SEPTEMBER 1978/$3

AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION

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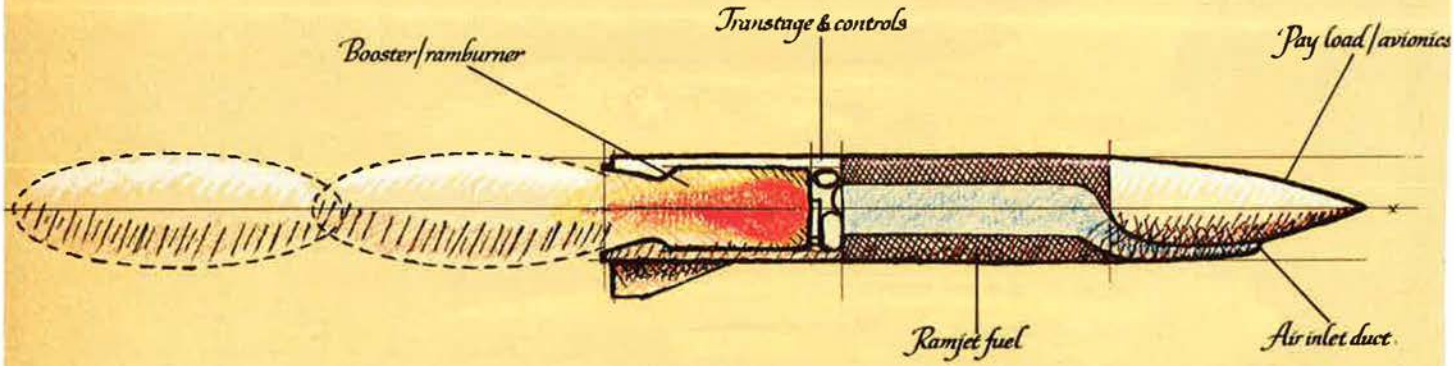
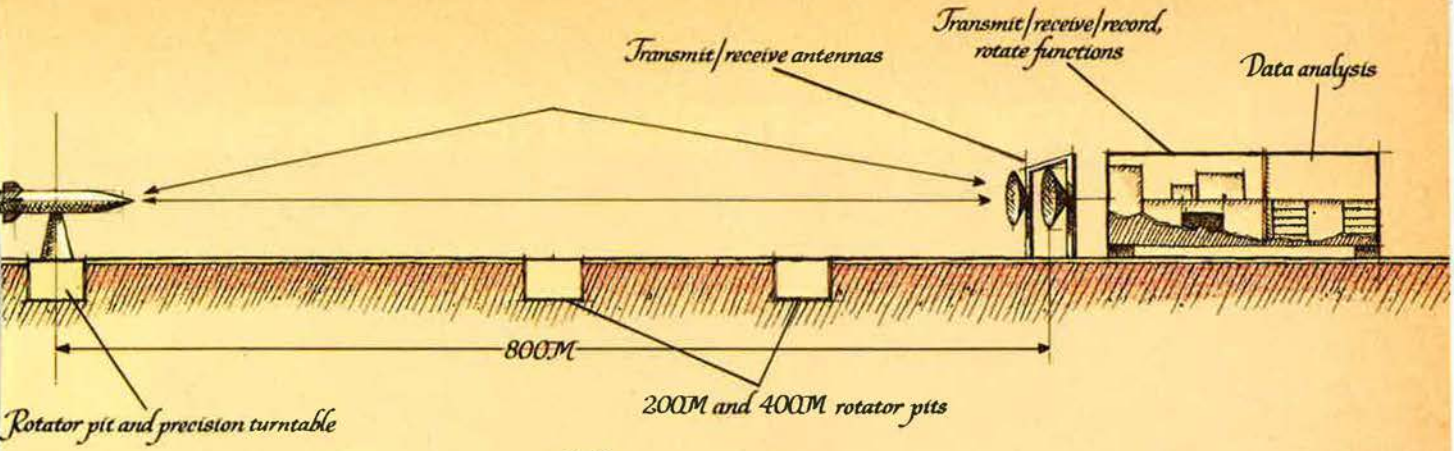


ASALM Ramjet phase



Radar cross-section range

Development of the missile systems that will be needed in the 1980s requires years of solid groundwork—the sort of groundwork we have been applying for more than ten years to the creation of a supersonic cruise missile.

We invested thousands of hours in research and testing of ASALM—the Advanced Strategic Air Launched Missile—exploring new concepts in integral rocket-ramjet propulsion, airframe structures, integration of system to aircraft, and guidance. We utilized the experience gained through successful development of 26 other major missile systems, including Titan, Pershing, Bullpup, Walleye, Sprint, and Patriot. We built on groundwork laid in the successful marriage of electronic and missile systems to some 30 different fixed-wing and rotary-wing aircraft. We drew on knowledge gained in developing and integrating a broad variety of guidance systems for precision day/night weapons.

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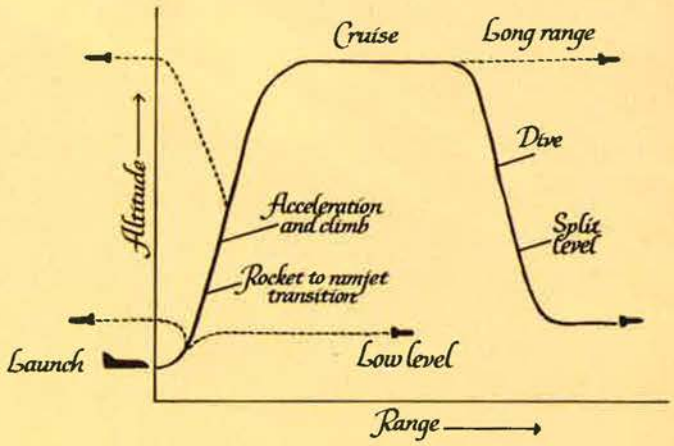
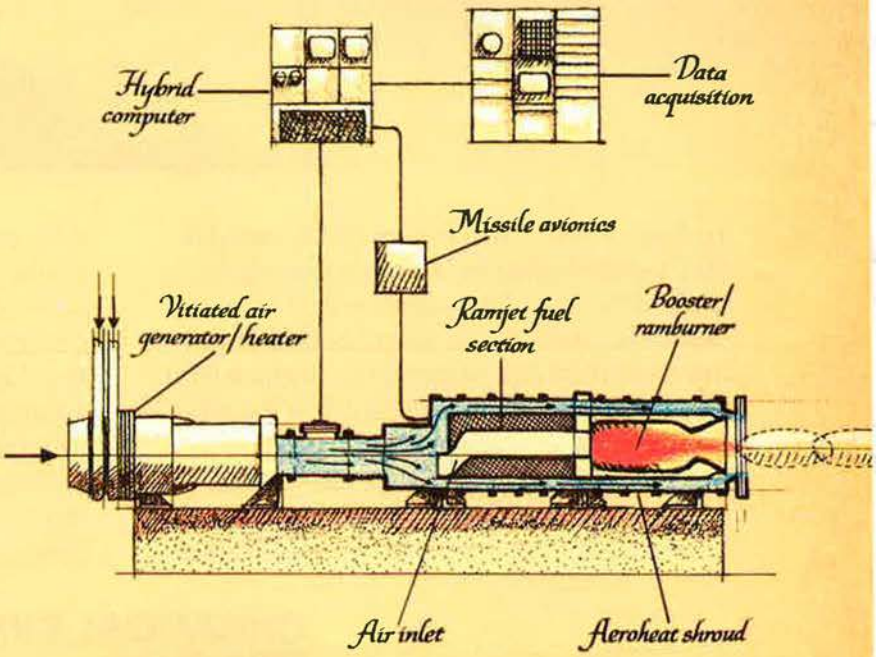


Flight simulation and analysis



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Technologies make the difference

In 1913, René Lorin invented the ramjet. But technologies at that time severely limited practical development of the idea. Now—65 years later, for missions requiring long-duration supersonic flight within the atmosphere—where cost is a major factor—ramjets are hard to beat.

