enemy force while still retaining some portion of his. If the margin is unfavorable (less than one), the aggressor loses; his force is depleted before the complete destruction of the enemy.

To understand the meaning of incentive, suppose the Soviets decide to strike first. Theoretically each of their launchers, equipped with multiple warheads, would kill several of our launchers. Since each of our launchers could have launched multiple-warhead payloads against the Soviet launchers and thus destroyed several of them, the measure of incentive to the Soviets is the number of launchers they can "save" by striking first. This is the product of the two MIRV numbers divided by the factors reflecting the average number of warheads required by each side to effect one launcher "kill." In general, more than one warhead is required to destroy a single launcher, dependent on the hardness of the launcher, on the warhead yield, on the impact accuracy and, most importantly, on the number of aim points that must be attacked to destroy each launcher deployed in a redundant "multiple-aim-point" mode.

**"Under this growing threat, the expected number of surviving US ICBMs decreases to the point of becoming marginal."**

In a broad sense, having a large favorable first-strike margin of superiority ensures a favorable outcome. When both sides have favorable margins, the situation is bilaterally unstable. This is truly the case where "he who shoots first wins." The incentive factor in turn is a measure of the degree of instability.

Targetable and vulnerable basing of any strategic weapon is destabilizing. The instability increases when either the strategic weapon or its opposing force consists of highly MIRVed missiles with effective warheads. The current instability concerns in the US should be the targetability of our ICBM launchers in view of the Soviet MIRV capability, the large yields of their warheads, and the ominous, albeit controversial, rate of progress in their

delivery accuracy. If not today, then certainly within the next decade, the Soviets may come to believe seriously that preemptive attacks against our ICBMs can pay off. If surreptitious attrition threatens our sea-based deterrent or a major change in undersea surveillance technology makes missile-firing submarines targetable, then in any serious crisis the Soviets may be tempted to accept the risk of attacking the US ICBMs and SLBMs.

Soviet military doctrine has traditionally emphasized the essential role of mass, surprise, and confusion of the enemy. In a serious crisis, reinforced by the conviction that the US will *not* back down, the vulnerability of our strategic offense forces, combined with the Soviet proclivity for mass and surprise, may well precipitate a Soviet nuclear attack.

The possible US payoff for preemption against Soviet ICBMs is much less. Even though we might lead the Soviets in weapon accuracy, our warhead yields are smaller and, under present plans, are expected to be fewer by the early 1980s than those of the Soviets. In the present and expected state of respective vulnerabilities of the two target systems, a US first strike is inconceivable; it would assume that the Soviets would rather lose their ICBMs than launch them on warning against the US.

Be this as it may, the current and proposed arms-control treaty provisions largely fail to promote stability. In SALT I, the limitations on the number of fixed launchers also limit the number of aim points, thus essentially depriving the forces of the protection offered by multiple-aim-point basing. With no limits imposed on the missiles *per se,* throw-weights and thus destructive power can be increased greatly. The combination of these two effects could result in high margins of superiority for both sides, with high incentive to strike first. This condition of bilateral instability is highly undesirable. Current SALT II negotiating positions would assure continuation of bilateral instability. The ICBM forces would remain targetable under provisions prohibiting land-mobile or multiple-aim-point deployment modes.

In summary, the past and current SALT negotiations have utterly failed to provide for the essential ingredient of stability, *i.e.,* the *survivability* of the most flexible and potentially most powerful components of the US triad, the ICBMs.

### Asymmetries

In the proposed SALT II agreements, the treatment of US strategic bombers fails to bear out our determination to offset unilateral Soviet advantages in force characteristics in "other areas."

According to explicit statements by the President and by the Secretary of Defense, the mainstay of our current bomber force, the B-52s, will have increasing difficulty in penetrating the continually expanding Soviet air defenses. The whole rationale supporting US cancellation of the B-1 was based on its questionable penetration capability relative to cost. Reliance on the air-launched cruise missile (ALCM) to penetrate is stated to be crucial to the viability of the strategic bomber, and thus to the whole triad concept.

In the proposed SALT II treaty and/or in an associated "protocol," the ALCM may be seriously restricted. Testing and deployment of armed ALCMs with a range greater than 600 kilometers may be limited to heavy bombers. The development, testing, and deployment of all cruise missiles with a range greater than 2,500 kilometers may be prohibited.

This means that US cruise missile carriers must penetrate to within approximately 1,350 nautical miles (nm) or less of their designated targets. Under such circumstances, the Soviets obviously could be expected to invest in a forward air defense barrier up to 1,000 nm from their borders. That is well within their technical capability; it is not restricted in any way by the present or proposed SALT treaties. Such forward defenses would cause significant attrition of US missile carrier aircraft. The proposed range limitation on ship- or ground-launched cruise missiles (600 km or 325 nm) means that, for all practical purposes, the US must renounce their use in a strategic nuclear mode; they indeed are of questionable value even in the theater nuclear mode.

By way of contrast, a very large proportion of high-value US military and economic targets are within easy reach of the seacoast. So, giving the Soviets full credit for respecting the *unverifiable* range limits on cruise missiles, these targets are fully accessible to their sea-launched cruise missiles, while Soviet targets are being pushed farther and farther out of our reach.

It is hard to perceive where in "other areas" this obviously "unilateral Soviet advantage" afforded by geography and by the distribution of societal assets would be offset. Certainly not, in view of the B-1 cancellation, by investing in more advanced strategic aircraft with unquestionable penetration capability. Neither are we likely to be permitted, if the Soviet view prevails, to use commercial-derivative aircraft as cruise missile carriers.

On the other hand, the Soviet Backfire bomber is not to be counted within the number of strategic nuclear delivery vehicles. The Soviet Union has indicated willingness to make an informal declaration (outside the contractual forms of the proposed treaty) of intentions not to employ the Backfire in an intercontinental role, not to deploy it in a fashion threatening the United States, and not to raise the production rate above the present level (which the Soviet Union refuses to disclose). According to Soviet indications, planned increases of the Backfire's asserted operational radius of 2,200 kilometers will not be large enough to give it an unrefueled intercontinental operational radius. But no US bombers are capable of striking many targets within the USSR and returning to their original takeoff bases without refueling.

Still another matter, indicative of the unevenly applied criteria, is the question of the mission/status of heavy bomber fleets on both sides. The Soviet inventory includes ninety to 100 heavy bomber variants—reconfigured for reconnaissance and antisubmarine roles but still retaining their bomb bays. According to the Soviets, these variants are not to be counted as strategic nuclear delivery vehicles. A question not yet answered is whether US B-52 bombers in protective storage are to be counted.

On balance then, the US has been and apparently still is willing to accept asymmetries favoring the Soviets on the various grounds that (a) the Soviets have to feel secure in possession of a credible deterrent; (b) they

have different, and close-by potential enemies across their borders; and (c) the US has long enjoyed an unjustified degree of strategic superiority. The Soviets, in contrast, are deliberately and systematically aiming at substantial degradation of our existing posture, both by constraining our capabilities and by increasing both the active and passive threats against our offense forces. In the particular case of the strategic aircraft, one is hard pressed to find a single instance where the unilateral and growing advantage to the Soviets is offset by even a semblance of advantage to the US. Once again, the practical clauses of the SALT treaty, agreed to or in negotiation, contradict the posture statements of our senior officials.

### Perceptions

In several specific instances, the wording and the interpretations of arms-limitation treaties, as well as subsequent actions by the Soviets and the US respectively, cause the perception of strategic balance to shift in favor of the USSR.

In the SALT I agreement, we allowed the Soviets 308 launchers with large throw-weight missiles, which we unilaterally defined as in excess of the SS-11's volume, while we agreed to not have similar large missiles. The Soviets did not agree to this specific volume and subsequently deployed additional missiles larger than this limitation. As a result, the Soviets have much larger deployed throw-weight. Both sides, and other nations, perceive this as a Soviet advantage. Indeed, the Jackson Amendment to the SALT I agreement demanding parity in future negotiations was an admission or validation of Soviet superiority. Since signing the SALT I agreement, the Soviets have continued to upgrade their large missiles with even larger throw-weight capability while we have retained our pre-SALT I missile programs. This further heightens the perception of Soviet superiority; the SALT II provisions, as being negotiated, do nothing to redress this imbalance.

By way of contrast, the US has deliberately avoided taking full advantage of the developments and deployments authorized by the treaty; *e.g.*, in spite of the authorized limits in SALT I, we have dismantled our operational ABM sites. In many cases we have unilaterally chosen to apply the treaty provisions in the most restrictive, rather than the most permissive, interpretation, *e.g.*, we have stopped the B-1 program without a Soviet *quid pro quo;* we have not even developed, let alone deployed, mobile ICBMs; and we have no developmental or operational satellite-killer weapons. Our technology insurance programs are moderately funded and aimed mostly at avoiding surprises in basic technology.

In the more general matter of national attitudes, the United States has favored strategic arms control as a matter of policy, prompted by our fundamental desire to live in a peaceful world in which our political system and our way of life are not threatened. In the late 1960s there also was a fleeting hope of reordering our domestic priorities, to reduce the expenditures for defense, and to use the resulting military dividend for socially worthwhile purposes. This attitude still lingers at the very top of our government; when in the slightest doubt about the need or the value, we invariably opt to constrain or defer defense programs in order to reduce total expenditures.

*Ben T. Plymale is vice president for business development of Boeing Aerospace Co. He directed the company's programs for Minuteman, the Short-Range Attack Missile, and the Air-Launched Cruise Missile. Thomas P. Rona earned degrees at the Sorbonne in Paris and at MIT. With Boeing since 1959, he heads the company's office on National Requirements and Strategy Development.*

Other countries may well perceive our attitude in these matters as a military weakness.

A number of recent US diplomatic and military decisions since the mid-1970s adds to increasing perceptions of Soviet superiority. The announced intention to withdraw troops from Korea, noninterference in Angola, our refusal to get involved in the Horn of Africa, and, most recently, the irresolution surrounding the neutron bomb, all reinforce the growing impression of US strategic inferiority, especially when Soviet propaganda never fails to attribute such decisions to their ever-increasing strategic supremacy.

The Soviet attitude toward limitations imposed by arms-control treaties is markedly different from that of the US. They may not have violated the existing treaty in the strictly legalistic sense (there are many who think that illegal actions *have* taken place, in spite of all the treaty loopholes that render such actions quite superfluous) but they have taken full advantage of every possible omission, lack of precision, or permissiveness in the now prevailing agreements. Their purpose seems to have been to relentlessly improve by all possible means the Soviet strategic posture to the detriment of ours. Thus, they have vigorously pursued an ICBM upgrading program resulting in a 1976 total nuclear strategic throw-weight roughly eighty percent higher than that of the US in all basing modes. Projections through 1985, based on current programs on both sides, indicate that this figure will rise to about 150 percent; *i.e.*, the Soviet total throw-weight will reach 2.5 times that available to the US. The Soviet civil defense investment, if successful, could essentially negate the original intent of the ABM ban to leave the urban/industrial targets unprotected. It is remarkable that the SALT I agreement is completely silent on the subject of passive civilian/industrial defense. Neither have the Soviets shied away from massive investments in exotic ballistic-missile defense technology, and their antisatellite weapons have only recently been publicly recognized by the US Department of Defense. Other nations will certainly perceive these actions as resulting in Soviet superiority.

The strategic arms control negotiations are conducted in what could be described as an atmosphere publicly humiliating for the US. We have often accepted unequal and imprecise terminology (as for instance at Vladivostok where no throw-weight limitations were placed on missiles, no constraints placed on modernizations, and no mention made of the nuclear-armed cruise missiles). The Soviets rejected out of hand our comprehensive March 1977 proposal, which included substantial reduction in numbers tending toward eventual elimination of all nuclear weapons. They also publicly rejected any linkage with pursuit of our mutual interests in other conflict areas. We have been making one concession after another on essential points. The progress in these negotiations,

publicized by Soviet propaganda, presents to the world the view that the US is knuckling under to the clear and growing supremacy of the Soviets and to the famous correlation of forces. If adverse perceptions of the US posture are to be avoided, US public declarations must reemphasize our determination to support at the implementation level our declared policy objectives.

### Positive Action Clauses

In reviewing the past negotiations and analyzing the rumors from those in progress, one is impressed by the large number of provisions that are restrictive in nature and therefore require verification of actions that have not taken place. Very few clauses are aimed at positive obligations in the sense of "thou shalt" as contrasted to "thou shalt not." It would be interesting to speculate what would happen if SALT were to impose an *obligation* on the two parties to provide maximum survivability of their offense forces and to disclose information about the survivability of their own and of their opponent's weapons. It would also be interesting to explore what would happen if both opponents were compelled by treaty to disclose such other essential information as their warhead types and production rates, the location of fixed missile sites, the number and acoustic signatures of submarines on station, and general deployment areas. US means of independent verification could then be calibrated and could also promptly detect whether the Soviets act in good faith. This, in time, would alleviate many misgivings associated with the current arms control treaty patterns.

### Some Do's and Don'ts of Strategic Arms Control

Any treaty which the US eventually ratifies should substantially encourage, or compel, the adversaries to invest in systems that are essentially survivable in their prelaunch mode. Specifically:

- The US should insist on mobile land-based ICBMs among those authorized, including redundant deployment modes.
- Antiballistic missile defense of ICBM sites should be permitted, as potentially contributing to launcher survival and therefore to stability.
- Limits should be placed on the number of individual reentry vehicles as contrasted to launchers or platforms. Of the total ballistic missile throw-weight, limits should be imposed for both ICBMs and SLBMs.
- The US should be allowed to implement substantial diversification, dispersion, and redeployment of its strategic offense forces.

In summary, many of these specific proposals can and should be further debated. In conjunction with all the others that are now being discussed, they must be analyzed to determine whether they contribute in a demonstrable way to furthering our objectives of essential equivalence. Any provision that is weak or questionable in that regard should be resisted or discarded. Provisions that are strong and supportive of our stated objectives must be presented as not negotiable. If our policy objectives in regard to strategic nuclear forces cannot be constructively served by further negotiations, then negotiations should be abandoned, or at least recessed, until new political and economic circumstances warrant reconsideration.

There can be no possible political, economic, social, or humanitarian goal that would justify accepting treaties that might lead to strategic instability or less than essential equivalence. Nothing can be more imperative. ■

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## SLOW ROLL

In the early days, Randolph Field, "The West Point of the Air," had nine small satellite airfields that were used for practice takeoffs and landings during the preliminary stages of basic training. These installations were very rustic and had no lavatory facilities. With more and more students coming into the Army Air Corps, and to ease the suffering of the weary flight instructors, the decision was made to install toilets in these outlying installations.

When the first latrine was completed, it was decided to have a tape-cutting ceremony to properly inaugurate this improved facility. In due course, on a beautiful sunny Texas afternoon, the ceremonies commenced.

In the midst of this important function, the hum of airplane engines grew louder and louder, until all at once a spectacular formation of twenty-seven shiny AT-6s came over the field at treetop level.

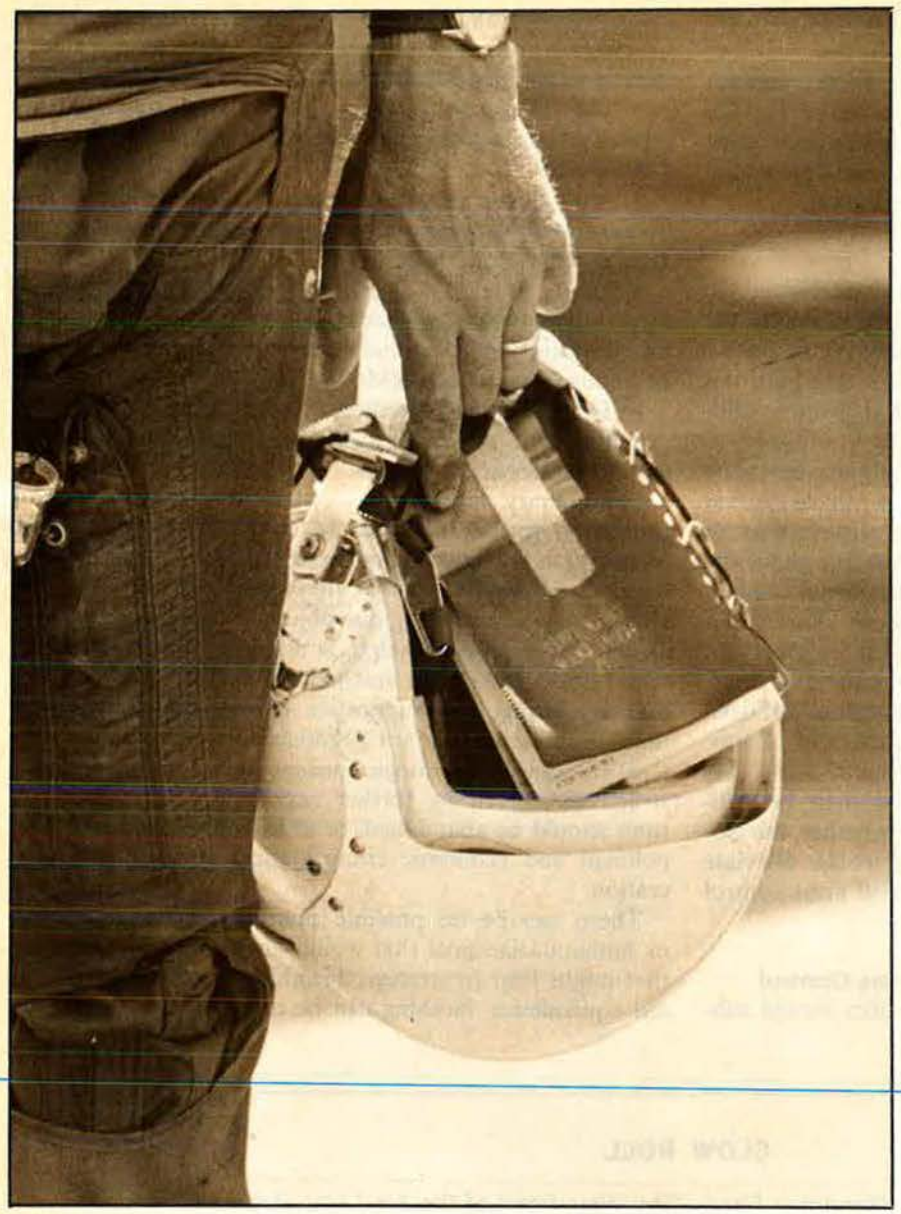
Passing right over the ceremonial area, each pilot threw out a roll of toilet tissue, which quickly unrolled in the windstream and drifted slowly downward onto the participating dignitaries.

As the roar of the twenty-seven propellers in low pitch faded in the direction of the Advanced Flying School at Kelly Field, the Director of Operations grinned at the Director of Flight Training and chuckled, "What do you think of THAT?"

The Flight Director frowned as he removed a strip of tissue that had caught his arm. "Worst formation I ever saw," he rasped. "They couldn't have come through Randolph!"

*—Contributed by Col. Fred E. Bamberger, Jr., USAFR (Ret.)*

(AIR FORCE *Magazine will pay $20 for each anecdote accepted for publication.*)



At first glance, the Air Force seems to have few personnel problems. But dig beneath the surface and you find too many pilots getting out, a shortage of scientific and engineering officers, and troubles in retaining airmen. So officials are taking a hard look at . . .

# Why They're Leaving the Air Force

**BY ED GATES**
**CONTRIBUTING EDITOR**

BY MOST outward appearances, the Air Force is in first-class shape, people-wise. It continues to attract far more "quality" recruits than the other services. Most hold high school diplomas; more than ninety percent who start technical training complete the courses. Stay-in standards are rigid; marginal producers and minor troublemakers, many of whom probably would find a home elsewhere in the military establishment, are weeded out. First-term reenlistments—the key to shaping a career force of merit—are running at a record high of forty-seven percent of the airmen eligible to re-up.

On the officer side, USAF continues to choose its commission candidates from the cream of American youth. Competition for AFROTC scholarships is nearly as keen as for Academy cadetships. Young officers seeking wings are of such a lofty caliber that flying school washouts are down to about ten percent. More than forty percent of all Air Force officers hold advanced degrees, while thousands more are working on theirs. About six of every ten rated officers completing their service commitments elect to stay aboard.

All this, surely, must add up to but one conclusion: USAF remains so well-heeled in the personnel department that, with only a modest effort, it can stay in the winner's circle for years to come.

Unfortunately, that's not so. Appearances are deceiving. There are rumblings beneath the surface. Officials are concerned about what lies ahead, because numerous serious people problems are developing.

### The Pilot Retention Problem

One problem is a pilot exodus that began gaining steam early this year. The 3,000-man pilot surplus of a couple years ago has been nearly erased; a deficit is just around the corner. Part, but far from all, of the problem rests with the nation's airlines, which until 1976 had added fewer than 300 new pilots annually. Suddenly, they are hiring at several times that figure and expect to continue. Up to eighty percent of their new hires—to accommodate growth and replace their World War II pilots reaching age sixty—will come from

the Air Force, Navy, and Marine Corps.

The potentially big salaries the airlines pay attract many military officers. But others say they're hanging up their suits mainly because they're unhappy with service life.

In any event, Hq. USAF officials and field commanders have launched a drive to stem the departures. They're contacting young pilots individually and in groups in an effort to open lines of communication; promote candid discussions concerning the Air Force as a career; and talk about career development, irritants, assignments, etc. Doubtless they're also noting negative aspects of commercial flying, *e.g.*, that just three years ago more than 3,000 airline pilots were furloughed. That unemployment figure still topped 1,300 at the end of last year, meaning that hundreds drew no or only partial pay for well over a year.

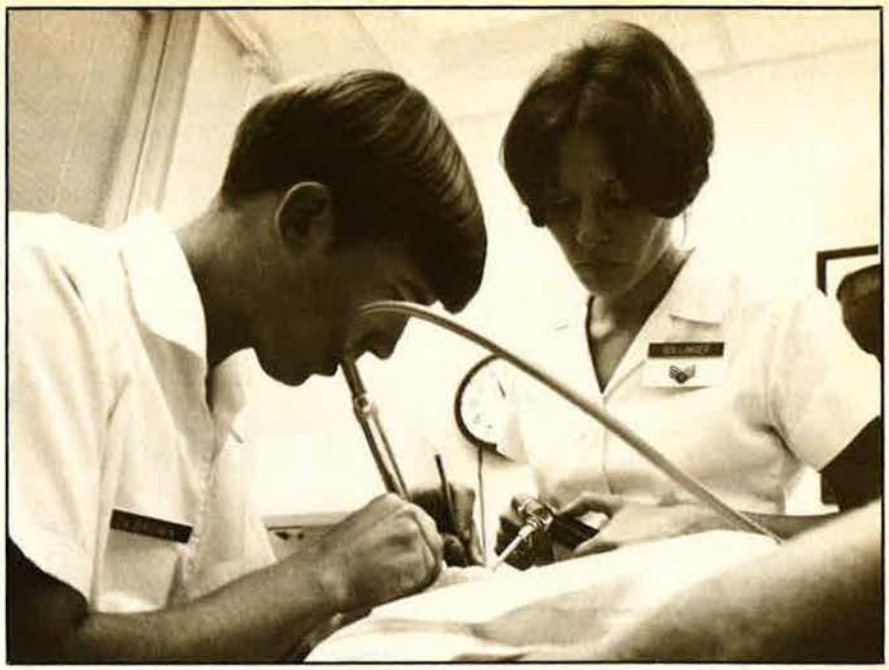
By the end of the current year, USAF pilot retention officials expect to have contacted some 15,000 rated officers for face-to-face talks.

First indications of increased rated losses surfaced in the Military Airlift Command (MAC) last year, as retention of airlift pilots continuing in uniform beyond their obligated service dropped to forty-five percent. The overall USAF average was 62.5 percent.

