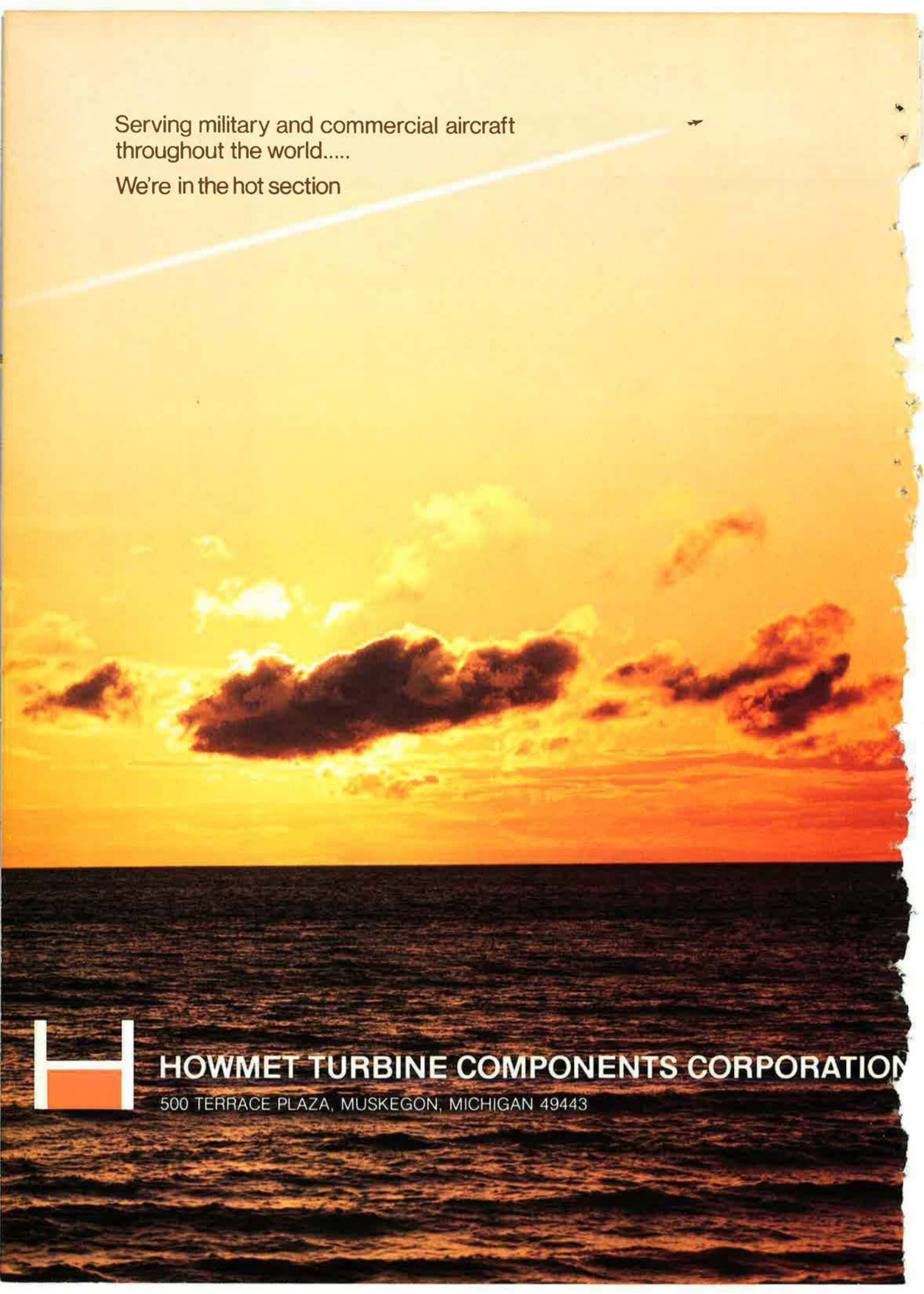
SEPTEMBER 1980/$3

AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION

Last Aerial Combat of World War II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More recently, the Astronics Division's AFCS for the **LTV A-7** initiated two breakthroughs—control augmentation with control stick steering and a two-channel fail passive AFCS. This system was later modified and put into production for the Lockheed **P-3C** to insure absolute reliability and safety.

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This Month

SEPTEMBER 1980 • VOLUME 63, NUMBER 9

ABOUT THE COVER

Readers know the role of the B-29 Superfortress in World War II, but few may recall the part played by its backup, the B-32 Dominator. The Consolidated-built bomber saw only limited action in the Pacific. Artist William Reynolds captures the Dominator in the last aerial combat of World War II. *See p. 37.*

Departments

AN EDITORIAL

Preparedness—The Parallels With 1940

GENERAL of the Air Force H. H. "Hap" Arnold wrote, "For the Air Corps, like the rest of the world, 1940 was a fateful year." That sentence led the 1940 chapter in his book, *Global Mission.* General Arnold then unveiled the year through a sequence of critical events, painting a clear picture of a muddled situation in American preparedness. At the same time, in that crucial chapter he also showed how a few farsighted, courageous, and decisive people in the right place at the right time sorted out the confusion and took the steps leading to eventual victory in 1945. Among them: Gen. George C. Marshall, Army Chief of Staff; Henry L. Stimson, Secretary of War; President Franklin D. Roosevelt; and, of course, Arnold himself.

The preparedness parallels between the years 1940 and 1980 are numerous. In 1940, both elected and professional leaders took the right steps. Whether or not in 1980 the key people are taking the right steps to ensure victory the next time is not clear. That awaits the verdict of history. However, it is instructive to cite the parallels and note the contrasts between now and that "fateful year."

In 1940, the nation was climbing out of the Great Depression. The recovery was fueled in part by the needs of warring nations abroad. In 1980, the country is simultaneously experiencing a deepening recession and accelerating inflation. It is uncertain whether one will overcome the other, both will improve or worsen, or the country will stagger along indefinitely in a sort of economic limbo.

The 1940 United States economy was clearly industrialized. Even so, 23.2 percent of the population lived on farms, mostly small holdings. As 1980 approached, the farm population had dwindled to 3.7 percent of the total. For working women, the reverse occurred. The labor force of 1940 included 13,000,000 women, comprising 27.4 percent of the female population. Now, more than 41,000,000 women are working—fully half of the female population.

In national politics, the Democratic incumbent President in 1940 ran a vigorous (and victorious) campaign against his Republican opponent. Some voters gave Franklin D. Roosevelt a third term because they believed he would keep the country out of foreign war, and they were not as confident that Willkie, the Republican, would. In 1980, the incumbent points out that during his tenure no American lives have been lost in combat (except for cases like the soldiers murdered in the Karachi Embassy and the Marines and airmen who died in the Iranian desert). His campaign organization tries to depict the Republican opponent as a button-pusher who will edge the country closer to war.

In 1940, America's allies were uncertain about its resolve and response to the threats they faced. But the allies still relied on American mobilization capacity to make up their equipment losses, and hoped to count on its manpower entering the global conflict before it was too late. In 1980, the allies once again doubt America's resolve. Now they seem more inclined to seek their own accommodations with aggressors of all stripes, and so do some Americans.

America's 1940 mobilization potential was tremendous, given the slack in its industrial base and its large pool of unemployed talent. The contrasts in 1980 are telling. Mobilization cannot be counted upon to bail the country out. *(See "In Focus," p. 18, about part of the problem.)*

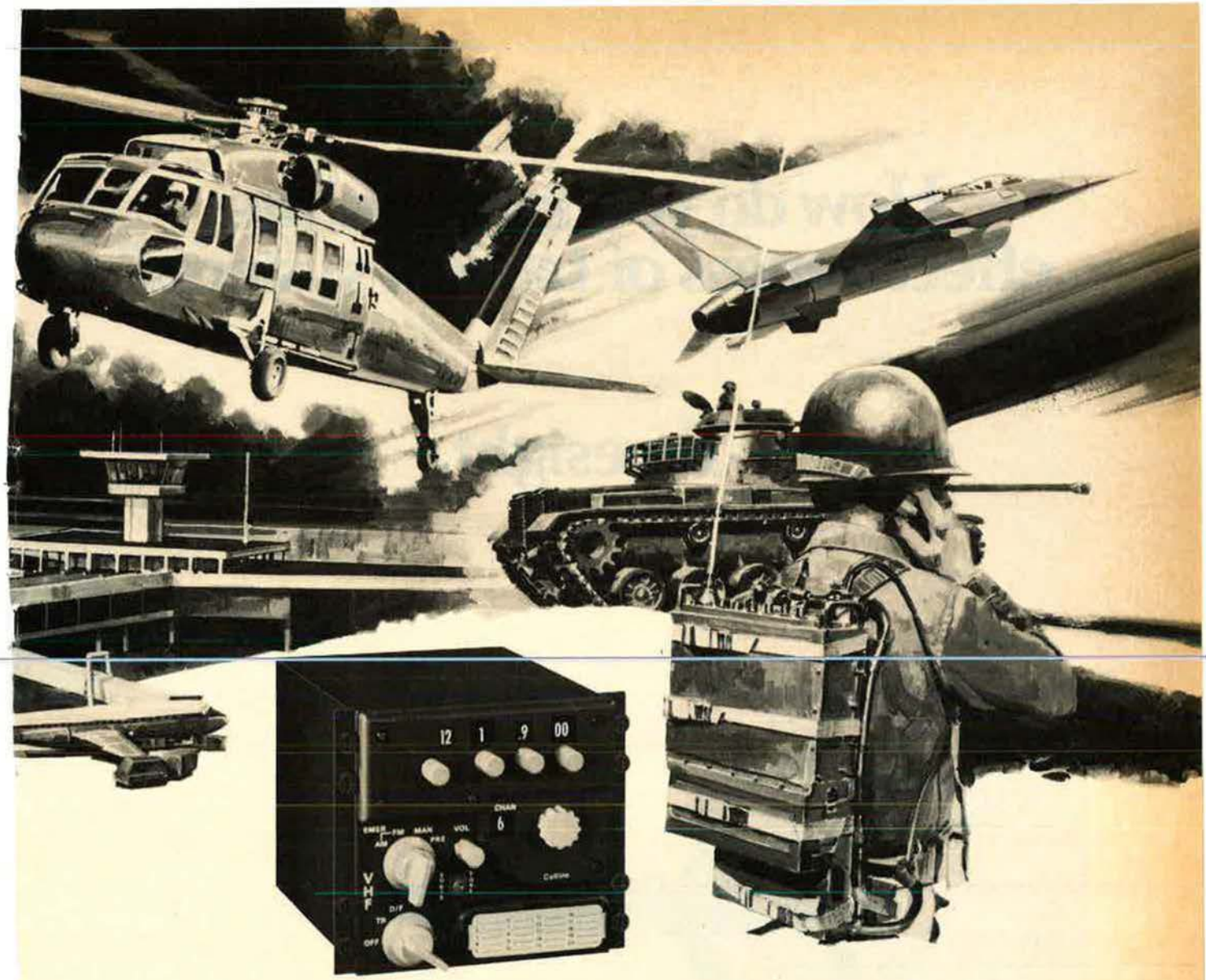
Consider the contrasts in personnel and aircraft strengths. In 1940, the Army Air Corps had 51,165 active-duty members, double the 1939 total. The number would triple again in 1941. By contrast, USAF's active-duty 1980 strength is 559,000, the lowest since before the Korean War. It will not increase significantly in 1981.

The Air Corps had about 1,700 aircraft in 1940. It was building up rapidly, and accepted 5,054 new planes from the factories that year. (More than 231,000 planes of all types were accepted by December 1945—a production miracle.) Today's Air Force has about 9,200 aircraft, with three-quarters of them more than nine years old. It has accepted fewer than 400 new aircraft in the fiscal year now ending, not enough to meet the needs of expanding mission requirements and peacetime losses. But the aircraft industry cannot expand rapidly now, as it did in 1940–41.

Consider the reserves—a different picture. In 1940, the Army National Guard was a ready pool for expansion of Regular formations. In 1980, the Army Reserve and Guard units are understrength and underequipped. By contrast, Air Force Guard and Reserve units are near authorized strengths, well trained, and ready. In fact, they perform regularly in all types of missions, flying a hefty chunk of total USAF commitments.

There is yet another contrast with 1940. Then the Air Force Association did not yet exist. Today, AFA is a strong voice for preparedness. As its members convene this month, the need for that concerted voice to awaken the rest of the population was never greater.

—F. CLIFTON BERRY, JR.



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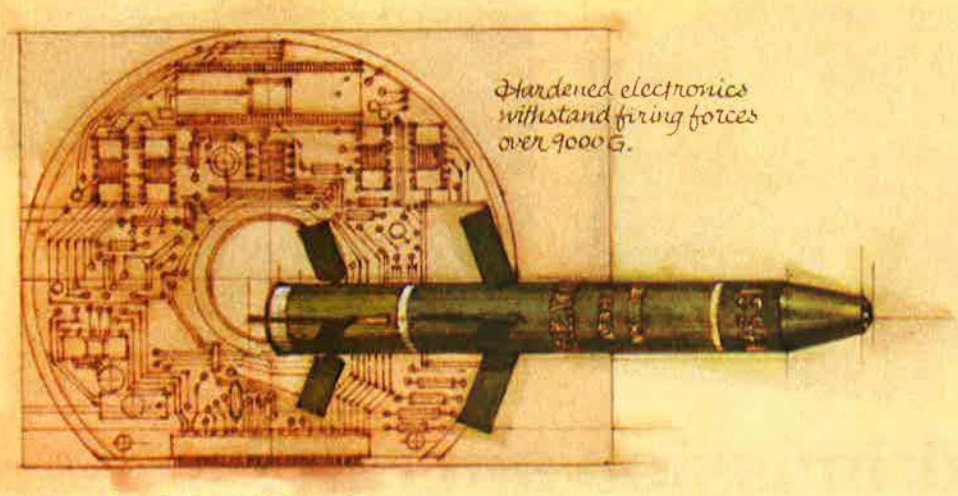
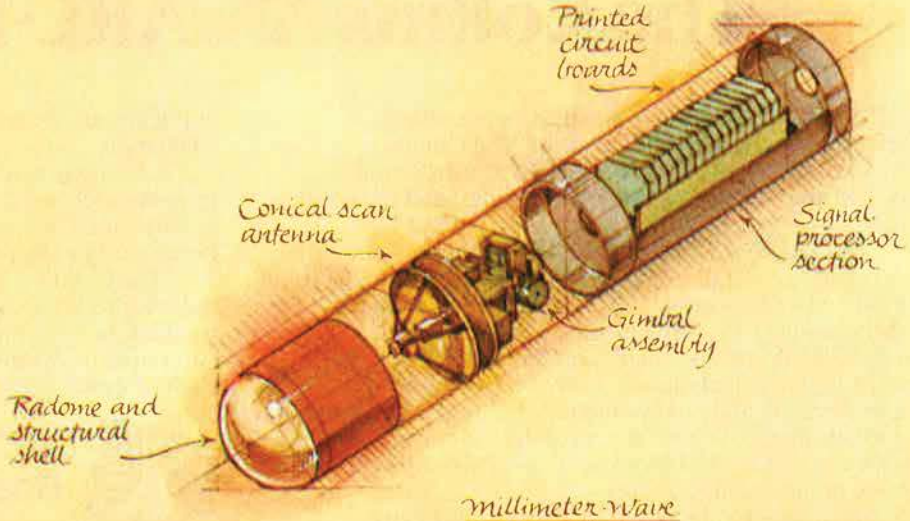
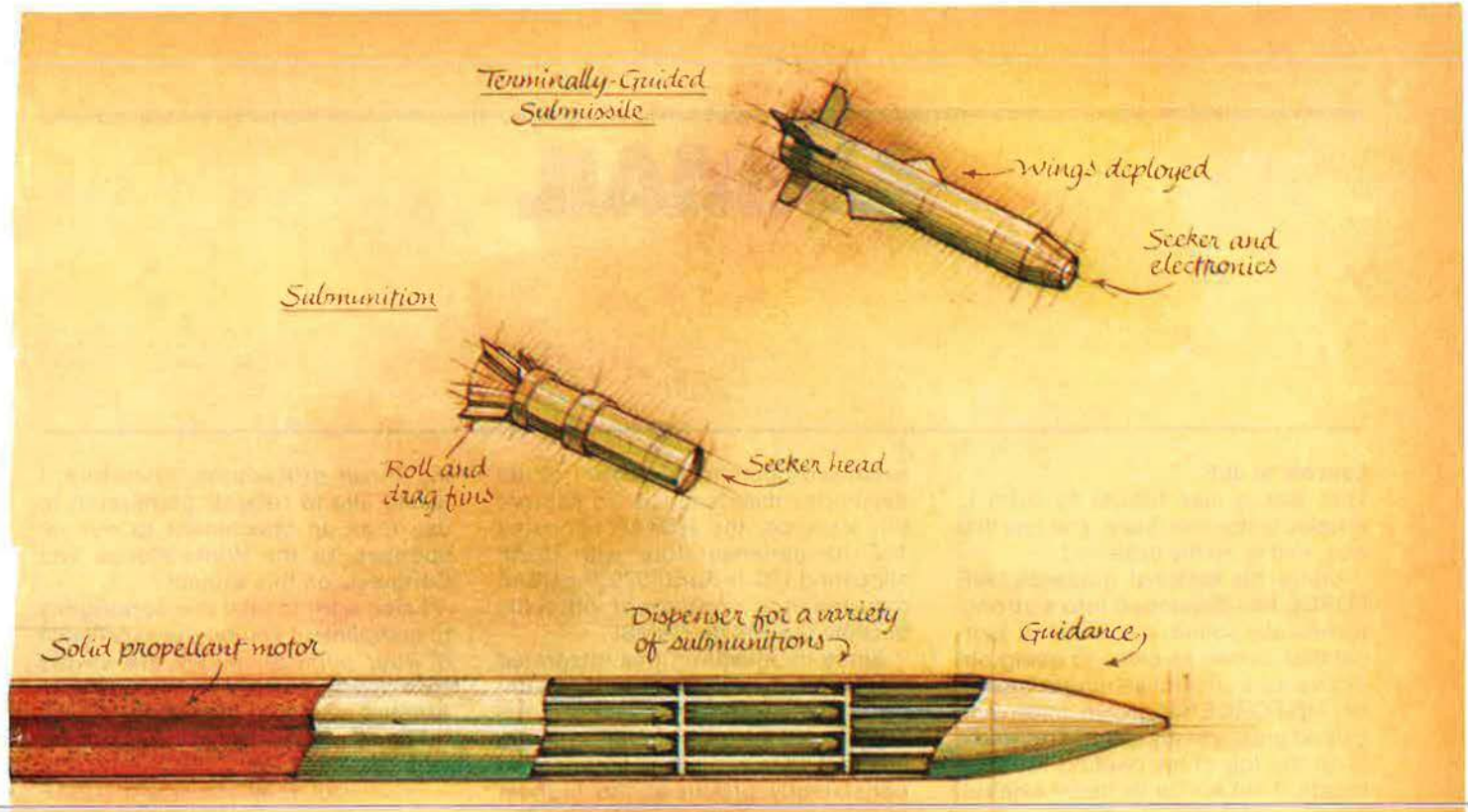
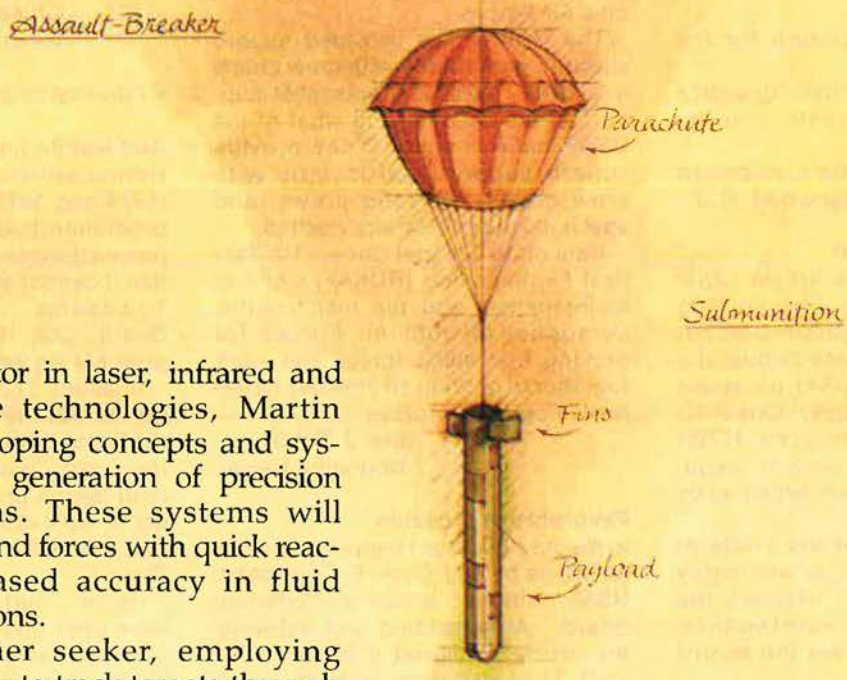


Copperhead Guided Projectile



Millimeter-Wave Contrast Seeker





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AIRMAIL

Laurels to JLF

That was a nice tribute to John L. Frisbee in the July issue, and one that was, and is, richly deserved.

Under his editorial guidance, AIR FORCE has developed into a strong, technically sound, easy-to-read journal that comes as close to being objective as a subjective magazine can be. AIR FORCE has grown, improved, gained greatly in my estimation, and it is on the top of my reading list each month. I subscribe to many aviation magazines; I scan most of them, but I *read* AIR FORCE.

And that is my criterion for the worth of an editor.

Thank you, John Frisbee, for such a wealth of useful, accurate, and important information.

David A. Anderton
Ridgewood, N. J.

Successful Joint Effort

In reading Mr. Berry's article (June '80), "Northeast Asia: The Shifting Balance," I took exception to an obvious exclusion of some factual detail. In describing the USAF air assets in Korea, Mr. Berry states: "One F-4D squadron of the 8th Wing (the 497th) is based at the ROKAF base at Taegu, with its aircraft entirely maintained by ROKAF technicians. . . ."

The maintenance of the F-4Ds at Taegu is part of a unique and highly successful joint effort between the USAF and ROKAF maintenance communities; so let's set the record straight.

In February 1978, the 8th Tactical Fighter Wing deployed six F-4D aircraft and a handful of maintenance personnel to Taegu to participate in a ninety-day test of a joint ROKAF/USAF maintenance effort. The test results exceeded all expectations and the experiment was extended indefinitely. In November 1978, the 497th TFS was formally activated with twelve F-4Ds. The maintenance concept that evolved was laid out in a "Memorandum of Understanding" between the ROKAF and USAF. Under the terms of the memorandum, the ROKAF assumed overall maintenance responsibility, while the USAF exercised operational control of the day-to-day maintenance. To achieve this balance, the ROKAF allocated 127 maintenance slots, with USAF allocating 120. In April 1979, the USAF maintenance contingent officially became the 6497th CAMS.

Since its inception this integrated maintenance effort has enjoyed unparalleled success in meeting or exceeding all its operational commitments. Additionally, maintenance has consistently produced the highest in-commission rates within the Pacific Air Forces.

The ROKAF has provided superb support, particularly with crew chiefs and load crews, and specialist support where needed. And what of the USAF maintenance? They provide superb support, particularly with crew chiefs and load crews, and specialist support where needed.

Hats off to Colonel Choe, 11th Tactical Fighter Wing (ROKAF) Chief of Maintenance, and the maintenance personnel of both Air Forces for proving that allied forces can work together to provide an effective deterrent to opposing forces.

Leo J. Petrin
Honolulu, Hawaii

Favorable Impression

In the July '80 issue I happened across an article by Maj. Gene E. Townsend, USAF, entitled "Inside a Promotion Board." After reading and enjoying the article, I passed it along to my staff. They also were quite favorably impressed by its content and recommended that we incorporate it in our responses dealing with promotion.

You see, we answer White House and congressional inquiries on all Air Force matters. Oftentimes, we receive communications wherein a member or member's family does not understand the internal workings of our promotion boards or our promotion system. We feel that this article would certainly be of assistance in explaining those procedures. Therefore, I would like to request permission to use it as an attachment to our responses, to the White House and Congress, on this subject. . . .

I also want to take this opportunity to compliment you on the excellence of your publication. We are always informed, enlightened, and impressed with your magazine; in fact, we find it indispensable in keeping up with the Air Force. . . .

Col. F. W. Hausmann, USAF
Department of the Air Force
Office of the Secretary
Washington, D. C.

• *Permission granted.*—EDITOR

And Not So Impressed

Having suffered two illegal passovers (1974 and 1975 temporary major) by promotion boards that did not have proportionate Reserve representation, I cannot agree with Maj. Gene E. Townsend, "Inside a Promotion Board," July 1980, that it is "the best possible system."

If Major Townsend had done his homework, he would know that the Air Force intentionally did not reveal the composition of promotion boards until forced to do so through discovery in connection with recent litigation *(John E. Stewart vs. the United States).*

As the Court of Claims stated: "We have been given what amounts to an informal, unpublished, secret Air Force policy (if it is the policy) which effectively insures that the statutory requirement in 10 U.S.C. Section 266 of 'an appropriate number' of Reserve officers is, in practice, merely an equivalent to token Reserve officer membership. Our necessary conclusion follows that this policy unfairly restricted the available pool of Reserve officer membership so that fair and adequate membership could not be had. This was an abuse of discretion. One Reserve officer out of twenty-five on the board is not (under the statute, legislative history, Air Force regulations, and DoD instruction) an appropriate number in this case and was legal error."

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.

To compound the injury, the separation Fact Sheet in 1975 erroneously stated that Reserve officers who reenlisted would remain eligible for permanent Reserve promotion. Consequently, some Reserve officers, myself included, were falsely influenced to reenlist. We were then assigned to the inactive component and denied promotion eligibility in our Reserve commissioned status, albeit what we had been told in the Fact Sheet.

My family has suffered over five years of injustice, and I must pay an attorney one-third of a settlement to correct errors that never should have occurred in the first place.

The best possible system? Baloney!

TSgt. James A. Bailey, USAF
(Capt., USAFR)
Hickam AFB, Hawaii

Why We Failed?

In reference to the editorial "Reflections on a Failed Mission" (June '80), I find your conclusion interesting: that the reason for the failed hostage rescue mission was "a piece of bad luck."

I agree that the failed rescue mission does not show inherent military weakness. On the contrary, what was accomplished (getting six C-130s and six RH-53s into the Iranian desert undetected in the middle of the night) was actually an impressive demonstration.

I also agree that considering the circumstances causing the failure of the mission, it is rather nonsensical to try to find someone to take the blame. However, I wonder if just writing it off to bad luck might not cause us to miss the real lessons.

If it really was bad luck that caused our military failure in the Iranian desert, maybe we have had a string of it lately—the loss (or tie, depending on your perspective) of the Korean War; our failure in Cuba (the Bay of Pigs invasion); and Vietnam (and Laos and Cambodia). Consider also our defeat (by forfeit) in Angola, and now the situation in Iran. The trend is ominous. To the best of my knowledge, our nation had not experienced defeat in war up through WW II. Is it our luck that has changed?

Let me offer another theory that may explain the change in the "fortunes of war" that we have experienced. The spirit of America is what has changed, not just our luck. America was once a nation that would write on its money (of all things) "In God We Trust." Nowadays, a more accurate description of our slogan would be "In Money We Trust." Let's face it. We have changed into a nation that has rejected God and most of His principles. Could it be that the trend of military failures (including the failed rescue attempt) is a result of the judgments of God against us as He tries to show us that we are helpless without Him?

Gen. Douglas MacArthur said: "History fails to record a single precedent in which nations subject to moral decay have not passed into political and economic decline. There has been either a spiritual awakening to overcome the moral lapse, or a progressive deterioration leading to ultimate national disaster."

It seems that in a prophetic way General MacArthur understood the real issues.

Capt. Phil Meteer, USAF
Okinawa, Japan

Was sorry to see you treat the rescue attempt so gently!

Never dreamed that the military was so snafued! Good men make poor equipment look good. Weather wasn't that bad—five choppers got through. The real shame of the matter

AIRMAIL

was that there was not the will to get the job done. . . .

. . . Everyone in our society today considers himself successful, regardless of what kind of a job is done.

Millard Harmon
Delmar, N. Y.

War Against the Axis

I am deeply gratified that the description of the planning for and results of the strategic air war against Axis Europe will receive wide coverage in your fine magazine ["The Plan That Defeated Hitler," by Maj. Gen. Haywood S. Hansell, Jr., July '80].

The Germans themselves, in analyzing the causes of the defeat in World War II, list failure to develop and employ a strategic bombing force as one of the primary reasons for that defeat. Yet we, who taught them that lesson, are in the process of forgetting it ourselves. If strategic nuclear exchange is, indeed, deterred by mutual apprehension, and if major conflict should be waged with conventional weapons (which is the thesis on which we are now embarked and on which we spend over eighty percent of our defense money), our cause will again need the critical advantages derived from conventional weapon strategic bombing. We take no cognizance of the lesson and make no provision for modern, penetrating bomber forces. This in spite of the fact that our own postwar analysis concludes that conventional weapon strategic air forces were the decisive element in the only major war of our experience. . . .

Maj. Gen. Haywood S. Hansell, Jr., USAF (Ret.)
Hilton Head, S. C.

General Hansell's essay on the strategic bombing of Germany [July '80] requires one additional footnote, especially since so many have, over the years, denigrated the effectiveness of the air effort.

Economic studies after the war indicated that Germany did not initially envision a war requiring an all-out mobilization. One result was that many plants and people did not go into "overtime," so to speak, until well into the war. This means that Germany was, in effect, mobilizing at the same time bombers were swinging into action. All of this was well documented by Rand economist Burton Klein's *Germany's Economic Preparations for War.*

The conclusion to be drawn, of course, is that the significance of the bombing was much greater than any bare-bones statistics about production would indicate.

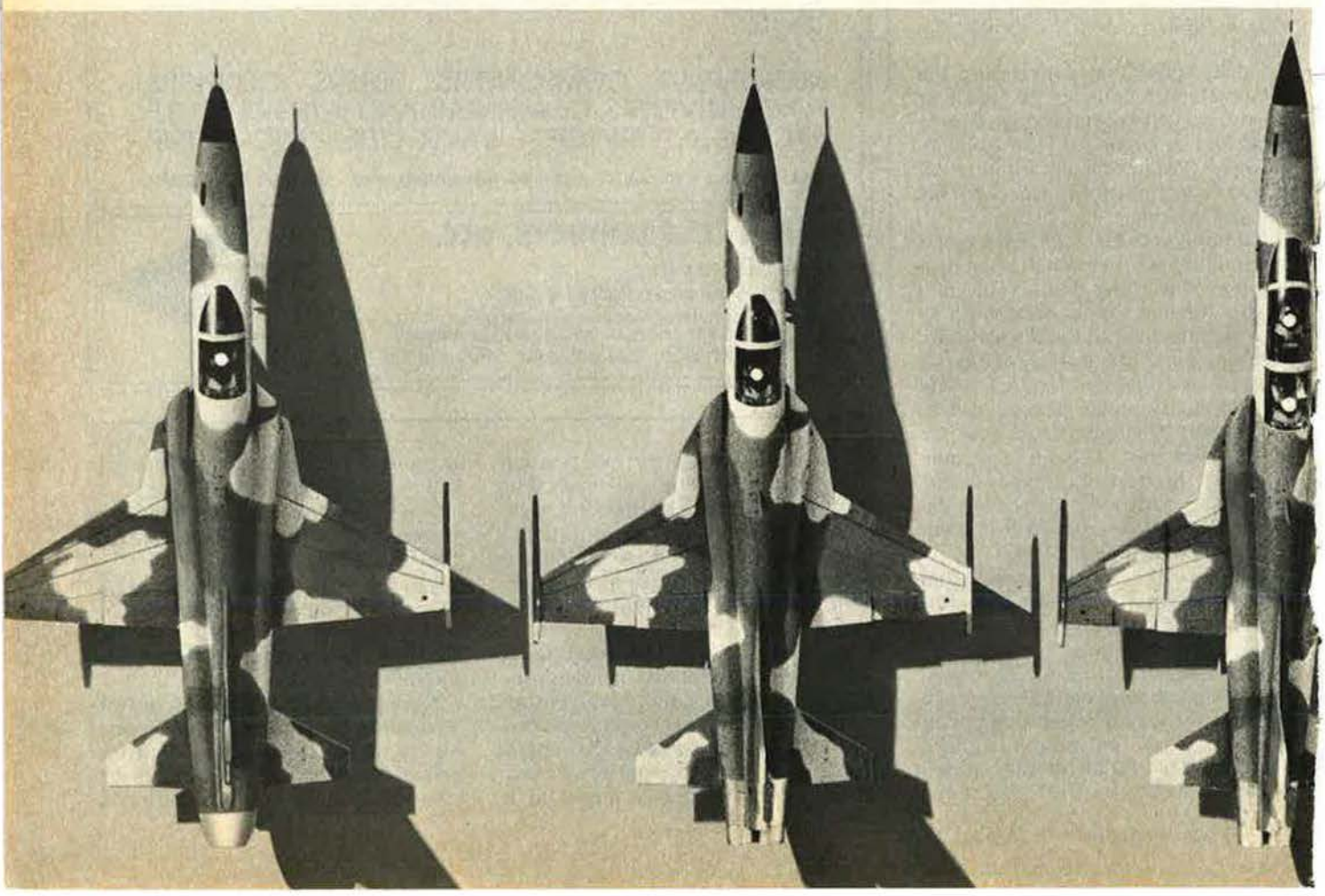
Col. Frederick C. Thayer, USAF (Ret.)
Pittsburgh, Pa.

That Funny Bob Stevens

CW4 Michael Novosel makes an interesting comment on Bob Stevens's description of the B-29 making a landing approach on the Navy carrier, but, shucks, I like Bob's version best. You just *know* that poor LSO jumped over the side!

Seriously, at least one carrier in those days had nets covered with mattresses over the side and sometimes those Navy jocks sent the LSO tumbling into them. The LSO would jog up the ladder and start waving at the next one. I'll bet the poor guys were glad when the Navy learned to do it with mirrors.

What I want to say most though is how much I enjoy Bob's cartoons. We



all owe the guy a vote of thanks for his wonderful sense of humor. Thanks to him, I remember the good days and forget the bad ones, if there were any bad ones.

Joe Lyons
Houston, Tex.

• *"Bob Stevens—Flying Cartoonist," a biographical profile by Associate Editor Hugh Winkler, begins on p. 158 of this issue.*—THE EDITORS

Volunteer Retreads

I read with interest about USAF plans to set up a department to handle call-ups of retirees, in emergencies, who volunteer for such a call-up ["Retirees—An Emergency Resource," by Ed Gates, July '80]. I can understand the interest in only the more recent retirees (whose skills are most current). I think they missed a bet in another field: Those ex-AAF men who continued in civilian life in the same field of work. The fellows who came home after WW II, Korean War, etc., probably never dreamed we'd be in the bind we are in now.

Many of us have acquired a very wide range of experience, and a high degree of skill in the same fields in which we served in the USAF. Perhaps—regardless of our level of skill—the Air Force wouldn't trust us beyond flight-line maintenance. That's OK. While a raw recruit is being pushed through basic, we could be producing results on the flight line.

Why not also consider this form of speedy, economical "retreading?"

Sgt. Bill Wildenhein, USAF (Ret.)
Elyria, Ohio

A Meeting of Aces

Fighter pilots have the good sense to place high adventure and romance into neat boxes to be opened only at special occasions. Last June the Fighter Aces Convention was held at Dayton, Ohio. Wright-Patterson AFB and the Air Force Museum made it a real special occasion by having the aces as their guests for several days, and it was a smashing success. Everyone seemed at home where aviation really started, quietly strolling through the Wright brothers' home and standing thoughtfully before history at the Air Force Museum, with lofty memories dashing about their heads.

At the cocktail and dinner parties, raconteurs were at their best. Flying formation with Flying Tiger greats like Tex Hill and Johnny Alison, Medal of Honor winner Jim Howard, and the ubiquitous John Waddy, the great ace from Australia, to name a few, was no easy task. Not to be outdone, several World War I aces were seen elbowing their way to the bar with no less vigor than they did at Issoudon, France, in 1918.

However, these sorts of occasions are sometimes used for purposes other than dinners and golf. If one wishes, he can tell his old flight leader or squadron CO, and even his group commander, that he screwed up on a particular mission without fear of "being deep-sixed" (well, maybe). On the other hand, one could be complimentary, as I chose to be during a cocktail party at the Air Force Museum. After my second drink that tasted like JP-4, I summoned enough courage to corner my former mentor (now a retired major general) for a few moments of unrehearsed compliments, such as he was not only a fine leader, but moreover sensitive to the "new pilots' " anxieties. I was especially complimentary of his calm and assuring voice over the R/T when bogies were called out at some point on the clock. This meant a great deal to those of us who at the time were flying "green four" or "tail-end Charlie" positions.

Noting that I had finished, for my right eye had stopped its nervous

AIRMAIL

twitch, a faint smile broke the genteel lines of his tanned countenance, his voice retaining the same tenor as of old, he said: "Well, Jim, I don't know about that. About all I remember saying when bogies were sighted was 'don't drop your tanks!' "—a sophist of old and with class.

J. L. Brooks
Los Angeles, Calif.

No USAF Info, Please

In my letter I spoke of my research for a book I will do under a State grant concerning the *Army* in Alaska since 1867. I mentioned the need to gather information about the Air Service, Air Corps, and *Army* Air Forces in Alaska.

I appreciate your running my message in your July issue; however, someone added "USAF" to the elements I am concerned with. Not correct. My own background is both Army and USAF, but my book concerns only the *Army* in Alaska. If you can get in a P.S. on this it may prevent my receiving some materials on USAF which I do not need.

Lt. Col. Lyman L. Woodman, USAF (Ret.)
117 Cook Ave.
Anchorage, Alaska 99501

Beresford Lithographs

Can anyone furnish me information on where to obtain the US Air Force Lithograph Series which includes the *Regensburg Raid of August 17, 1943; Over the Alps*, and the *Memorial Chapel and Window; 96th Bombardment Group (H)*, by Frank E. Beresford? They are now unavailable through USAF.

As a member of the 96th Bombardment Group during World War II, I am very much interested in obtaining lithos of the above pictures.

Maj. John L. Pfeiffer, USAF (Ret.)
RFD #3
Milton, Vt. 05468

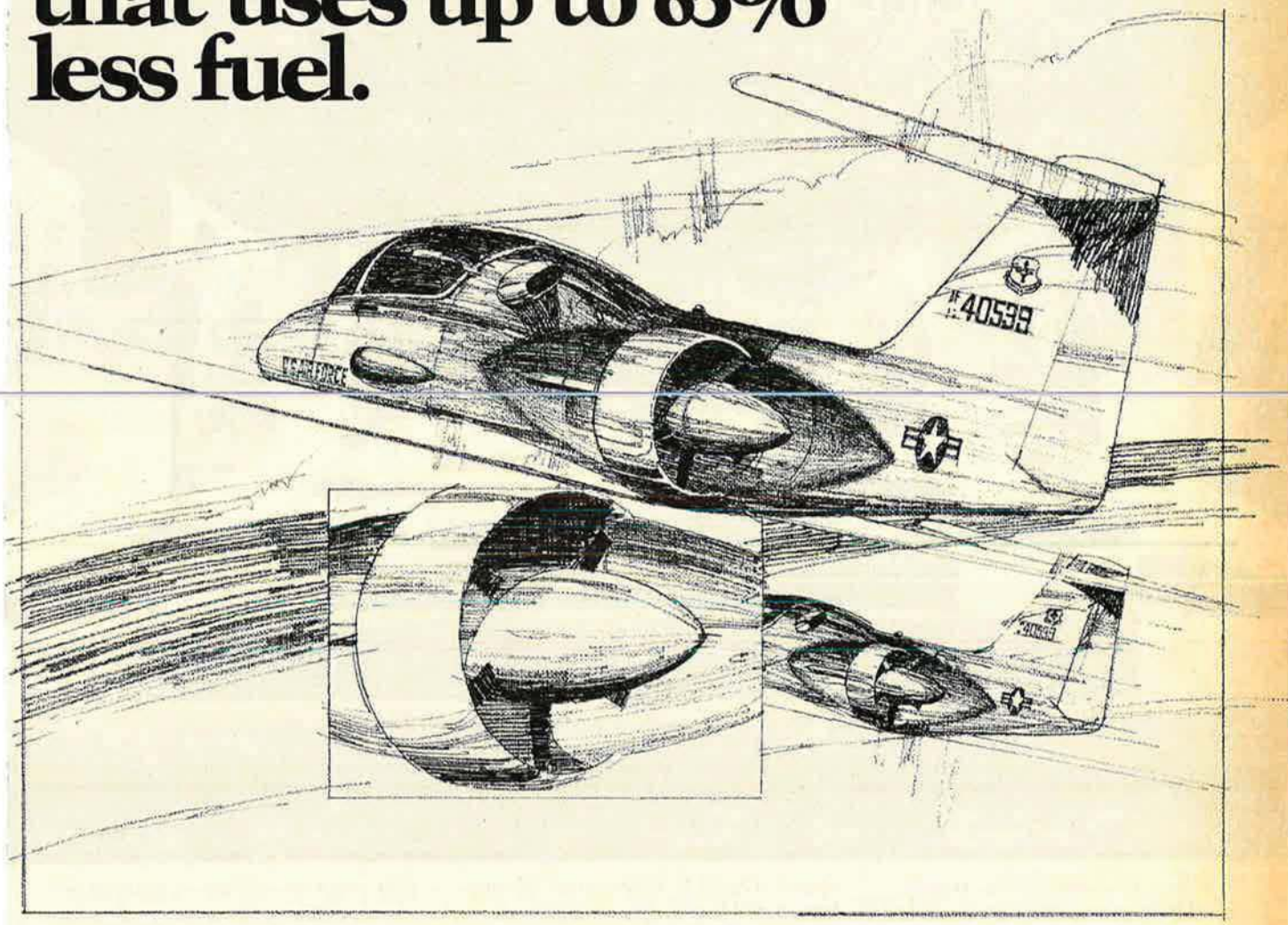
Mustang "Special"

Many thanks to you and your readers for all the help they have provided me. *F-80 in Action* will be published on August 1, 1980; *Gunships in SEA* will go to press in the summer of 1981; and *Airwar—Korea* shortly thereafter.

Squadron/Signal Publications has now given me the toughest assignment of all—find some new materia

From Vought/VFW:

The high-performance, next-generation trainer that uses up to 65% less fuel.



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The knowledge business

on the P-51 Mustang for the book *Mustang in Action* and a "special" on the P-51/F-51! Anyone that has photos and/or color slides of P-51 Mustangs, or information on Mustang operations during World War II, please contact me at the address below. All material will be handled with the greatest of care and returned ASAP.

Larry Davis
Squadron/Signal Publications
4409 12th St., S. W.
Canton, Ohio 44710

Pilot James Carter
The undersigned would like to contact any current or former AAF/USAF pilots who flew with a James Carter in the following units: (a) 61st Fighter Squadron, 56th Fighter Group, Eighth Air Force WW II (mentioned on p. 50 of William Hess's book *P-47 Thunderbolt at War*); (b) 45th Tactical Recon Squadron, flying P-51s (F-6) and later F-86s during Korean conflict; (c) 34th Fighter Squadron, flying F-105s in Vietnam circa 1965–66.

Please include telephone number when replying.

M. W. Rowland
P. O. Box 7013
Murray, Utah 84107

NIE Participants
For a doctoral dissertation on National Intelligence Estimates I would like to contact former military and civilian professionals who participated in drafting, reviewing, or approving NIEs.

AIRMAIL

Of particular interest are those people who served in military intelligence branches, the Office of National Estimates, or the National Security Council staff. Please contact:

Daniel Flamberg
220 West 93d St.
New York, N. Y. 10025

52d Fighter Interceptor Wing
I wish to contact any members of Hq. and Hq. Squadron, 52d Fighter Interceptor Wing, stationed at McGuire AFB, N. J., during 1951 and 1952, for the purpose of organizing a future get-together.

James O. Cantrell
104 Graylynn Dr.
Nashville, Tenn. 37214

Red Cross Centennial
The Red Cross will be celebrating its 100th anniversary in 1981. Local communities will be attempting to research areas of interest that might be unique to their situation.

In Dayton, at McCook Field, the early ambulance aircraft were developed and, right on through today, much of the engineering and design of all medical evacuation is done there.

In that regard, we would like to produce a display that would include old photographs, artifacts, and material related to the history of air medical evacuation.

If members of the Air Force Association who know of flight surgeons' equipment, flight nurses' uniforms, pictures or memorabilia and would be willing to contribute them to this project, I would appreciate your contacting me.

Alan C. Johnson
Dayton Area Chapter Manager
American National Red Cross
370 West First St.
Dayton, Ohio 45402
Phone: (513) 222-6711

Canberra Model
I am a member of a plastic modelers' association and hope soon to build a kit of a B-57G Canberra. This will require some conversion to depict the "G" model with its associated nose bulges. I have a few photographs of the aircraft, but would be very pleased to hear from anyone who can show me, via photographs or drawings, the exact shape of the nose fairings, especially from underneath. I would also be interested in photographs of any B-57Gs in service in Vietnam. All photographs that are sent to me on loan will be returned undamaged and quickly.

F/O D. J. Richardson
RAAF Base (MTMF)
Regents Park
NSW 2143
Australia

UNIT REUNIONS

Air Rescue Association
October 9–11, El Tropicano Hotel, San Antonio, Tex. Members, former members, and friends, worldwide, invited. **Contact:** Col. William Montgomery, USAF (Ret.), 3207 Bluefield, San Antonio, Tex. 78230. Phone: (512) 344-5015.

Association of Old Crows
17th annual convention and DoD/AOC Electronics Warfare Symposium, October 28–30, Anaheim, Calif., Disneyland Hotel. **Contact:** Association of Old Crows Eighty Convention, 15233 Ventura Blvd., P-8, Sherman Oaks, Calif. 91403. Phone: (213) 788-3752.

Sherman Field
3d annual reunion. All 3d Staff Squadron and other unit personnel ever stationed at Sherman Field, Fort Leavenworth, Kan. September 12–14, Ramada Inn, Leavenworth, Kan. **Contact:** Roscoe Swenson, 2053 Highland Avenue, Salina, Kan. 67401. Phone: (913) 827-2577 or (913) 823-2722.

20th Fighter Group
55th, 77th, and 79th Fighter Squadrons, minireunion with 8th Air Force Historical Society, Orlando, Fla., October 30–November 2. **Contact:** John W. Mayer, 5515 Kerth Rd., St. Louis, Mo. 63128.

31st Bomb Squadron (H) Ass'n
December 7, Orlando, Fla. **Contact:** Paul Neff, Box 143, Fort Worth, Tex. 76101.

55th Elint Association
October 24–26, Rio Rico Resort Hotel, Ariz. Past and present members of 55th Strategic Reconnaissance Wing, 38th 324th, 340th, 343d, and 4024th SRS, and direct support personnel (1948–80) invited. **Contact:** Col. Robert A. Dibbell, 8902 E. Maple Leaf Dr., Tucson, Ariz. 85710.

93d Troop Carrier Squadron, 439th Troop Carrier Group
October 18–19, Chicago, Ill. **Contact:** Tom Morris, 456 St. George's Ct., Satellite Beach, Fla. 32937; or Robert Bullock, Murrysville, Pa. 15668.

106th Observation Squadron
(1922–1942), reunion November 23–30, Sumpter Smith ANG Base, Birmingham, Ala. **Contact:** Lt. Col. Joseph L. Shannon, 4316 Linwood Dr., Birmingham, Ala. 35222.

342d Fighter Interceptor Squadron
October 2–4, Caribbean Gulf Hotel, Clearwater Beach, Fla. **Contact:** Bob Sutcliffe, 3572 Dove Hollow Court, Palm Harbor, Fla. 33563. Phone: (1-813) 758-3097.

346th Fighter Sqdn., 12th AF
October 24–26, Menger Hotel, San Antonio, Tex. **Contact:** S. L. (Al) Alexander, 6115 Warm Mist Lane, Dallas, Tex. 75248, or Ed Kregloh, 5311 Lorraine Dr., Camp Springs, Md. 20031.

437th Troop Carrier Group
16th biennial reunion, October 16–18, Marriott Hotel, San Antonio, Tex. **Contact:** Bob Maycan, 360 Walker Ave., Greenacres City, Fla. 33463.

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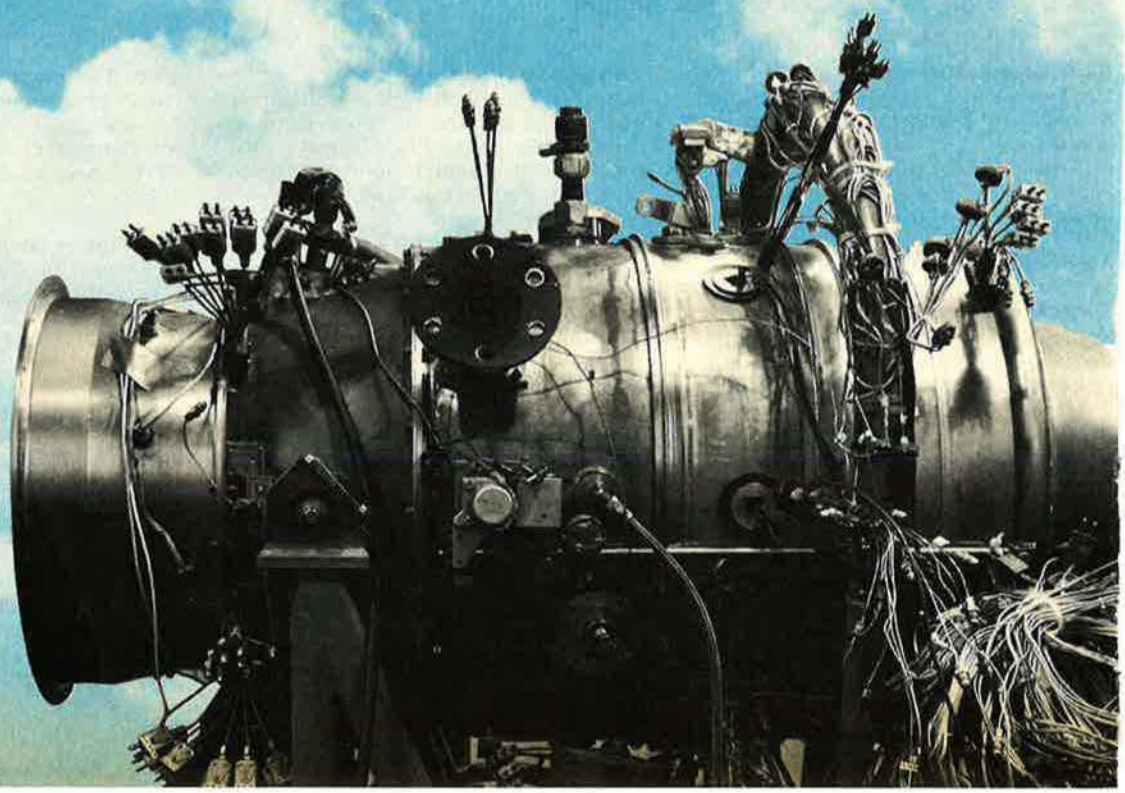

IN FOCUS...

By Edgar Ulsamer, SENIOR EDITOR (POLICY & TECHNOLOGY)

Washington, D. C., Aug. 1

The Tortuous Road Toward a New Bomber

Secretary of Defense Harold Brown, in a recent speech and a letter to Congress, restated the Carter Administration's implacable opposition to the B-1 strategic bomber, at least as originally designed. At the same time, he hinted broadly at the requirement to replace the B-52s both in the distinct role of cruise missile carriers and as penetrating bombers. "We need to consider their eventual replacement in each role," Dr. Brown acknowledged in a letter to the Senate Armed Services Committee.

In defending the Administration's decision of 1977 to cancel the B-1—seemingly against the Republican Party's platform, which favors resurrection of the aircraft in one form or another—Dr. Brown said, ". . . the B-1 was obsolete and a waste of money." Quite probably the number of military experts who agree with Dr. Brown's categoric and absolute statement can be counted on the fingers of one hand.

Yet, at the same time, Dr. Brown seemingly concurred with a Senate bill—since then accepted by the House—that mandates a comprehensive review of available options for a multirole bomber and specifically names B-1 technology as a candidate.

The language of the joint bill explains that ". . . $300 million may be obligated or expended to achieve an Initial Operating Capability as soon as practicable . . . but no later than 1987 . . . .

"The Secretary of Defense shall vigorously pursue full-scale engineering development of a strategic multirole bomber which maximizes range, payload, and ability to perform the missions of conventional bomber, cruise missile launch platform, and nuclear weapons delivery in both the tactical and strategic role. The Secretary of Defense shall submit a status report on the results of this effort including comparisons in terms of costs and military effectiveness of the candidate aircraft, which include but are not limited to: advanced technology aircraft, the B-1 and derivatives of the B-1, and FB-111B/C. This status report shall be submitted to the Committees on Armed Services of the House and the Senate by March 15, 1981."

Referring to a review of technological options for a multirole bomber by the Air Force Scientific Advisory Board, Secretary Brown said the "OSD staff is working with the Air Force to determine whether a completely new design, or some derivative of an existing one, would be the better choice." Overall, Dr. Brown claimed, "we have the exploratory programs necessary to develop a new bomber to meet any requirements for the 1990s."

While the Air Force position concerning a multirole bomber has not yet crystallized, it is possible that the final recommendation might involve development of two separate and distinct designs, although not concurrently. The design proposed by the Scientific Advisory Board is a B-1 derivative lacking supersonic capability but using a modified variable sweep-wing in order to ensure rapid flyout from under nuclear attack and low-altitude penetration at high, subsonic speed. This design, whose basic characteristics appear to be more or less firm, would include some modification of the original B-1 design in order to bring about radical reduction in radar cross section and hence detectability.

By all odds, this design will be capable of serving with equal competence in a purely strategic as well as a LRCA (Long Range Combat Aircraft) role. The latter mission encompasses a range of conventional warfare, including naval and force projection missions. Beyond this largely conventional technology is the potential for revolutionary designs that for security reasons are lumped together under the nondescript heading of "advanced-technology" systems. The common denominator of these technologies is "low observables," meaning stealth. What is not yet clear is whether these advanced technologies should be used first on either second-generation cruise missiles or for strategic penetrators. (Suitability of such aircraft for the LRCA role probably will turn out to be limited.) Also not clear is when such weapon systems—which eventually might include tactical aircraft—will become ready for operational deployment and for how long they might remain immune from countermeasures.

Proponents of these advanced technology systems compare them in terms of potential operational impact to the advent in the 1950s of nuclear-powered ballistic missile launching submarines that to date have remained largely undetectable and thus effective. This sanguine view is not universally shared, however, even though progress in "low-observables" technology over the past few years is said to have been truly startling.

The Quality vs. Quantity Battle

The never-ending tug of war between influential systems analysts in OSD and the Air Force (and to a lesser degree Naval Aviation) over the issue of quantity vs. quality in tactical fighter forces is once again at a critical, brass-knuckles stage. A recent spate of "horror stories" about allegedly disastrous readiness rates of Air Force tactical fighter forces, especially F-15s, that circulated in the news media and on Capitol Hill seemingly was instigated by this OSD faction.

Purpose of this campaign is to create the impression that the unnecessary complexity of USAF's new fighters lowers readiness rates and reduces sortie generation, thus coercing USAF to switch to low-cost, low-performance systems. One of the key factors disregarded by these reports of massive out-of-commission rates is that "flunking" readiness inspections is not the same as being unable to go to war. USAF aircraft have kits of spare parts that can only be used in case of war. Yet, in peacetime, readiness rates are determined on the basis of routinely available spares, without allowance for spares in the kits.

Among the alleged goals of the OSD group, derisively referred to as the "Mattel toy airplane faction" by some blue-suiters, are the closing down of the F-15 production line in FY '82, preventing USAF from upgrading follow-on F-16 aircraft with the LANTIRN all-weather system, internal ECM, AMRAAM missiles, and phasing out the F-111s. Basic contention of the OSD faction, which has strong allies in industry, is that USAF has consistently overestimated the threat and thus induced a situation where fewer and fewer aircraft at ever-increasing cost and complexity are being acquired. In treating sortie generation as the single measure of merit, these systems analysts favor a force involving mainly large numbers of VFR and perhaps even propeller-driven fighters.

This thinking is being rejected summarily, especially in the area of threat assessments and forecasts. Pointing at the massive upgrading of the Warsaw Pact's airpower under way and in prospect, including the acquisition of broad look-down, shoot-down capability, some experts suggest that the Air Force would be out of business by about 1985 had it followed the OSD faction's advice. In manpower and human terms alone, USAF believes, the notion of maintaining and operating swarms of low-performance aircraft, whose crews probably would see themselves as "kamikazes," makes no sense.

There are, of course, pluses that attend a predominantly large-number, low-cost-per-aircraft force. Primary is that quantity buys permit highly economic buy rates. Conversely, because of funding constraints, high unit costs, and the need to shore up readiness and sustainability investments, USAF is forced to buy aircraft at uneconomical rates.

On the other hand, a host of disadvantages results from a force held to limited performance systems. Principal are these factors:

- Austere aircraft, lacking adequate on-board sensors, depend heavily on survivable command and control systems. Without such systems, aircraft of this type can't function.
- Austere systems depend on favorable operating conditions, and even under the best of circumstances will suffer high attrition.
- Any fighter aircraft requires minimal combat effectiveness, or else it ceases to be a contender. This minimum rises in step with growth of the threat. A system that does not incorporate this growth margin becomes obsolete before its time.

IN FOCUS...

The pivot of US defense philosophy is superior technology. Only quality can provide the high exchange ratios and kill rates needed to cope with adversaries whose arsenal outnumbers ours. Conversely, the most effective way of boosting force effectiveness without boosting force size is by enhancing the quality of weapon systems and the proficiency of the people using them.

US Mobilization Capabilities Inadequate

The nation's ability to gear up for war—as mobilization exercises conducted in November 1978 proved—is seriously flawed and in need of comprehensive improvement. In releasing a detailed, public report about three interrelated mobilization exercises, Petite Nugget 78, Nifty Nugget 78, and Rex 78, the Defense Department commented that "existing mobilization plans were a hodgepodge of old and unconnected Presidential emergency orders, policies, regulations, and procedures. Each covered only one part of the process; moreover, not all parts were addressed."

The crisis situation portrayed in the 1978 exercises involved a short-warning, fast-breaking attack by the Warsaw Pact on NATO forces. Purpose was to gauge both military and civilian responsiveness by one of the most ambitious tests of this type ever undertaken in peacetime. Testing the roles of the major DoD staffs in mobilization planning, the exercises showed that the military staffs were "reasonably clear" in understanding their functions. By contrast, "the Service Secretariats did not have a clear understanding of their mobilization roles and were not well prepared to serve as the link between their respective uniformed service staff and OSD in the mobilization process. Nor was the OSD staff sufficiently knowledgeable about its liaison to the civilian agencies of the federal government. As a result of these misunderstandings, mobilization matters could not be expeditiously coordinated, and delays in obtaining resources were encountered."

The fallout from Nifty Nugget has been major for both the Defense Department and the civilian elements of the executive branch. The Pentagon compiled an inventory of shortfalls detected by Nifty Nugget as well as a catalog of action offices responsible for correcting these shortfalls. Lastly, the JCS decided to schedule a follow-on exercise to Nifty Nugget for this fall.

On the civilian side, Nifty Nugget led to an executive order creating the Federal Emergency Management Agency (FEMA), which consolidates the functions of the Federal Preparedness Agency, the Civil Defense Agency, and several other elements of government concerned with national emergencies and mobilization. In the event of national emergency or attack on the US, the President now has the option to propose to Congress or to direct by executive order the formation of a cabinet-level Office of Defense Resources, of which FEMA will be the nucleus. This office would be responsible for all civil mobilization efforts by providing broad policy advice to the President, adjudicating questions of priority and resource allocation, and coordinating the national response to mobilization.

Most importantly, and as previously reported in this space, Nifty Nugget prompted President Carter last year to set up an interagency group under the National Security Council to undertake the first government-wide review of mobilization in thirty years. This spring the President signed PD-57, a special Presidential Decision order defining the key goals of US mobilization planning, including industrial mobilization planning, patterned after the War Production Board of World War II. Special stress is put by PD-57 on "continuity of government," meaning the ability of government to function—or to reconstitute itself along classic democratic lines—after catastrophic events, including full-scale nuclear war.

Key flaws in mobilization planning detected in the 1978 exercises, according to the Defense Department report, included insufficient authority by the President to mobilize manpower. He can, for instance, without declaring a national emergency, recall officer and enlisted retirees from some services but not others. In a similar fashion, the Department of Labor and other agencies lacked both data and understanding concerning the effects of a national mobilization on critical labor skills. Analysis of the industrial base, at the same time, indicated that "industry probably cannot provide additional new equipment during the first few months of a short-warning conflict."

In a purely military context, the exercises brought out the importance

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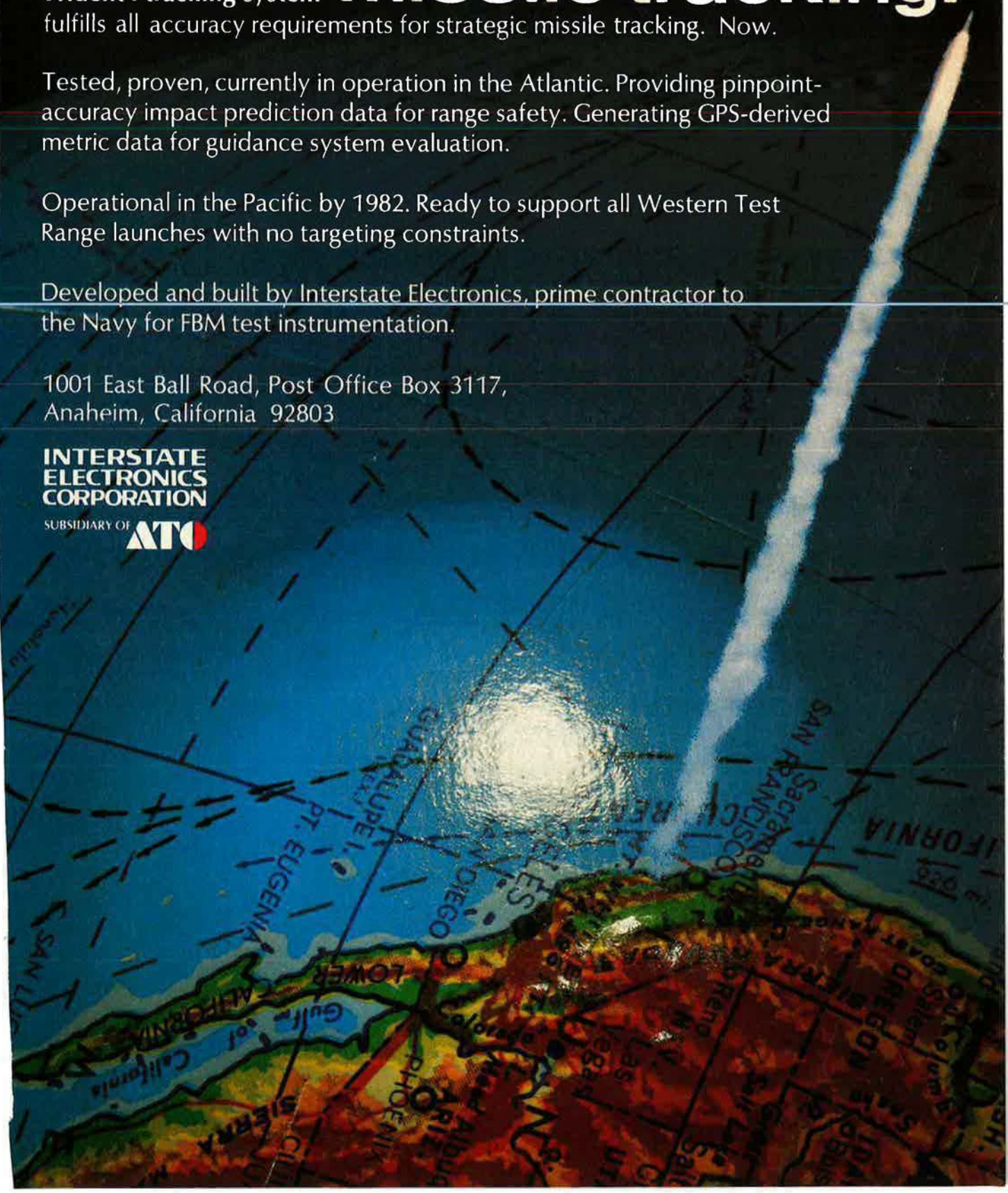

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Sperry has delivered more than 130 PQM-102s (formerly F-102s) with more than 75 to go. The QF-100 will succeed it as the primary Air Force full-sized target.