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CHEMICAL SYSTEMS DIVISION

UNITED TECHNOLOGIES®

AIR FORCE MAGAZINE
PUBLISHED BY THE AIR FORCE ASSOCIATION

SEPTEMBER 1978
VOLUME 61, NUMBER 9

This Month

ABOUT THE COVER

In celebration of the seventy-fifth anniversary of powered flight, AFA commissioned for our September cover the oil painting—titled "First Flight"—by aviation artist Keith Ferris. A portfolio of Mr. Ferris's work, portraying other aircraft of historical significance, begins on p. 85 of this special Anniversary Issue.

Departments

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AN EDITORIAL

The Heritage of Kitty Hawk

THIS year marks the seventy-fifth anniversary of powered flight. On December 17, 1903, at Kitty Hawk, N. C., Orville Wright piloted the Wright Flyer, driven by a sixteen-horsepower engine, a distance of 120 feet in twelve seconds. Later in the day, his brother Wilbur flew the frail craft 895 feet in fifty-nine seconds.

That was both a long time and a short time ago. Powered flight now spans more than a third of our existence as an independent nation. In quite a different perspective, two contributors to this issue of AIR FORCE Magazine—Lt. Gens. Ira Eaker, who is eighty-two, and Bill Kepner, four years his senior—were old enough to have remembered that historic event, if the papers of the day had been interested enough to carry the story.

As it turned out, the Wright brothers' achievement was one of the true milestones in man's history. It projected mankind from an age-old two-dimensional environment and two-dimensional thinking into a three-dimensional world. Life has not since been the same.

In 1903, almost no one, including the Wrights themselves, grasped the meaning of that first flight. Certainly no one could have seen the enormity of change it would bring in political, social, economic, and military affairs. And at first, change did come slowly. There was so much to learn about aerodynamics, so much that was lacking in materials and techniques, and so little support for all that had to be done.

Aviation got its first major boost during World War I, when the warring nations discovered its usefulness in combat. World War II wedded the airplane to large-scale production-line techniques. Between 1903 and 1940, about 40,000 planes of all kinds were built in the US. In the forty-four months of US involvement in the Second World War, nearly 275,000 aircraft rolled out of American factories. Gigantic strides were made in materials, powerplants, electronics, navigation systems, production. The United States became what it had not been before—the world's leader in aviation, a position now threatened by skewed priorities at home and subsidized competition from abroad.

Orville Wright lived to see the dawn of the jet age and of the nuclear era—the latter a by-product of long-range aviation. Orville died in 1948, thirty-six years after Wilbur was taken by typhoid fever. Within the three decades since Orville's death, the entire globe has been laced with commercial air routes, we have passed from the air age to the aerospace age, ballistic missiles dominate defense strategy, satellites circle the earth at 18,000 miles an hour or more, and men have walked on the moon. In the seventy-five years since Kitty Hawk, the world has changed more than in all the preceding years of recorded history, and the principal catalyst of that scientific-technical revolution was powered flight.

Is the world better or worse for that revolution? Like most developments that have changed the relationship of man to man and of man to his environment, the short history of powered flight is full of anomalies and contradictions, carrying the potential for both good and evil. In this imperfect world, it has been used for both ends.

But on balance, surely the good far outweighs the evil. The miracle of flight through and beyond the atmosphere has opened men's minds to new ideas, to an extent unequaled since the Renaissance. The scientific and technical achievements that have advanced powered flight have also contributed to a bounty of creature comforts beyond the wildest dreams of past generations. Millions of ordinary mortals have known the exhilaration of what September contributor Ted Park calls the "superlife" of flying. And powered flight has made global war possible, but less likely, through the threat of its destructiveness.

That powered flight has not been an unmitigated good is no fault of an essentially neutral technology, but of the ways in which men have sometimes chosen, or been forced, to exploit it. We cannot change history, but we must try to control flight's future course for the good of this nation and of the world. Indeed, that is the central objective of the Air Force Association, " . . . an organization through which free men may unite to fulfill the responsibilities imposed by the impact of aerospace technology on modern society; to support armed strength adequate to maintain the security and peace of the United States and the free world; to educate themselves and the public at large in the development of adequate aerospace power for the betterment of all mankind. . . ."

The Wright brothers—through their courage, vision, persistence, and good fortune—found the key to powered flight. In this seventy-fifth anniversary year of their great achievement, we honor them and their fellow pioneers, both civilian and military, who have speeded man's passage from those small beginnings at Kitty Hawk to a new world of global flight, supersonic speed, and the exploration of space.

It is a fitting time for the members of AFA to rededicate themselves to the objectives of this Association in a continuing quest for the still imperfectly fulfilled promise of the age of powered flight.

—JOHN L. FRISBEE, EDITOR

"At General Dynamics I've worked with some of the best aeronautical engineers in the world on concept and design. The F-16 is the most exciting aircraft I've ever seen. As an ex-jet fighter pilot, I can tell you it's the plane you dream of flying."
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Airmail

Not the Soviet Way

Representative Downey's letter in the July issue shows fundamental lack of knowledge about Soviet strategy, military theory, and capabilities.

For one, the USSR has no concept of "arms control"—in fact, the term does not even exist in the Russian language. As far as "crisis stability" is concerned, this, too, is an American invention. The Soviet Union does not believe it has to be deterred by anyone, the US included.

Mr. Downey further wants an arms-control agreement to restrict "high-accuracy ballistic missiles," yet SALT II in particular fails in this regard. The current generation of Soviet ICBMs will result in approximately 5,000 one- to two-megaton warheads, 9,000,000 pounds of throw-weight, and with CEPs of perhaps better than 600 feet.

The Congressman further believes that "long-range SLBMs, secure-based ICBMs, and strategic cruise missiles" are effective for "retaliation." Retaliation against what? Presumably the ubiquitous Soviet urban industrial complex. Yet, the essence of Soviet strategy is to dramatically draw down our peacetime forces, should deterrence fail. Further, weapon systems such as Trident, with 240 relatively low-yield MIRVs per aim point, and cruise missile carriers with fifty to sixty ALCMs per aircraft, will pose formidable cross-range and down-range spacing restrictions, *inter alia,* regardless of the target set.

At that, the majority of the Soviet population is unevenly distributed over an extensive area from the Baltic region to Leningrad to Moldavia. This population density appreciably narrows at the Urals. East of the Urals the population trend remains within the vicinity of the Trans-Siberian Railway. This is known as the Main Settlement Belt.

This trend in population distribution has been consistently reversed over a long period of years, where now the concentration is no longer so dominant in European Russia and in urban areas. The Soviet Union generically divides its population into four areas (1) the Main Settlement Belt west of the Urals; (2) the Main Settlement Belt east to the Urals; (3) the territories that are located south of the Belt, mostly in Central Asia and in the Caucasus; and (4) the territories north of the MSB, both in European and Asian parts of the country. In the first category, the percentage of the population has dropped by one-fourth, while in the last three categories it has increased by approximately twelve percent, sixty-five percent, and 320 percent, respectively, during the same period of time.

Those who have taken the time and effort to read professional Soviet military literature, such as the fourteen-volume *Soviet Military Thought Series* translated by the Air Force, know that Soviet analysts *never* discuss targeting cities. In fact, they repeatedly state that in 1945 the US "wasted" its two atomic weapons against Japanese cities, and should have used them against the central Japanese military forces.

Finally, arms control, according to Mr. Downey, is good for saving money. This is certainly one of our goals. Yet, the Soviet Union has never let domestic economic considerations interfere with the SALT negotiations. In fact, the USSR has shown an unerring propensity for spending money on its armed forces, apparently believing that this is a good way to defend its country. Since 1972, the Soviets have spent some four times as much on strategic offensive forces as the US. Moreover, the CIA recently stated that even with a SALT II agreement, Soviet military spending may be expected to increase at least four to five percent per annum well into the 1980s.

The sum of the above illustrates that strategic conceptualizing emphasizing arms control, crisis stability, and mutual deterrence is totally at variance with the Soviet approach.

Jeffrey R. Thomson
University of Southern California
Los Angeles, Calif.

Bloopers Caught

On page 77, top right-hand corner, of the July '78 issue, there is a picture of a model landscape for simulation training of pilots. This picture is turned sideways and should be placed upright. The tracking controls sit on a rail that is located on the floor. As this picture shows, the tracking rail is mounted on the side of the wall with a ceiling light on the left baseboard wall.