The increased departures have since extended into fighter, tanker, and other pilot groups. Pilot dropouts Air Force-wide are running about twenty-one percent above earlier expectations, Hq. USAF reports. Among the six-to-eleven-years-of-service group, voluntary pilot separations are up fourteen percent over eighteen months ago, though a shrinking pilot force accounts for part of this.

At the start of FY '77, USAF had 28,017 lieutenant-colonel-and-under pilots and lost 2,487 of them (not including suspensions or promotions to colonel) during the year. The inventory stood at 26,373 at the start of FY '78, last October. Separations through June 1978 totaled 1,485. The actual departures for the two years are expected to be about the same. The forecast is for an increase in the years ahead.

The airlines, USAF believes, will need more than 10,000 new pilots during the next decade just to offset attrition, and about 22,000 if growth predictions hold up.



*Because of lucrative careers in the civilian world, all types of medical personnel are difficult to entice into the services. For a further report on this critical specialist shortage, see "Speaking of People," p. 103.*

### USAF's Positive Approach

But USAF officials aren't wringing their hands. Their shift to the offensive has included telephone surveys of separating pilots, and more recently visits with aircrews assigned to the airlift, strategic, tactical, and training commands. They have found that while the lure of the airlines is a prominent factor in the exodus, it often is not the overriding one. The Hq. USAF office of Lt. Gen. B. L. Davis, Deputy Chief of Staff for Personnel, reports that many pilots contacted complain about erosion of benefits, attacks on the retirement system, family separations due to heavy TDY schedules, "the perceived need to fill squares" (*e.g.*, pursuing M.A. degrees when already faced with heavy work schedules), the OER system, and other irritants.

Many Air Force pilots, according to Military Personnel Center interviews, consider USAF flying better than commercial flying but "are unwilling to put up with the perceived hassle." Of one group of 179 pilots who separated recently, only nine actually had airline job offers. Three of every four said they had no civilian job of any kind lined up.

"Emphasize the institutional aspects of duty to country" and try to lessen or eliminate irritants that drive pilots away, Hq. USAF officials are urging commanders and supervisors. MAC and ATC, particularly, have "well-developed programs to erase irritants and improve job satisfaction," the authorities said.

Coming out soon is a "Commanders' Information Brochure," which authorities say will discuss "in forthright fashion the considerations of both an Air Force and an airline career."

For the first time in seven years, the service is starting to recall—voluntarily—Reserve pilots to extended active duty. The first twenty-five are returning this fall, with 200 more slated to come back next year. These officers hail mostly from a large pilot group allowed to separate two years ago at the height of the then rated surplus.

In addition, new USAF pilot trainees entering service next June and thereafter must agree to serve seven years (one in undergraduate pilot training [UPT] plus six afterwards), instead of the present six. The service, of course, won't get any extra mileage out of the extended commitment for several years. But older UPT entrants—say those who are twenty-five or twenty-six—may dis-

cover that the extra year cuts them out of the eventual airline pattern. The lines lose interest in military pilots in their early- and mid-thirties.

The Navy, with a more serious pilot retention problem—more than seventy percent of its flyers depart after their initial obligation—wants USAF to join forces and pressure the government for more flying pay, a flying bonus, or perhaps both. While the Air Staff is studying the idea of new financial incentives for military pilots, high-level approvals and action seem a long way off.

### Doctors, Scientists, and Engineers

Another tough manning problem concerns scientific and engineering (S&E) officers. Retention has been fairly satisfactory during a period of generally declining officer strength, and S&E requirements have remained relatively constant. But demands in the private sector, where civilian firms pay more than Uncle Sam does, create a situation that puts heavy pressure on USAF recruiters as they comb college campuses for seniors of high quality majoring in S&E-type disciplines. For the full FY '79, USAF is looking for 2,000 new S&E officers.

The most critical of all officer job fields—physicians—remains that way, and could get worse (*see "Speaking of People," p. 103*). As of June 30, USAF was 320 doctors short of its authorized 3,551, but it's no secret that the authorization is pegged well below actual needs. USAF recruiters this year, while signing up 100 percent of their quotas for male and female recruits, nurses, and Officer Training School students, are only at the fifty percent mark for medical doctors.

### Clouds on the Airman Horizon

On the airman side, overall quality remains high, but retention troubles are sprouting in the wings. Because USAF was forced to cut strength severely in recent years, fewer people were recruited. This means that fewer reenlistment eligibles are available now.

General Davis notes, for example, that while the current forty-seven percent first-team re-up rate looks good, it translates into only about 11,500 people signing for another hitch. This is because four years earlier, strength was being cut and recruiting was down sharply. Also, there was an increase of six-year enlistments in 1973–75 and those people are not yet eligible to re-up.

Compare this with a more normal reenlistment year, such as FY '71, when nearly 97,000 airmen were eligible to re-up. Only 20.3 percent did so, but that worked out to nearly 20,000 reenlistees.

#### THE COSTS OF PRODUCING PILOTS

The average cost of turning a nonrated officer into one qualified to wear USAF pilot's wings rose to $206,525 last year. But that's just the beginning. Air Force reports it cost another $147,367 to qualify him for C-5s and $247,106 to make him a B-52G commander. The tab to transform a UPT graduate into a fully qualified F-4 jockey has soared to $560,111! And these outlays do not include routine training that maintains combat-ready skills.

These costs figure heavily in decisions the Pentagon will be taking on future UPT production rates. Currently, the service is turning out only 1,050 new pilots annually, a record low. Plans call for an increase to 1,575 in FY '80 and higher production boosts in succeeding years. But with pilot separations increasing, production may have to be stepped up sooner.

General Davis and his staff are also concerned about:

- The slipping ratio of recruits with high school diplomas. Though still well above the other services, it has dropped from ninety-one to eighty-three percent in four years. This is worrisome, because twice as many non-high school graduate recruits fail to complete their enlistments as do high school graduates. Among the 1974 crop of Air Force recruits, for example, twenty-seven of each 100 high school grads dropped out before completing their hitches. But fifty-four of each 100 non-high school graduates dropped out early.
- The upcoming shrinking pool of youths becoming available for military service. This year, an estimated 1,800,000 males are reaching age eighteen, to be followed by steadily smaller numbers in succeeding years. By FY '94, fewer than 1,400,000 will enter the pool. That means sharply reduced manpower supplies.
- The generally tougher recruiting climate. USAF's top recruiter, Brig. Gen. William P. Acker, declares that "recruiting is getting tougher because the propensity to enlist is down and more and more high school graduates are going to college." The improving employment picture isn't helping either.

Personnel leaders cite additional factors that threaten to undermine retention and dilute airmen and officer quality. They include:

- The failure of military pay raises to keep pace with rising living costs. Again this year the government has "capped" the military-federal pay adjustment at 5.5 percent. Yet the civilian work force, particularly the unionized and public service sectors, enjoy more favorable treatment. As a result, it's tougher to maintain high recruiting and retention standards, officials told AIR FORCE Magazine.
- The December 1989 cutoff for use of the GI Bill. This, General Davis's office maintains, "will provide a strong incentive in the 1980s for members to leave active duty to use their educational benefits."
- The uncertainty about the extent to which retirement benefits will be "grandfathered," and the outcome of recommendations by the President's Commission on Military Compensation (PCMC). USAF officials are especially concerned with the PCMC's trust-fund proposal, a plan Air Staffers say would encourage high-caliber members to leave service after only ten years in uniform.

PCMC proposals generally, according to USAF analysis, would result in greater losses of experienced technicians and managers, higher pilot turnover, a fifteen percent boost in pilot training, and a loss of combat capability.

### USAF Shorted on SRB Funds

The various retention woes are coming under close scrutiny. A host of people at Headquarters in Washington, the Personnel Center at Randolph AFB, Tex., and throughout

the commands are tracking developments and working on solutions. The hub of this effort is a recently established full-time retention shop, headed by Col. R. B. Fink at the Center. It has come up with several initiatives designed to entice more first-termers to sign on again. One initiative lets airmen interested in retraining visit various base working areas to get a better insight into other jobs.

Other recent changes improve airman base-of-preference chances; increase their understanding of the selective reenlistment bonus (SRB), career opportunities, etc.; simplify the procedures for reenlisting; and permit departing first termers in needed skills to reenlist up to three months after they've gone home—after they've checked out the civilian job market.

This latter step, called the Delayed Reenlistment Program, also assures re-uppers their former rank and any SRB money their specialty may call for.

While officials are examining other moves aimed at maintaining the present high-quality force, they operate under severe dollar restrictions. This past fiscal year, for example, the other services have received about four times the $18 million USAF was allocated for SRB outlays. Based on Defense Department criteria, Air Force must limit this money to reenlistees in about forty airmen skills. Currently some 12,500 airmen are receiving SRBs, with a slight increase forecast for the upcoming year.

Typical critical Air Force skills that rate SRB payments include weather specialist, air traffic controller, and medical equipment repair. There is a big demand for such people on the outside, and the pay is attractive.

The average bonus payment rarely exceeds $5,000, and is often insufficient to lasso a talented member the Air Force needs to keep. Col. P. P. Kehoe, Chief, Airman Programs, Hq. USAF, noted, for example, that skilled medical equipment repairmen can start at civilian salaries in the $18,000 range. There is a demand for them at hospitals and physicians' offices throughout the country.

Colonel Kehoe is one of several officials who work the SRB list closely, to make certain it is targeted at the most needed skills. The latest revision of this important list was slated to go into operation the first of this month.

The other services also enjoy a related bonus advantage, in the form of a $2,000 enlistment bonus for new recruits in combat arms. USAF has no such bait. It's penalized for doing the best recruiting job in the military establishment.

### AECP and Other Enticements

All the services, meanwhile, are trying to curb the heavy turnover of recruits failing to finish their first enlistments. These dropout rates—for all causes—currently run from thirty-two percent in the USAF to forty-one percent in the Marine Corps, and the Defense Department is nudging the services to reduce them. It has slapped an attrition "reduction goal" on the Air Force, calling for a cut in losses among FY '79 accessions to twenty-five percent. It will be tough to meet.

*Yesteryear's pilot surplus is becoming a shortage as more opt for civilian life.*

General Davis and his people are not enthusiastic about arbitrarily attaining established attrition goals, for it could mean keeping marginal performers aboard. That's a risky business. A USAF staff study makes this point: "Experience indicates that marginal performers, if not released early in the game, would be subsequently separated for more serious causes with the attendant negative impacts on coworker/supervisor morale and productivity."

A major step in curbing attrition, as USAF authorities see it, is to somehow get the high school graduate recruit intake back into the ninety-plus percent range. It would pay dividends all along the line—in fewer forced exits, more completed enlistments, more re-ups, fewer tech school washouts, etc.

One special project, the Airman Education and Commissioning Program, is a resounding retention winner. Each year's 200 entrants head for college, commissions, and eventual S&E-type assignments, thereby helping fill the large number of such requirements. And it's not for just a couple of years. Close to 100 percent of all AECP products want to serve out full careers. It is one reason officials hope to talk Congress into coughing up more funds to expand AECP so that 300, perhaps more, bright young airmen accumulating off-duty college credits can enter the program each year.

Personnel officials seem reasonably confident the S&E situation won't get out of hand. They're less certain at this point on how the pilot manning problem will work out. The physician shortage, however, remains a king-sized dilemma that seems to be worsening and over which Air Force has little control.

On the overall retention front, authorities feel they can attain their enlistment, reenlistment, and commissioning goals, as they have done in the past, without diluting force quality. But there's one big condition—that they are provided the tools to do the job. The "tools," which can only come from the Administration and Congress, translate into such things as a fair share of pay and benefits for the troops and maintenance of their individual purchasing power. Without them, it could be a different story. ■

Rising fuel costs and a growing dependence on foreign sources are critical Air Force problems. In a war, our bombers and fighters would quickly be hampered without dependable sources of fuel. The Air Force, looking for domestic alternatives, is literally leaving no stone unturned in . . .

# The Search for Jet Fuel

**By RICHARD EARL HANSEN**

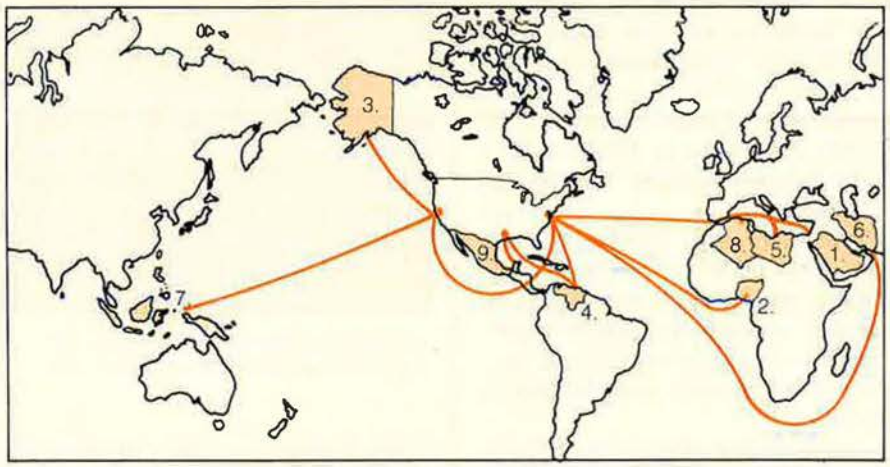
ALTERNATE sources of jet fuel or alternate fuels? Air Force Aero Propulsion Laboratory (AFAPL) experts at Wright-Patterson AFB, Ohio, believe that paths to both must be pursued vigorously. Since the Air Force became a separate service in 1947, scientists and engineers at AFAPL (and its organizational predecessors) have been responsible for developing and verifying the specifications for aviation fuels. Specifications have been designed to assure not only that the fuels would meet all mission performance requirements, but that they would be readily and economically available in times of crisis. As a natural continuation of this work, AFAPL is defining alternate fuels and examining alternate sources of hydrocarbons for aircraft turbine fuels.

Meanwhile, high-level action to forge a national energy policy has been moving at a snail's pace. AFAPL should be able to work more effectively toward secure sources of economical turbine fuels when a national energy policy goes into effect. A comprehensive US policy on energy sources probably would make available more manpower and money for solving this pressing national defense problem, according to Arthur V. Churchill, Chief of the Fuels Branch at AFAPL. He cautions, however, that the time needed for testing—laboratory work, engine runs, and actual flights—can be compressed somewhat, but not beyond certain limits. What, then, are the dimensions of the problem? Will we run out of time?

### Why the Concern?

The economic viability and the security of this country (and of our allies) are heavily dependent on an assured supply of oil. Today the US imports nearly half of its oil, a large part from the Middle East. All oil imports move by way of long oil lines of communication (LOC) that are highly vulnerable to disruption. If hostilities involving the major

**OIL ROUTES TO THE US**




*The map shows the principal trade routes by which oil and oil products from overseas come to the US. The main US ports of entry are Long Beach, Calif., for the West Coast; Houston, Tex., for the Gulf Coast; and the Philadelphia, Pa., and Newark, N.J., area for the East Coast. Last year, Canada furnished 515,000 barrels of oil a day to the US but most of it traveled by highway and rail. The figures below are for 1977.*

| SUPPLIER | THOUSANDS OF BARRELS PER DAY | SUPPLIER | THOUSANDS OF BARRELS PER DAY |
|---|---|---|---|
| 1. Saudi Arabia | 1,585 | 6. Iran | 828 |
| 2. Nigeria | 1,240 | 7. Indonesia | 585 |
| 3. Alaska | 1,200 | 8. Algeria | 563 |
| 4. Venezuela | 908 | 9. Mexico | 179 |
| 5. Libya | 848 | | |

(Source: Department of Energy)

powers were to erupt, the USSR undoubtedly would attempt to cut off oil supplies at the source or, by using its formidable submarine, surface ship, and bomber forces, to interdict tanker routes. Nor can sabotage of the relatively few supertanker ports in the US, mining ocean route choke points, or the employment of surface-to-surface missiles against the LOCs be ruled out.

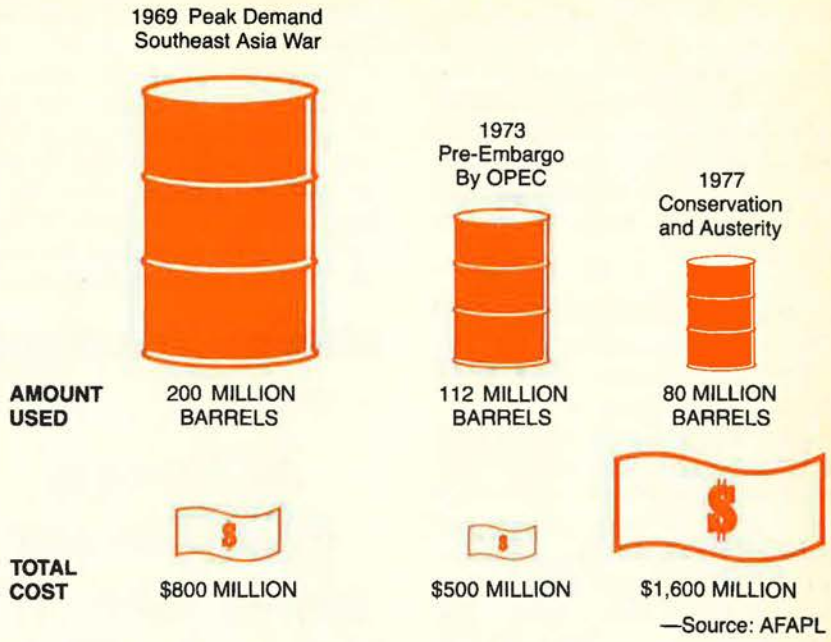
More subtle than the growing military offensive capabilities of the USSR, but no less dangerous, are Russian diplomatic and power moves astride the oil LOC. Keep your eye on developments that reflect a long-range projection of Soviet power where the crude oil is produced, and at choke points along the LOC such as the Strait of Hormuz at the south end of the Persian Gulf and the Strait of Bab el Mandeb leading from the Indian Ocean into the Gulf of Suez. Watch expanding Soviet influence in Africa, especially in the coastal states that flank the supertanker route around the southern tip of Africa.

Another dimension to reckon with is the growing competition among all nations for the dwindling oil resources of the world. Secretary of the Air Force John C. Stetson, in a December 7, 1977, speech at AFA's Iron Gate Chapter, in New York City, had this to say:

> For many years, the Soviets have been totally self-sufficient in oil. They even have been able to export significant amounts to other nations of the Warsaw Pact. But that situation is changing. . . . Before the end of the next decade, *the Soviet Union itself* will be forced to look outside its borders, if it is to meet its growing oil needs in any economically feasible way. . . .The prospect of obtaining low-cost Persian Gulf crude oil by threat or by military force, and then denying it to the free world, certainly has occurred to them. . . .

Beyond these concerns, there is growing evidence of paranoia among the Persian Gulf oil-producing states themselves. Each one seems to fear a possible attack on itself by one of their number with the objective of extending its own oil-producing years, achieving market dominance, and reaping greater profits.

**Figure 1: USAF Consumption of Jet Fuel In Selected Years**



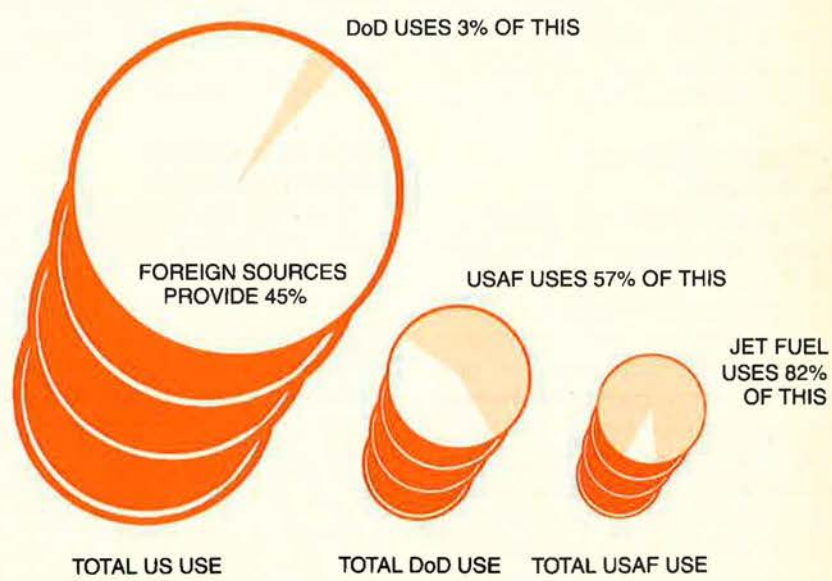

—Source: AFAPL

### The Critical Time Period

From now until the mid-1980s appears to be the most critical time from the standpoint of an assured supply of fuel that will enable the USAF to respond to threats requiring sustained military operations. According to Dr. Herbert R. Lander, Jr., Technical Area Manager of AFAPL's Fuels Branch, the US could be producing significant supplies of acceptable jet fuel by that time if there is a serious commitment of national resources to the development of alternate hydrocarbon sources.

Current timetables show that just to redefine and broaden the specifications for jet fuel to permit using

**Figure 2: Demand Picture for Petroleum in the USA 1977**




(Note that scale of figures is not exact)

—Source: AFAPL

a wider range of domestic hydrocarbons as raw material will take a disturbing *three years,* or to about 1981. Can we wait that long? Also producing an alternate jet fuel from nonpetroleum sources requires that we *start today* to build the mining, materials handling, and production facilities that will be needed. But we must remember that, at this writing, a national energy policy has yet to be decided.

### USAF's Jet Fuel Needs

Some appreciation of the Air Force's fighting needs for jet fuel can be gained from the pictorial graph in Figure 1, p. 75. At the peak of the Southeast Asia (SEA) War, USAF consumed two and a half times the fuel it now uses, but at only *half* the cost. Much of that fuel was refined in the Middle East from Persian Gulf crude and shipped directly to the users in SEA. Today, with conservation in effect, using more simulation, and scaled-down air operations, the Air Force is flying less and paying more than under those war conditions.

Figure 2 may help to place USAF jet fuel needs in perspective. According to AFAPL, the Department of Defense uses about three percent of the total US consumption of petroleum. Of the DoD total, USAF uses fifty-seven percent, and of the USAF share, jet fuel accounts for eighty-two percent. The military demands on total US petroleum supplies in peacetime are rather insignificant. But they can reach greater proportions—and importance—in war, especially if foreign supplies were to be cut off.

### Hydrogen: One of the Big Problems

Since aircraft in the USAF inventory and those now being produced or on the drawing board all use hydrocarbon fuels, AFAPL must concentrate on petroleum-type jet turbine fuels until well into the 1990s. Discarded as impractical were ethanols, methanols, hydrogen itself, and other potential fuel sources. The Department of Energy (DoE) and industry advocate using the vast quantities of coal and oil shale rock in the forty-eight contiguous states to make hydrocarbon liquids that resemble petroleum. Work also is being done on ways to use heavy crude oils and residues now uneconomical to refine, and still in the ground. Crude from Prudhoe Bay, Alaska, is more aromatic and heavier (low hydrogen content) than the crudes the West Coast refineries are set up to process, so refining economies must be devised for them as well. Liquid hydrocarbons to be derived from coal, oil shale rock, and tar sands also will be deficient in hydrogen content. Hydrogenation (hydrotreating) to add hydrogen to these liquids, making them suitable feedstocks for jet fuel production, is costly. No cheap way of producing hydrogen has, as yet, been devised. Energy is consumed to hydrotreat the hydrogen-deficient liquids, and that source of energy is usually other local refinery products or natural gas. As a consequence, the price of jet fuels from these alternate sources will be higher than from currently available crude oils. Advances in technology may make them more competitive, but a national emergency could make price a secondary consideration.

**"Today . . . the Air Force is flying less and paying more . . ."**

### Some Development in Fuel Technology

Good old JP-4, what is it? That straw-colored stuff has been around since the early 1950s. Its specifications were defined way back when there was plenty of oil and it was cheap. While there have been minor modifications to the specs of JP-4 to keep pace with engine technology, it basically has retained those properties first specified to ensure performance and availability.