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of materiels stockpiles, particularly those prepositioned in theater. All services, the Defense Department reported, experienced "significant shortages in important air and ground weapons delivery systems, armored combat vehicles, and essential spare parts."

In the transportation field, Nifty Nugget pointed out shortfalls in both management and resources on the part of the Military Traffic Management Command, the Military Sealift Command, and the Military Airlift Command. Flexibility in changing previously established plans and schedules was lacking, according to the Defense Department's critique, which "caused unacceptable delay in the movement of units and supplies and inefficient use of strategic airlift assets." Nifty Nugget led to the formation of the Joint Deployment Agency by the JCS to integrate and coordinate plans and actions by the three transport commands.

A critical problem arose in the exercises because of the steep demand on strategic lift aircraft for European reinforcements. The result was reduced support to other regions demanding these aircraft. (The NATO-Warsaw Pact conflict was not confined to the European Continent.) Thus, the Defense Department found that "a strategic airlift shortfall was apparent, even after the Military Airlift Command was augmented by Reserve Component Crews and by US commercial aircraft drawn from the Civil Reserve Air Fleet (CRAF)."

Washington Observations

★ Late in July 1980, Soviet weapons, including T-72 tanks and mechanized artillery, were dispatched from Cuba to Nicaragua. The total number of such weapons now in Nicaragua is estimated at 100 units each.

★ Without much fanfare, and in spite of the stalemate on SALT II, US/Soviet arms-control negotiations in a number of areas have been resumed and reportedly have brought the two parties—in one instance Britain also is a participant—closer together. Involved are the Comprehensive Test Ban Treaty, Mutual and Balanced Force Reduction, understandings concerning Theater Nuclear Forces, and agreements concerning the use of chemical weapons. Arms-control sources claim that the Soviets are in a conciliatory posture at this time, and are willing to make concessions in terms of on-site inspection.

★ Air Force leaders suggest that the high-energy laser weapons program is at a stage comparable to the status of aerial bombardment when Billy Mitchell demonstrated in 1921 that battleships could be sunk by aircraft. The airborne laser laboratory (ALL), a modified KC-135 aircraft, is scheduled this fall to demonstrate ability to shoot down SAMs with laser weapons.

If the airborne laser weapon program were to be developed on a crash, Manhattan Project-like basis, the Air Force believes operational systems could be available within a few years. Without such an approach, it will take probably ten years or more before laser weapons can be deployed on combat aircraft. Sentiment in Congress is building up to accelerate laser weapon programs, but there is no evidence that funding will be increased to the level of a crash program. USAF's assumption is that laser weapons will be used mainly against fast-moving targets, such as tactical air-to-air and surface-to-air missiles. While the laser won't deliver anywhere near the amount of energy of a missile or gun, it can be expected to pack sufficient punch to neutralize a missile.

First application of laser weapons now envisioned by the Air Force involves high-flying aircraft. Flying at altitudes between 35,000 feet to 40,000 feet, such a laser weapon could kill targets within a range of about 50 km. Latest calculations by the Air Force suggest that such a weapon system could carry enough fuel to fire the laser rapidly several times while retaining adequate operating range of the aircraft. For the moment, the Air Force does not share the optimism of some elements of the defense community concerning the feasibility of space-based laser weapons.

The Air Force position is at odds with such groups as the Capitol Hill Staff Group, a bipartisan organization of some thirty congressional staff experts in the defense field, which has just recommended the allocation of some $10 billion for the development and procurement of twenty-four "orbital battle stations" by FY '86.

★ Influential defense and foreign policy advisors to Presidential candidate Gov. Ronald Reagan have drawn up a five-year plan for "Phased Modernization in Nuclear Force Levels" that calls for the deployment of 1,000 Minuteman III/IV ICBMs in a Multiple Protective Structure (MPS-deceptively based) mode and development of a new "small" ICBM.

The Minuteman missiles would be upgraded by incorporating the improved AIRS guidance system developed for MX and by modifying them for cannister launch. The proposed Minuteman force would be deployed within a complex of 10,000 austere shelters situated in current Minuteman deployment areas. The Republican group's plan provides the option of either retaining the current MX program schedule or slowing down MX and diverting some of its funding to the development of Minuteman IV and the new small missile. The latter is to be optimized for mobility and concealment.

★ Air Force planners fear that plans to move toward a dedicated Strategic Forces Satellite Communications System (STRATSAT) in steps will doom this program, at a time when the Defense Department acknowledges that survivable command and control is *the* segment of US strategic deterrence that most needs enhancement. The progression envisioned by OSD and Congress starts with proliferation of transponders on host satellites and then shifts to a dedicated satellite system orbiting at an altitude of about 110,000 miles (five times geosynchronous altitude).

The problem, in USAF's view, is that once a proliferated system is deployed it will be almost impossible to change to the more costly, yet far more effective and survivable dedicated system. Basic rationale for the dedicated system, beyond general performance improvements, is one of tactics and doctrine. In case of a dedicated system, the approach of a suspicious Soviet satellite to within the kill radius of a large nuclear warhead would automatically result in a US protest and the request that the spacecraft change course. Soviet failure to heed the warning would constitute a serious provocation, triggering retaliatory or defensive measures by this country. As one space expert put it, "the beauty of a dedicated system lies in the fact that you declare it a sovereign point in space and put the other guy on notice that if he does anything to it, you will treat such an act as a form of crisis escalation." No such black or white approach is possible in case of a proliferated system. ■

IN FOCUS...

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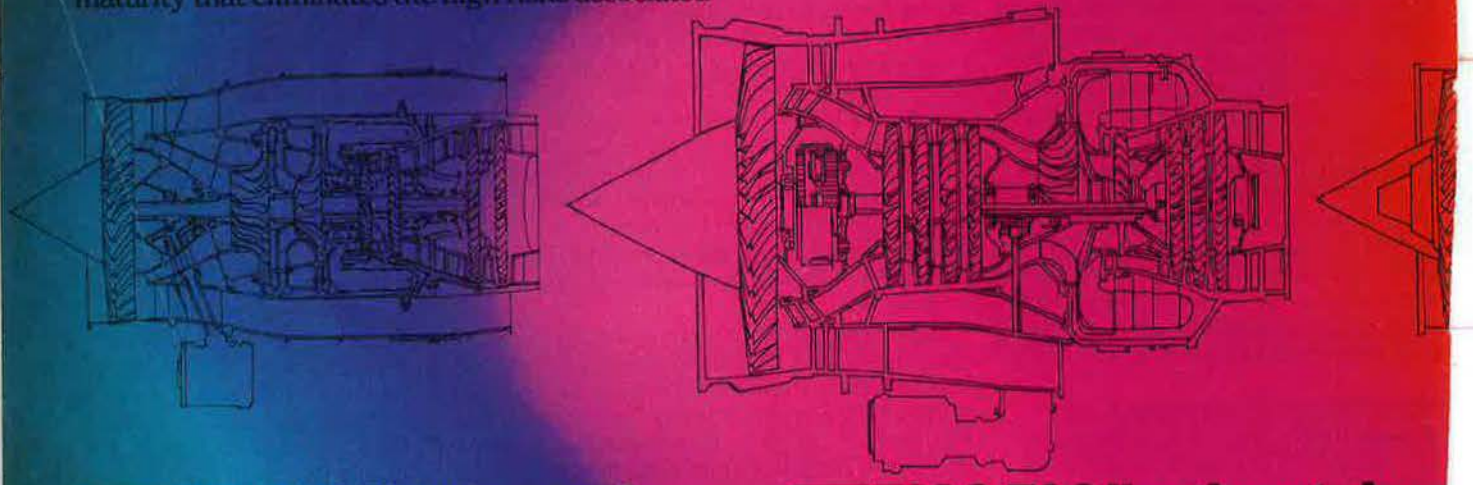

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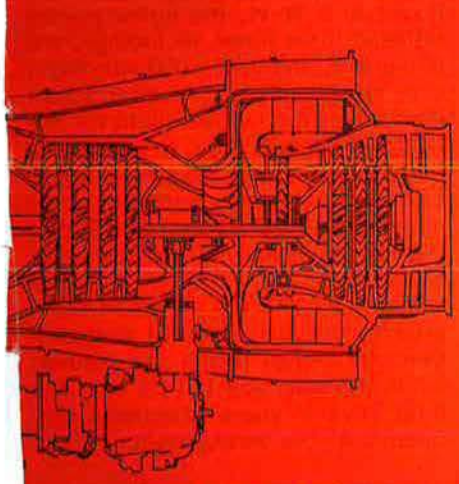

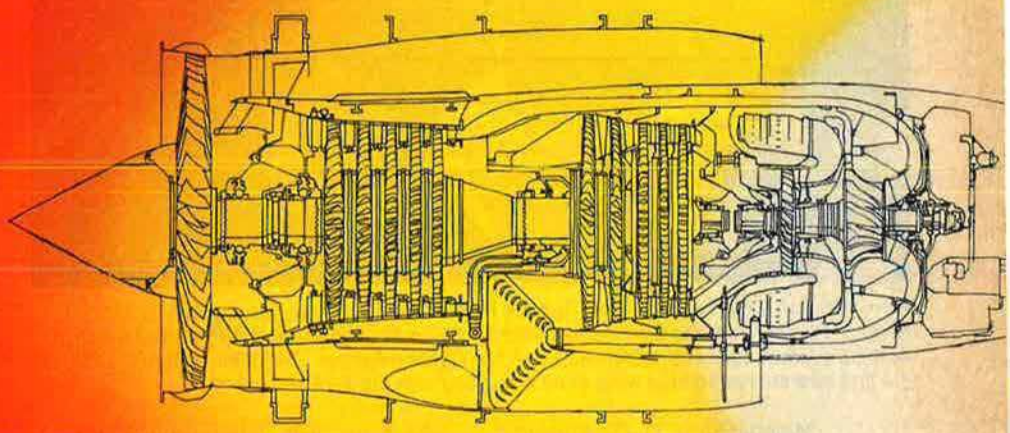

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Version available at 3,600 lbs. thrust to meet a variety of craft and mission requirements, and provide longer life with w operating costs.
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AEROSPACE WORLD
News, Views & Comments

By William P. Schlitz, SENIOR EDITOR

From left, Col. Troy Tolbert, 388th Tactical Fighter Wing Commander, Lt. Gen. William R. Nelson, Twelfth Air Force Commander, and Air Force Academy Cadet Jeff Hosken watch the Academy falcon salute its namesake, the F-16 "Fighting Falcon." The 388th, Hill AFB, Utah, is the first operational combat wing to be equipped with the F-16.

Washington, D. C., August 4

★ Britain's Thatcher government plans to spend about $12 billion to revamp the UK's nuclear force, including $2.5 billion to purchase some 100 US-built Trident missiles and support equipment.

The Thatcher government has also given its military forces generous pay increases and plans to spend more than $3 billion on new tanks and armored personnel carriers. Of the UK's annual budget, three percent—the sum the US has recommended be spent by NATO countries—will go for defense purposes, a spokesman for the Thatcher government said.

The Trident-1 missiles will replace the Polaris missiles the UK bought from the US in the mid-1960s. They'll be housed in new submarines and armed with new warheads built in Britain.

While each new submarine will be equipped with sixteen Tridents, as Polaris subs are now, the Tridents will have eight to ten independently targeted warheads vs. Polaris's three, which are not independently targetable.

The Tridents have a range almost twice that of the 2,900-nautical-mile Polaris, which will greatly expand the subs' cruising area. Deployment is expected to begin early in the 1990s.

Although Britain has assigned its nuclear weapons to NATO, it retains the right of unilateral use.

Under the arms sale agreement, officials said, Britain will man air-defense missiles at US air bases in the UK (the US has already agreed to purchase the British-made Rapier air-defense system).

Britain and the US have previously agreed to an expansion of the American base on UK-owned Diego Garcia in the Indian Ocean, and of the 572 intermediate-range ballistic and cruise missiles the US plans to station in Europe, some 160 ground-launched cruise missiles will be on British soil.

Such spending for Britain's military while social programs face cutbacks is sure to engender hefty opposition by Britain's Labor Party and disarmament groups in the UK.

★ The first four of seventy-five F-16s scheduled for delivery to Israel arrived there in early July.

Israel's initial F-16s were handed over by manufacturer General Dynamics Corp. last January but have been at Hill AFB, Utah, where Israeli pilots have been training.

The F-16s arrived in Israel after an eleven-hour, nonstop flight from Pease AFB, N. H.; the fighters were refueled three times, including once at night, during their 6,000-mile flight over the Atlantic and Mediterranean Sea. It was the longest flight for the F-16 yet logged. The aircraft were flown by pilots from Hill's 388th Tactical Fighter Wing: mission commander Maj. P. C. Burnett, and Capts. Pete Jones, Butch Kittles, and Larry Stellmon.

Nearly 2,000 F-16s are to be delivered to the air forces of Belgium, Denmark, Egypt, Israel, the Netherlands, Norway, and the US over the next several years. Australia and Spain are considering them.

★ In mid-summer, the first NATO personnel began arriving at Tinker AFB, Okla., to begin training on the Air Force's most advanced airborne surveillance and command and control aircraft, the E-3A Sentry.

NATO is scheduled to receive the first of a fleet of eighteen E-3As in early 1982. The NATO E-3As will be stationed at Geilenkirchen AB, Germany, near Aachen.

Tinker was picked as the training site because it is the main operating base for USAF's entire fleet of E-3As, and because facilities at the German base are not yet operable.

Airmen from Belgium, Canada, Denmark, Germany, Greece, Italy, the Netherlands, Norway, Portugal, Turkey, and the US will participate in some aspect of the training program, officials said.

Depending on the aircrew or support role, training sessions will vary from three to fifty-five weeks. TAC's 552d AWAC Wing, which operates


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At Spangdahlem AB, Germany, A1C Persel Gilliam sets the screw on a bomb drag fin. During Salty Radome, munitions personnel and augmentees recently conducted the largest conventional munitions buildup exercise in USAFE.

and maintains the US E-3As, will train NATO aircrews and computer software specialists. TAC's Field Training Detachment 413 will also train maintenance and computer personnel.

★ USAF picked Sheppard AFB, Tex., as the site of a cooperative program known as EURO-NATO Joint Jet Pilot Training (ENJJPT). The program is scheduled to begin in 1981 following an environmental impact analysis, as required by law.

The new program, to provide undergraduate pilot training and instructor pilot training, will process about 320 student pilots and 110 student instructor pilots per year. Costs and assignment of instructor pilots will be shared proportionately by NATO members.

Sheppard was picked because of its multimission role and because it is the site of several ATC units. The proposed program's flying training syllabus is essentially the same used by the German Air Force UPT program located at the base during the past twelve years; the latter will be absorbed into the new program.

Other than the economies of large-scale training, benefits expected from the new program are enhanced readiness through better interoperability and further standardization of tactics and techniques.

AEROSPACE WORLD

★ AFSC's Electronic Systems Division, Hanscom AFB, Mass., has awarded $121.4 million of a $163 million-plus contract to upgrade an E-4A National Emergency Airborne Command Post aircraft to the B standard.

Boeing Co., Seattle, Wash., will act as prime contractor in the modification program to equip the aircraft with advanced satellite communications terminals, improved command and control electronics, and the most powerful electrical generating system ever used in an aircraft. E-System's Greenville, Tex., Division is a major subcontractor teamed with Boeing in the venture. Other firms contributing components are Electrospace Systems, Inc., Richardson, Tex.; Collins Radio Division of Rockwell International, Dallas, Tex.; RCA, Morristown, N. J.; and Burroughs, Paoli, Pa.

The program will give the US two B versions, with options for upgrading the two remaining As. With plans to acquire two more Bs, the US would have six.

The E-4B's communication system employs many antennas ranging in frequency from super high frequency (SHF) to very low frequency (VLF). The VLF system requires several miles of trailing wire antennas.

The converted 747s would be used by the National Command Authorities and by CINC SAC to direct strategic forces during a nuclear conflict. Through them would be relayed commands to launch ICBMs if ground control centers became inoperative.

★ USAF has given the green light to General Electric Co. for full-scale development of GEPOD 30, a lightweight 30-mm gun pod.

Under initial contract funding of $1.4 million of what could total an estimated $32.9 million, GE's Armament Systems Department, Burlington, Vt., will build four GEPOD 30s and refurbish two engineering models designed and built as a company project.

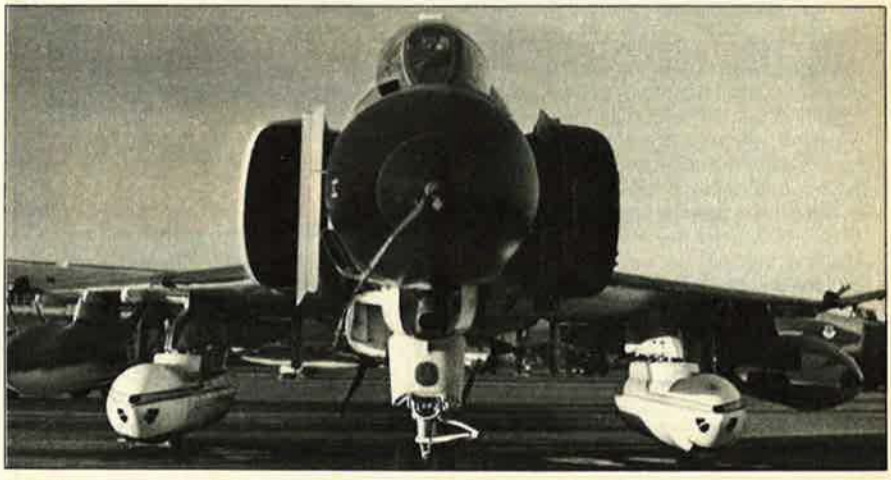
The contract includes provisions for funding sixty production units, and "the Air Force has expressed a long-range requirement for 520 GEPODs," according to GE.

The pod was developed as a means to deal with armor and other mobile and fixed targets. Because of its light weight (1,800 pounds), low recoil, and self-contained power, it can be installed on wing or body centerline stations of a variety of tactical aircraft. The pod has been flight-tested against ground targets by Northrop's F-5, the Vought A-7, and McDonnell Douglas's F-4E Phantom. The pod's gun is a derivative of the company's GAU-8/A 30-mm Gatling mounted in Fairchild Republic's A-10 *(see also p. 44)*.

The four-barrel GE-430 gun (vs. seven barrels of the GAU-8/A) fires the family of GAU-8/A ammunition, including target practice, high-explosive incendiary, and armor-piercing incendiary at 2,400 rounds per minute.

★ USAF has under way a $300 million program aimed at enhancing the capabilities of its FB-111A bomber fleet.

Sixty-five of the swingwing aircraft are to be modified at the Air Force's Air Logistics Center at Sacramento, Calif. Improvements include an aircraft/satellite telecommunications capability, a stall warning system, a



GEPOD-equipped F-4E Phantom. For details on the new, lightweight 30-mm gun pods being developed by GE for use on USAF aircraft, see item above.

radar warning receiver, and an improved electronic countermeasure system. The program will be the largest modification effort ever undertaken at the Center.

The aircraft/satellite communications capability will improve SAC's operational readiness by allowing the aircraft to disseminate emergency action messages "almost instantly within all echelons of the Department of Defense," officials said.

Technology and hardware are being supplied by the Fort Worth Division of General Dynamics.

★ The first production Laser Target Designators, hand-held devices that enable ground troops to pinpoint targets for laser-homing weapons or illuminate them for the delivery of conventional weapons, recently entered the US Army's inventory.

Deliveries of the LTDs by Hughes Aircraft Co. marked the introduction of production ground-laser designators into the US's arsenal.

The Army LTD, which resembles a short-barreled rifle, weighs on the order of sixteen pounds (7.26 kg).

Five of the fifteen LTDs delivered will go to USAF for test and evaluation by forward air controllers working with A-7 and A-10 aircraft equipped with Pave Penny laser trackers.

Hughes is also developing the Army's Ground Laser Locator Designator, a tripod-mounted laser designator and rangefinder.

★ The Air Force has given the go-ahead for the first phase of a program to develop a Low-Level Laser-Guided Bomb (LLLGB) system.

The object is to provide tactical air forces with the capability of precise delivery of current-inventory general-purpose bombs from very low altitudes while maintaining "equal or better performance characteristics than existing laser-guided bombs at medium or high altitudes."

First phase of the program—under a $9.5 million contract to Texas Instruments, Inc., Dallas, Tex.—involves design, assembly, and test and evaluation of a prototype. Phase two—under an additional $12.2 million pact—entails an option to build additional test weapons, engineering refinement, and further flight tests leading to a production decision in late 1982.

The program stems from studies verifying the need for a weapon that can be delivered in low cloud cover "and in environments safer than those that expose attacking aircraft to ground-launched missiles."

★ A new radio designed by AFSC's Electronic Systems Division, Hanscom AFB, Mass., to thwart enemy jamming is now in production and will be installed in thirteen types of aircraft at TAC bases in the US, Europe, and the Pacific.

Magnavox Government and Industrial Electronics Co., Fort Wayne, Ind., has already delivered forty-five of the systems that were tested aboard TAC aircraft. Under the production contract, the company will deliver an additional 907 of the Ultra High Frequency (UHF) systems between December 1980 and early 1982.

Some 838 will go into aircraft ranging from the A-10 to F-15; TAC will use the rest in vans, jeeps, and transportable shelters.

★ AFSC's Electronic Systems Division began testing its Maine-based experimental Over-the-Horizon Backscatter Radar System this past summer. The radar's transmitter site in Moscow, Me., and its receiver in Columbia Falls, Me., have been in operation periodically since last December to prepare for about a year of testing scheduled to end next May.

The OTH-B works by bouncing radar signals off the ionosphere, an atmospheric layer that extends from fifty to 250 miles above the earth's surface. Aircraft passing through the returning beam transmit a signal to the OTH-B receiver.

The radar beam can be steered from 500 to 1,800 miles to track aircraft hidden from ground-based radar by the earth's curvature.

Much of the air traffic approaching North America enters OTH-B's area of coverage. Flight plans for these aircraft, provided by international civil air traffic agencies, are fed into the system's computers and any that don't match up become "unidentified" targets for investigation.

A year's tests of OTH-B are needed because of the ionosphere's erratic behavior in the northern latitudes caused by the aurora borealis.

If the tests prove out, USAF plans to double the surveillance area of the

AEROSPACE WORLD

Senior NCO First ESD Acquisition Project Manager

CMSgt. Gene C. Yish of AFSC's Electronic Systems Division, Hanscom AFB, Mass., has chalked up the biggest first in his twenty-six-year career: He is the first senior noncommissioned officer at ESD to become an Acquisition Project Manager, a job held previously only by commissioned officers.

In early 1979, AFSC Commander Gen. Alton D. Slay decided to open management positions to senior NCOs. Chief Yish learned of a job opening, applied, and was selected. Now he manages EC-135 and E-4B flying command post antenna system acquisitions, directing their entire technical and financial aspects.

"I feel this is a definite career breakthrough for the senior noncommissioned officer," Chief Yish said. "Giving qualified NCOs full project manager responsibilities will relieve the shortage caused by lack of Air Force officers in the research and development field."

Chief Yish qualified through his more than 4,000 hours in Air Force technical training schools as well as earning a college degree. "There was also something else I could bring to the job: experience. I've spent half of my life working on communications equipment, watching technology advance from the vacuum tube to solid state transistors to computer-controlled high-speed integrated circuitry. And I've worked in just about every Air Force command," the Chief said.

Chief Yish checks specifications.

A recent letter to General Slay from ESD Commander Lt. Gen. Robert T. Marsh reads in part: Chief Yish "has met or exceeded all goals to date in getting the system on contract."

EF-111. NEWEST ELECTRONIC WARRIOR.

Eastern Europe has the densest thicket of electronic defenses in the world today.

The EF-111 Tactical Jamming System was developed by the Air Force and Grumman specifically to counter this potential threat—to provide cover for air-to-ground operations along the front line, and to support penetrating strike forces.

In a comprehensive four-year development and test program—the last six months conducted by Air Force personnel at Mountain Home Air Force Base in Idaho—the EF-111 significantly exceeded the operational reliability and "blue suit" maintainability standards set by the Air Force and Department of Defense.

Tests of the EF-111 system in a simulated Eastern European air-defense environment demonstrated its ability to detect and automatically assign jammers to counter and negate every type of threat encountered.

The need for the EF-111 is a well-established USAF requirement. EF-111 provides the capability to disrupt the Warsaw Pact radar net with support jamming in both standoff and escort roles.

The EF-111. It can do the job. And with a built-in growth capability to cope with new and more sophisticated threat radars, it will continue to do the job in the future.

The EF-111. A real answer to a real need.

Grumman Aerospace Corporation, Bethpage, Long Island, New York 11714.

GRUMMAN

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WE'RE ALREADY INTO OUR THIRD GENERATION NAVSTAR GPS USER EQUIPMENT

When the Navstar program began in 1973, Magnavox had already combined two decades of experience in the two principal GPS technologies: Positioning by satellite and spread spectrum signal processing.

In fact, we have built thousands of advanced satnav systems from the launching of the first Transit satellites in 1963.

And anti-jam spread spectrum modulation was originally developed by Magnavox in 1956.

During Phase I of GPS we qualified more user equipment than all other suppliers combined. We built more than 40 sets that met or exceeded specifications for flexible interfacing, cost effective design and performance; two full generations of equipment ranging from manpacks to systems capable of instant determination of velocity and 3D position within 10 meters in aircraft maneuvering in jamming environments.

The U.S. Air Force Space Division has selected Magnavox as one of two prime contractors for Phase II full scale development of approximately 50 sets with maximum commonality for minimum life-cycle cost, to be tested under field operating conditions in many different types of vehicles.

With more experience than anyone else in both anti-jam communications and satellite navigation, Magnavox occupies a unique position of leadership in the development and manufacture of user equipment for GPS in the decade ahead. Magnavox Advanced Products & Systems Company, 2829 Maricopa Street, Torrance, Calif. U.S.A. (213) 328-0770. Telex 674-373.

Magnavox

AEROSPACE WORLD

experimental radar from thirty to sixty degrees by reconfiguring the current system. Additional testing would then follow before a decision on building a fully operational system.

★ The folks who gave us the *Gossamer Condor* (first sustained, controlled, human-powered flight) and the *Gossamer Albatross* (first human-powered English Channel crossing by an aircraft) are now developing solar-powered aircraft.

One, the *Gossamer Penguin*, is based on the design of *Albatross* (it was backup for the Channel crossing) and built of the same ultra-lightweight materials pioneered by physicist Dr. Paul MacCready and his band of Californians. Its upper wings are lined with electricity producing solar cells developed for US space satellites. *Penguin* has already made a number of short test flights. It weighs sixty-eight pounds.

On the drawing boards is *Solar Challenger*, being designed to hit forty mph and to fly in moderate turbulence and to altitudes of 5,000 feet. It will weigh seventy-seven pounds and will be equipped with a 2.5 hp electric motor. *Challenger's* solar cells are to generate 2,500 watts of electricity to run the motor. It will carry no ground-charged batteries as have other solar-powered experimental aircraft.

The hope is that this coming fall the plane will make its first 100-mile flight, perhaps between San Diego and Los Angeles. A flight between London and Paris is contemplated for 1981.

Said Dr. MacCready: "We're trying to call attention to the fact that there is an alternate source of energy of great value to the United States that deserves a lot more attention than it's had."

★ **NEWS NOTES**—In July, **Maj. James E. McArdle, Jr.**, was presented the **Mackay Trophy for 1979's "most meritorious flight"** during which, as a helicopter pilot with Det. 13, 33d Aerospace Rescue and Recovery Squadron, Osan AB, Korea, he helped rescue **twenty-eight Taiwanese seamen from a ship in distress at night.** The Mackay Trophy, administered by USAF and the National Aeronautic Association, is the oldest award intended exclusively for Air Force flying officers for gallantry under combat or noncombat conditions.

In recognition of a **23,000-hour accident-free flying year,** the **18th**

Jacqueline Cochran—1907–1980

Jacqueline Cochran Odlum, famed aviatrix, cosmetics entrepreneur, AFA member and strong supporter since 1948, died of heart failure at her ranch in Coachella, Calif., in early August. She was seventy-three.

Orphaned and on her own as a businesswoman at an early age, Jackie Cochran began her flying career in 1932, earning her pilot's license after three weeks' instruction. She went on to win more medals, citations, and honors than any other woman aviator in history. A partial list of her deeds: winner of the Bendix transcontinental race in 1938;

Atlantic (in 1941) and a jet in 1962; Commander of World War II's Women's Airforce Service Pilots; first woman to break the sound barrier (in an F-86 Sabrejet in 1953); first woman president of the Fédération Aéronautique International (1958–59), the only woman to have been awarded the Distinguished Flying Cross (1969).

Besides her flying activities, Jacqueline Cochran also ran a successful cosmetics and perfume company (she was voted "Business Woman of the Year" in both 1953 and 1954) and was a former director of Northeast Airlines.

In 1936, Jackie Cochran married Floyd Odlum, successful businessman, financier, and one-time owner of Convair, now a part of General Dynamics. The Odlums lived on a 500-acre ranch in California.

Jackie set, and continued to hold, so many flight records, principally for speed, that she was awarded the Harmon Trophy as the world's outstanding woman aviator from 1937 through 1950, and again for 1953.

In 1964, she set a world speed record of 1,429 mph in an F-104G Starfighter.

Following the war years, Jacqueline Cochran held a commission in the Air Force Reserve, retiring as a colonel in 1970. She was also active in the Civil Air Patrol.

In 1971, she was enshrined in the Aviation Hall of Fame, the first living woman to be so honored. In 1948, she was presented AFA's Distinguished Civilian Service Trophy.

California State AFA Sponsors Iran Hostage Bracelet Program

A grass roots movement begun by a patriotic organization known as "Voices for Freedom" in California is gathering momentum.

California State AFA has taken up sponsorship of the Voices of Freedom cause—to demonstrate support of the Americans held hostage in Iran and their families by the sale of inscribed bracelets in the manner of the Vietnam MIA/POWs.

Three of the hostages, Air Force Col. Thomas Schaefer, Lt. Col. David Roeder, and Capt. Paul Needham, are among those threatened with dire action by the Iranians.

As of this writing, some 12,000 bracelets have been distributed by Voices for Freedom and California AFA. The nickel-plated bracelets cost $3 each and can be acquired from:

Capt. Fred Wyatt, USN (Ret.)
10250 Moorpark St.
Toluca Lake, Calif. 91602

The three families have approved the inscription of the officers' names on the bracelets, so please specify which when ordering.

It remains to be seen what effect the recent death of the deposed Shah will have on the hostage situation. But when the hostages are released, Voices of Freedom intends to use any residual funds resulting from the bracelet sales for such hostage-related charities as scholarships for the childen of the men killed during the rescue attempt.

For the intermediate term, however, the bracelet program is meant to keep the hostage issue in the public eye.

TFW, Kadena AB, Okinawa, Japan, was awarded **USAF's 1979 Colombian Trophy.** The wing transitioned from F-4s to F-15s during the year. Both aircraft are built by McDonnell Douglas Corp.

In mid-July, **Japan accepted its first F-15J,** of 100 to replace Lockheed F-104s of the Japan Air Self-Defense Force. **Most will be built under license** in Japan by Mitsubishi.

Beginning in November 1981, **all F-15s ordered for USAF and foreign air forces** will come equipped with an **overload warning system**—a woman's voice repeating "Over G, over G"—that will automatically tell pilots when aircraft are nearing aerodynamic limits. The device will be **retrofitted in earlier USAF Eagles.** Tests have shown that planes are flown more aggressively when pilots are alleviated of the overload worry. Maintenance also should be eased; overloads require inspection of possibly weakened areas.

In mid-July, **Volant Rodeo took place at Pope AFB, N. C.** The airdrop competition featured C-130s and C-141s from MAC, ANG, AFRES, and, for the first time, Britain, Canada, Australia, and Germany. **Last year saw the rebirth of airdrop competitions,** discontinued in 1963. USAF would like to see them as an annual event. Along with airdrops, the competition includes short-field landings, team deployment, land navigation, aircraft inspections, and problem solving.

AEROSPACE WORLD

The USSR continued its **internationalization of manned spaceflight** in July when yet another team of cosmonauts was launched to rendezvous with orbiting space station Salyut-6 and Valery Ryumin and Leonid Popov, who have been aboard since April 10. The visitors: **Col. Viktor Gorbatko** and **Vietnamese Lt. Col. Pham Tuan,** the first Asian in space.

Died: Herman R. "Fish" Salmon, the legendary test pilot whose first flight was in 1927 at age fourteen, who barnstormed in the '30s, and who went on to test aircraft ranging from the B-17 to the F-104, in an air crash in June at Columbus, Ind. He was sixty-six.

Died: Constance White, fishing enthusiast, gifted painter, and longtime House of Mercy volunteer who was also the widow of former Air Force Chief of Staff Gen. Thomas D. White. He died in 1965. Mrs. White succumbed to leukemia in July in Bethesda, Md. She was seventy-seven.

Died: Jean Kossarides, veteran test pilot and business executive who served as a fighter pilot in World War II and Korea, of complications following injuries suffered in a bus accident abroad, in July in Bethesda, Md. The AFA member was fifty-five. ■

INDEX TO ADVERTISERS

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E-Systems New Dimension TACAN II is the solution.

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Dual beacon-transponders, matched with a sophisticated test-monitor-control group that simplifies system maintenance, provide highly reliable and continuously monitored operation for enroute or terminal TACAN navigation. The four-kilowatt TACAN II is available in several configurations, but all of them come with the state-of-the-art performance that E-Systems two decades of TACAN experience provide.

Local and remote control, optional remote readout of station certification parameters and module-level fault isolation are just a few of the features we've included to make TACAN II your solution to improved TACAN performance needs.

E-Systems New Dimension TACAN II is here—tested, proven and reliable. For complete TACAN II information, contact: E-Systems, Inc., Montek Division, 2268 South 3270 West, Salt Lake City, Utah 84119. Phone: (801) 973-4300. Telex: 388-419.

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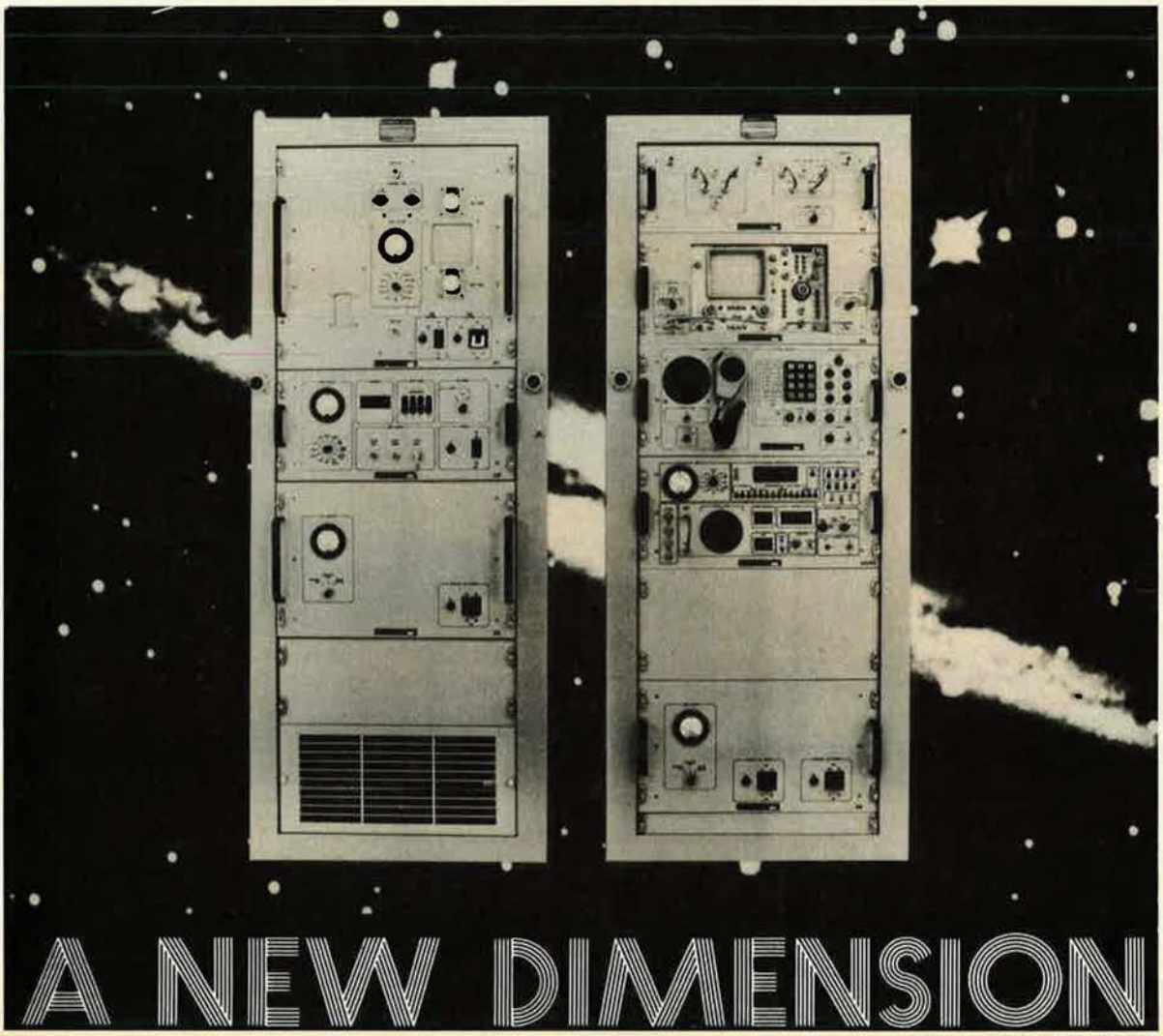

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In the years ahead, first-line aircraft will face the challenge of dealing with more sophisticated threats. Raytheon is now working to meet that challenge with AMRAAM (Advanced Medium Range Air-to-Air Missile). Inside and outside, Raytheon's design of the AMRAAM system is the shape of tomorrow in air superiority. Smaller, lighter, and faster than the system it will replace—with an advanced wingless airframe for maximum range and minimum drag—the entirely new AMRAAM is designed for operational use in the 1980's and beyond.

With an exceptional 30-year record of designing, developing, and producing air-to-air and ground-to-air defense systems, Raytheon has been selected as one of two finalists in the validation phase competition for this beyond-visual-range missile. AMRAAM is being developed under the direction of the U.S. Air Force for use by the Air Force, Navy, and allied forces. The missile will be compatible with all first-line fighter aircraft, including the F-14, F-15, F-16, and F-18.

A solid-state, active radar seeker makes AMRAAM a "launch and leave" system. This—and such capabilities as multiple missile launch and simultaneous target engagements—will result in superior system combat effectiveness. AMRAAM utilizes the latest in digital technology for fast response, improved guidance

AMRAAM...for command of the skies

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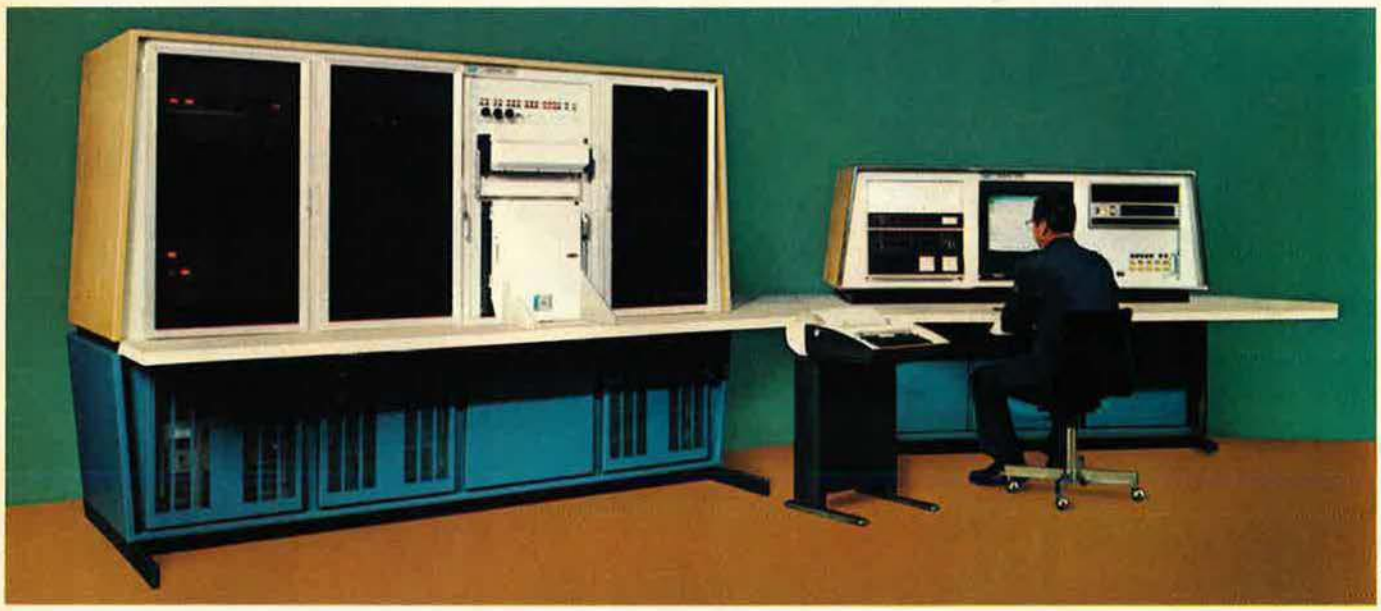

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Marking the thirty-fifth anniversary of V-J Day, the front cover of this issue of AIR FORCE shows what we believe was the last aerial combat of the war . . .

About That B-32 on Our Front Cover

BY MAJ. THOMAS L. SACK, USAF, CONTRIBUTING EDITOR

THIS month marks the thirty-fifth anniversary of the end of World War II. Our cover, painted by Washington-area artist William J. Reynolds, depicts a B-32 Dominator exchanging fire with Japanese fighters. To the best of our knowledge this action, on August 18, 1945, was the last aerial combat of the war.

The B-32 on the cover, tail number 2108578, was piloted by Lt. John R. Anderson. His crew was one of two flying photo-reconnaissance missions over Tokyo that day when intercepted by fourteen Japanese fighters—Navy A6M2 Reisens (Zekes) and Army Ki-44s (Tojos). The other bomber (not shown) was the *Hobo Queen II*. It caught the first onslaught, beating off nine enemy passes.

Five-seven-eight didn't fare as well. After fighters knocked out its number three engine, they concentrated their attack on this B-32. In the frantic moments that followed, one photographer in the Dominator was killed and the other wounded in the legs. Tail gunner Sgt. John T. Houston shot down one Zeke as it tried to sneak in behind. Sgt. Jimmie F. Smart, the upper rear turret gunner, hit another fighter, which rolled over and exploded below the B-32. The sergeant subsequently suffered a head wound and became unconscious.

The two B-32s fought their way clear and returned to Okinawa. Five-seven-eight carried one dead and two wounded airmen. The crew claimed destruction of two enemy fighters and one probable. *Hobo Queen II* claimed one probable. Japanese records indicate no fighters were lost in action against B-32s that day. Japanese Warrant Officer Sadamu Komachi officially claimed a B-32 as probably destroyed on August 18.

The only other aerial combat in which the B-32 participated took place the day before, when 578 became the first Dominator to shoot down an enemy plane. Another took credit for one damaged and one probable. The record shows that B-32s in World War II shot down three enemy fighters, damaged another, and received credit for three probables.

The B-32 was developed by Consolidated Aircraft, later known as Convair (and now part of General Dynamics), in competition with Boeing's B-29 Superfortress. Requirements for the aircraft emerged from the country's need for a high-altitude, long-range bomber. Gen. H. H. "Hap" Arnold, through the War Department, started action in 1939 for a four-engine bomber with a 2,000-mile radius. Douglas and Lockheed dropped out of the competition shortly after the preliminary design phase.

The B-32 was picked as backup to the B-29. Both aircraft were test flown for the first time in September 1942. Design problems, though, delayed further development of the Dominator. Initially, Consolidated patterned the B-32 on its sturdy and reliable twin-tailed B-24 Liberator. It was to be pressurized, with retractable turrets in the fuselage. When the first production model flew more than a year later, the plane's design had been changed to a single vertical tail, which soared thirty-two feet above the plane. Designers also abandoned the pressurized cockpit.

Problems plagued the aircraft throughout its life. Even the name ran into difficulty. Consolidated wanted to call it "Terminator," but the Army Air Forces insisted on Dominator.

Of the 1,706 B-32s the government ordered, only 118 were ever built. Of those, fifteen served in combat. Their achievements were minor, but the actions of August 17 and 18, 1945, earned the aircraft a footnote in US aerial combat history.

Painting is an avocation with cover artist Bill Reynolds. He was a fighter pilot in World War II, and is now the Air Force Region Director for Aerospace Education in the Air Force Liaison Office to the Civil Air Patrol. ■

(Sources for this article include Jeffrey L. Ethell, W. J. Reynolds, and Tom Y'Blood.)

The production version of the B-32 was eighty-two feet one inch long. It had a wingspan of 135 feet and stood thirty-two feet two inches high. Four 2,200-horsepower Wright R-3350-23 engines gave the 100,000-pound aircraft a maximum speed of 357 mph at 30,000 feet. Cruising speed was 290 mph. The Dominator carried a crew of ten, 8,000 pounds of bombs, and 5,460 gallons of fuel.

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October 1945—General of the Army "Hap" Arnold congratulates Lt. Col. Jim Straubel after awarding him the Legion of Merit for his work as Editor and Publisher of AIR FORCE Magazine, the official journal of the AAF during World War II.

Jim Straubel: The Man Who Put AFA Together and Made It Work

BY JOHN F. LOOSBROCK, PUBLISHER AND EDITOR IN CHIEF

AFTER the convention is over and September ends, Jim Straubel will turn over the AFA Executive Director's post to his successor. Before he retires to take up new pursuits, this is my chance to comment on Jim's stewardship of the Air Force Association. New words could not be more fitting than the comments made in 1976, marking the thirtieth anniversary of the Air Force Association. Here, somewhat condensed, is that tribute:

It is an extremely risky thing to write approvingly, and publicly, about one's boss. He may be embarrassed. He may be angry. He may privately disagree with your assessments.

But had it not been for Jim Straubel—his courage, his tenacity, his imagination, his creative talent—AFA very likely would not have survived for thirty months, let alone thirty-four years. And to say some of the things that should be known about Jim Straubel, I'm ready to run all the risks cited above plus the very obvious opening of myself to charges of sycophancy.

No, I do not sleep better because Jim Straubel is Executive Director of the Air Force Association. Very often I sleep worse, and occasionally not at all. No lack of faith is suggested by the foregoing. Rather, it is the deep sense of responsibility which Straubel is able to inculcate in those who work for him and which represents the essence of that overworked word, leadership.

A youthful Green Bay sailor who eventually left Wisconsin for the Nation's capital and joined the Air Force. Jim Straubel, circa 1920.

We all are products of our past, it is said, and Straubel is no exception; a fortuitous circumstance which explains in large part why he has been just right for AFA and, conversely, why AFA has been right for Jim Straubel.

The guts of the Air Force Association is communications—internal as well as external. And Straubel is, above all, a communicator. Blooded in the reportorial trenches of the daily newspapers in his native Wisconsin—Appleton *Post-Crescent*, Green Bay *Press-Gazette*, Milwaukee *Journal*—he came to Washington, D. C., in 1940 as managing editor of the then-new *American Aviation* Magazine.

A Reserve second lieutenant, Straubel was called to active duty in 1941, when Gen. H. H. "Hap" Arnold gave him the job of setting up and editing AIR FORCE Magazine as the official journal of the US Army Air Forces. Straubel plucked a team of talented people from the dark canyons of Manhattan to sun-drenched Hollywood and the product reflected the talent.

He ended his wartime stint as a colonel and, after a brief fling in pa-

A recent portrait of AFA's retiring Executive Director.

perback book publishing in New York, was called to the rescue of the floundering Air Force Association. His first chore was to revitalize AIR FORCE Magazine, which had been bequeathed to the Association by the AAF in a kind of war-surplus status. In 1948, then-President C. R. Smith named him Executive Director of the Air Force Association, a title he holds to this day.

So much for biography. Suffice it to say that Straubel's background as reporter, writer, editor, and publisher has mirrored itself, first in AFA's very survival when the magazine proved the financial savior of the Association and, second, in the respect and highly professional latitude he accords AFA's entire staff today. This latter is a rare phenomenon among association executives. It makes our editorial job easier but—and more important—creates an atmosphere of professionalism without which an association journal can never rise above the drab level of an unloved, unread, uninfluential house organ.

To colleagues who have wondered at my own adherence to the same boss for nearly thirty years, my stock reply has been: "You don't have to change bosses to change jobs. At AFA, you may keep the same desk but you find the job changing under you."

It is this yeasty approach to his life and his work that has made Straubel's thumbprint on AFA so legible and so indelible. He could easily have settled into a too-familiar Washington rut—an easy life for a few people. He opted for growth and innovation, for risk and reward, for a broad and visionary approach to the marketing of this concept we call "aerospace power."

Out of this ferment has risen a succession of programs and events all pointed in the same direction—a widened professional and public understanding of aerospace technology and its pervasive side effects—not simply its implications for national security but across the entire fabric of our national life. Not the least, of course, is the steady and, in recent years, spectacular growth of the entire Air Force Association.

It's been an incredible thirty-four years, thanks to an incredible man—Jim Straubel. After presiding over AFA's infancy and nurturing it through a sometimes stormy adolescence, he has brought it into universally-respected maturity. We of the staff, along with the Association's elected leadership and its 155,000 members, wish him the very best. ■

James H. Straubel receives a special plaque from former Presidents and Chairmen of the Board of the Air Force Association. Front row (from left): James H. Doolittle, Straubel, Arthur F. Kelly. Back row (from left): C. R. Smith, Julian Rosenthal, Harold C. Stuart, Thomas Lanphier, and Ralph Whitener (then on AFA's staff). The inscription reads: "To James H. Straubel, in grateful recognition of your dedication to the welfare and security of the nation and to the ideals and objectives of the Air Force Association to which you have willingly dedicated your talents and energies." Other signers include Carl A. Spaatz, George C. Kenney, and Edward P. Curtis.

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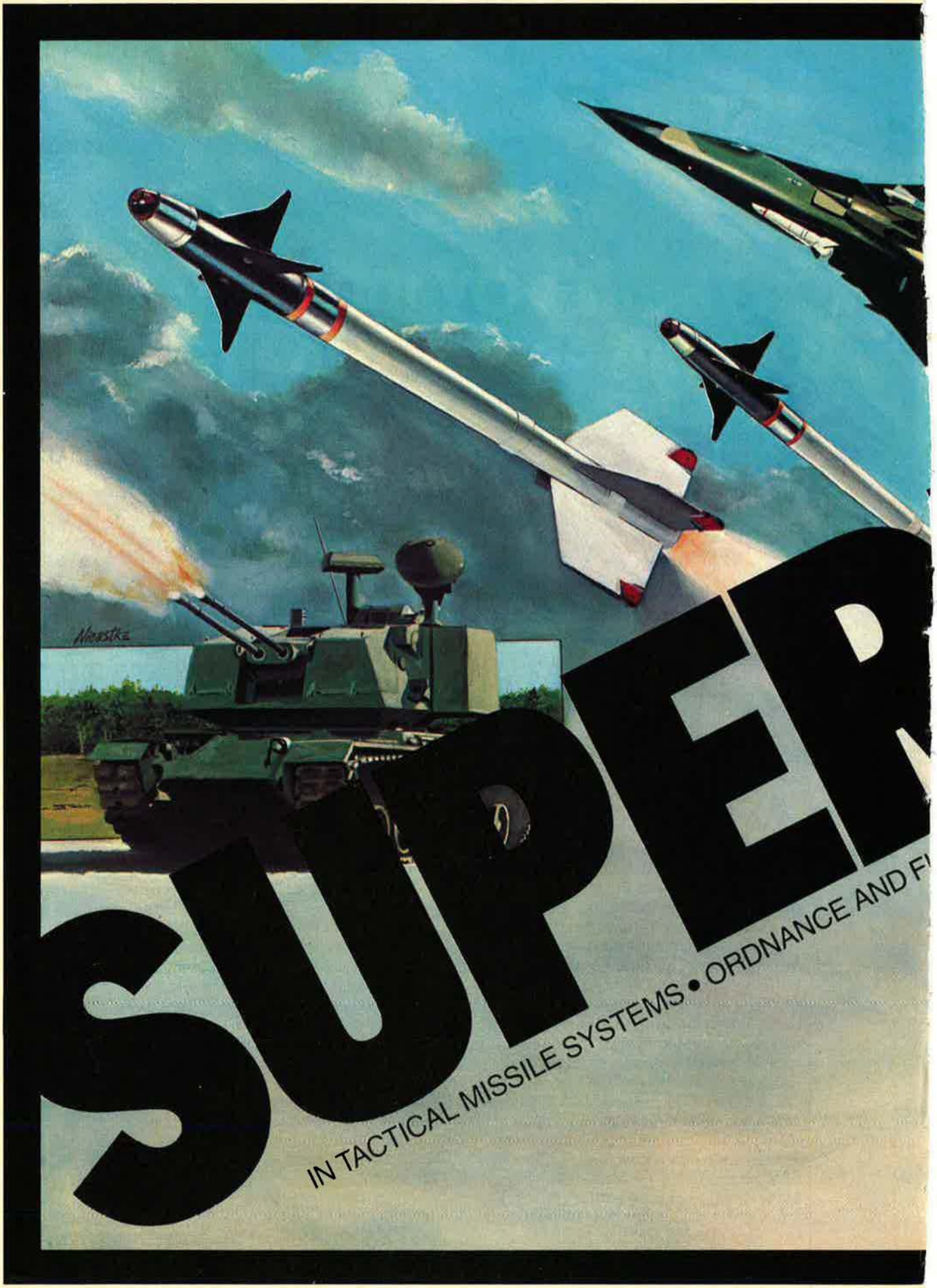
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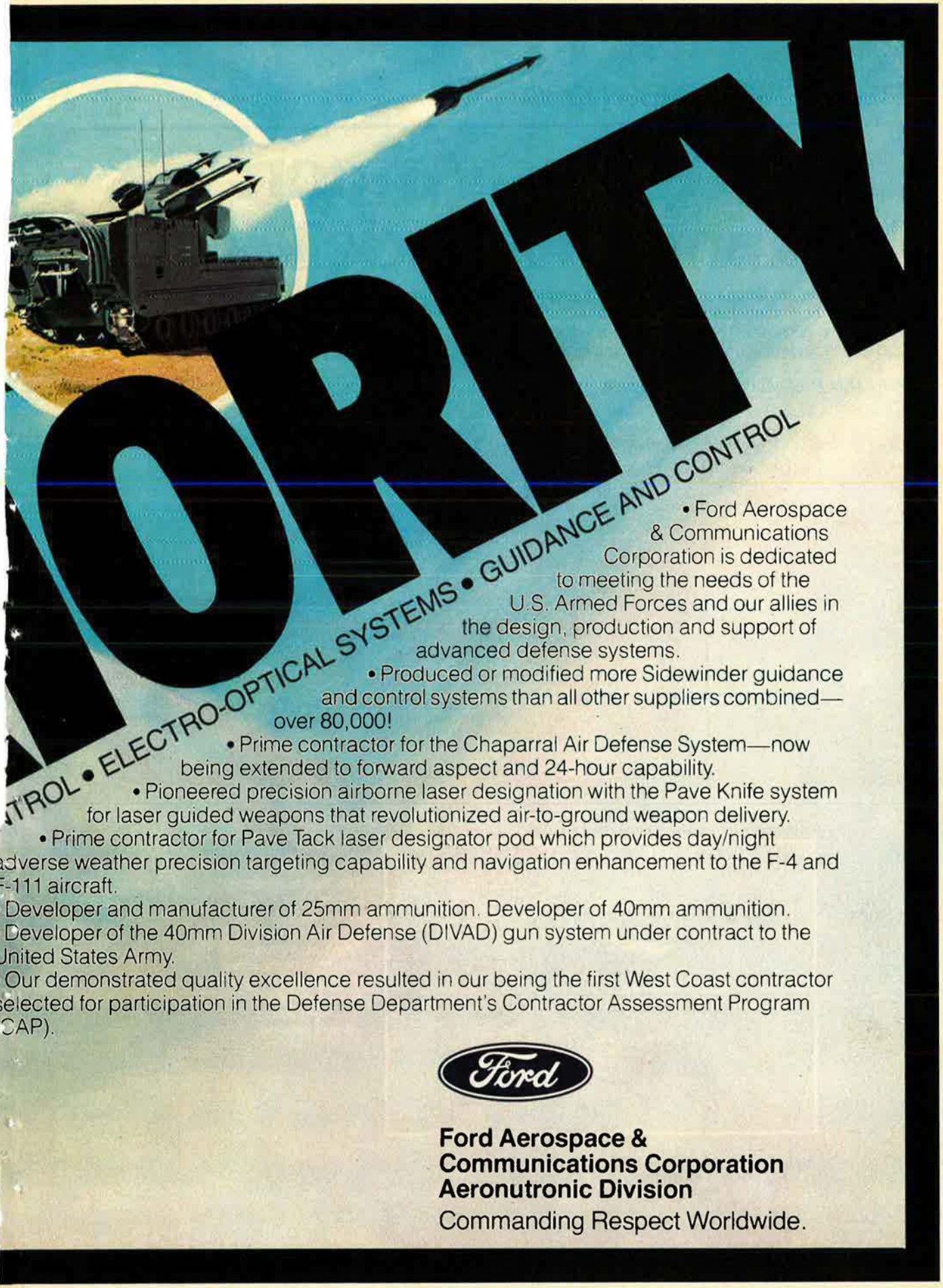

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AIR FORCE | SEPTEMBER 1980

Lethal Against Armor: The Joint Air Attack Team

Army commanders are enthusiastic about having direct access to Air Force A-10s in combat, an aircraft designed specifically for the ground support role. The A-10s, working in concert with Army attack helicopters, form a deadly combination.

BY WILLIAM P. SCHLITZ, SENIOR EDITOR

The Bell-built AH-1S Cobra has evolved into a weapon platform designed to "disrupt, harass, and destroy enemy armor thrusts." It can fly at 129 knots and is rearming with a 20-mm cannon.

"It will be *all of our forces* against *all of their forces.* Enemy fighters will be confronted with an array of tactical air . . ."

Coming out of a dive and climbing, a Fairchild A-10 Warthog leaves vapor trails in moist air.

Besides AH-1S attack helicopters, Army helicopter battalions are equipped with UH-1H transport helicopters, right above, and OH-58A Kiowa scout helicopters, right below, for the observation and reconnaissance role.

WARTHOG pilots play down the threat of MiGs and other high-speed enemy fighters coming against them in a European war. "After all," says Capt. Dale C. Hill, of the 354th Tactical Fighter Wing, Myrtle Beach AFB, S. C., "it will be *all of our forces* against *all of their forces*. Enemy fighters will be confronted with an array of tactical air—F-15s, F-16s, allied fighters, etc. And don't forget where the A-10s will be operating, down on the deck just above ground level. It will be very difficult for enemy aircraft to pick us out of the ground clutter. To engage us they'd be traveling at very high speed among the treetops, a very chancy situation. Plus, *we're* very maneuverable.

"No, the major threat to us and to the Army attack helicopters we'll be working with will be enemy air defense artillery [ADA]—missiles and radar-directed antiaircraft artillery—moving with their armored columns. These must be suppressed before we can go to work on their tanks."

Captain Hill is discussing Joint Air Attack Team (JAAT) tactics, a one-two weapon-system punch to be used against enemy ground targets: Army AH-1S Cobra attack helicopters armed with wire-guided TOW missiles working in concert with Air Force A-10 fighters mounting GAU-8A Gatling guns and AGM-65 Maverick fire-and-leave missiles. A third element not to be underestimated: Army field artillery and heavy mortars.

The artillery is seen as especially important in dealing with enemy ADA, "but either the A-10s or the attack helicopters are prepared to take on enemy air defenses, depending on who is in a position to do so," says Captain Hill.

While the Joint Air Attack Team would usually operate with Army units of brigade or battalion size, it may work independently of ground maneuver forces. Doctrinally, during offensive operations the JAAT would be employed against counterattacks, and defensively to reinforce ground units. In all likelihood, the attack helicopters, organic to Army units, would be in action before the A-10s are called in for close support. Regarded as gun platforms by Army commanders, the highly

mobile attack helicopters are ideally suited for situations in which rapid response is important.

The JAAT Helicopter Component

Under Army organization tables, attack helicopter battalions are found in the air cavalry combat brigade, air assault division, and on the corps level. In the future, the Army plans to add an attack helicopter company to every division. Besides its complement of sixty-three AH-1Ss, the attack helicopter battalion possesses thirty-six OH-58A Kiowa light observation four-place helicopters and thirteen UH-1H transport helicopters.

The two-place AH-1S, armed with eight TOW missiles, also is currently equipped with a turret-mounted 7.62-mm Minigun and a 40-mm grenade launcher. The Army is converting the turret weaponry to a 20-mm cannon.

The AH-1S force is also to be equipped with laser designator target markers, which means that A-10s armed with laser-guided missiles will be able to attack targets marked by the helicopters. In the future, single infantrymen using hand-held or shoulder-mounted lasers will be able to illuminate targets for either A-10 or helicopter attack. These lasers are currently entering the inventory *(see p. 28)*.

In combat, the Army plans to rotate an attack helicopter battalion's three companies (and the companies their platoons) into action. While one element is attacking, another would be en route to or from the attack, and the third would be at a forward arming and refueling point (FARP). At times of crisis, however, such as blunting an enemy armored thrust, all available helicopters would be committed.

The Army employs a basic team of five attack helicopters and three OH-58s. The latter fly in an aeroscout role and provide command and control. One OH-58 would transport the Army "combat team leader" and all three could remain on station observing the enemy in the contested area while the attack helicopters rotate for rearming and refueling. The scout helicopters, besides seeking targets and acting as decoys, provide lookout security for the attack helicopters, help direct artillery fires, and keep an eye out for potential Cobra firing positions. The scouts are armed with a 7.62-mm Minigun.

The combat team leader is responsible for positioning attack helicopters and coordinating their firepower with that of ground maneuvering units, the field artillery, and tactical close air support, when it is called in.

(Because air cavalry is constituted to *find* the enemy, it is organized for combat in its own fashion. Two scout helicopters may be used for reconnaissance when enemy contact is not likely. This serves to maximize the recce effort while conserving the operational readiness of aeroweapons aircraft. When contact is expected, an attack helicopter will accompany a scout, to field the maximum number of teams. One scout and two attack helicopters are teamed when the enemy is contacted. One scout, one attack helicopter, and a utility helicopter carrying a recce squad can put troops on the ground to reconnoiter, establish OPs, or secure critical points. On contact with the enemy, A-10s can be called in to form a JAAT team.)

Under the current NATO setup, an Army Group has as its counterpart an Allied Tactical Air Force for the allocation of air resources through its Air Command Operations Center. There are two notable aircraft exceptions, however: The Army corps commander, through his Air Support Operations Center, has direct access to A-10s and Royal Air Force Harrier V/STOL aircraft to meet immediate, urgent requests for close support down to his division, brigade, and battalion levels. The Army is enthusiastic about the prospect of having access to the A-10s, an aircraft designed specifically for the close support role. "In this context," says the 354th's Maj. Jay Terry, "in a 'target-rich' environment of a full-blown war in Europe, the Army commanders know they have a close support airplane they can rely on; one that isn't likely to be diverted from its primary mission of helping out the ground forces, as has happened in the past with dual-role aircraft."

On hand at an Army division is an Air Force Tactical Air Control Party (TACP) and an Air Liaison Officer (ALO). At brigade level, USAF maintains a TACP, ALO, and also a Forward Air Controller (FAC). These wear Army camouflage uniforms in the field, eat Army rations, and go right along with the troops. At the battalion level is a TACP and a FAC. All are instrumental in the employment of tactical air in close support, A-10s or otherwise.

Still other Air Force people are involved. Once an A-10 mission is laid on, a Forward FAC (FFAC) will travel in a scout helicopter with the Army team leader, although in some instances he could operate independently in a ground vehicle or from another scout helicopter. Also cranked up will be a FAC(A) (airborne FAC) flying an Air Force fixed-wing O-2A Skymaster or OV-10A Bronco.

Mounting a Joint Attack

Before the A-10s are committed, Army helicopter scouts and the Forward FAC search the target area for firing positions, avenues of approach, chokepoints, and potential engagement areas. Their major emphasis is on locating enemy air defenses. While the scout choppers maintain visual contact with the enemy, the team leader coordinates operations with the Forward FAC and ground force commanders, including artillery support. One high-priority target is enemy air defense radars. (In some instances in previous conflicts, friendly artillery was curtailed at the onset of air strikes, and increased enemy fire as a result of the pause caused unnecessary casualties; with close control of artillery and air, this shouldn't happen in the future.)

Friendly artillery can also engage other than the immediate targets of the A-10s and attack helicopters.