It is a blooper and you got caught. Well, better luck next time. We are all in this thing together.

Joseph M. Edwards
Altus, Okla.

• *Reader Edwards is right, of course.*—THE EDITORS

With reference to your checklist of major electronic projects that appeared in your July publication, you should be aware that System #2394, Operational Application of Special Intelligence Systems (OASIS), has been under contract to Martin Marietta Corporation, Denver Division, since February 1978.

O. E. Cummings
Dir., Program Requirements
Martin Marietta Aerospace
Denver, Colo.

Right Slot, Wrong Man, Perhaps

This isn't meant to be a personal criticism of Lieutenant Heidenfelder, whose "Airmail" letter in the July issue resounded in echo many others both new to the service and to data automation. Rather, let's call it a philosophical application of 20/20 hindsight to the matter.

First of all, the concerns expressed by Lieutenant Heidenfelder are conflicting ones. Two-year "turnaround" between jobs for a computer systems analyst who wants a challenging and meaningful job spell a lot of things, but not *career. Career broadening,* perhaps, but that would seem to be a misplaced objective for one's initial service commitment. In data automation, the average project development time exceeds two years, providing little of the "fruits of labor" for a man (or woman) on the go. Having worked projects with even longer development times, only to transfer before completion, I personally can assure anyone in Lieutenant Heidenfelder's plane (*boat,* for you Navy readers) that little in the way of "challenge" or "meaning" accrues to the task. This is particularly true for those

who follow and must pick up the pieces, generally with little or no overlap in assignments. (Remember—if and when you move—this could be you!) Which leads us to the next point—Air Force assignment policies.

As for the "lack of sense" in the placement of an individual in a job not related to his specialty—well, besides being very hard to do for someone in data automation, a specialty description is necessarily broad in scope. It details many tasks, of which programming is only a minor one for those in the Computer Systems Analysis specialty. And for another thing, an education in computer science just ain't what it used to be! For years now in industry, and more recently in the Air Force, those of us with a computer science degree have had the eerie feeling that something just isn't as it should be. And it's not! Lieutenant Heidenfelder's electrical engineering friend helps to tell the story. And the villain of the story is technology! Or more precisely, *training for changing technology*. My degree in computer science prepared me adequately for work on large, third-generation systems in 1969 and in the early '70s. The "era of the number crunchers." But with few exceptions, where such machines are still the mainstay, my education's value without the experience gained since then is indeterminate. Why? Technology—the advent in the "state of the art" of the more marketable, versatile, and less expensive minicomputers and microprocessors, each requiring an individual educated in both hardware and software disciplines. Disciplines *still* taught independently in most schools of higher education.

This posed no real problems for industry, where profit is the major motive. In fact, industry saw this advance as a blessing. Imagine. Now, instead of maintaining programs and people in each of the disciplines, it found it could develop one group with only a little additional training to maintain most computer installations.

Do you think it was the programmer/analyst with a computer science degree or the engineer with the hardware background who received the additional training? Easy, wasn't it? Well, the Air Force appears to have made the same choice. And as a result, isn't it possible you are now the *wrong man* for the job? Well, if the answer pains you, then you'd better invest in some good hardware manuals, digital fundamentals, and design courses, and plan to stay in one place awhile. Otherwise, your "minimum commitment" to the Air Force may well be the beginning of real job dissatisfactions.

Capt. Edward J. Higbee
Gunter AFS, Ala.

In reference to 1st Lt. Thomas J. Heidenfelder, two assignment first-term tours are very real. I have just recently been assigned to Kelly AFB, Tex., to an engineering section in the San Antonio Air Logistics Center. In the past six years, all personnel assigned here have been first-term second lieutenants out of ROTC programs or OTS at Lackland AFB. Within two and a half to three years these people have been reassigned and have also been very pleased with the Randolph AFB Military Personnel Center's decision of reassignment.

If Lieutenant Heidenfelder has been unlucky enough to have been assigned to an area where his career advisors do not offer him the opportunity to reassign through proper channels, I must say we here at Kelly AFB are quite fortunate to have such devoted engineers as Captain Dickinson in the 282XX career field doing an excellent job of managing Developmental Engineers.

As for shortages in scientific and engineering (S&E) personnel, money does seem to be a big factor, according to engineers. The majority of us perform jobs fully described in our job description and cannot complain.

Before making harsh accusations, perhaps Lieutenant Heidenfelder should have asked to see reports and surveys MPC has made, and solicited opinions other than just that of the engineer who graduated with him.

He may still find himself pulling a tour, since his first term isn't up yet. Meantime, there are more of us who are happy than those who are unhappy.

2d Lt. Gerardo H. Garza
Kelly AFB, Tex.

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.

EDITOR'S NOTE: In the obituary for Mrs. Hap Arnold in our August issue, page 23, an excerpt from the eulogy at her funeral is incorrectly identified as the entire eulogy. I do not want to leave the impression that what we printed was all I had to say about this grand lady on that sad occasion.
—John F. Loosbrock

Selections for UPT

During the past eighteen months, several letters have appeared in your magazine concerning the problems encountered by many ROTC commissionees who were denied entry into pilot training. Their problems have gone almost unnoticed by ATC/MPC while new programs are presently being created to train nonprior service individuals for pilot training. I feel the information contained below would be beneficial to eliminees.

During FY '79, Officer Training School (OTS) will begin to train prior and nonprior service individuals for entry into Undergraduate Pilot Training. Prior to entering OTS, each student will be required to attend the Flight Screening Program (FSP) at Hondo, Tex., Municipal Airport, and be required to complete fourteen hours of flying. FSP flying training is conducted in T-41 aircraft at a cost of $4,258 per student (FY '78 dollars). Upon completion of the T-41 flying phase, the individual will then enter OTS. OTS male and female costs per student are $10,520 and $10,313, respectively. The total dollar costs to front-load pilot trainees through OTS are $14,778 for males and $14,571 for females.

Currently, FSP at Hondo has a five percent washout rate. The elimination rate at OTS is approximately eleven percent. Therefore, 119 individuals would have to start the flying phase in order to have 100 pilot trainees graduate from OTS. In addition, those nonprior service inputs who are eliminated from either FSP or OTS are under no obligation to the government from that moment on.

Current ATC/MPC projections indicate an enrollment of thirty-eight individuals per FSP class. An estimated sixteen classes are expected during FY '79, with a dollar cost per

Airmail

class of approximately $561,500 for male students (slightly lower for females). For FY '79, $8,867,000 will be needed to front-load 600 male students through OTS for pilot training.

Presently, ATC/MPC has approximately 350 Undergraduate Pilot Training applications on file pending selection board action. These officers have already proven to be both mentally and physically qualified and anxiously await the opportunity to fly for the Air Force. Further, several of these officers already possess a private pilot's license.

If selection or nonselection criteria for UPT required a private license, it is extremely possible that those officers awaiting selection would obtain such at their own expense, thereby producing substantial savings to USAF. In direct contrast, all nonprior service eliminees from FSP or OTS would be hard dollar losses to the Air Force.

There are several alternatives to the above situation: (1) Elimination of the front-load process for those individuals with a private pilot's license would save approximately $4,258 per student; (2) Selection of those active-duty officers with licenses would save the same amount per student and increase the dedication and morale of the current junior officer force; (3) Require all nonprior individuals to sign an initial commitment to the Air Force, thereby lessening the probability of significant manpower and dollar losses. Considering the present attitude problems of many junior officers trying to enter UPT, the Air Force could prove that they do "take care of their own." The Air Force is setting a dangerous precedent by granting special consideration to those prior and nonprior service individuals without granting due consideration to those junior officers with approved applications on file. The savings are evident.

Name Withheld by Request

Flight to Australia

I am an Australian who now lives in the United States and am currently writing a book about my wartime experiences.

I was an RAAF navigator operating with RAF Bomber Command. My first tour was done with 460 RAAF Squadron and the second with 156 Pathfinder Force Squadron. The 460 Squadron was located at Breighton in Yorkshire, and we flew Wellingtons and later Lancasters. The 156 Squadron was based at Warboys near Huntingdon and flew Lancasters. Our first raid was the 1,000-bomber raid on Cologne (May 31, 1942), the last was Berlin (March 29, 1943). As you can see we had a very accelerated combat period. At the end of our Pathfinder work, because we were an all-Australian crew, we were selected to fly a Lancaster bomber from England to Australia by way of the Atlantic, Canada, the US, and the Pacific.