DoD has assigned the Air Force prime responsibility for all military aviation turbine fuels. In 1974, AFAPL started the Aviation Turbine Fuel Technology Program. The purpose of the program is to redefine the properties of an aviation jet fuel to give adequate availability at acceptable cost. Involved are extensive investigations into fuel analysis, combustion, fuel-system effects, and trade-offs in fuel properties vs. aircraft systems design.

A two-pronged approach was set up by AFAPL. On the one hand are studies to determine how we can broaden specification of jet fuels so as to cut costs of processing conventional petroleum crudes, as well as the lower quality, heavy, hydrogen-deficient crudes we expect to use in the future. On the other hand is research to determine the acceptability of fuels from alternate domestic hydrocarbon sources, *i.e.,* coal and oil shale.

AFAPL began serious evaluation of alternate sources in 1974, shortly after the 1973 oil embargo. In July 1975, a T-39 flew from Wright-Patterson AFB to Carswell AFB, Tex., using fuel derived totally from oil shale. That flight proved the technical feasibility of using fuel from alternate sources. Programs are now under way to develop methods for economically processing oil shale into jet fuel and to investigate the long-term impact of the differing properties of shale oil-derived fuels on aircraft engines, fuel pumps, filters, heat exchangers, auxiliary power generators, airframes, aircraft range, and the environment.

It should come as no surprise that the resulting jet fuel will be a compromise. Not only must all the factors listed above be weighed carefully, but old technology engines (J57, J79) that will be around for many more years must be served

*Richard Earl Hansen flew more than 6,000 hours—400 of them in combat—in three wars, before retiring in 1977 as an Air Force lieutenant colonel. He flew P-38s in World War II in the Pacific, F-51s during the Korean War, and SAC B-47s and B-52s. He was an OSI agent for four years, and served as Professor of Aerospace Studies at Syracuse University. During the Vietnam War, he was a C-130 tactical airlift pilot, operations officer, and squadron commander. Now a free-lance writer, he was Associate Editor of USAF's professional journal,* The Air University Review, *at the time of his retirement.*

by this fuel, as well as the new breed of engines (F100, F101) that lean-burn the fuel more efficiently and smoke-free.

Major studies of fuel processing, analysis, and altered effects of these fuels on combustion components are being done both in-house by AFAPL at Wright-Patterson AFB and under contract with industry. One such contract with a major oil company involved investigating alternative domestic hydrocarbon resources that could provide liquids for jet fuel production. Experiments were conducted with hydrocarbon liquids from three different shale oil conversion processes and two coal liquefaction processes that were refined into a product similar to jet fuel. The liquids from shale rock produced a jet fuel at lower pressures (cheaper) than the coal liquids. Although the shale oils and the coal liquids reacted similarly to hydrotreating, the coal liquids, having very low paraffins to start with, came out highly naphthenic in the processed product. This indicates that the coal products may give some undesirable smoke emissions and a possible reduction of engine hot section life. Conclusions were that oil shale produces a jet fuel more like the present petroleum product than coal liquids and is also technically and economically closer to commercialization.

Another Air Force contract, in this instance with a research corporation, was designed to determine which of the jet fuel specifications could be amended to result in greater availability, and also to estimate the effects those changes would have on the refining industry's willingness to provide such a fuel. Confidential surveys of the refining industry (respondents represented twenty-one percent of US jet fuel production) showed that increased output could result from less stringent specifications for freeze point, boiling point, aromatics content, and smoke point. These increases, which ran from twenty percent to twenty-eight percent as the specifications were varied, were to some degree at the expense of other refinery products.

### Experimental Work by AFAPL

AFAPL experiments now in progress emphasize combustor (burner-can) technology. What, for example, are the effects on turbine engines, as well as emissions, of altered hydrogen and nitrogen content in a range of possible specifications? These studies assess the effects of hydrogen and nitrogen content variation, fuel volatility, aromatic content, and boiling point on performance and durability of combustors in Air Force turbine engines.

A Fuel/Engine/Airframe Optimization study initiated during FY '78 has two objectives, according to AFAPL. First, to determine the extent to which fuel properties can be varied without detrimental effects to any USAF aircraft or mission and to assess cost and availability. Second, to establish fuel properties that will minimize life-cycle costs of aircraft systems. Results will be used as guidance to an Advanced Development Program expected to be started in FY '79 that will determine effects on engine hot section, augmentors, APUs, fuel systems, and airframes so that engineers can go to work on adaptations. This Advanced Development Program is expected by AFAPL to result in the modification of JP-4 specifications within *ten years* to a projected fuel with properties resembling those in the table in Figure 3.

According to AFAPL, validated fuel specifications are a *must* to ensure confidence in engine performance, compatibility with combustion systems, fuel system components, airframe design, and level of environmental emissions of jet fuels derived both from petroleum and alternate sources of hydrocarbon liquids.

Will the timetables and goals described above assure USAF enough jet fuel to support national objectives in an emergency, if foreign oil supplies were cut off? Dr. Lander believes that a national energy policy, when Congress approves one, will give AFAPL a better focus on direction, milestones, and dates. This will allow the laboratory to streamline its programs and concentrate on specific aims. AFAPL now is working on a broad front to be able to go rapidly in the direction that Congress decides is most advantageous to the US. Dr. Lander is confident, because of strong DoD/DoE support, that policy guidance will be received from cabinet level by the end of 1978. A program for converting some ground consumers of petroleum to other energy forms will help free up crude for other critical uses such as jet fuel should a national emergency arise.

In the speech quoted earlier, Secretary Stetson said ". . . the attack on Pearl Harbor was generated in large part by Japan's need for resources, especially oil. And that lesson is relevant today. . . . The potential for conflict over resources still exists and probably will increase."

Making sure that the US has adequate domestic sources for jet fuel—the goal of Air Force Aero Propulsion Laboratory, working with industry—could be a major factor in deterring national emergencies. When that goal is reached, a potential adversary will know that the Air Force is always ready to fly and fight—with jet fuel made mostly from rocks. ■

**Figure 3: Comparative Specifications for JP-4 and a Projected Turbine Fuel**

| | JP-4 (Averages) | Projected (Averages) |
|---|---|---|
| Fuel boiling point (maximum) | 465° F | 600° F |
| Flash point (minimum/maximum) | −10° F | 90-130° F |
| Freeze point (maximum) | −72° F | −50° F |
| Net heat of combustion (minimum) | 18,700 BTU/# | 18,300 BTU/# |
| Aromatics maximum by volume | 12.5% | 35% |
| Nitrogen weight (maximum) | (not stated) | 0.005% |
| Hydrogen weight (maximum) | 14.5% | 13% |

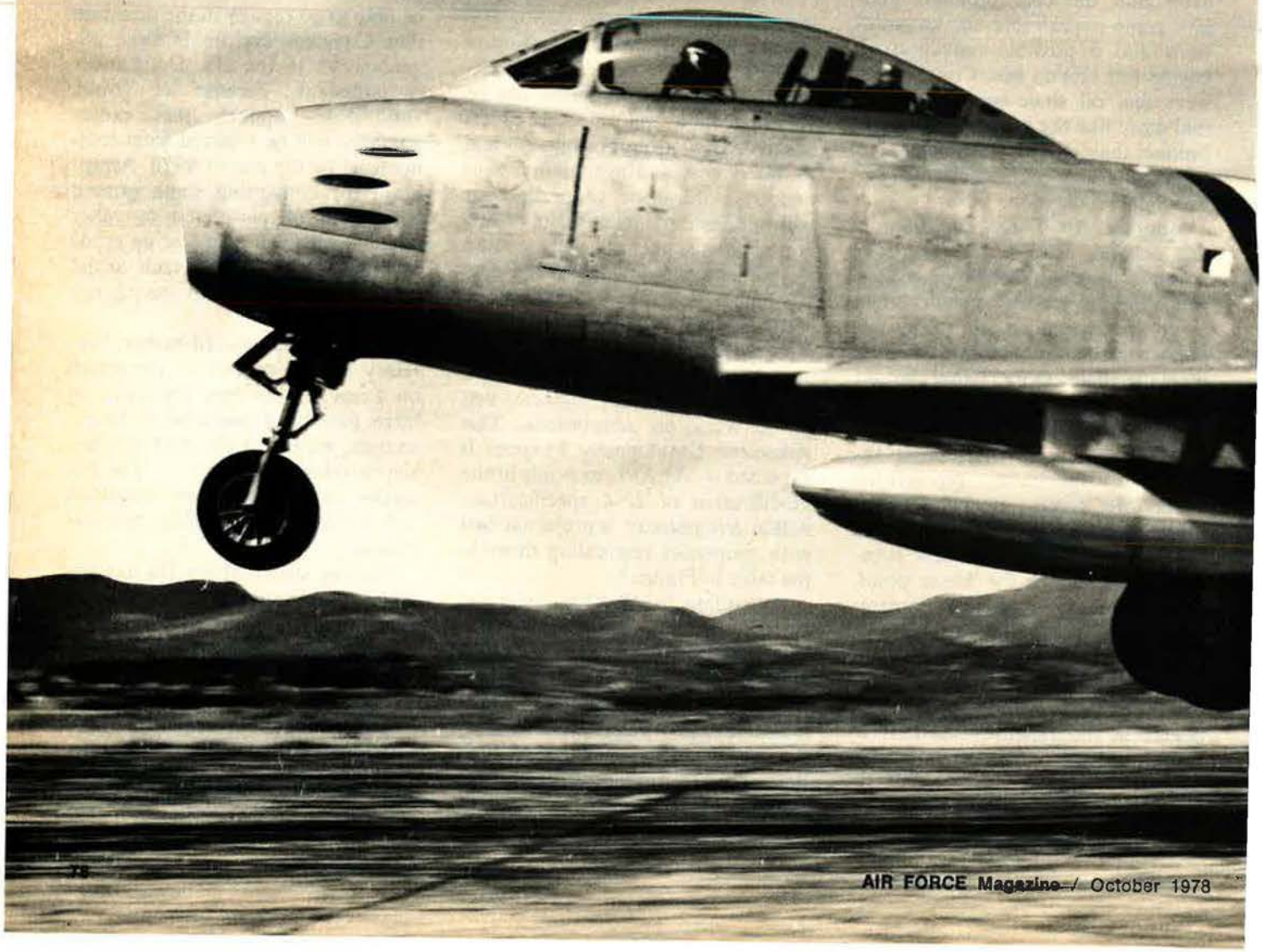
—Source: AFAPL

# My Love Affair With the Sabre

In 1949, a new age in aerial combat was dawning with the advent of the jet fighter. One newcomer—a sweptback beauty called the Sabre—especially impressed the fighter-pilot fraternity. Within two years this machine would be tested in battle in a remote part of the world known as MiG Alley . . .

**BY MAJ. DOUGLAS K. EVANS, USAF (RET.)**

*The Sabre's sleek lines show up well in this F model. Deliveries to USAF of the F began in March 1952, and it was in combat in Korea by fall. All told, 2,540 F models were produced.*



I DON'T remember ever getting such a charge out of seeing a new airplane as I did on my first look at the F-86. That was at Kirtland AFB, N. M., in the fall of 1949. I remember saying, "Look at that—the Spitfire of World War III!"

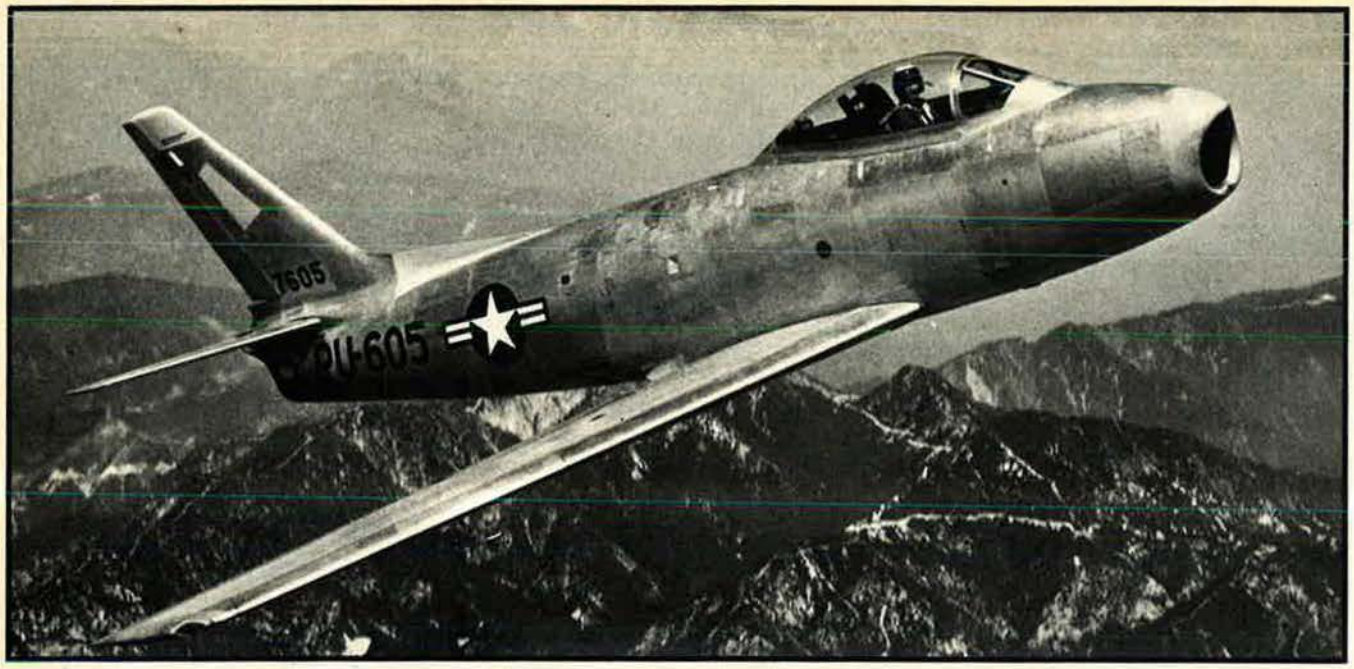
Jet Spitfire? World War III? Little did any who flew the F-86 in its first operational year even dream that within two years some of us would be experiencing the greatest thrills of our lives in that graceful bird in the first great jet battles of history over Korea. Remember now, 1949 was still the early days of jet flying. Any jet was an attention-grabber wherever it appeared. And the Sabre? It was so far out at the time as to be breathtaking. Just sitting on the ramp, it had super-racy lines. You couldn't take your eyes off it. *Everything* was swept back. Without any external appendages, it looked lean and eager, like a falcon poised to leap into the blue.

Later, I flew the Republic F-84C Thunderjet and F-84F Thunderstreak; the North American F-100D and -F Super Sabre; the Grumman F9F-6, -7, and -8 models of the Cougar while on exchange duty with the Navy; and the LTV F8U-1, -1E, and -2 models of the Crusader with the Marine Corps. But no plane since the F-86 has generated quite the same emotion, even the red-hot supersonics.

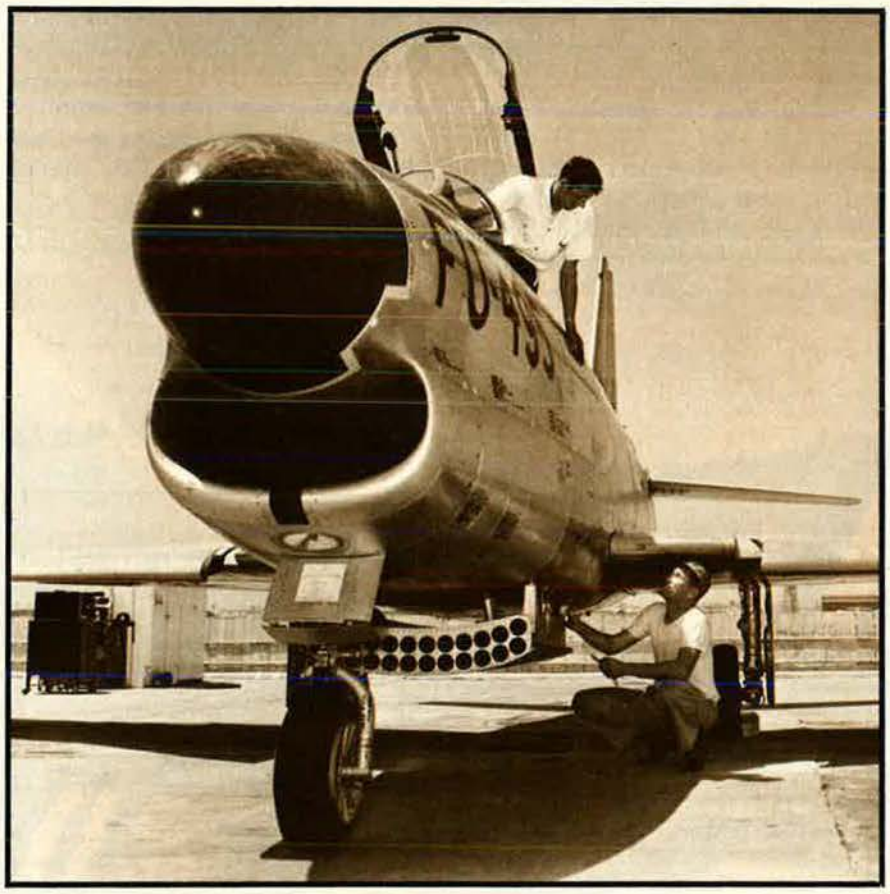
Before we talk about flying the F-86, let's go back over the high points of its early life. While World War II was still smoking, the various aircraft and engine manufacturers had their eyes on the future possibilities of jets, with the German Me-262 providing lots of incentive. North American Aviation began working out jet fighter proposals with both the Air Force and Navy. As plans evolved, the Navy went the straight wing route and got the North American FJ-1 Fury, while the Air Force went along, very wisely, with the idea of thirty-five degree sweepwings that had been first considered by German designers. George Welch, North American test pilot, took up the first XP-86 in October 1947. Speeds above 600 mph were reached with no problems. The first engine used was the General Electric J35, putting out 3,700 pounds of thrust. That engine went on to be manufactured by Allison and powered the straight-wing F-84 Thunderjet series.

In 1948, by the time GE came out with the more powerful J47 of 5,200 pounds thrust—the early standard for the -86 line—the designation of *P-Pursuit* was changed to *F-Fighter*, and the F-86A was coming off the assembly line. It was the first fighter that could be regularly dived through the sound barrier. More notably, it was the second aircraft of any kind to go supersonic.

In 1949, the first outfit to fully equip with the F-86 was the 1st Fighter Group, with the 4th Fighter Group next in line. Both of those units already had extensive jet experience in F-80s. The third to equip that year was the 81st Fighter Group, which had moved from Hawaii to Albuquerque, N. M. They




*The F-86A (above) first flew on May 18, 1948, and in September, one set a world speed record of 670.981 mph. The bulbous-nosed D (right) was the all-weather interceptor version.*



checked out in F-80s while awaiting their F-86s.

The 81st was in the midst of conversion when several contingents of pilots, myself included, were transferred in to fill the squadrons and add to the checkout problem. The quickest solution to get operational was to waive the intermediate F-80 and go directly to the F-86. Two Mustang pilots were picked to try the direct method. It wasn't until the first had his thrill that I learned I was to be the second.

Only days before, George Welch and some slide-rule experts from North American had visited us for performance briefings. The complex ground school already had us prop jockeys in a daze, and topping that off, the terminology of the briefings seemed straight out of Buck Rogers. Also, we were all aware that just a year earlier, Maj. Richard Johnson had set a new world's speed record of 670 mph in an early F-86 production model. To approach such a significant step, or leap, in one's flying experience created the feeling of a serious digestive disorder.

### P-51 to F-86—Solo

There were several "firsts" for me in that initial checkout. Taxiing out with the main gear behind and a steerable nose wheel in front sure seemed strange. So did the bulky crash helmet that prevented a helpful scratching of the head while pondering all those new switches and gauges. After peering around big engines tilted into the sky by tail wheels for all the previous years, the clear view down the Kirtland runway was a reassuring start as I re-

*Maj. Douglas K. Evans, USAF (Ret.), shown here in the cockpit of his F-86A at K-13, Suwon, Korea, in the summer of 1951, earned his wings and commission during World War II. On inactive duty he served with the Air Force Reserve and the Air National Guard. He had separate tours of exchange duty with the US Navy and the Marine Corps. In Korea, he was a flight commander in the 4th Fighter Group, and was credited with two kills and a probable. He took part in the Forward Air Controller program in Vietnam and flew L-19s with the Vietnamese Air Force. He was serving with TAC when he retired in 1968, and since then he has logged some 4,000 hours of flight time in a variety of civilian aircraft. He lives in Fort Myers, Fla.*

leased brakes. With no great thunderous roar of familiar power up front, the departure seemed more like being squirted at the horizon like a wet cake of soap. Other strange things happened fast as soon as my Sabre came unstuck.

In spite of plenty of word on the sensitivity of aileron boost, I didn't really get the message until the wheels left the ground. As if part of this initiation, the landing gear handle, in the early A models, had to be manipulated up or down through an unhandy, notched, keyhole slot. That unfamiliar action with one hand caused inadvertent lateral movement of the stick by the other, and my reaction put me about two cycles behind the sensitive hydraulics. The observers on the ground witnessed the first jet-propelled ornithopter as I flapped away into the desert sky.

Because of the small number of available F-86s, those first transition hops were strictly solo, as there were not even chase planes to spare. This gave us a chance to collect ourselves privately, and catch up with the airplane out of sight of the jokesters.

From the Sabre cockpit the visibility was the greatest of any fighter, anywhere, at least until the F-15 and F-16. That was one key asset in both its combat success and pilot popularity. On the first hop that view was startling, almost a fishbowl effect. No nose, no wings blocking the scenery. From below the shoulders on up you were enclosed in a true window on the world.

The flight controls were so responsive they seemed actuated by thought. Any maneuver, any change of view was available at will. Our exhilaration at flying such a fabulous plane just about matched the velocities we experienced in sensational plunges at the earth, followed by the most gratifying zooms, right back up into contrail country. The F-86 was the first fighter in which a pilot could disregard the old redline bugaboo or any other restriction while cavorting through the sky, playing with Mach numbers and freer than any bird. (We'll overlook the unseemly comment, "Happy as a bird, with a brain to match.")

With only 430 gallons of internal fuel in the clean configuration, we often flew trips of 500 miles, good practical know-how for later glide-stretching missions in Korea. (We found that a good rule of thumb in the F-80, F-84, and F-86 was that, with negligible winds, you could fly as many miles as you had gallons aboard with fifty to seventy-five gallons remaining for the landing pattern.)

### Combat in Korea

Luckily, the F-86 came out at the perfect time, ready when challenged for the sky by its famed antagonist, the Russian MiG-15. That contest in Korea generated some of the biggest, wildest clashes in fighter history during the fall of 1951. Just before one particular brawl, I counted 150 MiGs in three formations converging on our two squadrons of twelve Sabres each. Only in the F-86 could we have made it through such odds without becoming Thanksgiving turkeys.

With all hands flying their planes to the limit in big dogfights, you were apt to find yourself alone with your F-86 in the midst of hungry company, as I did one day. The squadron formation had rapidly split down to elements of two aircraft each. In one maximum rate turn to evade the fire of a pack of MiGs, my wingman snapped out. In the midst of all that churn, we couldn't get back together, so I picked up a loner from another squadron and headed back into the fight. The action was lacing the sky with a giant cobweb of contrails

above the Chongchon River at Kunuri.

I had already seen three planes spinning out of the tangle of contrails and down through scattered clouds. One was a MiG, one appeared to be an F-86, and the other I couldn't identify. Those sights indicated the maneuvering efforts being put out by both sides and my borrowed wingman didn't hang on for long either.