Once committed, one team of attack helicopters will engage targets while another maneuvers to new positions, to maintain pressure on enemy forces. According to Army planners, "Although they cannot hold terrain like ground maneuver forces, attack helicopter units can dominate terrain, denying the enemy its use by direct aerial fires. . . ." As will the A-10s, they will use terrain masking as much as possible to break radar or infrared lock-ons of enemy air defense

weapons. "Radar-directed weapons can't see through hills or trees; if they can't lock on, they can't fire effectively," says Captain Hill.

When a close support mission is requested, A-10s under the control of a direct air support center (DASC) will either be scrambled or diverted, depending on mission urgency or priority, and normally will contact the appropriate Air Force tactical air control party located with the Army ground maneuvering unit. Routed to a holding area outside the range of enemy air defenses and flying at altitudes below enemy early warning radar, the A-10s will then come under the control of the responsible airborne FAC, who is presumably in contact with the Forward FAC operating with the Army attack helicopter combat team leader.

As for A-10 capabilities, the aircraft can take off from its base, fly at 500 feet for 100 nautical miles, maneuver in a holding area for an hour, attack targets for twenty minutes, return to base, and still have fuel reserve of thirty minutes.

It will be the airborne FAC's job to relay to the A-10s such information as target description and location, the friendly artillery line, known ADA threats, the positions of friendly forces, and recommended direction of attack (A-10s and attack helicopters are capable of attacking enemy columns from front, flanks, and, in some cases, rear.) The airborne FAC also advises the terrain-hugging A-10s as to the heading and distance to an initial point near the target area, where the planes can begin to acquire targets by "bunting up" (Air Force lexicon; "popping up" in Army lingo). (The attack helicopters, normally operating at treetop altitudes and at maximum standoff range from targets and usually facing them, should be visible to the incoming A-10s and so of use as cuing references, as will smoke and burning vehicles in the target area.)

One basic tactic of the JAAT stemmed from the early realization that the attack helicopters and A-10s will be occupying the same airspace. The result is a rule that the helicopters operate at treetop heights and below. They use clearings for maneuver and "pop up" over the treeline to attack targets (rotors churning above the treeline are difficult targets for enemy radars to lock on), while the A-10s fly just above treetop level and rely on their greater speed to make use of terrain masking (A-10s can attain 450 mph, but in combat would probably fly at 300 to 350 mph).

One rather hairy aspect is that the A-10s currently have no electronic aids (such as radar altimeters or inertial navigation) to help keep them oriented, but rely entirely on pilot judgment, knowledge of the terrain, skill in map reading, and experience. Surprisingly enough, this is considered a plus by Warthog drivers, who actually enjoy an aircraft they can *fly*, instead of "zipping along above the clouds punching black boxes." A-10 flying training is "structured" to attain progressively lower altitudes with confidence.

Other faith-building features of the aircraft: the titanium armor "bathtub" that protects the pilot and the flight controls; the cockpit's head-up display that allows the pilot to acquire and attack targets without distraction from flying; and the aircraft's zero-zero ejection capability. (One Warthog pilot who lost his aircraft in the treetops punched out, landed by parachute, and walked away without a scratch.)

JAAT Communications

The key to successful JAAT operations, then, would seem to be communications. It is no accident that two of the three radios equipping the A-10 (VHF-AM and VHF-FM) are standard to Army forces. The ideal situation would be a face-to-face, full-fledged briefing of Air Force and Army participants prior to a JAAT operation, but a minimum briefing for A-10 pilots would concern the ground tactical situation, current and forecast weather, enemy air defense information, and FAC contacts. Update information could be received by A-10 flights en route to the operational area.

And what about enemy jamming? It is known that the Soviet Union and Warsaw Pact have devoted a generous portion of their resources to electronic warfare. So the jamming capability is there, but not all frequencies at once. By "succinct" use of frequencies, stepping to other frequencies, and perhaps the use of a prearranged sequence of frequencies, Warthog pilots believe that they can counter jamming. In any event, A-10 pilots say that once attack helicopter crews have worked with A-10s and are experienced in their methods, communications are not all that imperative, the single essential requirement of the A-10s being target map coordinates.

"We'll be on them like flies on a piece of sugar," says Major Terry. "We train with a two-plane formation that will separate to attack targets in the same area. And more than one 'two-ship' can be put in to work the same territory. As we complete our passes at standoff distances, the Cobras will rise out of the treeline, seemingly at random but under the direction of their team combat leaders, to continue the attack. The Cobras and A-10s could attack simultaneously if need be."

"While we are equipped with eleven hardpoints for various stores, we don't intend flyovers to drop bombs unless we know that the ADA has been taken out. Interdiction missions of that type would be in the extreme. We do have a secondary mission of area saturation in search and rescue of downed pilots, however.

"So under usual conditions we'll rely on our standard combat load of four Mavericks, which have a maximum effective range of 20,000 feet. Or we can hose down targets with our 30-mm GAU-8 Gatling gun at a pilot-selectable 2,100 or 4,200 rounds per minute," says Major Terry. (The A-10 was built around the GAU-8, developed by General Electric. As an indication of its prowess, a one-second burst puts seventy rounds on the target at a range in excess of 4,000 feet with the first rounds impacting on the target before the trigger is released.)

If something more than a two-ship element is used to attack targets in the same area, the first A-10 flight leader must coordinate in advance with the FAC(A), FFAC, and other flight leaders. This is because the various flights usually won't have visual contact with each other. Also, because timing is crucial in keeping the pressure on the enemy, the first flight leader into the target must inform succeeding flight leaders when

to attack. Individual aircraft maneuver within their sectors to attack on prebriefed time over target to vary attack headings.

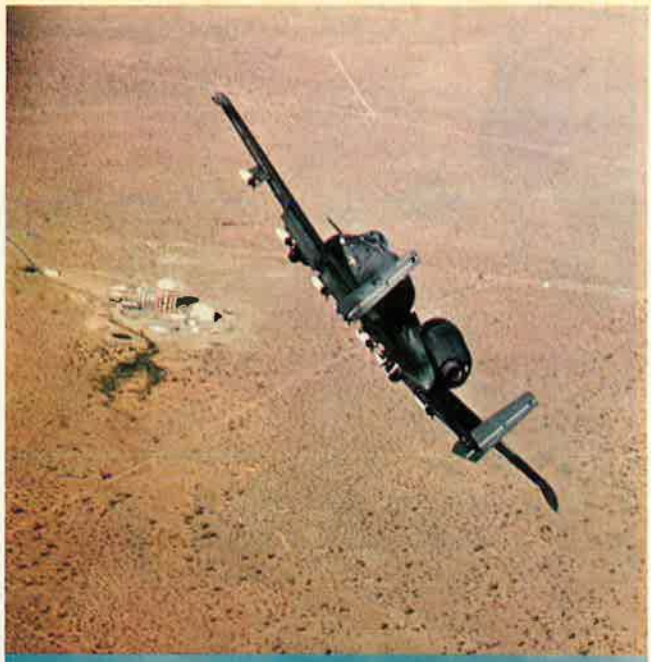
During these attacks, individual aircraft should maneuver to be as unpredictable as possible. In the two-ship formation, for example, the wingman must key off the flight leader and attack nearly simultaneously to maintain constant pressure.

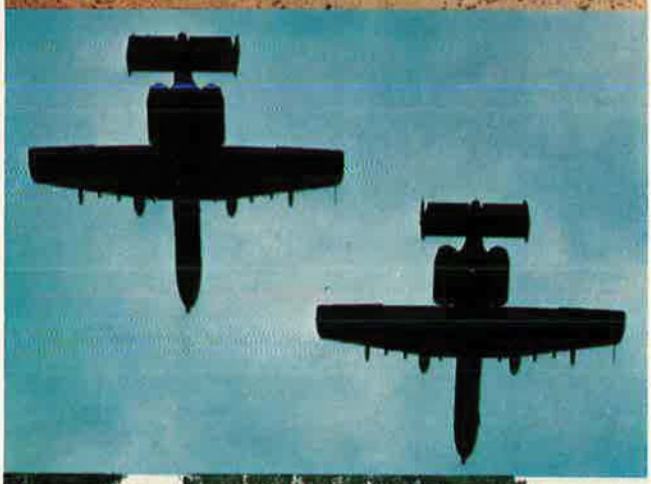
"Working with the helicopters, we are the jack-of-all-trades of close air support. Exercises have shown that the sum of the two parts is greater than the whole," says Captain Hill, "with kill ratios four or more times those of Cobras and A-10s working independently."

A Tough Airplane

"The A-10 is a very sturdy aircraft," says Captain Hill. "Two A-10s had a midair [collision] at Nellis AFB, Nev., in 1978 and both came home. While most airplanes have a single main wing spar, the A-10 has three. The aircraft has four self-sealing fuel tanks, each of which can be isolated if battle-damaged. Eighty-five percent of the aircraft's thrust is bypass air that never went through the engine, therefore creating less heat for an infrared threat to lock on. The twin tails also mask the exhaust. If both hydraulics control systems are knocked out, we can fly by wire. We're changing the camouflage paint scheme from sky gray to dark green as more effective against such dark backgrounds as woodlands. We have high-intensity flare and chaff-dispensing systems to confuse enemy missiles. And of course we'll be continuously jinking [rapid random changes in direction and attitude] in combat areas.

"If the aircraft is bullet-holed in combat, we can slap on some speed tape and continue to fly missions, unlike most other aircraft. We can plug holes with aluminum from beer cans if we have to," says Major Terry. "Working at a forward operating location [FOL], A-10 load crews have demonstrated the capability to simultaneously rearm and refuel in less than fifteen minutes from touchdown to liftoff, vs. about forty-five minutes for other fighters. This makes for high sortie rates. The plane has its own internal aux-



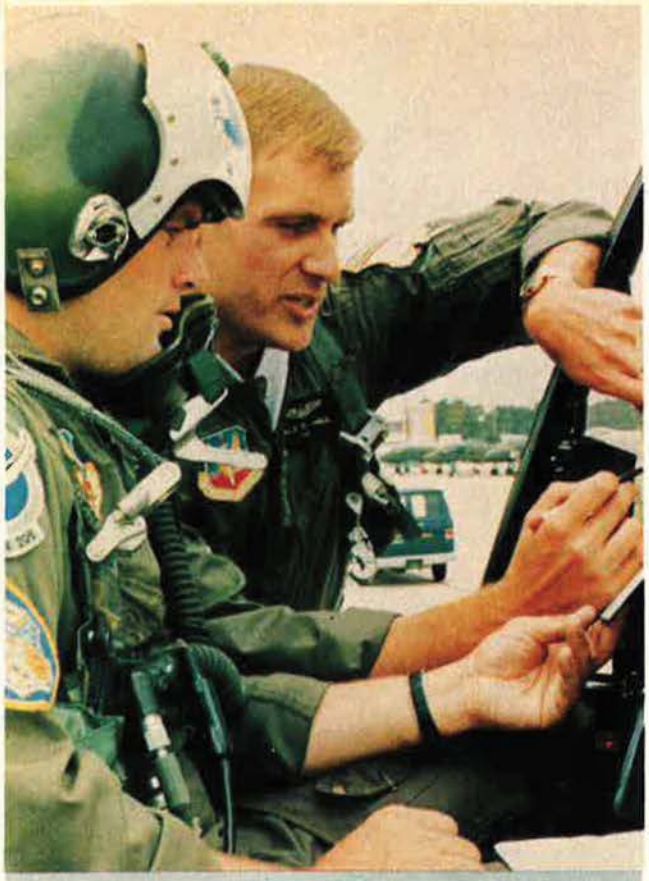


"Working with the helicopters, we're the jack-of-all-trades of close air support . . . the sum of the two parts is greater than the whole . . ."

Like the Army's attack helicopters, the A-10s will feint, mask, attack, withdraw, and attack again, making full use of terrain cover. A-10 pilots train in a "two-ship" formation for attack.

Warthog on taxiway at the proposed forward operating location training area at Myrtle Beach AFB, S. C., the first NATO-like FOLTA in the US. Working with the Hydra 1 ammunition loading system, the A-10 can be armed and turned around within fifteen minutes.

"If the aircraft is bullet-holed in combat, we can slap on some speed tape and continue to fly missions..."



Two Warthog pilots of the 354th Tactical Fighter Wing, Capt. Dale C. Hill, above, and Capt. Mike Madelen, discuss a mission. The Advanced Attack Helicopter, below, with night and weather capability, is being developed for US Army by Hughes Helicopters and should be operational by the mid-1980s.

iliary power unit for engine restarts, thus making it independent of ground equipment. It can also turn around on fifty-one feet—the length of its wingspan—of hard surface and can operate from 3,000-foot runways."

The two pilots also pointed out that the A-10's twin TF34 engines, also built by GE and protected by armor plating, provide enough thrust so that the aircraft could return to base if one were knocked out. Mounted independently above the fuselage, one engine could disintegrate without affecting the performance of the other. Their position helps to lessen foreign object ingestion, likely to be encountered when operating from rough fields.

Early Lessons

In the earlier exercises called JAWS (for Joint Attack Weapon Systems) to prove out Joint Air Attack Team concepts, a key lesson was learned: that for both the helicopter and A-10 components, low-level tactical navigation combined with terrain masking to minimize exposure was essential to keep loss rates down.

In those and subsequent exercises, Air Force personnel learned to "talk Army," while Army people learned to "talk fighter pilot," which fighter pilots insist is not the same as learning to "talk Air Force."

While "nap-of-the-earth" flying has its satisfactions for Warthog drivers as pilots, it is very fatiguing. Attention is engaged full-time, and, in jinking, pilots pull high Gs. These factors must be offset, the Air Force learned, with a higher pilot-to-aircraft ratio. USAF also learned that in JAAT tactics, the relatively slow speed of the A-10 was, in fact, an asset since the aircraft could remain in a contested area longer and had more time to acquire targets than high-speed fighters that "streaked in at 600 mph while taking a peek over the side to spot targets." Regardless of this, however, from Tactical Air Command's point of view the ideal would be for all of its tactical fighter pilots to have experience in JAAT tactics.

Thunderhog I

While the A-10 may be known officially as the Thunderbolt II, on the flight line it is affectionately called "Warthog." The two names were melded last October in a realistic training exercise at Myrtle Beach AFB dubbed "Thunderhog I."

Locally planned and directed by the 354th Tactical Fighter Wing, Thunderhog I simulated actual combat deployment, including a five-hour flight with aerial refueling, to what at Myrtle Beach AFB represented a bare base forward operating location a la Europe. The wing-wide exercise involved sortie surges of all three fighter squadrons on close support missions and was the most extensive of its type ever conducted by a TAC wing.

Thunderhog I was guided by a ten-day scenario created by wing intelligence. During the exercise, the 354th practiced for contingencies up to and including coming under air attack. Such warskill capabilities as ground security against insurgents and treating casualties were also put to the test. Wing personnel operated from a simulated deployed location on the base, were served at a field kitchen, and generally behaved as if it were the real thing.

So successful was the exercise that an even more ambitious Thunderhog II is being planned for this coming October, but with an interesting twist that has high potential. The 354th has on base a heavily wooded, 300-acre site. The site contains twenty-four dispersed hardstands linked by two and a half miles of taxiway. The facility was

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Today's military pilots need their on-board computers more than ever to help them navigate, automate weapons delivery, and access real-time mission information. This means the need to improve reliability and performance margins in avionics systems has increased. So has the need to reduce spiralling life-cycle costs.

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built during World War II and had long since stood abandoned.

The idea is to resurface five of the hardstands and a mile and a half of taxiway for an initial test of the area as an A-10 bare-base forward operating location as similar as possible to those in Europe *(see box)*.

If during Thunderhog II the surging of A-10s goes smoothly, and wing planners see no reason why it shouldn't, then the entire site will be developed as a Forward Operating Location Training Area (FOLTA) —the first in the US.

"When the FOLTA idea, the brainchild of Wing Commander Col. Michael P. C. Carns, was broached to TAC Commander Gen. W. L. Creech, the potentialities for such a training area were grasped immediately. Wing planners were told to 'think big,' " says Deputy Combat Support Group Commander Lt. Col. John P. Kelly, FOLTA project officer.

Instead of parked in rows on the flight line, aircraft would be dispersed throughout the area, with all the attendant problems of security, camouflage, maintenance, rearming, refueling, and communications. One important aspect would entail training pilots in the intricacies of command and control and taxi and takeoff timing. Also planned for later exercises in this area is the construction of a simulated TAB-V NATO-type aircraft shelter so that aircraft entrances and exits can be practiced.

Tent or semipermanent personnel shelters, maintenance, and field kitchen facilities will also be erected.

But that's not all. The potential exists for utilizing the FOLTA for other TAC units, flying the full range of the command's aircraft, to which they could deploy to demonstrate and hone readiness and also be put through their Operational Readiness Inspection (ORI) paces.

For the Future

Due at Myrtle Beach AFB in the near future is a totally digital A-10 simulator, the first building block of a system being designed to present an entire mission profile for the aircraft, including coming under attack by ground and air threats.

While not eagerly awaited by Warthog pilots—they like to fly—the cost- and energy-cutting simulator is designed to react as much like the aircraft as possible. In fact, A-10 pilot Capt. Jake Thorn has journeyed frequently to Reflectone of Tampa, Fla., to provide operational judgments during its construction. The simulator is expected to prove especially helpful in training novice A-10 pilots.

For its part, US Army is looking forward to the introduction of two new weapon systems that will be instrumental in the JAAT role: the Advanced Attack Helicopter (AAH) and the laser-guided Hellfire missile to arm it.

Billed as the Army's quickest reacting and mobile antitank weapon, the AAH, like the Cobra, will take full advantage of terrain masking. The AAH is equipped with a Target Acquisition Designation System and Pilot Night Vision System (TADS/PNVS), which permit it to navigate and attack in darkness and adverse weather. Twin engines and flight-system redundancy provide survivability. Designed to defeat armor, the AAH is also lethal against other targets with its 30-mm chain gun and 2.75-inch free-flight rockets.

When deployed in the mid-1980s, the AAH will be the Army's primary attack helicopter designed to move quickly to break up armored attacks and will be backed up and complemented by the Cobra.

The AAH is in full-scale engineering development, with Hughes Helicopters, Culver City, Calif., the prime contractor. GE of West Lynn, Mass., supplies the engines. Martin Marietta Corp., Orlando, Fla., recently was awarded the contract to provide the TADS/PNVS.

The AAH will be able to carry a total of sixteen Hellfire missiles or a combination of the weapons mentioned above. Hellfire is a third-generation antiarmor weapon, capable of ground- or air-launching. It will home in on a laser mark projected from a ground observer, from other aircraft, or from the launching aircraft itself. One follow-on seeker is planned that will allow the missile to find its target without outside designation. Hellfire is also in full-scale engineering development, with Rockwell International Corp., Columbus, Ohio, the prime contractor and Martin Marietta providing the guidance systems.

NATO's likelihood of accepting the first blow in a conventional conflict, coupled with the imbalance in armored forces, makes the development of such weapon systems, and their employment in such joint USAF/Army tactics as JAATs, an imperative for the US in the 1980s. ■

A-10-Equipped Air Force Units

The 354th Tactical Fighter Wing at Myrtle Beach AFB, S. C., is the only operational active-duty A-10-equipped wing in CONUS; the seventy-two Warthogs of its three fighter squadrons are heavily tasked for close support-type training missions all over the country. The 355th Tactical Training Wing, Davis-Monthan AFB, Ariz., was the first unit in the Air Force to receive A-10s, and is responsible for primary A-10 pilot training.

Also in the US, four Air National Guard units have been equipped with eighteen A-10s each: the 174th Tactical Fighter Wing, Syracuse, N. Y.; the 103d Tactical Fighter Group, Windsor Locks, Conn.; the 104th Tactical Fighter Group, Westfield, Mass.; and the 175th Tactical Fighter Group, Baltimore, Md.

At Barksdale AFB, La., the Air Force Reserve's 47th Tactical Fighter Squadron (917th TFG, 434th TFW) is currently transitioning from A-37s to twenty-four A-10s. On June 27, this became the first AFRES unit to receive an A-10 aircraft straight from the production line. And at Grissom AFB, Ind., the 45th TFS (also belonging to the 434th TFW) will convert to eighteen A-10s next year.

In Great Britain, at RAF Bentwaters/Woodbridge, is stationed the 81st Tactical Fighter Wing, a sort of superwing whose intended six squadrons will be equipped with a total of 108 Warthogs. The 81st's A-10s constantly rotate to forward operating locations at the US air base at Sembach, Germany, and three other German bases: Ahlhorn, Norvenich, and Leipheim. The FOLs, at which maintenance and turnaround detachments are stationed, are in a rough north-to-south line about 120 miles (193 km) from the West German border with the Warsaw Pact. The northerly bases, Ahlhorn and Norvenich, are in the 2d Allied Tactical Air Force area and, in the south, Sembach and Leipheim are in the 4th ATAF's territory.

The plan is for eight A-10s to be on hand at an FOL at any given time. Each of the 81st's six fighter squadrons has been assigned a border sector for thorough familiarization of terrain features. As with the 354th TFW in the US, the 81st is heavily tasked for close support training, including JAAT with Army Cobras, in Europe.

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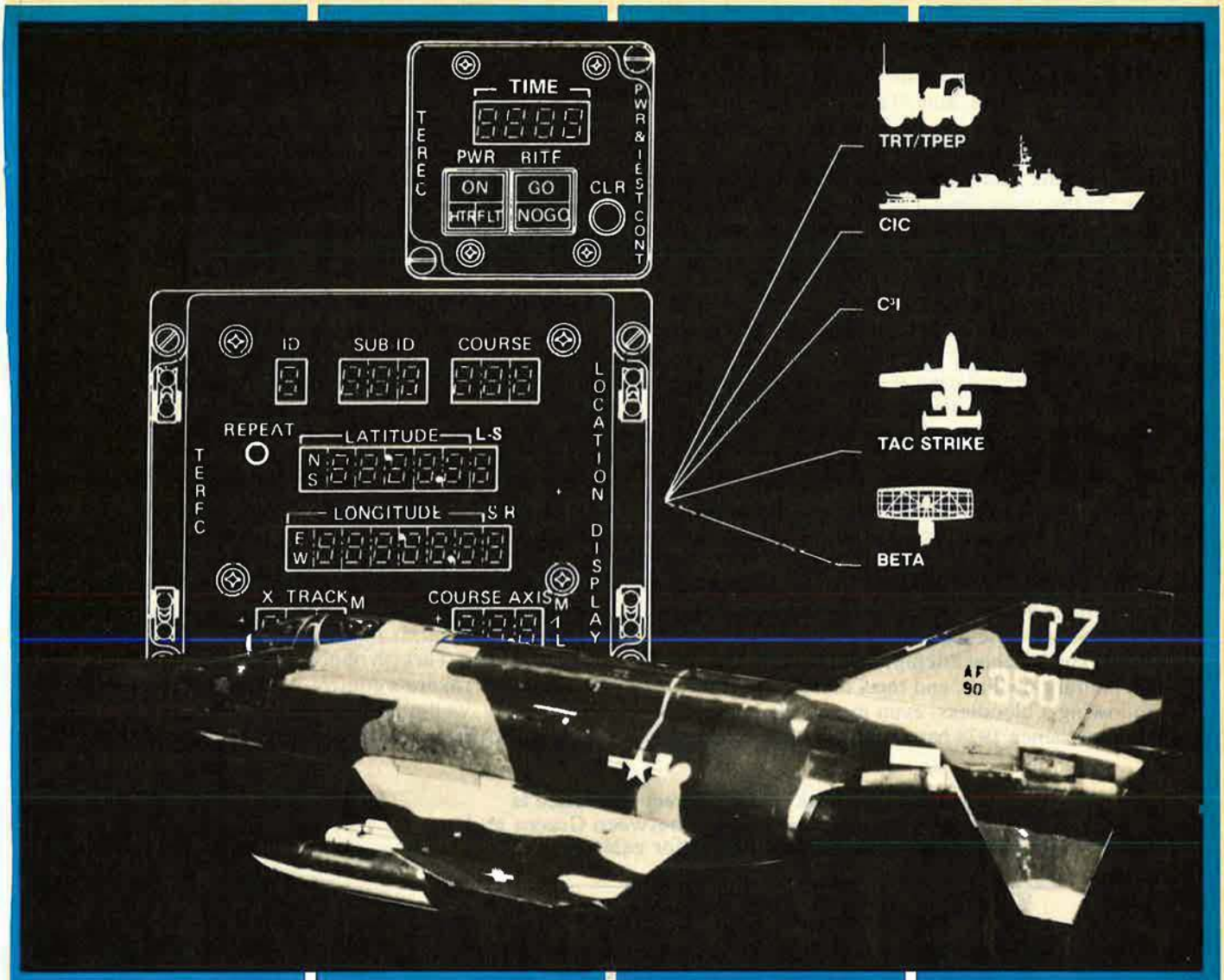

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On its southeastern flank, NATO's very existence is threatened by long-simmering tensions between Greece and Turkey. The outlook is not bright for easing . . .

The Eastern Mediterranean's Glum Situation

BY GEN. T. R. MILTON, USAF (RET.)

IN A recent poll on the quality of life in various cities, as viewed by American business people, Athens came in last. Despite the Acropolis, the glorious (if badly polluted) blue Aegean, and all the other admitted attractions of Athens, it is the last among ten, behind such places as Geneva, Brussels, Paris, and even New York. It is a curious commentary on how the world has evolved in the years since a savage civil war almost tore Greece apart. Harry Truman, supported by wiser counsel than seems to be on tap nowadays, came to Greece's aid in 1948, and the war had a happy ending.

Following those bloody civil war years, Athens became a tourist paradise, as well as a delightful place for more permanent exiles. The Colonels' coup in 1967 marked a new authoritarian era for Greece, although the coup itself—viewed in perspective—was really based on the persuasive grounds of keeping a far left and much worse government from coming to power. In any case, the Colonels ran things during their seven years with some disregard for the sensibilities, and sensitivities, of radicals and leftist opponents. And, as is often the case with military juntas, the soldiers became preoccupied with the business of governing. They neglected the source of their power, the Greek military forces, in their fascination for the new civilian responsibilities they had taken on. The botched attempt in Cyprus showed up this Greek military decline, and the Colonels shuffled off to jail following a bloodless, even meek, surrender.

The years since 1974 have seen Greek democracy restored with all the freedom, and difficulties, that democracy carries with it. Inflation, air pollution, traffic congestion, and Greek *amour propre* are all at new highs. When Lebanon turned from an uncommitted, and thus peaceful, Mideast oasis into a battleground, the money changers began to shift from Beirut to Athens. Now the city is busy, superficially at least, prosperous, and increasingly unattractive in the way of cities everywhere. If we are to believe the business poll, Athens is no longer even a moderately nice place to live.

The Aegean Question

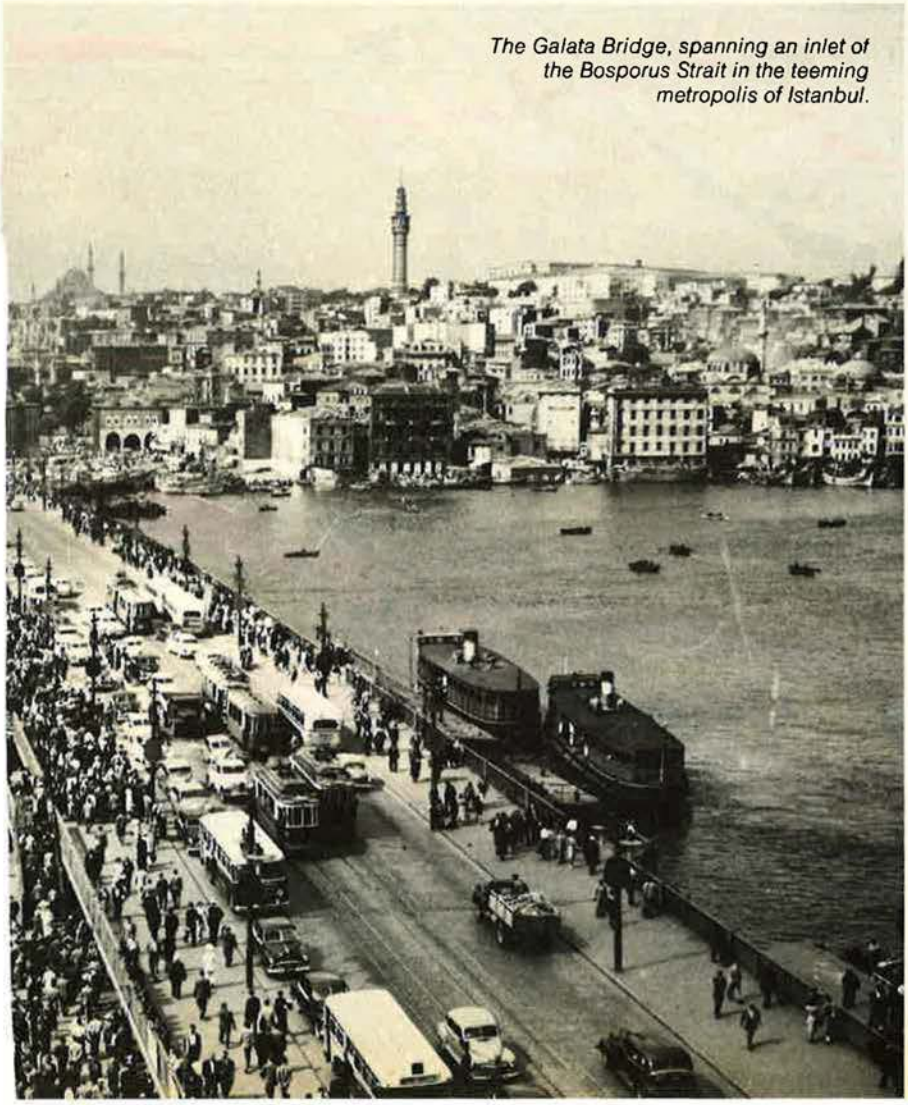
This still takes nothing away from the charm of the rest of Greece and those thousands of magic Greek islands. Unhappily, those same islands are a principal factor in Greece's unrelenting tension with Turkey, for it is the question of the Aegean islands, and not Cyprus, that is creating the present impasse. Cyprus does cause some difficulties, true enough, between the Greeks and the Turks, but these seem to be exaggerated with distance. Greek-Americans are more worked up over Cyprus, an island that appears to be prosperous enough despite the Turkish seizure of former Greek Cypriot land, than are the Cypriots themselves. The Greek Cypriot leader, Kyprianu, is reportedly difficult, if not actually irrational. His Turkish opposite number, Denktash, is at least under Ankara's control. Various self-assured if not necessarily well-qualified men of affairs, from Clark Clifford to Kurt Waldheim, have taken a crack at the

Cyprus problem without result, for the Turks are pragmatic people who have a historic understanding of the rights of conquest and the ritual of the bazaar. Whatever, Cyprus is not the main source of Greek-Turkish tension. That lies in the Aegean Sea and in the blue sky above it.

As the only immediately available placebo for Greek self-esteem, ailing as it was after the Cyprus debacle, the newly installed government of Konstantine Karamanlis (he has recently been elected President) took Greece out of the NATO integrated military structure. Greece thus became, like France, a sort of NATO member a la carte, privy to its councils, taking part in such activities as it chose, but under no obligation to join in the common defense. The penalty for this behavior is deprivation of NATO common funding for such things as air and naval bases, radars, and other expensive works. In Greece's case, unlike that of France, this does inflict a hardship on the Greek armed forces, who have benefited over the years from NATO contributions. Nevertheless, Karamanlis pulled Greece out. Greek pride was soothed, and the supposition was that Greece would wander back in, one way or another, after a few years in the outside world. This premise did not take into account the Turks, who saw a chance to right a wrong they had, in their opinion, submitted to in earlier and more ingenuous times. It has to do with control over the Aegean airspace.

Before Cyprus and the Greek walkout, control of air traffic over the Aegean Sea, and the military identification and, if necessary, interception of that traffic rested with Greece. The FIR—or Flight Information Region—line encompassed the almost countless Greek islands. The line thus gets within a mile or less, in places, of the Turkish coast. To offset this Greek advantage over Turkey, NATO established land and air headquarters in Izmir—the Smyrna of Homer's day—under the command of United States Army and Air Force generals. We were the honest brokers in those years before Cyprus, and the headquarters in Izmir were manned jointly by Greek, Turkish, and US military people. The main purpose of these headquarters was to remind both Greece and Turkey of their status as allies against the greater threat from the Soviet Union. Most years the scheme worked, although the Greeks walked out from time to time in response to some Turkish-Greek flareup, usually over Cyprus. But, on the whole, the device of having the Sixth Allied Tactical Air Force Headquarters on Turkish soil at Izmir worked. Turkey accepted Greece's responsibility, if not its sovereignty, over the Aegean.

With Greece's withdrawal from the NATO military structure, the whole fragile framework came unglued. There was no longer a need for the presumably neutral United States commanders in Izmir. They were supplanted by decidedly non-neutral Turkish NATO generals, who now have somewhat subdued, and lower-ranking American generals as their deputies. The



The Galata Bridge, spanning an inlet of the Bosporus Strait in the teeming metropolis of Istanbul.

. . . the headquarters in Izmir were manned jointly by Greek, Turkish, and US military people. The main purpose of these headquarters was to remind both Greece and Turkey of their status as allies against the greater threat from the Soviet Union.

Camel overhead! Gunfire from below! As the Red Baron fell, a new concept of air combat was taking shape.

Who actually downed the legendary Baron Manfred von Richthofen on 21 April 1918? Even though RAF pilot Capt. A.R. "Roy" Brown received credit, did he really fire the fatal shot as he believed? If so, how could von Richthofen continue flying for more than a minute with a chest wound that should have been fatal in seconds?

If instead, a ground gunner did it, then which one? A rifleman? Antiaircraft artilleryman? Machine gunner?

The question may never be totally, positively answered. But there's no dispute that air warfare has changed greatly since that memorable World War I battle. Combat in the skies has become more tightly controlled and disciplined. And of course planes have grown larger, stronger, faster...able to perform a host of missions.

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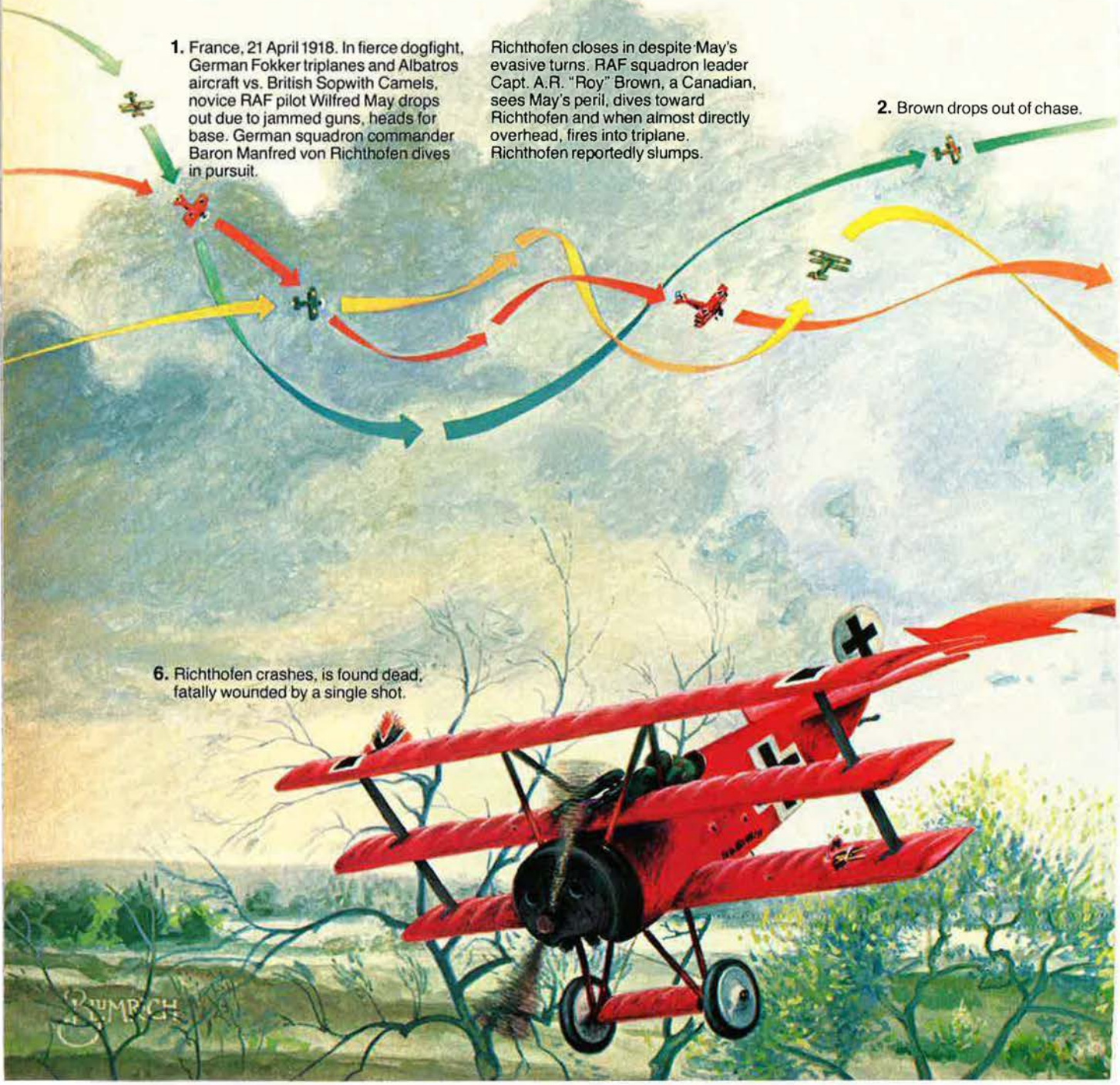

With this information, the F-4G fighter crew can then take appropriate action.

Other high-performance aircraft, too, gain increased effectiveness from IBM systems. The Navy's F-14 has one that displays navigation, target and weapons delivery information in an easy-to-grasp presentation. We're also aboard the Air Superiority F-15 Eagle, the F-111D and F, the A-7D/E Air Force/Navy craft, and others.

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3. Richthofen continues gaining on May, passing over fire from Australian riflemen, machine gunners and anti-aircraft batteries. Pieces of triplane reportedly break off.

4. May returns to base at Bertangles.

5. Richthofen's triplane turns unsteadily, swerves, heads downward.

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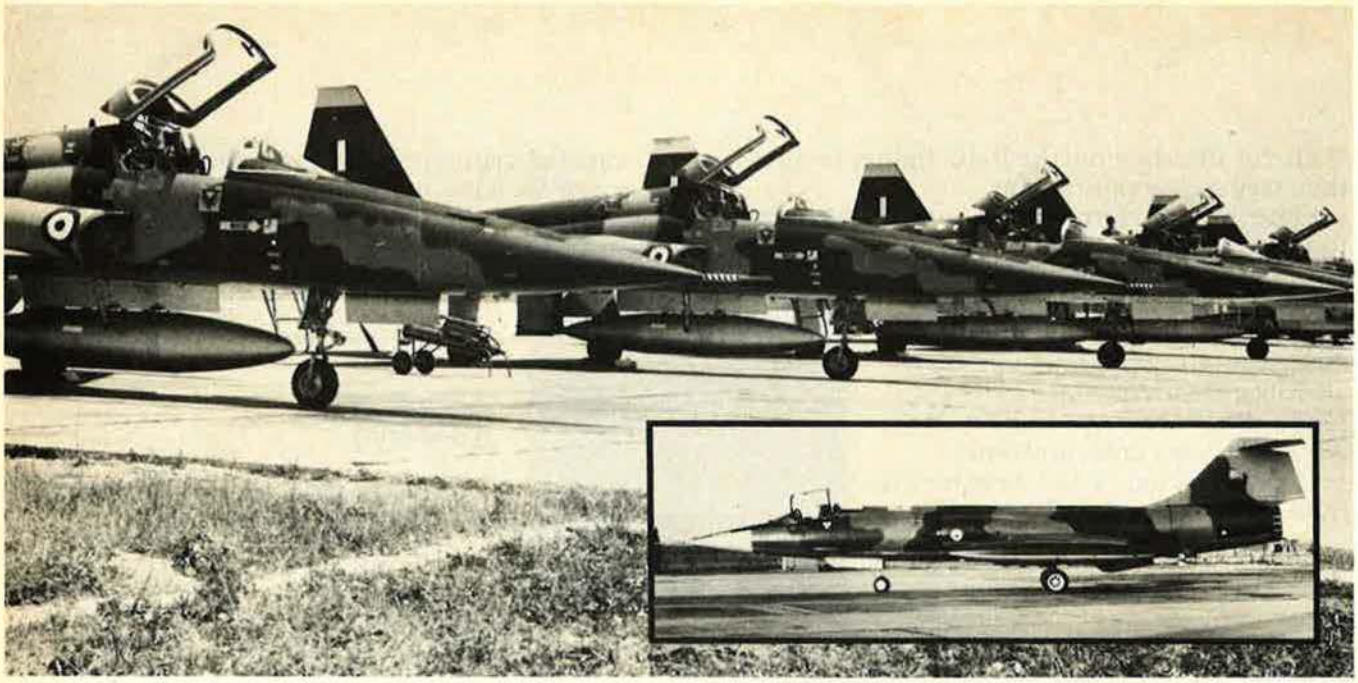

Northrop F-5 Freedom Fighter aircraft of the Hellenic Air Force lined up on the ramp. In the inset is an F-104 of the Turkish Air Force. Tension between Greece and Turkey is reflected by incidents of their aircraft sparring in the Aegean skies.

Aegean airspace deal is off as well. Turkey wants a more even division of the air above the Aegean. Since any line that puts the sky above a Greek island under Turkish control has some alarming connotations for Greek sovereignty, this proposal is unacceptable to Greece. There have been various compromises cobbled up, mostly revolving around the creation of equal air headquarters in Greece and Turkey with a new United States headquarters sitting on top of both. If not exactly Delphic, it is a Solomon-like solution, but so far no dice. The FIR line must stay where it is, say the Greeks, and it must move, say the Turks.

The issue is potentially explosive. Last May, NATO held one of its major exercises, Dawn Patrol, in the Aegean. In the course of the exercise, Turkish and American airplanes were aggressively intercepted by Greek fighters, some of them incorporating dry firing passes into what were allegedly identification runs. Nothing much came of this incident save a battle of NOTAMS and a Turkish vow not to let it happen again without some reaction. The Aegean, in short, is a dangerous place for what remains of allied cooperation on the Southern Flank. It is too bad for everyone on our side, this conjured-up threat of Greece vs. Turkey, because it is destroying NATO in the eastern Mediterranean. The fact that neither Greece nor Turkey is in any shape to take on the other seems to have no bearing on the situation. Turkey's Aegean Army, for instance, consists of two poorly equipped brigades and no real amphibious capability. As for Greece, it would be insane to contemplate an attack on Turkey with the present Greek forces. They would both be better off, and so would we all, if they would direct their attention toward the real threat. That day may come again, but not, evidently, very soon.

Turkey—Bases and Economics

If Athens is the last of ten, then it would be uncharitable even to guess where Ankara would land on a list of however many cities rated as to quality of life for foreigners. The climate in Ankara—cold and raw in the winter, hot and dusty in the summer—is not benign, but climate is not the principal virtue of many cities. It is the other aggravations in the form of fuel shortages, and thus no heat, frequent electricity outages, and thus no air-conditioning, that call attention to Ankara's climate. And there are the strikes, further visible symptoms of Turkish economic troubles, which complicate life in Turkey these days. Turkish Airlines were going back to work toward the end of May after two months on the ground. During that time, just getting from Ankara to Istanbul was no easy job, and getting around the rest of Turkey was an adventure. The hotels go on strike, with little warning and total inconvenience to the trapped guests. And then, of course, there are the terrorists, a mindless group of assassins bent simply on political disruption through random murder. Ankara is no garden spot for foreigners or, these days, for Turks either.

Nonetheless, it is the capital of an ally, one that remains strongly tied to the United States in spite of the cavalier treatment we accorded Turkey during the arms embargo.

The base agreement signed late last spring gives the United States use of the Turkish facilities for another five years. It is not by any means unrestricted use. Anything beyond activities in support of NATO, like using Adana, for example, as a staging base for Mideast operations, must be negotiated separately on a case by case basis. Nonetheless, the agreement is signed, and it is significant to remember that it was negotiated with the government of Bulent Ecevit and signed after his successor and bitter rival, Suleiman Demirel, came to power.

Any power in Turkey is pretty shaky these days, and dependent on an uncertain coalition, but the point remains clear: Turkey is an ally and friend of ours, no matter what her internal problems, unless we will it otherwise by a few more actions like the embargo. As further proof, the Turkish boycott of the Olympics was not an easy thing for a nation on the Soviet border to do. The announcement of the Olympic decision came soon after most of our NATO allies had decided to go to Moscow and also after, it is fair to note, the abortive rescue attempt in Iran.

At any rate, Turkey is in a state of ferment. Seven people a day are murdered by terrorists. Until recently, the hit squads had kept their victims random and politically insignificant. Now, the pattern is changing with the attack on a Turkish major general and another, a week or so later, on a leader of the far right party. There is enough evidence of one kind or another to link these Turkish assassins to similar groups in Italy, Germany, and Lebanon.

The weapons they use mainly come in from Eastern Europe across the Black Sea, the Syrian frontier, and through the crowded border control points in Turkish Thrace. Getting weapons is no problem for terrorists. As for money to support their pursuits—transportation, safe houses, and just plain living expenses—it seems to come from Eastern Europe as well. Like their comrades in Italy and elsewhere, these Turkish terrorists are organized into small cells that have minimum contact with, and knowledge of, the rest of the network. And like political terrorists elsewhere, their aim is the destruction of the existing society, in this case Turkish democracy.

The mindless and random murders begin to make sense if their purpose is to bring about, in desperation, a military government, hence providing a rallying cause for revolution. The near paralysis of the parliament in these critical times must be encouraging to these violent people of the left, for the plain fact is that Turkey's present form of democracy is proving too divisive and inefficient. In recognition of this fact there is a proposal to remodel the government along the lines of de Gaulle's France, which would, among other things, give a popularly elected President the kind of authority needed in the present crisis. However, so far, there is no visible enthusiasm for this constitutional revision.

Turkey has had no President since the retirement of President Koruturk several months ago. The parliament, typically, cannot agree on his successor. Meanwhile, the Army, which sees itself as the guardian of Ataturk's revolution, will be most reluctant to seize power no matter how grave the situation. Tough notes to the politicians to get on with the job are one thing, and the Army has no problem doing that, but the generals shy away from taking over. It is probably this reluctance that has caused the terrorists to raise the stakes by making a general a target.

Nineteen of Turkey's sixty-seven provinces are now under martial law, as they have been for several years, and the violence is growing. Beyond that, martial law is having a debilitating effect upon the army itself. Young conscripts spend most of their twenty months padding the sidewalks on police duty rather than learning military skills, to say nothing of the disillusionment that must come with learning the enemy is within and not on the Soviet border.

Meanwhile, there is still some lingering disappointment with our restored military sales program after the four-year embargo. The Turks are beginning to understand that we are no longer the rich uncle we once were, and so they have a grudging acceptance of our inability to furnish everything they want when they want it. They cannot accept, however, what seems to be our usurious approach to training costs in the United States. It is a sore point and one that may do harm out of all proportion to whatever piddling amount this policy returns to the Treasury.

In all the troubled years of NATO's existence in the eastern Med, these, since 1974, are the worst. Always before, the trouble in Cyprus was potential and, one way or another, warded off. Now the Turkish Army is on that island, and it is not going to leave quietly, with a return to things as they were before. Unquestionably, the best Greece can hope for in the way of a Cyprus agreement is an improvement of their present situation there, certainly not a return to the status before 1974. If Greece cannot swallow that, then it is a fair guess that Turkey will continue to hang on to what it has.

The real problem remains the Aegean, one that is even harder to unravel. Since the earliest days of NATO it has been impossible to arrive at an agreed-on naval boundary in the Aegean between Greece and Turkey. Sensible people, in fact, have long since turned their attention to other, and more solvable, problems. Now the airspace has joined the ocean below it as something to be boundaried. Even with the best of good will on the part of everyone concerned, this would be extremely difficult, and, as we have noted, there is scarcely any good will at all. Maybe, like the naval boundaries, this one will also end up in limbo.

All of which gives rise to a question about the future of NATO itself in the eastern Mediterranean. On the face of things, that future is not bright. ■

Gen. T. R. Milton graduated from West Point in 1940 and commanded bombing units in Europe during World War II. His later service included command of the 41st Air Division and of Thirteenth Air Force. He was also Chief of Staff of Tactical Air Command, Comptroller of the Air Force, and—just before his 1974 retirement—US Representative to the NATO Military Committee. He is a regular contributor to AIR FORCE Magazine.

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Despite problems and pitfalls, US companies are cooperating more than ever with European partners to develop aerospace systems to meet present and future requirements. The trend is called . . .

Transatlantic Codevelopment

BY F. CLIFTON BERRY, JR., EDITOR

COOPERATIVE DEVELOPMENT of aerospace projects is a trend under way among European companies and nations for two decades. It has spread to US companies and the US government only within the past few years, and is just now gathering strong momentum. Partly, the reason for this increasing transatlantic cooperation is military utility; that is, a desire for increasing the interoperability and standardization among weapon systems of the allies. In addition, the economic motivations are strong: to achieve a development program together that might be too expensive for one partner alone; to gain access to markets heretofore dominated by someone else; and to enjoy the benefits of advanced technology transfer. Political benefits can accrue through multinational development programs also, if the pitfalls are recognized and understood early enough to be taken into account.

Because more US companies—and the US armed services—are participating in multinational weapon development programs, it seems time to highlight typical cases, the better to understand the trend. Also, some appreciation of the obstacles to codevelopment is useful, so that false or unrealistic expectations can be avoided. In last month's issue, several European collaborative projects were sketched out (*see article beginning on p. 62 of August issue*). In this survey, examples of US-European codevelopment projects are highlighted, along with acknowledgment of the special problems attendant on them.

Different "Business as Usual"

USAF's Lt. Gen. Kelly H. Burke, its Deputy Chief of Staff for Research, Development and Acquisition, says: "The Air Force is at the forefront of the Department of Defense effort to strengthen the Western alliance through increased de-

fense material standardization and interoperability, and exchange of R&D technology." He cites the F-16 Fighting Falcon coproduction program as "a success from whatever perspective you measure it."

General Burke also notes that USAF "business as usual" now routinely includes "consideration of our foreign allies' capabilities in technology and production, especially in NATO." The goals are not artificial, General Burke notes, sought solely as politically useful window-dressing. He says their purpose is "to provide an increased industrial base within the alliance through better allocation of available funds."

Referring to the F-16 program, General Burke says that it provides a cost-effective weapon system, and increased defense for the collective budgets involved. He points to increased jobs on both sides of the Atlantic, saying: "The question of jobs cannot be taken too lightly. We find that in all discussion of cooperative development with our allies after resolving the questions of technology transfer, standardization, interoperability, and security, the impact of jobs is still a sensitive issue."

Europeans are sensitive to the jobs issue, of course. But transatlantic cooperation requires a realization that they also see the US with its stronger resources and more advanced technology base as less motivated economically to codevelop weapon systems. In the view of some observers, these factors make it difficult to reach equitable accommodations, either with the United States government alone, or with US companies and the government.

Principal European Concerns

The General Accounting Office (GAO) surveyed several European governments and aerospace industry sources in their countries to pin down their perspectives on weapon codevelopment. According to the GAO, the "principal impediments Europeans see are":

- US domination of joint ventures, relegating European partners to junior status;
- Restrictive US arms export policies and strings on third-country sales;
- US restrictions on technology transfer; and
- Doubts whether the US Congress (and Defense Department) will compromise on present weapon acquisition processes.

The GAO notes that the first problem can be solved through mutually satisfactory development of agreements before programs begin. The remaining three require changes to current US policy and procurement practices. Until now, the US government has been handling codevelopment situations on an ad hoc, case-by-case basis, granting waivers and exceptions as appropriate and feasible. That won't do for the long term, says the GAO: " . . . the United States should prepare for the day when weapon systems codevelopment programs with members of the alliance will become more prevalent." Noting that several initiatives have started, the GAO says, "A rethinking of arms sales and technology transfer policies is in order. Procurement regulations and practices conceived for the domestic environment should also be reviewed from the standpoint of their applicability to transatlantic codevelopment undertakings."

A cautionary note from the GAO, however: it believes that changes to US laws, regulations, and policies should be made only after "studying the effect they could have on national objectives related to national security, the balance of payments, the industrial base, and the transfer of technology." It urges the President to identify and propose changes needed to facilitate transatlantic codevelopment, and to appoint a high-level group to carry out the task.

The GAO cites examples of obstacles at the high national policy level. But practical administrative problems impeded smooth functioning of cooperative projects. An example from the 1979 activity around the Enhanced Tactical Fighter (ETF) program suffices. Grumman Aerospace and British Aerospace planned to team up in the competition. British Aerospace was to send a group of experts to Grumman to work jointly on the response to the USAF call for submissions from interested parties. Suspense time for responses was sixty days. However, processing time for the British visitors to be cleared to enter the Grumman plant was more than six weeks.

This predicament was cited by a British official to Dr. Walter P. LaBerge, the Principal Deputy Under Secretary of Defense, Research and Engineering. Dr. LaBerge said, "Sometimes it's hard to point the bureaucracy in the same direction as the policy."

Another impediment to multinational cooperation is more conceptual than bureaucratic. A British executive draws an analogy to contrast the civil and military aviation markets. He says, "Before you start up a civil aircraft program, you assess the market. With military aircraft, you first assess the threat." The problem in Europe, however, is this: the "NATO threat" is different from the "US threat" or the "British threat," and so on. That is, each nation has its own idea of the threat. It holds that very closely, and is unwilling to release it to foreign aircraft development partners. The result, in this official's view, is an agreed-upon "NATO threat," that is nothing more than a collection of platitudes of little value in developing an aircraft suitable for several NATO nations' use.

Progress, Not Problems

If only the problems were considered, very little progress would be made. However, there has been more progress in transatlantic cooperative development than one would guess. While the problems have been highlighted and the rhetoric has concentrated on the multisyllabic rationalization, standardization, and interoperability, many real programs have begun and are moving along. Lt. Gen. Kelly Burke cited the F-16 fighter program. He also says the NATO AWACS airplane, the Navstar Global Positioning System, and joint pilot training programs *(see p. 27)* "offer us the opportunity for greater defense capability through standardization." He mentions others, cited in congressional testimony by other Defense Department officials: the "family of weapons" approach, for instance, on the AMRAAM and ASRAAM programs, among others. General Burke mentions the KC-135 aerial

TOP: Under Secretary LaBerge: "Point the bureaucracy in the same direction as the policy." BELOW: The Vought/VFW concept for the Next Generation Trainer program.

tanker reengining with the CFM International CFM56 engine, and then says, "Our replacement Next Generation Trainer program is open to foreign sources. A US-foreign team [Vought and VFW] was awarded a study contract for competition of the requirement."

NGT Cooperation

The purpose of USAF's Next Generation Trainer (NGT) program is to provide a successor to the present Cessna T-37B "Tweety Bird" as its primary trainer aircraft. Five semifinalists remain in the competition after an initial cut: Cessna, Fairchild Republic, General Dynamics, Vought, and Rockwell. They all are performing study contracts, with results due to USAF in mid-October.

The Air Force has stated a preference for twin-engine power and side-by-side seating in the NGT. Cessna plans to upgrade its T-37B into a new T-37D model. Fairchild, General Dynamics, and Rockwell are contemplating new designs. Vought is teaming with a German company to offer a modification of a proved concept, the Fantrainer. Vought's partner is Vereinigte Flugtechnishe Werke (VFW), and its subsidiary Rhein-Flugzeugbau (RFB) of Bremen.

"The Fantrainer already has incorporated such desirable features as maintainability, accessibility of components, and low specific fuel consumption," says Robert J. Patton, Vought's Vice President for Aircraft Development Engineering. In modifying the tandem-seat Fantrainer to the NGT requirement, Patton says Vought and VFW/RFB are "utilizing the unique concept and data base developed in the Fantrainer over the past ten years," and applying the results to be fully responsive to USAF needs for the primary pilot training mission.

Structure of the development team is very simple. VFW is to be Vought's subcontractor, with work performed by its RFB subsidiary. About fifty percent of the nonpurchased parts (about twenty-five percent of costs) will be made by RFB, the remainder by Vought. Assembly will occur at Vought's Dallas plant. In preparing the proposal for USAF that resulted in the current award, a group from VFW/RFB worked as part of the Vought team. A VFW/RFB group continues at Vought in the present phase of the competition.

Should the Fantrainer become USAF's answer to the NGT requirement, at least 600 aircraft are expected to be produced for it. The world market could be much larger. Vought and VFW have agreed that marketing rights will be retained by Vought, but actual marketing efforts will depend on each partner's past classical marketing areas, in order to capitalize on strength and experience.

When asked whether the NGT effort foretells other transatlantic collaborative projects by his company, Patton says, "Yes. We are very interested in furthering international arrangements like this."

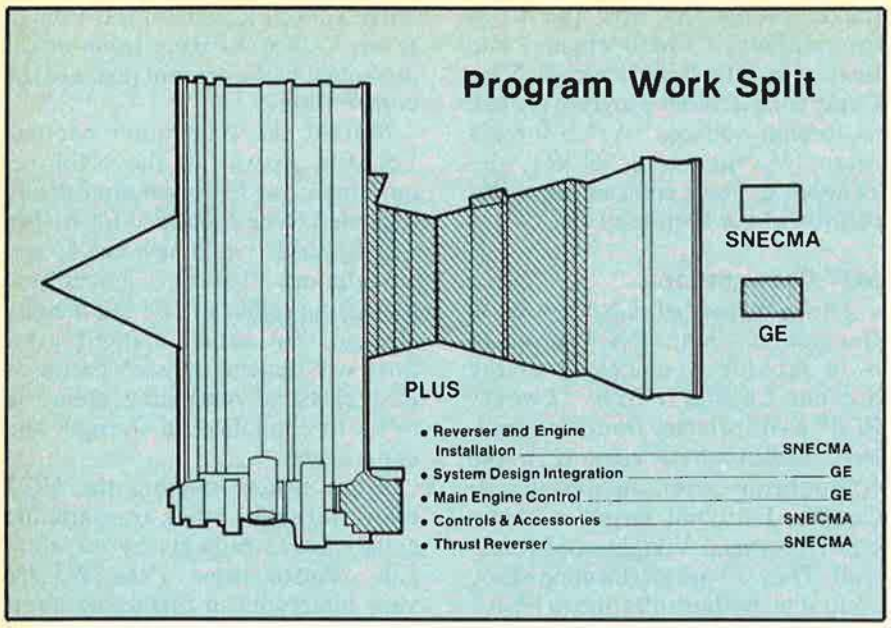
The International Engine

Mentioned by General Burke was the CFM56 engine, to be retrofitted into the KC-135 aerial tankers. It is the product of CFM International, a joint company incorporated by SNECMA in France and General Electric in the US. Each of the parent companies has fifty percent ownership of CFM International, and they split revenues on a fifty-fifty basis. Richard P. Taylor is Director, Military Programs, for CFM International.

Mr. Taylor tells the background of the collaboration. SNECMA, the French company, was primarily military-oriented and wanted to branch into more commercial business. General Electric had identified a gap in the commercial jet engine market in the "ten-ton" region (20,000 pounds of thrust), and wanted to do more international business. After a SNECMA competition, in which GE prevailed over Rolls-Royce and Pratt & Whitney, the parent companies formed CFM International. Then they developed the CFM56 engine together.

The CFM56 was jointly certified by the Federal Aviation Administration and France's counterpart agency, the DGAC. Each accepted the other's witnessing of test results, speeding up the process and preventing duplication.

As for the company structure, Dick Taylor says that its staff is purposely kept quite small (forty



CFM 56 work is split about fifty-fifty between GE and SNECMA; so are revenues, with pricing based on the competitive marketplace.

persons or fewer). Both parent companies are totally liable for guaranteeing performance of their offspring, a reassurance for customers worldwide. The engine work is split about fifty-fifty, but the US-French split is about sixty-five to thirty-five, because some of the components in the CFM56 engines from SNECMA are actually furnished by other US suppliers. Also, about seventy-five percent of the spares support is GE, and twenty-five percent SNECMA. As mentioned, the revenues are split fifty-fifty, with the agreement containing provisions for corrections when the dollar-franc exchange rate ventures outside agreed limits.

The CFM56 has been selected for reengining the KC-135 fleet, and a mutually-funded flight test program is under way on one of Boeing's 707 aircraft. The KC-135 fleet totals about 600 airplanes, of which 128 are Air Guard or Reserve. Dick Taylor cites the commercial market for the CFM56, which for the moment is concentrated on reengining Douglas DC-8 aircraft. CFM International has orders and options to provide engines for eighty-eight aircraft (sixty-nine firm and nineteen options), with forty-plus more in negotiation. An additional military market for the CFM56 engine could be the Navy's eventual replacement for its present C-130 TACAMO aircraft.

Mr. Taylor makes two points considered important to the success of the CFM56 program to date. First, it is based on successful commercial programs, not government-to-government memoranda of understanding. In consequence, the incentive is to be cost-competitive. The second point, pricing, flows from that. Pricing is based on competition in the marketplace, not on costs plus markup. Both features keep the program competitive.

Commercial Transport

Edward G. Uhl, Chairman of the Board of Fairchild Industries, calls the Fairchild-Saab commuter airliner project "the first joint commercial aircraft development, production, and marketing program between European and American corporations." It aims to develop and produce an aircraft with thirty-plus seats, using proven engines and aimed at the world short-haul market. Another company official calls it the "first-ever aircraft design-through-marketing cooperative effort between a US and a foreign company."

Although aimed at the commuter airline market for the start, a Fairchild official says that the transport could be suitable for military use, and the potential military transport market is kept well in mind in the design process.

The program is broken into four major phases, with Phase One almost completed. It runs from January through September. Its purpose is to firm up all design specifications and freeze the design. That includes selection of the engines. The General Electric CT7 has been picked. It is the commercial version of GE's T700 engine in the Army's Blackhawk and Advanced Attack helicopters, and Navy's LAMPS helicopters. Phase One is being done in the design engineering section at Fairchild Republic, directed by Raul Benedicto. His deputy is Ulf Edlund of Saab of Sweden. About 100 engineers are working on the project, about evenly divided between Fairchild and Saab.

Phase Two begins in October. A Swedish Project Director is to be named, with an American deputy from Fairchild. They will take the program through prototype, flight test, and certification—in both Sweden and the US.

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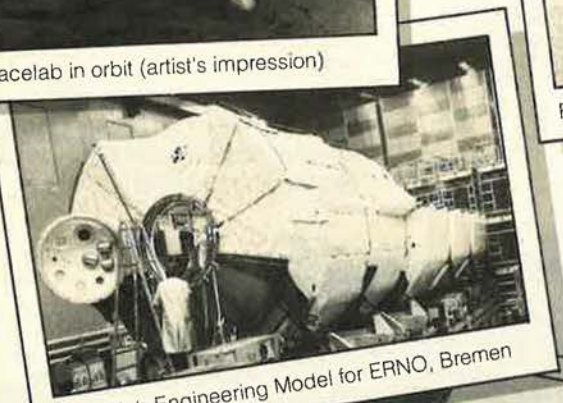
Spacelab in orbit (artist's impression)

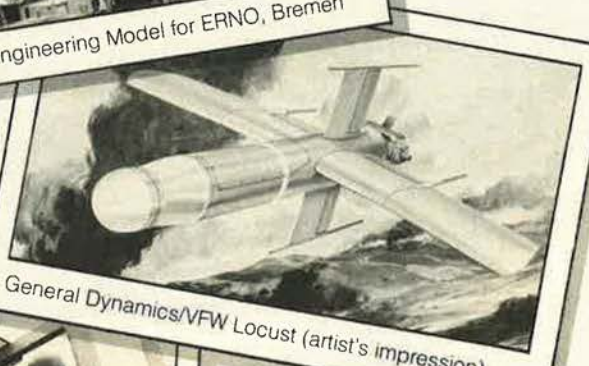
Fantrainer 400

The Vought/VFW entry for NGT



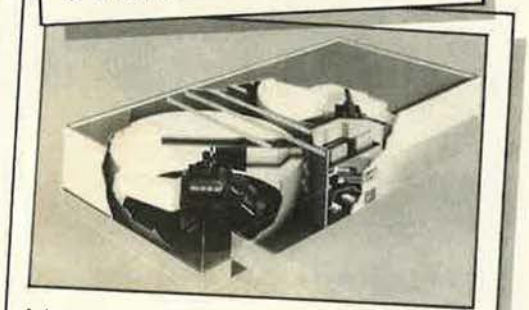
Spacelab Engineering Model for ERNO, Bremen

VFW nautical simulator for Norway



General Dynamics/VFW Locust (artist's impression)

Locust in launch container



Advanced nautical simulator (artist's impression)

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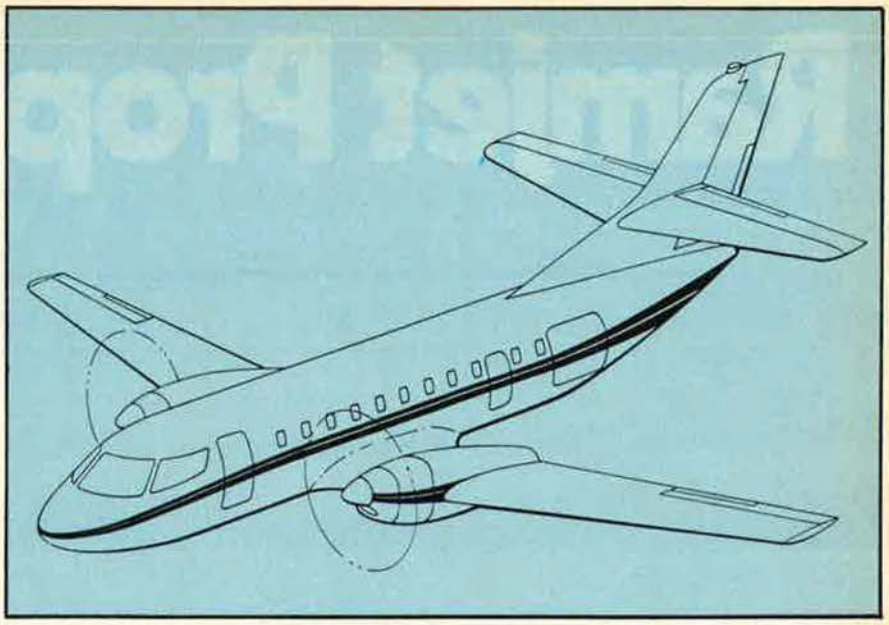
duction. Production work will be divided about fifty-fifty. Fairchild Republic will build the plane's wings, empennage, and nacelles. Saab will build the fuselage. Final assembly and flight test will take place at Saab's Linköping plant in Sweden. Aircraft destined for North American customers will be flown "green" (insides bare) to the US and fitted out at Fairchild's Swearingen subsidiary in San Antonio, Tex.