So, I am writing this book covering both the flight to Australia and my Bomber Command days. I would very much like to correspond with any Americans who were in the Air Force at that time and may have been at, or near, the same places as myself. Specifically, I would like to get in touch with persons who fall into the following:

1. Bomber crew members who were bombing Germany by day in 1942–43. This includes ground staff.

2. Ferry/transport command crew members who were flying the Atlantic in 1942–43.

3. Flight crew/ground crew members who were based at, or visited, any of the following: East Anglia, York, Huntingdon, Prestwick, Dorval, Goose Bay, Gander, Toronto, Hamilton Field, Hickam Field, Canton Island, Palmyra Island, Nandi, and Sydney.

4. Weather officers who were responsible for preparing forecasts for Europe, the Atlantic, and the Pacific.

Does anybody remember our Lancaster arriving at Hamilton Field, Calif., or Hickam Field in late May 1943?

All letters will be answered and any assistance will be appreciated.

Robert S. Nielsen
6695 Heartwood Dr.
Oakland, Calif. 94611

ROTC Memorabilia

Air Force ROTC has been given the opportunity to provide historical information and memorabilia to the Air Force Museum for a permanent Air Force ROTC display.

To make it attractive and of historical significance, we are in need of items to be placed in the display. Uniforms and ROTC accoutrements, old detachment patches, field training items, flying paraphernalia, photos, or any other memorabilia former members of ROTC wish to donate would make a worthwhile contribution to Air Force history.

Any item pertaining to Air Force ROTC will be greatly appreciated. I will acknowledge any contribution sent to me.

Richard M. Howland
Dir., Office of Information
AFROTC (ATC)
Maxwell AFB, Ala. 36112

493d Bomb Group (H) Vets

Trying to locate members of the 493d Bomb Group (H), that operated out of Debach, England, during WW II. If you were a member or have knowledge of any members, please write to

Paul F. Sink
8609 DeSoto Ave., Apt. 216
Canoga Park, Calif. 91304

Researching Authors

I am a student at Huron College, the University of Western Ontario, London, Canada. During the past year I wrote an essay entitled "The Arrow Controversy: Was the Diefenbaker Government Justified?", dealing with the 1959 decision to cancel development and production of the CF-105 Avro Arrow fighter aircraft. With the encouragement of friends and faculty at the college, I am expanding my research with the aims of publishing a revised version of my paper as well as, perhaps, expanding the work to a monograph.

I would like to hear from anyone who (a) has information pertaining to the project or the decision; (b) knows of someone who might; or (c) actually worked on the program.

Mark E. Mullin
3664 Golden Orchard Dr.
Mississauga, Ontario, Canada

I am in the process of initiating a research project (with possible publication) on AC-47, AC-119, and AC-130 aircraft. Require information about development, squadrons using the aircraft, use in SEA, and photos (will be returned).

Kenneth T. Wilhite, Jr.
4620 Georgetown Ct., Apt. 1
Indianapolis, Ind. 46222

I am presently writing a history of the Aerospace Defense Command's William Tell weapons meets and would like contact with anyone who has served with any of the intercep-

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COMMITMENT

At first it was Command and Control—C&C. Then, in the 60's, we heard the phrase "C-Cubed" — Command, Control and Communications. And lately, with a greater emphasis on more sophisticated EW capabilities, we have begun to hear about "C^4"—Command, Control, Communications and Computers. While it may be a new concept to some, we at SPERRY UNIVAC Defense Systems have been living with that concept since ENIAC.

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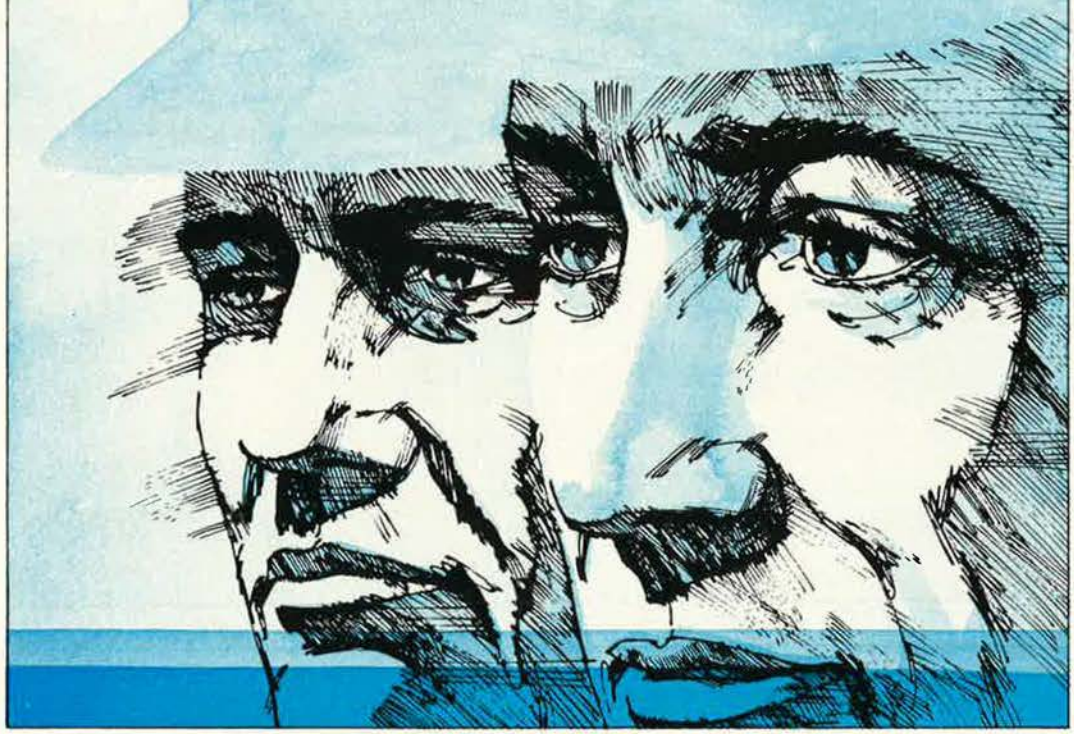

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Lafayette, Ind. 47904

Gunships in SEA

I'm doing a book on gunships in Southeast Asia and would like to hear from aircrews and ground personnel. I also need photos of gunships in SEA. AC-47s, AC-119s, AC-130s, AU-23/24s, and Navy AP-2Hs are being covered. Developmental and operational information and pictures are also needed.

I'd also like to thank the people at AIR FORCE Magazine and the readers of AIR FORCE Magazine that have helped me with the other two books I have finished for Squadron/Signal.

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

History of Bluie West-8

The Junior Officer Committee at Sondrestrom AB, Greenland, is interested in gathering historical information, artifacts, and memorabilia concerning the history of Sondrestrom, formerly known as Bluie West-8 (BW-8).

We would be interested in hearing from anyone who can tell us about units and people stationed here, significant events that took place here, aircraft flown, etc. Old photos would be greatly appreciated. Our long-range goal is to establish a small museum to tell the history of Sondrestrom.

Capt. Harold A. Higley, Jr.
4684th ABGp/CCE
APO New York 09121

451st Bomb Group

An effort is being made to locate the men who served with the famous WW II 451st Bomb Group (H), Fifteenth Air Force. My cohort in this endeavor, Peter A. Massare, of Rochester, N. Y., and I have collected well over 200 names and current addresses.

Would like to hear from more former members.

Robert Karstensen
1032 S. State St.
Marengo, Ill. 60152

Crew of "Blackhawk"

I am seeking the names and current addresses of the combat crew or crews of the 413d Bomb Squadron, 96th Bomb Group, that flew the B-17G aircraft Serial Number 44-85599 "Blackhawk."

In 1960, this aircraft received national publicity by the USAF and civilian newspapers regarding its disposition and last flight. The last flight was from Davis-Monthan AFB, Ariz., to the 96th Bomb Wing (SAC), Dyess AFB, Tex., where this B-17G is reposing in honor for the edification of newcomers to the 96th BG, a fitting tribute to this battle-scarred warrior.