I wasn't aware of that problem as a hard clearing turn put me, to my surprise, right in the middle of a terrific melee. There were -86s firing on MiGs and MiGs firing on -86s. As I was trying to sort out the hassle, I saw a MiG firing like mad on a lone -86, so I took him on a quick, high angle-off and fired like mad myself. I hit him and he smartly broke off the -86 and whipped inside my track and up, while my hasty clearing glance disclosed there were no more friends among the planes around me. I did a couple of quick swishes with my rudder to clear my six o'clock and realized with a shock—no wingman!

I counted six MiGs above on my right, two on my left, and two above swinging to my left, all lining up for a run on me. I knew I was really in for it—all by myself. There wasn't a second to waste. I just pulled hard right to get with the closest and biggest bunch, figuring the bigger the crowd, the more confusion for them and the better for my survival.

Things rapidly got hectic again. A new entry appeared in the show like a hand passing right over my head. Another MiG. Evidently my sudden hard turn had spoiled his pass and he reversed on my left side to scissor me. I scissored into him and he goofed his maneuver, so I reversed when he overshot me. As he was my immediate threat and I was in a bad bind anyway, I figured I'd try to ventilate him. But before I could give him the proper attention, my privacy was invaded by a sound I heard just that one time. I know of only one friend who heard that sound—the distinct and very disturbing muzzle blast of heavy cannon fire—and came back to tell about it. At the same moment I found myself in the middle of a stream of 37-mm and 20-mm tracer shells.

*Bigger, wider, heavier, and faster than its predecessors was the F-86H, final production version of the Sabre. It was powered by the J73-GE-3 engine, an improved version of the J47. USAF received a total of 473.*

I had been fired at many times, but when you consider that jet fighter pilots are enclosed in pressurized cockpits flying at high speeds, the guns have to be darn near sticking in your ear for you to be able to *hear* them.

I went into the most violent left break I ever made, while my head was turned around to view this latest and most dangerous newcomer practically in formation behind me. His nose intake looked as big as the entrance to the Holland Tunnel—with Roman candles spitting out of it!

The leading edge slats on my wings banged out and my F-86A literally swapped ends. A near heart attack situation produced that vital reaction, but I had asked almost too much from my trusty Sabre. In the next instant I found myself in a most unusual position, hanging in the safety belt, my head jammed into the canopy, and the world slowly revolving *above* me. I didn't think about any fancy recovery. I just hauled that bird back into the proper flying business and ended up in a vertical dive.

Checking my six o'clock again, I saw white stuff pouring out of my tail pipe. Then it dawned on me—I was streaming a vertical contrail. Talk about coming out smelling like a rose! To top it all off, I couldn't see another plane in the sky. Whether the MiGs considered me a goner and the shooter had rushed home to Antung to collect his DFC (or Hero button), or they thought that was the trickiest display of "hot" flying they'd ever seen and decided to leave me alone I'll never know. But my F-86 had salvaged my hide for another day.

In those early days of massed MiGs, such "success" stories were almost as welcome as reports of kills. They may not have increased the tally of MiGs shot down, but they did build confidence.

As the war went on, the MiG ranks were thinned by a loss ratio of 10-to-1 in favor of the F-86 and its able pilots. In winning air superiority, the Sabre was the single most influential weapon of the Korean War. That historical achievement is

not widely realized or appreciated, yet it should rank with the most noted air campaigns of other wars.

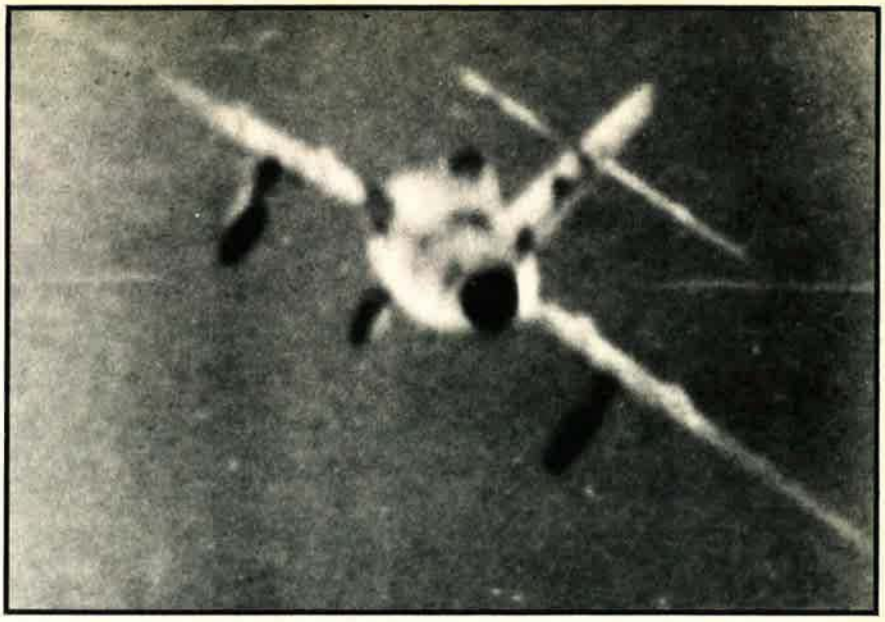
### The Sabre Line Goes On

The -86E was the next operational model after the A, and came into service during my combat tour in Korea. Though it had no more thrust, it did have the new hydraulic "flying tail," as it was called, and an irreversible boost system. No matter what the airspeed, the control pressures were the same and violent reversal maneuvers were easier without so much attention to trim. From that time on, the all-hydraulic flight control system became the world's standard.

My introduction to the latest and hottest of the F-86 line began in ferrying an F model from the North American plant. To get one's hands on a brand, spanking-new fighter right off the assembly line is sort of like a kid's shopping spree at a toy factory. In clean configuration with the added power of the later J47 putting out 6,000 pounds of thrust, the improvement in performance of the F was delightfully evident. That great feeling of handling the best in the blue had yet another boost.

But the original -86A itself had demonstrated some surprising capabilities. Three A pilots on a cross-country got bagged by weather, inoperative navaids, and low fuel, which forced them to land at the first airfield they could find. The strip looked awfully short, but they all made it OK. As it turned out, that small runway was only 2,200 feet long! Following some tests at Wright-Patterson AFB by other -86s, it was decided to fly the birds out of the civilian field. All three got out with plenty of room to spare. One -86A used only 950 feet in its take-off roll!

I was in the first squadron to receive the all-weather version of the -86, the D model, and flew it a few hours before going on a tour of carrier duty with the Navy. Actually, the D was a considerably redesigned airplane, fatter and heavier, with a distinctive radome protruding above the intake. It was the most complex single seater of its day, and our first experience with afterburner, auto pilot, zero reader, and radarscope for intercept. (We summed it up as television and overdrive.) With the burner plugged in, the J47 put out 7,200 pounds of thrust and gave us the chance to read 50,000 on the altimeter.



*This Russian-built MiG-15, its landing gear damaged by the F-86 pilot's fire, burst into flames seconds after this gun-camera picture was taken. F-86s enjoyed a 10-to-1 margin of victory over MiGs in air-to-air combat.*

The D and later modified L went on for many years as first-line night/weather interceptors for air defense of the US and our overseas theaters. The K model was introduced for foreign sales and production. The D, L, and K versions were identical in appearance except for the gun ports of the 20-mm cannon in the K that replaced the rocket pack that popped out of the bellies of the D and L.

The final US Air Force version of the -86 was the H model. It came out in the mid-1950s and was really a different airplane. Much larger and heavier than its forebears, it used the J73 engine with 9,000 pounds of thrust. Some versions had the original F-86 armament standard of six .50s while others carried four 20-mm cannons. The H was considered one of the best nonafterburner fighters produced and became a great favorite of the Air National Guard for many years. In all, more than 6,000 F-86s of various models were produced in this country.

The F-86 Sabre had its glory time at the top of the fighter scene, and served for years in the front rank of many air forces. Though those days are history, to have flown the F-86 all-out in the joyous company of squadron life was to know the ideal in a fascinating calling. Only occasionally does a fighter come along that can produce such intense loyalty, one that gives the pilot a feeling he can meet any challenge with confidence. This has been the dream of fighter pilots of every era.

I have only to refer to my notes made during F-86 transition back in 1949 to remind myself:

"I flew my second formation flight today. Back in the groove. I was thinking, 'Is this really me up here in such a fighter, after all those years of hoping?' I don't think I'll ever get over that feeling."

Today, all I can add to that is—I never have. ■

Pararescuemen of the Air Force's Aerospace Rescue and Recovery Service are members of a select brotherhood of volunteers. Trained in skills as diverse as mountain climbing and scuba, the PJs have the satisfaction of knowing that . . .

# They Risk Their Lives 'That Others May Live'

BY 1ST LT. D. RICK DOUGLAS, USAF

FOR THE Air Force, pararescue history began on August 3, 1943, when twenty-one people bailed out of a disabled C-46 over unchartered jungle on the rugged China-Burma-India transport route. So remote was the site that the only way of getting help to the survivors was by parachute. Lt. Col. Donald Flickinger, an AAF doctor who retired in 1961 as a brigadier general, and two medical corpsmen volunteered to parachute into the forbidding terrain. The three, aided by natives, cared for the injured for a month until they could make their way to safety.

One of those who survived the ordeal was Eric Sevareid, the television news commentator. Of the men who risked their lives to save his, Sevareid later wrote: "Gallant is a precious word; they deserve it."

Today, Regular, Reserve, and Guard units of the USAF Aerospace Rescue and Recovery Service (ARRS) continue the tradition of gallantry that began in the Asian theater thirty-five years ago. In 1977, 618 names were added to the long list of military and civilian people who owe their lives to the men and women of ARRS. These humanitarian missions, many of them under the Military Assistance to Safety and Traffic (MAST) program, took place throughout the country and overseas in a variety of difficult and dangerous conditions.

In Montana, an HH-1 rescue helicopter crew evacuated a man suffering from massive internal injuries caused when a horse fell on him. A ninety-eight-year-old man and his ninety-three-year-old wife, trapped in their cabin by flood waters in Alaska, were transported to safety by a rescue helicopter. Two balloonists were recovered after they were forced to ditch in icy waters five miles off the coast of Iceland. In one seventeen-day period, HH-1 crews transported six prematurely born infants to hospitals in the St. Petersburg, Fla., area.

Many of the most daring and difficult saves could be made only through the teamwork of ARRS helicopter crews and a uniquely trained group of experts—the ARRS pararescuemen, or PJs for short.

### Men of Many Skills

All PJs are volunteers. They are precision parachutists, skilled medical technicians, and experts in survival. They are trained in scuba diving, mountain climbing, and tree jumping. In short, they are well equipped with the techniques they need to accomplish the mission—saving lives.

SSgt. Alexander Wassuta, a veteran PJ, has participated in more than thirty lifesaving missions. In one recent mission, Wassuta was sent after a scuba diver stranded in rough seas off Maedo Point, Okinawa, Japan. The weather was rainy and foggy, and a major storm was approaching. The seas were extremely rough. Other divers had made their way safely ashore and contacted the Rescue Coordination Center at Kadena AB.

After the rescue alert helicopter crew located the diver, Wassuta was lowered from the HH-53 by a hoist to recover the man.

The diver refused to leave any of his new scuba gear, however, stalling the rescue. As the storm drew nearer, the HH-53 hoist operator lost internal communications with the pilot and was unable to give the crew hovering instructions to keep the rescue device near the diver and Wassuta.

The alternate PJ aboard the HH-53, Sgt. James Q. Derrick, Jr., stepped in with his operating intercom to pass on the hoist operator's instructions.

Meanwhile, the diver still clung defiantly to his tanks and equipment, unwilling to discard them and permit the recovery of both men in one hoist operation. Deciding that he didn't have time to argue, Wassuta put the diver on the rescue device and sent him up by the hoist, along with his diving equipment. Wassuta remained below in the rough waves that were pushing him toward the deadly surf.

By this time, the HH-53 crew was having difficulty keeping sight of Wassuta in the fog and surf. Just before visibility dropped to zero, Wassuta was recovered. The HH-53 climbed to a safer altitude and delivered the diver to the nearest medical facility.

### The Making of a PJ

There are fewer than 400 PJs in the Air Force, ANG, and Air Force Reserve. They be-


—Photos by 1st Lt. D. Rick Douglas, USAF

gin their training with an eight-week indoctrination and preconditioning course at Lackland AFB, Tex. Classes include lectures on anatomy and physiology, the physiological aspects of scuba, diving medicine, basic mountaineering, and the care and use of small arms.

The majority of a trainee's time is occupied with rigorous daily physical training. To complete the course, a PJ must run six miles in forty-eight minutes, swim 4,000 meters in 100 minutes, and do fifty push-ups, fifteen chin-ups, and 100 sit-ups. One of every 1,000 volunteers is actually selected, and only half of those selected complete the Lackland course.

Students next are given parachute training at the US Army Airborne School at Fort Benning, Ga. After five static-line parachute jumps from Air Force aircraft, graduates are awarded parachutist wings. While in training, PJs learn to maneuver to a pinpoint landing, to jump safely into trees or water, and to cope with parachute malfunctions.

The PJ trainee barely pins on his parachute wings when he is sent to the US Army Special Forces Underwater Scuba School at Key West, Fla. There he is taught the use and care of scuba equipment, and how to conduct underwater searches for sunken equipment or missing persons. To graduate, trainees must swim 2,000 meters underwater, guided by compass, to a surface target; and dive to a depth of 130 feet.

Trainees learn to handle objects returned from outer space, such as satellite packages, manned space capsules, and high-altitude target drones.

The Mercury space capsule *Aurora-7* splashed down 250 miles south of the primary recovery zone on May 24, 1962. Opening the hatch, astronaut Scott Carpenter climbed out onto his one-man raft, anticipating a long wait.

*In full scuba gear, above, is Sgt. Raymond C. Medley, exiting from an HC-130. Left, during rescue training, Sgt. James R. Lundberg maneuvers his chute to land near a "survivor."*

Suddenly, splashing sounds came from nearby. Two PJs emerged from the water and secured a flotation collar around *Aurora-7*. It was the first space-related mission for PJs. Following

*Rappelling, right, is strenuous work; with a litter patient, it demands utmost concentration. Caring for the injured while awaiting evacuation, below, is all in a day's work for PJs.*

scuba school, trainees attend survival school at Fairchild AFB, Wash. At this stage of training, they learn how to live with limited rations and minimal or improvised clothing. They find and prepare edible plants and animals and practice land navigation techniques during extended escape-and-evasion maneuvers. They experience life in a simulated prisoner-of-war camp. After successfully completing this course, students are sent to Kirtland AFB, N. M.

At Kirtland, trainees enter the final phase of instruction, a grueling eighteen-week Pararescue Recovery Specialists Course, where their knowledge is tested under realistic scenarios. They must complete all phases of a six-week medical course that teaches emergency treatment of trauma patients under field conditions. Survival, combat operations, mountaineering, and parachuting techniques are taught in another six-week technical operations course. A third six-week period is an aerial operations course that includes aircrew training and evaluations, parachuting, and aerial gunnery.

Graduates of the ARRS training program

*Air Force 1st Lt. D. Rick Douglas comes from a family with a military background and is a 1975 graduate of the Air Force Academy. An HH-53 helicopter pilot at Kadena AB, Okinawa, he has earned paratrooper wings and has been through both scuba and jungle survival schools.*

are awarded the maroon beret with its distinctive silver Pararescue emblem.

### Serving Others Round the Globe

Pararescuemen are assigned to ARRS units in the US, England, Spain, Iceland, Japan, South Korea, and the Philippines. They serve as combat aircrew members on HH-53, HH-3, HH-1, and HC-130 rescue aircraft.

A recent save by pararescuemen Sgt. George R. Miller and Sgt. Kenneth J. Musnicki symbolizes the readiness of PJs to operate at any time, in any environment. They were aboard an HH-3 rescue helicopter launched to search for the bodies of three women presumably killed in the crash of a Cessna 172 near Banaue, in the Philippines. The pilot had survived and hiked through rugged terrain to safety.

*Above, an HH-53 reels up litter containing a simulated victim during routine PJ training. In good hands, left, as litter is brought aboard a hovering HH-53 rescue helicopter.*

The weather was deteriorating and the sun beginning to set when the helicopter crew spotted the crash site. Due to the high elevation of the site, the HH-3 was forced to burn off fuel before it was light enough to hover over the rough surface. Miller and Musnicki were lowered by hoist to find the bodies.

What they found were three ladies, alive though injured. After treatment, the most seriously injured survivor was hoisted aboard the helicopter. The HH-3, low on fuel, was forced to depart after dropping supplies for the night to the others on the ground.

Left behind, the PJs attended to the remaining two patients. One, with a suspected broken back, had to be removed from the crumpled aircraft where she had been pinned in the wreckage. Miller spent the night heating canteens of water over a campfire and placing them around her to reduce the pain. Musnicki treated the other survivor for broken bones and shock. The four were recovered at dawn by a larger HH-53 rescue helicopter.

During the thirty-one-year history of the ARRS, 18,111 people, including more than 9,000 civilians, have been rescued.

"Our mission is service to others, and we have proven our ability to do the job time and time again," says USAF Maj. Gen. Ralph S. Saunders, ARRS Commander. The ARRS motto, "That Others May Live," fittingly summarizes the record of the command's 4,100 dedicated military and civilian people, and of its band of superachievers—the pararescuemen. ■

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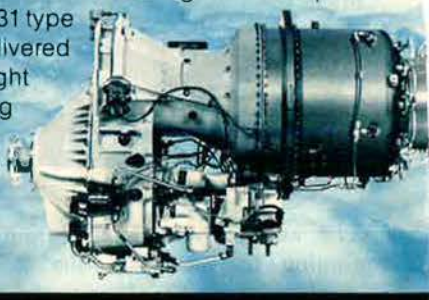

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# GARRETT TURBOPOWER

## Mission-qualified, mission-ready

This is the fourth in a series of articles on men who contributed to the development of airpower. General Knerr was so persistent a campaigner for airpower before and during World War II that the Army recalled the retired colonel to active duty to control his public statements. He rose quickly to become head of logistics for US Strategic Air Forces under Gen. Carl Spaatz. He ended a forty-one-year career as the first US Air Force Inspector General.

# Maj. Gen. Hugh J. Knerr, Hard Campaigner for Airpower

BY MURRAY GREEN

MAJ. Gen. Hugh J. Knerr shares with Billy Mitchell the dubious distinction of having sacrificed his military career to attain an independent air force. TV *aficionados* or insomniacs who have watched Gary Cooper portray Mitchell on the late show have an easy familiarity with Mitchell's martyrdom—but Maj. Gen. Hugh who?

Mitchell, a flamboyant personality, was always good copy wherever he went. Knerr functioned best behind the scenes. By nature quiet and retiring, he was a rare combination of doer and idea man. Officers who held high positions during World War II consider Knerr to be one of the great logisticians to come out of the war. As a thinker, Knerr was sought out by Frank Andrews, who made few military decisions without consulting him.

Early on, Knerr hitched his wagon to Andrews's star, serving as chief of staff and right bower to Andrews when he was named the first Commander of the GHQ Air Force at Langley Field, Va. For four years, starting in 1935, both men fought losing battles with the War Department General Staff in efforts to procure a nucleus of Boeing B-17 Flying Fortresses, America's best insurance if drawn into another world war.

*Hugh Knerr, shown here as a major, before an LB-6 Keystone Bomber, later became one of WW II's great logisticians.*

When his tour as Commander of the GHQ Air Force ended in March 1939, Andrews reverted to his permanent rank of colonel and was sent into semi-exile in San Antonio, a path paved fourteen years before by Billy Mitchell. Knerr had graduated from Annapolis in 1908, switched to the Army three years later, then learned to fly. With Andrews's departure from Langley Field, Knerr decided that thirty-plus years of service was enough. He retired with a disability—mostly a broken heart.

As a parting shot, Knerr drafted a four-page, double-spaced memorandum that found its way, via the good offices of an undisclosed friend, onto President Roosevelt's desk. FDR read the memorandum, "Airplanes for the United States," made three copies, distributed them to key personnel, then called in his military aide. According to a private letter Andrews received in May 1939, "FDR told Pa Watson he had lied to him and got into quite a temper."

For months following the sellout of Czechoslovakia to Hitler at Munich in September 1938, the President complained about America's shortage of front-line aircraft while trying to shake up his own senior staff. But he had been talked out of his demand for 10,000 planes a year in favor of balanced expansion of the Army. Knerr attacked that concept and the penny-pinching General Staff that was pushing it. His memo told of vain efforts by Andrews to beef up the GHQ Air Force, and challenged the commonality concept of combining the functions of attack aviation and bombardment aviation in one airplane, a utopian quest of successive generations of defense efficiency experts—to this day.

One year after Knerr's memo, the Luftwaffe led a German sweep across Western Europe. Alarmed, President Roosevelt figuratively swept those Navy ship models off his Oval Office desk and called for 50,000 planes a year, another revolution of sorts.

Meanwhile, Andrews had been recalled to Washington by Gen. George C. Marshall, the new Army Chief of Staff. Andrews was dispatched to head the Caribbean Defense Command (CDC), the first unified Army-Navy command. Repeated efforts in 1940–41 to restore Knerr to active duty in the CDC met with collective stonewalling in Washington. "I can't let the matter drop," Andrews wrote Knerr, now working for Sperry Gyroscope as a civilian. "Please drop your effort to help me come back. It will only do you harm," Knerr pleaded. "You have too big a job and too momentous an opportunity ahead of you to have it marred by personalities. . . . When that job is finished," Knerr wrote with feeling, "our autonomous Air arm will need you to head it up. I shall redouble my efforts to speed the day."

Among those redoubled efforts, a close friend, Rep. J. Mark Wilcox (Fla.) introduced a succession of bills—mostly drafted by Knerr—while lobbying at the White House for a separate air force. Paul Scott, a Miami attorney close to FDR, was approached to become Secretary of Air, should legislation pass the Congress.

*After the liberation of France, General Knerr (center) was decorated by the French government. Others so honored included Maj. Gen. Frederick J. Anderson (left) and Brig. Gen. Edward F. Curtis. All three were with US Strategic Air Forces.*

*Lt. Gen. Carl A. Spaatz (center) confers with, from left, Maj. Gen. Ralph Royce, Maj. Gen. Hoyt S. Vandenberg (standing), and Maj. Gen. Hugh J. Knerr, at an air base in England.*

As the unification drive took on momentum, after Pearl Harbor, the Army was reorganized for the second time in less than one year. This time, on March 9, 1942, the Army Air Forces gained coequality with the Army Ground Forces and the Army Service Forces, in effect, *de facto* autonomy. In Knerr's words to Andrews, opponents "beat us to the punch." Andrews and Knerr saw it as another half-loaf solution while America was losing the war on almost every front. (Lt. Gen. Frank Andrews became Commander of all US forces in the European Theater in February 1943. He was killed in an aircraft accident three months later.)

Knerr worked with Alexander de Seversky, airpower gadfly, whose daily columns and Disney-produced movie, "Victory Through Air Power," caused men in high places to gnash their teeth. On another level, Knerr dictated the substance of a best seller, *The Fight for Air Power,* published by William Bradford Huie, a skilled polemicist. Under his own byline, Knerr published articles in *American Mercury* and *Reader's Digest.* He also signed on with the Getts Lecture Agency, touring the provinces, hammering away at America's shortcomings in the air. This multidirectional barrage served notice America was heading for other defeats unless airpower was soon placed under central direction.

Early in August 1942, Knerr was given a national platform before the Senate Military Committee. Two weeks later, he received a "pink slip" from Tom Morgan, President of Sperry, who apologized for having to choose between two competing interests. His company was heavily committed contractually to the US Navy, a fact he could not ignore.