Phase Four is marketing, and occurs concurrently with the first three. The world market is split into North America, where Fairchild sells, and the rest of the world, sold by Saab. For marketing "the rest of the world," the partners have set up a jointly-owned Swedish company in Paris, headed by Alan R. Buley, former president of VFW. The North American marketing will be handled out of Swearingen in San Antonio. Sales revenues will be shared on a fifty-fifty basis, regardless of origin.



Phase One of the Fairchild-Saab 340 commuter transport ends in September, with final design completed. This is an artist's concept prepared early in Phase One.

Other Programs

A quick survey turns up scores of cooperative projects, either actual or contemplated, and both military and commercial. Only two more examples will be cited—one in electronics and the other in advanced structures for airframes.

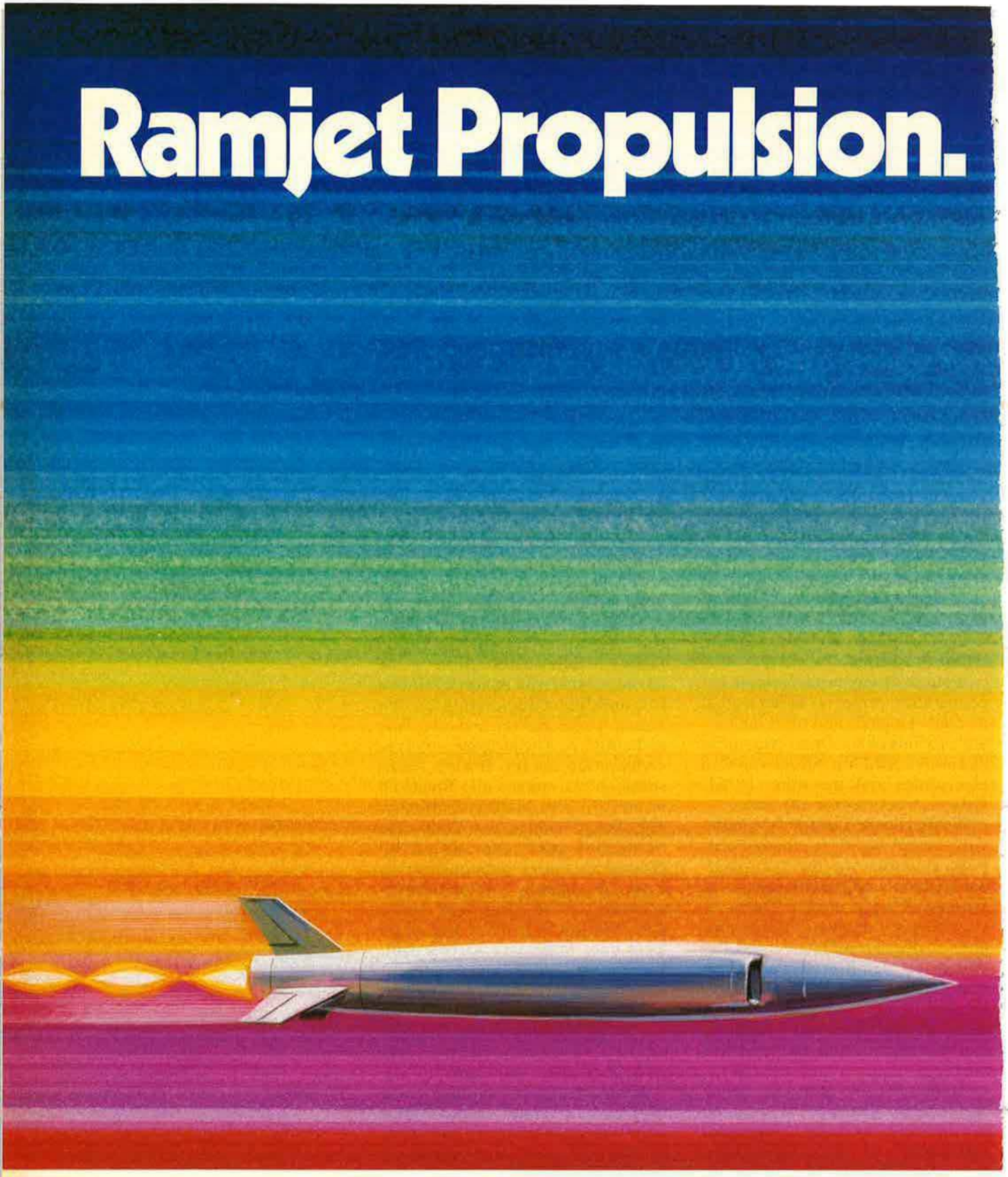
Westinghouse Electric is teaming with companies from three European countries for the UKADGE competition. UKADGE stands for United Kingdom Air Defense Ground Environment. It is a program to upgrade and modernize the British air defense network. The four-nation team is in competition for the NATO program, which could eventually result in similar work throughout the entire NATO area.

Among the four partners, Westinghouse is responsible for program management, systems integration, and digital and voice communications. SINTRA of France will handle applications software for the data-handling systems. Hollandse Signaal Aparaten of the Netherlands deals with the man-machine interface portion of the work, and Great Britain's International Computers Limited (ICL) is responsible for data-handling system hardware and the executive software. The program is in the later stages of competition, leading to award of the program contracts soon.

An example of cooperative development of advanced structures for aircraft manufacture is under way at British Aerospace's Warton facility. There, carbon fiber is the advanced material being developed for building components of the Jaguar strike fighter and the Tornado MRCA. The program involves cooperation among British Aerospace and Grumman and Rockwell in the US, plus MBB in Germany. The Jaguar engine bay doors are being designed and tooled by Grumman under subcontract to BAe. Grumman will go on to manufacture the left-hand door, while BAe Warton will make the right-hand one. MBB is a partner with Warton on the Tornado taileron. Rockwell engineers are currently at Warton as part of a team conducting a composite fuselage study applicable to a future fighter, a private venture of both companies.

Although exceptional and novel several years ago, transatlantic codevelopment projects are more normal now, and seem very much a way of future development of aerospace projects. Lt. Gen. Kelly Burke sums up: "Even given the problems of cooperative efforts to date, the future holds continued growth in international programs with our allies. There just doesn't seem to be any other way financially to meet the allied defense requirements of the '80s." ■

Ramjet Propulsion.



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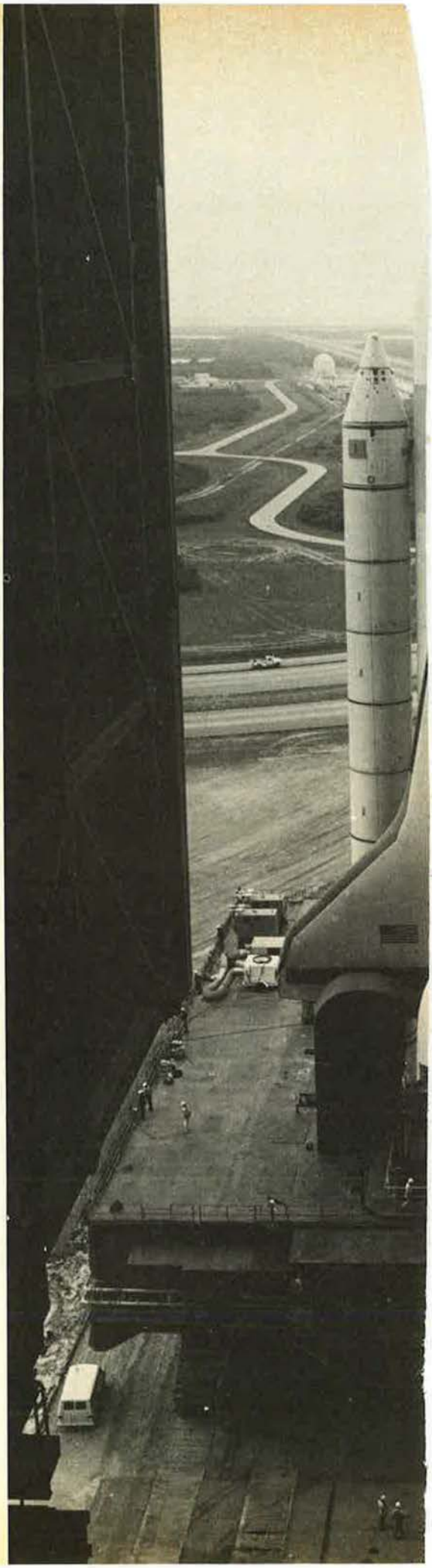
SPACE SHUTTLE MIRED IN BUREAUCRATIC FEUD

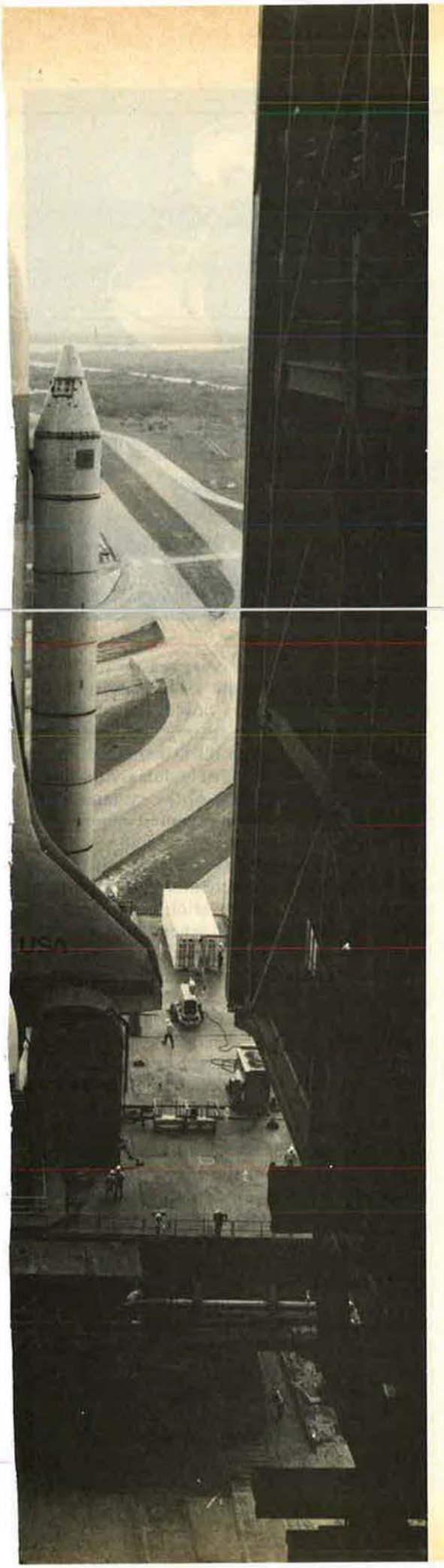
BY EDGAR ULSAMER
SENIOR EDITOR (Policy & Technology)

THE National Aeronautics and Space Act of 1958 that fathered the civilian National Aeronautics and Space Administration and assigned to it overall responsibility for this country's space operations, in retrospect, can be faulted for underplaying and obscuring the importance of space to national defense. This condition is accentuated because the Soviet Union, unencumbered by moralistic views about the peaceful and humanitarian character of the cosmos, treats space as a predominantly military high ground that needs to be seized and exploited by its armed forces.

Until recently, the US defense sector, from the National Security Council to the Pentagon, accepted tacitly if not fatalistically NASA's primacy in manned space operations. This era of passivity seems to be drawing to a close, however. Recent interviews with officials in the Defense Department and elsewhere who are concerned with the military's mission in space suggest a sea change that portends a major showdown within the government bureaucracy and the willingness to "go public" about what is perceived as a serious impediment to a clear-cut and crucial defense requirement. Catalyst for the defense sector's new-found assertiveness is the precarious state of the National Space Transportation, or Space Shuttle, program and the widely held perception that a combination of factors, not the least of which is NASA's putative nonchalance about schedules and operational aspects, threatens to turn this program into a management nightmare.

From the dawn of the space age, the military in general, and the Air Force in particular, recognized that the new medium—not withstanding "fuzzy thinkers" who declare space a pristine sanctuary free from all forms of military operations—represents a vital new dimension





The Space Shuttle Orbiter Enterprise *rolls out of the Vehicle Assembly Building en route to a launch complex at Kennedy Space Center.*

of national security. Not too surprisingly, when during the gestation period of the Shuttle, Congress and the executive branch determined that the program was neither viable nor supportable without assigning it primarily a national security role, the Air Force had to be dragged into the program "kicking and screaming," as one participant remembers. The somewhat arbitrary and in retrospect unwise cancellation of the Air Force's own manned space program, the Manned Orbiting Laboratory or MOL, of course, heightened USAF's resentment over being drafted not only into involuntary servitude on the Shuttle but also defraying a major portion of its support costs.

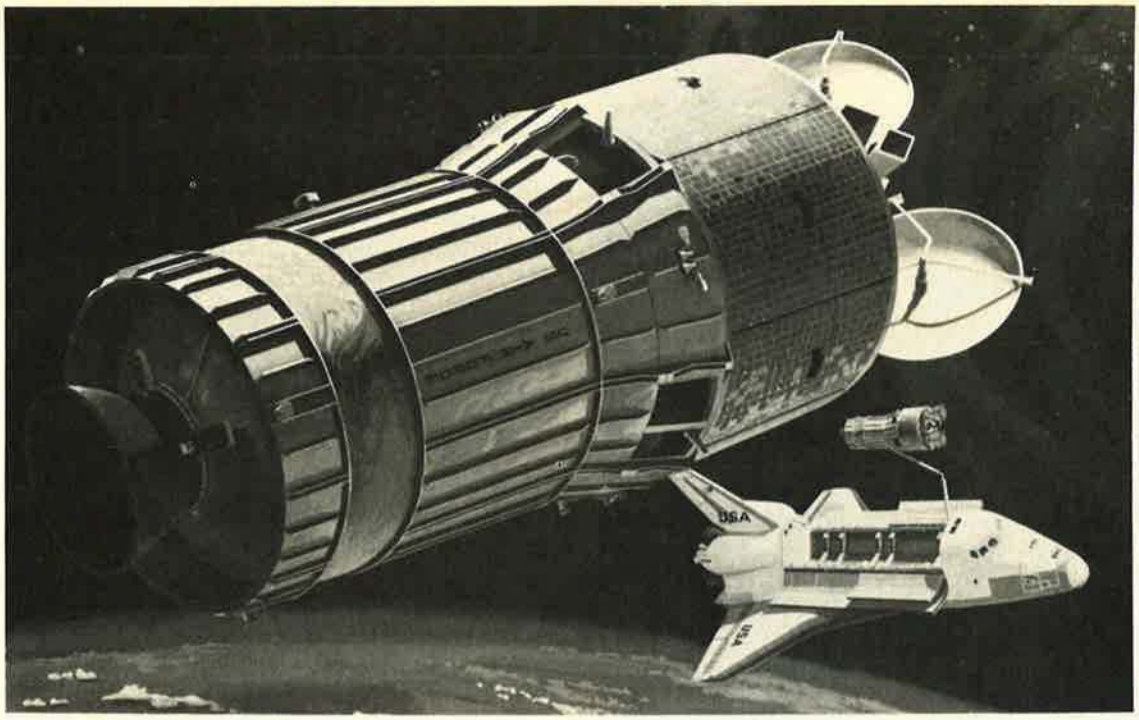
The Shuttle's Technical and Schedule Problems

A number of factors further intensify the defense sector's skepticism about the Shuttle. Billed originally as a highly economical, high-capacity, quick-turnaround airliner into space, the Shuttle turned out to be far more complicated and costly than was understood at the outset.

The reusable upper stage of the Shuttle system, the Orbiter, for instance, was to have been good for one hundred flights under the original plans. But NASA later shifted to a far less stringent and more cautious approach, saying merely that whether or not individual Orbiters can be prepared and cleared for reuse will be determined by careful post-flight inspection on a case by case basis. Defense Department experts claim that reuse of individual Orbiters beyond ten flights without complete teardown and refurbishing appears improbable and doubt that the original goal of one hundred flights per unit will be reached even once the system has matured.

In a related change, NASA backed off from the goal of a "two-week turnaround" time for the Orbiter and concedes now that it will take about 280 days to refurbish the system after each flight. As a result of these two changes, the recurring costs per flight—which have to be borne by the users—will be higher and the availability and "responsiveness" of the system lower than predicted.

Another area in contention between NASA and the national security sector involves the so-called "traffic model," a forecast of who will be flying how many missions within certain periods. NASA's assumptions about the number of satellites serving defense and the intelligence community to be lofted by the Shuttle in the decade of the '80s—especially from 1985 on—appears excessive in retrospect. Even though these early forecasts involve Pentagon-supplied information, these figures



Two USAF-developed IUSs (Inertial Upper Stages) being deployed to deliver payloads to higher orbits or planetary trajectories.

leaned toward the high side in order to shore up political support for the program. Since then, major improvements in the on-orbit life span of military and intelligence satellites have reduced sharply the number of required launches. Using new empirical information concerning on-orbit life cycles, the Pentagon sees a sharp drop in the number of military Shuttle missions from NASA's "traffic model."

. . . some influential officials hold the view that since the national security mission of the Shuttle is its reason for being, "we [the Pentagon] ought to be in control of the program."

NASA agrees with the Pentagon on this score, but points out that the number of Shuttle missions involving nonmilitary payloads appears to have been understated in the "traffic model" to roughly the same extent that the national security missions were overstated. NASA, therefore, contends that on balance the traffic model will turn out to be correct. The defense sector counters by saying that this merely contributes to the "civilianization" of the Shuttle.

DoD's Reservations About NST

Although not shared by all relevant elements of the defense sector, some influential officials hold the view that since the national security mission of the Shuttle is its reason for being, "we [the Pentagon] ought to be in control of the program." Feeding this view is the perception that NASA is an R&D agency that is developing the Shuttle "with an R&D mentality," with little regard for meeting schedules vital to the national security mission of the system. Cited here is NASA's often repeated slogan that "nobody get kudos for on-time failures," plus the fact that NASA, as yet, has refused to commit itself to a firm schedule and is reluctant to share "inside" information concerning development problems with other elements of the executive branch. Compounding the problem of NASA's casual approach to Shuttle program schedule slippages and uncertainties, in the near universal view of a large number of Pentagon officials, is NASA's tendency to "trade inflation for time," meaning the willingness to forego requests for supplemental funding to compensate for unforeseen inflation by stretching out the program. In a related sense, so the charge goes, NASA lives in perennial fear of Congress's or the White House's canceling out the Shuttle program and thus is extremely timorous in its funding requests.

NASA executives acknowledge that their agency's funding requests indeed are being held to austere levels and that there is nagging concern about the political viability of the Shuttle from one budget cycle to the next. But the reasons for NASA's caution and apprehension, Agency officials contend, are neither timidity nor paranoia but the fact that "we are completely under the thumb" of the Office of Management and Budget (OMB) and lack both the clout and White House access of a cabinet department. NASA's original cost forecast for

the full Shuttle program, for instance, was "adjusted downward" arbitrarily during the Nixon Administration by about $1 billion, which happens to be, in then-year dollars, the equivalent of the cost "overrun" the program experienced since 1972.

Failure by other elements of the Federal bureaucracy to understand NASA's peculiar vulnerabilities and status combined with bureaucratic infighting and a steady barrage of criticisms of the "architecture" of the Shuttle program at times have brought the entire project close to the point of extinction. NASA feels, therefore, that its fears are well-founded and that its ultra-cautious approach is a matter of necessity, not choice. The point is being made also that the Carter Administration, which is likely to be remembered more for canceling rather than sustaining technology and weapon programs, had grave reservations about the Shuttle program. Later on, however, President Carter reportedly began to recognize the importance of the Shuttle to space-based intelligence systems that in turn could increase the verifiability of SALT II. White House support of the program since then has been reasonably firm.

Congress, in NASA's view, has been consistently sympathetic and appropriated essentially all the monies for the Shuttle sought by the executive branch. The FY '80 supplemental request, for instance, sailed through Congress with comparative ease and with only a token cut of $15 million from the $300 million asked for by the Administration. At the same time, however, space experts from the defense sector claim that the supplemental request understates essential and urgent funding requirements of the Shuttle program and thus could contribute to further delays in the system's first flight.

Shuttle Enterprise *landing after separation from a 747 over the Mojave Desert and a five and one-half minute free flight.*

"Territorial Imperatives" Under Dispute

Two other bureaucratic factors have caused conflict between NASA and the national security sector. The Pentagon believes that the Shuttle program would benefit if an experienced military program manager were put in charge, and cites in particular the fact that the Apollo program was run brilliantly by a military management expert. That was then-Air Force Maj. Gen. Samuel C. Phillips, later on Commander of the Air Force Systems Command. NASA so far has turned a deaf ear to this suggestion by countering that development by the Air Force of an essential element of the Shuttle, the inertial upper stage (IUS) that will take payloads to geosynchronous orbits and beyond, encountered serious cost overruns. In the other instance, Pentagon space experts claim that NASA's cavalier attitude concerning scheduling was underscored by the Agency's tardiness in appointing a Shuttle Operations Director. All concerned parties agreed in November of last year that such an executive position—separate from but coequal with the program's development office—was to be created at once. Yet it took NASA until mid-July of this year to do so. NASA confirms the fact of the delay, but charges that internal bickering within the Pentagon over who should fill this slot rather than the Agency's tardiness caused the delay.

The Space Shuttle—How It Will Work

The Space Shuttle, a hybrid of space and aeronautical engineering, looks much like a large aircraft with stubby delta wings. It is 122 feet long and has a seventy-eight foot wingspan. It will be launched into space attached to one side of a 154-foot-tall missile-shaped fuel tank and two smaller solid-rocket boosters. In case of special payloads, one strap-on solid motor will be added to each rocket booster for "thrust augmentation." The two (or four) rocket boosters and three Orbiter engines will propel the Shuttle on takeoff. The engines of the Orbiter will be fueled by the large expendable tank. The boosters as well as the tank will be dropped during the system's ascent to orbit.

The Space Shuttle enters earth orbit at an altitude of between 100 and 600 miles. Because many payloads require higher orbits, the Shuttle works in concert with the Air Force-developed Inertial Upper Stage (IUS). The IUS will be carried by the Shuttle in its cargo bay. After the Shuttle reaches orbit, the unmanned IUS is deployed to ascend to higher altitude orbits or even planetary space.

On completion of its mission, the Space Shuttle will reenter the atmosphere and the two pilots guide the system to an unpowered landing. Takeoff and landing will occur at either the Kennedy Space Center in Florida or Vandenberg AFB in California. Current USAF efforts on the Shuttle program include development of the basic two-stage IUS; development of the launch facility at Vandenberg AFB; design and development of ground support equipment and software required unique for national security missions; and development of interface verification equipment and payload integration capabilities. The total FY '81 funding request for these USAF activities is about $517 million.

The way NASA operates the Shuttle, and the extent to which it meets the peculiar security requirements of DoD—in fact preponderantly CIA—payloads, are make-or-break issues, this writer was told over and over. As Brig. Gen. Robert A. Rosenberg, USAF's Assistant Chief of Staff for Studies and Analyses and until recently a National Security Council official, pointed out sagely, "The Shuttle is not an end unto itself. To the extent that [the Space Transportation System] imposes bureaucratic inefficiencies and impedes the effective management of our space program, the nation would be denied a tremendous opportunity. . . . We must avoid falling into the trap of letting the tail wag the dog." He cited as a central issue the definition of the Shuttle's role in support of standing operational missions: "Such missions include those with the objective of maintaining at least a certain minimum capability continuously on-orbit, a few backup vehicles on the ground, and a very modest manufacturing throughput capability. Such systems have little surge capacity, and the premature launching of a replacement vehicle may well cause gaps and loss of mission accomplishment later on if the vehicle expenditures exceed usage rates planned many years in advance. Rescheduling of a launch only a few months before the designated date may so disrupt the overall Shuttle support plan and carry with it such severe cost impact as to effectively remove manipulation of the launch schedule as an effective management tool for the user."

It would not seem farfetched to read into this analysis tangible apprehension on the part of the Air Force over trading in the autonomy of its own proven launch systems for the "collectivism" and technical as well as operational uncertainties of the Shuttle.

Conflicting Military and Civilian Interests

While the national security sector probably engages in some posturing in order to impel NASA toward curing perceived management deficiencies and lukewarm cooperation with defense, serious thought is being given to "opting out" of the program and staying, at least for the time being, with USAF's own expendable launch systems.

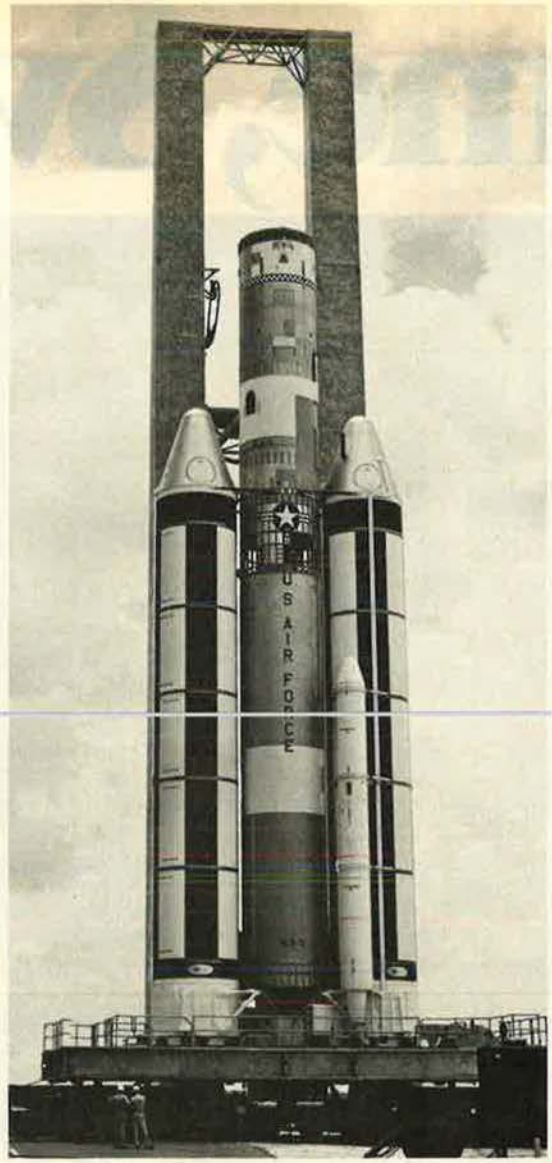
Fairly typical of the Pentagon's attitude is this comment by a senior official: "It is crystal-clear that a new kind of organizational pattern has to be established because the current arrangement is not really acceptable to the military." If things stay the way they are, this official and other similarly authoritative sources don't expect the Air Force and other elements of the Defense Department to use the Shuttle. Expanding on this contention, another Pentagon executive said there are no easy solutions to the deep-rooted management and organizational problems that attend the present bureaucratic arrangement concerning the Shuttle. What is clear to most Pentagon executives concerned with the military space mission is that the national security sector "has to be given a degree of control that it now lacks."

The weakest element of the Shuttle, in the view of Pentagon experts, is inadequate security at the Lyndon B. Johnson Space Center (JSC) at Houston, Tex. Yet, it is from here that some ultrasensitive defense and intelligence satellite launches will be controlled, the first of which is scheduled for March 1983. The easiest way out of the security problem, this writer was told, is "to stay with our current systems because we do control them." The other, less-drastic option for improving the security aspects of Shuttle operations is by setting up a Consolidated Space Operations Center (CSOC) in Colorado Springs, Colo. CSOC, according to Lt. Gen. Kelly H. Burke, USAF's Deputy Chief of Staff for Research, Development and Acquisition, involves two elements—a satellite control segment and the Space Shuttle operations and planning segment. The DoD interim Shuttle control facility that is being installed at JSC, General Burke told Congress, "will not meet all DoD requirements for planning and conducting DoD missions in the long term: it does not provide an

The So-Called Tile Problem

Probably the most serious technical challenge confronting the Shuttle is the so-called tile problem that plagues its reusable Orbiter stage. Large surface areas of the Orbiter, a vehicle roughly the size of a DC-9/737 jetliner, are covered by several thousand special, individually tailored tiles that protect the craft from the searing heat encountered on reentering the atmosphere. Some of these tiles have fallen off. Efforts to correct this problem proved both time-consuming and difficult. While other methods of thermal protection are under consideration, most experts believe that it would take at least five years to provide the Shuttle with a new type of heat shield.

The Shuttle tile problem has been responsible for schedule slippages.



Above, a Titan III launch vehicle. Pentagon uncertainty about the reliability and performance of the Shuttle has resulted in a determination to keep the Titan production line open.

adequate level of security protection; it is located in a region susceptible to environmental and man-made threats; it is limited in capacity; and it does not provide direct and continuing control over military operations."

The new USAF budget request contains some $13 million for concept definition of the CSOC.

While the mood in the Pentagon concerning the Space Shuttle at this time ranges from ambivalent to negative and there is increasing determination to keep the Titan III/34D production line open indefinitely, nobody doubts that if brought back on track, the Space Shuttle could be invaluable to the national security mission in space. This could be doubly true if the Air Force eventually were to be given full operational control over all Shuttle missions and hardware serving national security. Senior NASA officials say privately that, once the Shuttle has achieved fully matured operational status, the program could be split into two separate parts—one serving civilian commercial purposes and the other confined to governmental functions. Major aerospace companies already are vying for and are deemed fully capable of operating the civilian Shuttle operations as a private enterprise. The Air Force, on the other hand, could take over management and operation of the Space Transportation System from NASA to carry out national security and other governmental missions.

Air Force interest in such a solution presumably will depend largely on how well and how quickly NASA solves the technical, economic, and operational problems of the Shuttle, the cost to USAF of operating the system for all government users, and whether or not the Soviet Union deploys a comparable system. For the time being, the Soviets appear to confine their efforts to the development of a relatively unsophisticated reusable manned space transportation system that could start flight testing within two or three years.

Another course of action open to the Defense Department and the Air Force, of course, would be development of a space transportation system that is tailored to meet national security requirements and is fully, rather than only partly, reusable. Obviously, the long-held dream of an "aerospace plane," a single stage to orbit system that takes off like an airplane, goes into orbit, and lands like an airplane on more or less conventional runways without being confined to one or two special and expensive facilities, would have major advantage over the present Shuttle system.

All the uncertainties and concerns about the present status of the Shuttle program notwithstanding, it probably is an article of faith as well as a military imperative that the Air Force must play a key role in exploiting manned spaceflight. To lose that option or, in a broader sense, to leave the field of manned spaceflight to other nations because of conflicting "territorial imperatives" of the federal bureaucracy would indeed be a national tragedy. ■

. . . the Space Shuttle could be invaluable to the national security mission in space. This could be doubly true if the Air Force eventually were given full operational control over all Shuttle missions and hardware serving national security.

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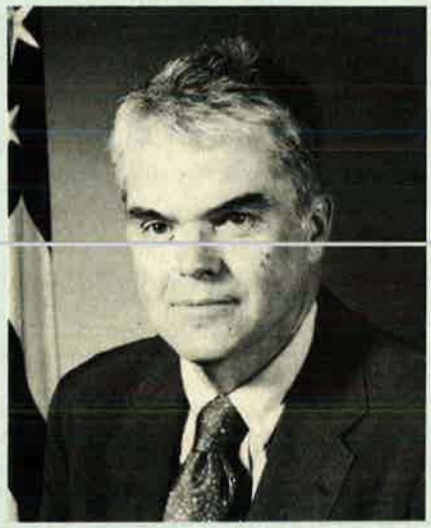
THE VITAL ELEMENT OF THE MILITARY EQUATION

BY THE HON. HANS MARK, SECRETARY OF THE AIR FORCE



THIS month we mark the thirty-third anniversary of the establishment of the United States Air Force as a separate service in our armed forces. Occasions such as this provide an opportunity to reflect on the past and, hopefully, to anticipate the future.

We are now at the end of the "post-war" period, during which our role in the world was that defined by the conditions existing at the time our Air Force was established at the end of World War II. Those countries that were liberated by the United States in World War II and those nations we helped to defeat are today strong, prosperous, and free. This happy situation is largely a consequence of far-seeing policies the United States has followed for the past three decades.

On the other hand, those nations that fell into the orbit of Soviet Russia thirty years ago are still groaning under the tyranny of Russian imperialism. One need not look far for evidence. Eastern Europe remains restive under the heel of its ancient foe. The recent visit of Pope John Paul to his native Poland illustrates how defiant that population is toward Soviet tyranny.

In the Far East, the bloody tragedy in Indochina is continuing, and those who saw all problems in that unhappy region as the result of actions taken by the United States must surely realize by now how wrong they have been.

In the New World, the "success" of Fidel Castro's socialist "paradise" can be measured by the simple fact that fully ten percent of Cuba's population is now living in the United States. I think this is an unprecedented, historical landmark of failure, which cannot be denied even by those most blinded by Communist propaganda.

During this entire period, Russian military strength has grown steadily. The Russians have consistently pursued their imperial policies backed by their military might since that is the only way they have been able to exert their influence in the world. They have only been deterred from pressing their designs through our actual or threatened military intervention. Recent events in the Middle East have signaled an acceleration of Russian expansionism, and this means that, once again, we must look to our military capabilities and decide with great care where and how we will meet this new threat.

On several occasions, I have had the opportunity to outline in this magazine what I believe the Air Force must do to strengthen its forces: First, we must modernize our strategic nuclear deterrent force, including the eventual development of a replacement for the B-52 bombers. Second, we must enhance our airlift capability by creating a new transport aircraft that can operate much more independently of ground facilities than our current airplanes. Third, we must improve our ability to conduct operations in space and develop the proper organizational arrangements to deal with this new role. I need not dwell on these issues again since you are all well aware of these requirements, and I know that you will continue to be articulate advocates for these positions in the public debate about our military posture. Rather, I want to express some opinions about the most vital element of the military equation, and that is the people who serve in uniform.

One of the most unhappy consequences of the war in Vietnam is that it lowered the esteem in which military people are held in this country. Since 1972, pay and benefits for military people have declined when compared with compensation received by people in the civilian economy. This has been due partly to the underestimation of the inflationary trends that have characterized recent years but I believe a case can be made that a major reason has been the neglect caused by the relative unpopularity of the military.

In view of the obvious new threats from Soviet Russia, this situation must be changed. We must again create a political climate in which everyone understands that those who follow the profession of arms play an important role in our society. We cannot afford a situation in which many of our junior enlisted people are eligible for food stamps and other social welfare programs. We cannot tolerate conditions that force senior noncommissioned officers to hold another job so that they can make ends meet and support their families. These conditions erode self-respect and self-confidence and make it impossible to develop the kind of esprit de corps necessary for successful military organizations.

Much has been made of the readiness of our armed forces to fight, but this has usually been translated into the maintenance of hardware and into the purchase of new spare parts for our equipment. I submit that readiness begins in the mind, and this is where we must start. The military profession must, once again, hold a place of honor in our society, and this place must be accompanied by enough compensation to make it attractive for high-quality people to make a career out of military service.

We cannot continue to lose highly skilled officers and enlisted people after six to ten years of service because we do not provide the necessary means for them to feel comfortable that they have a long-term future in the service. I have found this to be the essence of conversations I have had with a great many people on numerous base visits I have made during the past year. I have heard this story again and again in many places (from many mouths). I believe that it is true and that we must listen.

It is my sincere hope that our elected political leadership has understood this point and that steps will be forthcoming in the near future to remedy the situation. Only then will the military force we actually have be truly ready to defend our nation's vital interests abroad. ■

THE PREMIUM ON QUALITY

BY GEN. LEW ALLEN, JR., CHIEF OF STAFF, UNITED STATES AIR FORCE

THE focus of US military planning for the past nine months has been predominantly on the implications of the Soviet invasion of Afghanistan. I discussed this issue at some length with Senior Editor Edgar Ulsamer, as reported in the August issue of AIR FORCE Magazine. As I indicated in that interview, Soviet willingness to directly intervene in an area outside their traditional sphere of influence, and whose proximity to the Persian Gulf raises the specter of Soviet control of the critical energy supplies in this region, has had a significant impact on Air Force planning for contingency operations. In recent months, we have taken a number of steps to improve our preparedness to respond—and sustain that response—to meet any Soviet threat to US vital interests in Southwest Asia.

We are also making major adjustments, over the period of the Five-Year Defense Plan, in the relative emphasis to be placed on force readiness vs. force modernization. The bold Soviet resort to military power to further their foreign-policy objectives has prompted us to place a premium on increasing the effectiveness of existing forces. Given present constraints on defense spending, this focus on near-term readiness and sustainability has had to come at the expense of force acquisition. This choice is a painful one, especially in view of the fact that the Soviets are relentlessly both expanding and improving the quality of their military forces. We will, of course, continue to acquire more modern, capable weapon systems—but at a slower pace and in fewer numbers.

This shift in priorities has strong implications for everyone in our Air Force. It means we are going to have to wring every last bit of capability out of every weapon system we have in order to provide an effective deterrent against steadily improving Soviet strategic and general-purpose forces. That kind of challenge can only be met by emphasis on the most critical element in our readiness equation—quality people. Never have experienced, dedicated people been more important to our health and capability as an institution. Unfortunately, this premium on quality people comes just as we are experiencing severe losses of precisely these irreplaceable assets.

The continuing departure of experienced aviators, engineers, NCOs, and physicians from our ranks is my single greatest concern and has occupied a substantial portion of my time and attention over the past year. It was the principal item on the agenda of senior Air Force leaders defending the Fiscal Year 1981 Air Force Budget before the Congress this winter and spring. Great efforts have been made to heighten public awareness of this problem and the specific factors prompting career-minded military professionals to hang up their uniforms.

This situation is, in a word, intolerable. It cannot continue if the Air Force is to maintain an adequate fighting force. I sense that efforts to make this problem known, to publicize the skills and dedication of our people, and to prompt actions to alleviate the major causes of their dissatisfaction—loss of purchasing power and erosion of benefits—are having effect. The nation, and its governing bodies, are coming to realize that today's complex national security environment requires top-notch, technically competent people. We in the Air Force are especially dependent on the seasoned veterans who are steeped in the lore of our profession.

This type of force cannot be had on the cheap. Nor can it be provided by a draft. In the final analysis, the Air Force must be able to attract a broad cross section of talented young people and provide them with both a challenge and a quality of life that will enhance the appeal of a career commitment. The Air Force has the heritage, the array of career fields, and the demand for excellence that will excite and capture this type of commitment.

However, the quality of life in our Air Force has clearly eroded over the past several years. Of greatest concern is the loss in purchasing power our people have suffered due to the ravages of inflation and inadequate gains in compensation. Groups like the Air Force Association have done a tremendous job in carrying this message, as well as reporting on the superb capabilities of our Total Force—active, Guard, and Reserve.

To date, the Air Force has successfully weathered the storm of growing disenchantment with the quality of service life. We are an institution of professionals, a winning team, with a strong faith that the country is slowly but surely turning an important corner in attitudes toward the role and contribution of its armed forces.

I believe that the future holds not only great challenge but great promise for our nation and our Air Force. Events have conspired to confront us with enormous demands, both personal and professional. In my view, those demands represent a test and an opportunity. I have no doubt that we are equal to the test—and that we will seize, individually and collectively, the opportunity to grow both personally and as an institution. ■

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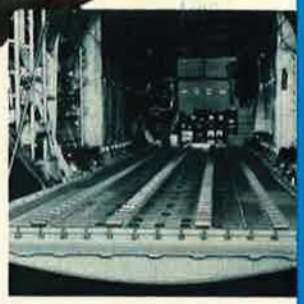

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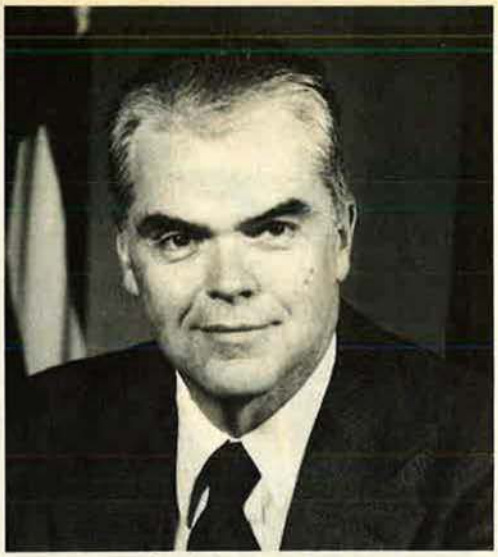

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(As of August 15, 1980)

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Chief of Staff
Gen. Lew Allen, Jr.

Ass't Vice Chief of Staff
Lt. Gen. Marion L. Boswell

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Chief of Air Force Chaplains
Maj. Gen. Richard Carr

The Judge Advocate General
Maj. Gen. Thomas B. Bruton
(Effective September 1)

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Lt. Gen. Paul W. Myers

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Dr. Edwin B. Stear

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Chairman

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Air National Guard
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Maj. Gen. William J. Campbell

Director of International Programs
Maj. Gen. Richard V. Secord

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Lt. Gen. Howard W. Leaf

Deputy Inspector General
Col. Frank D. Hardee

Deputy Inspector General for Inspection and Safety
Maj. Gen. Len C. Russell

Deputy Chief of Staff
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Director of Electromagnetic Combat
Brig. Gen. William L. Kirk

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Deputy Comptroller
Frank A. Fishburne

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Maj. Gen. George M. Browning, Jr.

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Brig. Gen. Avon C. James

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Col. Donald G. Kane

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Manpower and Personnel
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(Temporarily Vacant)

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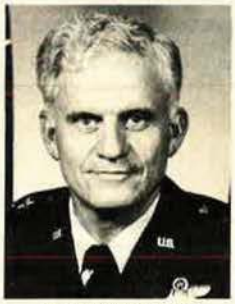
J. Craig Cumbey

Director of Personnel Programs
Maj. Gen. Herbert L. Emanuel

Assistant for General Office Matters
Col. Ralph E. Havens



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Brig. Gen. Joseph H. Connolly

Director of Program Integration
Brig. Gen. M. Roger Peterson

Special Assistant for MX
Brig. Gen. James P. McCarthy

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Lawrence D. Garrison

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Hq. Wright-Patterson AFB, Ohio

CMSgt. Robert E. Rogers
Senior Enlisted Advisor, AFLC

Air Force Acquisition Logistics Div.
Lt. Gen. J. G. Albert
Wright-Patterson AFB, Ohio

AFLC International Logistics Ctr.
Brig. Gen. G. W. Rider
Wright-Patterson AFB, Ohio

Ogden Air Logistics Ctr.
Maj. Gen. John J. Murphy
Hill AFB, Utah

Oklahoma City Air Logistics Ctr.
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Tinker AFB, Okla.

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Newark AFS, Ohio

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Hq. Andrews AFB, Md.

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Eglin AFB, Fla.

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Vandenberg AFB, Calif.

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Arnold AFS, Tenn.

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Maxwell AFB, Ala.

Air Force Military Training Ctr.
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Lackland AFB, Tex.

Technical Training Ctr./Chanute
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Chanute AFB, Ill.

Technical Training Ctr./Keesler
Maj. Gen. Don H. Payne
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Military Airlift Command

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CMSgt. James R. Vitalie
Senior Enlisted Advisor, MAC

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Maj. Gen. Thomas M. Sadler
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22d Air Force
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Aerospace Rescue and Recovery Service
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Brig. Gen. Albert J. Kaehn, Jr.
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313th Air Div.
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314th Air Div.
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326th Air Div.
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OMMANDS

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42d Air Div.
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45th Air Div.
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Pease AFB, N. H.

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3d Air Div.
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Andersen AFB, Guam

7th Air Div.
Brig. Gen. Robert D. Beckel
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Colorado Springs, Colo.

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Commander


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Commander


CMSgt. Fred Dickinson
Senior Enlisted Advisor

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(Effective September 1)


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Senior Enlisted Advisor

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Superintendent

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(Retiring September 1)

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Washington, D.C.

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Washington, D.C.

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Department of Energy
Germantown, Md.

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Washington, D.C.

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(Effective September 1)

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National Security Council
Washington, D.C.

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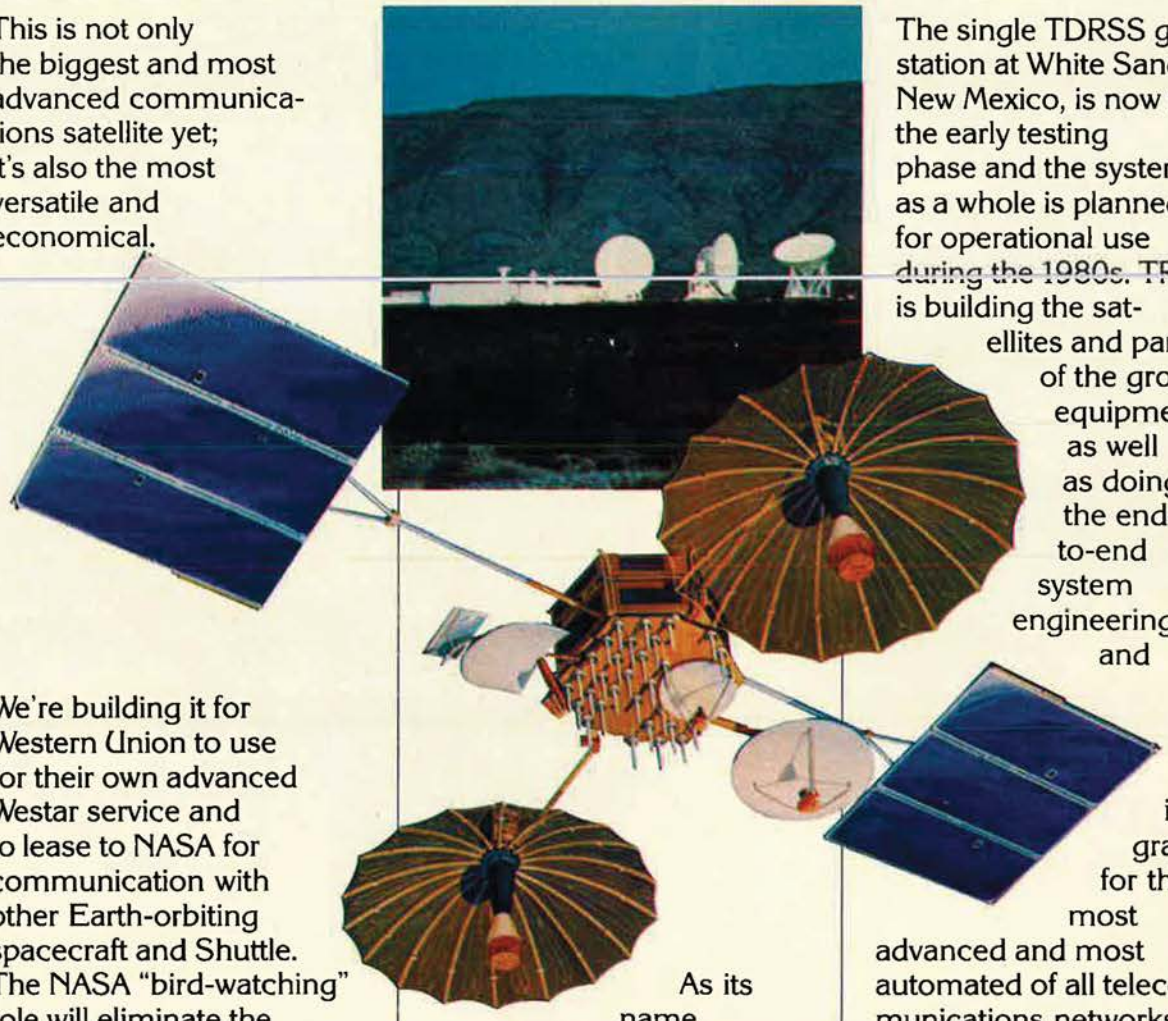
TDRSS*

World's biggest birdwatcher.

This is not only the biggest and most advanced communications satellite yet; it's also the most versatile and economical.



We're building it for Western Union to use for their own advanced Westar service and to lease to NASA for communication with other Earth-orbiting spacecraft and Shuttle. The NASA "bird-watching" role will eliminate the need for costly ground stations in politically risky areas.

As its name *Tracking and Data Relay Satellite implies, TDRSS can keep track of many other satellites (as many as 100 in fact); it can transmit data for as many as 27 at a time at extremely high bit-rates. It will also relay commercial TV, voice and data at lower cost than ever.

The single TDRSS ground station at White Sands, New Mexico, is now in the early testing phase and the system as a whole is planned for operational use during the 1980s. TRW is building the satellites and part of the ground equipment as well as doing the end-to-end system engineering and integration for this most advanced and most automated of all telecommunications networks. We're also developing the extremely complex control software.

TELECOMMUNICATIONS SATELLITE SYSTEMS FROM

A COMPANY CALLED TRW

DEFENSE AND SPACE SYSTEMS GROUP

30 years ago. The first launch from the Cape. Just another first in GE's 80-year history of space technology development.

On July 24, 1950, General Electric scientists directed the successful launch of Bumper 8, the first rocket vehicle to leave the new Cape Canaveral complex. Previously, at the White Sands test range, the GE-led team had integrated and launched other Bumpers—V-2 rocket boosters topped by WAC Corporals—the first U.S. 2-stage vehicles.

Bumper 8 was fired from a makeshift pad amid the Florida palmetto scrub. The GE engineering team improvised a service gantry from a painter's scaffold. The blockhouse was a bank of sandbags built against a fisherman's shack. We also improvised the first ablative nosecone, sheathing the Corporal's plywood ogive with resin to protect the instrument package in the nose.

These were not the first GE pioneering efforts in space technology. GE was the first U.S. space contractor, signing an Army contract in 1944 to research and develop long-range guided rocket vehicles. The first heavy rocket launch in the U.S. was made by GE in 1946. The first phase-comparison system for rocket vehicle guidance was developed by General Electric.

This pioneering actually began in 1900, when GE established the first industry laboratory for pure research. Experiments began with high vacuum technology, and progressed to materials development, testing, thermal effects, reliability analysis and many more technologies which later became essential to space research.

We pioneered in communications and electronics, too, inventing the magnetron tube in 1917, the radio altimeter in 1928, and in scores of other developments integral to space programs, including electronic image transmission, control systems, sensors, data processing, checkout systems, simulation systems, and command guidance, to mention a few.

Today, General Electric is pushing new frontiers in the two Viking spacecraft which are orbiting Mars, equipped with GE articulation and attitude control systems . . . in the Voyager vehicles, nearing the edges of the solar system, and in five Global Positioning System satellites, all equipped with GE-built power equipment.

GE is also applying generations of advanced technology know-how to major Space Shuttle contracts. Our tasks? Design, development, integration and test of experimental and operational payloads. Integration, checkout and space qualification support services. Provision of critical life support systems for crew members. Prime contractual responsibility for two Shuttle-launched spacecraft systems.

GE-built Nimbus and Landsat earth observation systems—10 in all—are noted for their long operational lives. We are working toward a 1981 launch for DSCS III, a military communication system with significant advances in power, orbital life and operational utility, which is also being studied for other applications. A high-power broadcast satellite system we designed and built for the Japanese government has met demanding operational requirements in synchronous orbit for more than two years.

Decades of technological innovation in all disciplines make General Electric unique among aerospace companies. To every space program we're involved in, we bring the resources of generations of advanced technology, plus the capabilities of more than 15,000 GE scientists and engineers still pioneering in more than 100 laboratories. Isn't that the kind of capability you want applied to *your* next space program? GE-103

Space technology leadership—by tradition

General Electric Space Division, Valley Forge, Pa.

GENERAL ELECTRIC

Airbus Selects Litton

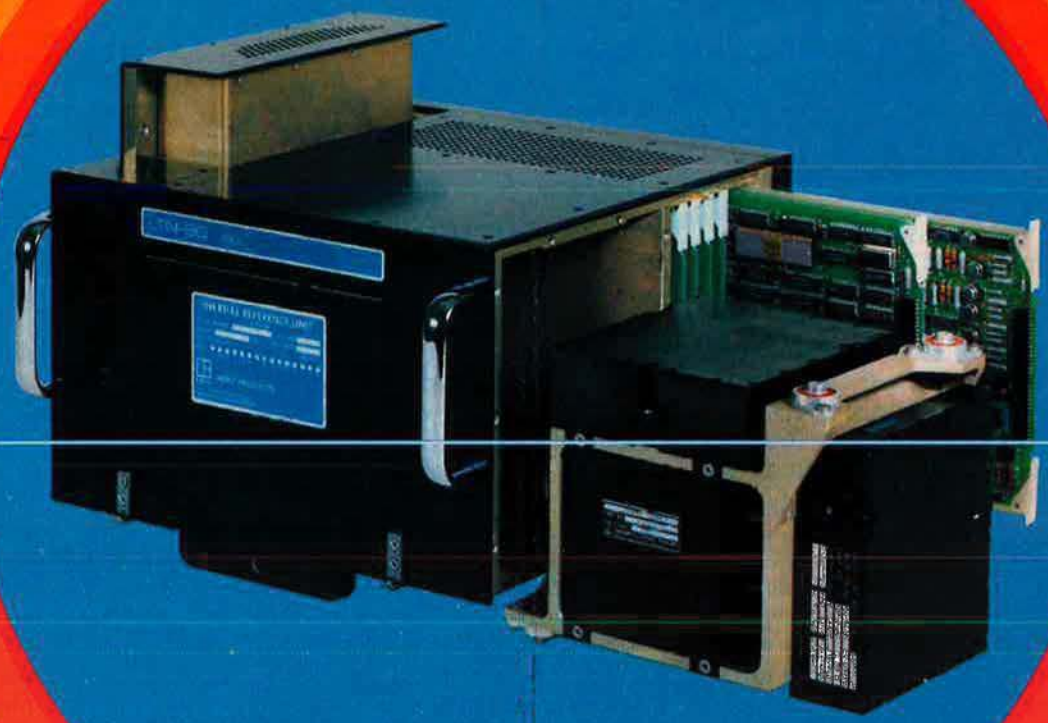
Airbus Industrie has announced its selection of Litton Aero Products LTN-90 Ring Laser Gyro Inertial Reference System as standard navigation equipment aboard its A-310 all-digital wide-bodied jetliners.

The new Litton navigation systems will be installed in triplicate in the twin-jet medium range A-310 Airbus, of which Airbus Industrie has announced orders from more than ten different customers. Soon to be flying with Lufthansa and Swissair, the LTN-90 has been in development by Litton for many years.

The ring laser gyro concept represents an advanced approach to inertial navigation. This strapdown system fully complies with ARINC 704.

The LTN-90 has also been designed to function as a digital Inertial Navigation System (INS) to satisfy operators not desirous of using flight management computers. Litton will also offer versions to satisfy requirements of transport aircraft which are not equipped with all digital avionics.

The LTN-90 provides low cost of ownership and very high reliability combined with high accuracy over extended periods of flight. Although it is felt that current INS systems will continue to be used, strapdown systems of this type are expected to become standard equipment on transport type aircraft in the next several years.



Litton **AERO PRODUCTS**
Canoga Park, California 91303

You are invited to take advantage of Litton's strong capability in navigation systems for a wide range of special applications. Call or write Vice President, Marketing, Litton Aero Products, 6700 Eton Avenue, Canoga Park, California 91303 (213) 887-3022 or our Marketing offices in Atlanta, Ga. (404) 995-0629, Washington, D.C. (202) 554-2570, Hong Kong 5-7951968, London 01-499-5377, Paris 225-43-57.

The decade of the 1980s will see a less-experienced USAF with more female members, single parents, and in-service marriages. More problems are foreseen, but service leaders have fashioned a "Compensation Plan" that may solve retention ills . . .

USAF's Personnel Situation in the 1980s

BY ED GATES, CONTRIBUTING EDITOR

WHAT's ahead on the people front for the 1980s?

Almost certainly USAF in the decade ahead will be a younger, less experienced force than now. Most of the airmen and half the officers will be under thirty-one years old. Four of every ten officers will be lieutenants, many performing in jobs normally earmarked for higher rank.

There'll be many more women members and increased reliance on the Reserve components, whose missions will grow. USAF personnel planners who "work" the force structure of the future also see a small but steady rise in overall active-duty population, from the 556,000 members today to perhaps 575,000 in five years, with most of the increase being programmed for Europe.

Strength increases augur well for promotions, both airman and officer. Officials declare that though promotions are considered good now, they should improve in the future. Despite the personnel strength increase, the planners see a decline in married officers, from seventy-nine percent today to seventy-three percent in 1985. A minor increase in married enlisteds, from sixty-one to sixty-two percent, is expected over the same period.

More significantly, the planners forecast sharp increases in the number of in-service couples (where each partner is military) and in single parents. Severe problems accompany both prospects. The Air Force this past June counted 19,257 in-service couples among its ranks (in some cases one partner is listed as "other military"), up from 18,717 six months earlier. That is a growth rate of nearly 1,100 per year, a situation posing all sorts of assignment problems for the 1980s. Members' skills don't always match job openings, particularly at remote sites. Keeping both partners of in-service couples together, which the Air Force tries to do, will become more difficult.

More Single Parents

Five years ago, there were about 3,900 single member Air Force parents. That figure recently jumped to 6,500 and the projection for 1983 is 9,000. Though regulations require that single parents make firm contingency plans for their dependents, a good many apparently have found this impossible. One report shows one out of three single parents has made no arrangements for the child's or children's care during mobility deployments, while twenty-three percent are unable to go TDY or PCS. Some two of every five single parents are not prepared to evacuate their dependents from abroad, the report states.

Various steps, of course, can be taken to ease the problem, such as forced separation, tightening enlistment criteria, or both. But no one wants to throw out good performers, or reject promising recruits because they have dependents. After all, the objective is enlisting good people and holding them, not turning them loose. Tough decision-making lies ahead.

Bigger Role for Women

Many of the new single parents are women; growth of the distaff contingent has been phenomenal, and all indicators point to more of the same. In 1973, about 16,500 women, a mere 2.3 percent of the total force, served in the Air Force. Today, 57,000 members are female, and the projection is 91,500, or seventeen percent of the force, by end-FY '84.

There is talk of additional increases. The office of USAF's Director of Personnel Plans, Maj. Gen. William Usher, looking to the mid-1980s, says that by then the male recruiting-eligible population will decrease another sixteen percent. Thus, more women may be the answer; General Usher and his associates have made clear, however, that mental, physical, and other standards for all recruits will not be lowered.

Another likely prospect for the 1980s certain to affect many members is more "contracting out" of housekeeping projects, training missions, and other chores. The idea here is that in-house manpower will be conserved for the most important mission-related jobs. The Defense Department is strongly pushing the contracting-out theme.

Rated Retention Woes

Today's critical pilot retention situation probably won't be licked by the mid-1980s, though officials are banking on improvements to set in well before then. The magnitude of the problem is shown on the accompanying pilot inventory chart. Besides the obvious questions this situation generates, there are others less obvious, such as, "Can we afford to send pilots to AFIT and PME in the numbers needed?" or, "What's the proper timetable for withdrawals from the rated supplement?" In other words, how do you distribute reduced resources?

Another puzzler tied to the manpower shortages goes like this: "The better people will be challenged to work harder to offset the falling experience level, with resultant dissatisfaction and future adverse impact on retention. . . ." These are typical of skull-busters that officials must come to grips with.

Meanwhile, they feel the pilot and navigator exodus may have bottomed out. But this doesn't solve the shortage problem, which, by 1982, is expected to reach 3,400 pilots and 900 navigators. The pending (at press time) flight pay raise, including prospects of a bonus of up to four months' basic pay, is seen helping the situation.

The fall-off in airline hiring plus the lines' furloughing of many aircrew members low on the seniority ladder have combined to close doors, at least temporarily, on military flyers looking for that kind of employment. If it continues, the Air Force and Navy should benefit.

Flying Sergeants?

But what if the airlines lick their fuel-cost problems, recover financially and expand? Such a scenario could dash Air Force hopes and create a brand-new ball game. Might that, in turn, lead to drastic changes such as creation of an enlisted pilot corps? Flying sergeants? Most unlikely, planners say, though even the wildest scheme cannot be completely ruled out.

Hq. USAF officials stress that the service remains firmly committed to a college-educated officer force, headed and indeed dominated by pilots. Furthermore, recruiting of line officers other than engineers and scientists is no problem. The Academy, the AFROTC establishment, and Officer Training School continue to produce plenty of high-quality officers.

Signing up new doctors remains a critical problem. Indeed, authorities are forecasting that less than half of this year's 1,500 physician recruiting quota will be subscribed. However, the President recently signed the military physician pay bill into law, and there is general optimism that doctor recruiting and retention will start to improve. The new law provides four different kinds of bonuses for the medics.

The Air Force hopes to improve engineer-scientist manning by laying on a $15,000 "accession" bonus for these hard-to-find people. But that stipend, designed to let the services compete with industry, may be a couple of years away from approval.

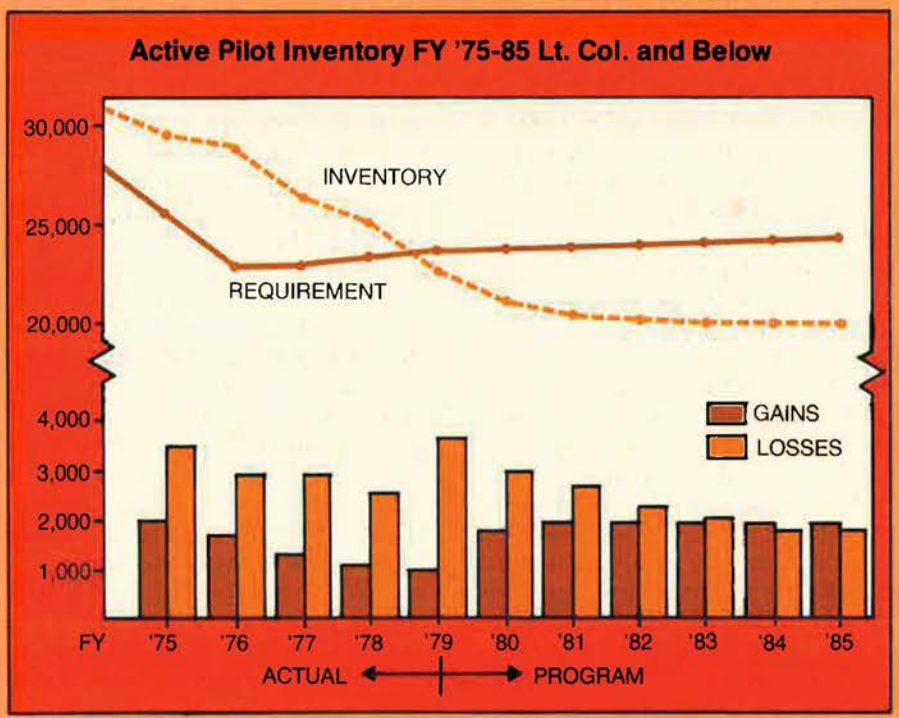
Major changes on other fronts should not be ruled out in the future if the situation demands. Joseph Zengerle, USAF's Assistant Secretary (Manpower, Reserve Affairs and Installations), sees pilots and certain other critically needed specialists—aircraft mechanics and engineers, for example—as "national resources."