One of our members, Charles A. Blumenfeld, flew twenty-five missions as navigator on "Blackhawk" and gave us the names of some of the crew: S. Tolbert, pilot; McDonald, bombardier; Vic Hunt, gunner. Further information would be appreciated.

Robert W. Owens
96th BG (H) Memorial Association
900 South Western Ave., 2-R
Chicago, Ill. 60612

Looking for Uncle's Buddies

Would like to contact anyone who may have known or flown with my uncle, 2d Lt. Chelius (Cheely) Clifton Howard, who was with the 385th Fighter Squadron, 364th Fighter Group, Eighth Air Force, in England. His plane went down March 21, 1945, near Osnabruck, Germany. I am planning a trip to England this fall to visit the airstrip site (if it's still there) and his crash site in Germany.

Cheely H. Carter
P. O. Box 365
Millington, Tenn. 38053
Phone: (901) 872-0504

USAF Patches

I am a handicapped veteran and retired USAF Civil Service employee. I would appreciate any military patches, especially USAF. They are needed for civic, AFA, military, and veterans functions later this year. The collection I have accumulated thus far draws considerable interest when on display.

Earl H. Jastram
2104 Madera Rd.
Sacramento, Calif. 95825

History of U-2

I am presently working on a photo-oriented book on the Lockheed U-2 reconnaissance aircraft. It will cover the history of the aircraft from the mid-1950s to the present.

I would like to contact anyone who was (or is) associated with the U-2 (aircrew, maintenance, operations, image interpreter, etc.) at any time. Of particular interest are photographs for use in the book, and stories or vignettes that relate to the U-2.

Material loaned will be carefully treated and returned to the owner. Full credit for used information and photos will be given unless requested otherwise.

Gerald Ellis
1617 Kapiolani Blvd., #1502
Honolulu, H. I. 96814

SEA TFS Patches

I am collecting SEA unit patches for the years 1965 to the end of the conflict. I particularly need patches of the 4th, 34th, 435th, and 555th Tactical Fighter Squadrons.

Would appreciate hearing from anyone willing to swap or sell their patches.

Frederick L. Savidge
1520 Grampian Blvd.
Williamsport, Pa. 17701

Search for Words

I am presently working toward my MA in English, and in conjunction with my work I am doing research into the military origin of words, phrases, and terms used by the general public.

Would like to exchange information in this area with other members of the military. Any guidance or suggestions would be most appreciated.

Maj. John W. Bossom,
USAF (Ret.)
1917 Grande Circle, #54
Fairfield, Calif. 94533

Little-Noted Norseman

I am researching the use of (U)C-64 Norseman aircraft by USAAF for an article devoted to modeling this little-noticed craft. Of particular interest are paint schemes and markings used on Norsemen in the CBI theater and the UK. Any information on the aircraft Maj. Glenn Miller was aboard when lost would be extremely valuable. Aircraft serial number was 44-70285 and was assigned to the 2d Strategic Air Depot, Repair Squadron, 35th ADG, Eighth Air Force Service Center based at RAF Abbott's Ripton. The plane was lost after leaving Twinwood Field for Bordeaux, France, on December 15,

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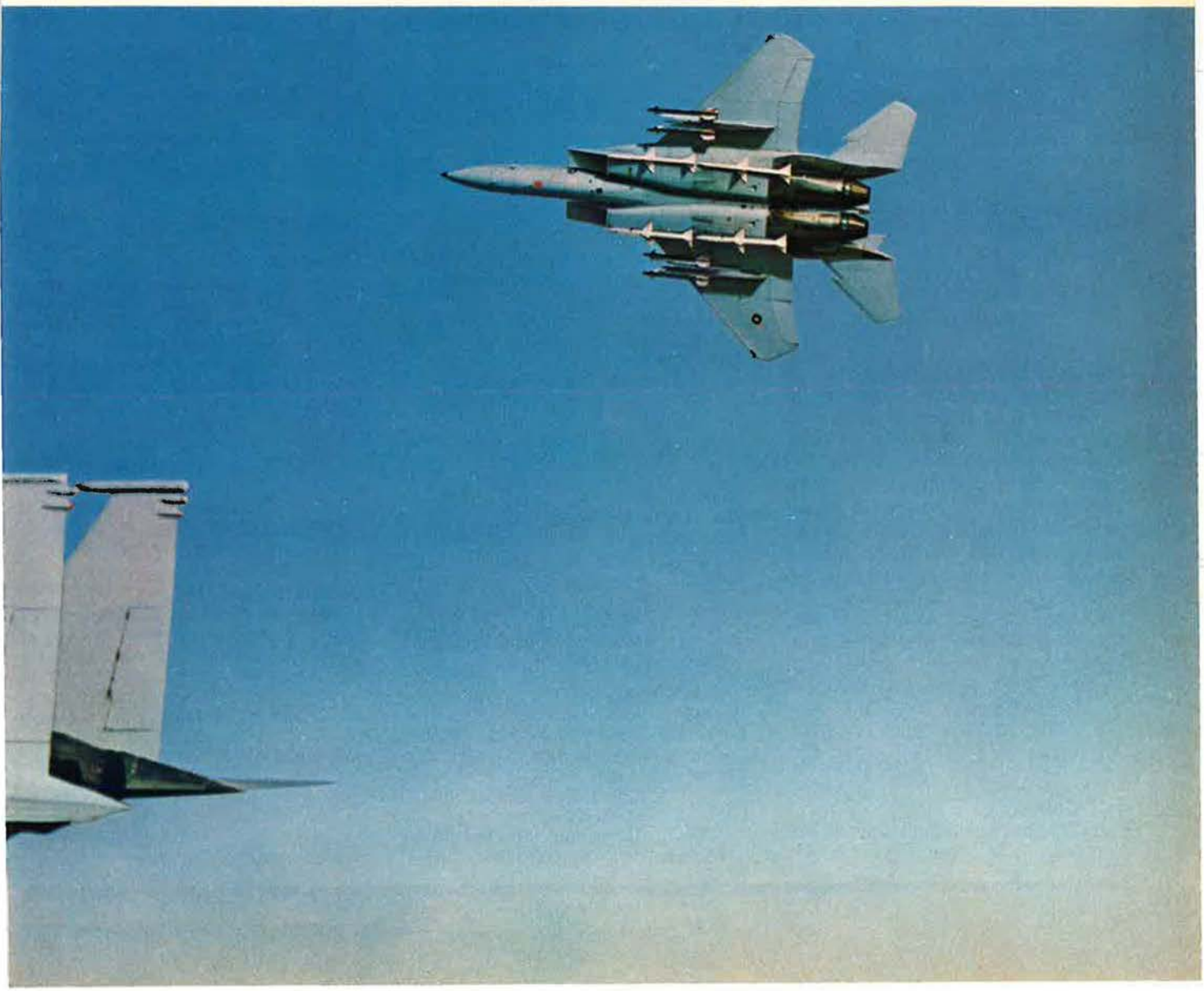

Airmail

1944. The pilot was Flight Officer John Morgan.

No illustration of this bird has been found and any information will be forwarded to the Air Force Museum, which also desires the information. All materials received will be returned as soon as possible.

Lt. Keith C. Svendsen
103 Meehan Dr.
Dayton, Ohio 45431

90th Bombardment Group (H)
Seeking former members of the 90th Bombardment Group, WW II and the early '50s, who have photos, logbooks, etc., that they would be willing to loan for reproduction. All items will be returned in original condition. Copies will be placed in the base museum for public display.

Capt. B. J. Zirkle
320th SMS/DO
F. E. Warren AFB, Wyo. 82001

Delta Dagger Information
I have just finished constructing an F-102A Delta Dagger model with 57th Fighter-Interceptor Squadron markings and would be interested in finding out more about the plane and its deployment with the 57th FIS—when they deployed, where, for how long, etc.

A1C David A. Comerford
PSC Box 1635
Tyndall AFB, Fla. 32403

Stories of Unusual Experiences
I am preparing a series of articles on former military personnel who have had unusual experiences or jobs. Just completed one on a retired Air Force colonel who had been a parachuting fire fighter for the US Forest Service and had been held as a war criminal by the Japanese during WW II. Am especially interested in obtaining enlisted candidates.