Surprised, but not angry, Knerr went about his article-lecture circuit. The dam broke on October 10, 1942. He received a call at his Epping Forest home near Annapolis, Md., from Secretary of War Henry L. Stimson. Walking into the Secretary's office the next day, Knerr was surprised to see Maj. Gen. Joseph T. McNarney, defense management troubleshooter, standing at the desk. At last, Knerr thought, he would return to active duty.

Not so fast! McNarney ordered Knerr to cease and desist in his public utterances. They were causing embarrassment to the War and Navy Departments.

"I will not!" Knerr coolly

replied. Whereupon, McNarney whipped out an official order that read: "You are directed to refrain from all public written and oral comment on the conduct of the war and on questions relating to the tactical use and organizational relationships of the Armed Forces and its Allies." Failure to comply clearly could result in court-martial, though the term itself never entered the discussion.

Deciding to call the card, Knerr showed the order to a friend on Capitol Hill and mentioned also his forced departure from Sperry. Senatorial displeasure soon made itself known at the Munitions Building, and it wasn't a week later when the telephone rang once again at Epping Forest. McNarney was summoning Knerr to another conference, explaining the case had caused "considerable discussion." And so Secretary Stimson had suggested that McNarney do whatever he thought best. Would Knerr like to come back on active duty? But what about his "disability," Knerr asked? Oh, that! Secretary Stimson had decided to overrule the Surgeon General, the first time he had ever done so, McNarney averred.

They took a walk down the hall. "I have the captive and turn him over to you," said McNarney to Hap Arnold, Commanding General of the Army Air Forces, while making a hasty departure, glad to be rid of a hot potato. Arnold knew what was coming and seemed genuinely pleased to have Knerr back, though he had broken no speed records responding to Andrews's calls to have Knerr restored to duty. Relations with Knerr had been less than friendly, starting with a misunderstanding over proper recognition of the men who flew to Alaska with Arnold in 1934. As second in command, Knerr had handled all logistics on the spectacular mission.

And, now, in late October 1942, the Eighth Air Force Service Command was threatening to come apart for lack of overall direction and detailed administration. Monumental foulups were reported at UK modification centers, where planes were supposed to be readied to support the imminent invasion of North Africa and the longer-range buildup of strategic air in the UK.

In the spring of 1943, Knerr was rushed to Europe to support Maj. Gen. Follett Bradley, author of an overall logistical plan that bore his name. But Bradley was suddenly removed from the picture in June 1943 by a severe heart attack. Bradley, while flat on his back, wrote Arnold of how Knerr had taken hold. While the two-star then handling logistics could "make a go of it," Bradley thought, "the best man for the job is Hugh Knerr, but I am afraid the powers that be would pass out at the mere suggestion of giving him the necessary rank and authority to swing the job." As for Colonel Knerr, "he really doesn't give a damn whether or not he is made a Brig. General," Bradley wrote, "but there is no question but that his work and usefulness would be facilitated if he were promoted."

It was the kind of challenge at which Hap Arnold excelled. Overcoming his own feelings about Knerr, Arnold bulldozed two promotions through the staff in one year. By 1944, Major General Knerr was named Deputy Commander for Administration, US Strategic Air Forces under Gen. Carl "Tooey" Spaatz. It was the first time that air logistics had ever won status equal to that accorded Operations, then headed by Maj. Gen. Fred L. Anderson.

*Dr. Murray Green, a long-time contributor to AIR FORCE Magazine, took time out from his work on a biography of Gen. H. H. Arnold to research this article on General Knerr. He is living in retirement in the Washington, D. C., area after thirty-four years as a civilian aide for the Air Force, including service in the office of the Air Force Secretary. He was deputy head of the Secretary's Office of Research and Analysis for the years 1947–70. He earned a B.S.S. in Social Science and an M.S. in education at City College of New York, and a Ph.D. in history and international relations at American University, Washington, D. C.*

At war's end, Knerr succeeded Lt. Gen. Bill Knudsen as commander of the Air Technical Service Command, a merger of the Air Materiel and the Air Service Commands. But he was denied his third star in 1946 by the ill-timed publication of *The Case Against The Admirals,* by William Bradford Huie, his erstwhile collaborator. Old interservice wounds were reopened, causing Knerr to fail to win across-the-board approval for a high post in the new Joint Staff. He closed out his forty-one-year career in 1949 as the first Inspector General of the United States Air Force.

Twenty years after retiring from service, Hugh Knerr answered my knock on his apartment door in Coral Gables, Fla. His handshake was cordial but his blue eyes were cool and his manner correct. The subject of our meeting—research on a biography of Hap Arnold—caused discomfort as it brought to the surface Knerr's total devotion to the memory of Frank Andrews, Arnold's rival for the top AAF post. Treading cautiously through several long interviews, Knerr mellowed in pleasant surprise when shown letters by Arnold, handwritten in 1934 to Mrs. Arnold in California while he was on temporary duty in Washington. Arnold had jeopardized his own standing with Generals MacArthur and Hugh Drum, fighting to win recognition for the thirty-three men who flew with him to Alaska. The recommended DFC awards were shot down strictly for external political reasons.

Hugh Knerr reappraised his own view of Hap Arnold. General Knerr and I became fast friends after that information came to light. I was later privileged to administer disposition of his official papers, which now repose in the US Air Force Academy Library at Colorado Springs.

When cancer overtook Hugh Knerr at the Bethesda Naval Hospital in his eighty-fifth year, the Washington newspapers failed to carry a notice of his passing. Only a handful knew of or bothered to attend the final rites at the Fort Myer Chapel.

Two years later, a high Air Force official balked at fulfilling Mrs. Hazel Knerr's modest request that a street at Andrews Air Force Base be named for her husband in symbolic recognition of the long, fruitful association between him and Frank Andrews. Thanks to the personal intercession of retired Air Force Lt. Gen. Ira Eaker, that objection was overruled. Today, as the official traveler from Washington to distant points proceeds toward the Passenger Terminal along Arnold Ave., the main artery on base, he turns left onto Knerr Drive, a small unobtrusive monument to a great, unobtrusive man. ■

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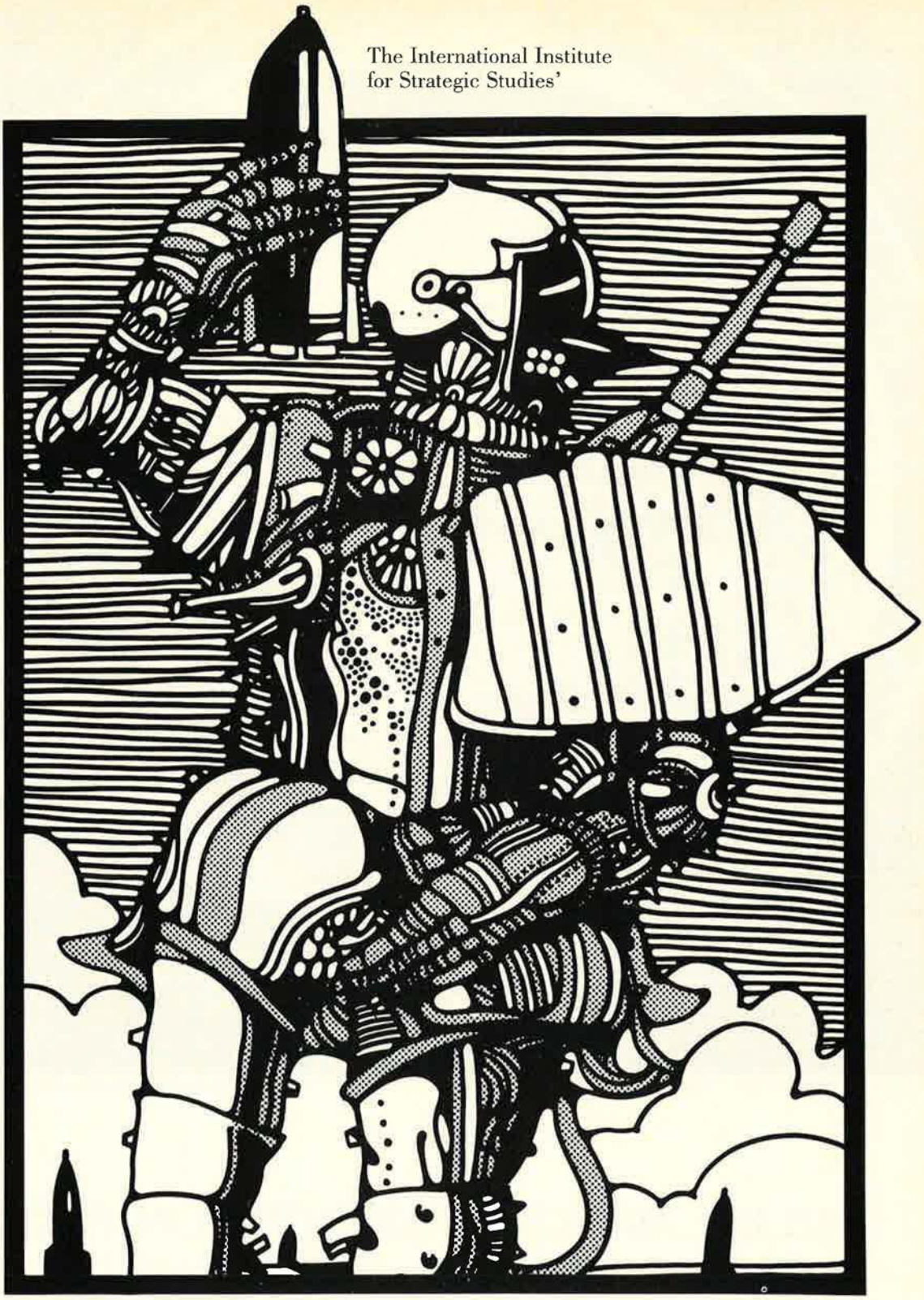

# Military Balance 1978/79

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AIR FORCE MAGAZINE

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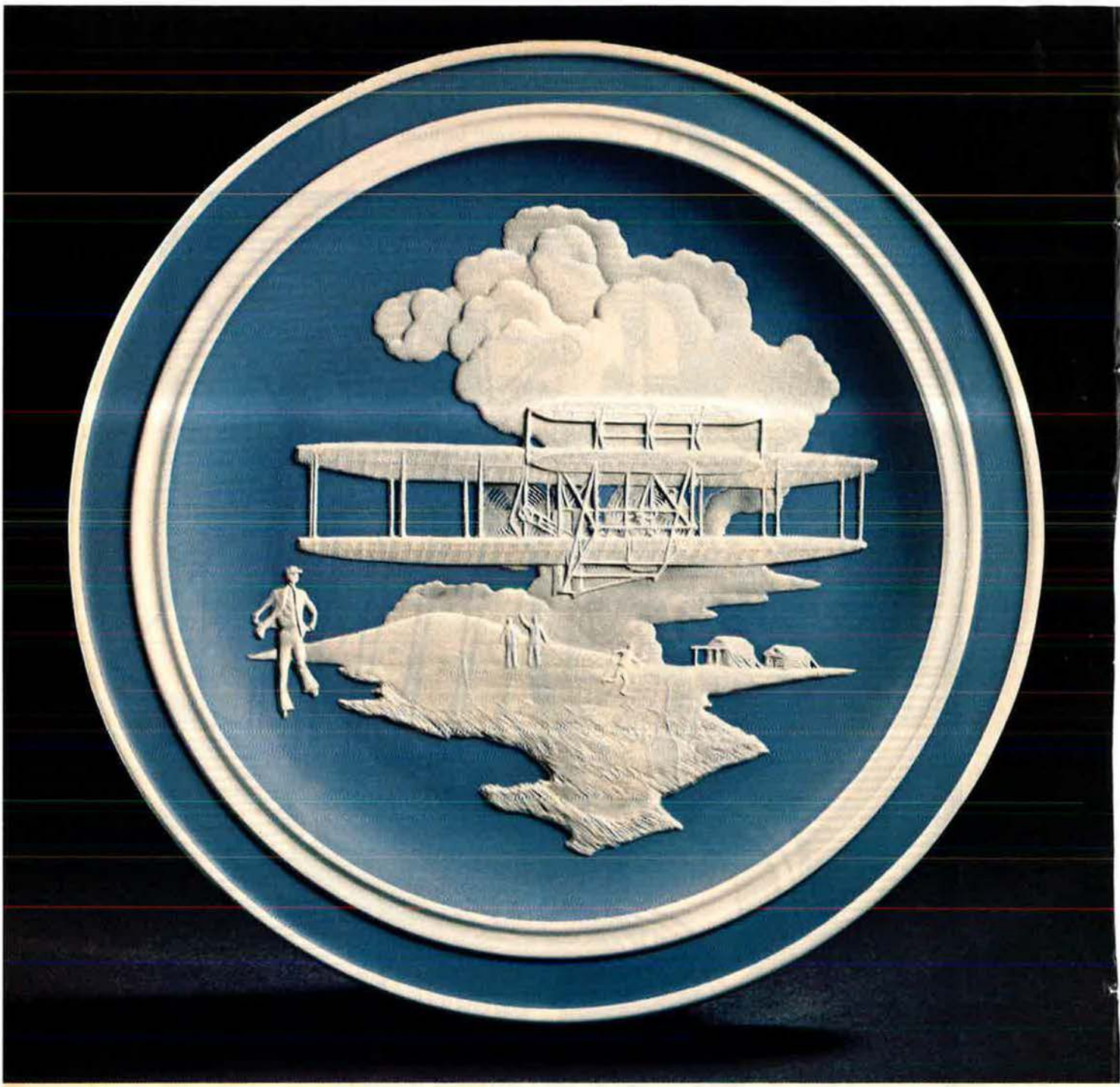


978 FM

ILLUSTRATION REDUCED. ACTUAL PLATE 9" IN DIAME

# OFFICIAL AIR FORCE ASSOCIATION PLATE

A limited edition fine Parian porcelain plate bearing an original design
of The Wright Brothers' First Flight.
Issued in honor of the 75th anniversary of powered flight.
Eligibility limited to members of the Air Force Association.

*Handsome limited edition Parian plate will honor the 75th anniversary of the Wright brothers' first flight. Available* exclusively *to Air Force Association members.*

To commemorate the 75th anniversary of the Wright brothers' first flight—the event that signaled the dawn of the age of aviation—the Air Force Association will issue a handsome limited-edition porcelain plate.

This will be the *first* porcelain commemorative plate ever issued by the Association.

In deeply sculptured relief, the plate bears an original design that depicts the historic moment at Kitty Hawk, North Carolina, when "Flyer I" became airborne for the first time. Orville Wright is at the controls. Wilbur races alongside him down the beach. And the flying machine—with its chain-driven propellers pushing forward—slowly lifts its wings skyward.

The design is an *original work of art,* commissioned solely and exclusively for this issue. It will be crafted of fine Parian porcelain—in pure ivory tones over a rich sky-blue background. The Association has appointed Franklin Porcelain, a division of the world-famous Franklin Mint, to create this commemorative plate.

Parian porcelain—so named because its translucent quality resembles that of Parian marble—is an especially appropriate choice for this unique work. The varying depth of the sculptured design creates subtle degrees of translucency in the porcelain, allowing the background color to show through in a way that adds to the overall strength of the work. The blue-tinged clouds, for example, appear to recede, while the more boldly sculptured aircraft seems ready to soar off the surface of the plate.

The Official Air Force Association Porcelain Plate will be issued in a single, strictly limited edition. It is available exclusively to members of the Association, with a limit of one per person. Invitations to acquire this plate are now being sent to members, who will have only until October 31, 1978, to order.

Each plate will be individually crafted, serially numbered, and registered in the name of its original owner. The plate will be accompanied by a Certificate of Authenticity attesting to its limited-edition status and commemorative significance. A specially designed stand will also be provided, so that the plate may be displayed to best advantage on a cabinet, shelf, desk, or table.

Since the plate is being offered just this one time, those members who do not receive the special announcement by October 10 should contact Richmond M. Keeney, Membership Director, Air Force Association, 1750 Pennsylvania Ave., N.W., Washington, D.C. 20006, without delay.

*Man's first sustained power flight . . .*

On the morning of December 17, 1903, Orville Wright climbed into the pilot's "cradle" of the "Flyer I." The twelve-horsepower engine was run up, the plane unleashed, and the Flyer sped down a wooden rail into a twenty-seven-mph wind. The time was 10:35 a.m.

The machine, miraculously, stayed aloft, at first about three feet above the sand and then rising to a height of about ten feet.

This first flight lasted twelve seconds and covered a distance of 120 feet. The Wrights made three more flights that day, with the brothers taking turns at the controls. The fourth flight, with Wilbur as pilot, took place at noon, lasted fifty-nine seconds, and covered a distance of 852 feet.

# The Bulletin Board

By James A. McDonnell, Jr., MILITARY RELATIONS EDITOR

## People Programs Hit

Congress in late summer killed the Defense Officer Personnel Management Act (DOPMA) and threatened to eliminate proposed junior enlisted travel entitlements. Both are USAF and AFA priority items.

In addition, the President's veto of the FY '79 military authorization bill placed several personnel projects in temporary jeopardy. Tied to that measure are extensions of doctor incentive pays, selective reenlistment bonuses, and the present commissary bagger system. All were slated to expire September 30 unless the veto issue—the $2 billion nuclear submarine—is resolved. The present bagger arrangement may, if necessary, be continued by Defense Department directive, a high source told AIR FORCE Magazine.

DOPMA's prime opponent, Sen. Sam Nunn (D-Ga.), prevailed in scuttling the much-needed legislation that the House has now passed twice. Nunn talked of slashing grade ceilings in DOPMA to the point that promotion opportunity would be cut to as low as fifty percent for O-3s looking for majorities. It's now eighty percent. Some officials prefer no DOPMA to one with such "impossible restrictions." In any event, Defense will "try again" with DOPMA next year, an official said.

To extend the grade ceilings USAF must have to continue officer promotions, the service, weeks before DOPMA's demise, sent Congress legislation continuing existing temporary ceilings two years. If approved, as expected, it will represent the ninth such extension since ceilings were established in 1954. If not approved, demotions and RIFs may appear.

The Senate, meanwhile, in passing the Civil Service reform bill, placed a $47,500 ceiling on the amount future retired military personnel can earn annually from combined pensions and federal salaries. An identical limitation is contained in the House version of the reform measure. The Senate also voted to eliminate federal job preference for retired military O-4s and above.

The Senate was also in the process of denying travel entitlements to junior enlisted members overseas. Its Appropriations Committee ignored pleas from the Pentagon to approve the allowances endorsed earlier by the House.

The Senate did, however, refuse to go along with an earlier House vote to lay on a one-year moratorium on officer forceouts for temporary promotion passovers. This and other disputed issues must be settled by a conference committee.

Another people program in doubt at press time was whether women can continue to receive abortions at military hospitals and under CHAMPUS. Rep. Robert Dornan (R-Calif.) rammed through a proposal to ban them. "One abortion is too many . . . and abortion with dollars allocated to keep our nation strong and our military people healthy is a horrendous act," Dornan intoned. The House backed him up 226 to 163.

Not so Rep. Elizabeth Holtzman (D-N. Y.), who declared the ban would "undermine" the country's ability to recruit women.

On another vital people-type issue, the Senate approved $9.5 million to run the bogged-down registration program of the Selective Service System in FY '79. That's exactly what the Administration recommended, but far less than the $17 million Sen. Barry Goldwater (R-Ariz.) and others wanted to "strengthen the mobilization base for all services." Surprisingly, such normally promilitary solons as Sens. John Tower (R-Tex.) and John Stennis (D-Miss.) helped shoot down the $17 million attempt. The Pentagon's top manpower chief, John P. White, testified earlier that with the $9.5 million, Selective Service would probably be able to "provide 100,000 inductees within sixty days after mobilization." That's not nearly good enough, many concerned quarters contend.

## Aid Society Expanding

The Air Force Aid Society, with assets topping $33 million, is increasing its loans, grants, and scholarship assistance. Its income is also rising sharply. And the thirty-two-year-old official relief agency has a new director, Gen. Louis T. Seith, USAF (Ret.).

AFAS is actively urging members with financial problems to inquire about assistance. Publicity has been stepped up Air Force-wide. Bases should underscore the new availability of help in different ways, such as noting in daily bulletins that "Your AFAS office is located in building —," Hq. USAF authorities say.

So far, the increased selling effort has resulted in more loans, which account for more than ninety-four percent of the normal assistance for members and dependents needing help. Less than six percent is dispensed as grants (gifts).

In calendar 1977, for example, AFAS loaned $1.55 million for a variety of causes, *e.g.*, emergency car repairs and vocational training for wives so they can become breadwinners. This compared with $91,600 dispensed in grants—normally for food, clothing, and shelter. Both of those figures were up substantially from the previous year; furthermore, the bulk of the loans and grants in 1977 occurred during the second half of the year, just after the liberalization policy began to gather steam.

The trend is continuing. Officials told AIR FORCE Magazine that through the first five months of 1978, there have been 3,747 loans, amounting to $850,600, and 199 grants totaling $45,450.

Educational loans are a separate —and the largest—AFAS assistance category. Last year more than $2.2 million was loaned to USAF sons and daughters to help defray college expenses.

In 1976, the Society's total income was nearly $1.5 million. Last year, it jumped to $2.1 million, of which more than half was investment income. Nearly $800,000 represented its cut of the annual Air Force Assistance Fund drive.

This year should show a further income increase, partially because the Society will receive a handsome $1,267,535 from the 1978 Fund campaign, compared with $985,861 earmarked for the Enlisted Widow's Home and $499,225 for the Air Force Village.

Rising stock market prices and increased dividends this year should also help swell the Society's treasury. At the start of this year, AFAS had nearly $12 million of its assets in common stocks, $5.75 million in corporate bonds and notes, and $4 million in government bonds. More than $11 million in loans receivable and small amounts of cash account for the rest of the agency's $33.3 million in assets.

General Seith, fifty-seven, became the Society's chief executive officer the first of this month. Before retiring from the USAF in August 1977, he was Chief of Staff, Supreme Allied Headquarters, Europe. He replaces Maj. Gen. Reginald C. Harmon, USAF (Ret.), who was the Air Force's first Judge Advocate General.

Over the years, the AFAS has helped more than 512,000 Air Force members with $52 million in loans and grants and 14,000 Air Force children with $24 million in college loans.

### Pay Overhaul Slips

The Defense Department's plan to clear pay change proposals through the Administration this fall and get them to Congress early next year has run into a snag. The services' firm opposition to Defense's inclination to adopt various recommendations of the President's Commission on Military Compensation is partly responsible. The Joint Chiefs of Staff have also registered their concern.

The original schedule called for DoD to submit its pay overhaul package to the Office of Management and Budget in August, with legislative drafting to follow. This has slipped, a high Defense official told AIR FORCE Magazine, although it was not clear for how long. However, some quarters feel the entire project may go down the drain and that the Retirement Modernization Act, or something like it, may be revived and eventually become the extent of military pay reform. RMA, a Pentagon proposal of the early 1970s, would change the present retirement system less drastically than the PCMC proposals that DoD has been favoring.

### But Sea Pay Is Going Up

Sea pay is the principal exception to the present moratorium on changes with the military compensation system. The old sea pay formula, which for years has paid sailors only $8 to $22.50 a month, is being cast overboard, probably this month. Its replacement, contained in the FY '79 military authorization bill, will hike sea pay, on a graduated basis, to from $25 to $100 per month. Coast Guardsmen also will receive the higher rates, but several thousand enlisted Marines will be cut off from sea pay.

***AFA Believes . . .***

## WW II—It Only Seems Like 'Yesterday'

From time to time, this column has called attention both to the plight of the young Vietnam veteran and to the sad predicament of the aged World War I veteran who has seen inflation and advancing age rob him of security.

Between these extremes lies more than half the total veteran population—a group we might call "senior veterans." To those of us whose memories of World War II are still vivid, it comes as somewhat of a surprise to realize that these "senior veterans" *are* the World War II people—now at an average age of fifty-eight.