The government, he reminded, spent a bundle training them. Perhaps they and other specialists "owe" Uncle Sam something more for his largesse. Or they might welcome helping out. "Why," Secretary Zengerle mused in an interview with AIR FORCE Magazine, "couldn't something be worked out to bring back ex-military flyers furloughed by the airlines for brief periods?" Or ex-USAF mechanics who go on strike? The Air Force is critically short of maintenance personnel and the shortage is expected to worsen. Seemingly these and other measures might help plug active-duty manpower gaps, he suggested.

Fewer PCS Moves

On related unique people issues likely to surface in the 1980s, Secretary Zengerle, thirty-seven, a former Army officer and a West Pointer, cited the impact of reduced gasoline availability. "It may mean fewer PCS moves, thus longer stays at present bases," he said, adding that this in turn "suggests a need to make bases more attractive, living more comfortable, and recreational programs more appealing." Switching to another topic with implications for the future, Secretary Zengerle posed this question: "What happens to female crew members when they become pregnant?"

The Air Force efforts to improve officer retention have been well publicized. They include the drive for more flight pay, more promotions, offers of continued active duty to most passed-over officers, fewer additional duties, decentralized decision-making, more individual participation in reassignments, and more assignment information.



During the mid-1970s, the Air Force was overloaded with pilots. It encouraged thousands to leave, and denied flying training to many qualified AFROTC graduates. Later came the huge "unprogrammed" losses of flyers seeking employment with the airlines or unhappy with USAF, or both. More recently, the inventory fell below requirements. Officials now hope the worst is over, and that in four years annual gains will exceed losses.

Separate moves have been taken to keep experienced NCOs "in," including the noteworthy "high year of tenure" (HYT) waiver program. Hq. USAF last March asked 1,000 selected E-5s through E-8s who were near their forced retirement dates—their HYT—to stay aboard for two additional years of service. Sixty percent accepted, a figure personnel planners are pleased with. Cycle number two, in which another group of NCOs approaching their HYT will be invited to serve two extra years, is already under way. Outstanding E-9s, who have participated in HYT extension exercises for several years, will continue to be offered HYT-waivers of three years, giving them thirty-three years of service altogether. *(For a roundup of airmen internal improvements, see "Fine-Tuning Enlisted Incentives," April '80 issue.)*

Househunting Trips

Hq. USAF authorities, meanwhile, promise to continue to look under every possible rock for new projects to improve retention, improvements made within the service and separate from Congress. General Usher, for instance, disclosed that the Air Force plans to approve permissive TDY for people to make househunting trips prior to a station transfer. This, of course, is not the actual househunting subsidy the service is pushing *(see "Speaking of People," p. 169)*, but at least it protects members' leave time; they won't lose it.

The Air Force is pinning some of its hopes for improving enlisted retention on a beefed-up selective reenlistment bonus (SRB). It wants authority to pay bonuses to NCOs with more than ten years of service; the idea is to curb the departure of so many veterans whose experience is needed. Congress may have approved the request by the time this is in print.

Service leaders are quick to caution, however, against "overuse of bonuses as a substitute for adequate pay levels." In other words, bonus hopefuls should look for increased bonus money to continue to be funneled into skills that are in extraordinary demand, not spread widely throughout the enlisted work force list.

Rising Prior Service Intake

Increased recruiting of persons with prior military service is already here, and it promises to play a greater role in USAF's future manpower plans. This year's prior service recruit quota is 2,800, up from 1,000 to 1,200 in recent years. The quota for next year is set at 5,000. It probably won't get much larger, certainly not approaching the 12,000 to 13,000 prior-service recruits the Army is taking in each year. Such large numbers, the Air Force correctly feels, will almost certainly be filled by many people of low quality.

"We're firmly committed to maintaining our high standards—in people, appearances, and every other way," General Usher stated.

The planned increases in prior-service recruits, coupled with the HYT extensions, won't prevent the overall airman force from growing younger. The official forecast is that seventy-five percent will be thirty or under by 1985, compared with seventy-one percent now and sixty-seven percent in 1970.

The expected youth and relative inexperience of the future USAF is further dramatized by another set of projections. It shows the "airman career force"—that portion of total enlisted strength with five or more years of service—plunging from 243,000 last year to 210,000 by 1985 and to 196,000 by 1990.

Pay Goals Set

To provide new ammunition for the retention battle of the 1980s, the Air Force has hammered out an impressive set of compensation "goals," twenty-four in all. The list, described simply as the USAF "Compensation Plan," documents the validity of each goal, provides the estimated cost, and establishes a timetable for attainment. The plan, which Air Force officials are pushing hard within the Pentagon, on Capitol Hill, and to groups throughout the country, contains USAF's case for compensation equity. None of the other services has anything like it. *(For more about the plan, see "Speaking of People," p. 169.)*

But will such thrusts lead to a solution of the retention problem? Can USAF sell its programs to the extent that stay-in-service rates will improve significantly over the next few years? Can the Air Force really pull it off?

Talk to different experts and you may get slightly different answers. But the consensus among the experts, whose hopes have been buoyed by midsummer movement of several compensation improvements in Congress, is one of "cautious optimism." That best describes the feeling among officials in the Hq. USAF Air Staff and in the Office of the Secretary of the Air Force.

Sharing this view is a leader who is probably closest to the problem—Chief Master Sergeant of the Air Force James M. McCoy, who spends most of his waking hours talking with the troops involved, about their plans, their problems, their expectations.

Chief McCoy's response to the big question of today and tomorrow is, "We've got to pull it off!" He adds that "our people are high caliber, intelligent, well-informed. Many of them are on the fence about staying in. They really want to, provided they can see that they and their families will receive a fair shake." That day would appear to be approaching. ■

Outlook for the 1980s

- The All-Volunteer Force will still be with us.
- USAF will continue the fight for pay comparability.
- Expect more incentives for shortage skills.
- Women will play a larger role—eleven percent of the force today, seventeen percent in 1984.
- Reserve Forces missions will continue to grow.
- Congress will show interest in revised retirement plan, but expect no change in the next two years.
- Mobilization planning will be upgraded.
- People programs will play a critical role in the Air Force mission.
- Readiness—that's the bottom line.

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One of the "few great captains" who nurtured and encouraged the small cadre of airpower visionaries in the 1920s and 1930s, Frank M. Andrews was killed in an air crash before his full leadership powers could be applied to the crusade in Europe. His legacy lay in the airpower leaders who carried on, and who built the foundations for today's US Air Force.

Lt. Gen. Frank M. Andrews

BY LT. GEN. IRA EAKER, USAF (RET.)

ALTHOUGH I had known Frank M. Andrews only casually when he served on the War Department General Staff and I was on the Air Staff during the years of 1924–32, I was well acquainted with his biography and reputation.

He was born in Nashville, Tenn., February 3, 1884, and graduated from West Point in 1906, ahead of H. H. Arnold, later Chief of the Army Air Forces.

Through the Overcast

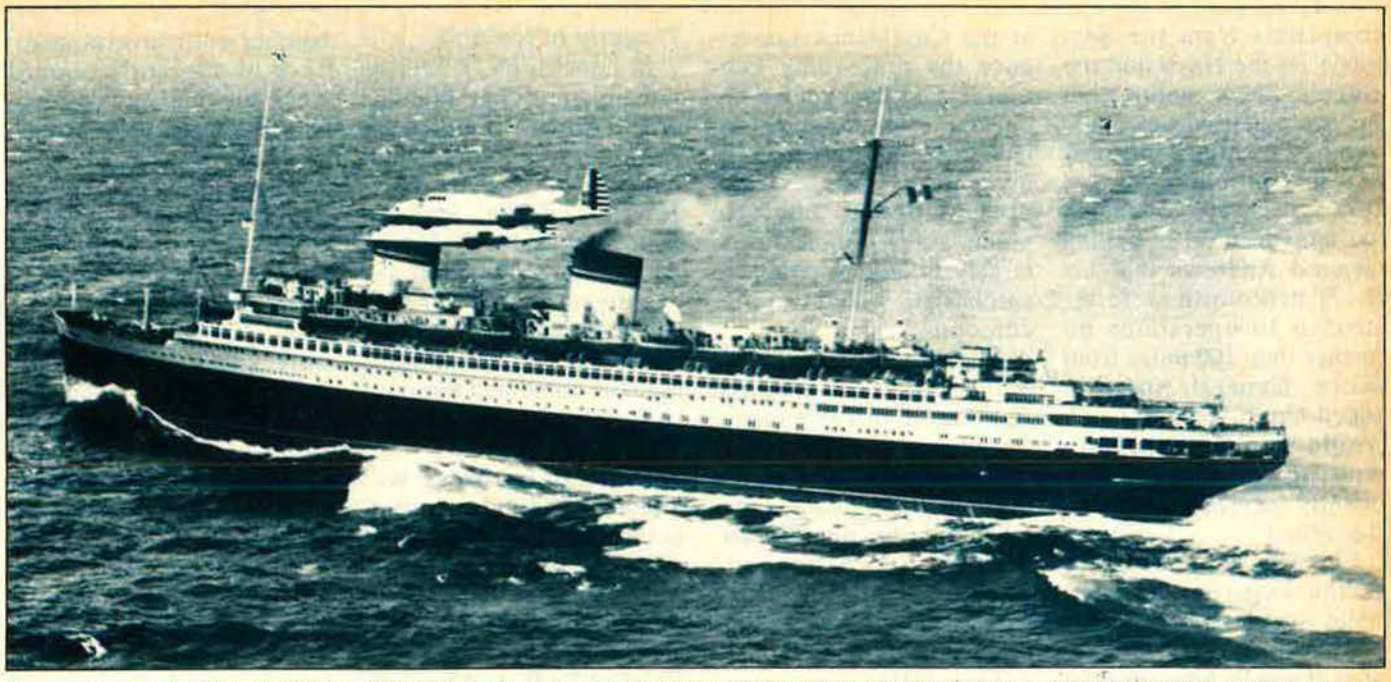
My first personal experience with General Andrews occurred in the late spring of 1935, when he came to inspect the First Wing of the GHQ Air Force. Andrews had just assumed command and completed the organization of this entity, so long sought by leaders of the Army Air Corps, as a hopeful beginning of the creation of an air arm coequal with the Army and Navy.

Brigadier General Arnold commanded the First Wing of the GHQ Air Force. It was composed of the 9th Bomb Group and the 17th Pursuit Group. General Andrews immediately showed an interest in a system we had devised for flying single seaters through the overcast, permitting us to use the gunnery range at Muroc Dry Lake, Calif., when low clouds covered our home base at March Field. In our early attempts to climb through the clouds, I noted that when I looked out one side of the plane, the clouds passing the wing gave the impression that the plane was turning in that direction. I, therefore, tended to overcontrol and eventually fell into a spin.

Brig. Gen. Frank M. Andrews, upon his appointment in March 1935 as Commander, GHQ Air Force.

I devised and had built a baby-buggy top for the cockpit of the P-26, with which we were then equipped. I then discovered if I covered the cockpit shortly after takeoff and began a slow, climbing turn to the left, I was able to climb through several thousand feet of overcast without difficulty. The next step was to have additional planes flying formation on me. It was found they could do this easily. The best formation was in two-plane elements stepped down. Eventually, we were flying six-plane formations on the covered plane without difficulty.

General Andrews, who had a reputation as one of the best instrument pilots in the Air Corps, expressed his desire to participate in this exercise. After about an hour in the covered plane, he became precise in



The rendezvous that raised a ruckus: During 1938 maneuvers three B-17s intercepted and photographed the Italian liner Rex *776 miles at sea. General Andrews was subsequently ordered to restrict his B-17s to within 100 miles of the US coast, but his point had been made.*

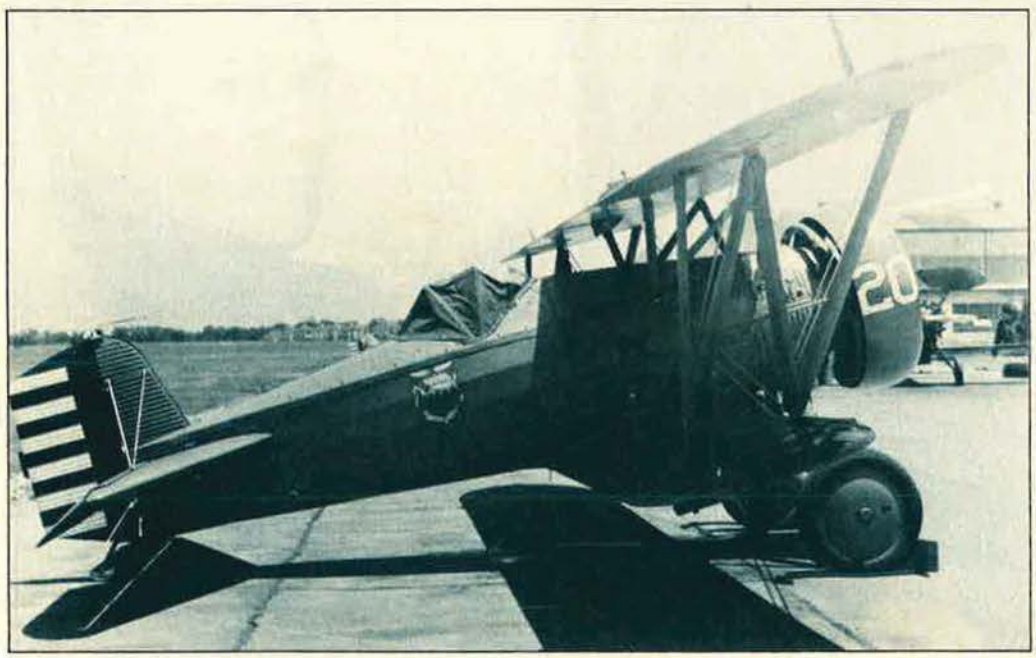
flying it and subsequently participated in all phases of the operation, both as the covered leader, and as a member of the following formations. He later made this system standard in the GHQ Air Force, and all pilots were required to become proficient in this operation.

This experience confirmed our conviction that General Andrews was probably one of the most experienced instrument pilots in the Army Air Corps.

Earlier, as he was organizing the GHQ Air Force, he obtained a DC-3 and became very proficient in flying it under all weather conditions.

Photographing the *Rex*

My second personal experience with General Andrews occurred when I was borrowed by him from the Information Division of the Air Staff to serve as G-2 on his staff for maneuvers held at Mitchel Field, L. I., N. Y. They were held at this location in order to obtain maximum publicity from the New York City press. A Reservist, 2d Lt. Harris B. Hull, was called to active duty as a member of my staff. He learned that the Italian liner *Rex* was making its maiden voyage to the United States and was then about a thousand miles from New York City. He suggested to me that this would be a wonderful opportunity to gain publicity. If we flew a flight of B-17s to intercept the *Rex* 400 or 500 miles at sea and photographed it, these pictures would probably be featured in all the New York City newspapers. I submitted the idea to General Andrews, who approved it and the operation was successfully executed.



General Andrews had a reputation as one of the best instrument pilots in the Air Corps. He required all pilots to become proficient in flying with canopied cockpits, as shown on this P-12.

Three B-17s, led by Maj. Caleb Haynes, with Lt. Curtis E. LeMay as navigator, found the *Rex* 776 miles at sea and made excellent photographs of two of the B-17s in flight across the deck of the liner. These pictures did receive full coverage in the New York City daily papers the following day.

On that day, General Andrews was conducting his daily staff conference when there was an urgent call from Gen. Malin Craig, Army Chief of Staff, in Washington. General Craig said that he had received

complaints from the Secretary of the Navy and the Navy's CNO, stating that the *Rex* flight was in violation of the Navy's prerogative of controlling the sea approaches. He concluded the conversation by telling General Andrews that his B-17s henceforth were restricted to operations no further than 100 miles from shore. General Andrews asked him if General Craig would put this order in writing, and he subsequently received a letter to that effect.

This was but one feature of the extensive Mitchel Field maneuvers, but, due to the controversy it created, it was by long odds the most publicized feature.

These maneuvers also greatly increased General Andrews's stature in the minds of all Army Air Corps officers.

A Missing Letter

The next opportunity I had for close contact and observation of General Andrews was when he came to London from Cairo, Egypt, where he had been commanding US Forces in the Middle East, to take command of all US Forces in the United Kingdom. The principal organization of the US Forces in UK consisted of the Eighth Air Force, which I commanded and which was then conducting daylight bombing raids against Nazi-occupied Western Europe. Since the Eighth was the only US force engaged in combat and also because of General Andrews's keen interest in the concept of daylight bombing, we spent much time together.

At one point, late in April 1943, I received an assignment to return to Washington to present what we called the Combined Bomber Offensive to the US Joint Chiefs of Staff, which had been authorized at the Casablanca Conference the preceeding February. The day before my departure for Washington, General Andrews came to my quarters and I made the presentation to him. He made a few suggestions, largely involving points to emphasize, which were incorporated.

After we finished consideration of the Combined Bomber Offensive, General Andrews began reminiscing on our experience in the Mitchel Field maneuvers, including the photographing of the *Rex*. At one point he told me that the Craig letter was in his file at his quarters in London.

This letter was never found. Undoubtedly, it had been removed by a current member of the Andrews staff with prior service on the War Department General Staff, who thus appreciated the possibility of its embarrassment of the Army and Navy.

Tragedy at Iceland

In conclusion, it will be remembered that Marshal of the Royal Air Force Sir John Slessor, in his authoritative, postwar book *The Central Blue*, included figures that showed that the Allied long-range planes destroyed more Nazi submarines in the critical "Battle of the Atlantic" than the combined forces of the Allied Armies and Navies.

General Andrews was undoubtedly under consideration to lead the Allied cross-channel forces, when the plan was completed and the forces available. Gen. George C. Marshall, Army Chief of Staff, had brought General Andrews to London in order to give him an opportunity to become better acquainted with the British chiefs of staff.

A part of General Andrews's command was based at Reykjavik, Iceland. He was piloting a B-24 bomber with several members of his staff aboard when the fatal accident occurred that had such tragic consequences.

General Andrews was approaching the runway at Reykjavik in dense fog when he failed to clear an intervening elevation by about 100 feet. All aboard were killed. It was, tragically, his belief in his undoubted ability as an instrument pilot and his lack of knowledge of the Reykjavik terrain that led to his undoing.

These three experiences briefly recounted convinced me that Gen. Frank M. Andrews would have been a superb commander for our cross-channel operation.

He was far and away the most experienced individual in the use of airpower to supplement the older services to obtain maximum effort with minimum loss of lives. ■

General Andrews seated at his desk aboard the Boeing B-17 "Flagship." Before his death he was under consideration for command of the cross-channel invasion.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In January 1942, with the US still absorbing the shock of Pearl Harbor and with the Japanese surging ahead on all fronts, a handful of AAF P-40 pilots found themselves in the midst of the combat zone. For the 17th Provisional Pursuit Squadron there were no such luxuries as mess hall, paymaster, or tech supply, but the President of the United States had a message for them . . .

"YOU MEN ON JAVA ARE NOT FORGOTTEN"

BY COL. LESTER J. JOHNSEN, USAF (RET.)

AFTER flying school graduation, in July 1941, I became a member of the 79th Pursuit Squadron of the 20th Pursuit Group. The group was commanded by Col. Ira Eaker and based at Hamilton Field, Calif. We were soon off to several months of maneuvers, returning a few days after Pearl Harbor. Following the usual procedure, the youngest pilots were sent off by ship to points unknown. Rumors had us going to the Philippines, then to Australia. After zigging and zagging the Pacific for thirty-two days aboard the *President Polk,* a new passenger-freighter ship, we landed at New Zealand, and then continued on to Australia.

The ship's cargo was twenty P-40Es in crates, four C-47s on deck, and a couple of PBYs. There were twenty pilots, twenty crew chiefs, and twenty armorers—called a combat team. Marine and Navy pilots were aboard, and an old Navy Reserve doctor who shook like a leaf when he gave us shots. The ship was staffed and supplied for a luxury cruise—so we lived like kings. There were a barbershop, gift shop, and seven-course meals with professional waiters. For those who didn't get seasick, it was great!

On our arrival in Brisbane, the first man to come aboard was an Army Air Forces pilot. He had wings pinned on his shirt! In the States we'd never worn wings except on our blouses. We thought it was pretty neat, and so, with our wings proudly displayed on our shirts, we said goodbye to the *President Polk* and proceeded on our journey.

Australia

The P-40s were unloaded and hauled to Amberly Field. There they were uncrated and put together, crew chiefs and lieutenants working side by side. To our amazement lots of nuts, bolts, and stuff was left over when a plane was completely put together, but this didn't seem to worry anyone as we test-flew the aircraft.

I had some 150 hours in a P-40, but had never fired a gun nor dropped a bomb. That was not part of the training program in the 20th. The guns were in crates and cosmoline, to make sure they wouldn't rust! I made a vow at this time that, if I ever made it back, I would put all my efforts into the proper training of pilots who would be going into combat. (In 1943, I believe we did that in the 321st CTU and RTU Squadron, when I was commander, at Seymour Johnson Field, N. C., flying P-47s.)

As soon as we could get five to eight aircraft ready, they would start north for Darwin. There was no such thing as maps for this journey. We could follow a railroad track to Charlesville, but there it ended. Bleak sand and scrub from then on. One procedure was to glom onto an airliner that flew once a day, and that was preferable to trusting our unswung compasses! Sometimes we formed behind an old B-17, and others followed a Beechcraft C-45-type plane flown by an airline pilot from the Philippines.

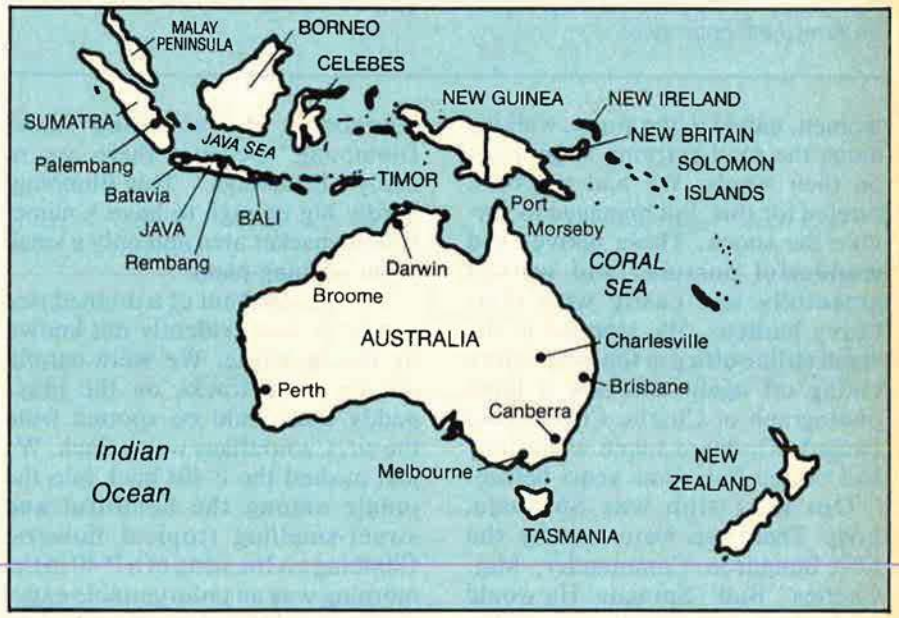
The RAAF at Darwin was flying Wirraways—an aircraft that looked like an AT-6 with a rear gunner. The Aussies really liked our P-40s and couldn't understand why we were not continuously polishing the bird. They were a big help to us with our guns. On every flight we had been firing our guns, and the six .50s were jamming or wouldn't fire at altitude. The Aussies said the oil we were using on them would congeal when it hit the cold upper atmosphere. We wiped off all the oil and fired them dry, and from then on they improved.

Off to Java

We left Darwin early one morning, heading for the island of Timor—540 miles over open water in airplanes we had put together ourselves. We tried not to think of that pile of nuts and bolts that had been left over. The Beech that was navigating for us on this leg was tough to follow, as it was very slow, requiring us to stagger through the air, trying not to stall or lose our precious navigator.

Upon landing at Kupan, Timor, I discovered that my tail wheel was flat. The Beechcraft had a crew chief aboard, but no spare parts. Everyone told me, "You'd better stay here until someone can fix it." That sounded like good advice until I saw our flight fire up their engines and start to taxi out behind the Beechcraft, passing a burned-out P-40 that had been strafed by the Japanese. To heck with the tail wheel! Bumping along after the flight had taken off, I found that some forward pressure on the stick helped in turning, but then I had to be careful not to nose down and dig in the prop. That would be great—prop and engine damage *and* a flat tire on lonely Timor.

After getting airborne, my problem was to find and catch the flight, and the navigator. Thanks to the slow pace of the Beech, I soon found those specks in the sky. I knew we were heading for Bali, but, with no maps, I had to find them or I'd be lost in the maze of tropical islands.



In 1942, Lt. Lester J. Johnsen and his P-40E "Peanuts," named in honor of the young pilot's wife.

About halfway to Bali, Lt. Andy Reynolds shot down a lone Japanese plane, probably a reconnaissance type. We called it an Me-110, but I doubt it was that type, and instead was a Japanese-built recon plane. Andy was a quick and aggressive pilot, who later went on to become an ace. We landed at Bali on an airfield pocked with bomb craters and dotted with burned-out planes.

We were hungry when we arrived and somehow managed to get into town. We were surprised to find the

Col. Lester J. Johnsen, USAF (Ret.), was a P-40 pilot in Java, Australia, and New Guinea in 1942. In 1944, in the European theater he flew P-47s with the Royal Norwegian Air Force in Belgium and Holland. During his USAF career, he commanded the 321st Fighter Squadron; 4th Fighter Group; 84th Fighter Group ("Geiger's Tigers"); and the 51st Fighter Wing. He is now a successful Christmas tree farmer in Washington state. One son is a USAF F-4 Phantom pilot at Ramstein AB, Germany, the other a Flying Tiger 747 captain, and his daughter is married to an Army helicopter pilot.

Obscured by the jungle, a Javanese early warning station, where a native would pound on a hollow log with a heavy club, the sound reverberating for miles through the lush greenery.

women, naked to the waist, walking along the road carrying large loads on their heads. We had not been briefed for this, but managed to survive the shock. These natives had wonderful posture, and walked gracefully and easily with their heavy burdens. We stopped in the small airline office at the field before taking off again and saw a large photograph of Charlie Chaplin and Paulette Goddard taken when they had visited Bali some years before.

Our next stop was Surabaja, Java. There we were met by the 17th Squadron Commander, Maj. Charles "Bud" Sprague. He would lead us to our secret rice paddy field. I was on his wing and wanted to impress him so I stuck in close and steady. We had no radio contact, but I noticed he was gesturing frantically—so I moved in closer. This increased his arm waving! We had to return to Surabaja because of a thunderstorm over our field. We quickly learned after landing that the way to fly formation in combat was to loosen up and fly forward enough to cover each other's tail. Thank goodness for modern-day briefings! We should have been given this training in Australia by those who had been in combat before us.

Java Campaign

The next day we landed at our home-to-be in Java: Blimbing near Djombong. It was called "near Djombong" because there are so many "Blimbings." This Blimbing, hardly big enough to have a name, had no market area and only a small sugar refining plant.

We operated out of a drained rice paddy. It was evidently not known by the Japanese. We were careful not to make tracks on the grass paddy that could be spotted from the air. Camouflage was a cinch. We just pushed the P-40s back into the jungle among the beautiful and sweet-smelling tropical flowers. Climbing on the wing of a P-40 in the morning was an unforgettable experience of color and smell created by the extravagance of fragrant vines and flowers hanging from the jungle ceiling.

The density of the jungle was impressive. I made the surprising discovery of a US C-47 sitting in the undergrowth not more than 100 yards from our squadron hut. The plane was invisible from even close range, because the jungle was so dense and fast-growing. The plane's tail had been damaged on landing while bringing in men and supplies from Australia. The crew had gotten parts from the Dutch and were repairing it. Finally repairs were completed, and the C-47 was flown out one night, full of pregnant Dutch wives.

The Javanese were a warm, busy people. When it rained, they would run around with huge tropical leaves over their heads. Many times we wished we could speak their language so we could communicate and find out more about them. In our short stay we instinctively liked them.

The Dutch pilots were great. Their squadron commander was half Dutch and half Javanese, a very handsome individual. Twenty-six years later, while I was on duty in Oslo, Norway, as Defense and Air Attaché, one of the Dutch pilots walked into my office. He was then with Lockheed Aircraft, selling C-130s. We recalled many details of the little Java campaign.

The low point in many of our memories of Java was the onset of dengue fever—a sort of second cousin of malaria. The disease must attack the nerve endings, because all desire to do anything was lost and the sweat and smell were horrible! Victims were very depressed and listless and ached in every portion of their bodies. The aftereffects often lingered on and on.

We were well supplied with surface transportation, since among the first things to arrive at the wharves of Java were jeeps and staff cars. Money, however, was a problem. We had received no pay since leaving the US some two months previously. The brilliant answer to this dilemma was to appoint someone paymaster, and send him to Surabaja in a staff car to make a draw from a Javanese bank. On his return, we divided up the loot. Now

The Per Diem Ribbon

After we were evacuated to Australia, we were pilots without a unit. The 17th had been only Provisional. Most of us were without orders and pay records. Our first concern on arriving in Sydney was to get some pay so we could enjoy the lights of the city. Since leaving for Java, we had not had any milk to drink, and the Australians have great milk bars. But we needed money. The Finance Officer, of course, would have nothing to do with this ragged group of "officers." But fighter pilots were not to be denied, and we stormed into the Adjutant's office, then on to the Executive Officer. He finally went to the Colonel, returning with news that we could get a partial pay.

The Finance Officer was not particularly pleased with our return, but we were exuberant in our small triumph. We were attracted to the yellow ribbon the Finance Officer was wearing, and asked what it stood for. It was the Asiatic-Pacific Theater ribbon, already dubbed the "Per Diem Ribbon" by the pilots. After signing a form of pay sheet, we each got $50, and the Finance Officer probably hated fighter pilots from then on.

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The famed P-40, like the above, gave a good account of itself in helping to defend Java. It escorted Douglas A-24s, as on left, on bombing missions against invading Japanese.

we could eat at the "Black Hole" (a local so-called "restaurant") and buy our fruit and peanuts for breakfast and lunch. When we evacuated from Java, we were told to burn all records, so the "paymaster's" records went up in smoke!

Our mission was air defense of Java. The early warning system of the Dutch Air Defense Command was primitive. It did not enable our P-40s to climb to the altitude of the enemy bombers and fighters. The system was without radar. It consisted of spotters on outer islands and along the coast. Paralleling that was a native system in which a hollow log was pounded. The sound could be heard for miles. We could never quite figure out the system, but maybe it was better than ours—we'll never know.

The P-40s soon began to lose their pep because of skimpy maintenance, and Dutch fuel that was not the 100 octane our fighters were designed for. We got a few victories, but we suffered losses, too. We learned a bit about fighting the Zero and how to attack the 96-Series heavy bomber. The tactics we used were pretty much the same as in other theaters. We quickly learned not to dogfight the Zero, but that we could outdive or outrun a Zero at low altitude until we could get a new position of advantage. We lost some good young men before we began to practice this in earnest. However, we seldom were at an altitude advantage because of the short notice of a raid. When contact was made, our guys did well.

The Dutch Air Defense Command gave the squadron credit for more than sixty-five enemy planes destroyed. The squadron claims were fifty. Because of the overwhelming enemy numbers, our pilots did not have the opportunity to verify each other's victories. Nine of our pilots were killed or missing in action during the stay in Java.

Attacking Sumatra

Although our mission was the air defense of Java, we did participate in some bombing missions. On February 17, with Major Sprague lead-

Escort Duty

Other AAF units operated in Java: the 19th Bomb Group, remnants of the 7th Bomb Group, and a few A-24 dive bombers. We flew escort for the A-24s, B-17s, and LB-30s. On a mission against enemy shipping in Bali, the P-40s also strafed landing barges and troop concentrations on shore. Our only contact with the bomber pilots was while on missions that Air Defense asked us to perform. After we left Java, we met some of those pilots in Australia, and would usually get a good-humored cussing out for not providing a better escort. One of these is Charlie Able, who later became vice president of McDonnell Douglas. He never fails to remind me that he would not have been shot down in his A-24 during the Java Sea battle if I had not been so negligent in my escort duties. Charlie went on to fly P-39s in New Guinea, and he and I ran a P-47 training squadron in 1943.

ing, the squadron flew from Batavia (renamed Jakarta in 1949 when Indonesia became an independent nation) to dive bomb targets at Palembang, in Sumatra—landing craft in the river. Since we had no bombs that fit the P-40s, the Dutch adapted some for our use. The squadron was composed of eight planes for this mission. On the way to the target area, we were attacked by Japanese 97-Series fighters. The 97 was a small fighter with fixed landing gear, and because of this some of the P-40s retained their four 20-kilo Dutch bombs. In the engagement, Major Sprague and Lieutenants Kiser, McCallum, and Kruzel each shot down a fighter. After the Japanese were dispersed, the P-40s continued on and bombed their targets.

The Invasion Fleet

It was around February 20 or so when we heard the enemy had taken Bali and Timor. There went our steppingstones to or from Australia—no more supplies, nowhere to run. We heard about a speech by President Roosevelt in which he said, "You men on Java are not forgotten." We tried to believe that there would be a gigantic Allied invasion, and a stand taken in Java, and hoped we weren't another Dunkirk.

On February 27, we were assigned to escort nine A-24s on a bombing mission. We flew top cover for the A-24s, and watched them head for a sight that made my stomach sink. The Java Sea was filled with the Japanese warships. Ships stretched to the horizon and beyond—they kept coming—about six abreast, steaming toward Java—our marooned island. The enemy fleet was being intercepted by nine Allied warships and firing had begun. We watched the near misses, the longs and shorts on both sides. One Allied ship was burning, with black smoke pouring from it, and it was dropping out of formation. This was later identified as the *Marblehead*, an American cruiser. We encountered no enemy aircraft, and on return to base reported our grim story of the invasion fleet.

Last Mission

On March 1, the squadron flew what turned out to be our last mission from Java. We took off at 5:30 a.m. in three flights of three P-40s each, along with six Hawker Hurricanes and four Brewster Buffaloes of the Dutch Air Force. Our target was the Japanese landing at Rembang.

The main Japanese landings had taken place during the night, but troops and materiel were still being ferried in in small craft between some thirty transports and the shore.

As soon as our planes appeared, we were caught in a crossfire between shore batteries and AA guns on the ships. This intense antiaircraft fire downed Lieutenants Caldwell, Reagan, and Adkins, but we still managed to hurt the landing forces. We sank many barges and small boats filled with troops and supplies, and we put several of the shore AA batteries out of action. We attacked from the east side of the bay, out of the sun.

Our surviving aircraft returned individually to base, the last landing by 7:40 a.m. We were all pretty well shot up. About 9:00 o'clock, a pair of Japanese Zero fighters hit us, strafing the field at will and further damaging or destroying all of our remaining planes.

Major Fisher instructed us to turn over any usable equipment to the Dutch and ordered the remainder of the squadron to proceed to Jogjakarta, to be evacuated to Australia from there by B-17s.

As we were leaving, a US Army major appeared at our operations hut (the operations hut was nothing but a grass roof held up by wooden poles, without walls or windows). The major said he had a small field artillery unit, complete with guns, and that he and his men had been ordered to take up a position in the hills and stay behind. Thirty years later, at a cocktail party in the small town in Washington state where we both then lived, I met this same man again. We compared notes, and I learned he'd been taken prisoner by the Japanese soon after we'd first met on Java, and had spent the rest of the war as a POW.

Our evacuation from Java was one more dicey operation. The B-17 could not accommodate everyone in a single trip. Some had to be left at Jogjakarta, with instructions to light a fire on the airfield when a B-17 returned later that night, if the enemy had not taken the field by then. The field was under intense strafing by Zeroes. We watched from the trenches while waiting anxiously for the returning B-17. The twelve-hour wait raised aching questions in those left behind: Will the crew be too bushed to fly? Can they find the airfield in the blackout? Will the Japs bomb the field? It's a big field; where will they park? Better get that fire built and ready to light, and don't dare go to sleep.

The long, anxious wait was rewarded by the unmistakable sound of a B-17's engines, alerting everyone. They scrambled aboard, a tired lot.

We had arrived in Java eager to do a job, and left with only the clothes on our backs, but thankful we had survived. Bone-tired, we slept intermittently on the way to Broome. We climbed into cots at the Royal Australian Air Force barracks on arrival. We barely stirred during a Japanese bombing and strafing attack that destroyed a dozen flying boats in the harbor and damaged aircraft on the field as we slept. ■

Exotic Quarters and Rations

Our barracks in Java were homes that the Dutch had vacated for us, furnished only with beds and mosquito nets. At the nearby sugar mill, the Dutch women cooked a daily evening meal for us. The food left much to be desired, or maybe we didn't appreciate Dutch cuisine.

When an ingenious member of our group discovered the original "Black Hole of Java," dinner meal attendance dropped off. The "Black Hole" was something to behold, but the smell of the pungent Oriental cooking still lingers in my nostrils. It was so dark in the so-called restaurant that we usually didn't know what we were eating. The cook could prepare a hunk of buffalo meat, swimming in an Oriental sauce, that was delicious.

Breakfast was peanuts and baskets of strange and tasty fruits brought around by small children. We bought them and ate while on alert. Lunch? Peanuts and fruit—when you could get them.

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Europe was falling fast. By June 1940, the jackboots of Hitler's legions had marched over Poland, Norway, Denmark, Holland, Belgium, and France. The bulk of the British Expeditionary Force was extracted from Dunkirk while Hitler paused. Next to come: Operation Sea Lion, the German invasion of England. But first was fought the . . .

Battle of Britain, 1940

BY F. CLIFTON BERRY, JR., EDITOR

IN mid-1940 America, it was still Europe's war. The Republicans nominated Wendell Willkie of Indiana to run for president against FDR's try for an unprecedented third term in the White House. Both candidates took to the rails on whistle-stop campaigns through a countryside just emerging from the Depression and aware of the expanding conflict abroad. The consensus for military preparedness was just building in a populace who thought the Armistice of 1918 was supposed to have brought an end to war.

The US Army Air Corps was undergoing expansion and preparation for war, beginning from an "utterly inadequate" 1939 base of 1,600 officers, 18,000 enlisted men, and 1,700 airplanes. But it was not ready for the global conflict it soon entered and won. For now, only the Royal Air Force stood between the Luftwaffe and England.

Hitler needed air superiority to protect his swarms of landing craft and supply ships crossing the English Channel. Field Marshal Goering promised to achieve it in short order. The aerial offensive began in mid-August 1940 and continued unabated through October, when Hitler was forced to postpone *Sea Lion* indefinitely.

England had been saved by an epic battle fought in its own airspace. At the cutting edge of the battle were the pilots of Fighter Command, numbering about 1,400 when it started. Their main weapons: the Supermarine Spitfire and Hawker Hurricane, bolstered by Boulton Paul Defiants and Bristol Blenheims. The Luftwaffe bombers were mostly Dornier 17, Heinkel 111, Junkers 87, and Junkers 88 aircraft. Their fighter escorts: the Messerschmitt 109E and Messerschmitt 110s.

After the Battle of Britain, Prime Minister Winston Churchill told the House of Commons: "Never in the field of human conflict was so much owed by so many to so few."

To mark the fortieth anniversary, AIR FORCE Magazine interviewed Wing Commander Bob Stanford-Tuck, DSO, DFC, one of "the few." Now living in Kent, under the skies where the battle was fought, Bob Stanford-Tuck commanded 257 Squadron (Hurricanes) at its height on September 15. He is one of the RAF's foremost WW II fighter aces, having destroyed thirty German aircraft in combat before he was shot down and captured in January 1942.

What memories of the Battle of Britain period remain most vivid for you forty years later?

First, the simply beautiful summer, which is unusual for us to get in England. The year 1940 saw a brilliant, bright, sunny summer. As for the battle, we were in kaleidoscopic conditions of constant takeoffs and combats at high altitude, landing and refueling and rearming as rapidly as possible; more or less continuous action the whole time. Of course, we were up very early in the morning—well before dawn, mostly—to be up there ready for the attacks which developed pretty regularly every day.

What was the level of proficiency of your support crews?

Jack Pardue's painting of Bob Stanford-Tuck and Spitfi honors all of Fighter Command in the Battle of Britain, 19 Painting © 1980, Air Force Associati


EZOL
EZOL

Top: Waiting, but not for long. Aircrew on alert status, with life preservers on, wait for the call to action. They might enter combat up to four times between dawn and mid-afternoon during the battle's height. Above: Scramble for takeoff, as pilots of 601 Squadron race for their waiting aircraft. RAF Fighter command controllers exploited radar to vector the fighters against German formations.

Absolutely first-class. They worked like hammer and tongs. Because in those days of 1940 most of them were part of the small regular Air Force that we had. They were really very efficient and experienced armorers and fitters and riggers. But, of course, not as many as we would have liked.

You had been flying in the RAF for five years, hadn't you?

Yes, since 1935.

Did the pilots in your squadron vary from brand-new to as experienced as you?

Yes, they did. We had to rush ahead with our training scheme to face up to this enormous battle—particularly Fighter Command that I can speak for—because we were very much numerically inferior to the German forces that were attacking us. Of course, we had to speed up our training scheme considerably for the intake to build up our fighter pilot strength. So a lot of them were very young, and very inexperienced, but nevertheless they had all the guts in the world. But their experience wasn't the same as the nucleus of the fighter pilots we had from the peacetime fighter squadrons. We had to build up and expand on that. There was nothing else we could do but hurry them through their training and get them into the squadrons quickly.

What changes in RAF fighter flying tactics and techniques resulted from the early combat in the summer of 1940?

That's quite a point. I had my first casualties over Dunkirk a few months before the Battle of Britain, when we were trying to cover the evacuation of the British Expeditionary Force and save what we could.

Our Commander in Chief, Lord Dowding, was forced to let a few of his very small fighter force go to cover the Dunkirk evacuation. It was over Dunkirk that I had my first contact. Incidentally, as an indication of the sort of casualties we were having then, in two days of air combat over the beaches I lost six pilots and six Spitfires, which is pretty heavy for any squadron.

I decided immediately then that our rigid flying tactics with formations and that sort of thing were almost useless in mixed combat with the more experienced Messerschmitt 109 pilots. Theirs was a very flexible and easy flying formation broken right down to the loose pair they flew, called the *Rotte*. We were flying tightly in odd numbers of threes and up to fours—most unwieldy for combat. So without any authority, I very quickly changed my Spitfire squadron's combat tactics to the looser pairs, where we could give each other more reciprocal aid from attack.

Did other squadrons then change because you had done it, or did each squadron commander do it out of necessity?

Well, I cottoned onto it because I liked the formation the Germans were flying. At about that time, several other RAF fighter commanders realized the same thing, and we were soon down to flying pairs.

Was there any resistance to this change on the part of the more senior officers who had prescribed the other formations?

You mean the old peacetime thing? No. They were perfectly understanding, and raised no objections at all to me or the others. After all, it's the fighter leader up there in the sky who is responsible for it once it starts.

What equipment modifications came about as a result of the early combats?

First, we had no deflection armor plating so that bullets could strike and bounce off. That was very hurriedly rushed through the factories and fitted down in the squadrons, such as the heavy bulletproof

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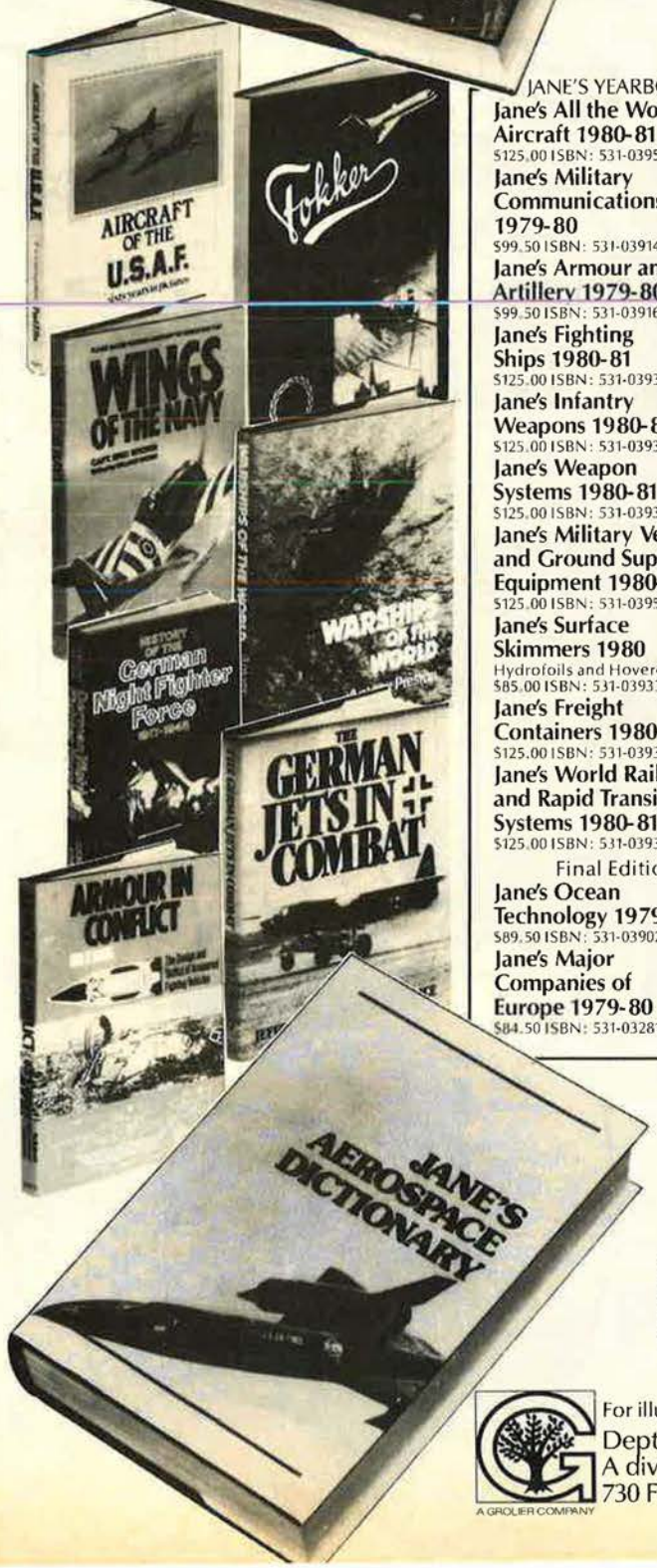

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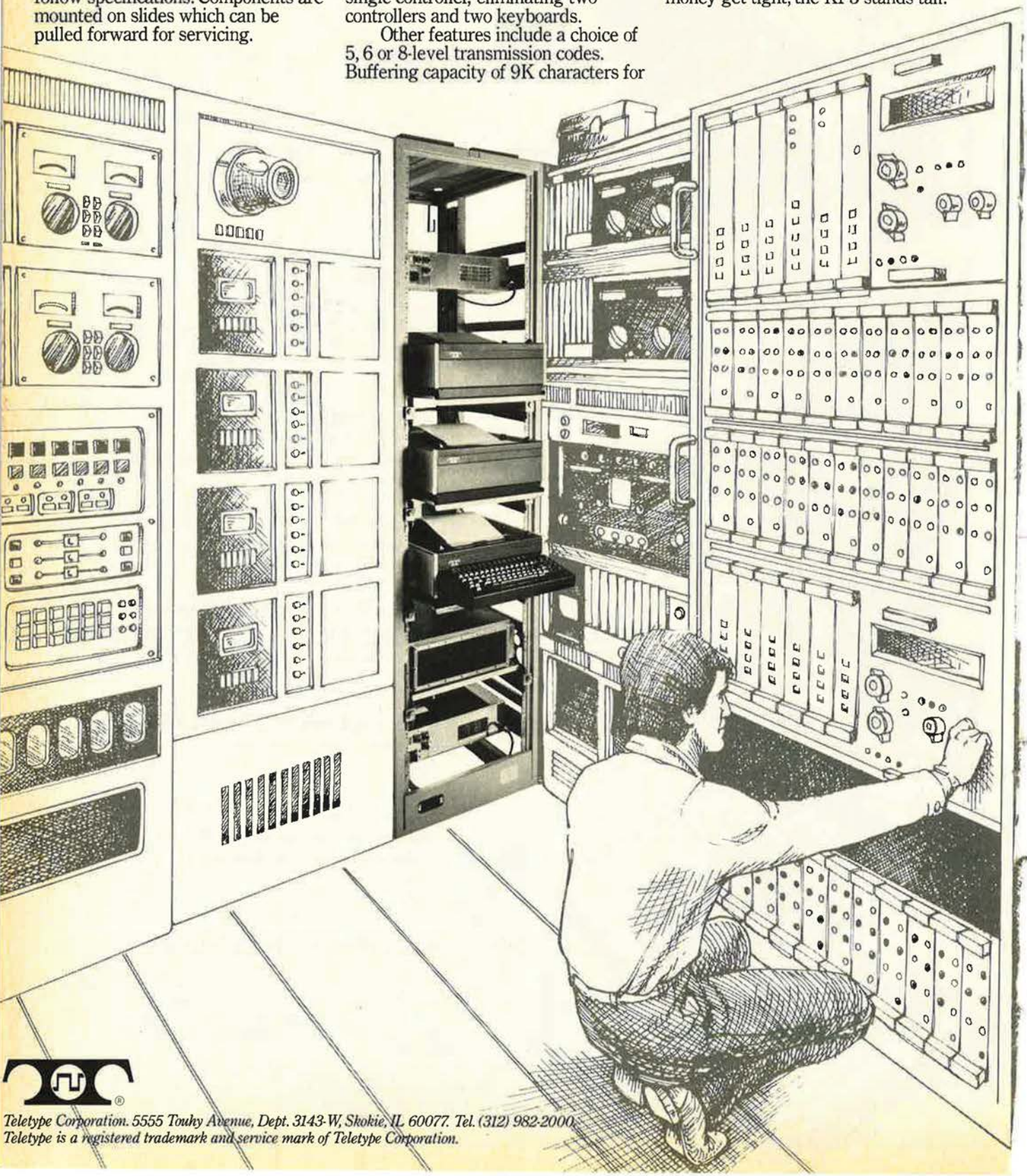

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windscreens and deflection armor plate around the fuel tanks and ammunition and places like that.

Lord Dowding is reported to have argued that if the gangsters in Chicago could have bulletproof glass, then his fighter pilots should, too.

That's exactly what he said; it's down on record.

Was this when you recommended installing cannon instead of the .303 machine guns?

Yes. I first came in contact with the Hispano 20-mm cannon when I was told to carry out some trials on a four-cannon Hurricane. I did quite a few of the trials with it, and immediately realized the hard-hitting power its cannon had in comparison with the .303s. Of course, all the German Messerschmitts were fitted with a cannon anyway. There was quite a lot of argument before we got the OK to fit them as a matter of routine to our Spitfires and Hurricanes. But, once decided, then it was forced ahead as quickly as the 20-mm cannons could be turned out and fitted.

What limited the speed of the conversion?

The availability of the cannon. We weren't manufacturers of the 20-mm cannon at the time, so factories were set up and they were produced very rapidly under license to Hispano-Suiza. A very efficient gun it was, too.

You flew more than 1,000 hours in Spitfires before joining 257 Squadron with Hurricanes. How do you compare the two fighters?

They are both very wonderful airplanes. The comparison I've always had in mind was that the Spitfire was like a fine thoroughbred race horse, while the dear old Hurricane was rather like a heavy workhorse.

But, of course, the Hurricane had tremendous advantages for attacking the bomber formations. For example, as you sat in the cockpit behind the gunsight, the nose sloped downward slightly away from you, which gave you very much better visibility over the nose when you were in combat, which is of vital importance. Also, it was a remarkably good gun platform; very steady when you opened fire. Also it was very easy to fly, had no vices, and would take a great deal of punishment and bring you back home. So it was a very fine aircraft for fighter vs. bomber work.

Now, the Spitfire was faster, would fly higher, and was very much more responsive to the controls, and was a slightly higher performance airplane.

It could turn inside the Me-109, couldn't it?

Yes. I did the very first comparison trials between the Spitfire and the Me-109E that we had captured in France.

Where did you conduct those?

At Farnborough. My opponent was a Schneider Trophy pilot. First, I flew the Spitfire and he flew the Messerschmitt against it through the set test routine. Then we landed and compared notes, and swapped aircraft and repeated the process to even out any personal variations.

What were the results?

They were basically comparable in performance. However, each had little advantages over the other, and vice versa. They were virtually equivalent performers.

Hawker Hurricane fighters in the tight prewar formation discarded rapidly in light of combat experience.

Did it then come down to individual pilot performance?

Very much so. That always comes in at the crunch . . . how he can fly, how familiar he is with his aircraft, and furthermore, his general tactics in the air once the combat starts. If he knows his aircraft intimately he doesn't have to watch the controls. And also, of course, he must be able to shoot straight.

What lessons do you see the Battle of Britain holding for the US today?

One that always sticks out to me is this: we must never, for a long, long time to come—centuries, probably—let our armed forces be depleted by politicians to such a low level that if there is an aggressor, we cannot face up to it. That stands out very clearly.

In 1940, we were in the position where various politicians and ministers had chopped our armed services back, and we were very small. So when the crunch of Hitler's plans for invasion with his vast Luftwaffe did come, we were numerically very inferior. It cost us dearly. It could have cost us the whole battle, and then probably the invasion of Britain would have taken place. But fortunately, things turned our way. So that is the prime lesson. After all, the armed forces of a nation are its national insurance policy, apart from its industry and its wealth. So I think they should never be allowed to be run down to such an extent that they cannot face up to a serious aggressor. ■

Yanks in the RAF

Seven Americans are listed among the names of the pilots who flew fighters for the RAF during the Battle of Britain. One, W. M. L. Fiske, was killed during the battle. All of the others eventually were killed in the war: Arthur G. Donahue, J. K. Haviland, Vernon C. Keough, Phillip H. Leckrone, Andrew Mamedoff, and Eugene Q. Tobin.

Tobin, Mamedoff, and Keough became founding members of No. 71 Eagle Squadron of the RAF on September 19, 1940. Eventually, two more American "Eagle" Squadrons (Nos. 121 and 133) were formed, flying RAF combat missions until the transition of their units into the US Army Air Forces' Fourth Fighter Group in September 1942. (See *The Eagle Squadrons*, by Vern Haugland, reviewed in December 1979.)

While they and their RAF comrades in arms fought the battle, the United States began to accelerate its preparations for war. On August 27, 1940, Congress granted authority to the President to activate the Reserve components. A week later, Roosevelt announced the transfer of fifty mothballed World War I destroyers to Great Britain in exchange for US base rights on her possessions in the Western Hemisphere. And on September 16 the first peacetime draft in US history was authorized.

Learning to fly can be a terrifying experience, especially when your instructor inspires all the confidence usually reserved for your local used-car salesman. However, as with all things, there is good and bad, as seen in this look at . . .

The Teachers

BY LT. COL. JIM BEAVERS, USAF (RET.)
Illustrations by Bob Stevens

IT WAS one of those Omaha winter days—snow on top of snow, and as much of it moving horizontally in the stinging wind as falling vertically. I was in the weather office at Offutt AFB, Neb., looking gloomily at a surface chart that depicted all sorts of cruddy conditions between there and Kirtland AFB, N. M., from which I was awaiting an airplane to take me home after two days of consultation with the SAC staff. The ceiling at Offutt was about 200 feet, and the base ops officer had just issued a Notice to Airmen that read, in part, ICERUN (ice on the runway), SNORUN (snow on the runway), to which I would have added, "and nose run, too." It was bitterly cold.

Out in the operations room, there was exactly one inbound on the board, and he wasn't from Kirtland. The pilot's name was unfamiliar. The odds were very much against his being the guy I was looking for. I wasn't alone in the room. Standing aloof was an older man whom I happened to know a little about, but had never formally met. He was a very senior full colonel, and he had amassed more than 24,000 hours as a prewar airline pilot, a wartime bomber pilot, and a postwar wing commander in SAC. He was dressed in a flying suit, but was making no effort to fill out the blank clearance form in his hand. He had apparently decided to wait for better weather.

The single inbound arrived. It was a C-47, and it was on the runway before anybody could see it. The pilot had to use near takeoff power to taxi through the white glop that covered the transient parking area, but he made it. He shut down the engines and climbed out of the airplane.

He was a first lieutenant, a short kid, and he bounced through the snow into base ops as if he owned the place. He reminded me of a short guy from Texas whom I'd known as a cadet and whom everybody liked. The Texan sometimes performed as drill sergeant, and in a heavy drawl intoned, "Y'luft, y'luft, y'luft raht luft." It had a nice beat. When he was in ranks with the rest of us, somebody was always yelling, "Fill in that gap!" He claimed to be a graduate of Terrasina Tech, a fictitious college for which he had a remarkable inventory of football cheers—all of them hilariously obscene. I therefore instinctively liked the C-47 pilot.

Inside, he immediately began filling out a new clearance. Whatever his destination, he was going on.

The senior full colonel watched, aghast. He walked up to the lieutenant and said, "Son, I have 24,000 hours, and I'm staying on the ground."

The truncated lieutenant smiled and replied, "Colonel, I have 1,900 hours, and I'm taking off. Nice talking to you, sir."

Having so said, and having gone through the clearance procedure, he trooped back out to the old gray lady he was flying, cranked her up, and plowed back out to the active. The wheels were retracting as he passed base ops and disappeared into the soup.

Whoever that kid was, he symbolized the Air Force to me much more than the 24,000-hour senior colonel did. The lieutenant had the supreme confidence of youth, but more than that, he knew what he was doing and knew that he knew. That was what the Air Force was all about, in terms of operating flying machines, and he was living proof that some guys in blue suits knew how to teach people to fly. Not all did, nor do all civilian instructors. And not all instructors are teachers.

Tailwind? What Tailwind?

My first instructor in private life was maybe three or four years older than I. In 1941, he was a recent graduate of the University of North Carolina. I was a sophomore. My father had agreed to pay the necessary $24 for me to enroll in the Civilian Pilot Training Program, which was worth three classroom credit hours and a private pilot's license. The instructor's name was Ernest, and I'll leave him otherwise anonymous.

His teaching philosophy was one of indifference. After they had mastered the basic takeoff and landing, he showed his students how to do something once and once only. If they got it, fine. If they didn't, that was too bad, but not a matter of deep concern to Ernest. His attitude of indifference rubbed off on others. The university's airport was new, and consisted of two bulldozed runways with no hardtop. There was no control tower, and the Piper Cubs we were flying weren't equipped with radios anyhow. A ragged windsock was mounted on the single hangar, but unless the wind was blowing very hard, nobody paid any attention to it because on a calm day the Cub could take off and land perhaps three times in the available length of either runway. The field was equip-

ped with a tetrahedron, which nobody ever bothered to set, the presumption being that if the wind got strong enough, it would set itself, provided it was left unlocked. Nobody ever bothered to find out whether it was or was not.

When I soloed in the Cub, I noticed that I was using an inordinate amount of runway to get airborne, but attached no great significance to it. Come to think of it, not much of anything registered for me at the age of eighteen except coeds with good figures and the fact that my money was running out again, and it was therefore time to write the folks a newsy letter.

I tried my first landing, and things got more complicated. I overshot, couldn't figure out what I was doing wrong, and overshot again. I tried a third time with the same result. Ernest marshaled all the students and the other two instructors to dance a daisy chain around the tetrahedron, which they had discovered was locked into the downwind position, and had turned around. Preconditioned to ignore it, I did—daisy chain notwithstanding. Eventually, I landed downwind on the last third of the runway, putting the main gear on first and struggling to get the tail down and the little airplane under control before I ran out of real estate. I got away with it, promptly turned the Cub around, taxied to the other end of the runway, and took off downwind again. Before Ernest finally got my attention and got me turned around, I had shot four takeoffs and landings, all of them swept along by what must have been a good twenty-knot tailwind. Hell, I was starting to like it.

Whatever the quality of Ernest's instruction, I joined up as an aviation cadet in early 1942 as a licensed pilot with possibly a hundred hours in my log book—maybe ten percent of it padded.

Of all the instructors I encountered in flying school, only two stand out in my memory. My primary instructor was a civilian and a weirdo. He didn't in the least fit the currently romanticized white-scarfed, dashing pilot. He was an older man, thin as a rail, with a gaunt, craggy face and beady eyes. He wore nondescript clothing that Goodwill Industries would have rejected out of hand. His most memorable trait, however, was his habit of sucking on caramel-flavored hard candy all day long. He smelled like caramel from five feet away.

When he discovered that I was already a licensed pilot, he hustled me through four hours of transition in as many days in the Stearman PT-13 and then, at an auxiliary field, climbed out of his cockpit to lean into mine.

"Okay, sport, go shoot me some sharp, spiffy landings!" he said, spraying me with caramel.

No man ever had a better incentive to get airborne, and to this day I can't stand the odor or the taste of caramel candy.

In basic, I met a man I genuinely admired. He was the stage commander, an Irishman fittingly named Mike, an ex-railroad engineer, and a yard wide through the shoulders. Superficially hard as nails, he was tough on the other instructors and on student officers, but pretty much a pushover in dealing with struggling young cadets.

I had trouble with the BT-13. Other guys had difficulty in primary with the Stearman, and I'd had none. My introduction to the Stearman had set off a love affair

"Get it all set up and it'll even shoot touch-and-goes for ya."

that I've never fully recovered from, and anybody who's ever flown that pretty little bird knows what I mean. It was a simple joy to fly, and with one possible exception—the T-33—I've never since felt such an affinity for an airplane. It was as if those bright yellow wings were attached to my own shoulders and those classy, slim landing gear struts extensions of my own legs. Perhaps to perpetuate a personal tradition or something, I came screaming in downwind one day in spite of all sorts of flashing red lights from the tower, and placed the lovely young miss on her tiptoes—main gear first—and coaxed her little fanny down in demure and respectable fashion. I loved the airplane—*loved* it!

. . . swept along by what must have been a good twenty-knot tailwind.

The Railroad Philosophy of Pilot Instruction

But the BT-13 was something I couldn't relate to. For one thing, the cockpit was too big. It wasn't an airplane—it was a truck. In spite of that, it was exactly what it was intended to be—a hybrid between the light, uncomplicated Stearman and the relatively heavy and complex AT-6. The BT-13 had fixed gear, but it had a two-position prop control that was either full low pitch for takeoff and landing or full high for cruise. It had hand-cranked flaps and preposterously big, circular trim tabs for the elevators and rudders. The airplane had me buffaloed, and those big trim tabs were part of the problem. For some obscure psychological reason, I had never thus far used them. Instead, I was trying to fly the beast like I had flown the little love of my life in primary, and the BT-13 was just too heavy for that. I was fighting it every inch of the way.

Mike the Irishman elected to find out firsthand what my problem was. He took me up for a checkride, determined to show me how easy it was to fly that turkey. Using railroad language, he demonstrated his own mastery of the airplane. The climax of his display of skill came when he rolled the Vultee Vibrator inverted and held it there while the engine quit. By chance, I happened to observe the elevator trim tab as he rolled, and Mike ran it all the way into the full forward position. A very large light came on in my troubled brain, and that was the turning point in my battle with the BT-13.

The dead engine didn't bother me. I knew it would restart when we rolled erect. But something else happened that really upset me. Seventy-five cents dropped out of the unzipped left pocket of my flying suit and came to rest against the closed canopy. Seventy-five cents, to a cadet at the time, was the equivalent of perhaps five dollars today. Just as I was reaching up (or down) to retrieve the coins and avert financial disaster, Mike flipped us upright again, and they all disappeared between the open floorboards into the belly of the airplane.

Explaining the problem on the interphone, I asked for the controls and got them. I rolled inverted again, running the trim tab full forward as I did so. Cripes, what a difference *that* made!

Out came fifty-five cents. I captured the coins with my free hand and stuffed them into a side pocket. Still twenty cents short, I belted the rudders and jolted the stick. Up (or down) from beneath the floorboards came half a dollar, two quarters, and my two missing dimes. I was now one dollar and one big lesson ahead.

Mike then proceeded to teach me still another. He took the controls and headed for the field, calling the tower and getting approval for a straight-in approach.

"All y'gotta do," he announced in the process, "is keep this thing headed for the roundhouse—get it on the right track and just chug on down the line." He was on a long, easy final. "Nothin' to it. Get it all set up—establish your approach speed with the throttle and flaps, get trimmed up, and it'll land itself."

It did—several times. He hit the runway, ballooned colossally, hit again, ballooned again, and stalled out at about five feet to come down with a crashing jolt that almost unrolled the sleeves of my flying suit.

"See?" Mike observed in a disinterested voice over the interphone. "Get it all set up and it'll even shoot touch-and-goes for ya."