Please forward name, address, telephone number, and brief summary, to

Brig. Gen. Richard M. Baughn, USAF (Ret.)
1366 Lost Creek Blvd.
Austin, Tex. 78746

B-17 Crew
I would like to contact any of the former crew members of B-17E 41-2446 that crash-landed in New Guinea after running out of fuel on the return from a mission to Rabaul on February 23, 1942. The account of this incident in Martin Caidin's *The Ragged Rugged Warriors* states that the crew, exhausted and malaria-ridden, returned to their squadron in Townsville, Australia, on April 1, 1942.

The aircraft, assigned to the 22d Bomb Squadron, 7th Bomb Group, and attached to the 19th Bomb Group, has been found near the north coast of New Guinea, completely intact and in reasonably good condition.

Members of the crew were: Capt. Fred C. Eaton, Jr., 0395142; Capt. Henry M. Harlow, 0398714; 1st Lt. George B. Munroe, Jr., 0412187; Sgt. Richard E. Oliver, 6578837; TSgt. Crawford (serial number unknown); TSgt. Clarence A. LeMieux, 6558901; SSgt. John V. Hall, 6710161; Sgt. Howard A. Sorenson, 6581180; and Sgt. William E. Schwartz, 6913702.

Would appreciate hearing from any of the crew or anyone having information on this aircraft and mission.

Walter D. House
2215 W. 29th South
Wichita, Kan. 67217

UNIT REUNIONS

Glider Pilots
The National WW II Glider Pilots Association will hold their 8th annual reunion in Springfield, Mass., October 5-7. We are expecting between 400 and 500 of the "Forgotten Bastards of the WW II AAF." Contact

Ginny Randolph
Reunion Secretary
136 W. Main St.
Freehold, N. J. 07728

Ranch Hands
The 12th annual reunion of the Ranch Hand Vietnam Association will be held at Hurlburt Field, Fla., October 13–15. Contact

Maj. Jack Spey, USAF (Ret.)
850 Tarpon Dr.
Ft. Walton Beach, Fla. 32548
Phone: (904) 243-5696

Recces
Recce Reunion II will be held October 6–8 at Ramada Inn South, Austin, Tex. Further info from

Col. John E. Stavast
P. O. Box 21442
Bergstrom AFB, Tex. 78743
Phone: AUTOVON 685-3333

U-Tapao Vets
The U-Tapao Veterans Association will have its annual reunion at Offutt AFB, Neb., October 6–7. All officers, regardless of service or specialty, who were associated with SAC operations in the Western Pacific/SEA theaters are invited. Details from

Maj. Joe Bergmann
P. O. Box 13023
Offutt AFB, Neb. 68113
Phone: AUTOVON 271-3035
(402) 291-7073 (home)

Class 40-G
The 38th reunion of Flying School Class of 40-G will be held in Canyon Plaza Hotel, Palm Springs, Calif., November 10–12. Contact

Hugh H. Bowe
1807 Santiago Dr.
Newport Beach, Calif. 92660

BAD 1
A BAD 1 (Burtonwood, England) mini-reunion will be held in conjunction with the 8th AF Historical Society reunion in Washington, D. C., October 19–22. Write

D. E. Harris
P. O. Box 8900
Northridge, Calif. 91324

37th Fighter Sqdn.
Annual reunion of the 37th Fighter Squadron, WW II, will be held in Williamsburg, Va., September 29–October 1. Contact

Walt A. Goodman
3485 Eleanor Dr.
Baton Rouge, La. 70805

452d ARW (AFRES)
The 452d Air Refueling Wing (AFRES), March AFB, Calif., invites former members of the present wing and its predecessor units to the 3d annual Officers Dining Out, November 18, at the March Officers Open Mess. Reservations accepted on first-come first-served basis due to limited space. Further information from

Maj. Al Dietrich
or
Ms. Liz Owens
Hq. 452d ARW (AFRES)
March AFB, Calif. 92506
Phone: (714) 655-4520
AUTOVON 947-4520

Class 7101
"First of the Finest," Class 7101, former members of Columbus AFB, and any of our IPs please contact one of the following for possible reunion.

Tom Bowman
204 E. Washington St.
Itasca, Ill. 60143
Phone: (312) 773-2410
or
Mike Lewis
142 Lakeway Dr.
Oxford, Miss. 38655
Phone: (601) 234-4735

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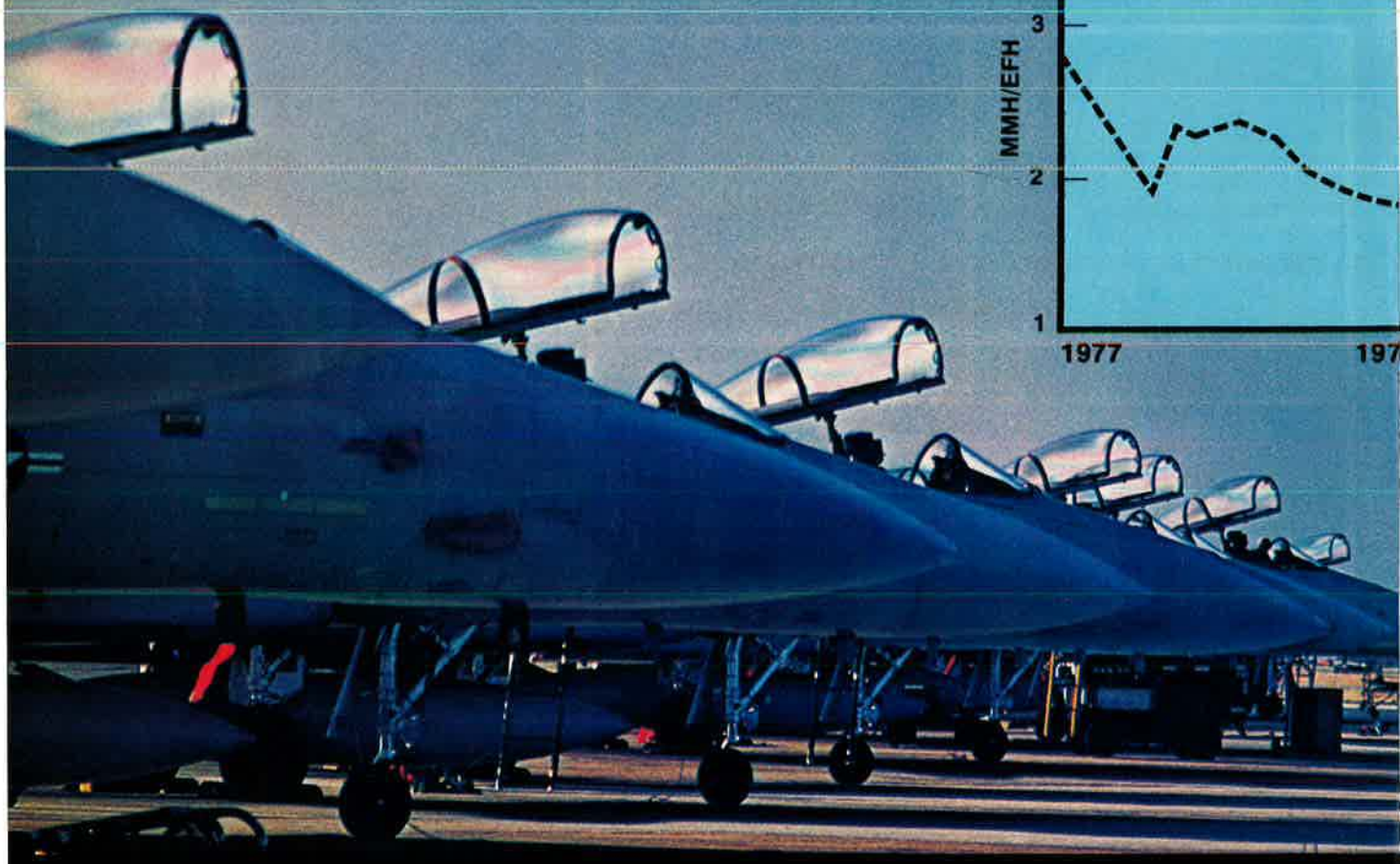