A new set of concerns and priorities is on the horizon for that group, whose previous connection with veterans' benefits centered largely on educational assistance, home loans, and other aids in readjusting to civilian life. Within the next ten years, the Veterans Administration will be forced to change the focus of many of its services to handle this new and cresting wave.

Recognizing this, Rep. Barbara A. Mikulski (D-Md.) has introduced a bill that calls on the VA to develop a comprehensive plan for health and social services to accommodate the senior veteran. "By the year 2000," she pointed out, in introducing her proposed legislation, "the veterans population in this country over the age of sixty-five will triple." (That will, of course, include Korea veterans who may not have served in World War II.) She stressed that "we have now reached a point in time when we must consider a new aspect" of the original GI Bill commitment. The unprecedented numerical strength of this "new wave" will call for services that have not previously been in large demand, as well as for expansion of old services.

Representative Mikulski's bill would require the VA to submit to the Veterans Affairs Committees of both Houses a plan that will address the following functions, among others:

- Providing retirement counseling and planning services;
- Converting unused acute-care VA hospital facilities to long-term care facilities;
- Expanding the number of hospital-based home care units;
- Expanding and improving long-term care and catastrophic health care programs;
- Establishing new facilities to provide daytime care—in lieu of nursing home care—for senior veterans who are able to live with their families;
- Establishing hospice programs for terminally ill senior veterans;
- Extending health care services to surviving spouses of veterans.

None of these services would be totally new to the VA. For some years it has been warning of this upcoming surge and, in fact, has used age distribution projections to justify the recently approved expansion of the national cemetery system. VA, indeed, has been a leader in studies of aging and its attendant ramifications.

Nonetheless, AFA believes that Representative Mikulski's bill (which would require a report by December 1979) will, at the least, alert Congress to the problem and perhaps provide a different perspective on "veterans" legislation.

We salute Barbara Mikulski's initiative and encourage a searching look at the projected impact of the senior veteran on VA facilities. We hope our veterans' programs will be ready.

—JAMES A. McDONNELL, JR.

# The Bulletin Board

—STAFF PHOTO BY FICK KNAPP

*John O. Gray, right, recently retired AFA Assistant Executive Director, was honored on Capitol Hill by House Majority Leader Jim Wright (D-Tex.) in August. Citation on the Congressional Plaque, the first presented by Wright, reads: "John O. Gray—In appreciation for your tireless dedication and support of a strong national defense and singular accomplishments in articulating those needs to Congress." Mr. Gray, at his retirement on June 30, had served more than twenty-one years with AFA.*

### Recruiting Hopefuls Hear This

Special "recruit-the-recruiter" teams from Air Training Command and the Military Personnel Center are visiting Stateside bases to smoke out good staff and tech sergeants for recruiting duty. The itinerary called for stops late this year at Langley AFB, Va.; Grissom AFB, Ind.; Vandenberg and Castle AFBs, Calif.; and bases in the San Antonio, Tex., area.

With recruiting growing tougher, USAF officials are determined to keep all recruiting slots filled with the best sales people they can find.

The Recruiting Service, meanwhile, reported that the Air Force Recruiting Assistance Program (AFRAP) in recent months has provided more than 11,000 "age-qualified" leads. Last year, many youths USAF members and friends recommended were too young or too old. So the Service urged lead providers to recommend only fully qualified persons. Recruiting Chief Brig. Gen. William P. Acker, in lauding the new AFRAP effort, said "the recruiting outlook portends extreme difficulty ahead." AFA is solidly behind the AFRAP effort.

As part of its continuing support of AFRAP, AFA, at last month's National Convention, presented a Special Citation to Mountain Home AFB, Idaho, recognizing it for its outstanding support of the AFRAP program. This was the second year that this award has been presented and the second year a TAC base (last year, Nellis AFB, Nev.) has taken the honors.

A new award instituted this year at the Convention singled out the Outstanding Air Force Recruiter of the Year. The recipient, from the 3513th USAF Recruiting Squadron at Hancock Field, N. Y., was TSgt. Robert E. Jacques.

### Kin "Arrangements" a Must

"Single member" parents and military couples with children, like couples where one member is Air Force and the other civilian, are supposed to have made "adequate child care arrangements." The arrangements are to allow all bluesuiters to participate in a "full range of military duties," including TDY and PCS. But many USAF parents apparently haven't complied. So Headquarters has told all units to track "the magnitude of the problem," report back, and follow up with subsequent reports every six months. Before long, all parents should have gotten the message.

### CHAMPUS Changes Set

The Defense Department is coming out with a new, simplified CHAMPUS claim form officials say "will significantly reduce" the mountain of claims returned for correct or additional information. If it works out, beneficiaries, often frustrated by long delays, will get their money much sooner.

Also about to appear is a CHAMPUS Handbook designed to answer just about any CHAMPUS question a person might have. Massive distributions are planned so that every family or person eligible for the program will receive a copy, hopefully by November, a DoD official told AIR FORCE Magazine.

The new claim document, CHAMPUS Form 500, is supposed to be easy to fill out. It's to be used by beneficiaries receiving "non-institutional care" from physicians, pharmacies, medical suppliers, ambulance companies, and laboratories. The form it replaces, DA Form 1983-2, has been something of a disaster, the Defense Department acknowledging that three of every ten submitted have had to be returned for corrections.

"Fewer errors and speedier payments"—that's what lies ahead, Defense officials predict. But many CHAMPUS users, stung in the past over delays and red tape, will be taking a "show-me" attitude.

At press time, CHAMPUS customers also waited for word on whether the reimbursement rate would be raised from the 75th to the 80th or 90th percentile. The issue was in doubt on Capitol Hill.

### Veterans Corner

"We feel we've done everything possible" to encourage young veterans to use their GI Bill benefits, a spokesman for the Veterans Administration told AIR FORCE Magazine recently. He was referring to the Agency's special drive this past summer to nudge all eligible vets into school, college, or other GI Bill training programs. Editors, TV and radio stations, educators, and veterans organizations helped spread the appeal. "Now we're waiting for the fall school-college enrollment figures to tell us how many veterans responded to this major outreach effort," the spokesman added.

# The Spirit Lives

The smoke is gone. The debris is cleared. Hope has now replaced the tears in the eyes of all who treasured their visits to San Diego's Aero-Space Museum and International Aerospace Hall of Fame.

Prior to the February 22, 1978 fire that destroyed 46 airplanes, more than 30 engines and more than three-quarters of a century of priceless testimonials to pioneering aviation heritage, nearly ten million guests had stepped into the shadows of time and chapters of the world's aviation history.

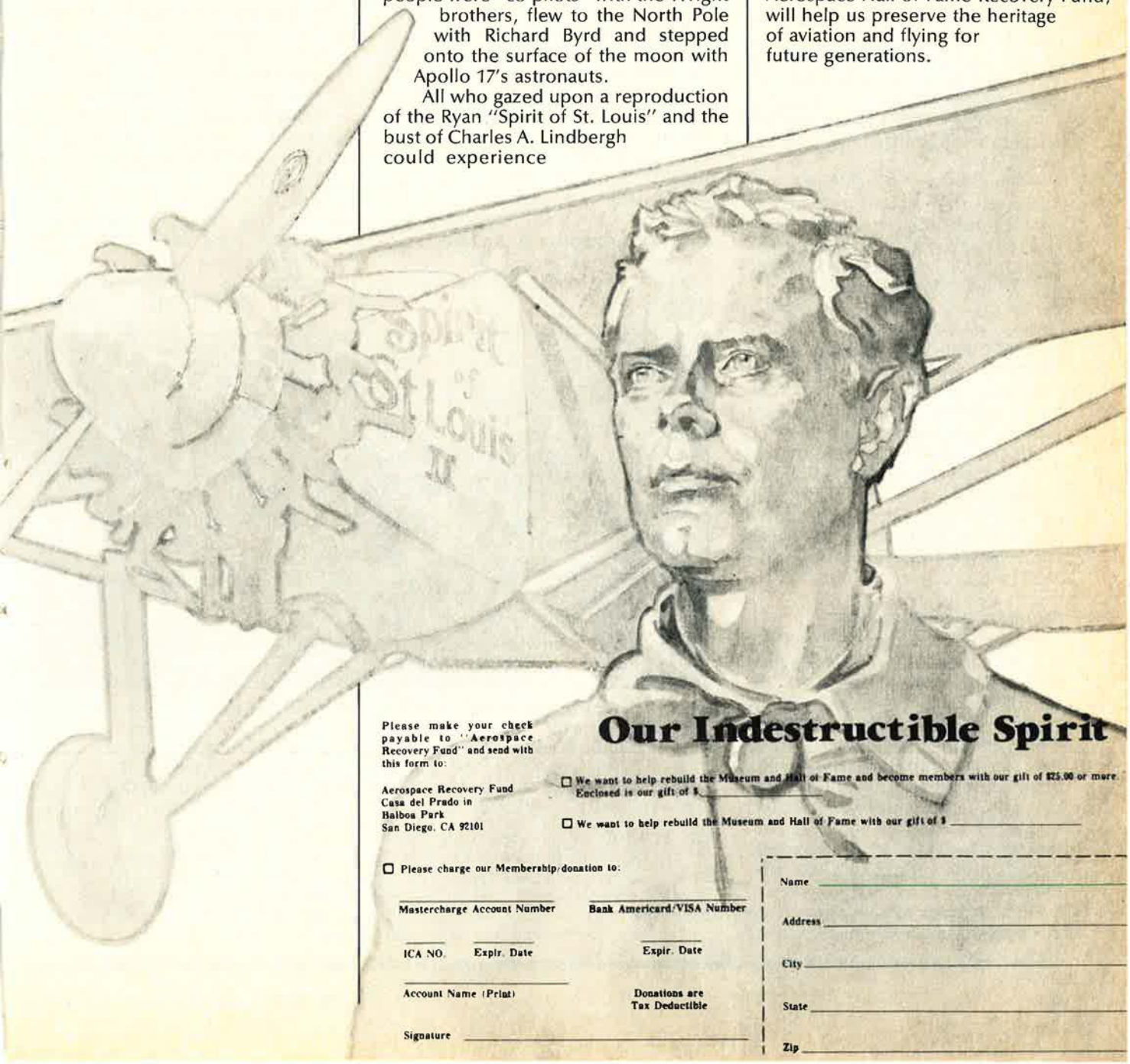
In 1977 alone, more than 800,000 people were "co-pilots" with the Wright brothers, flew to the North Pole with Richard Byrd and stepped onto the surface of the moon with Apollo 17's astronauts.

All who gazed upon a reproduction of the Ryan "Spirit of St. Louis" and the bust of Charles A. Lindbergh could experience for a brief moment a surge of special pride in the courageous adventures of that young American pilot as he opened the skies in 1927 for trans-oceanic flight.

For the sake of our school children in generations to come. For the sake of aviation enthusiasts and casual visitors to San Diego in the decades ahead, a new Aerospace Historical Center will rise from the ashes of that tragic fire.

A "spirit" has already been created. It is an indestructible spirit.

Won't you join our "spirit" project today? Your donation to the San Diego Aero-Space Museum and International Aerospace Hall of Fame Recovery Fund, will help us preserve the heritage of aviation and flying for future generations.




## Our Indestructible Spirit

Please make your check payable to "Aerospace Recovery Fund" and send with this form to:

Aerospace Recovery Fund
Casa del Prado in
Balboa Park
San Diego, CA 92101

☐ We want to help rebuild the Museum and Hall of Fame and become members with our gift of $25.00 or more. Enclosed is our gift of $ _____

☐ We want to help rebuild the Museum and Hall of Fame with our gift of $ _____

☐ Please charge our Membership/donation to:

Mastercharge Account Number _____ Bank Americard/VISA Number _____

ICA NO. _____ Expir. Date _____ Expir. Date _____

Account Name (Print) _____

Donations are Tax Deductible

Signature _____

Name _____

Address _____

City _____

State _____

Zip _____

# The Bulletin Board

For full-time enrollees, VA monthly payments range from $311 for a single vet to $422 for one with two dependents, plus $26 for each additional dependent. Participants also may receive free counseling and tutorial help, extra pay via VA's work-study program, and low-interest VA educational loans. Other veterans' items:

• Rev. Corbin L. Cherry, forty, a much-decorated Army veteran who lost a leg fighting in Vietnam, has been named head of the Chaplain Service for VA's hospital system. The VA Chaplain Service consists of 914 clergymen, 403 of whom serve on a full-time basis. They provide twenty-four-hour coverage of the agency's nationwide hospital, nursing home, and domiciliary network.

• The Senate, as expected, has approved substantial pension increases for needy veterans. The House okayed similar legislation earlier. Final congressional action and Presidential approval were expected by the end of September.

• VA officials reported that the agency's efforts to inform young veterans of government-sponsored programs for them begins as soon as the Defense Department sends it word of their separation. Follow-on mailings, containing advice on and how to apply for all veteran entitlements, continue for six months. At the end of that period, VA says it sends a roundup letter, reviewing and reminding the veteran of benefits.

### "Boom" Claims Plunge

Remember "sonic booms"? In the 1960s the Air Force was plagued with claims from citizens who insisted that USAF aircraft booms broke their windows, damaged their homes structurally, turned their chickens into nonlayers, etc. Boom suits peaked in 1965 when the service fielded 9,574 claims asking $5 million in damages. But they've tailed off sharply since then, dropping last year to only 335 asking for a total of $525,000.

Much smaller amounts are actually paid, of course, because claims investigators, JAGs, and engineers have become very savvy in spotting phoney or exaggerated claims, such as claimants trying to hold up the service for long-existing home damages. During the past four years, the Air Force reports, payments ranged from only 3.2 percent to 9.5 percent of the actual amounts claimed. USAF's immediate boom goal: "Further reduction in claim activity."

### Retiree Job, Pay News

From the retired activities office at the Military Personnel Center comes word of AFJROTC instructor job openings at several high schools, for both retired NCOs and officers. They carry a sometimes-overlooked extra benefit: award of five quarters of graduate or undergraduate credit from Troy State University for completing the preassignment orientation course at Maxwell AFB, Ala. Contact AFROTC/JRI at Maxwell, or call (205) 293-7741 for details. There would be many more such retiree job opportunities if USAF's 275-unit JROTC program, with its mere 33,000 students, approximated in size the Army's 647-unit, 110,000 student program. AFA has long sought an expanded Air Force program. The retired activities office also reports that:

• The latest retired pay raise, of 4.9 percent, was slated to appear in September 30 pay checks.

• USAF retirees and widows of retirees contributed $245,000 in this, their first year of participation in the Air Force Assistance Fund drive (*see earlier item for Fund distribution details*).

### CAP Aid Try Advances

For years the Air Force has tried —unsuccessfully—to squeeze a few dollars out of Uncle Sam to buy uniforms for Civil Air Patrol cadets and reimburse senior CAP members for expenses during missions.

Help may be on the way at last, for a House Armed Services subcommittee in August approved a bill authorizing the auxiliary $1,057,188 for such purposes in FY '79. The full committee was expected to take up the measure after the lawmakers' Labor Day recess. CAP Commander Brig. Gen. Paul E. Gardner said the bill would provide $663,568 for cadet uniforms, $321,620 for maintenance reimbursement costs, and $72,000 in partial travel reimbursement.

Early this year, General Gardner had testified about the "significant contribution" the bill would have on the organization.

In a related development, AFA's General Robert F. Travis Chapter,

*Twenty-two high school students were recently named Air Force award winners at the 29th International Science and Engineering Fair at Anaheim, Calif. The eleven first-place winners, who received $25 Savings Bonds from the Air Force Association and plaques produced by the Air Force Orientation Group, are, from left, sitting: Lynn E. Wirtz, Natchez, Miss.; Mary E. Kroening, San Diego, Calif.; Maryanne Povinelli, Westlake, Ohio; and Karen Borckman, Westgate, Iowa. Standing: Christopher B. Williams, Metairie, La.; Delano R. Freeberg, Rochester, Minn.; John D. Ostrosky, Warren, Mich.; Stephen Funaro, Briarwood, N. Y.; Gregory A. Dale, Arlington, Va.; Perry J. Damiani, Greendale, Wis.; and Charles E. Sauls, Tifton, Ga. At far right is Brig. Gen. Forrest S. McCartney, Deputy Commander for Space Communication Systems, SAMSO, Los Angeles AF Station. The annual Science Fair recognizes scientific talent among students. Air Force awards were made in each of the Fair's eleven categories of competition. The overall winner was Maryanne Povinelli.*

*The USAF First Sergeant Academy, Keesler AFB, Miss., recently graduated its 2,000th top kick. He is MSgt. John W. Calahan of the 23d Aircraft Generation Sqdn., England AFB, La. Sergeant Calahan is congratulated here by Maj. Gen. Harry A. Morris, the Hq. USAF Director of Personnel Plans. The Academy was formed in 1973. All Air Force first sergeants take the school's four-week course.*

Fairfield, Calif., recently sponsored a day of special activities to draw public attention to the mission of both CAP and USAF's Aerospace Rescue and Recovery Service. The event, held at Vacaville, Calif., featured CAP displays, vintage and modern aircraft, aerial demonstrations, drill-team competition, etc. General Gardner was guest speaker. Chapter President Arthur L. Littman said the group hoped to make the CAP-ARRS day an annual event.

### Short Bursts

Sixteen more women—from active duty and the AFROTC—have been **chosen for USAF pilot training** and two more for **navigator school.** Entries began last month and continue through February. To date, sixteen women have become Air Force pilots and nine are in training; six have won navigator wings.

The USAF Inspector General is warning all hands against the **illegal use of dependent ID cards** at exchanges, base hospitals, theaters, etc. He's called on commanders to make "periodic, unscheduled" security police checks on ID cards at base entrances. All members, he added, **must turn in cards** invalidated by divorce, marriage, college disenrollment, etc. He spoke of penalties for noncompliers.

The House recently voted, 401 to 2, to designate next July 18 **"National POW/MIA Recognition Day."** The two nay voters: Reps. Patricia Schroeder (D-Colo.) and Gary A. Myers (R-Pa.).

**TSgt. Spencer T. Hayes** of the Alabama Air National Guard recently won $15,915 for his clever **suggestion for modifying radar tracking equipment.**

"For some years to come, [USAF] **women in grades higher than major and staff sergeant** will still **be somewhat rare."** That's the unhappy word from Willard H. Mitchell, USAF's Principal Deputy Assistant Secretary (Manpower Resources and Reserve Affairs). He was explaining, in an appearance at Eglin AFB, Fla., that the service's rapidly increasing female strength is all coming in at the bottom of the grade structure—into "a closed personnel system." So "it will be several years" before Air Force women **are more equally distributed** throughout the grade structure.

The Illinois congressional delegation and state community leaders are putting heavy pressure on the Pentagon **to save Chanute AFB,** which is on the Administration's base "hit" list. The group enjoys **considerable political muscle,** including House Armed Services Committee Chairman Melvin Price of East St. Louis, Ill.

The new Hq. USAF **Military Affiliate Radio System (MARS)** station was commissioned recently at Andrews AFB, Md. **Sen. Barry Goldwater** (R-Ariz.), an avid ham radio enthusiast, placed the first official call during special ceremonies. The event culminated years of effort to attain a centralized Air Force MARS facility for the Washington, D. C., area.

When male military personnel retire from service, their wives receive **a certificate of appreciation,** for dedicated support of the Air Force. But there's been **nothing for nonmilitary husbands** of retiring women members. So, to correct this glaring oversight, the service has just approved a certificate for these hitherto-unfortunate fellows. It's due out early next year.

The Air Force has been after Congress to authorize funds to **expand the Air Force Museum** at Wright-Patterson AFB, Ohio. But Congress has **deferred the request** until next year, saying that the Museum Foundation should use the time to try to raise private funds and think about charging admission fees.

### Senior Staff Changes

**CHANGES: B/G William R. Brooksher,** from Chief, Security Police, Offutt AFB, Neb., to Chief, Security Police, AF Inspector Gen. Activities Center, Kirtland AFB, N. M. . . . **B/G William E. Brown, Jr.,** from Chief, Security Police, Bolling AFB, D. C., to Cmdr., Air Def. Wpns. Cen., ADCOM, Tyndall AFB, Fla. . . . **M/G Kelly H. Burke,** from DCS/Plans, Hq. SAC, Offutt AFB, Neb., to Dir., Opl. Rqmts., DCS/RD&A, Hq. USAF, Washington, D. C. . . . **M/G Thomas E. Clifford,** from Cmdr., 26th NORAD Rgn., & Cmdr., 26th AD, ADCOM, Luke AFB, Ariz., to Dep. Asst. Secy. of Def. (PA), OSD, Washington, D. C.

**B/G James S. Creedon,** from Jt. Test Dir., EW/Close Air Spt., Jt. Test Force, DCS/OP&R, Hq. USAF, Washington, D. C., to Cmdr., 26th NORAD Rgn., & Cmdr., 26th AD, ADCOM, Luke AFB, Ariz., replacing M/G Thomas E. Clifford . . . **B/G Alonzo L. Ferguson,** from Dep. Dir., J-3 (NMCC), JCS, Washington, D. C., to Dep. Dir. for Ops. & Training, DCS/OP&R, Hq. USAF, Washington, D. C. . . . **B/G Melbourne Kimsey,** from Cmdr., 97th BMW, SAC, Blytheville AFB, Ark., to Dep. Dir., Programs, DCS/P&A, Hq. USAF, Washington, D. C., replacing M/G Charles E. Woods.

**B/G Richard W. Phillips,** from Dep. Dir. for Devel., DCS/RD&A, Hq. USAF, Washington, D. C., to Dep. Dir., General Purpose Forces, DCS/RD&A, Hq. USAF, Washington, D. C. . . . **B/G William L. Strand,** from Cmdr., Tac. Tng. Holloman, TAC, Holloman AFB, N. M., to Jt. Test Dir., EW/Close Air Spt., Jt. Test Force, DCS/OP&R, Hq. USAF, Washington, D. C., replacing B/G James S. Creedon . . . **M/G Charles E. Woods,** from Dep. Dir., Programs, DCS/P&A, Hq. USAF, Washington, D. C., to Cmdr., AF Commissary Svc., Kelly AFB, Tex.

**SENIOR ENLISTED ADVISOR CHANGES: CMSgt. Ronald J. Esposito,** from First Sergeant, AFMPC, Randolph AFB, Tex., to Senior Enlisted Advisor and First Sergeant, AFMPC, Randolph AFB, Tex., replacing retiring CMSgt. Theodore J. Severson. ■

# Toward a New World Strategy

A National Symposium of the Air Force Association,
Hyatt House Hotel, October 26-27, 1978, Los Angeles, California

**Featuring:**

*Keynoters—*

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**Gen. Bryce Poe, II, Commander, AFLC**
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**Air Force Association,** Suite 400, 1750 Pennsylvania Ave., N.W. Washington, D.C. 20006

*Ed Gates . . . Speaking of People*

# Military Medicine: Can the Shortage of Physicians Be Remedied?

What kind of money will it take to get enough physicians into uniform and keep them there in order to maintain reasonable health care at military facilities?

How about $72,303 per doctor? That figure, according to Army Surgeon General Lt. Gen. Charles G. Pixley, represents the current median annual income for medical doctors throughout the country. That stipend, he adds in underscoring the rapidity with which physicians' incomes are skyrocketing, is up from $62,800 in 1976. And "they will continue to increase," he asserts.

Even those lofty amounts are dwarfed by incomes certain specialists command. Take radiologists, who shun military service like the plague, for obvious reasons. So the services try to hire some on contract. But "when we can find a radiologist willing to contract," Navy's Surgeon General Vice Adm. Willard P. Arentzen reports, *"the contract price may be as high as $200,000"* (emphasis supplied).