But he had demonstrated in unforgettable fashion that trim tabs or no, it was still necessary to fly the airplane. He didn't apologize for the bad landing, and I would have liked him less if he had. His refusal to make excuses was a lesson in itself. I struck a sort of armed truce with the BT-13 after that flight. It served its intended purpose, and after mastering it, I found the AT-6 easy to fly.

Never Teach Yourself

Pilots in my time ran into instructors at almost every turn, and I think it's probably not much different today. If one of us got transferred to a new station, even if only one day's travel was involved, he somehow lost his aeronautical citizenship in route. He had to demonstrate by means of a checkride that he had not in the intervening twenty-four hours incurred total amnesia. Moreover, as we World War II graduates progressed through the years, amassing flying time, while instructors tended to remain young forever, there frequently arose the question of who should be the checker and who the checkee. I was once given a check-

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ride by an IP who had almost a thousand less hours in the specific airplane involved than I had. We got along all right in spite of that. He agreed to check me out, and I agreed to his right to do so. Who cared? It was, as an RAF exchange pilot on duty with SAC once put it, nothing more than a matter of filling in "those miserable little squares." The teaching quality and level of experience of instructors had to vary from base to base, because each installation had to use whatever was available to it. Out of that, I suppose, came today's standardization and evaluation.

I myself tried teaching on one occasion when I was a base operations officer and therefore empowered to designate myself an authorized, accredited, and consequently eminently qualified dispenser of knowledge. One of my first customers was the newly appointed director of operations. It took me several days to give him a thumbs up, after which he noted, "Beavers, I don't know what your talents are, but instructing isn't one of them."

The supreme test of my teaching ability during that assignment came when I elected to check myself out in the P-51. Where we previously had none, four of the airplanes had arrived unannounced the day before, the pilots obtaining my signature on some papers and then disappearing as mysteriously as they had arrived. The only thing I had to guide me was the Pilot's Handbook of Operating Instructions—the basic tech order. I read it from cover to cover. Some of it was preposterous. For example, it said I should use sixty-one inches of mercury on takeoff, and that seemed patent nonsense. Whoever heard of sixty-one inches of mercury? The document went on to say that the throttle could be shoved past the stop to 105 inches, and I decided that I was reading science fiction.

Nevertheless, I went out and climbed into a P-51D. I was immediately intimidated by the huge four-bladed prop ahead of me at the end of what seemed to be an engine the length of a football field. Recalling the tech order, I cranked it up. It ran. No excuse, so far, for chickening out. I called the tower for instructions and taxied to the end of the runway, remembering to move the stick forward when I needed to turn and to lock the tailwheel by keeping the stick in my lap while going straight.

"Okay, sport, go shoot me some sharp, spiffy landings!"

I ran the engine up and checked the mags. No luck: it checked out perfectly. I sighed and called the tower again to ask for takeoff clearance. More lack of cooperation: I got it. I pulled out onto the runway, lined up the airplane, took a deep breath, and shoved the throttle to the stop. Sure enough, the manifold pressure gauge read sixty-one inches, and I wouldn't have believed it possible, to that point.

The Mustang was ready to fly before I was. I got it off the ground, pulled the wheels up, and for the life of me couldn't remember what the first power reduction was supposed to be. Everything in my memory bank had been dumped when I read that manifold pressure. Head deep in the cockpit, I consulted the tachometer for clues. All it told me was what I already knew. Meanwhile, I was building up airspeed and roaring out of the state toward Tennessee. I finally reduced the manifold pressure to something like fifty-four inches and pulled the rpm back to around 2,400. It was probably wrong, but it was better than screaming ahead at takeoff power. Then I looked out of the cockpit, and I was lost, but since I had taken off to the west, it seemed to follow that I should turn east. After congratulating myself on my flawless logic, I racked the Mustang up into a ninety-degree bank and hauled in on the stick. Unprepared for the G-forces, I almost broke my neck in the process. I must have been doing 400 mph at the time.

After essaying some further innovative power reductions and performing a little exercise known as getting one's head out of one's lower colon, I found the field. Somehow, I made it onto the ground. At the end of the runway, with the P-51 under control, I had to agree with the director of operations. I was a lousy teacher. Even with myself as a student, I didn't have the patience or the talent to do it right. What's more, I could easily have brought on a midair collision in those first few confused minutes after takeoff from a very busy airport. That was seventeen years before my retirement, and I never instructed again.

An old aphorism holds that "them as can, do; them as can't, teach"—probably first uttered by some dummy who didn't fit into either category. When it comes to flying, my experience says that it ought to be phrased differently: "Them as can teach should, because good teachers are hard to find. Them as can't should stay out of the classroom, because they constitute a hazard to flight."

And of course those who don't fit into either category can always try writing about flying. ■

Jim Beavers's lighthearted accounts of B-25 combat operations in North Africa, transitioning to jets, and life as an Air Staff planner have enlivened the pages of AIR FORCE Magazine for the past four years—all with illustrations by "There I Was . . ." cartoonist Bob Stevens. Beavers retired from the Air Force as a lieutenant colonel in 1963, after serving as a nuclear weapons specialist, and now divides his time between writing and running his business in Winter Park, Fla.

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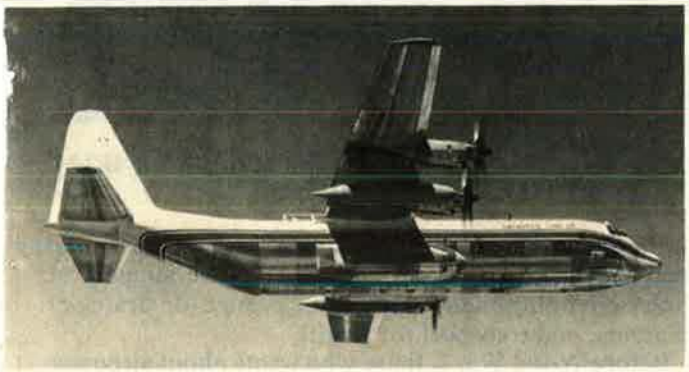

Hercules is flown by some 50 operators around the world and by the U.S. Air Force, Navy, Marines, and Coast Guard. It was the first big, turbine-powered airlifter with a rear cargo door, which lets large, fully assembled trucks and bulldozers be driven on and off. And Hercules can use short, remote airstrips of almost any surface—dirt, gravel, grass, sand, or snow.

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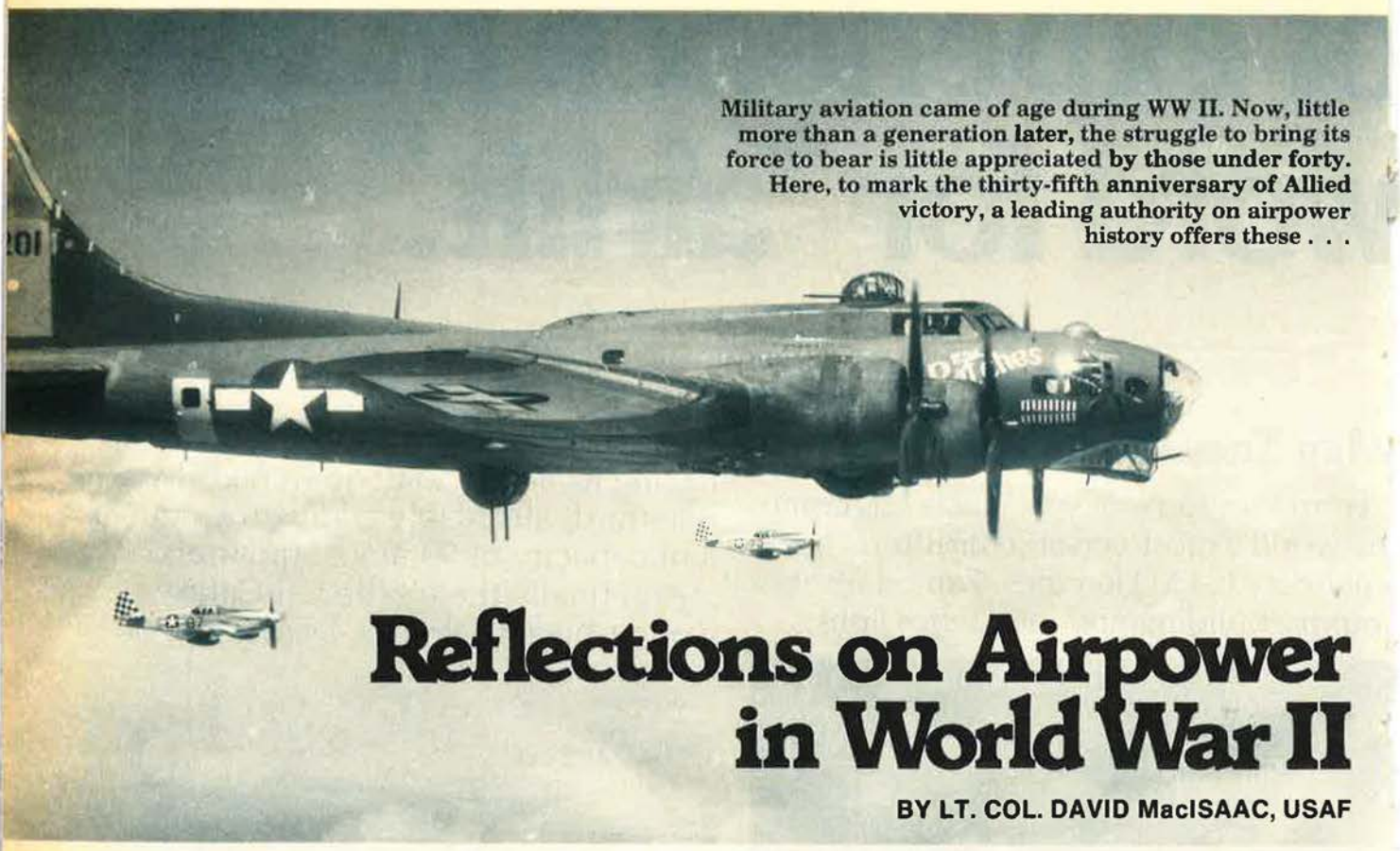

Military aviation came of age during WW II. Now, little more than a generation later, the struggle to bring its force to bear is little appreciated by those under forty. Here, to mark the thirty-fifth anniversary of Allied victory, a leading authority on airpower history offers these . . .

Reflections on Airpower in World War II

BY LT. COL. DAVID MacISAAC, USAF

NOT MANY people today share an understanding of the role played by military aviation in World War II. In 1945, few Americans had any doubts that airpower had become, whether by its presence or absence, the potentially decisive factor on all fronts, in all theaters, and in all campaigns. The emergence of atomic and later thermonuclear weapons soon made this awareness one of foreboding more than anything else, and has obscured from view the accomplishments without which victory would have been longer delayed and the establishment of the United States Air Force rendered improbable, if not impossible.

Forty-one years ago this month, the war, already long simmering in the Far East, got under way in earnest in Europe. Six years later the Allied powers emerged victorious. In the interim, airpower grew from infancy to at least advanced adolescence (the view of the late Maj. Gen. Orvil A. Anderson), if not maturity (the preferred view of the postwar USAF). The experiences of the major combatant powers varied, and were powerfully affected by the prewar views of the controlling minds in each country.

World War I and Its Aftermath

From 1914 to 1918, military aviation played an occasionally spectacular, increasingly important, yet largely unessential part. In the development of military airpower, the war was no more than a transitional phase, though providing enormous impetus to the technical development of aircraft and to the recruitment and training of flying personnel, so that a new generation became air-minded. At the conceptual level, the war witnessed the emergence of now-classical roles and missions: reconnaissance, air-to-air combat, tactical support of forces operating on the surface, long-range (or strategic) bombing, and transport (or airlift).

Before World War I, those who wrote about airpower did so almost invariably in terms of prophecy. Very quickly after the war, however, the prevailing tense of statements about airpower switched from the future to the present. Whether we think of Douhet, Mitchell, Trenchard, or de Seversky, we cannot escape noticing a strident urgency in writings and statements urging airpower's claims to supremacy. The fundamental doctrine shared by such thinkers was paraphrased by Edward Warner as: "The airplane possesses such ubiquity, and such advantages of speed and elevation, as to possess the power of destroying all surface installations and instruments, ashore or afloat, while itself remaining comparatively safe from any effective reprisal from the ground."

Throughout the 1920s and 1930s, military men chose sides by declaring their acceptance or rejection of that doctrine. So much emotion, so much irrational faith became bound up in discussions of this issue that historians half a century later often find *themselves* entrapped in the debate.

Theories and Theorists

Giulio Douhet's *Command of the Air* (1921) set the prevailing tone. Repelled by the futility and useless loss of life in the trenches of World War I, the Italian general proposed rejecting the battlefield altogether in favor of a science-fiction leap across the trenches by aircraft di-

rected against an enemy's "vital centers." Airmen elsewhere, particularly in Great Britain and the United States, shared Douhet's view that the center of gravity for a modern state was its industrial heart. Most of them, however, were far less willing than Douhet to concentrate exclusively on long-range bombardment aircraft.

In Britain, for example, short-range attack and patrol aircraft became an important element of the "air control" concept, whereby the Royal Air Force worked at applying aircraft to the policing functions of the Empire. Later, following Hitler's rise to power in Germany, bombers would still be emphasized by the air staff but not to the exclusion of the fighters necessary for air defense. At our own Air Corps Tactical School, bombardment was also emphasized, but aircraft and tactical doctrine for air superiority and tactical ground support were by no means ignored.

In Germany, Douhet's ideas never took hold for several reasons. One was that Hitler's initial goals had to do with conquest rather than with destruction. Also, the Luftwaffe's technical status as a separate service was offset by the traditional dominance of the General Staff, whose interest in aircraft was in how they could be used to spearhead the attack of ground forces. In Japan, France, and Russia (with the notable exception of the Japanese naval air arm), equipment and doctrine lagged behind the other powers.

The War Begins

Even before Hitler's invasion of Poland in September 1939, airpower had achieved notoriety in Spain, China, and in its deterrent role at Munich in 1938, when fear of the Luftwaffe drove the decisions of the Chamberlain government.

During the campaigns in Poland, Norway (April 1940), France (May 1940), and over Great Britain (late 1940, early 1941), attacking air forces emphasized terror tactics, airborne assaults, and tactical support of engaged forces. The RAF's victory in the Battle of Britain was absolutely crucial to the future combined American-British bomber offensive. The Luftwaffe's leadership and equipment had much to do with the outcome, but one would be callous to question the achievements of those gallant few, to whom never did so many owe so much in yet another "nearest run thing you ever saw in your life." (Success or failure is not the yardstick by which to judge heroism.)

1941–42: Years of Adversity

The German invasion of Russia in June 1941 helped relieve the pressure on Britain's air force, which, along with the Royal Navy and the remnant army rescued from Dunkirk, had stood alone for a year. In the Mediterranean, Greece, and Northern Africa, the RAF developed tactics and techniques that would become standard in the coming years. With the Japanese attack on Pearl Harbor on December 7, 1941 (and with the sinking of the *Prince of Wales* and *Repulse* off Malaya by land-based Japanese aircraft three days later), naval warfare entered a new age. Three events were especially important.

The Halsey-Doolittle raid launched from the carrier *Hornet* against Tokyo in April 1942 signaled a new vulnerability not taken into account by Japanese planners. In May, the Battle of the Coral Sea became the first engagement where the opposing fleets were never in sight of one another. And at Midway in June 1942, the sinking of four Japanese carriers by a combination of pluck and luck made it apparent to all that naval warfare had entered the air age.

Architects of airpower application (from left), Gen. H. H. Arnold, Commanding General, US Army Air Forces; Air Chief Marshal Sir Arthur Harris, RAF Bomber Command; and Maj. Gen. Ira Eaker, CG Eighth Air Force, stroll on the lawn of Sir Arthur's estate.

On the Russian and Mediterranean fronts, 1942 saw the stemming of the Axis tide, signaled most auspiciously by the German defeats at El Alamein (October) and Stalingrad (December) and the successful US-British landings in North Africa (November). In Great Britain, RAF's Bomber Command and the fledgling US Eighth Air Force, the one operating by night and the other by day, began the attack on Axis Europe.

By the end of May, Bomber Command, despite earlier severe losses, was able to mount the first thousand-plane raid, against Cologne. The Eighth spent most of 1942 in a buildup phase, beginning with the arrival of Brig. Gen. Ira C. Eaker and a staff of six on February 20. By mid-June, Eaker, Commander of Eighth Bomber Command, had been joined by Maj. Gen. Carl A. Spaatz, who had been named Eighth Air Force Commander, and advance elements of the 15th Bombardment Squadron.

American participation in air attacks against the Con-

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tinent had begun in June when thirteen B-24s under the command of Col. Harry A. Halverson took off from Fayid, Egypt, to bomb oilfields at Ploesti. (The outfit, en route from the US to China, was diverted for the mission.) Halverson's gang then went to work on the Italian fleet. The next attack on the Continent came when six crews of the 15th Bombardment Squadron flying RAF Bostons (the British name for the Douglas A-20), joined an RAF low-level attack on four German airfields in the Netherlands. (The date, July 4, was important to the Americans for reasons their RAF colleagues might well have considered obtuse!) The first mission of the Eighth took place on August 17, when twelve B-17s of the 97th Bomb Group led by General Eaker attacked marshaling yards at Rouen-Sotteville. The rapidity of the Eighth's early buildup is astonishing in retrospect, but it would soon be slowed by diversions of aircraft and crews to the Pacific and Mediterranean. In addition, the requirement to conduct combat crew training in the theater of operations was disconcerting, to say the least (*see box*).

1943: Trial and Error

The "Germany first" policy of the Combined Chiefs of Staff, along with the problems faced at Guadalcanal and throughout the Solomons, delayed large-scale offensive action in the Pacific until late in 1943. In the Mediterranean theater, airpower matured by leaps and bounds, and tactical control techniques worked out in the Northwest African Tactical Air Forces (NATAF) were incorporated in the War Department's FM 100-20, *Command and Employment of Air Power*. In addition, *all* elements of the Northwest African Air Forces (NAAF) participated effectively in the expulsion of Rommel from Africa and the invasions of Sicily (July) and Italy (September). By late November, advance elements of the Fifteenth Air Force were establishing themselves in Italy at bases near Foggia.

For the Eighth Air Force in England, 1943 was a trying year. It had begun hopefully enough with the decision at the Casablanca Conference in January to endorse the Combined Bomber Offensive *(see box)*. The diversion of resources to the Mediterranean late in 1942 had been accompanied by continuing requirements throughout late 1942 and early 1943 to attack German submarine facilities along the European coast. If the grand strategy of an amphibious assault launched against the Continent from England were to be successful, the Battle of the Atlantic simply had to be won first. While admitting as much, General Eaker and his commanders fretted over when they would ever be cut loose to realize an equally important prerequisite—the destruction of the Luftwaffe and hence assured air supremacy over the point of assault.

By late summer of 1943, target priorities began to fall more in line with the Eighth's hopes. Long-range attacks deep into Germany began with the aircraft industry and ball-bearing production facilities as primary targets. Lacking escort fighters of sufficient range to accompany the bombers all the way to their targets, the Eighth suffered heavy losses, especially against Schweinfurt-Regensburg (August 17) and again at Schweinfurt on October 14. (For the definitive account of this period, see Thomas M. Coffey, *Decision over Schweinfurt*, David McKay Co., New York, 1977.) Finding it unwise to continue deep penetration attacks until long-range escorts became available in force, the Eighth scaled back its operations as the typically horrid winter flying weather returned.

Gen. Dwight D. Eisenhower in cockpit of Martin B-26 "Son of Satan," April 11, 1944. Ike is chuckling at his own comment: "If these engines start up, I'll come right out through this window!"

Combat Crew Training, England, in 1942

Gen. Curtis E. LeMay, recalling the early days with the 305th Bomb Group in England:

"When I was given command of a bomb group [the 305th], it consisted almost 100 percent of inexperienced people. I had one major, who had been commissioned from the rank of master sergeant, an administrative clerk, and he was my group adjutant. I had two pilots, besides myself, who had flown B-17s before, and we three had to check out the other pilots, who came directly from single-engine school. The armament officer was an ex-Marine corporal who had been a captain in the Nicaragua National Guard for a while. He knew something about machine guns, so he was my ordnance officer. My prize was a first lieutenant who had been a line chief in B-17s as a tech sergeant.

"The navigators I got two weeks before we went overseas. They had had one ride in a B-17 before they navigated across the Atlantic; the first time half of them had ever *seen* the Atlantic was when they navigated across it. The bombardiers had never dropped a live bomb. They'd dropped some practice bombs over a desert on a nice white circle you could see for fifty miles, something entirely different from trying to hit a factory in the midst of a built-up area in the industrial haze of Europe. The gunners had been to gunnery school, supposedly, but had never fired a gun from an airplane.

"We never got to fly formation until we got to England. The first day we could fly I got up in formation and it was a complete debacle. The next flight, I got up in the top turret on the radio and positioned each aircraft until the gaggle I had around me approached the formation I wanted to fly. The third time we flew, we went across the Channel. That was our start into combat."

—From *Air Power & Warfare*, ed. by A. F. Hurley & R. C. Ehrhart, (Washington: Government Printing Office, 1979, pp. 197–98)

The Companion Trainer Aircraft: The advantage is with the Beechcraft C-12.

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- The C-12 is an airplane the USAF has already learned to count on for reliability.
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1944: Victory in the Air

In the Southwest and Central Pacific Theaters, led by General MacArthur and Admiral Nimitz, land-based and carrier-borne aircraft spearheaded the drive across the Pacific. Lt. Gen. George Kenney's Fifth Air Force was in almost daily contact with the enemy along what MacArthur liked to call "the New Guinea-Mindanao axis." The Fast Carrier Task Forces pushed inexorably from the Gilberts to the Marshalls and on through the Marianas to the Philippines. Before the year was out, the Twentieth Air Force (armed with the new B-29) was established at Guam, Saipan, and Tinian, launching its first attack on Tokyo in November. The circle was closing; Japanese airpower was in ruins; desperate measures would be adopted, but all would fail.

In Europe, the year began with major reorganizations. General Eisenhower returned to London from the Mediterranean to command the European Theater. With him came Lt. Gen. Carl A. Spaatz, appointed CG, US Strategic Air Forces (USSTAF, controlling the Eighth in England and the Fifteenth in Italy). To his chagrin, Lieutenant General Eaker was reassigned from command of his beloved Eighth to become CG, Mediterranean Allied Air Forces (MAAF). Maj. Gen. James H. Doolittle succeeded him at High Wycombe.

During February, USSTAF launched a massive attack on the German aircraft industry. The Luftwaffe rose in fury to repel the attacks, and in the process lost 1,000 pilots. From this blow it would never recover; Allied air superiority over the Continent had been achieved. Before it could be exploited, however, control over all air forces, strategic and tactical, passed to General Eisenhower. From March until September, from three months before until three months after the invasion at Normandy, the majority of the air effort was tied to supporting the invading forces.

Occasionally, as on May 12 and 28, General Spaatz prevailed on Eisenhower to authorize deep penetrations against German synthetic fuel production. These resulted in sharp reductions in the availability of aviation gasoline, reductions that had the compounding effect of reducing the fuel available for training new pilots. Following the breakout from Normandy, Maj. Gen. Hoyt S. Vandenberg's Ninth Air Force moved to bases on the Continent, providing daily support to the ground forces advancing toward Germany.

When, late in 1944, the USAAF bomber forces were at length freed to concentrate on German synthetic fuel plants and the German transportation network, the Luftwaffe, already so weakened by June that it could not oppose the Normandy landings, fell into disarray. Hopelessly outnumbered by the combined forces of the USAAF, RAF—and by now the Russian air forces in the East—and undergoing increasing attack by day and night, the GAF had lost the battle. Not even the introduction of new terror weapons (the V-1 in July and V-2 in September) or the new high-speed jet fighter (Messerschmitt-262, also in September) could stem the tide.

1945: Exploitation

Despite high hopes in October 1944 that Germany would collapse before the end of the year, 1945 opened in Europe with the Allied forces hurriedly regrouping following Hitler's last-ditch offensive in the Ardennes (the Battle of the Bulge, December 1944). Rain, snow, freezing weather, and mud were everywhere in the opening months of the year. But so also, weather permitting, were the fighters and medium bombers of the Ninth. The Eighth Air Force heavies, by now equipped with primitive radar bombsights, continued to pound Germany until early April.

Victory in Europe, never in real doubt after mid-1944, had been too long delayed. Many would later argue that continuing diversions of USSTAF to "nonstrategic targets" were a primary cause of that delay. We can never be certain about such things, but we can acknowledge some undisputed facts: (1) the visionaries among the airmen never doubted that the war would be dominated from the air; in this they were correct ahead of time (not many of us ever are!) even if they were not right about some of the details; (2) the European air campaign as laid out by the planners was not followed other than by exception, for reasons well beyond the control of either the original planners or the air com-

The Battle of Casablanca

Gen. Curtis E. LeMay recalls Lt. Gen. Ira C. Eaker's victory in "The Battle of Casablanca" (January 1943):

"I was not always privy to the fierce struggle behind the scenes engulfing Eaker in his efforts to keep the concept of daylight strategic bombing alive. Churchill, Sir Archibald Sinclair of the Air Ministry, and Air Chief Marshal Sir Charles Portal of the RAF were all critical of our seemingly slow progress; at home, the army and navy were keeping Hap Arnold constantly on the defensive, anxious to divert part (or all) of our resources to their own ends. In a nutshell, strategic bombing was not proving itself, yet.

"I did not see the confidential memoranda that were being circulated among the powers-that-were (nor, indeed, was Eaker always apprised). But I heaved a sigh of relief when Eaker won the "Battle of Casablanca" in early 1943. Roosevelt had already announced to Churchill that he would go along with the latter's desire to merge the American daylight bombing effort with the RAF's night bombing strategy. Hap Arnold sent posthaste for Eaker to fly down to the conference from London to defend the daylight concept. Eaker . . . worked day and night at Casablanca preparing a twenty-three-page summary. Aware of Churchill's impatience with long-winded documents, Eaker boiled it down to a single page and presented it orally. Surprisingly, Churchill changed his mind, taking a particular fancy to the phrase, 'by bombing the German devils around the clock, we can prevent them from getting any rest.' From then on, we had a firm foundation for our daylight policy, although there continued to be shifting emphases on target priorities."

—Excerpted from "Strategic Air Power: The Command Realities," by Curtis E. LeMay, included in the March 1980 reissue of *IMPACT*, the wartime monthly intelligence magazine for crew members (New York: James Parton & Co., Inc. 1980)

(Also reproduced in *Aerospace Historian*, 27, 1 [March 1980], pp. 9–15)

Lt. Col. David MacIsaac is presently Chief, History of Warfare Studies at the Air War College, Maxwell AFB, Ala. His assignments have included Strategic Air Command (Texas and Spain, 1959–64); four tours at the Air Force Academy; Vietnam; Visiting Professor of Strategy at the Naval War College; and Resident Fellow, Woodrow Wilson International Center for Scholars.

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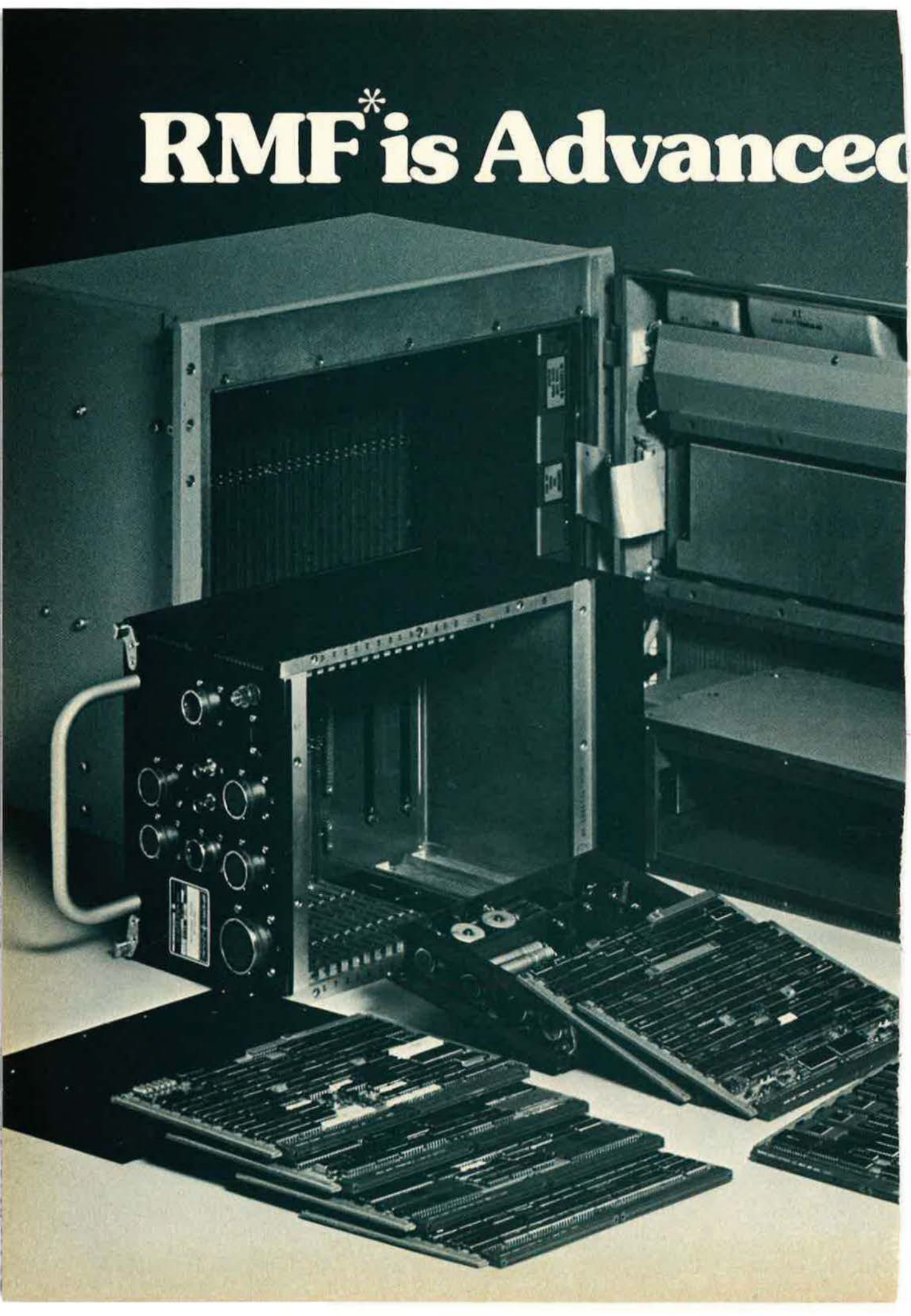

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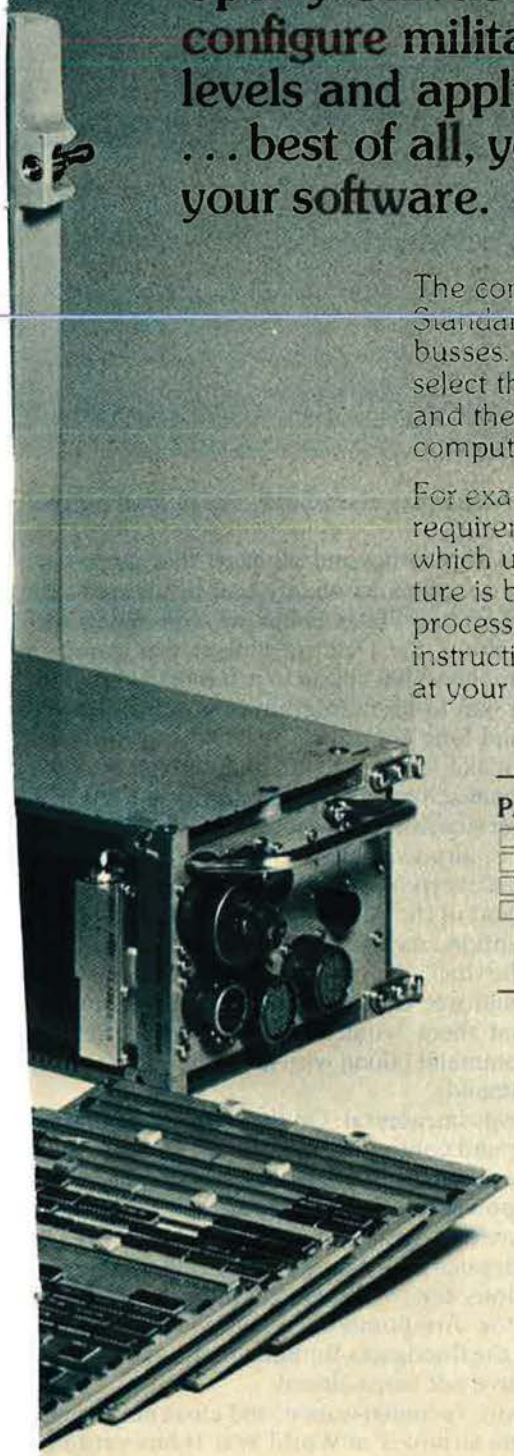

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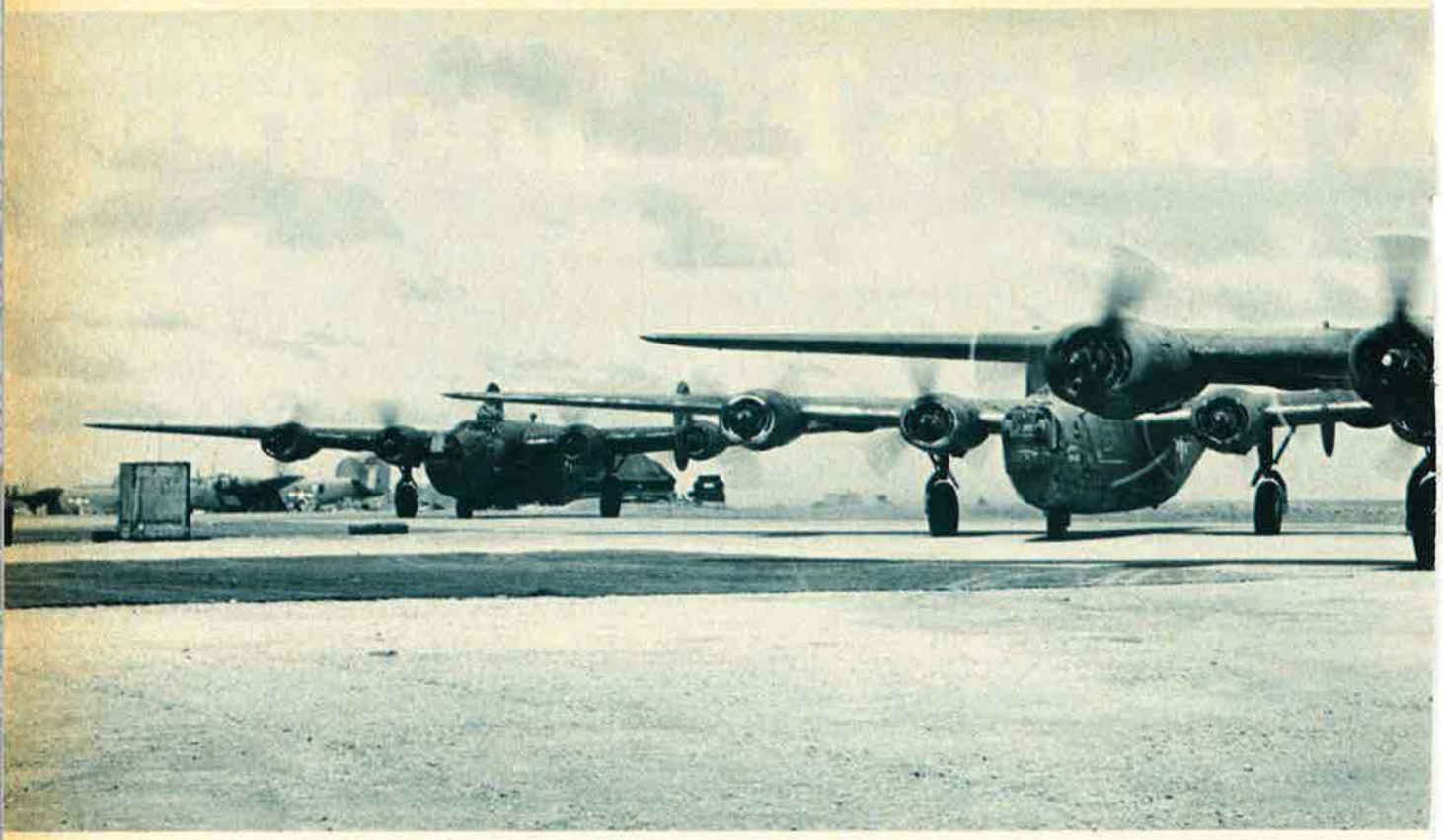


manders on the scene; (3) the heroism displayed by the airmen of World War II was not exceeded in any war, before or since; and (4) in the absence of Allied airpower, it is inconceivable that the invasion could have been launched, yet alone the war won.

In the war against Japan, 1945 saw altogether too many bloody battles, in the Philippines and at Iwo Jima and Okinawa. Some—Iwo Jima not included—might have been avoided had not General Marshall been convinced beyond argument that a full-scale invasion of the Japanese home islands would be necessary to induce surrender. As it happened, however, no such invasion proved necessary. The combined effects of the bombing attacks and naval blockade, capped by the atomic bombs, brought the war to an end much more quickly than had been thought possible.

After It Was Over

When it came, the victory was overpowering on Americans at home. The atomic bombs—weapons none of the senior airmen saw any need to employ—directed the destiny of the future Air Force. President Truman (not unlike ten-year-olds, like me) was thoroughly impressed by the new possibilities of atomic war from the air. The facts were simple: We had it, they (whoever) didn't. Therefore we could go on hold, the popular reasoning went.

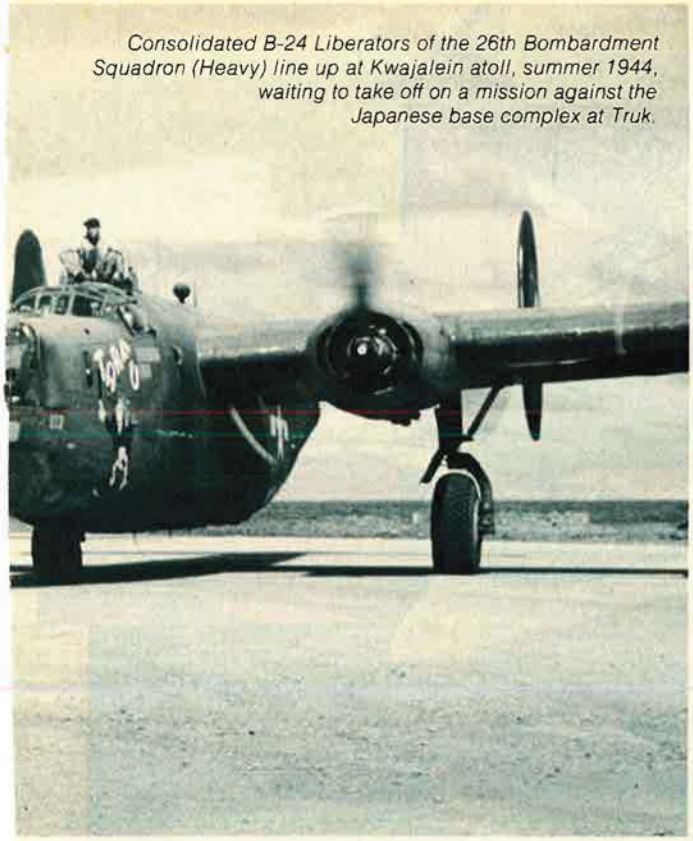
That's exactly what the nation did, under presidential and congressional leadership, for the better part of five years (until the invasion of South Korea on June 25, 1950). Recognizing this trend as early as November 1945, General Spaatz, Hap Arnold's heir-designate and hero of two world wars, strove mightily to keep alive the long-range striking force. He might have preferred to concentrate his energies elsewhere, but he had no real choice.

The war had shown beyond all cavil that airpower, especially when applied as widely and in as many directions as the United States could do, dominated surface warfare. But if the Defense budget was going to drop from more than $100 billion to just over $11 billion, then priorities had to be reordered. It was back to the 1930s again, and long before the Eisenhower Administration would make the phrase famous, the postwar Air Force sought (and achieved) "more bang for the buck."

Within the service not much thought was given to how many aspects of airpower had proven themselves. The atomic weapons overpowered thought, and the drive for the establishment of the Air Force as a separate service distracted attention. As Spaatz and Ike took over from Arnold and Marshall, Ike had to spell out that the new Air Force would not be organized under one combat command—that there would be a tactical as well as strategic air command (along with an air defense and air transport command).

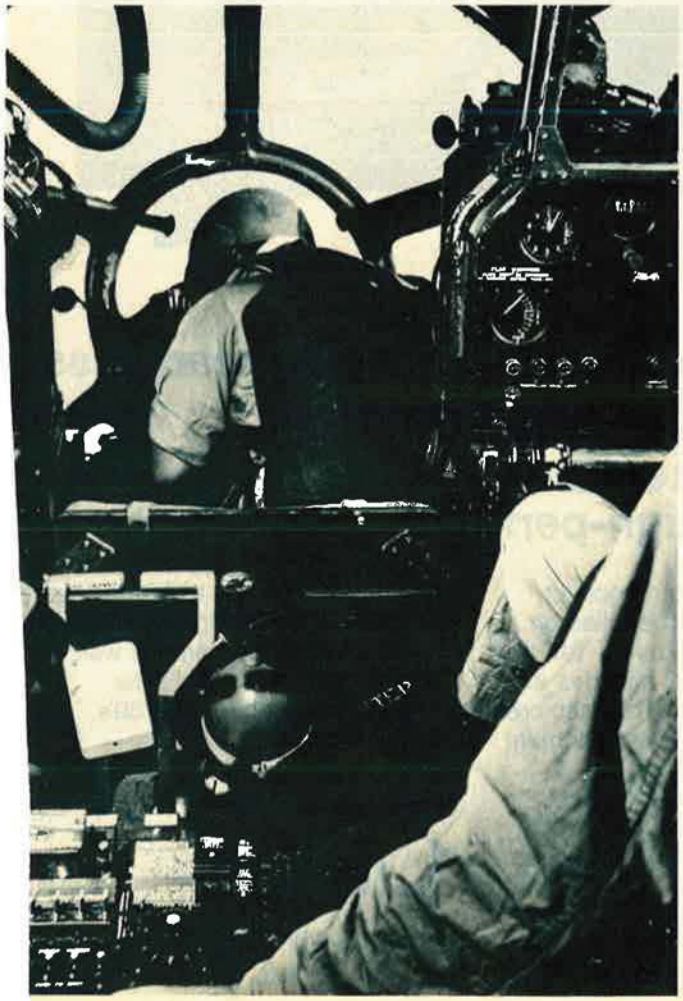
But all this was intramural. On the outside, beginning during the war and continuing ever since, a battle raged among commentators and evaluators about the effectiveness of airpower during World War II. RAF Bomber Command's avowed policy of striking target "areas" (technically necessary for them, but leading to abominable justifications for "dehousing" factory workers) followed by the fire-bombing of sixty-six Japanese cities, opened the floodgates for humanitarian criticism. Those gates have not since closed.

In its transport, reconnaissance, and close air support roles, American airpower in World War II has yet to be given its due by historians. (There's not much help in



Consolidated B-24 Liberators of the 26th Bombardment Squadron (Heavy) line up at Kwajalein atoll, summer 1944, waiting to take off on a mission against the Japanese base complex at Truk.

ABOVE: Gen. H. H. Arnold, CG, Army Air Forces, interviews a B-29 crew chief on Guam. Maj. Gen. Curtis E. LeMay (left) watches. BELOW: Lt. Gen. George C. Kenney (left), Commander, Far East Air Force, with Brig. Gen. Paul B. Wurtsmith, CG, Thirteenth Air Force. BELOW LEFT: In a B-29 over Japan, the bomb run begins as copilot switches on the autopilot while bombardier hunches over bombsight.



sight because most people now looking for dissertation topics are about twenty-five-years-old—hence born circa 1955 and impressionable teenagers in the agonizing 1968–72 era.)

Nonetheless, the single clear lesson of World War II was that the visionaries were correct when they argued in the 1920s and '30s that all future warfare would be dominated from the air. They agreed on that. What they argued about was just how airpower would dominate surface warfare. In doing so, they fumbled now and then.

But to criticize those who flew before for failures of detail in their prophecies about the future is to subject those who gave us our chance to a more severe ordeal than they deserve. What we should do, instead, is marvel at their vision, and emulate their stamina in pulling off what they had been told was impossible. ■

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Building the Pe

BY HERMAN S. WOLK

The weapons of today are the museum pieces of tomorrow. So tomorrow, the B-29, the Superfortress of today, will belong in the Smithsonian Institution, with the Wright and Lindbergh planes, its place on the line to be taken later by bombers that will carry fifty tons of bombs, planes with jet or rocket motors capable of flying around the world at supersonic speeds.

—Gen. H. H. Arnold,
Commanding General, Army Air Forces,
November 1945

LATE 1944. America's military leaders thought that the end of the war was in sight. The cross-channel invasion of the European continent had succeeded. Lt. Gen. Carl A. (Tooey) Spaatz's strategy to attack Germany's oil production and to flush the Luftwaffe proved a striking success. The Nazi air defense found it had to deal with the Army Air Forces' (AAF) long-range escort fighters. Its oil supply dwindling, the German air arm was being beaten. Hitler's Europe was taking a pounding from the air.

In the Pacific, B-29 units under Brig. Gen. Haywood S. (Possum) Hansell had arrived in the Marianas. Before long, Japan would feel the weight of the B-29 air offensive. In Washington, Gen. Henry H. (Hap) Arnold, commanding the AAF, was especially anxious to inaugurate sustained attacks against the heart of Japan. He had carefully nurtured B-29 development, convinced the huge long-range bombers would be the decisive weapon against the Japanese.

Arnold was also looking far into the future, long past the end of the war. His success in building the AAF and his tenacious wartime leadership rested on his ability to identify and to relate the many parts of a complex mosaic. Arnold mastered the crucial interdependence of industrial mobilization, training, logistics, doctrine, strategy, operations, and command. He had also gained the confidence of Gen. George C. Marshall, Army Chief of Staff.

Arnold was the prescient technologist. He thought about how the United States had been unprepared for global war, and he was determined to attempt to ensure this did not happen again. He held fast to the idea—almost obsession—that superior airpower depended upon preeminence in scientific research. "American air superiority in this war," he emphasized in late 1944, "has resulted in large measure from the mobilization and constant application of our scientific resources." The nation dare not "muddle through" as it had for the past twenty years: "I don't want ever again to have the United States caught the way we were this time."

Toward New Horizons—A Technological Blueprint

The AAF Commander turned to the scientist, Dr. Theodore von Kármán. They had been friends since the early 1930s, when Arnold commanded March Field, Calif., and von Kármán headed the California Institute of Technology's rocket research project. Subsequently, General Arnold requested the scientist's help, appointing him in 1940 as consultant to the AAF and a special advisor at Wright Field. In the autumn of 1944, Arnold asked von Kármán to form a scientific group to write a long-range study.

In November 1944, the AAF Scientific Advisory Group was established. "I am anxious," Arnold informed von Kármán, "that the Air Forces' postwar and next war research and development programs be placed on a sound and continuing basis." Prewar research and development had proved insufficient. Arnold wanted a plan for the next twenty years. "It is a fundamental principle of American democracy," he noted, "that personnel casualties are distasteful. We will continue to fight mechanical rather than manpower wars."

The work accomplished by the Scientific Advisory Group in 1945 led to important advances in aviation. In August 1945, von Kármán submitted a report (*Where We Stand*) identifying such future developments as offensive and defensive missiles and aircraft (manned or pilotless), which would fly at speeds far beyond the velocity of sound. During the next several months, von Kármán and his associates wrote the major long-range study, *Toward New Horizons,* which was presented in thirty-three volumes to Arnold in December 1945.

In his introductory volume, Dr. von Kármán emphasized "the decisive contribution of organized science to effective weapons." In future wars, the Air Force would need to attack long-range targets with great speed and force; defend the United States; and transport large numbers of weapons and troops to remote places. Von Kármán also described the form of subsequent Air Force organization for research and development. In January 1946, *Toward New Horizons* was distributed to the Air Staff. Arnold described it as "the first report of its kind ever produced." For many years it would remain a basic guide for Air Force research and development.

cetime Air Force

LEFT: Dr. Theodore von Kármán, who drafted the first basic guide for Air Force research and development. ABOVE: Gen. George C. Marshall, left, and Gen. H. H. Arnold during a wartime conference. Arnold and Marshall did not see eye to eye on the size of the postwar Air Force.

Meanwhile, the spring of 1945 had brought monumental events. Nazi Germany surrendered. Maj. Gen. Curtis E. LeMay, commanding XXI Bomber Command of the Twentieth Air Force, pressed the B-29 campaign against Japan. Arnold agreed with LeMay's judgment that in the Pacific the B-29s gave the AAF "for the first time the opportunity of proving the power of the strategic air arm."

Postwar Planning Begins

Characteristically, General Arnold had postwar issues on his mind. Foremost were the objectives to gain an independent air arm and to build a strong Air Force. Early in the war, he had agreed with General Marshall to postpone the drive for independence until after the conflict. In the meantime, Marshall gave the AAF a substantial measure of autonomy. The Army Air Forces had been established in June 1941 and in March 1942 became coequal to the Army Ground Forces and Army Service Forces.

In 1943, Arnold had formally initiated the AAF's postwar organizational planning. Col. F. Trubee Davison was put in charge of the Special Projects Office and a Post War Division was also established. Brig. Gen. Laurence S. Kuter was brought back from North Africa to become Assistant Chief of Air Staff, Plans. As part of the War Department, the AAF's postwar planners had to maintain liaison with the planning offices under General Marshall's direct control, especially the Special Planning Division under Maj. Gen. W. F. Tompkins. During 1943–45, in a series of plans, the AAF scaled down its postwar force estimates.

In February 1944, based on work done by Kuter's Post War Division, the AAF submitted an Initial Postwar Air Force plan (IPWAF-1) to the War Department. This plan described an Air Force of 1,000,000 men divided into 105 groups. Kuter's planners formulated this estimate based on peacetime standards. It was what they thought would be required to keep the peace in the immediate postwar period. However, the War Department thought that this plan, devised without consideration to cost, was unrealistic. A second plan, Postwar Air Force-2, consisted of 635,000 men in seventy-five groups.

The Need for a Standing Air Force

General Marshall held firm ideas about the postwar military establishment. He was convinced, based on the post-World War I experience, that the public and the Congress would not support a large standing Army. The military budget would be cut. Austerity would be the

rule. He favored a system of Universal Military Training (UMT). Marshall therefore directed that the War Department and the AAF conduct a "re-survey" of what was termed the postwar "troop basis." The War Department's preliminary re-survey consisted of an Air Force of only 120,000 men, divided into sixteen groups.

In March 1945, Arnold reacted strongly to this plan. He informed Marshall directly that the size of postwar forces should not be based upon an estimate of the peacetime budget. The AAF commander came to this issue from a quite different angle than the Army Chief of Staff. Arnold was an aviation pioneer who dated from the era of the Wright brothers. In the interwar years, he was among the small group that fought the Air Corps' technological, political, and bureaucratic battles. A deep believer in airpower and the independent strategic mission, he was now intent upon ensuring a separate Air Force for the postwar era.

He had the ability to recognize the connection between key ideas. Moreover, he was determined to see these concepts bear fruit. In his own mind, the issue of postwar force structure could not be divorced from autonomy. The nation, according to Arnold, required a "quality" mobilization-day (M-day) Air Force. As Commanding General, AAF, he could not rely on UMT as a substitute for forces in being. In the event of a surprise attack on the United States, there would not be sufficient time to mobilize. Quality regular forces were required, prepared to respond instantaneously. Arnold stressed to Marshall that the Army had an obligation to state its postwar needs as best it could aside from the probability of austerity. Thus, toward the end of the war, Arnold took his case forcefully to Marshall. This unprecedented action was based upon the conviction that UMT, if enacted and initiated, could strike a severe blow to Arnold's long-held conception of a sufficiently strong, standing postwar Air Force.

Marshall and his planners remained unconvinced. The American people would not support large, standing forces in peacetime. The Army Chief of Staff remembered clearly the post-World War I demobilization and how Congress turned down plans for substantial peacetime forces. This was the American tradition. In case of a peacetime emergency, the United States would again need to call upon "citizen soldiers." The Reserves and the National Guard would have to be mobilized.

In the spring of 1945, Kuter, who had played a leading role in postwar planning, left Washington to become Deputy Commander of the AAF in the Pacific. Arnold brought Lt. Gen. Ira C. Eaker, Commander of the Mediterranean Allied Air Forces (former Eighth Air Force Commander), to AAF Headquarters as Deputy Commanding General, AAF, and Chief of the Air Staff. In Washington, Eaker was destined to play an important part in postwar planning, especially in regard to force structure and deployment. At the end of May 1945, he approved an Interim Air Force plan for seventy-eight groups, thirty-two separate squadrons, and 640,000 personnel. This plan would cover the period from the close

ABOVE: General Eisenhower, left, with General Arnold in Sicily during the war. Later, as Army Chief of Staff, Eisenhower strongly supported plans for a single Defense Department and a separate Air Force. RIGHT: General Arnold with Generals Spaatz (center) and Vandenberg, 1945. Spaatz and Vandenberg went on to become the first and second USAF Chiefs of Staff.

of demobilization to V-J Day plus three years. In mid-July, Trubee Davison's Special Projects Office formulated a so-called "V-J Plan," to be put into effect after the defeat of Japan, marking the seventy-eight groups as the end of demobilization.

A Single Defense Department?

In the summer of 1945, it became clear that Japan was a defeated nation. Reeling from the effects of the punishment from LeMay's B-29s and the Navy's blockade, the question remained as to when the Japanese would lay down their arms. In Washington, the services accelerated postwar planning. In April 1945, a report of the Joint Chiefs of Staff (JCS) Special Committee on Reorganization (Richardson Committee) recommended a single Department of National Defense and an independent Air Force. Adm. J. O. Richardson, chairman of the committee, dissented from the majority view. Naval leaders, including Secretary of the Navy James V. Forrestal, opposed the idea of a single department with three coequal services.

Publication of the Richardson Committee's report (Maj. Gen. Harold L. George represented the AAF on the committee) triggered even more intense interest in the unification issue on the part of Congress and officials of the Truman Administration. Secretary Forrestal, meanwhile, attempted to gain statutory backing for a permanent increase in the Navy's postwar strength. However, President Truman and General Marshall failed to appreciate the Navy's proposal. Marshall called it another example of the Navy going its own way. Truman ordered the JCS to consider the needs of each of the services and to give him a comprehensive program for postwar requirements.

As a result, Arnold directed Spaatz, Eaker, Lt. Gen. Hoyt S. Vandenberg, Assistant Chief of Air Staff for Operations and Training, and Maj. Gen. Lauris Norstad, Assistant Chief of Air Staff, Plans, to establish the AAF's postwar force objective. In August 1945, following Japan's surrender, and before the AAF formulated and sent a final plan to Marshall, the War Department directed the Army Air Forces to structure a program of seventy groups and 574,000 personnel. This personnel figure would reflect the Interim Air Force as of July 1, 1946. The AAF would level off at 550,000 after July 1946. On August 28, 1945, Deputy Commanding General Eaker met with leaders of the Air Staff and officially set the postwar goal of seventy groups and 550,000 men. This personnel objective failed to last. In November the War Department General Staff directed an AAF troop basis of 400,000. General Vandenberg informed Eaker that War Department plans called for this figure to hold at least until February 1947.

Despite recommendations by a Special War Department Committee on the Permanent Military Establishment to reduce the AAF even more, in December 1945 Gen. Dwight D. Eisenhower, who had replaced Marshall as Army Chief of Staff, approved the seventy-group, 400,000-man levels. In January 1946, the JCS approved the AAF's postwar force objectives. Thus, the group strength and troop basis for the Interim Air Force (the period of occupation and demobilization) and for the peacetime Air Force would be the same—400,000 personnel and seventy air groups, as follows: twenty-five very heavy bomb groups; twenty-five fighter groups; five medium and light bomber groups; ten transport groups; and five tactical reconnaissance groups. In the event of war, this postwar plan also described a so-called Mobilized Air Force, to be formed within one year after hostilities began. This M-day Air Force was based upon a system of UMT, and a 1,000,000-man reserve. This total force would be 1,500,000, divided into 131 groups: seventy regular groups, twenty-seven from the Air National Guard, and thirty-four from the Organized Reserve.

Thus, far from an arbitrary figure, as many writers have claimed, the seventy-group goal culminated over two years of postwar planning by the AAF and the War Department. General Arnold's planners started with figures considerably larger than seventy groups and 400,000. Arnold argued that the AAF had an obligation to the nation to make what it considered to be a realistic assessment apart from arbitrary budget estimates. However, the planning of the airmen could not be done in isolation. Their plans were part of the War Department's. The AAF's final objective was directed by the War Department, and it was based in part upon the need to maintain overseas bases and ultimately to contribute to an air force under a United Nations organization.

The Army Belongs on the Ground

With the war over, in November 1945 General Arnold, his health precarious, turned over to Spaatz the major tasks of directing the AAF's unification and reorganization programs. In December, Truman—his patience growing short—recommended to Congress creation of a single Department of National Defense with three coequal branches. Arnold and Spaatz firmly supported the President. Army Chief of Staff Eisenhower also strongly backed this proposal for unification and a separate Air Force. When he returned to Washington from Europe, Eisenhower had informed his commanders and staff that, based on the AAF's demonstrated effectiveness in the war, he believed that no "sane person" could deny that the Air Force deserved independent status. He made clear to his staff that he expected them to support the program for a separate air arm.

In January 1946, Eisenhower and Spaatz turned their attention to peacetime reorganization. In December 1945, Eaker had organized within the Air Staff an Ad Hoc Committee on Reorganization of the Army Air Forces. However, this committee—with representatives from the various functional Air Staff offices—found it impossible to reach a consensus on reorganiza-

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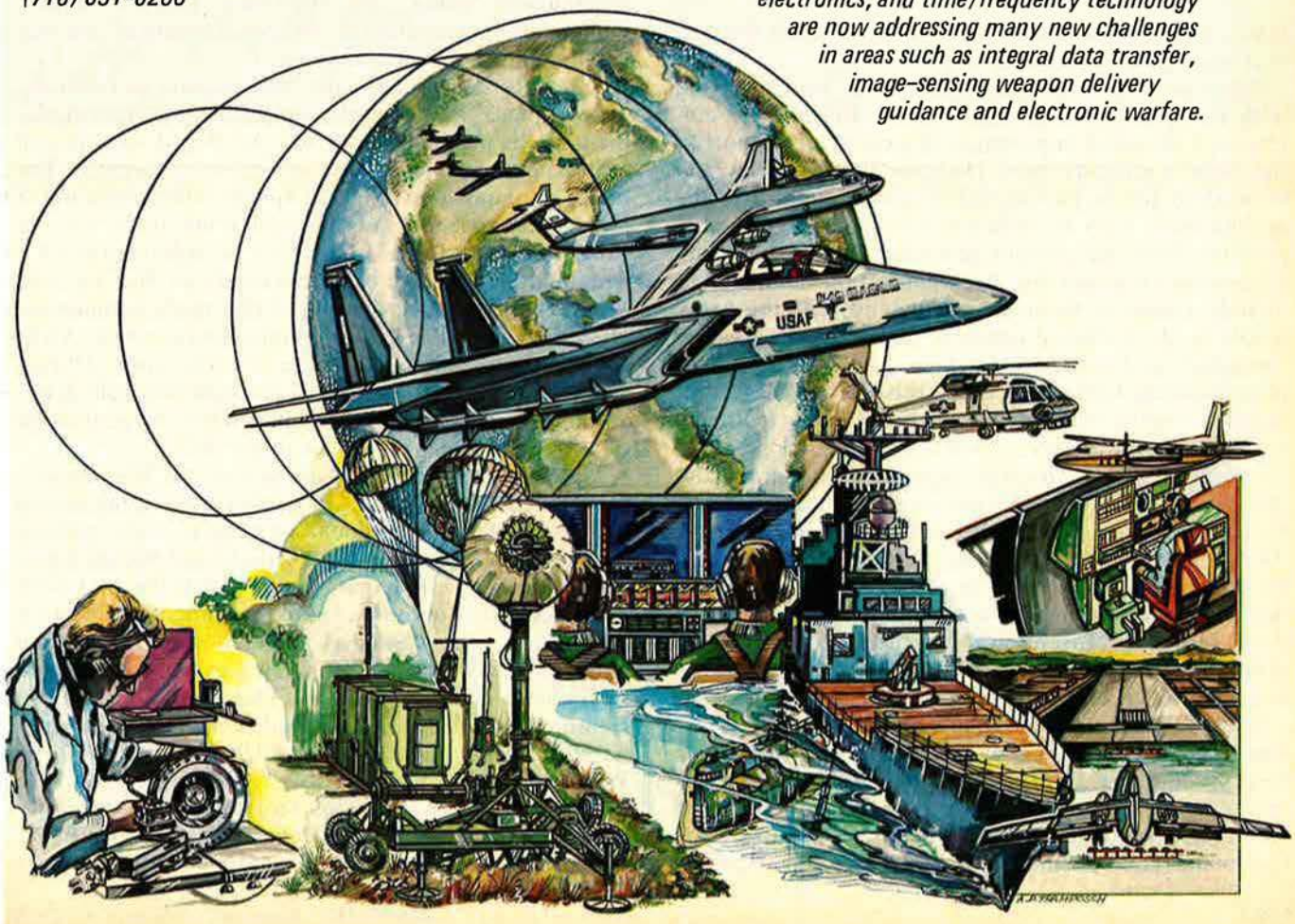
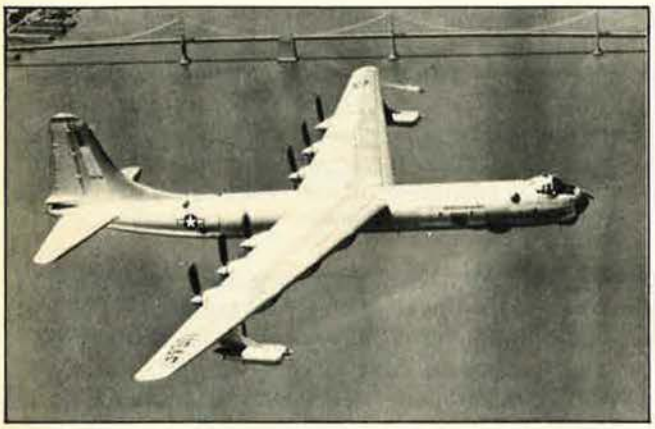


tion. Under pressure from Spaatz and Norstad, the committee subsequently agreed on a compromise that called for an Air Force Combat Command consisting of strategic, tactical, and air defense forces.

With Arnold about to retire, Spaatz was now acting officially as deputy to the Commanding General, AAF. Sometimes called "Eisenhower's airman," Spaatz had built a close relationship with General Eisenhower, founded on mutual trust and confidence. Spaatz had qualities that Ike admired and respected: quiet compe-



An RB-36 reconnaissance bomber over San Francisco Bay, 1954. General Arnold believed that such long-range bombers would be an integral part of the future Air Force.

tence, loyalty, and a flair for knowing precisely the correct strategy at the crucial point.

Now, in early 1946, Spaatz and the Air Staff struggled with the question of reorganization. Eisenhower emphasized the great importance of tactical air support to the Army's ground forces. He knew first hand how the tactical air forces had provided critical support to the ground units. Also, Eisenhower was under considerable pressure from his ground generals. Both Spaatz and Eisenhower realized that if reorganization should fail to include a separate tactical air command, then the Army would in all likelihood organize and designate its own "integral" air forces. As Maj. Gen. Elwood R. Quesada (Commanding General of the Ninth Tactical Air Command during the war) noted: "There is a strong tendency within the Army to gain control and command of tactical air forces." Key Air Staff planners recognized the Army's keen interest in the question of "integral" tactical air. Brig. Gen. William F. McKee, Air Staff Deputy Assistant Chief of Operations, and Col. Reuben C. Moffat, Chief of the Post War Division, had argued the importance of creating the tactical air element within the AAF. Moreover, Eisenhower was firm. "Basically," he observed, "the Army does not belong in the air—it belongs on the ground."

Tooey Spaatz and Eisenhower came to an understanding. Rejecting the idea to organize the combat air forces under the Continental Air Forces, Spaatz directed in late January 1946 that three major combat air commands be created. These would be the Strategic Air Command (under Gen. George C. Kenney), Tactical Air Command (Maj. Gen. Elwood Quesada), and the Air Defense Command (Lt. Gen. George E. Stratemeyer). Major supporting commands would be the Air Training Command (Lt. Gen. John K. Cannon), Air Materiel Command, formerly Air Technical Service Command (Lt. Gen. Nathan F. Twining), Air University (Maj. Gen. Muir S. Fairchild), Air Transport Command (Lt. Gen. Harold L. George), and Air Proving Ground Command (Maj. Gen. Donald Wilson). Originally to become effective in February 1946, this major peacetime reorganization along functional lines was formally approved by Eisenhower and distributed in chart form to the Air Staff. It became effective on March 21, 1946.