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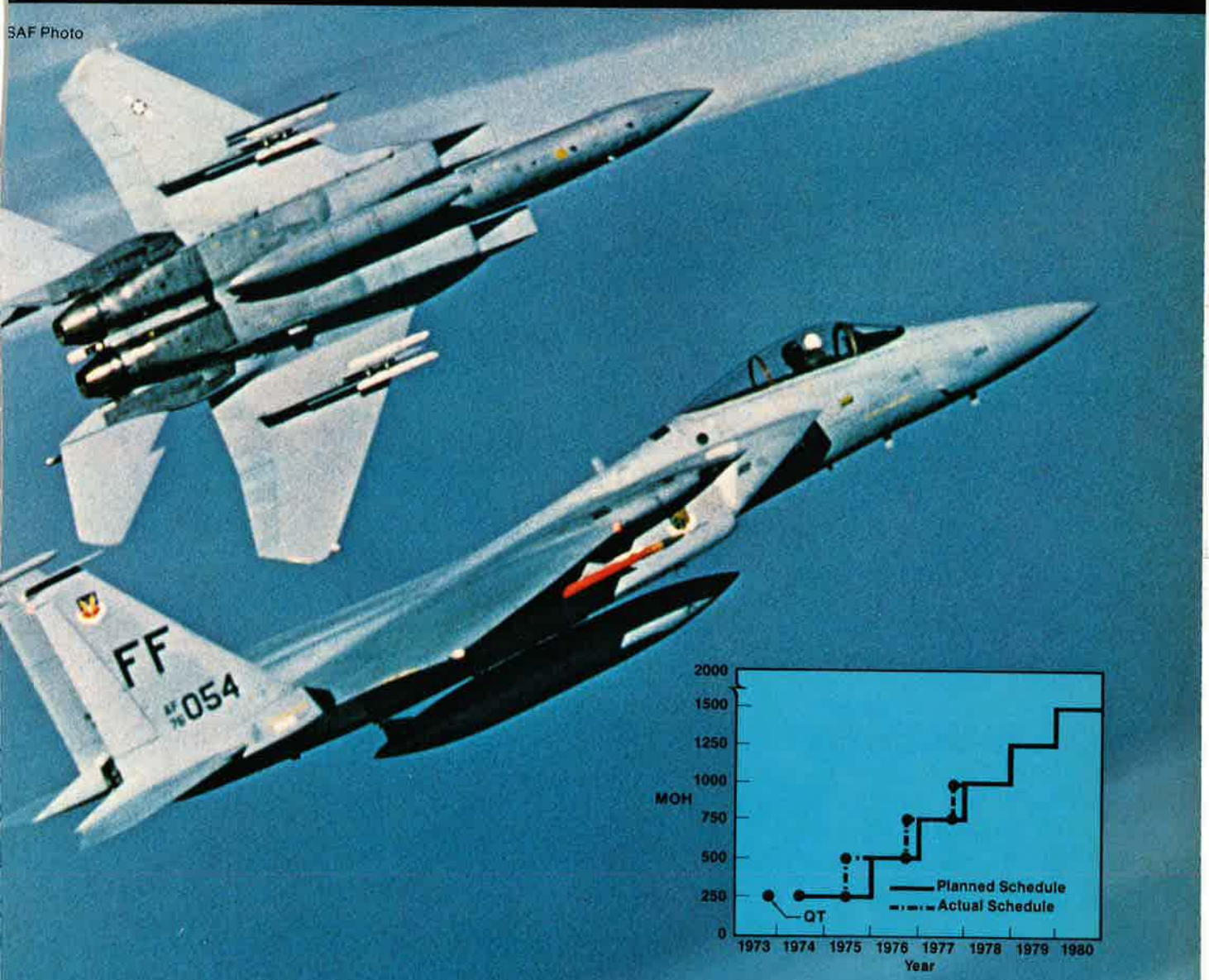

The Air Force set tough standards on the F-15's engine for Maximum Operating Hours—the highest number of hours an engine can be operated before overhaul. So far, the F100 has beaten every check point. It's already up to 1,000 MOH—and it got there faster than any other military jet engine.

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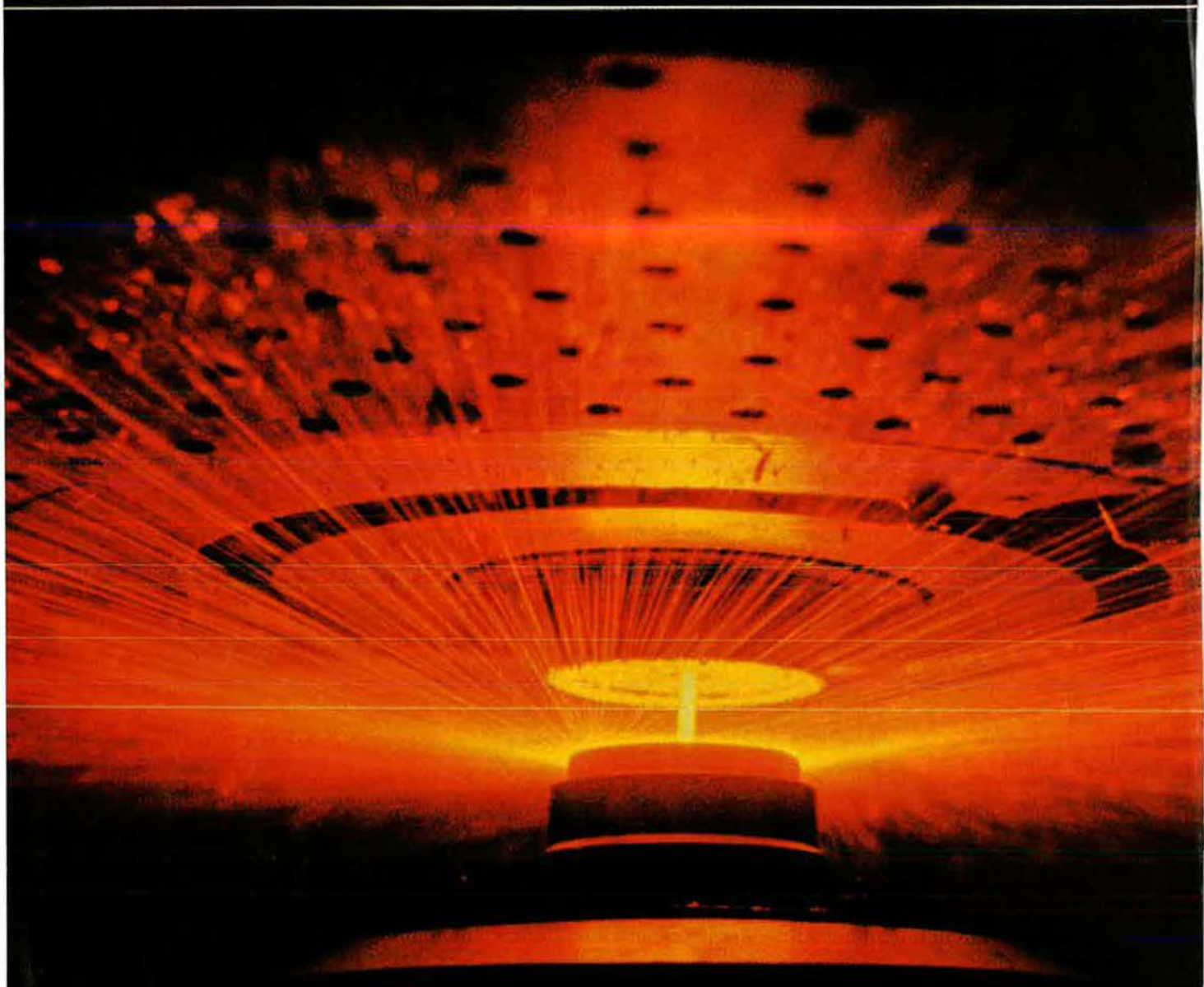

Shown above, a stream of molten alloy, created under vacuum, falls onto a rapidly spinning disk. This disintegrates the stream into fine particles and hurls them into helium quench gas, causing freezing to take place at rates near 1,000,000 degrees per second.

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UNITED TECHNOLOGIES

In Focus...