Drs. Pixley and Arentzen, along with USAF's new Surgeon General Lt. Gen. P. W. Myers, are key participants in a congressional probe of what to do about the decline in the number of uniformed health professionals, physicians especially. In recent Capitol Hill appearances, they explained that current military doctor compensation just isn't doing the recruiting and retention job. The medical chiefs also reported widespread grumbling throughout the medical corps over the restrictions on doctor specialty pay. Their message in a nutshell: Physician shortages are increasing and will become even more serious unless improvements, particularly in pay, are forthcoming. Dr. Arentzen also underscored another factor that military physicians weigh in making their career decisions—the opportunity, or lack of it, to practice on a diverse patient population that includes retirees and dependents of all ages.

Further, the three chiefs told of worsening dental officer shortages. General Pixley, for example, said that against a "recognized requirement" of 2,349 dentists, the Army currently has only 1,795. He hung more crepe when he explained that "expanding dental-insurance coverage" countrywide will greatly increase the demand for dentists. As a result, he forecast, "practice will become more lucrative for civilian dentists, and the Army will find it more difficult to compete for an increasingly scarce professional resource." All the services are in the same boat.

The House Armed Services Subcommittee on Military Compensation, chaired by Rep. Bill Nichols (D-Ala.), is conducting the much-needed examination of military doctor-dentist pay and its impact on military health care. Besides the services' top medical chiefs, the subcommittee is consulting Defense Department officials and plans to call in physicians from the field to testify. It may visit some of them at bases—"in their working environment," Nichols said.

The Nichols group is also asking related questions: Can the demand for military medical care, ever growing because of more and more retirees and their dependents, be curbed? Or reduced? Can CHAMPUS be improved? Can preventive medicine programs be expanded? How about more physician assistants?

All are pertinent questions, because there's no way the government is going to provide military doctors full income comparability with civilian medics, at least in the near future. But how close to comparability must the government go to get military care back on the track? How far ahead of line-officer pay can doctor pay be allowed to travel? What about medics with the Veterans Administration and other federal agencies? There are all kinds of perplexing questions but few answers at the moment.

In any event, Uncle Sam, within the next year or so, will probably boost military doctor-dentist incentive pays and change the way they are applied. Thus, more medical officers who now are denied incentive pay, but are doing the same work as those drawing it, might share in the outlays. Such a reapplication of special doctor pay could boost hundreds of medical officers' incomes several thousand dollars annually. But would this action really improve recruiting and retention?

Currently there are three special military physician pays: a $100 to $350 per month stipend based on length of service; a so-called Variable Incentive Pay providing up to $13,500 a year for certain doctors who execute active-duty agreements (but those procured under the services' medical scholarship program get no VIP at all following residency training, a circumstance that causes considerable bitterness); and "continuation pay" amounting to several additional months of basic pay for high-ranking physicians.

This patchwork incentive pay arrangement provides up to $17,000 per year more than nonflying line officers draw. But it's obviously not enough.

Congress recently extended, until September 1980, the three existing special pays, thus allowing the Nichols subcommittee time to come up with the answers, if indeed any genuine solutions exist.

One plan the subcommittee is weighing was circulated around the Pentagon earlier, but has not yet received Administration blessing. It is H.R. 13213, which a Nichols' aide described as a starting point for deliberations.

The bill would scrap the present incentive pays and establish a "primary special pay" (PSP) that would give all medical officers below general/flag rank from $1,200 to $11,000 annually, based on length of creditable service. (All with more than fourteen years of such service would receive the maximum $11,000.) The PSP would be increased by $5,000 whenever the officer is not in internship or residency training and by $2,000 if he is board-certified.

In addition, the bill contains incentive pay authority for specialists in short supply of from $4,000 to $8,000 a year. It seems likely that most specialists would be cut in on this; if not, a new round of complaints would certainly develop.

Four years of medical school, all nonactive duty time spent in intern and residency status, and all active duty spent as a military physician would count as creditable service.

Overall, the bill would provide up to $22,000 annually above basic pay and allowances, compared with the present $17,000 maximum. However, it's not clear to what extent the next maximums or near-maximums would be distributed.

Typical lieutenant colonels and colonels drawing the proposed $22,000 maximum medical pays would find themselves in the $50,000–$56,000 total annual salary range. Add a bit for tax advantage.

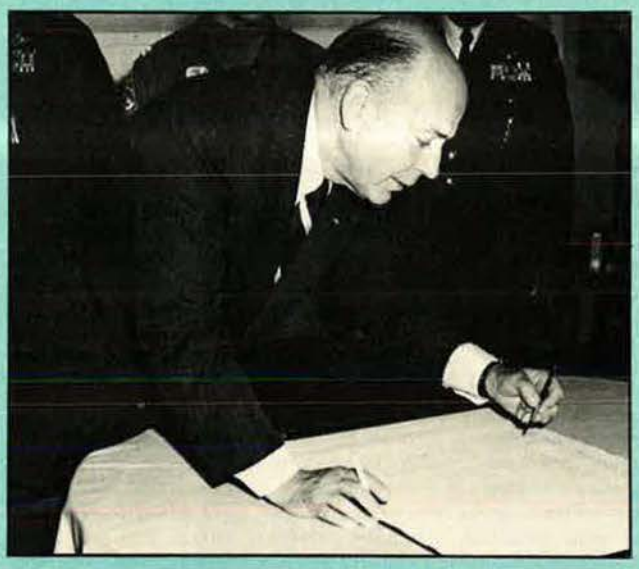
That, of course, is still below the civilian MD median income level. For lower-ranking military medics the gap is broader. But is the new plan within reasonable range of what's required? Or will the subcommittee have to up the ante? Hopefully it can come up with the answers in the next few months. The future of military medical care may hinge on the subcommittee's eventual recommendations. ■

# AFA News

By Don Steele, AFA AFFAIRS EDITOR

## SAC ALERT FAMILY CENTER RENAMED FOR THE LATE GERALEE DOUGHERTY

On July 8, the SAC Alert Family Center at Griffiss AFB, N. Y., was renamed the "Geralee Dougherty Family Center" in honor of the late wife of retired Air Force Gen. Russell E. Dougherty, former Commander in Chief of the Strategic Air Command. The dedication plaque reads, "Dedicated To Geralee Dougherty, 1922–1978, She Also Served." During the ceremonies, the deed to the building was turned over to Col. Richard J. Kiefer, 416th Bomb Wing Commander, by S. A. "Bud" DiMaggio, President of AFA's Colin P. Kelly Chapter. During his visit to Griffiss AFB, General Dougherty was the speaker at a luncheon for wives of 416th Bomb Wing members, and at a Dining Out for all 416th officers and their wives. In the photo on the right, General Dougherty is shown as he became the first to sign the guest register at the newly renamed center. Photo below: Among the dignitaries at the Dining Out were, from left, the Hon. Alexander Pirnie, former US Representative from New York; AFA National President and Mrs. Gerald V. Hasler; and Brig Gen. Charles B. Jiggetts, Commander, Northern Communications Area (AFCS). In photo below right, General Dougherty, center, is shown at the Dining Out with General Jiggetts, left, and Chapter President DiMaggio, right.



*A recent dinner meeting sponsored by AFA's Northern Virginia Chapter honored AFA Assistant Executive Director John O. Gray, who retired on June 30, and featured a presentation by Col. Joe Morgan, Chief, Missile and Nuclear Division, DCS/Research and Development, Hq. USAF. Head-table guests included, from left, Colonel Morgan; Mr. Gray; AFA President Gerald V. Hasler; Chapter President Larry Dyer; AFA Board Chairman George M. Douglas; and Virginia State AFA President Jon Donnelly.*

# chapter and state photo gallery

*The Texas State AFA's 1978 Convention was held recently in Fort Worth. Head-table guests at the convention luncheon included, from left, AFA President Gerald V. Hasler; the Hon. John C. Stetson, Secretary of the Air Force and the guest speaker; State AFA President T. A. "Tim" Glasgow; and the Hon. Jim Wright, Majority Leader of the US House of Representatives, who introduced the speaker.*

—Photo by Ken Bashore

*During the Air Force Ball at the Texas State AFA's 1978 Convention, State President Tim Glasgow, left, assisted by AFA President Hasler, right, presented the Texas State AFA's "Airman of the Year" award to SMSgt. Bernard L. Gaydosh, center, First Sergeant of the Security Police Squadron at Sheppard AFB. At the business session, delegates elected Frank Manupelli to succeed Mr. Glasgow for 1978-79.*

—Photos by Russ Egnor

*The Nation's Capital Chapter recently sponsored a reception honoring Gen. David C. Jones, Chairman, Joint Chiefs of Staff; Gen. Lew Allen, Jr., USAF Chief of Staff; and Gen. James A. Hill, USAF Vice Chief of Staff. Photo on left: The receiving line consisted of, from left, Chapter President George L. J. Dalferes; General and Mrs. Jones; General and Mrs. Allen; and General and Mrs. Hill. Photo below left: Among the more than 300 leaders of Congress, the Air Force, aerospace industry, and AFA who attended were, from left, retired Air Force Gen. Russell E. Dougherty; Mrs. Barbara Lake; Lt. Gen. Edgar S. Harris, Eighth Air Force Commander; Lt. Gen. Richard L. Lawson, Director J-5 (Plans & Policy), Joint Chiefs of Staff; and Maj. Roy Williamson, Deputy Chief, Civil Branch, Community Relations Division, Air Force Office of Information. Photo below: During the evening, AFA National Treasurer Jack Gross, right, visited with General Jones, left, and Chairman Mel Price of the House Armed Services Committee.*

# AFA News

*Retired Air Force Gen. T. R. Milton was the guest speaker at a recent meeting of AFA's Hawaii Chapter in the Coral Ballroom of the Hilton Hawaiian Village. Shown, from left, are Chapter President Jim Dowling; General Milton; Maj. Gen. Charles C. Pattillo, Vice Commander in Chief, Pacific Air Forces; and retired Episcopal Bishop Harry S. Kennedy of Honolulu.*

*Rep. Philip E. Ruppe (R-Mich.) was the guest speaker at the Huron Chapter's recent installation banquet. Following his address, Congressman Ruppe was presented a copy of the poem "High Flight" mounted on a wall plaque. In the photo, Congressman Ruppe, right, shows the memento to, from left, Chapter President John Patton; Brig. Gen. W. E. Masterson, 40th Air Division Commander; and Col. John Doran, 379th Bomb Wing Commander.*

*Paul Pobrezny, founder and president of the Experimental Aircraft Association, was the guest speaker at the Billy Mitchell Chapter's Annual Awards Dinner in Milwaukee, Wis. Steve Wittman, aviation pioneer and racer, was named the recipient of the Chapter's Billy Mitchell Memorial Award. Shown after the presentation of the award are, from left, Wisconsin AFA President Charles Marotske; Mr. Pobrezny; Chapter President K. W. Jacobi; the Hon. Warren Knowles, former Governor of Wisconsin; and Mr. Wittman.*

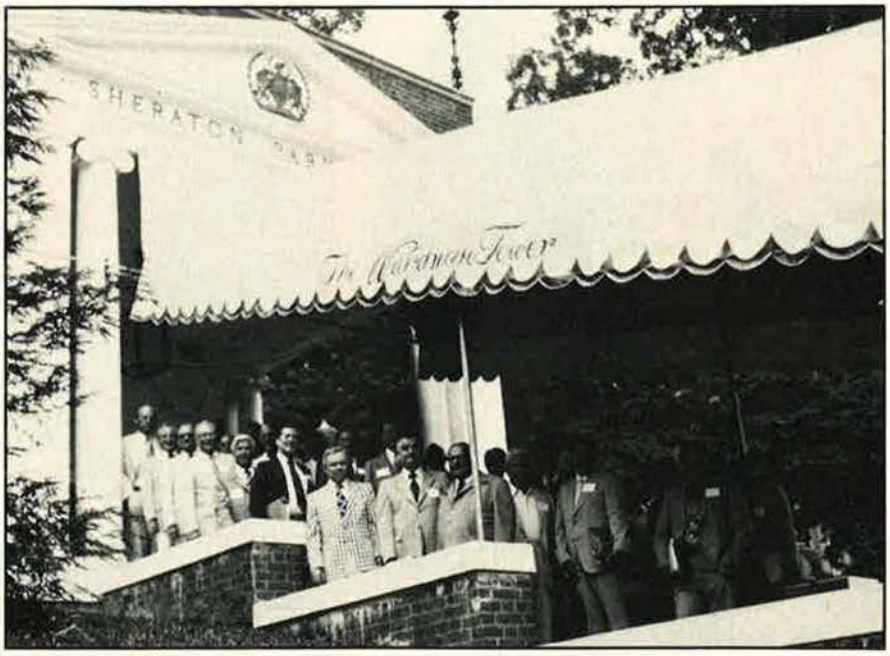
## COMING EVENTS

**AFA National Symposium,** "Toward a New World Strategy," Hyatt House Hotel at the Los Angeles International Airport, Calif., October 26–27 . . . **Seventh Annual Air Force Ball,** Century Plaza Hotel, Los Angeles, Calif., October 27 . . . **Iron Gate Chapter's Sixteenth National Air Force Salute,** New York Hilton Hotel, New York City, March 24, 1979 . . . **AFA Golf and Tennis Tournaments,** The Broadmoor, Colorado Springs, Colo., May 25 . . . **AFA Nominating Committee and Board of Directors Meetings,** The Broadmoor, Colorado Springs, Colo., May 26 . . . **Twentieth Annual Dinner honoring the Air Force Academy's Outstanding Squadron,** The Broadmoor's International Center, Colorado Springs, Colo., May 26.

# photo gallery

*Maj. Gen. John S. Pustay, Commander, Keesler Technical Training Center, was named the first recipient of the Mississippi Gulf Coast Chapter's "Spirit of Keesler AFA Award" at a Chapter dinner in Biloxi recently. The award, a limited edition silver plate with the Air Force seal inscribed on it, will be awarded annually to an individual who has made a major contribution to the Air Force and AFA, and who carries the spirit of being a winner. It will be permanently displayed in the Spirit of Keesler Center and the names of future recipients will be added annually. In the photo, Chapter President Don Wylie, left, and General Pustay, right, are shown with the award.*


*The Pennsylvania State AFA's 30th Annual Convention was hosted by the Col. Stuart E. Kane, Jr., Chapter in State College, and featured an address by Lt. Gen. Bennie L. Davis, Deputy Chief of Staff (Personnel) at Hq. USAF. During the convention banquet, State AFA President Lamar Schwartz, left, presented the Pennsylvania AFA's "Man of the Year" award to Jack Flaig, right, Chairman of the Convention and President of the host Chapter, which was named the State AFA's "Chapter of the Year." Delegates elected Mr. Schwartz to serve another term as State President.*




*AFA's Fourteenth Annual State Presidents' Orientation Meeting was held recently in Washington, D. C., at the AFA Headquarters offices and at the Sheraton-Park Hotel. Twenty-eight AFA State Presidents attended the two-day meeting and received briefings from AFA President Gerald V. Hasler; Maj. Gen. Charles Blanton, Director of Legislative Liaison, Office of the Secretary of the Air Force; AFA Department Heads; and AFA's Tax Counsel. The group is shown here on the steps of the Sheraton-Park's Wardman Tower.*

# AFA News photo gallery

*During the Charter Night program of the newly chartered Middlesex Chapter, New Jersey State AFA President Leonard Schiff, left, presents a gavel to Chapter President Fred Bell.*

—Photo by Dennis Bowman

*Gen. John W. Roberts, third from right, Commander, Air Training Command, was the guest speaker at the annual Dining Out sponsored by AFROTC Detachment 685 at Oregon State University. During the evening, General Roberts was named the first honorary member of the Flying Beaver Alumni Association and was awarded an AFROTC Recognition Plaque. Shown with General Roberts are Dining Out staff members, from left, Thomas McCoy, Thomas Kuivila, Diane Waterworth, Larry Weber, and Mark Ketelsen, President of the Mess and recipient of AFA's AFROTC Silver Medal.*

# 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): **Donal B. Cunningham,** 1 Keithway Dr., Selma, Ala. 36701 (phone 205-875-2450).

**ALASKA** (Anchorage, Fairbanks): **David W. Robinson,** P. O. Box 1120, Anchorage, Alaska 99510 (phone 907-274-3561).

**ARIZONA** (Phoenix, Tucson): **E. D. Jewett, Jr.,** 7861 N. Tuscany Dr., Tucson, Ariz. 85704 (phone 602-297-1107).

**ARKANSAS** (Blytheville, Fort Smith, Little Rock): **Gordon W. Smethurst,** RR #2, Box 43D, Cabot, Ark. 72023 (phone 501-374-2245).

**CALIFORNIA** (Apple Valley, Edwards, Fairfield, Fresno, Hawthorne, Hermosa Beach, Long Beach, Los Angeles, Marysville, Merced, Monterey, Novato, Orange County, Palo Alto, Pasadena, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, San Mateo, Santa Barbara, Santa Monica, Tahoe City, Vandenberg AFB, Van Nuys, Ventura): **Edward A. Stearn,** P. O. Box 5867, San Bernardino, Calif. 92412 (phone 714-889-0696).

**COLORADO** (Aurora, Boulder, Colorado Springs, Denver, Ft. Collins, Grand Junction, Greeley, Littleton, Pueblo, Waterton): **Stephen L. Brantley,** 1089 S. Buchanan St., Aurora, Colo. 80010 (phone 303-320-7153).

**CONNECTICUT** (East Hartford, North Haven, Stratford, Windsor Locks): **Joseph R. Falcone,** 14 High Ridge Rd., Rockville, Conn. 06066 (phone 203-565-3543).

**DELAWARE** (Dover, Wilmington): **Hal Hester,** 159 S. Fairfield Dr., Dover, Del. 19901 (phone 302-378-9845).

**DISTRICT OF COLUMBIA** (Washington, D. C.): **George L. J. Dalferes,** 12602 Tartan Ln., Oxon Hill, Md. 20022 (phone 301-897-6620).

**FLORIDA** (Bartow, Broward, Cape Coral, Ft. Walton Beach, Gainesville, Jacksonville, New Port Richey, Orlando, Panama City, Patrick AFB, Redington Beach, Sarasota, Tallahassee, Tampa): **Eugene D. Minietta,** Box 286A, Route 1, Oviedo, Fla. 32765 (phone 305-420-3868).

**GEORGIA** (Athens, Atlanta, Rome, Savannah, St. Simons Island, Valdosta, Warner Robins): **William L. Copeland,** 1885 Walthall Dr., NW, Atlanta, Ga. 30318 (phone 404-355-5019).

**HAWAII** (Honolulu): **James Dowling,** 2222 Kalakaua Ave., Honolulu, Hawaii 96815 (phone 808-923-0492).

**IDAHO** (Boise, Pocatello, Twin Falls): **Ronald R. Galloway,** Box 45, Boise, Idaho 83707 (phone 208-385-5247).

**ILLINOIS** (Belleville, Champaign, Chicago, Elmhurst, Peoria): **C. W. Scott,** P. O. Box 159, O'Fallon, Ill. 62269 (phone 618-632-7003).

**INDIANA** (Indianapolis, Logansport, Marion, Mentone): **Roy P. Whitton,** 916 Oak Blvd., Greenfield, Ind. 46140 (phone 317-632-9537).

**IOWA** (Des Moines): **Ric Jorgensen,** 4005 Kingman, Des Moines, Iowa 50311 (phone 515-255-7656).

**KANSAS** (Topeka, Wichita): **Cletus J. Pottebaum,** 6503 E. Murdock, Wichita, Kan. 67206 (phone 316-681-5445).

**KENTUCKY** (Louisville): **Stanley P. McGee,** 5405 Wending Ct., Louisville, Ky. 40207 (phone 502-368-6524).

**LOUISIANA** (Alexandria, Baton Rouge, Bossier City, Monroe, New Orleans, Shreveport): **Thomas L. Keal,** 404 Galway, Shreveport, La. 71115 (phone 318-868-9688).

**MAINE** (Limestone): **Alban E. Cyr,** P. O. Box 160, Caribou, Me. 04736 (phone 207-492-4171).

**MARYLAND** (Andrews AFB, Baltimore): **Robert J. Beatson,** 7813 Locris Ct., Upper Marlboro, Md. 20870 (phone 301-336-5400).

**MASSACHUSETTS** (Boston, Falmouth, Florence, Hanscom AFB, Lexington, Taunton, Worcester): **Mary Anne Gavin,** 38 Tremlett St., Boston, Mass. 02124 (phone 617-282-2059).

**MICHIGAN** (Battle Creek, Detroit, Kalamazoo, Lansing, Marquette, Mount Clemens, Oscoda, Petoskey, Sault Ste. Marie, Southfield): **Howard C. Strand,** 15515 A Dr., N., Marshall, Mich. 49068 (phone 616-963-1596).

**MINNESOTA** (Duluth, Minneapolis, St. Paul): **David J. Little,** 1888 Princeton Ave., St. Paul, Minn. 55105 (phone 612-699-3600).

**MISSISSIPPI** (Biloxi, Columbus, Jackson): **Billy A. McLeod,** P. O. Box 1274, Columbus, Miss. 39701 (phone 601-328-0943).

**MISSOURI** (Kansas City, Knob Noster, Springfield, St. Louis): **Donald K. Kuhn,** 3238 Southern Aire Dr., St. Louis, Mo. 63125 (phone 314-892-0121).

**MONTANA** (Great Falls): **Jack R. Thibaudeau,** P. O. Box 2247, Great Falls, Mont. 59403 (phone 406-727-3807).

**NEBRASKA** (Lincoln, Omaha): **Lyle O. Remde,** 4911 S. 25th St., Omaha, Neb. 68107 (phone 402-731-4747).

**NEVADA** (Las Vegas, Reno): **William S. Chairsell,** 2204 Westlund Dr., Las Vegas, Nev. 89102 (phone 702-878-6679).

**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, Edison, Forked River, Fort Monmouth, Jersey City, McGuire AFB, Newark, Trenton, Wallington, West Orange): **Leonard Schiff,** 246 Franklin Ave., Cliffside Park, N. J. 07010 (phone 201-861-2950).

**NEW MEXICO** (Alamogordo, Albuquerque, Clovis): **Joseph H. Turner,** P. O. Box 1946, Clovis, N. M. 88101 (phone 505-762-4557).

**NEW YORK** (Albany, Bethpage, Binghamton, Buffalo, Catskill, Chautauqua, Griffiss AFB, Hartsdale, Ithaca, Long Island, New York City, Niagara Falls, Patchogue, Plattsburgh, Riverdale, Rochester, Staten Island, Syracuse): **Kenneth C. Thayer,** R. D. #1, Ava, N. Y. 13303 (phone 315-827-4241).

**NORTH CAROLINA** (Asheville, Charlotte, Fayetteville, Goldsboro, Greensboro, Raleigh): **William M. Bowden,** 509 Greenbriar Dr., Goldsboro, N. C. 27530 (phone 919-735-4716).

**NORTH DAKOTA** (Concrete, Fargo, Grand Forks, Minot): **Ernest J. Collette, Jr.,** Box 345, Grand Forks, N. D. 58201 (phone 701-775-3944).

**OHIO** (Akron, Cincinnati, Cleveland, Columbus, Dayton, Newark, Toledo, Youngstown): **Robert J. Puglisi,** 1854 SR 181, Crestline, Ohio 44827 (phone 419-683-2283).

**OKLAHOMA** (Altus, Enid, Oklahoma City, Tulsa): **William N. Webb,** 404 W. Douglas, Midwest City, Okla. 73110 (phone 405-734-2658).

**OREGON** (Corvallis, Eugene, Portland): **Roy G. Loughary,** P. O. Box 66127, Portland, Ore. 97266.

**PENNSYLVANIA** (Allentown, Beaver Falls, Chester, Dormont, Erie, Harrisburg, Homestead, Horsham, King of Prussia, Lewistown, Philadelphia, Pittsburgh, State College, Washington, Willow Grove, York): **Lamar R. Schwartz,** 390 Broad St., Emmaus, Pa. 18049 (phone 215-967-3387).