Also early in 1946, Eaker and Vandenberg worked out a plan to organize an atomic strike force. The 509th Bomb Group, which had returned to the United States from the Pacific, would be the heart of such a force. This initial plan called for organization of a single atomic wing composed of three very heavy bomb groups. The wing headquarters would direct training and be responsible for maintaining liaison with the Manhattan District.

A Maximum Degree of Autonomy

Spaatz took additional action to place the postwar AAF on a firm foundation. He had long felt the need to create a high-level deliberative group which, apart from the Air Staff, would have the time to consider and to formulate policy. He called this the principle of the "cloistered cell." This body would have nothing to do with daily operations. Spaatz discussed his ideas with Eisenhower, Eaker, and Maj. Gen. Hugh J. Knerr, Commanding General of the Air Technical Service Command. They were enthusiastic.

Officially taking command from Arnold in February 1946, Spaatz immediately signed a directive implementing his plan. In March, the Air Board was created with Knerr being appointed as Secretary-General. The board's composition reflected Spaatz's determination to have a cross-section of the best thinking in the Air Force. The board consisted of the top leadership in AAF headquarters; the Assistant Secretary of War for Air, Stuart Symington; and heads of the major commands. Directly responsible to the Commanding General, AAF, the board would meet whenever necessary. During 1946–47, the Air Board played an important role in developing positions on unification and the reorganization of USAF Headquarters, in October 1947.

Meanwhile, after the end of the war, the War Department acted to reorganize. It had been operating during wartime under the President's emergency war powers legislation of December 1941. Arnold and Spaatz advocated a reorganization that would provide the AAF with almost complete autonomy until the unification question was settled. They wanted a Chief of Staff for Air coequal with the Army Chief of Staff. However, in early 1946 this was rejected by the War Department's Simpson Board report. The AAF was made coequal to the Army Ground Forces under the Army Chief of Staff and the War Department General Staff. The Army Service Forces was abolished. This reorganization was completed in May 1946 by War Department Circular #138, which directed that the AAF "must be provided with

the maximum degree of autonomy permitted by law without permitting the creation of unwarranted duplication in service, supply, and administration."

Circular #138 set the War Department's organization until the AAF achieved independence. The Army Air Forces remained coequal to the ground forces. Spaatz took his place on the Joint Chiefs of Staff, as Arnold had been. The position of Assistant Secretary of War for Air was retained, a post assumed by Symington in January 1946. Most importantly, Spaatz knew full well that he had Eisenhower's firm support for creation of a separate Air Force.

LEFT: President Truman, with General Spaatz and General Eaker (right), proclaims "Air Force Day," 1946. ABOVE: The commanding generals of the reorganized AAF, 1946. Standing left to right: Lt. Gen. Nathan F. Twining, Maj. Gen. Donald Wilson, Maj. Gen. Muir S. Fairchild. Seated left to right: Lt. Gen. John K. Cannon, Gen. George C. Kenney; AAF Commander Gen. Carl A. Spaatz; Lt. Gen. Harold L. George; Lt. Gen. George E. Stratemeyer, and Maj. Gen. Elwood R. Quesada.

The Potential of Technology

Simultaneously with the drive to achieve independence and to reorder its internal organization, the AAF, as mentioned, continued to focus on technology. Arnold had kept in close touch with von Kármán. The potential of missiles was on Arnold's mind. The Air Corps had set requirements for guided missiles prior to World War II. Research continued during the war on pilotless aircraft, air-launched glide bombs, and glide torpedoes. Vertical bombs such as the Azon (VB-1) missile were employed with success in the CBI theater. A Razon (range and azimuth) vertical bomb was developed, but not used in combat. The JB-2 (jet bomb), a copy of the German V-1, was tested and ordered into production, but was not used in combat.

The fact was that until the Germans' use of guided missiles, especially the V-2, the AAF had assigned low priority to this developmental field. However, by late 1944, the AAF's interest in guided missiles accelerated and changed from development of controlled bombs to self-propelled missiles. Then, as noted, in 1945 von Kármán recommended acceleration of the development of jet aircraft and guided missiles. In October 1945, the Air Technical Service Command invited bids for projected missiles. Subsequently, the ATSC divided missiles into four categories: air-to-air, air-to-surface, surface-to-air, and surface-to-surface. In April 1946, the AAF accepted a Convair proposal for a long-range missile. This marked the start of Project MX-774, the forerunner of the Atlas ICBM.

Since 1944, the AAF, AGF, and Army Service Forces had been involved in an increasingly intense contest for developmental and operational control of missiles. The AAF argued that missiles were part of basic aircraft technology. The ground and service forces considered missiles to be extensions of artillery. Consequently, missiles became enmeshed in the roles and missions controversy, the AAF defending its strategic, tactical, and air defense roles and also trying to gain the antiaircraft artillery function. Also, in late 1945 and early 1946, the AAF became concerned about what it considered to be the Navy's attempt to capture the air defense mission with its antiaircraft guided missile program. General Arnold was worried about the Navy's intentions in the entire missile field.

At the same time, the Army Air Forces did not neglect the development of jet aircraft. Based on an AAF request, in 1943 Lockheed designed an experimental jet fighter that would eventually be designated as the F-80 Shooting Star. Known until 1948 as the P-80, this first true American jet fighter entered the operational force in numbers in the spring of 1946. One year later, the North American B-45 bomber and the Republic F-84 Thunderjet became operational.

In 1945–46, the Army Air Forces confronted a staggering array of problems. They were foreseen by the air leaders before the close of war. The emphasis was upon building the postwar United States Air Force. Demobilization (which left the AAF a shell of what it had been at wartime peak), research and development, reor-

ganization, redeployment, and force structure had simultaneously to be faced. It was an extraordinarily difficult and even chaotic period. The paramount concern was winning the long struggle for independence; but this must be a strong Air Force in-being.

The airmen primarily remained influenced by what they considered to be the lessons of the war. The airpower theories that had been refined in 1942–45 had proven effective. The AAF had demonstrated its destructive power. Nonetheless, even after Japan's surrender, Arnold wondered whether people would forget "the part that we have played." However, the energies of the air leaders constantly had to be focused on future plans. As mentioned, in late 1945, prior to his retirement, General Arnold gave Spaatz the tasks of deciding the specifics of the AAF's position on unification and of drawing internal reorganization plans.

The Foundation Is Set

Arnold left a towering legacy. When the United States entered World War II, he was ready to command global operations. Adept at planning grand strategy with the Joint Chiefs or of following complex logistical and deployment plans to fruition, he possessed other invaluable skills. Arnold knew his people. Under tremendous pressure to show dramatic results, he knew where to find the proper commander for the job. To his critics, he was an impatient promoter. However, in Washington he fought the bureaucratic war with toughness and dexterity. He gained General Marshall's confidence and won the Chief of Staff's support for air independence. When it counted, Arnold had the stamina and tenacity.

These skills proved crucial to creating a master blueprint for the postwar Air Force. Before the end of the war, General Arnold ordered the decentralization of Headquarters AAF activities. The Air Staff had become far too involved in routine operations and planning. It would also be necessary to keep the aviation industry at a viable production rate. Industrial planning was most important. He appointed the key men to plan the Air Force of the future. "A modern, autonomous, and thoroughly trained Air Force in being at all times will not alone be sufficient," Arnold emphasized, "but without it there can be no national security." This also meant a strong Air Reserve and National Guard.

Preparing to pass the reins of command to Spaatz, Arnold charted research and development plans, calling on a scientific team of civilians and airmen. The nation and the air forces had been caught unprepared for war. In the future, he emphasized, "the first target of a potential aggressor might well be our industrial system or our major centers of population. If the United States is to be secure in the future, we must never relinquish the means of preventing such a blow."

So as Marshall and Arnold gave way to Eisenhower and Spaatz, the foundation for the United States Air Force (which would be created in September 1947) had been set. A great deal more work remained to be accomplished. Arnold left more than people and plans. He left a vision and also a warning to the country that he had served so well: "Present equipment is but a step in progress, and any Air Force that does not keep its doctrines ahead of its equipment, and its vision far into the future, can only delude the nation into a false sense of security."

The United States was fortunate to have an unusually gifted group of men to lead the AAF immediately after the war. They had led the Air Corps between the wars, built up, organized, and commanded the AAF during World War II, and directed the reorganization that set the stage for establishment of the USAF. They were pragmatic technologists and organizers. Their ideas, skills, and leadership set an extraordinarily high standard for air leaders of the future to follow. ■

THE HOT SEAT

One misty morning in Italy during World War II, I was directed to fly a courier mission to deliver late intelligence information to an advanced headquarters. This was a fairly routine matter until I learned that a "Headquarters Colonel" who needed some flight time was going to be in the left seat of the Cessna C-78 Bobcat that served as our utility aircraft. His reputation as a pilot was somewhat dubious, but being familiar with the area, I figured it'd be a "no sweat" deal.

We took off without incident and headed toward the forward area. The weather was marginal, and I quickly noticed we were drifting off course. I called this to the pilot's attention. He eyed me narrowly for a moment and took corrective action, but we were soon again way off course.

Again I spoke out: "Colonel, I hate to tell you, but we ain't where we are supposed to be!" He stared at me icily and replied stiffly, "Captain, I think I am perfectly capable of flying this airplane to where we have to go."

Before I could utter another word, a burst of flak exploded some distance above us.

To his everlasting credit and my great relief, the colonel quickly took evasive action and proceeded to get us back where we belonged. As we now continued toward our destination, he grinned sheepishly at me and said, "Captain, if it gives you any consolation I'd be glad to change places with you, but right now this seat is slightly soiled!"

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

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

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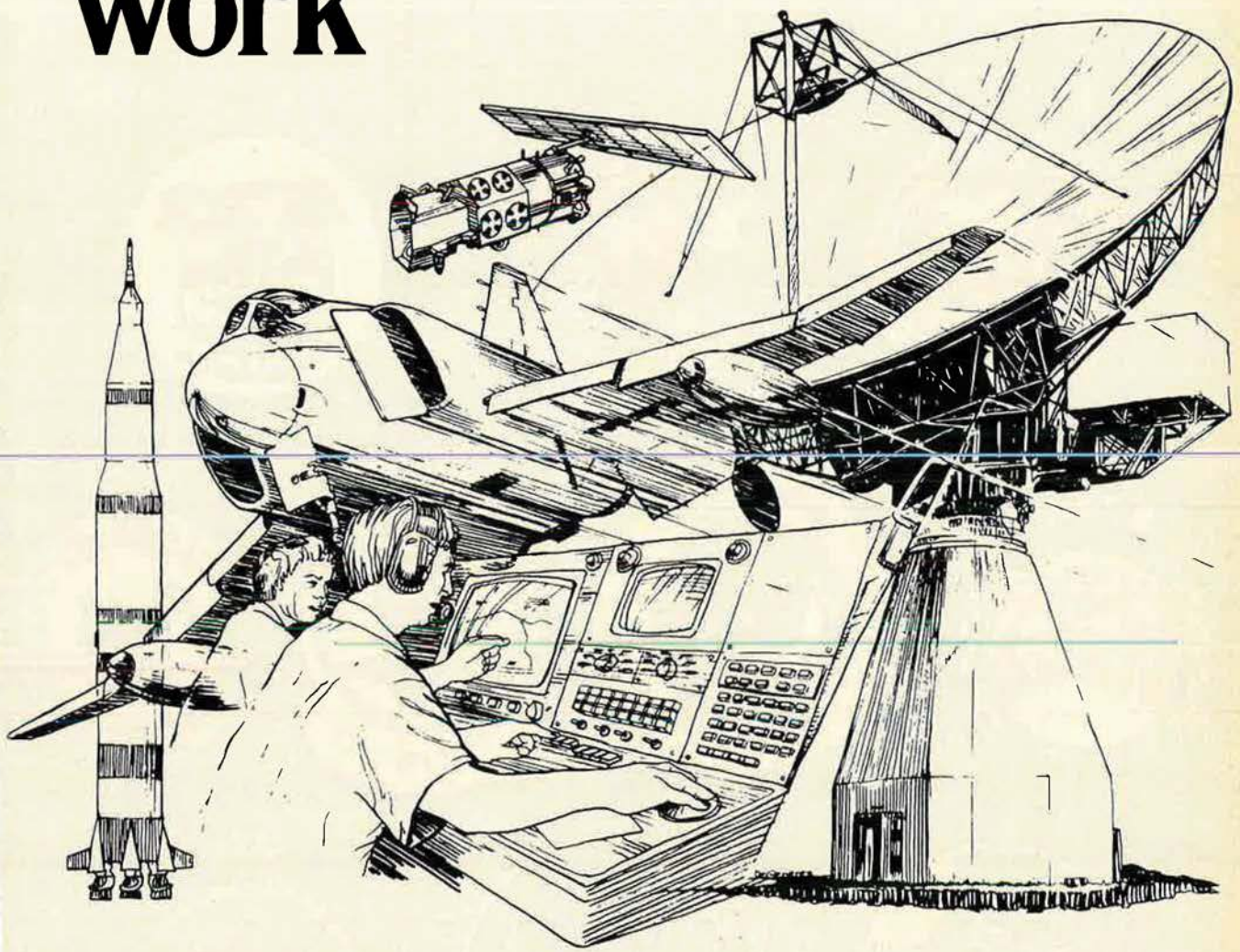

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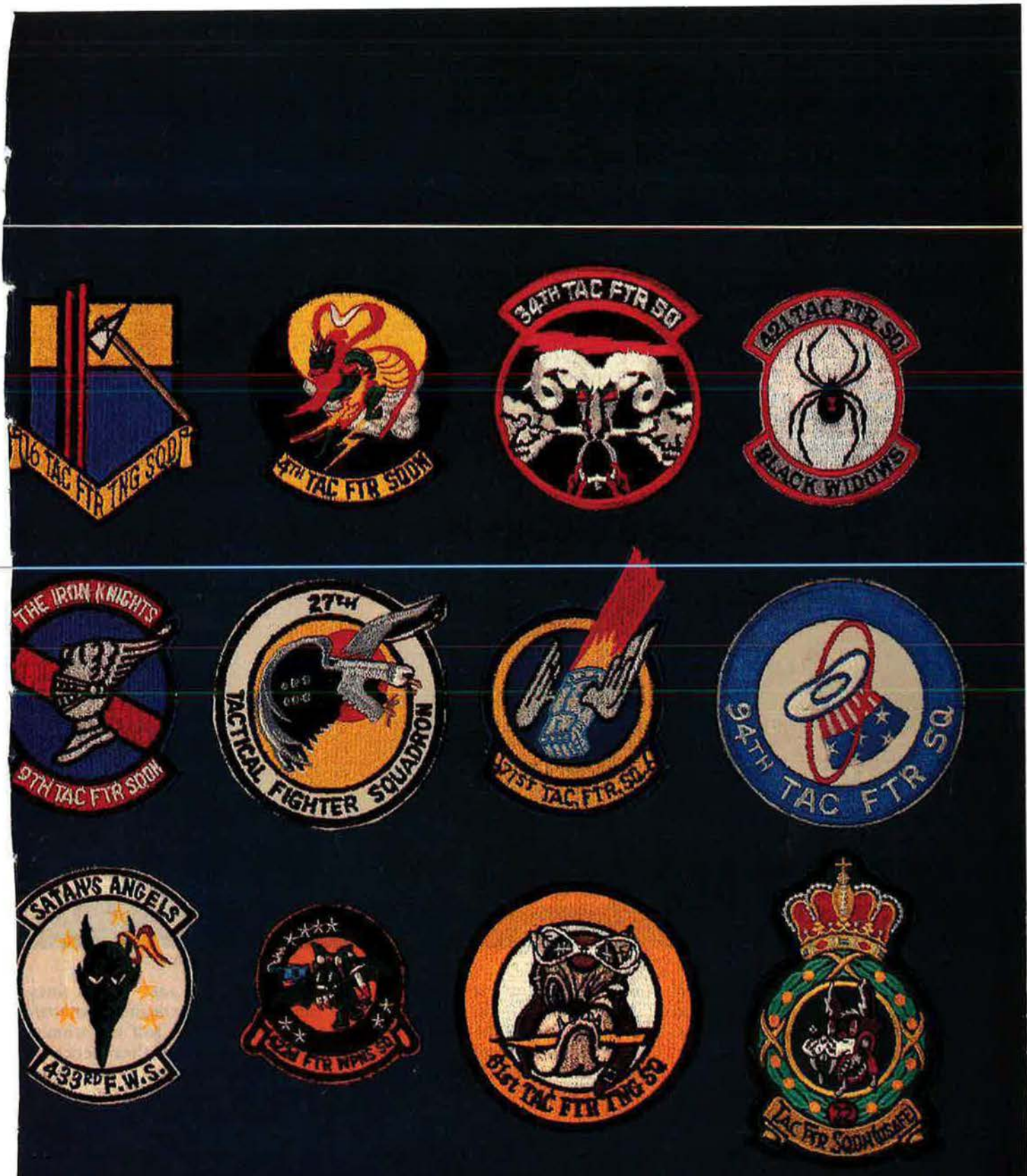

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They Are the First

ON MAY 28, the United States Air Force Academy graduated and commissioned 887 cadets as second lieutenants. They constitute the twenty-second class to have completed the rigorous academic and military training program that began in 1955. The school graduated its first class in 1959, but this year's was the first to include women. Ninety-seven women graduates walked out of Falcon Stadium with their degrees and Air Force commissions.

The barrier to women in the service academies dropped on October 7, 1975, when President Gerald R. Ford signed the FY '76 military procurement bill, which had been amended earlier by Congress to admit women to the military academies. More than 1,200 women sought appointment to the USAFA Class of 1980, and on June 28, 1976, the school received 157 of them as part of its 1,593-member freshman class.

Women Air Force officers, second and first lieutenants, assisted during the first year as Air Training Officers, positions normally held by upperclass cadets. The officers also served as role models for the women students. When the cadets attained upperclass status, they took responsibility for training the underclass women.

The women cadets lived their first semester in Vandenberg Hall dormitory and were assigned among twenty of the Cadet Wing's forty squadrons. At the beginning of their second semester, half the women moved to Sijan Hall, the other cadet dormitory, and were assigned among the remaining squadrons.

Each cadet at the Academy is required to earn between 179 and 188 semester hours of academic credit in the sciences and humanities, physical education, and military and aviation training. Intramurals are mandatory with thirteen of the sixteen intramural sports open to women. They do not participate in boxing, football, or wrestling. Extracurricular activities in the form of clubs, committees, and teams also vie for each cadet's attention.

This year, Mark W. Graper, Sar

Facing page: Underclassmen wait start of graduation parade. Above left: Dignitaries and seniors watch Cadet Wing pass in review. Left: Secretary Mark presents diploma to Kathleen M. Conley. Above right: Julie Richards shares congratulations with classmates. Right: Graduates loft caps as ceremony ends. (Photos by Bill Madsen and Paul Harrington)

The Percentage of Women at the Service Academies

(Figures for 1980 Graduating Classes)

School	Total	Women	Percentage
USNA (Annapolis)	938	55	5.8%
USMA (West Point)	870	61	7.0%
US Coast Guard Academy	156	14	8.9%
US Air Force Academy	887	97	10.9%

Mateo, Calif., took the honors as top overall graduate with the best combined average for academics and military training. William A. Ehrenstrom, Salem, Ore., was the top academic performer, while James R. Knowles, Northfield, Minn., earned the Outstanding Cadet in Military Performance Award.

More than half the Class of 1980 accepted assignments to pilot training. Of these 580 new lieutenants, twenty-five are women. One woman is among the twenty-five selected for navigator training. Another twenty-five men have gone to helicopters. Of the twenty-eight officers receiving graduate scholarships and fellowships, three are women. Two others are among the nine accepted to medical school.

The remaining men and women have taken various assignments throughout the Air Force. For the women officers these include eleven as acquisition project officers; nine into communications; eight into scientific fields; seven to intelligence; six into engineering; five into management analysis; four into aircraft and ammunition maintenance; three each to civil engineering and space systems; two each to computers, supply and tuels management, missile launch, and air traffic control; and one each to missile maintenance and procurement.

—By Maj. Thomas L. Sack, USAF

SCIENCE/SCOPE

The U.S. Air Force is evaluating a hand-held laser that can pinpoint targets for laser-homing weapons or mark them for the delivery of conventional weapons. The device, called a Laser Target Designator (LTD), resembles a short-barreled rifle. Weighing less than 16 pounds, it is the lightest ground designator in the world. Forward air controllers will use the LTD to illuminate targets with an invisible light beam for "hand-off" to A-7 and A-10 aircraft equipped with Pave Penny laser spot trackers. The tests are being conducted with five production model LTD's built by Hughes under contracts with the U.S. Army Missile Command.

A fast-reacting radar will warn U.S. Navy destroyers and other high-value ships of attack by enemy cruise missiles. The Mark 23 Target Acquisition System pinpoints targets quickly and automatically as they approach low on the horizon or from high-dive angles, whether they have popped up from beneath the ocean's surface or were launched from distant surface ships or high-altitude aircraft. TAS also tells the ship's fire control system which targets have the highest priority so that Seasparrow missiles or other weapons can be fired in time to intercept the threats. Hughes has delivered the first production system.

Smart weapons of tomorrow will rely on sophisticated algorithms (sets of mathematical formulas) to pick out their own targets and aim for the most vulnerable spots. The new weapons, like the Wasp anti-armor missile that Hughes is developing for the U.S. Air Force, will incorporate densely packaged electronic components and new low-cost, compact signal processors. The Wasp's automatic target selection will free pilots from time-consuming target detection tasks, thereby increasing weapon delivery rates. Also, the "fire-and-forget" capability reduces the need for close approaches to the target, thereby decreasing pilot exposure to increasingly lethal enemy defenses.

In its first airborne launch, the U.S. Navy's improved AIM-54C Phoenix missile intercepted an unaugmented supersonic drone target at long range. In previous AIM-54A launches at this range, the target has been augmented electronically to simulate a much larger aircraft. The high-altitude test was conducted with the drone and the launching F-14 fighter approaching each other nearly head-on. The missile guided itself in its semi-active mode, tracking radar returns reflected off the target by the F-14's AN/AWG-9 weapon control system. The missile also carries its own transmitter to track autonomously as it nears a target. Hughes is upgrading the Phoenix to meet anticipated airborne threats through the 1990s.

Designers of computer software systems can expect help from other computers in the near future. A computer aid being developed by Hughes serves as draftsman, librarian, and report writer of a design session. The system, appropriately called AIDES (for Automated Interactive Design and Evaluation System), converses with the designer in near English and draws charts on TV-like terminals and plotters. It also analyzes designs for soundness and testability. AIDES reduces the labor intensity associated with software design, while improving consistency and overall quality. Studies indicate the system trims design time by 30 percent and slashes costs for structure chart documentation by 95 percent.

Creating a new world with electronics

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A nation cannot deter or, if necessary, win a war without both the equipment and the will to apply those resources skillfully. With the nuclear balance shaky and Western conventional forces becoming increasingly intimidated by the huge Soviet military machine, perhaps it would be wise to consider the question of . . .

Technology vs. Numbers

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

HOW the time does fly. The four years since the summer of seventy-six have gone by on the breeze, and here we are, deep in another presidential campaign. In the last one, we can recall, the eventual winner promised a number of things, as is customary in these campaigns. One such promise had to do with cutting several billion dollars out of a bloated defense budget. All in all, defense spending appeared to be pretty low on Mr. Carter's list of priorities.

Now we are at it again, with defense very much a key issue in this year's contest. President Carter can say, with figures to prove it, that he has raised the defense budget to the highest level ever. Governor Reagan can counter with impressive arguments that it is still not enough. Meanwhile, strategy has become a growth industry, with strategists of all persuasions busily preparing studies on weapon system choices, ways to base the MX, and how to redesign the various services.

There has never been a time when so much advice has been available on the subject of national security, and yet, with it all, there seems to be a curious lack of philosophical thinking about this business of going to war. It is a disagreeable subject, war, and to many it doesn't bear reflection. Instead, it is easier to focus on the weapons, the gadgetry, rather than on the basic deadly purpose behind our enormous outlay for defense. It would appear, then, to be a good time for a refresher course on the writings of Karl von Clausewitz, a strategist who thought in philosophical terms and whose influence is clearly a factor in the behavior of our antagonist, the USSR.

Clausewitz's conception of war was a rational, if cold-blooded one. A nation went to war only in its own interest, and having decided on that course, it did whatever was necessary to win. It follows, therefore, that a nation not equipped to win had better stay out of war. One way of staying out, short of having a winning edge, is to maintain some kind of equilibrium. For a good many years the existence of a strategic balance was a comforting thought for ourselves and our allies. Huddled under the American strategic umbrella, we were all confident the Soviets would be restrained from any major follies. Meanwhile, we could provide an inferior, scarcely even serious, capability in conventional forces. A Soviet attack on the West would invite massive destruction of the USSR at an unpredictable moment, almost as though "Dr. Strangelove's" Doomsday Machine were in place and ready.

Now we find the balance of terror in danger of becoming unbalanced with a consequent, and belatedly recognized, need to get ourselves back in equilibrium in that department. The MX, a new bomber, and the Trident are all elements in that equation, and it is our bad luck that they have been delayed these past four years. But, assuming we still have time to get back on even terms in the nuclear department, and thus able to discourage that kind of war, there remains the problem of a national strategy. If we have one, beyond the desire to avert a nuclear exchange, it is not evident.

True enough, there is a Rapid Deployment Force in the gestation period, but that is more a gesture than a strategy. And since it must be plain to the world at large, let alone the Soviets, that we are not going to have anything beyond a one-shot volunteer army until long after a national emergency is declared, any threat on the ground we might present is apt to be less than convincing. "War . . . does not spread to the full in a moment," said Clausewitz. "Each of the two opponents can form an opinion of the other from what he does."

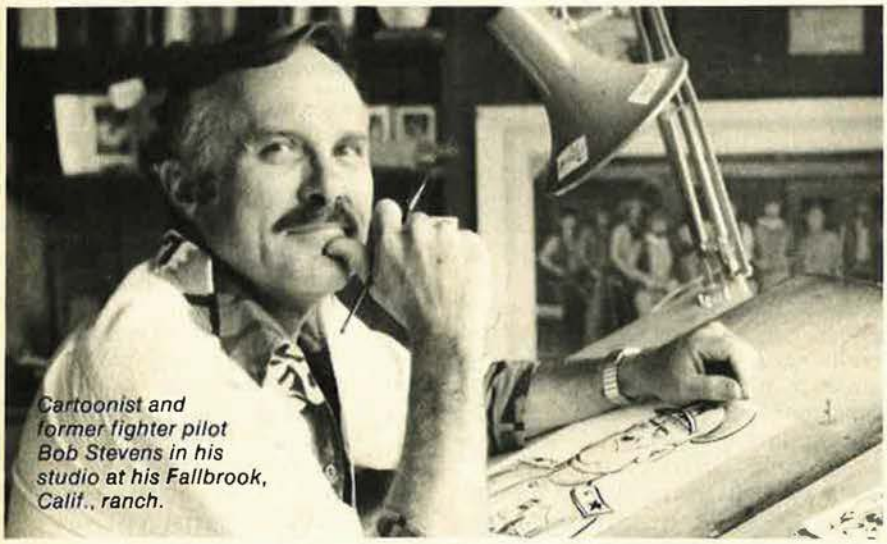
What we do best, at least these days, is fight in the air, whether from carriers or land bases. Or, I should say, it is the thing at which we are capable of doing best. A strategy that focused on tactical air and the most advanced munitions, coupled with all the support to make it truly mobile, would seem to be our best ticket to survival in this dangerous world. Such a strategy would call for increasing and modernizing the tanker fleet, together with something we have not had since World War II, a production base turning out attrition airplanes. The Soviets do it while we stagger along with scarcely enough production to meet peacetime losses.

It is hard to beat the drum for airpower without conjuring up memories of past and extravagant claims made in its name. The fact remains that it is really our only way of countering the immense numbers on the Soviet side. Technology, whether the British long bow at Crécy or the machine gun in World War I, has had a history of changing the odds. Tactical air, with our own vast lead in air refueling, is our way of getting there fast with the biggest punch. Old Clausewitz, who never saw an airplane, would have approved of that. ■

If man were meant to fly, he'd have wings. If man were meant to draw, he'd have ink flowing from his fingers. If he does both, he's probably . . .

BOB STEVENS— FLYING CARTOONIST

BY HUGH WINKLER, ASSOCIATE EDITOR



Cartoonist and former fighter pilot Bob Stevens in his studio at his Fallbrook, Calif., ranch.

QUESTION: What do most readers of AIR FORCE Magazine first turn to when they receive their new issue?

ANSWER: "There I Was . . .", of course!

"There I Was . . ." is the creation of cartoonist Bob Stevens, who has been drawing the monthly feature for the magazine since January 1964. It is one of the most popular sections of the magazine, with its humorous yet wholly credible depictions of piloting pitfalls. Stevens's vignettes ring true, for he draws much of his inspiration from his (and others') thousands of hours in the cockpit.

Cartooning came before flying for Stevens. As a child he would draw stories about cowboys and Indians on the back of his mother's rolls of shelf paper, "stretching from the living room to a bedroom." The Iowa-born Stevens moved to southern California with his family in 1929, where he was raised and attended college. While attending Pasadena City College, Stevens contributed editorial cartoons to the school newspaper. "I got punched in the eye once for one of them," he recalls. "I thought I was doing really well, for I was being read."

Prior to World War II, Stevens worked as a technical illustrator for Douglas Aircraft in Santa Monica. It was there that he was bitten by the flying bug. After a demonstration flight, he took lessons and soloed before Pearl Harbor. He tried to enlist in the RAF, but since he was under eighteen years of age, he needed his parents' permission to join. When they read the part of the release agreeing to ship the remains to a burial location of the parents' choice, they balked.

With the entry of the US into the war, Stevens joined the Army Air Forces. He was commissioned in 1943 and trained fighter pilots as photo recce flyers in the F-5, a version of the P-38. He subsequently trained in the P-51, and served in the combat zone in the Pacific. He was on the island of Ie Shima, near Okinawa, at the war's end. During the war Stevens flew just about every piston-engine fighter except the P-39.

He continued to draw throughout the war years, illustrating training manuals and publishing cartoons in various service newspapers.

After the war, he served a brief civilian stint with Southwest Airways. He checked out for his civilian license and did some charter flying. But the Air Force still beckoned.

In 1948 he rejoined the Air Force to make military flying a career. He checked out in the F-80 Shooting Star, his first jet fighter, and then flew P-47s in Hawaii. When his unit transferred to New Mexico they were equipped with the F-86 Sabre. Stevens set an unofficial world speed record on January 11, 1950, while serving with the 91st Fighter Squadron. He flew his F-86A Sabre at 33,000 feet between the control towers of Davis-Monthan AFB, Ariz., and Kirtland AFB, N. M., in twenty-seven and one-half minutes, for an average speed of 711.75 mph.

Subsequently, Stevens served as a flying safety investigator and a maintenance flight test pilot, which gave him the opportunity to fly different types of aircraft. Later, he participated in the development of strategic missile employment con-

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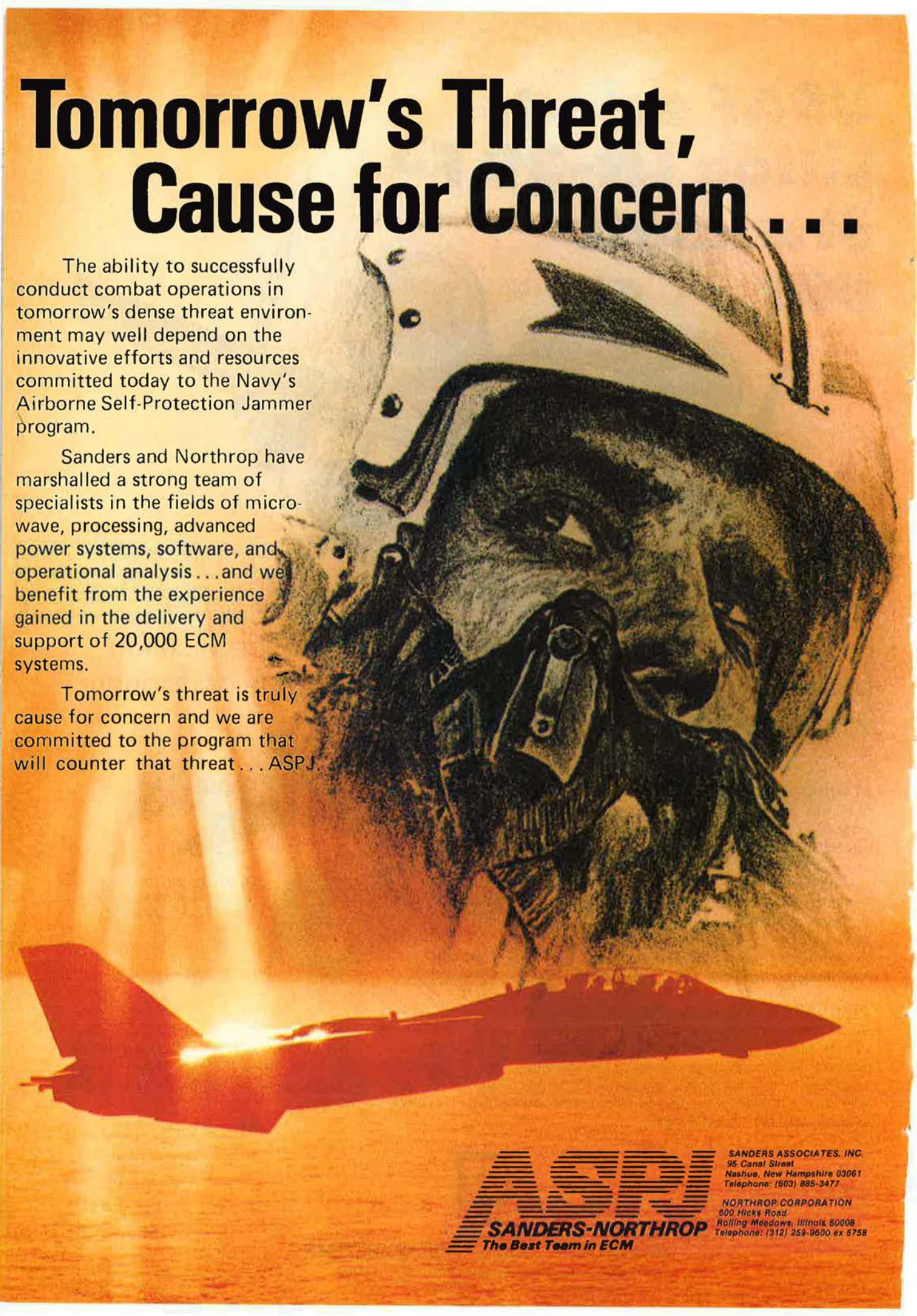

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Young Capt. Robert M. Stevens on the wing of his F-86A Sabre, in which he set an unofficial world speed record in 1950.

cepts, and served as deputy commander and commander of the first Atlas missile squadron, the 564th Strategic Missile Squadron based at Cheyenne, Wyo.

When Stevens was assigned to a staff desk job at Hq. SAC, Offutt AFB, Neb., he found the routine tedious. He decided to retire from the Air Force in 1964 with the rank of lieutenant colonel, and pursue a career as a cartoonist.

Settling first in San Francisco, he created a syndicated comic strip called "Clementine," about a little girl and her friends. He later drew editorial cartoons for the San Jose *Mercury-News*, which led to a job with the Copley News Service in San Diego. Through CNS, his editorial cartoons appeared regularly in more than 300 papers throughout the world, garnering many honors. He has received three Pulitzer nominations, and was awarded five Freedom Foundation medals and four Lincoln Day Awards for his work.

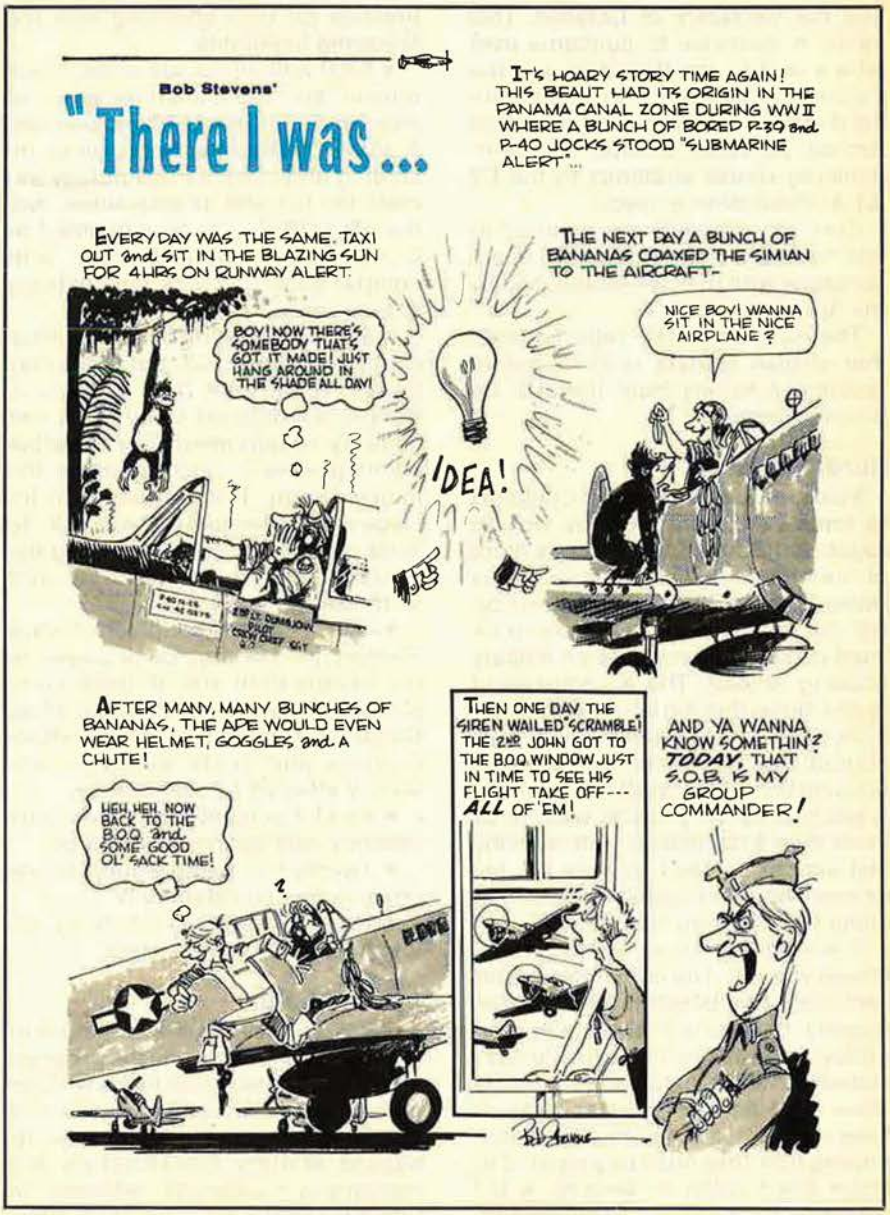
In 1972, Stevens decided to abandon editorial cartooning in order to free-lance full time. He wanted to concentrate on more humorous subjects: the "There I Was . . ." series that he began for AIR FORCE Magazine in 1964, and a similar series called "Stop Squawk!" for *Private Pilot* magazine. In addition, he now does cartoons for the Trailer Life Publishing Co., which publishes seven national magazines about campers and other recreational vehicles. Two collections of his cartoons about camping and RVs have been published.

Stevens has also published several collections of his "There I Was . . ." series. His most recent book is *If You Read Me, Rock the Tower*, available from the Village Press in Fallbrook, Calif., which is also where Stevens and his wife, Barbara, reside on their avocado ranch.

After leaving the Air Force, Stevens drifted away from flying. But feeling he needed to stay current on the latest in aviation, he took a refresher flight, and became "smitten for the second time." He now owns his own plane, a Mooney 201, and flies himself around the nation.

Stevens is currently working on a project with the first man to fly faster than sound, test pilot and retired Air Force general Chuck Yeager, illustrating a book on Yeager's life. He is also preparing another collection of the "Stop Squawk!" cartoons for publication.

And, if he can squeeze it into his busy schedule, perhaps a few more delightful "There I Was . . ." cartoons for AIR FORCE Magazine. ■



"There I Was . . ." has been a fixture of AIR FORCE Magazine for more than sixteen years. One of Stevens's own favorites was the "There I Was . . ." published in the April 1975 issue, above.

CAPITOL HILL

By Kathleen G. McAuliffe, AFA DIRECTOR OF LEGISLATIVE RESEARCH

Washington, D. C., August 5

JCS and Congress

A House Armed Services panel, headed by Rep. Samuel Stratton (D-N. Y.), has recommended that legislation be enacted requiring the Joint Chiefs of Staff (JCS), upon request, to provide Congress with their views on national defense budget levels as expressed to the President and the Secretary of Defense. This came in response to concerns over letters sent by the President and the Defense Secretary to Sen. John Stennis (D-Miss.), Chairman of the Senate Armed Services Committee, condemning House additions to the FY '81 Authorization request.

Currently, the JCS are required to testify before committees only in accordance with policies established by the Administration.

The subcommittee report stated that civilian leaders tend to ignore recommendations from the JCS on defense issues.

Burden Sharing

Steps are being taken by Congress to force our NATO allies as well as Japan and South Korea to carry more of the mutual defense burden. In the House-passed Military Construction Bill, for example, no funds are to be used to pay property taxes on military housing abroad. The accompanying report states that the US is pouring billions into NATO defense and thus should not pay taxes on facilities housing US military in allied countries. A group of NATO projects was cut by more than $130 million, with specific instructions to DoD to save US tax dollars wherever possible by obtaining support funds from host nations.

Even construction in the Indian Ocean was cut. The committee report said the Administration had not adequately defined its objectives and policy in that area. It was further stated that since Japan and the NATO allies have an even greater stake in keeping the sea lanes free for transporting fuel, they must be prepared to share the burden in keeping a US presence in the Persian Gulf and Indian Ocean area by directly assisting US activities or by assuming more responsibility for their own defense.

Authorization Conference

The Defense Department authorization for procurement and R&D in FY '81 is likely to be a record $52.8 billion.

Members of the joint House and Senate conference reached a compromise on DoD spending with the following highlights:

- $300 million for full-scale development and $75 million for procurement of a multirole strategic bomber. A study of alternate approaches including an advanced technology aircraft, the B-1 and its derivatives, and the FB-111B/C is to be submitted to Congress by March 15, 1981, with comparisons of costs and military effectiveness.
- $35 million for R&D of the outsize cargo transporter, CX, but funds may not be spent until DoD submits to Congress a detailed study of lift and mobility requirements for possible contingencies in such areas as the Indian Ocean. The analysis is to include well-developed plans for CX "to make such full-scale engineering development both economical and technically feasible."
- 4,600 or more Multiple Protective Shelters for MX may be deployed in the Nevada-Utah area if, upon completion of a study of alternate sites, Congress decides that military effectiveness and costs would be adversely affected by split-basing.
- An 11.7 percent raise in pay, subsistence, and quarters allowance.
- Twenty-five percent limit on recruits in mental category IV.
- Once-a-year cost of living adjustment for military retirees.

Space Shuttle

NASA's Space Shuttle continues to run into problems. While the program received supplemental funds of $285 million for FY '80 and is authorized $1.873 billion for FY '81, a recently passed Military Construction Bill contains a substantial reduction in funds for space transportation facilities at Vandenberg AFB, Calif., and at the same time withholds the appropriated money until after the first launch, now set by NASA officials for March 1981. Withholding the appropriations came in response to notification from the Secretary of the Air Force that the December 1983 IOC (Initial Operating Capability) date at Vandenberg is unattainable and must now be pushed back to June 1984. *(See also the article on p. 72.)*

Retirement Change

Future careerists face a change in calculating retirement income. The compromise Authorization Bill proposes averaging the top three years of basic pay instead of the current formula of basing retirement on final salary. In the future, annual retirement income will run from 9.5 to seventeen percent less than current rates. The Pentagon is projecting a four-percent decline in retention rates with the change.

The provision will affect only those entering active duty after enactment of the bill.

Republicans on Defense

The Republican 1980 Defense Platform calls for immediate defense spending increases to achieve and maintain military and technological superiority over the USSR.

Rejecting the mutual-assured-destruction (MAD) theory and favoring strategy to deter a Soviet attack by beefing up sustained war-fighting capabilities of US strategic forces, the platform devotes considerable attention to the mid-1980s ICBM vulnerability. The platform proposes: earliest possible deployment of MX in a survivable basing mode; accelerated development and deployment of a new manned strategic penetrating bomber using research already done on the B-1; an air defense system of dedicated interceptor aircraft and early warning systems; speedup of deploying cruise missiles on aircraft, land, ships, and submarines; modernization of the military command and control system; and, finally, development of an antiballistic missile (ABM) defense system. ■

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AIRMAN'S BOOKSHELF

Five-Star Sailor

Master of Sea Power: A Biography of Fleet Admiral Ernest J. King, by Thomas B. Buell. Little, Brown and Co., Boston, Mass., 1980. 609 pages with index and photographs. $22.50.

Fleet Admiral Ernest J. King was the most powerful naval commander in the history of mankind. Holding both titles of Chief of Naval Operations (CNO) and Commander in Chief, US Fleet (COMINCH), King served as one of the Joint Chiefs of Staff and President Roosevelt's principal naval advisor throughout World War II. On the eve of that war, however, King had been passed over for the top Navy slot and given his "twilight" assignment with the Navy's General Board before mandatory retirement at age sixty-four. After the war, Gen. George C. Marshall and many of King's subordinates such as Nimitz and Halsey were better known by the public than King himself. That in itself speaks a volume about this enigmatic leader who played such a vital role in defeat of the Axis powers yet who shunned publicity at all costs.

Thomas B. Buell, himself a naval officer, history professor, and author of a biography on Adm. Raymond Spruance, has written a thorough and in-depth narrative of Admiral King's life, not only as a military leader but also as an individual. This is the first significant biography of the Admiral, and it fills an important gap in coverage of our World War II leaders.

The author devotes the first 100 pages to King's naval career from graduation at Annapolis in 1901 to the outbreak of war in Europe in 1939. During that period, King made every effort to select his own assignments in surface, submarine, and aviation commands as well as shore duty at the Naval Academy and the Naval Postgraduate School. He received acclaim for directing the recovery of two sunken submarines and commanded one of the Navy's first aircraft carriers, the USS *Lexington.*

Rather than spending the war in retirement as he expected, King was assigned as commander of the Atlantic Fleet in early 1941 to support the British in the Battle of the Atlantic. His subsequent replacement of Admiral Stark as the senior Navy commander placed him in the position for which the first forty years of his career had only been preparation.

The remaining 500 pages deal with King's role as a strategy-maker, both in the JCS and with the senior British and American commanders in the Combined Chiefs of Staff. The author traces King's incessant fight for a central Pacific thrust against the Japanese, despite strong British resistance to such a move. The British wanted to defeat the Germans first before turning any Allied resources to the Pacific theater. King felt that such a strategy would allow the Japanese undue time to establish their positions and markedly increase the costs in Allied men and materiel when an offensive began. The resulting Pacific offensives, under the command of Admiral Nimitz and General MacArthur, contributed largely to defeat of Japan within only a few months after Germany's surrender.

Buell's description of King's relationships with the President, Generals Marshall and Arnold, as well as their British counterparts provides a new insight to many of the conference-room battles that were fought in developing an Allied strategy for the war. Each of the top-level meetings such as Arcadia and Trident is related in detail. Once a strategy decision was made and directions given, King left the rest of the details to his subordinate commanders. As a result, little about battle activities will be found in this volume.

The author's ability to delve into Admiral King as a man is largely due to his use of King's notes used in preparation of his memoirs. Other collections of personal papers as well as extensive files prompted by the Admiral's heavy emphasis on memos and correspondence also provided a wealth of information. The total value of this book is marred, however, by lack of any footnotes to reference the myriad of documents mentioned. Buell does provide an extensive bibliographic section and comments about the primary sources used in each chapter.

Master of Sea Power is a well-written and thoroughly interesting analysis of this great military strategist and leader. It will stand as an invaluable work on Fleet Admiral King and his contributions in strategy, coalition warfare, and leadership.

—Reviewed by Capt. Don Rightmyer, Office of Air Force History.

New Books in Brief

Batfish, by Hughston E. Lowder with Jack Scott, is the day-by-day account of the career of a US Navy submarine from its launch in 1943 to its final resting place as a war memorial berthed at Muskogee, Okla. Hughston Lowder (who served as radio and sound equipment operator aboard the sub) and writer Jack Scott trace the seven war patrols of *Batfish,* including the incredible sinking of three Japanese subs in as many days in February 1945, to make it the foremost submarine-killing sub of the war. Photos, appendix, index. Available from Prentice-Hall, Inc., Englewood Cliffs, N. J., 1980. 232 pages. $10.95.

From Weakness to Strength. This large volume is a collection of essays by some of the most respected foreign and defense policy experts in the nation, assembled under the auspices of the Institute for Contemporary Studies. The premise of the book is that meaningful, fundamental changes in policy are necessary. The authors suggest appropriate security policy directions, and spell out specific options and strategies to deal with the complex issues facing the United States in the 1980s. Included are articles from Fred Iklé, Edward Luttwak, Paul Nitze, Sam Nunn, Elmo Zumwalt, and others. Notes, references, and index. Institute for Contemporary Studies, San Francisco, Calif., 1980., 524 pages. $8.95.

Iran: From Religious Dispute to Revolution, by Michael M. J. Fischer. Anthropologist Fischer, who spent much time in fieldwork in Iran prior to the revolution, attempts in this scholarly work to clarify for Western minds the nature of the social revolution in Iran. The author's study of Shi'ite culture reveals a complex and often contradictory picture of a nation struggling to come to terms with itself. The book is especially valuable and timely for its in-depth understanding of a little-known and widely misunderstood society in transition. With notes, bibliography, appendices, and index. Harvard University Press, Cambridge, Mass., 1980. 314 pages. $17.50.

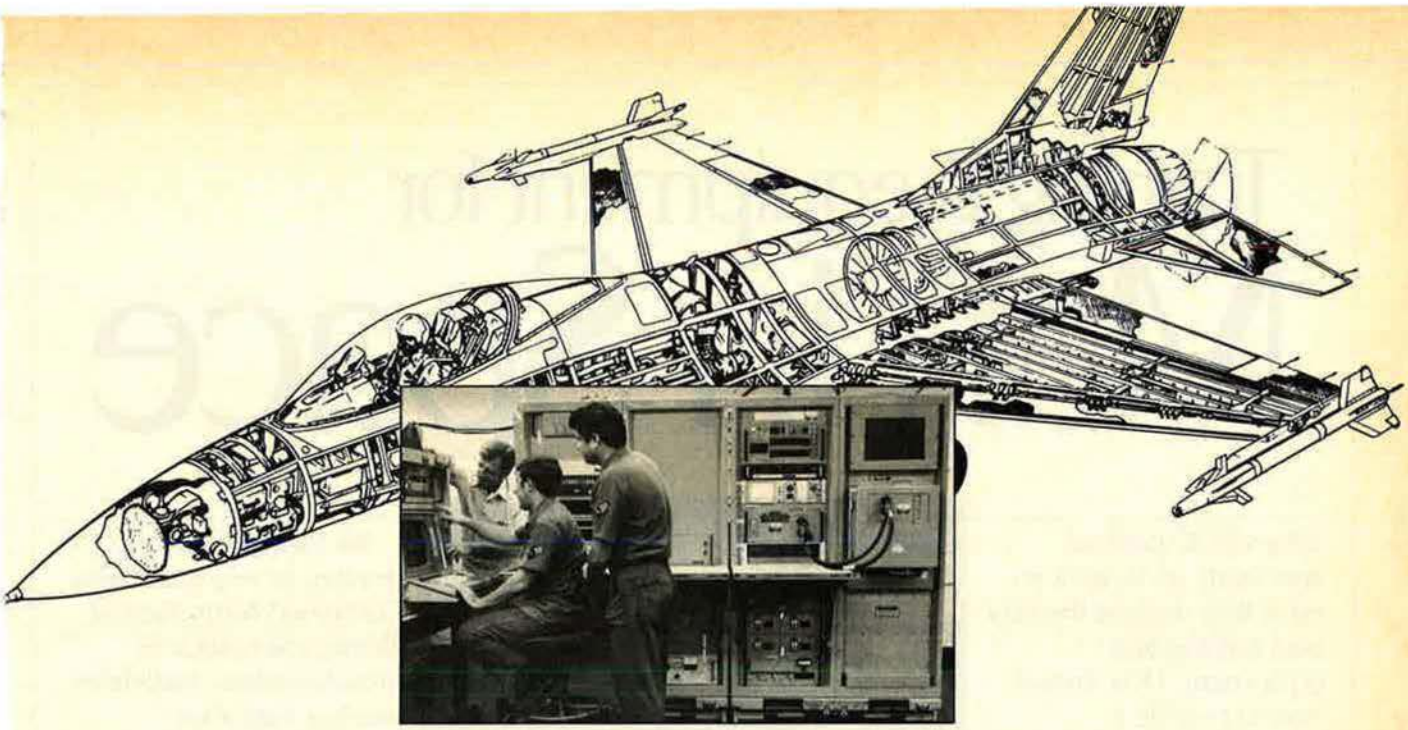
Now Is the Time to Prepare a Guide for Your Survivor, by Rear Adm. Benjamin Katz, USN (Ret.), is a 1980 revision of the Admiral's compendium of information that can save a survivor costly mistakes at a time of emotional stress. It covers funeral plans, records that should be maintained, taxes and financial arrangements, legal matters, and helpful advice on actions that should and should not be taken on the death of a spouse. Also included are forms to be completed to secure a wide range of survivor benefits. The book is in its fifth printing. Overlook Co., 910 N. Overlook Dr., Alexandria, Va. 22305. 41 pages. $2.95 postpaid.

Strategic Survey 1979, by the editors of The International Institute for Strategic Studies. In this annual reference on trends in worldwide security and defense structures, the editors emphasize that Third-World crises will increasingly affect international security for the coming decade, and that "without the concurrence of the regional states security cannot be imposed, and stability will prove elusive." Included in the book are a broad overview summary and chapters on "New Factors in Security," "The Super-Powers," and "Arms Control." Each major geographical area is examined for military and political developments affecting security issues. The survey also contains a chronology of 1979 events with implications for international stability. The International Institute for Strategic Studies, London, England, 1980. 140 pages. $6.50.

Tenth Air Force Story, by Kenn C. Rust. The little-heralded Tenth Air Force, created from the ashes of the ill-fated Java and Sumatra campaigns, went on to rack up an impressive history, culminating with the expulsion of the Japanese from their Burma stronghold. The latest volume in the "US Air Force Series" by the Historical Aviation Album, this book—like others in the series—contains a wealth of information including unit markings, squadron color codings, profile line drawings, maps, unit history charts, an aces list, and many photos, with excellent examples of aircraft artwork. Aviation Book Co., 1640 Victory Blvd., Glendale, Calif. 91201, 1980. 64 pages. $7.50.

Your Career in Federal Civil Service, by Flint O. DuPre. The federal government has become the nation's single largest employer, hiring an average of more than 200,000 people a year. In this well-organized book, the author demystifies the process by which a would-be federal worker lands a government job, and provides a comprehensive survey of the opportunities and benefits offered by federal employment. Appendices, index. Available from Harper & Row, New York, N. Y., 1980. 274 pages. $10.95.

—Reviewed by Hugh Winkler, Associate Editor.



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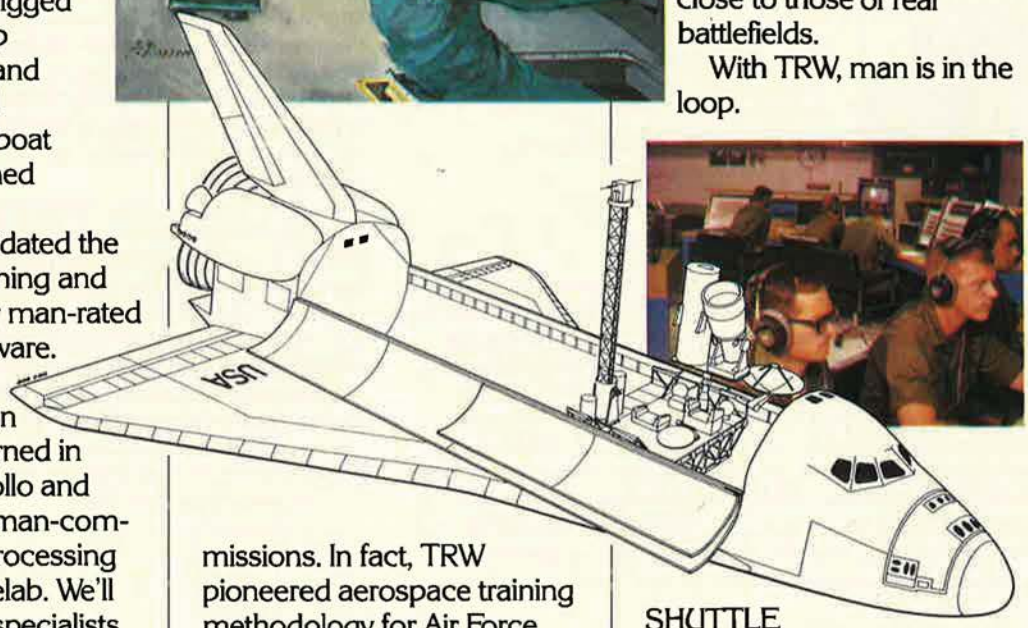

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SPEAKING OF PEOPLE

USAF's Twenty-Four-Point Compensation Plan

By Ed Gates, CONTRIBUTING EDITOR

WHEN you want, in the worst way, to sell something you regard as extremely important, you draw up a hard-hitting sales campaign, one filled with justification and thoroughly documented. You doubtless also assemble a crackerjack sales force to peddle the message to the right people.

That's pretty much what the Air Force is doing and promises to keep doing with its "Compensation Plan." The plan lists USAF officials' "most-needed" pay and benefits improvements. They are set down in priority order, with estimated costs to the government and complete with the rationale for their adoption over the next few years.

For example, in advocating the important variable housing allowance, the Plan's narrative section establishes that military people annually pay $600 million over and above their quarters allowance for off-base housing. This, of course, was never intended. But it's happening, and it hurts.

Dependent dental care is another key item in the plan. Its case is equally persuasive, the narrative noting that the present lack of such care jolts military families in the pocketbook and is totally inconsistent with the trend in the private sector, where such care has become a routine fringe benefit.

The current plan features twenty-four separate goals. Included are many of the pay-benefit legislative items Congress had been looking at favorably in recent months. Applied Defense-wide, USAF's lists of goals would add an estimated $7 billion-plus to the annual DoD personnel budget. So, as Hq. USAF planners concede, they won't all materialize overnight. Some may not make it for several years, if ever.

But the important thing is that USAF alone has a well-organized drive under way. It is something all members, particularly the leaders, can get behind. That's what they're doing, pounding home the word within the Pentagon, on Capitol Hill, and to groups throughout the country. As a result, congressional and grass-roots support for better pay and benefits has emerged. The Air Force aims to keep it that way.

What if some of the key "goals" don't make it in the next couple of years? What if new initiatives are needed?

Col. Paul Arcari, USAF's top compensation expert, explained that the list won't remain static. It will be amended, altered, or otherwise massaged as required. Every few years it will be revised completely. "We'll keep the heat on year after year," Colonel Arcari said.

Let's look at the current plan. Its goals and their status at press time follow in priority order:

1. 15.2% across-the-board pay raise. Senate approved 11.7%.

2. 50% flight pay raise and flyer's bonus. A 25% raise and bonus (equal to four months' basic pay) moving through Congress.

3. Variable housing allowance. Senate approved as discretionary, House as an entitlement. USAF wants as entitlement.

4. PCS improvements. Breezing through Congress.

5. Reenlistment bonus improvements. Moving through Congress.

6. BAS expansion. USAF favors BAS for all single careerists. Congress approving 10% increase in current payments.

7. EM Per Diem equity. Would equalize with officers. Doubtful for now.

8. CHAMPUS improvements. USAF would update fee schedule, reimburse at 90th percentile. Congress approving $1,000 for handicapped kin.

9. Singles COLA overseas. In FY '81 budget. Chances uncertain.

10. $15,000 Engineer-scientist bonus. USAF target: FY '82.

11. Junior enlisted PCS entitlements. Would provide 1,500 pounds HHG, trailer allowance, other improvements. USAF target: FY '83.

12. Increased CONUS per diem. House committee, Senate approved.

13. HHG weight increases. For all on PCS. USAF target: FY '82.

14. Family Separation Allowance. House committee. Senate approved $30 monthly for junior EM. USAF would raise careerist rate to $65.

15. Trailer allowance increase. House committee, Senate approved.

16. Temporary lodging allowance. USAF wants ten days TLA by FY '84.

17. New hazardous-duty incentive pay. Would provide $55/$110 monthly for HDIP skills not on current list. USAF target: FY '83.

18. Junior EM BAQ. When on leave, travel status. USAF target: FY '84.

19. Optional Residency. Would allow more singles to live off base and collect BAQ. House committee approved.

20. Dependent dental care. Pending in House committee.

21. Educational Scholarships. To lure good recruits. USAF target: FY '82.

22. Improved tuition aid. Would cover 90%. USAF target: FY '82.

23. Special-Incentive pay increase. 50% raise sought by FY '84.

24. Househunting trip. Would first pay travel expenses for member and spouse, later five days' per diem. USAF target: FY '84. ■

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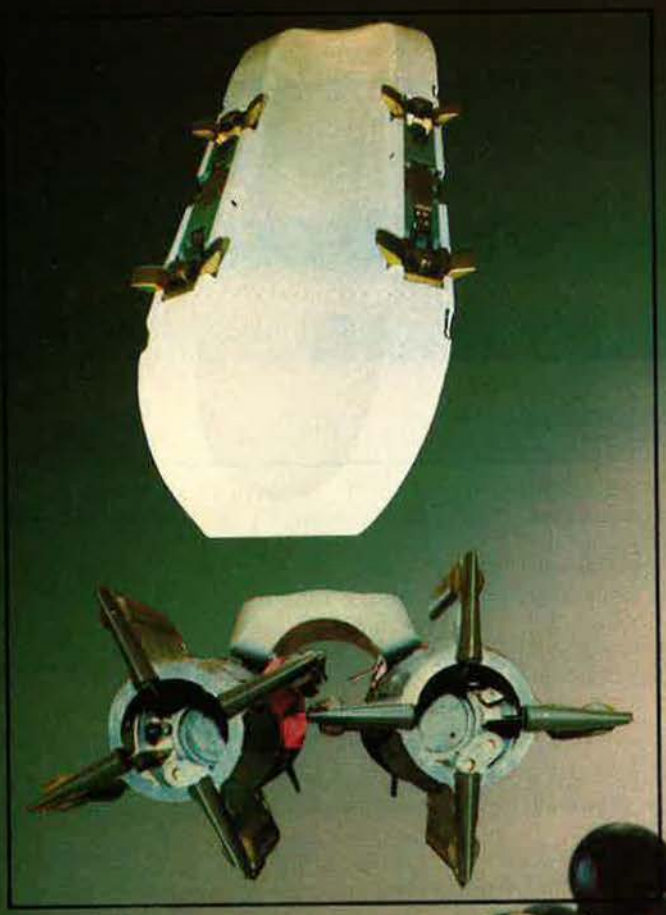

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By James A. McDonnell, Jr., MILITARY RELATIONS EDITOR

Retention Issue Dominates Meeting

Retention, retention, and more retention—that was the dominant theme of the July 9–10 joint meeting of AFA's Junior Officer Advisory Council (Executive Committee) and Enlisted Council at the Sheraton Washington Hotel in the nation's capital.

The thirty junior officers and NCOs heard Maj. Gen. William R. Usher, the Hq. USAF Director of Personnel Plans, update the retention picture and explain Air Force's multiple actions to secure pay and benefits improvements. General Usher, who also serves as the JOAC advisor, predicted that the 1989 GI Bill cutoff date will be extended, thus enabling many careerists to complete retirement service and still protect their education entitlement.

He also urged council members to tell people at their bases just what USAF is doing to solve the retention puzzle.

USAF's Deputy Surgeon General, Maj. Gen. Murphy Chesney, in his briefing for the groups, said the service "wants to run CHAMPUS out of business" by getting more patients back to military facilities, "where they can be treated at less cost." However, he feels CHAMPUS will improve markedly over the next two years. The Air Force, General Chesney added, wants to make in-service medical care for dependents and retirees a "right" (instead of on a space-A basis) and "budget accordingly."

Other Hq. USAF officials who addressed the meeting included Col. Richard Conaway, a personnel policymaker; Col. Larry Shreve, Chief of the Legislative Division, in the office of the Secretary of the Air Force; Col. Alexander Sloan, Deputy Director, Medical Plans & Resources; Maj. Steven Strobridge, Action Officer, Compensation, Entitlements Division, DCS/M&P; Capt. Timothy Timmons, Personnel Analyst Officer, Analysis Branch, Analysis Division, DCS/M&P; and CMSgt. William Hazelton, Personnel Management Specialist, Leadership and Management Branch of the Human Resources Development Division.

Principal luncheon speaker was Joseph C. Zengerle, Assistant Secretary for Manpower, Reserve Affairs and Installations. AFA President Victor R. Kregel introduced Zengerle.

The councils, whose members are scattered throughout the service, advise the AFA leadership on personnel problems and suggest ways the Association can help solve them. President Kregel said that "their advice is invaluable."

Each year the councils pursue special projects, and this year's, not surprisingly, is Retention. The JOAC is preparing a pamphlet dealing with the troublesome issue, which will receive service-wide distribution. The Enlisted Council is slated to prepare retention addresses suitable for delivery to the public. Both projects are to be completed at the AFA Convention in September, which also will be held at the Sheraton Washington.

Capt. Robert Murdock, Scott AFB, Ill., is chairman of the JOAC, and CMSgt. Robert Carter, Lackland AFB, Tex., heads the Enlisted Council.

Guests at the Council luncheon included, from left to right: Maj. Gen. Dan F. Callahan, USAF (Ret.), AFA Chairman of the Board; Dean Phillips, Special Assistant to the Administrator, Veterans Administration; Chief Master Sergeant of the Air Force James M. McCoy; Lt. Gen. Andrew P. Iosue, Deputy Chief of Staff, Manpower and Personnel; William Lawson, Executive Director of the White House Veterans Federal Coordinating Committee; CMSgt. Robert Carter, Chairman, AFA's Enlisted Council; the Hon. Joseph C. Zengerle, Assistant Secretary of the Air Force for Manpower, Reserve Affairs and Installations; Victor R. Kregel, President, AFA; and Capt. Robert Murdock, Chairman, AFA's Junior Officer Advisory Council.

Academy Moves to Cut Cadet Attrition

Concerned about cadet attrition they say has averaged around forty percent the past several years, Air Force Academy officials have launched "Stop Out," a project that lets sophomore students wavering about resigning to sit out a year. In a leave-without-pay status, they can travel, "reflect on their career goals," or do whatever they wish. Those who return the following year will resume their studies where they left off.

Academy officials say "a very high percentage of students" at civilian colleges who take leaves of absence return to complete their degrees. "These students return refreshed, much more mature, and ready to resume studies in ways that are impressive," Academy officials said in endorsing the idea for "our cadets."

"Academic reasons" account for about a quarter of the Academy's cadet losses, while the other three-quarters is called "voluntary—mostly attrition due to a change in career goals." The officials said that while the overall exit rate "closely approximates" that experienced by schools

with similar standards, "we're concerned about the level of voluntary attrition."

Actually, total losses appear to be getting worse. The class of 1980 had an overall attrition rate of about forty-four percent. The class of 1981, which graduates next spring, has already reached the forty percent attrition level of recent years, while the class of 1982 has reached the thirty-five percent attrition point. A chart furnished by the Academy explains the dropout picture for both male and female cadets:

	Entered		Graduated/Still Enrolled	
Class	Men	Women	Men	Women
1980	1,440	156	801	97
1981	1,352	153	837	68
1982	1,267	177	824	119
1983	1,331	173	1,034	133

The class of 1984, composed of 1,384 men and 227 women, entered the Academy on June 23. The second largest class since the 1,630 original members of the class of 1974, they were culled from a record 7,158 applicants. The first forty-two days were spent in basic training.

Officials could not forecast attrition from the new class, though they cited "new initiatives designed to improve training programs and better motivate cadets." These plus "Stop Out" should reduce attrition, they said.

THE BULLETIN BOARD

O'Seas BX Credit Program Successful

Credit in Air Force and Army exchanges overseas, only recently launched, is working out well, and many members, particularly lower graders, are participating, according to Defense Department and Army Air Force Exchange Service (AAFES) officials.

The overseas credit project, officially called the "Deferred Payment Plan" (DPP), began in a few outlets in mid-1979 and has since been phased in to all other foreign exchanges. The store at RAF Bentwaters, UK, was the final one to adopt DPP this past May 28.

Yet, while officials report good customer acceptance of the DPP and few abuses, they remain firmly opposed to credit in exchanges in the fifty states. They see no chance of such a possibility. The only credit buying authorized in Stateside stores is for uniforms. Oil company credit cards are honored, and BX conces-

AFA BELIEVES...

Let's Keep the Faith

As this is written, in mid-summer, Washington is relatively quiet. Congress is at home, attention is focused on the political conventions, and summer vacations have left skeleton staffs in many offices.

On the other hand, in at least one area there seems to be ever-increasing activity. That area is the issuing, from widely diverse quarters, of proposals for increased military pay and benefits.

The President, during his Memorial Day visit to the Navy's *Nimitz,* reversed his previous stand and promised Administration support for the Nunn-Warner proposal, plus some additions, such as dental care for dependents. As they have been doing for some time, the service chiefs continue to cite the need for increased compensation in order to maintain readiness. Service civilian leaders, including Air Force Secretary Hans Mark and Joseph Zengerle, Assistant Secretary for Manpower, Reserve Affairs and Installations, have included in most every speaking opportunity a plea for enhanced pay. The Chief Master Sergeant of the Air Force, James M. McCoy, who has just completed visits to every area of the world, has taken the message everywhere he has gone.

But in such previously unlikely places as national news magazines, editorial columns of major newspapers, and commentary of nationally syndicated columnists, the cry for paying military men and women what they are worth has reached an unprecedented level. Even one of the major political party platforms includes a plank calling for more pay and benefits, including such a specific item as increasing the rate of per diem.

Finally, in the halls of Congress, the army of staff members still carry on day-to-day activity while the members are in their respective home districts. News releases churn out as one member after another adds his or her name to the rolls of those calling for "more pay for the troops." An Air Force Pentagon action officer, on his third tour in the Big Building, says that he has never witnessed such a surfacing of pay-related legislation in any Congress with which he has been involved.

And this is good. AFA believes it is high time that the glare of publicity shine on this important topic and is glad that the light of public acknowledgment has brightened this hitherto dark corner. For too long, AFA was a lonely voice calling for equitable and just compensation as perhaps the one most effective means of stemming the alarming exodus from the career-level officer and enlisted ranks *(see May editorial "Try Throwing Money at It").* So we salute this new awareness.

But we also caution that this tide of rhetoric alone will not solve the problems of compensation and retention. As heartening as the words may be, if actions do not follow, the problems will become even worse.

This column hears from many of the blue-suiters throughout the force. Almost without exception one thought comes through. Paraphrased, it is: "I am heartened that our leaders are finally recognizing our plight. I am willing to wait for a few months to see what happens on this. But, if after all this publicity nothing happens again, I'm leaving as soon as I can." Thus, the danger of unfulfilled expectations looms ever larger the more the publicity builds.

Thus, we exhort those persons in positions to influence the final outcome not to disappoint those dedicated people who have had their hopes raised. Should that happen, the result would be, we believe, a tragic acceleration of the loss of our most vital resource.

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—JAMES A. McDONNELL, JR.

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sionaires may accept major credit cards in the fifty states, Pentagon officials said.

Overseas, DPP approval is based on the BX customer's ability to meet his payments and whether there is a history of bad checks. Maximum credit is $1,000. A finance charge of one percent per month is levied on the unpaid balance. AAFES officials said that by the end of 1979 approximately $55.6 million in DPP sales had been chalked up. This figure, they added, represented twenty-eight percent of the total retail sales at stores where the plan was in operation. Many stores, of course, didn't launch the DPP until this year.

E-1 through E-4 customers accounted for sixty-three percent of the DPP sales volume, which is about what authorities expected. A main aim in okaying credit in the first place was to "provide financially burdened military personnel, particularly in the lower grades, with an opportunity to make necessary purchases to establish households overseas and to spread the financial burden for other special requirements such as back-to-school and Christmas purchases," the Pentagon told Congress in seeking the lawmakers' blessing for the project. Another objective of DPP, the Pentagon added, was to give members the chance "to purchase high-cost items, such as stereo equipment and television sets, as alternatives to seeking entertainment on the local economy." And thereby reduce individuals' costs, the Pentagon might have added.

So far that's the way things have worked out. Officials said that as of early this year stereo and other electronic equipment accounted for seventy percent of the DPP sales. Photographic supplies and clothing were a distant second and third.

Credit purchases overseas are also permitted on furniture, auto tires, jewelry, household goods, home heating oil, concession automotive repairs, and automotive parts. The Armed Services Committees closely control the items that can be sold in AAFES outlets.

Authorities said that overseas Navy exchanges are starting to offer credit, but that several months will pass before all are doing so.

THE BULLETIN BOARD

Commissaries Again?

The House Appropriations Committee has resurrected the explosive commissary subsidy issue, hinting that it may try again to cut store appropriations, which would, of course, raise commissary prices. The committee and other elements of Congress tried unsuccessfully to reduce federal support for the stores during the mid- and late-1970s.

Quiet on the commissary front followed. But recently the committee, in hearings on the FY '81 military appropriations bill, asked Defense Department officials a series of hostile commissary questions.

For example, if the committee ordered the closing of the 109 commissaries in metropolitan areas, which it said "are violating the congressional intent," would the Pentagon support putting those savings into larger selected bonuses and proficiency pay?

Defense disputed the committee's assertion that the metropolitan stores violated congressional intent, saying it's clear Congress authorized them as "an economic relief for the well-being of service members." The Department then said it "would oppose the directed closure of any . . . stores, particularly those operating in metropolitan areas."

A related committee question asked Pentagon officials if they would support a commissary subsidy cut of, say, twenty percent if the savings were made part of a major pay increase package? The answer: a resounding no. And, would denying commissary privileges to the 3,500 foreign diplomats and their families who now enjoy them save any money? The Pentagon's answer: no. The committee also talked about eliminating the annual $80 million exchange system transportation subsidy; Defense officials strongly objected to the idea.

If the committee is serious about cutting commissary support, its report on the '81 spending bill should contain the signal. That report is due out this month.

Officer Recallees Increasing

More former officers are voluntarily returning to extended active duty than USAF had previously estimated. And the recallees themselves, who separated in the mid-1970s when the service was overstrength with officers, are "enthusiastic about their duties and are extremely happy to be back with the Air Force family," officials said.

USAF earlier said that the FY '79 recall program—a major effort to offset the heavy officer exodus of more recent years—netted 478 volunteers and that 237 and 120, respectively, would probably return the following two years *(see January '80* AIR FORCE *Magazine)*.

The Air Force now puts the FY '79 returns at 502 and the FY '80 and FY '81 estimates at 490 and 350, respectively. That adds up to 1,343 over a critical three-year period for officer manning.

For the current fiscal year, five boards sent recall bids to 601 persons, including 313 pilots, eighty-three navigators, and 205 nonrateds. Some 490 will have returned by the end of this month when the year ends, the officials say.

The first board for the FY '81 pro-

The Arnold Air Society and Angel Flight of the Troy State University, Ala., AFROTC unit recently dedicated the Dr. Theodore C. Marrs, Jr., Library, which includes two portraits of the former Deputy Assistant Secretary of Defense for Reserve Affairs by Woodi Ishmael, a former Air Force artist presently on the TSU staff. Mr. Ishmael and the detachment commander, Lt. Col. James Phillips, presided at the dedication ceremonies. Dr. Marrs was a vigorous promoter of the Air Reserve Forces and a tireless speaker in support of USAF programs.

gram was held a few weeks ago, and subsequent boards are slated to meet in October 1980, January 1981, and April 1981. "We expect 350 officers to return in FY '81," USAF said.

Two surveys have polled recallee attitudes and found them to be enthusiastic. The service said that "feedback from commanders is that the recallees are doing a great job in many challenging positions. With few exceptions, the field reaction to the recall program is very positive."

Center Has Important Reminders

Air Force members sometimes don't take advantage of programs designed to help themselves and their families. The Manpower and Personnel Center has some recent examples:

• *Assignment Preference.* While more than half of the airmen returning from overseas this month and in October have received one of their choices of Stateside bases, others listed no preference or only one preference. Others wasted choices by naming bases where their skills could not be used. Some even asked for states where there are no bases, like Iowa and Vermont.

Airmen returnees can do themselves a favor by listing many choices on their assignment preference form (AF Form 392). Of the 4,186 tech sergeants and below returning in

THE BULLETIN BOARD

September and October, 766 received their first choice, 1,365 got one of their top three, and 2,157 received one of eight choices listed. This still leaves a lot of unhappy airmen, however.

• *Career Objective Statement.* Too many officers don't keep this piece of paper, the AF Form 90, up to date. This is particularly true for those in career fields where transfers are frequent; if they don't keep the data current, the Center's resource managers have no guidance. Also, officials say keep the forms "realistic." They add that CBPOs have considerable literature on the forms and the assignment process. One such document for flyers, AF Pamphlet 36-6, has been widely circulated. It will soon be updated to include assignment data for support officers.

• *Record of Emergency Data.* This form does more than tell the Air Force who to contact, pay back pay to, etc., in the event of a member's death. For example, suppose a member's parents are in poor health so that a direct notification might be dangerous. Thus, an alternative relative could be listed. The form also contains a place for listing life insurance policies, but if the form is outdated, companies would not be contacted and intended beneficiaries could be denied insurance.

The Center says the bottom line is this: "Update the form if there have been any changes in family status, addresses, or beneficiaries as the result of marriage, civil court action, death, or other readons."

Authority Sought to Call Up More Reserves

The Defense Department wants to increase from 50,000 to 100,000 the number of members of the Selective Reserve the President can order to active duty other than during a war or national emergency. The time limit on such recall would remain at ninety days.

The 50,000 ceiling, laid on in 1976, has helped the Pentagon in planning exercises and enhanced the Total Force policy, but Harold W. Chase recently told Congress that a 100,000 ceiling would "allow better Guard and Reserve Force augmentation in support of the Rapid Deployment Force" and reap other benefits. Chase is Deputy Assistant Secretary of Defense for Reserve Affairs.

Flight Waiver Policy Explained

Numerous nonrated officers who want to fly, but are too old, ask for age waivers, and some have been approved. But this "in no way means the Air Force is soliciting over-age applicants," Hq. USAF declared recently.

In fact, exceptions to the age limit, which is twenty-seven and one half, from now on will "be made only in rare instances" where applicants can document that they were erroneously prohibited from flying training consideration earlier. Erroneous counseling by a CBPO, if it can be proved, is an example.

The warning came as the service announced that the next semiannual board to choose active-duty nonrated officers for flying training will convene October 14–17 at the Military Personnel Center, Randolph AFB, Tex. The quotas will be as follows: nonrated to pilot 150, navigator to pilot twenty-five, and nonrated to navigator fifteen. Those who complete the courses will be part of the pilot-navigator buildup the service is trying to pull off. In FY '81, for instance, the service plans to train 1,850 new pilots and 650 new navigators, compared to 1,575 pilots and 600 navigators this fiscal year.

The October 14–17 board will con-

The 1979 Colonel L. Joseph Brown Award, recognizing the most outstanding programs in equal opportunity and treatment, went to Pacific Air Forces. PACAF Commander Lt. Gen. James D. Hughes, right, received the plaque from USAF Chief of Staff Gen. Lew Allen, Jr., in recent Pentagon ceremonies. Mrs. Laura Brown, widow of the officer for whom the award is named, looks on. The late Colonel Brown engineered the development of many current Air Force social action programs.

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sider women applicants on a "best-qualified" basis with males.

Short Bursts

USAF leaders at press time were keeping one eye on Capitol Hill in anticipation of early approval of several pay-benefits improvements ranging from various bonuses to an 11.7 percent pay raise. Typical was **Lt. Gen. Andrew P. Iosue,** the Hq. USAF Deputy Chief of Staff for Personnel, who told AIR FORCE Magazine he feels the efforts of the "USAF leadership to encourage the government to provide adequate rewards are about to pay off."

Members wanting up-to-date information on the status of the pending improvements, including those in the Nunn-Warner and the Administration's Fair Benefits packages, should be able to secure it via a **new retention hotline.** It will operate nonstop at the Air Force Manpower and Personnel Center, Randolph AFB, Tex., playing late retention news. Since the most important news will be congressional action—or delay—on benefits items in the mill, that should dominate the coverage. The retention hotline numbers are **AUTOVON 487-2012** and commercial **(512) 652-2012.**

To **Jack Flaig,** President of the **Pennsylvania State AFA,** goes much of the credit for the recent establishment of an AFROTC unit at St. Joseph's University in Philadelphia. He spearheaded the drive for the new unit, the 140th in the USAF inventory. Boston University and a dozen yet to be disclosed schools are slated to get new AFROTC detachments next year. The new units will concentrate on furnishing USAF officers in scientific and engineering skills.

And all 350 of the airmen to be chosen for the **Airman Education and Commissioning Program** (AECP) in FY '81 will pursue engineering degrees. Four boards, the first on the twenty-second of this month, will make the selections.

Some years ago USAF was criticized because many members at separation or retirement time cashed in big on **unused accrued leave.** So the word went out: Commanders will encourage people to use up their leave each year; besides it's good for recharging tired batteries. Not much was heard about the matter until Hq. USAF recently sent out new literature. It declares that "vacations from duty are essential to the morale and motivation . . . [and that] lengthy respites from the work environment tend to have a beneficial effect on an individual's psychological and physical status. . . ." It's the same policy, a Hq. USAF spokeswoman said, but with "new emphasis."

Air Force retirees have been getting **forty copies of retirement orders,** whether they need them or not. No more. Now the Manpower and Personnel Center is dispatching just two copies to CBPOs, which in turn can run off the number needed or give the retiree a copy to hand carry to the base duplicating office. The change, the Center reports, is supposed to save money, speed up distribution, and "help preclude the many complaints we have received about the late receipt of retirement orders."

With silver prices climbing again, old silver trophies gathering dust in base and unit trophy cases may be worth a bundle, the USAF IG notes in his TIG Brief. It's a reminder to commanders to take **proper security precautions.** And how well "do we protect the silver services in our clubs?" the Brief asks. ■

THE BULLETIN BOARD

SENIOR STAFF CHANGES

PROMOTIONS: To be **Lieutenant General:** Walter D. **Druen,** Jr.

RETIREMENTS: B/G James P. **Albritton;** M/G Anderson W. **Atkinson;** L/G Devol **Brett;** B/G William D. **Curry,** Jr.; M/G Howard M. **Estes,** Jr.; B/G James R. **McCarthy;** M/G Cuthbert A. **Pattillo;** B/G Thomas C. **Pinckney,** Jr.

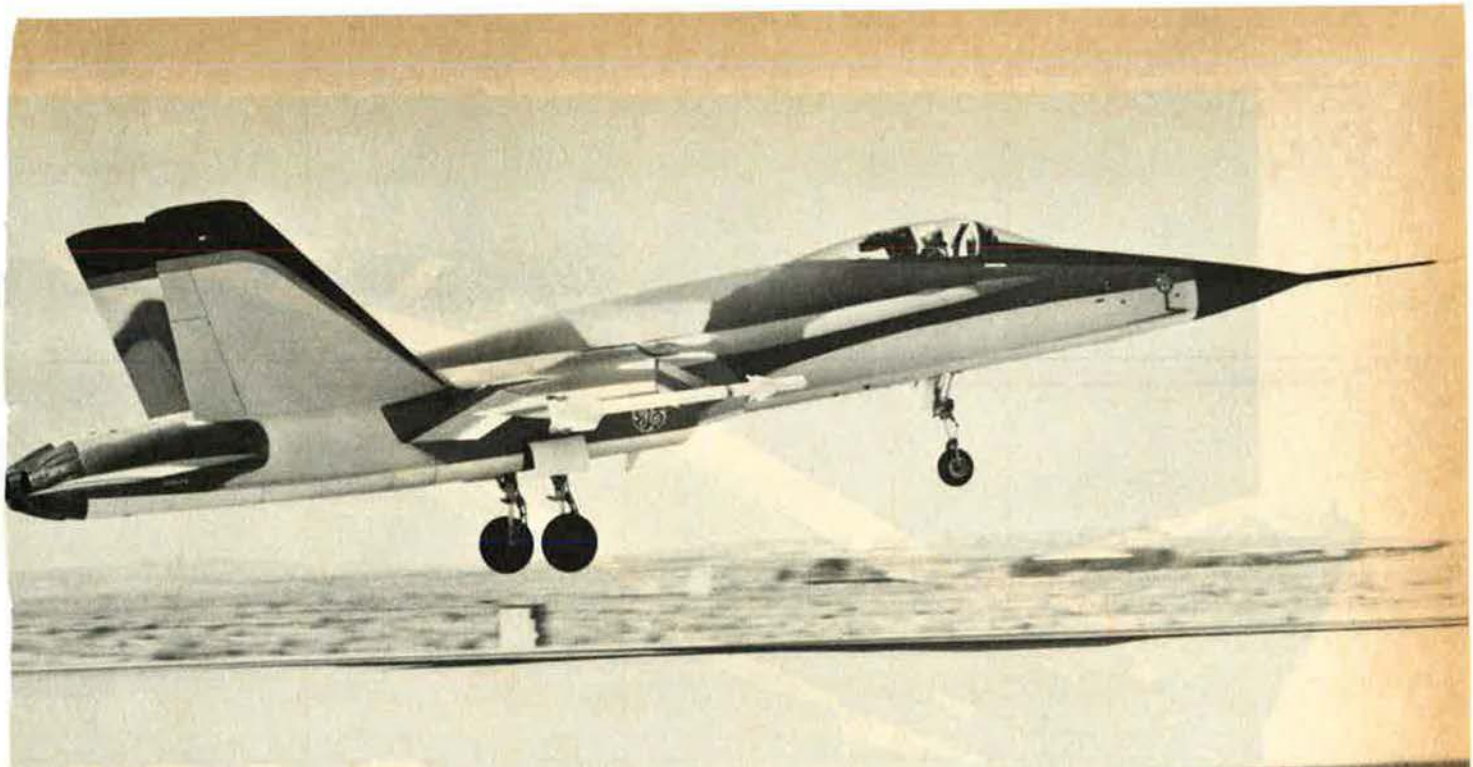
CHANGES: B/G Spence M. Armstrong, from Dep. Dir. of Space Systems & C^3, DCS/RD&A, Hq. USAF, Washington, D. C., to DCS/Tech. Trng., Hq. ATC, Randolph AFB, Tex., replacing M/G Mele Vojvodich, Jr. . . . **M/G William E. Brown, Jr.,** from Cmdr., Air Defense Weapons Center, TAC, Tyndall AFB, Fla., to Cmdr., 17th AF, USAFE, Sembach AB, Germany, replacing M/G (L/G selectee) Walter D. Druen, Jr. . . . **M/G (L/G selectee) Walter D. Druen, Jr.,** from Cmdr., 17th AF, USAFE, Sembach AB, Germany, to Cmdr., AAFSE, & Cmdr., 16th AF, USAFE, Torrejon AB, Spain, replacing retiring L/G Devol Brett.

M/G George A. Edwards, Jr., from Cmdr., 314th AD, PACAF, & Cmdr., Korean Air Defense Section, Osan AB, Korea, to Dir., J-5, USREDCOM, MacDill AFB, Fla., replacing retiring M/G Cuthbert A. Pattillo . . . **M/G Fred A. Haeffner,** from DCS/Plans, Hq. TAC, Langley AFB, Va., to Cmdr., 314th AD, PACAF, & Cmdr., Korean Air Defense Section, Osan AB, Korea, replacing M/G George A. Edwards, Jr. . . . **B/G Alfred M. Miller, Jr.,** from Cmdr., 25th AD/NORAD Rgn., McChord AFB, Wash., to Cmdr., Def. Gen. Sup. Ctr., Defense Logistics Agency, Richmond, Va., replacing B/G William D. Curry, Jr., who is retiring.

B/G John L. Pickitt, from Ass't DCS/Plans, Hq. TAC, Langley AFB, Va., to DCS/Plans, Hq. TAC, Langley AFB, Va., replacing M/G Fred A. Haeffner . . . **B/G Robert H. Reed,** from Cmdr., Tac. Trng. Davis-Monthan, TAC, Davis-Monthan AFB, Ariz., to Cmdr., Air Defense Weapons Center, TAC, Tyndall AFB, Fla., replacing M/G William E. Brown, Jr. . . . **M/G Stuart H. Sherman, Jr.,** from Dir., Manpower & Organization, DCS/Military Personnel, Hq. USAF, Washington, D. C., to Cmdt., AFIT, ATC, Wright-Patterson AFB, Ohio, replacing retiring M/G Gerald E. Cooke.

B/G C. C. Teagarden, from Staff Judge Advocate, Hq. USAFE, Ramstein AB, Germany, to Staff Judge Advocate, Hq. SAC, Offutt AFB, Neb., replacing B/G (M/G selectee) Thomas B. Bruton . . . **B/G Harold W. Todd,** from Exec. Ass't to Chmn., JCS, Washington, D. C., to Cmdr., 25th AD/NORAD Rgn., McChord AFB, Wash., replacing B/G Alfred M. Miller, Jr. . . . **M/G Mele Vojvodich, Jr.,** from DCS/Tech. Trng., Hq. ATC, Randolph AFB, Tex., to Dir., Manpower & Organization, DCS/Military Personnel, Hq. USAF, Washington, D. C., replacing M/G Stuart H. Sherman, Jr.

SENIOR ENLISTED ADVISOR CHANGES: CMSgt. Roy J. Nolin, to SEA, Hq. AFIS, Washington, D. C., replacing retiring CMSgt. George L. Proud. ■



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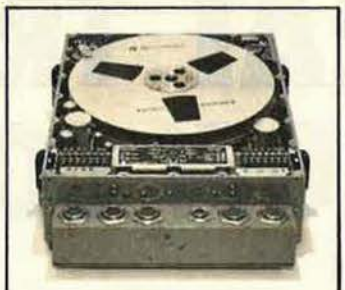

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AFA NEWS

Chapter and State Photo Gallery

By Vic Powell, AFA AFFAIRS EDITOR

Col. Al Renshaw, Commander of the 28th Bomb Wing, right, explains the operations of Airborne Command Post aircraft to US Congressman James Abdnor (R-S. D.), during a recent visit by the Congressman to Ellsworth AFB, S. D. With the Congressman are (from left) Hoadley Dean, AFA National Director; Col. Richard Schoonmaker, Commander of the 44th SMW, Ellsworth AFB, S. D.; and Charles Benson, President of the Rushmore Chapter of AFA in Rapid City. Congressman Abdnor is a member of the Rushmore Chapter.

Joseph C. Zengerle, Assistant Secretary of the Air Force for Manpower, Reserve Affairs and Installations, center, was the banquet speaker at the recent annual convention of Florida State AFA. At left is Dan Callahan, Chairman of the AFA Board of Directors, who spoke at the convention luncheon. At right is John G. Rose, President of Florida State AFA. Secretary Zengerle also recently addressed members of the AFA Board about issues of concern to his office.

Congressman William Carney (R-N. Y.), center, addressed a recent meeting of the Suffolk Chapter of New York State AFA. Congressman Carney, a member of the House Science and Technology Committee, spoke about the need for military preparedness. At left is Suffolk Chapter Secretary Robert Holecek, and, at right, Chapter President William Holecek.

CALENDAR OF EVENTS

Kansas State AFA Convention, September 6, Fort Riley . . .
AFA Board of Directors Meeting, September 14, Washington, D. C. . . .
AFA 34th Annual National Convention, September 15–18, Washington, D. C. . . .
AFA Aerospace Development Briefings and Displays, September 16–18, Sheraton Washington Hotel, Washington, D. C. . . .
AFA 1980 Symposium, "America's Security in the '80s," Hyatt House Hotel, October 23–24, Los Angeles . . .
Air Force Ball, Century Plaza Hotel, October 24, Los Angeles.

A recent luncheon meeting of the Nation's Capital Chapter highlighted publication of the book A Few Great Captains, *an account of the development of US airpower through the lives of the men who participated in its creation. Those present at the luncheon included (from left): Lt. Gen. Ira Eaker, USAF (Ret.), whose exploits are recounted in the book; Jack Reiter, Chapter President; Dr. Hans Mark, Secretary of the Air Force, who also addressed the meeting; Gen. Robert Mathis, USAF Vice Chief of Staff; DeWitt S. Copp, author of the book; and Lt. Gen. John B. McPherson, USAF (Ret.), President of the Air Force Historical Foundation, which sponsored publication of the book.*

One of aviation's pioneers was honored at the recent Alabama State AFA annual convention. Glenn E. Messer, a stunt flyer, airmail pilot, and businessman, was presented a sculpture of an early barnstorming pilot in honor of his contributions to the development of aviation. The award was sponsored by the Birmingham Chapter and presented by Chapter President Donald L. Krekelberg, right. Messer, now in his seventieth year of flying, pilots his own Cessna 180.

The Doolittle Raiders annual convention was held April 18 in Newport Beach, Calif. Among those honoring General Doolittle (center) were his son John, left, and Bob Eichenberg, of the General Curtis E. LeMay Chapter of Orange County, Calif.

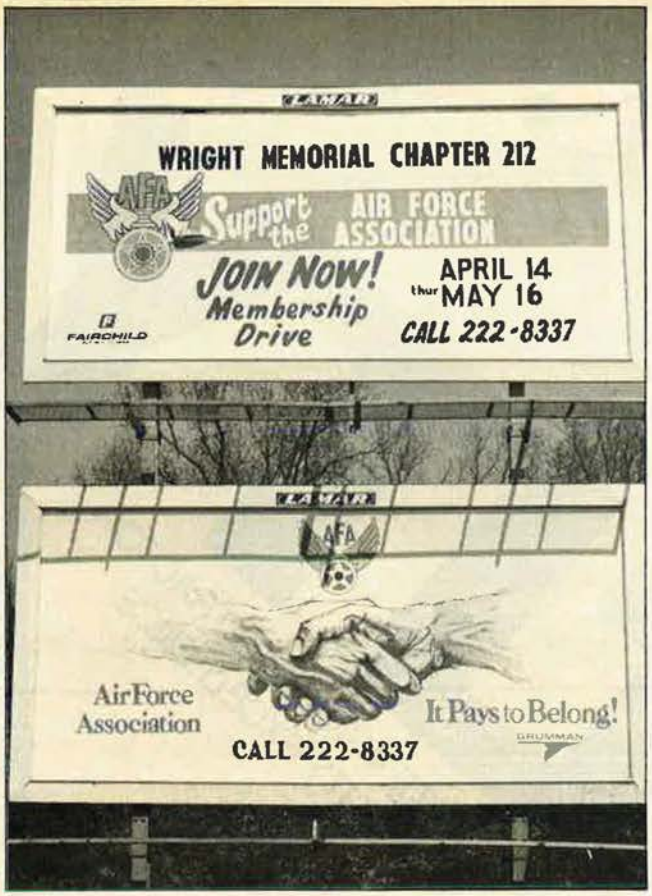
Gen. W. L. Creech, Jr., Commander of Tactical Air Command, second from left, was guest speaker at a recent dinner meeting of AFA's Grand Strand Chapter in Myrtle Beach, S. C. Also attending the May 30 dinner were (from left) Jones E. Bolt, Chapter President; William B. Gemmill, Secretary-Treasurer of the Chapter; and Col. Michael P. C. Carns, Commander, 354th Tactical Fighter Wing.

AFA NEWS PHOTO GALLERY

The Illinois State AFA's annual convention was held at Chanute AFB in conjunction with the base's Open House. The State organization sponsored a Fly-In of the T-34 and Comanche Societies and the Flying Farmers, totaling more than 125 private aircraft from as far away as Florida. The head table at the convention banquet included, left to right: Alexander Field, AFA National Director; Mrs. Frank Elliot, wife of Maj. Gen. Frank Elliott; Dr. Hans Mark, Secretary of the Air Force; Kurt Schmidt, President of Illinois State AFA; Maj. Gen. Norma Brown, Commander of Chanute Technical Training Center; and Gen. Bennie Davis, Commander of Air Training Command.

Pennsylvania Rep. Gregg Cunningham, a member of AFA and the state's Air National Guard, addressed the recent Pennsylvania State AFA annual convention in State College. From left to right are Brig. Gen. Frank H. Smoker, Jr., Commander of the Pennsylvania Air National Guard and recipient of Pennsylvania State AFA's Outstanding Pennsylvanian Award; Victor R. Kregel, AFA National President; Cunningham; and Jay Claster, master of ceremonies at the event and Chairman of the Centre County Aviation Authority.

The Donald W. Steele, Sr., Memorial Chapter of Northern Virginia recently elected officers, all of whom are thirty-five years of age or younger. Outgoing President Larry Dyer says it is an effort to encourage younger veterans to join AFA. Left to right: Ellis T. Nottingham, Jr., Vice President, and Under-40 National AFA Director; James O. Newhouse, President, and former Under-40 National AFA Director; Dyer; Miss Deborah Dyer, Secretary; and Albert L. Phillips, Treasurer. Nottingham, Newhouse, and Phillips served as tactical fighter pilots in Vietnam and currently fly tactical fighters with the Air National Guard.



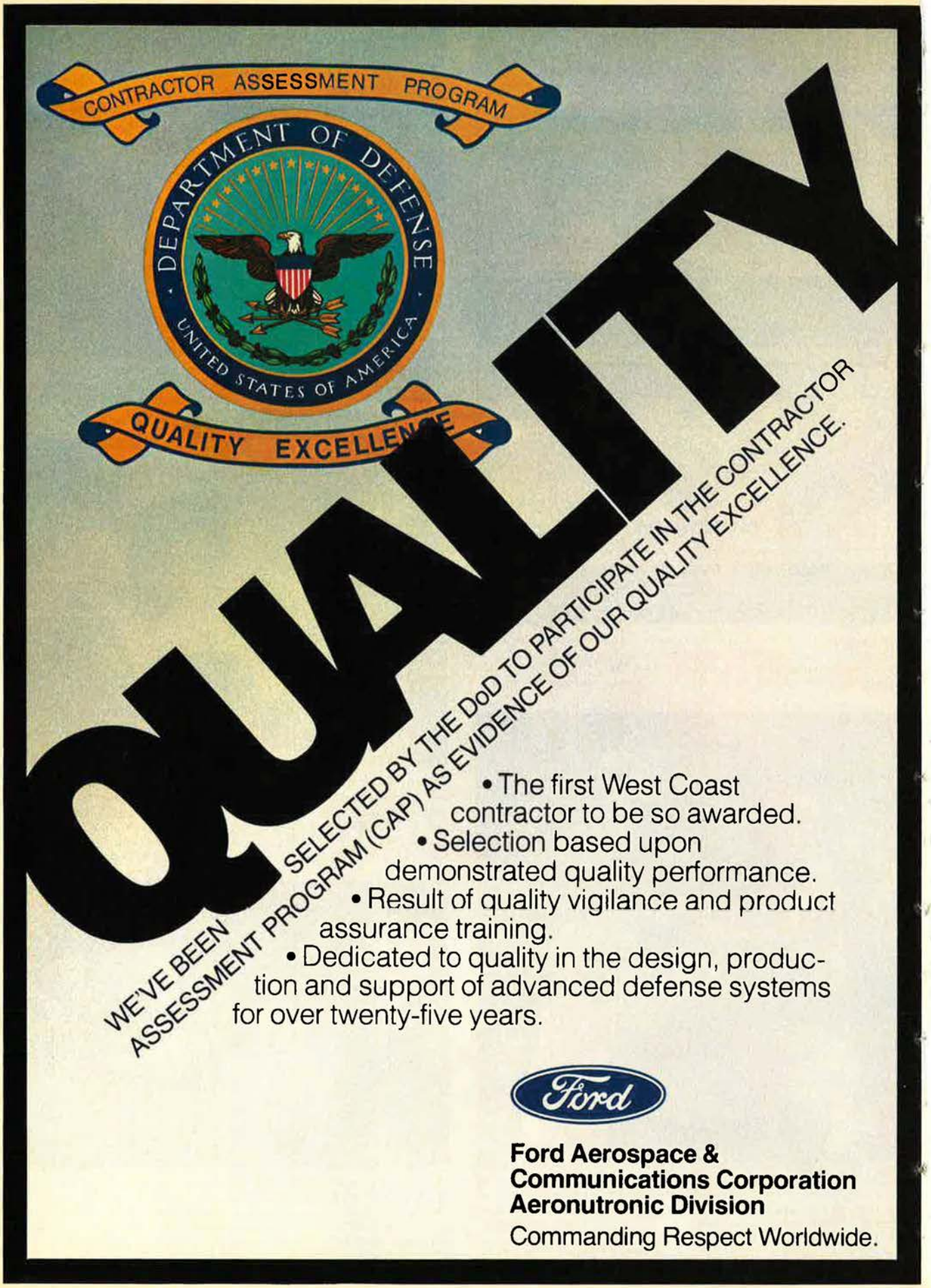
Wright Memorial Chapter, Dayton, Ohio, with support from Grumman Aerospace and Fairchild Industries, placed these two large billboards outside the main gate at Wright-Patterson AFB, Ohio. The double-barrel promotion advertised AFA and the Chapter's annual membership drive.

Congressman Robert W. Davis (R-Mich.), left, was the featured speaker at a dinner meeting of the Huron, Mich., Chapter. Chapter President Maury Cornelius is at right. Congressman Davis is a member of the House Science and Technology Committee.

Twenty-two awards to personnel of Davis-Monthan AFB and southern Arizona were presented recently by the Tucson Chapter at its Annual Awards Banquet. SSgt. Michael J. Bogulaski, left, received the AFA NCO Leadership Award, presented by Brig. Gen. Kenneth L. Peek, Jr., Commander, Air Force Manpower and Personnel Center, right. Chapter President Fran Thompson, center, initiated the awards program.

The Indiana State AFA recently honored Martha Raye for her efforts in three wars to entertain and support American troops overseas. The award was presented on stage at a Clarksville, Ind., dinner theater during a curtain call of the play in which she was appearing. Roy Whitton, President of the State organization, presented the award. Miss Raye is a registered nurse and spent countless hours in front line hospitals in Vietnam.

Thirty-five members of the South Bend, Ind., Chapter recently chartered a bus to visit Wright-Patterson AFB at Dayton, Ohio. The group received several briefings and toured the Air Force Museum. Shown left to right: John Kagel, Chapter Communication Officer, and an executive of the South Bend-Mishawaka Chamber of Commerce; Brig. Gen. Richard Kelly, AFLC Chief of Staff and a native of Mishawaka; Richard DeLong, Chapter Secretary; and Col. James H. Rigney, Jr., Commander, 2750th Air Wing, Wright-Patterson AFB.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AFA NEWS PHOTO GALLERY

The thirteenth annual convention of Washington State AFA, held at the McChord AFB NCO Club, honored individuals and units of the base and local area. Secretary of the Air Force Dr. Hans Mark spoke to an audience of community and AFA leaders about the importance of air defense and the airlift mission. Participating in the awards ceremony, Secretary Mark poses with AFROTC Cadet Lt. Col. Brian S. Brander, left, and Cadet Lt. Col. Kenneth J. Blair, second from left, who each received AFROTC scholarships from the Tacoma Chapter. Civil Air Patrol Cadet 1st Lt. Donald J. Sudy, right, received the Tacoma Chapter Award.

Lt. Gen. Jack Albert, Commander, Air Force Acquisition Logistics Division, was guest speaker at a recent meeting of the Middle Tennessee Chapter in Nashville, Tenn. His presentation to the Chapter stressed the importance of using proven systems to meet new operational needs, pointing out that a vital part of the acquisition process is the supportability, reliability, and maintainability of the system. At left is Dan Callahan, Chairman of the AFA Board of Directors. Gil Smith, President of the Chapter, is at right.

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(817) 692-5480
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Webster Groves, Mo. 63119
(314) 968-0050
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Crestline, Ohio 44827
(419) 683-2283
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Seattle, Wash. 98188
(206) 575-2875
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Farmington, Utah 84025
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AIR FORCE MAGAZINE PROUDLY PRESENTS THE

Keith Ferris Military Aviation Calendar for 1981

ollowing the success of its 1980 calendar, and ıe pleasure it has given to thousands of ırchasers, AIR FORCE Magazine has again ɔmmissioned aviation artist Keith Ferris ɔ produce twelve original paintings ɔr the 1981 calendar.

hese twelve new Ferris paintings have been executed exclusively for this purse. Each painting depicts a noteworthy ent in military aviation. They span military iation history, both in time and geography, d depict a variety of air forces and aircraft ssions.

Aircraft depicted in the 1981 calendar are: 17 jet trainer; P-51 Mustang fighter; Russian G-21 fighter; Japanese "Betty" bomber; 123 Provider transport; B-57 Canberra ɔmber; German Ju-87 Stuka dive bomber; ?-1 US Navy fighter; Sopwith Camel carrier unch; F-106 Delta Dart interceptor; Tornado ultirole combat aircraft; B-10 bomber.

Keith Ferris, son of an Air Force officer, ew up around airplanes, and has been paint- them for more than twenty-six years. He an AFA member, belonging to the Unionɔrris (New Jersey) Chapter. Ferris's aviation aintings are renowned for their technical acıracy and depiction of events as seen ırough the eyes of a pilot.

The descriptive commentary accompany- each painting is written by Jeffrey L. Ethell, expert aviation writer, and also the son of an Air Force officer. Ethell's research not only contributes to the veracity of Ferris's paintings; it enhances the enjoyment and appreciation of the events painted.

Each full-color reproduction is appropriate for framing. In fact, persons ordering two copies can have one for calendar use and frame the other right away.

Paintings, such as "Solo Student Over the Numbers" shown above, measure 12" x 8¾" and are suitable for framing.

The 1980 calendars — the first offered by AIR FORCE Magazine — are already collectors' items; the 1981 calendars are certain to continue the tradition. They make a perfect gift for aviation enthusiasts everywhere.

Orders received now will be filled in early November, plenty of time for Christmas mailing, even overseas.

Quantity discounts are available on request.

The Keith Ferris Calendar
% AIR FORCE Magazine
1750 Pennsylvania Ave., N.W.
Washington, D.C. 20006

Please send me _____ copies of the 1981 KEITH FERRIS Military Aviation Calendar ıt $7.95 each for AFA members ($8.95 for ıon-AFA members), postpaid.

☐ Enclosed is $_____
I am ☐ am not ☐ an AFA member.
☐ Charge my credit card as follows:
☐ MasterCard ☐ American Express ☐ Visa
Card # _____
My card expires on _____
Signature _____
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Address _____
City _____
State _____ ZIP _____

20% Dividend paid for 1979 calendar year

SEE NEW BENEFITS FOR FAMILY COVERAGE!

NOW AVAILABLE TO

CURRENT BENEFIT TABLES

Insured's Attained Age	STANDARD PREMIUM: $10 per month Basic Benefit*	HIGH OPTION PREMIUM: $15 per month Basic Benefit*	HIGH OPTION PLUS PREMIUM: $20 per month Basic Benefit*
20-29	$85,000	$127,500	$170,000
30-34	65,000	97,500	130,000
35-39	50,000	75,000	100,000
40-44	35,000	52,500	70,000
45-49	20,000	30,000	40,000
50-54	12,500	18,750	25,000
55-59	10,000	15,000	20,000
60-64	7,500	11,250	15,000
65-69	4,000	6,000	8,000
70-74	2,500	3,750	5,000
Aviation Death Benefit*			
Non-war related	$25,000	$37,500	$50,000
War related	$15,000	$22,500	$30,000
Extra Accidental Death Benefit*	$12,500*	$15,000*	$17,500*

*The Extra Accidental Death Benefit is payable in addition to the basic benefit in the event an accidental death occurs within 13 weeks of the accident, except as noted under AVIATION DEATH BENEFIT (below).

*AVIATION DEATH BENEFIT: The coverage provided under the Aviation Death Benefit is paid for death which is caused by an aviation accident in which the insured is serving as pilot or crew member of the aircraft involved. Under this condition, the Aviation Death Benefit is paid in lieu of all other benefits of this coverage. Furthermore the non-war related benefit will be paid in all cases where the death does not result from war or an act of war, whether declared or undeclared.

OTHER IMPORTANT BENEFITS

COVERAGE YOU CAN KEEP. Provided you apply for coverage under age 60 (see "ELIGIBILITY") your insurance may be retained at the same low group rates to age 75.

FULL TIME, WORLD WIDE PROTECTION. The policy contains no war clause, hazardous duty restriction, combat zone waiting period or geographical limitation.

DISABILITY WAIVER OF PREMIUM. If you become totally disabled at any time prior to age 60 for at least a 9-month period, your coverage will be continued in force without further payment of premiums as long as you remain disabled.

FULL CHOICE OF SETTLEMENT OPTIONS. All standard forms of settlement options, as well as special options agreed to by the insured and United of Omaha, are available to insured members.

CONVENIENT PAYMENT PLANS. Premium payments may be made by monthly government allotment (payable to Air Force Association), or direct to AFA in quarterly, annual or semi-annual installments.

DIVIDEND POLICY. AFA's primary policy is to provide maximum coverage at the lowest possible cost. Consistent with this policy, AFA has provided year-end dividends in all but three years (during the Vietnam War) since the program was initiated in 1961, and basic coverage has been increased on six separate occasions.

ADDITIONAL INFORMATION

Effective Date of Your Coverage. All certificates are dated and take effect on the last day of the month in which your application for coverage is approved, and coverage runs concurrently with AFA membership. AFA Group Life Insurance is written in conformity with the insurance regulations of the State of Minnesota. The insurance will be provided under the group insurance policy issued by United of Omaha to the First National Bank of Minnesota as trustees of the Air Force Association Group Insurance Trust.

EXCEPTIONS: There are a few logical exceptions to this coverage. They are:

Group Life Insurance: Benefits for suicide or death from injuries intentionally self-inflicted while sane or insane will not be effective until your coverage has been in force for 12 months.

The Accidental Death Benefit and Aviation Death Benefit shall not be effective if death results: (1) From injuries intentionally self-inflicted while sane or insane, or (2) From injuries sustained while committing a felony, or (3) Either directly or indirectly from bodily or mental infirmity, poisoning or asphyxiation from carbon monoxide, or (4) During any period a member's coverage is being continued under the waiver of premium provision, or (5) From an aviation accident, either military or civilian, in which the insured was acting as pilot or crew member of the aircraft involved, except as provided under AVIATION DEATH BENEFIT.

ELIGIBILITY

All members of the Air Force Association are eligible to apply for this coverage provided they are under age 60 at the time application for coverage is made.

*Because of certain restrictions on the issuance of group insurance coverage, applications for coverage under the group program cannot be accepted from non-active duty personnel residing in either New York or Ohio. Non-active duty members residing in Ohio, however, may request special application forms from AFA for individual policies which provide coverage quite similar to the group program.

OPTIONAL FAMILY COVERAGE
(new benefit schedule effective 6/30/80)
PREMIUM: $2.50 per month

Insured's Attained Age	Life Insurance Coverage for Spouse	Life Insurance Coverage for each Child*
20-39	$20,000.00	$4.000.00
40-44	15,000.00	4,000.00
45-49	10,000.00	4,000.00
50-54	7,000.00	4,000.00
55-59	5,000.00	4,000.00
60-64	3,000.00	4,000.00
65-69	2,000.00	4,000.00
70-75	1,000.00	4,000.00

*Children under six months are provided with $250 coverage once they are 15 days old and discharged from the hospital.

Upon attaining age 21, and upon submission of satisfactory evidence of insurability, insured dependent children may replace this $4,000 group coverage (in most states) with a $10,000 permanent individual life insurance policy with guaranteed purchase options.

Please Retain This Medical Bureau Prenotification For Your Records

Information regarding your insurability will be treated as confidential. United Benefit Life Insurance Company may, however, make a brief report thereon to the Medical Information Bureau, a nonprofit membership organization of life insurance companies, which operates an information exchange on behalf of its members. If you apply to another bureau member company for life or health insurance coverage, or a claim for benefits is submitted to such a company, the Bureau, upon request, will supply such company with the information in its file.

Upon receipt of a request from you, the Bureau will arrange disclosure of any information it may have in your file. (Medical information will be disclosed only to your attending physician.) If you question the accuracy of information in the Bureau's file, you may contact the Bureau and seek a correction in accordance with the procedures set forth in the federal Fair Credit Reporting Act. The address of the Bureau's information office is P.O. Box 105, Essex Station, Boston, Mass. 02112. Phone (617)426-3660.

United Benefit Life Insurance Company may also release information in its file to other life insurance companies to whom you may apply for life or health insurance, or to whom a claim for benefits may be submitted.

ALL AFA MEMBERS (under age 60)

APPLICATION FOR
AFA GROUP LIFE INSURANCE

United of Omaha

Group Policy GLG-2625
United Benefit Life Insurance Company
Home Office Omaha Nebraska

Full name of member _____
Rank Last First Middle

Address _____
Number and Street City State ZIP Code

Date of birth (Mo. Day Yr.)	Height	Weight	Social Security Number

This insurance is available only to AFA members

☐ I enclose $13 for annual AFA membership dues (includes subscription ($9) to AIR FORCE Magazine). Please send membership application.

☐ I am an AFA member.

Name and relationship of primary beneficiary

Name and relationship of contingent beneficiary

Please indicate below the Mode of Payment and the Plan you elect:

Mode of Payment	Plan of Insurance: Standard Plan		High Option Plan		High Option PLUS Plan	
	Member Only	Member And Dependents	Member Only	Member And Dependents	Member Only	Member And Dependents
Monthly government allotment (only for military personnel). I enclose 2 month's premium to cover the necessary period for my allotment (payable to Air Force Association) to be established.	☐ $ 10.00	☐ $ 12.50	☐ $ 15.00	☐ $ 17.50	☐ $ 20.00	☐ $ 22.50
Quarterly. I enclose amount checked.	☐ $ 30.00	☐ $ 37.50	☐ $ 45.00	☐ $ 52.50	☐ $ 60.00	☐ $ 67.50
Semi-Annually. I enclose amount checked.	☐ $ 60.00	☐ $ 75.00	☐ $ 90.00	☐ $105.00	☐ $120.00	☐ $135.00
Annually. I enclose amount checked.	☐ $120.00	☐ $150.00	☐ $180.00	☐ $210.00	☐ $240.00	☐ $270.00

Names of Dependents To Be Insured	Relationship to Member	Dates of Birth Mo. Day Yr.	Height	Weight

Have you or any dependents for whom you are requesting insurance ever had or received advice or treatment for: kidney disease, cancer, diabetes, respiratory disease, epilepsy, arteriosclerosis, high blood pressure, heart disease or disorder, stroke, venereal disease or tuberculosis? Yes ☐ No ☐

Have you or any dependents for whom you are requesting insurance been confined to any hospital, sanatorium, asylum or similar institution in the past 5 years? Yes ☐ No ☐

Have you or any dependents for whom you are requesting insurance received medical attention or surgical advice or treatment in the past 5 years or are now under treatment or using medications for any disease or disorder? Yes ☐ No ☐

If YOU ANSWERED "YES" TO ANY OF THE ABOVE QUESTIONS, EXPLAIN FULLY including date, name, degree of recovery and name and address of doctor. (Use additional sheet of paper if necessary.)

I apply to United Benefit Life Insurance Company for insurance under the group plan issued to the First National Bank of Minneapolis as Trustee of the Air Force Association Group Insurance Trust. Information in this application, a copy of which shall be attached to and made a part of my certificate when issued, is given to obtain the plan requested and is true and complete to the best of my knowledge and belief. I agree that no insurance will be effective until a certificate has been issued and the initial premium paid.

I hereby authorize any licensed physician, medical practitioner, hospital, clinic or other medical or medically related facility, insurance company, the Medical Information Bureau or other organization, institution or person, that has any records or knowledge of me or my health, to give to the United Benefit Life Insurance Company any such information. A photographic copy of this authorization shall be as valid as the original. I hereby acknowledge that I have a copy of the Medical Information Bureau's prenotification information.

Date _____, 19 ____ _____
Member's Signature

FORM 3676GL App. REV. 10-79

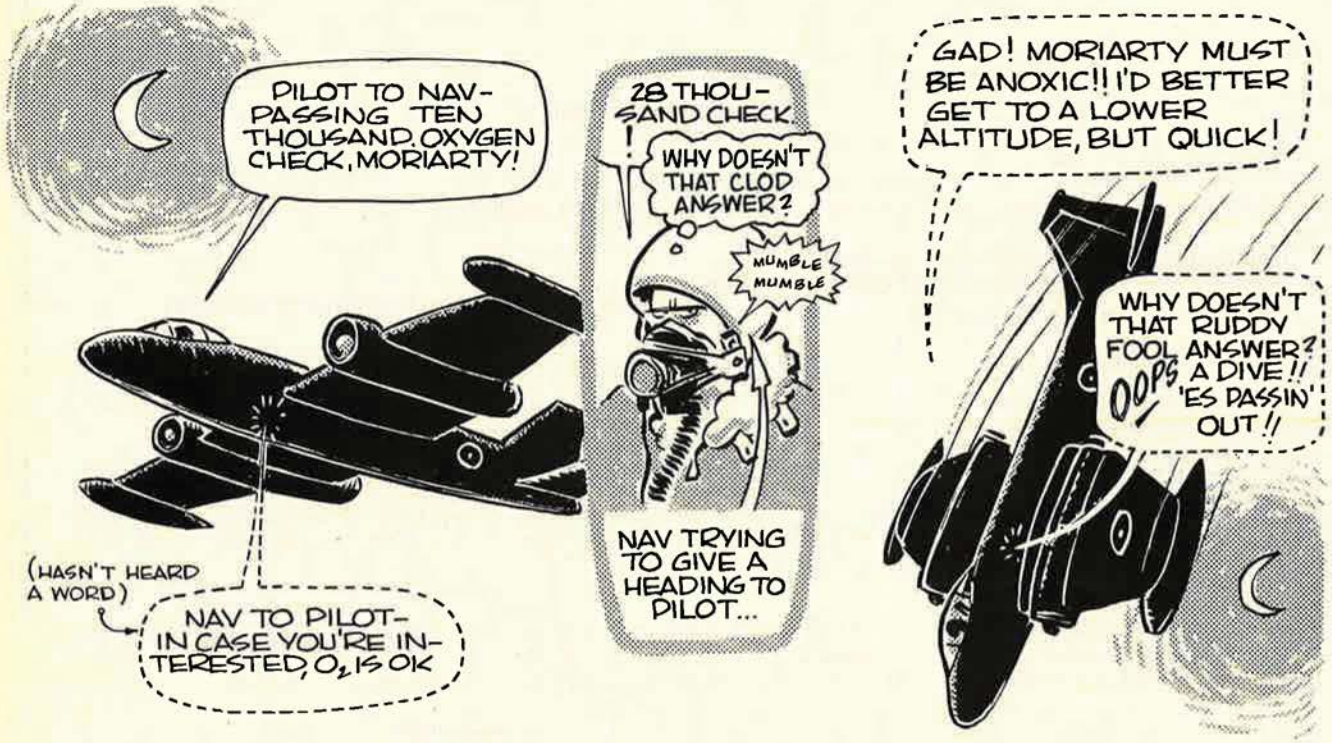
Application must be accompanied by a check or money order. Send remittance to:
Insurance Division, AFA, 1750 Pennsylvania Avenue, NW, Washington, D.C. 20006 9/80

Bob Stevens'

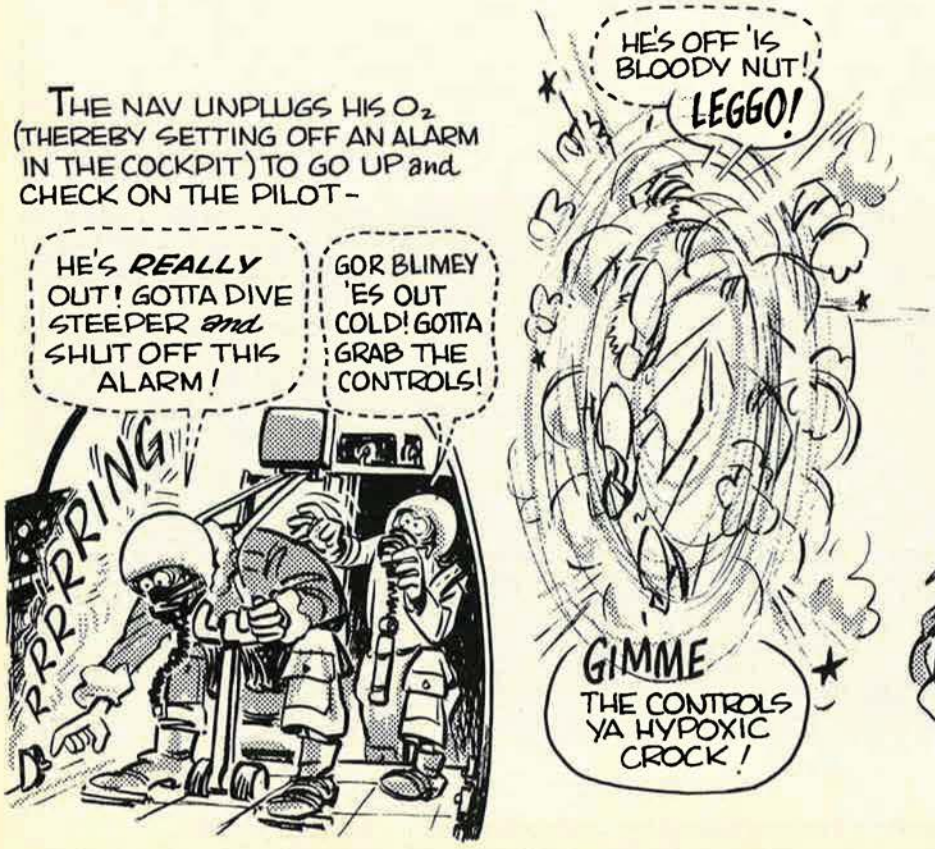
"There I was..."

"ARE YOU THERE, MORIARTY?"

SITUATION: RAF CREW TRAINING IN CANBERRA (USAF VERSION: B-57). THE INTERCOM LINK BETWEEN PILOT-UP FRONT-and NAVIGATOR'S COMPARTMENT IS FUZZY, AT BEST. WE JOIN THE CREW CLIMBING OUT ON A NIGHT CROSS COUNTRY—



THE NAV UNPLUGS HIS O_2 (THEREBY SETTING OFF AN ALARM IN THE COCKPIT) TO GO UP and CHECK ON THE PILOT—



ORDER IS RESTORED AT 5000 FT—

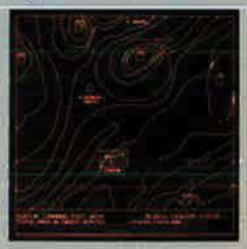
How to lose excess wait.

Mil-spec plasma displays in 90 days.

Now you can take delivery on our PD 3500 in just 90 days ARO. We're building our mil-spec plasma unit in assembly-line style.

You still get the same rugged unit that shrugs off heat, vibration and grime. It's perfect for aerospace, military and severe industrial use.

And plasma gives you a clear, bright image with no flickering. A big, easy-view, flat plane screen. Plus a skinny, 6-inch body that fits where you want it.



The cost is actually lower than a ruggedized CRT. And it lasts up to five times longer. You save money.

It's mil-spec quality at a mass-production price. Get the complete data package on the PD 3500.

Call or write today to Marketing Manager, Display Products, Interstate Electronics Corp., 1001 E. Ball Road/P.O. Box 3117, Anaheim, CA 92803, (714) 635-7210.

INTERSTATE ELECTRONICS CORPORATION

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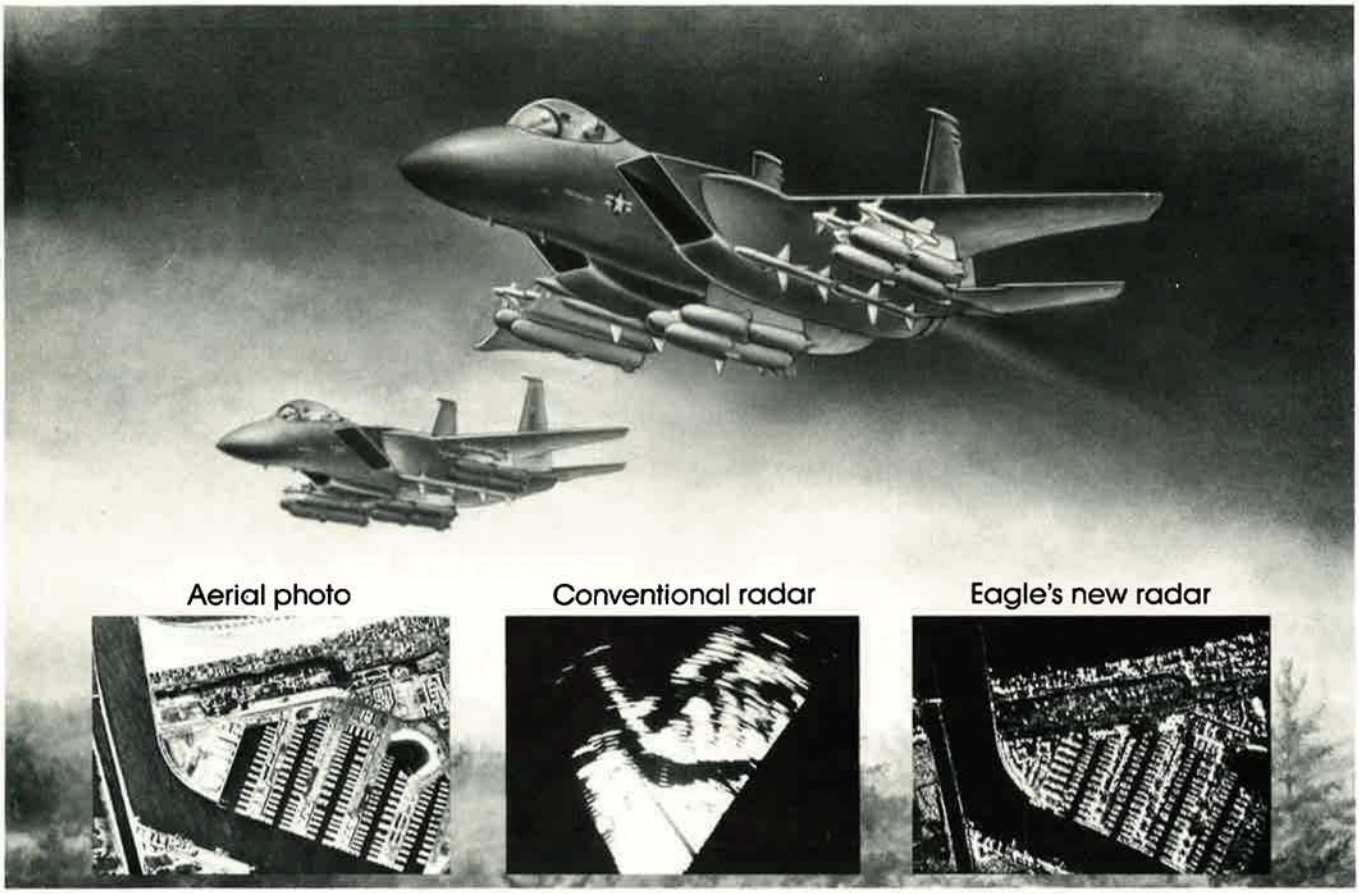

Aerial photo

Conventional radar

Eagle's new radar

New eyes and claws for the Eagle.

Our F-15 Strike Eagle, equipped with new synthetic aperture radar, can "see," map, and display in the cockpit tactical mobile targets *20 nautical miles away.* It can do it day or night, fair weather or foul.

This new, sharper-eyed Eagle, part of a McDonnell Douglas Advanced Fighter Capability Demonstration program, offers the Air Force the night and in-weather attack capability it needs—*with an existing and proven aircraft.*

Along with improved APG-63 radar, the Strike Eagle carries FAST Packs for 10,000 additional pounds of fuel. With FAST Packs, the Eagle can still carry four AIM-7F Advanced Sparrow missiles; or 8,800 *additional* pounds of air-to-ground ordnance; or infrared tracker and laser-spot designator pods. In total, over 24,000 pounds of external ordnance can be carried on the F-15 weapons stations.

To take full advantage of its sharp new eyes, the Strike Eagle will fly with a two-man crew. The second crewman serves as navigator and weapons system operator, easing the pilot's workload.

The Strike Eagle. It's still an Eagle through and through, with air-to-air superiority second to none. Now it's also a long-range, in-weather, precision bomber—the only fighter that can release its ordnance while flying faster than the speed of sound. It's one aircraft that offers the flexibility, without sacrifice of performance, that America needs in the cost-conscious times ahead.

F-15 Strike Eagle

MCDONNELL DOUGLAS