**RHODE ISLAND** (Warwick): **Charles H. Collins,** 143d TAG (RIANG), Warwick, R. I. 02886 (phone 401-737-2100).

**SOUTH CAROLINA** (Charleston, Columbia, Greenville, Myrtle Beach, Sumter): **Robert H. Morrell,** RR 2, Hopkins, S. C. 29061 (phone 803-776-2041).

**SOUTH DAKOTA** (Rapid City): **Ken Guenthner,** P. O. Box 9045, Rapid City, S. D. 57701 (phone 605-348-0579).

**TENNESSEE** (Chattanooga, Knoxville, Memphis, Nashville, Tri-Cities Area, Tullahoma): **Thomas O. Bigger,** Sverdrup/ARO, Inc., AEDC Div., Arnold AFS, Tenn. 37389 (phone 615-455-2611, ext. 243).

**TEXAS** (Abilene, Austin, Big Spring, Commerce, Corpus Christi, Dallas, Del Rio, Denton, El Paso, Fort Worth, Harlingen, Houston, Kerrville, Laredo, Lubbock, San Angelo, San Antonio, Waco, Wichita Falls): **Frank Manupelli,** 6061 Northwest Expressway, #210, San Antonio, Tex. 78201 (phone 512-349-1111).

**UTAH** (Brigham City, Clearfield, Ogden, Provo, Salt Lake City): **Lee Mohler,** 2605 Bonneville Terr., Ogden, Utah 84403 (phone 801-777-3421).

**VERMONT** (Burlington): **James W. McCabe,** RFD, Monroe, N. H. 03771 (phone 603-638-4932).

**VIRGINIA** (Arlington, Danville, Harrisonburg, Langley AFB, Lynchburg, Norfolk, Petersburg, Richmond, Roanoke): **Jon R. Donnelly,** 8539 Sutherland Rd., Richmond, Va. 23235 (phone 804-649-6425).

**WASHINGTON** (Port Angeles, Seattle, Spokane, Tacoma): **Frank R. Troutman,** P. O. Box 383, Issaquah, Wash. 98027 (phone 206-655-0540).

**WEST VIRGINIA** (Huntington): **James Hazelrigg,** Rt. 2, Box 32, Barboursville, W. Va. 25504 (phone 304-755-2121).

**WISCONSIN** (Madison, Milwaukee): **Charles W. Marotske,** 7945 S. Verdev Dr., Oak Creek, Wis. 53154 (phone 414-762-4383).

**WYOMING** (Cheyenne): **Norman L. Hanson,** P. O. Box 1244, Cheyenne, Wyo. 82001 (phone 307-634-7779).

Some 1,000 Arnold Air Society and Angel Flight members from 143 colleges and universities around the nation "attained new heights in professionalism" during this year's . . .

# Conclave in Phoenix

At the Arnold Air Society's National Conclave, held this spring in Phoenix, Ariz., Gen. David C. Jones, Chairman of the Joint Chiefs of Staff, agreed to serve as the Society's 1978–79 Honorary National Commander.

Among previous Honorary National Commanders have been Gens. H. H. "Hap" Arnold, James H. Doolittle, and Curtis E. LeMay, cartoonist Milton Caniff, and James H. Straubel, the Air Force Association's Executive Director.

An estimated 1,000 Arnold Air Society and Angel Flight members from 143 colleges and universities attended the Phoenix Conclave, held April 1–6.

This year's gathering was the thirtieth annual meeting for the Society. "The Conclave attained new heights in professionalism," said William G. Morley, Executive Administrator for the two organizations.

Highlighting the Conclave was a briefing by Dr. Paul Holman, an Air Force intelligence analyst, on the Soviet Union, followed by a question-and-answer period.

Other programs included a panel discussion headed by Brig. Gen. Norma Brown on women in the Air Force, and a discussion led by Brig. Gen. H. J. Dalton, Jr., USAF Director of Information, and Steve Ritchie, a Vietnam War ace and member of AFA's Board of Directors, on Air Force and US policy.

Brig. Gen. David Easson, Commandant of Air Force ROTC, discussed Air Force officer needs, and an Air Force military personnel center team was on hand to counsel cadets on commissions.

Cadet Michael Otterblad, of the University of Minnesota at Duluth, was elected Commander of the Society for 1978–79. He succeeds Cadet Steve Chambers of St. Thomas College, Minn., who has since enrolled in the Armed Forces medical school, Washington, D. C.

Beverly Stokes, Louisiana State University at Baton Rouge, was elected National Commander of Angel Flight. The Conclave also selected Holly Backus of St. Catherine's College, St. Paul, Minn., as Angel Flight "Little General." She succeeds Bronwyn Lawson of the University of Texas at Austin.

Guest speaker at the annual Military Ball was Lt. Gen. James D. Hughes, Commander of the TAC's Twelfth Air Force. Honored guests included Gerald Hasler, President of the Air Force Association; USAF Maj. Gen. Thomas Clifford; E. F. "Sandy" Faust, Vice President for AFA's Southwest Region; and William P. Chandler, Vice President for the Far West Region.

Mark S. Miller, of Baylor University, was presented the H. H. Arnold Sabre Award as outstanding area cadet commander.

At the awards luncheon, Jack Sorenson from Hq. Air University, Maxwell AFB, Ala., delivered a dramatic and moving call for a return to a "can-do" national attitude.

Seven AFROTC cadets' performances during the year were recognized with the Lovelace Medallion: Leslie A. Palmer, University of Texas at Austin; Chris N. Michalakis, Embry-Riddle Aeronautical University; Wray R. Johnson, Southwest Texas State University; Ivan A. Moore, Jr., Virginia Military Institute; Margaret L. Wallace, University of Arizona; Mark W. Rienhart, Purdue University; and Mark S. Foy, Norwich University.

Cohosting the 1978 Conclave were the Arnold Air Society and Angel Flight at Arizona State University at Tempe. The 1979 Conclave will be held March 16–20 in St. Louis, Mo., hosted by the Arnold Air Society and Angel Flight at Southern Illinois University at Carbondale, assisted by the units at Parks College, Ill. ■


*Beverly Stokes, Louisiana State University at Baton Rouge, newly elected National Commander of Angel Flight, is introduced by master of ceremonies E. F. "Sandy" Faust.*

*In recognition of his selection as the outstanding Air Force ROTC Cadet in the midwest region, Cadet Wray R. Johnson of Southwest Texas State University receives the Lovelace Medallion from AFA President Gerald Hasler. Mr. Hasler was emcee for the awards luncheon.*

*The Society's Joint Operations Award, recognizing cooperation between Arnold Air Society and Angel Flight, went to Louisiana State University.*

*The celebrated "Footprints of Freedom" from the Air Force ROTC and Angel Flight at Brigham Young University provided their talented entertainment at the military ball.*

*Michael Otterblad, University of Minnesota, Duluth, the new National AAS Commander, salutes outgoing Commander Steve Chambers, left, in the change-of-command ceremonies.*

*John C. Ritchie, AAS Colonel, University of Florida at Orlando, receives the Commander's Award Plaque for outstanding leadership from National Commander Steve Chambers of St. Thomas College, Minn. Ritchie is the Society's Southeast Area Commander.*

*AAS Col. Winford Speakman, Auburn University, in an after-hours hallway conference with Society Executive Administrator William G. Morley.*

*Col. David J. Pennington, USAF, presents the Air Force Recruiting Service Award for best membership training to Rebecca Cheek, Angel Flight Pledge Trainer at Baylor University, Waco, Tex.*

# Airman's Bookshelf

## Blacks in the Air Force

*The Air Force Integrates: 1945–1964,* by Alan L. Gropman. Office of Air Force History, Washington, D. C., 1978. Available through the Superintendent of Documents, US Government Printing Office, Washington, D. C. 20402. 384 pages, including index and bibliography. $4.75.

The time span indicated in the title of this important work is somewhat misleading. While the years 1945–1964 are indeed the subject of the book, the first chapter sets the stage with a short but concise discussion of post-World War I through pre-1945 racial policy in the Air Corps. There is also an epilogue that very briefly treats the period between 1964 and the race riots at Travis AFB, Calif., in 1971.

This book is important because it relates the official Air Force attempts to deal with the nation's, and its own, deepest and most far-reaching "people problem." As Gropman [lieutenant colonel and former member of the Air Force Academy History Department, now serving on the Air Staff] makes clear, the perception of race within the Air Force has been tied to that prevailing in our society. The Air Force, much to its credit when faced with the order to integrate, moved with alacrity and purpose. However, after the initial move, the Air Force allowed itself to slip into what must be viewed as apathy toward the sociological effects of integration. Society forged ahead, albeit under the pressures of protest and the civil rights movement, while the Air Force went about its primary mission of preparing for and fighting a war.

We have a "system" now to help prevent frustration and bitterness arising from racial causes. This system should prevent friction before it leads to violence. But the point is well made in this examination that we in the Air Force felt we had an adequate "system" to handle complaints during the years that allowed discrimination to breed the frustration that led to the violence at Travis. Every commander should understand how the institution in which we all live has dealt with its problems, and further understand that we must guard against repetition. After all, we are still in the process of guaranteeing equal rights and treatment within the Air Force. Our problem has not gone away. Further, we are undergoing a simultaneous integration of the sexes and the parallels between the attitudes and positions one used to hear on race and what one hears and reads today with regard to women in the services are striking.

I have two minor complaints about the book. First, there are too many long quotations. I thoroughly enjoyed Gropman's narrative style, and while I appreciate the historian's desire for contextual accuracy, I would much rather have read more Gropman. Second, there are many pictures of people scattered throughout the text, often of presidents or important generals. I would much rather have seen pictures of places, such as MacDill AFB, Fla., at the time of the riot there in 1946. Scenes of places can give a flavor for events and conditions while official photographs do not provide such background.

These criticisms are more than compensated for by the author's supporting material and documentation. There is an adequate index and a superb bibliography. The chapter notes at the end of the book are detailed and contain a wealth of information in their own right.

I highly recommend this book for any individual serving in the Air Force at any level.

*—Reviewed by Maj. Donald J. Alberts, Hq. USAF.*

## Officers Under Attack

*Crisis in Command,* by Richard A. Gabriel and Paul L. Savage. Hill & Wang, New York, N. Y., 1978. 264 pages plus tables, notes, bibliography, and index. $10.

In the immediate aftermath of Vietnam, many officers tended to explain our failure in terms of political restraints on our military power or the impact of changing social values on military discipline. Only recently have a number of books focused on the internal military factors that contributed to our defeat. *Crisis in Command,* revealingly subtitled *Mismanagement in the Army,* is perhaps the boldest of these studies. Two political scientists, Paul Savage (Lt. Col., USA, Ret.) and Richard Gabriel (Maj., USAR), have written an impassioned analysis of the Army as a force that increasingly failed to perform in combat because of the effects of officer careerism.

Briefly stated, Savage and Gabriel argue that the Army in Vietnam lacked "cohesion." It therefore "disintegrated" (as evidenced by indiscipline, drug abuse, fraggings, and combat refusals) under "minimal combat stress." The specific reasons for the lack of cohesion are several, but in the authors' view they fundamentally stem from one cause—the replacement of leadership by managerial modes of behavior among officers. The heroic officer who shared danger with his men has been replaced by "entrepreneurial" officers who have subsumed an ethic of self-interest (like the business world) and seek to aggrandize their own career advancement. But soldiers in Vietnam refused to be "managed" to face the risk of death in battle.

The authors rely heavily on the 1970 Army War College *Study on Military Professionalism* and on comparisons with the German and British armies. Their narrative will strike many sympathetic chords. They describe with accurate disdain the personnel, promotion, and rotation policies that have debilitated military professionalism. But for a book that purports to analyze the

Army in scholarly fashion, their formal argumentation lacks rigor. Savage and Gabriel depend on a narrow base of studies and statistics marshalled toward preconceived notions. The book plainly suffers from overconviction.

What, then, is the value of the book? *Crisis in Command* serves a valuable purpose in bidding the officer corps to debate reform. It reasserts a military ethos based on performance in combat. It argues for a return to an officer ethic based on shared sacrifice. It calls officers to lead by example in time of hazard. And it squarely portends that continued failure to change the character of the officer corps will result in continued defeat.

The book concentrates exclusively on the Army, but the lessons for the Air Force are clear. The Air Force officer corps has developed the same entrepreneurial character that the authors describe for the Army. Thus, one must ask: Did the Air Force perform so well in Vietnam only because it was isolated from continuous combat stress on relatively secure bases? Will we enjoy the same immunity in the future? Savage and Gabriel persuasively challenge us to consider the questions of cohesion and leadership for the next war, now instead of later.

*—Reviewed by Capt. Donald M. Bishop, USAF, Department of History, USAF Academy.*

## New Books in Brief

*Aviation Year, No. 2,* by Michael J. Hooks. The Paris Air Show and the golden anniversaries of Cessna, Pan Am, and Lindy's Atlantic crossing were only a few of the milestones in aerospace during the Queen's Jubilee Year, 1977. This volume, compiled by members of Air-Britain, the International Association of Aviation Historians, encapsulizes the major events that made the year memorable. Also includes aviation films released during the year; aircraft making their debut; a synopsis of military aviation events; airliners delivered and on order; aviation stamps issued; the balloon and airship scene; and more. Photos, charts, Avia Books, Ltd./Ducimus Books, Ltd., De Worde House, 283 Lonsdale Road, London, SW13 9QW England, 1978. 128 pages. $12.50.

*Export of Aerospace Technology: Fifteenth Goddard Memorial Symposium,* edited by Carl Tross. Military, government, and industry leaders probe political, economic, military, and social issues involved in the complex area of technology transfer. Their remarks, presented at the Goddard Memorial Symposium, are reprinted in this volume. Included as appendices are select government reports, studies, and hearings on the export of aerospace technology. Select bibliography. American Astronautical Society. Available from UNIVELT, Inc., P. O. Box 28130, San Diego, Calif. 92128, 1978. 161 pages. $20.

*How To Become a Successful Consultant In Your Own Field,* by Hubert Bermont. The terms "freelancing" or "consulting" are often euphemisms for "unemployed." Not so to author Bermont, who parlayed his experience as an executive into a successful and useful (to his clients as well as to himself) career as a consultant. Anyone recently retired or about to retire will find this slim, breezy, irreverent, but immensely practical account of his experiences most helpful. His advice is no substitute for talent and experience but if you have a modicum of both, he'll tell you how to cash in on it. May be ordered from Bermont Books, 815 15th St. N. W., Washington, D. C. 20005. 157 pages. $20.

*The Industrialization of Space,* Vol. 36, Part I, edited by Richard Van Patten, Paul Siegler, and E. V. B. Stearns. Here are the proceedings of the American Astronautical Society's annual meeting held in October 1977 on the industrialization of space. Part I covers large space structures, advanced transportation, communications, navigation, space habitation, space manufacturing including logistics, materials processing in space, environmental testing in space, space products, raw materials from space, terrestrial power from space, in-orbit manufacture of satellites, and a panel discussion. 590 pages. $45. *Industrialization of Space,* Vol. 36, Part II, includes papers on economics, psychosocial and biological considerations, space law, space community planning, space enterprise, space organization, and services. Available from UNIVELT, Inc., P. O. Box 28130, San Diego, Calif. 92128. 528 pages. $40.

*Prisoner at War: The Survival of Commander Richard A. Stratton,* by Scott Blakey. In January 1967, Commander Stratton was taken prisoner by the North Vietnamese. In March he was photographed hollow-eyed and bowing at a press conference announcing his confession to heinous war crimes. Here is the true story of the 2,251 days he was held captive and the courage and strength both he and his family possessed to live with, and ultimately conquer, the horrors of Vietnam. Anchor Press/Doubleday & Co., New York, N. Y., 1978. 398 pages. $10.

*The U.S.S.R. and Global Interdependence: Alternative Futures,* by Walter C. Clemens, Jr. The author, professor of political science at Boston University and an associate of the Russian Research Center at Harvard, believes trade and détente with the Soviet Union serve the long-range policy interests of the West and should be encouraged despite doubts on both sides. He examines political forces in the USSR and finds Soviet leaders increasingly aware they must play a greater role in international cooperative programs if they are to sustain the trade and technology exchange essential to their economy. American Enterprise Institute for Public Policy Research, 1150 17th St. N. W., Washington, D. C. 20036. 113 pages. $3.25.

*We Came Home,* by Capt. (USNR-Ret.) and Mrs. Frederic A. Wyatt. In his introduction, former Gov. Ronald Reagan says: "We watched through a blur of tears as each man on the plane came down the ramp and, while they couldn't know it, they brought a healing and a restoration to the soul of a nation." In the book, nearly 500 former POWs tell about imprisonment, return, and what it all meant. Royalties from the book are to be placed in a trust fund for the college education of sons and daughters of those missing, killed in action, or totally disabled from the Vietnam War. Dr. John R. Hubbard, President of the University of Southern California, is among the members of the scholarship committee. P.O.W. Publications, 10250 Moorpark St., Toluca Lake, Calif. 91602, 1978. 600 pages plus photos. $30 softbound, $40 hardbound.

*—Reviewed by Robin Whittle*

Bob Stevens'

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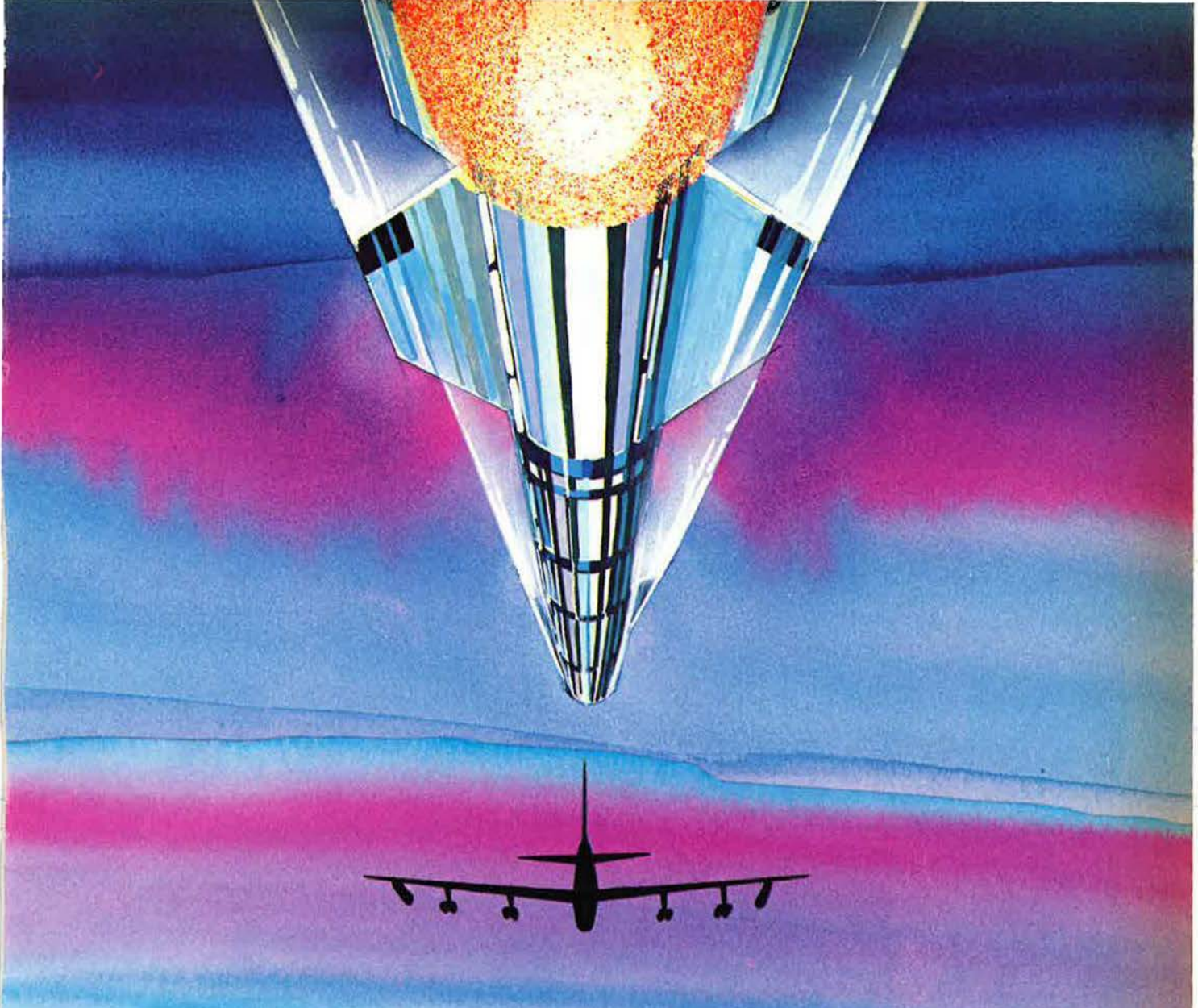

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**McDonnell Douglas in missiles?** Yes. We've built more than 100,000 guided missiles for America's armed forces.

**McDonnell Douglas in missile integration?** Yes, from the tiny Dragon man-carried missile to the satellite-boosting Delta; from the Harpoon which flies from ships, planes and subs to new designs for advanced strategic and tactical missiles.

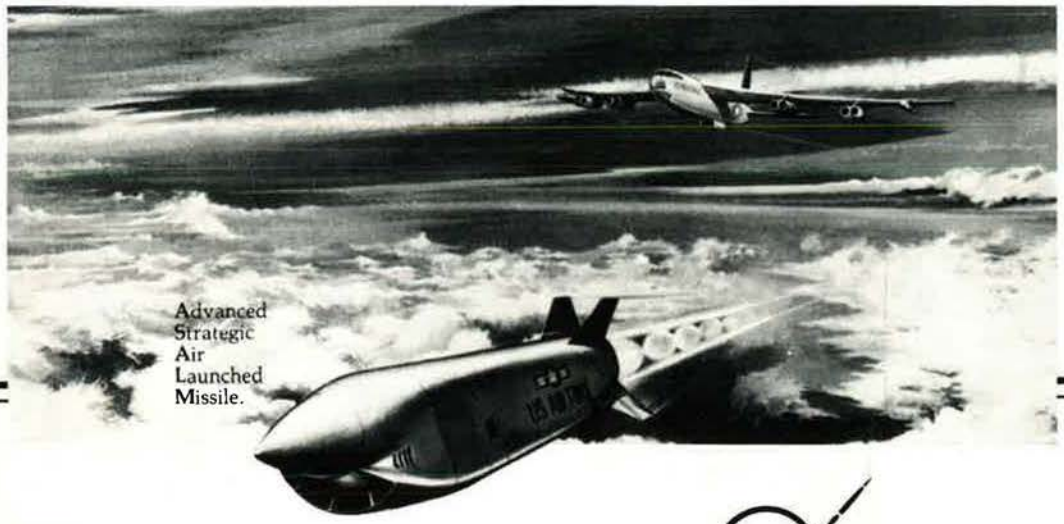
**Mission experience?** Yes. Air-to-surface—Harpoon, Skybolt, Gargoyle, Roc, Kingfisher. Surface-to-surface—Honest John, Dragon, Harpoon, Thor. Surface-to-air—Nike Series, Zeus, Spartan, Talos, Typhon. Air-to-air—Genie, Sparrow, Bird Dog. Decoy—Quail. Undersea-to-surface-to-air—Harpoon.

**Aircraft integration?** Yes. We've been marrying missiles to airplanes since before there were jets.

**Supersonic/hypersonic airframe experience?** More than anyone! Lifting body programs—Alpha Draco, BGRV, ASSET. Space—Mercury, Gemini, S-IVB and Shuttle propulsion modules. Aircraft—thousands of F-4 and F-15 fighters.

**Missile guidance experience?** Yes, as guidance contractor for the nation's cruise missiles, whether fired from land, sea or air.

**McDonnell Douglas in ASALM?** Yes! We've been at it since the USAF asked, "Is it possible?"

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