BY EDGAR ULSAMER, SENIOR EDITOR

Washington, D. C., Aug. 7

SALT vs. Soviet Defense Spending

The Central Intelligence Agency's latest assessment of trends in Soviet defense spending climaxes in a noteworthy finding: A SALT II agreement "along the lines currently being discussed . . . would probably reduce the rate of growth of total Soviet defense spending by only about 0.2 of a percentage point per year," below the level envisioned if there were to be no accord. Cumulatively, the CIA analysis predicts, SALT II would curb by "less than 1.5 percent" the total Soviet military spending projected between now and the early 1980s in the absence of a treaty. Predictably, the US arms-control lobby and most of the news media have ignored the CIA's findings.

If the intelligence community's assessment is correct—and there is no good basis for suspecting the CIA of alarmist bias—SALT II stands revealed essentially as a hollow alibi for continued neglect of already inadequate US strategic capabilities.

The CIA's report, "Estimated Soviet Defense Spending: Trends and Prospects," makes less than comfortable reading for other reasons. Over the past ten years, Soviet defense spending, depending on definitions used, amounted to between eleven and thirteen percent of the USSR's gross national product. By way of a benchmark, Soviet expenditures for health and education accounted for only six to seven percent. (The US defense budget, by contrast, stands at about 5.2 percent of GNP and is heading downward.)

During the same ten years, the cost of operating Soviet military forces averaged about one-quarter of all defense spending, enviably low compared to the US, whose military personnel costs alone absorb more than half of the Defense Department's budget. The Soviet personnel account—comprised of military pay, allowances, food, personal equipment, medical care, travel, and retired pay—absorbed only about one-sixth of all defense spending, an astonishing example of thrift if one allows for the fact that Soviet military manpower increased some twenty percent during the ten years cited. Between sixty-five and seventy-five percent of all Soviet males reaching draft age were conscripted, and military personnel and civilians working for the Ministry of Defense represent between three and four percent of the total labor force, the report notes.

Soviet economizing on people paid off handsomely in weapon acquisition, which accounted for more than half of all Soviet defense spending, and for RDT&E (research, development, test, and evaluation), which climbed from less than one-fifth to about one-fourth of the defense budget, the greatest growth of any category. In the acquisition sector, the CIA finds, outlays for aircraft and missiles grew faster than those for land armament and naval ships. Overall, weapons acquisition grew at an average annual rate of about four percent.

Among the Soviet Union's five branches of military service, its Air Force (the equivalent of USAF but without ICBM and air defense forces) grew fastest, more than three times the rate of total defense spending. The number of tactical aircraft of Frontal Aviation (roughly corresponding to USAF's TAC) increased by about fifty percent, with decisive improvements in quality. More than 500,000 military personnel are assigned to the Air Force, according to the CIA report.

The past ten years were marked by wide fluctuations in spending on the Strategic Rocket Forces (the equivalent to SAC's ICBMs plus intermediate- and medium-range ballistic missiles that have no US counterpart). At the height of the third-generation Soviet ICBM deployments in the late 1960s, Strategic Rocket Forces accounted for about ten percent of all defense outlays. Following a dip in 1975 to five percent—because of the transition to the fourth-generation ICBMs—the fraction has gone back up to about eight percent. Military personnel assigned to Strategic Rocket Forces number more than 300,000.

The Soviet Air Defense Forces (similar to NORAD/ADCOM in basic function) absorbed about one-eighth of the total Soviet defense investment. Air defense manpower increased by about ten percent and now numbers about 600,000. Outlays for interceptor aircraft went up by more than thirty percent, while spending on SAMs and antiballistic missiles declined by about twenty-five percent, according to the CIA.

Allocations to the Soviet Union's Naval Forces, manned by about 400,000 military personnel, lagged behind the Air Force and Ground Forces, but showed rapid growth in naval strategic attack forces, ballistic missile submarines, and open-ocean submarine warfare capabilities.

For good reasons, CIA analysts link their forecasts to the USSR's internal political prospects, especially the inevitability of drastic changes in the aging top leadership. Over the next five years, the CIA predicts, "several of the top Soviet political leaders will pass from the scene." With no heir apparent to President Brezhnev in evidence, the analysis predicts (with caveats) that his mantle probably will pass to a "caretaker regime." Given the probable aversion of caretakers to drastic change, the CIA speculates that defense funding will continue to climb at the traditional rate of four to five percent annually:

"The political influence of institutions and leaders who support defense programs—the uniformed military, managers and overseers of defense and related industries, and party and government leaders whose constituents depend heavily on defense production—would be likely to remain substantial." As in the past, the dismal state of the USSR's civilian economy is unlikely to influence measurably Soviet defense spending, the CIA predicts.

The forecast, therefore, is for long-term growth in Russian defense expenditures at the rate of four to five percent per year. For the next two or three years, growth probably will be slightly lower due to the transition from the current generation of ICBMs, fighter air-

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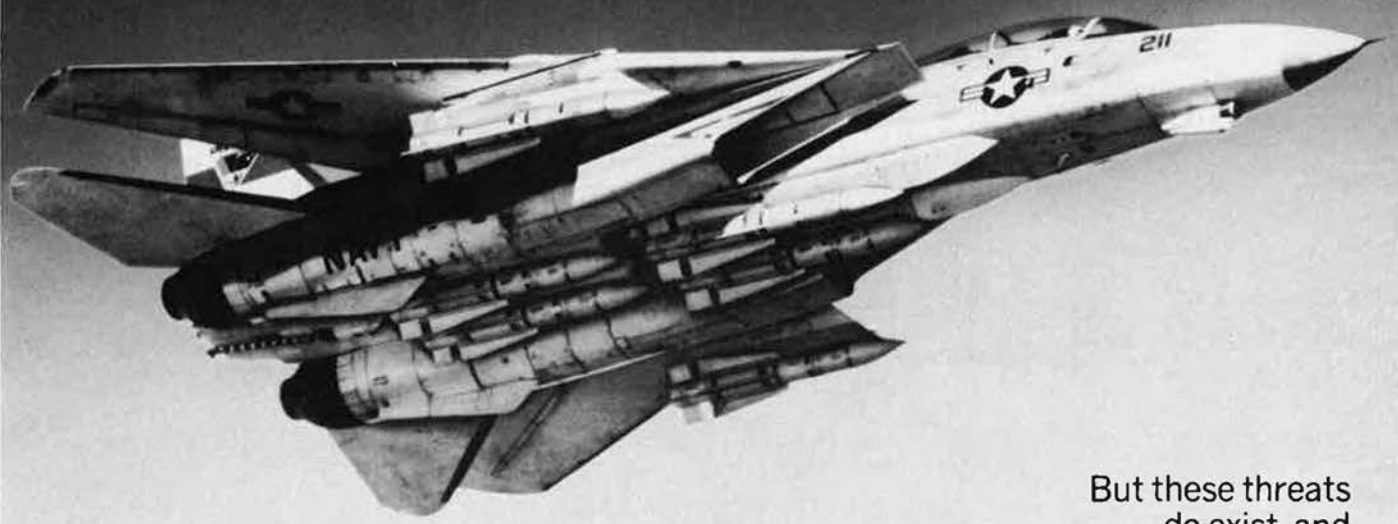

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craft, and ballistic missile submarines to the next. (It is probably not too early to predict that this temporary slowdown—if it occurs—will induce a short-lived euphoria in this country, based on misreading long-term Soviet goals.)

During the early 1980s, the CIA expects the Soviets to begin testing and deploying a number of new weapon systems. These include the next (fifth) generation of ICBMs, new aircraft, and new missile-carrying and attack submarines. This column learned that the intelligence community recently revised its assessment of the fifth-generation Soviet ICBMs now in research and development. Described previously as involving four new types, along with a drastically modified fourth-generation system, the evidence now is that the Soviets are developing six new weapons.

The CIA also reports the possibility that the Soviets, by the early 1980s, will have a new strategic bomber in operation. US knowledge of the aircraft, this column learned, is sketchy because it is not yet ready for flight-testing.

Production of tactical aircraft and of the Backfire bomber will increase over the next five years, says the CIA. Specific forecasts covering that period include the introduction of a new large ballistic missile submarine and deployment of a new long-range ASW aircraft, new low-altitude SAMs (presumably the SA-10 described previously in this space), and one or more interceptors modified to engage cruise missiles and other low-flying targets.

Meanwhile, the ominous effects of the relentless Soviet military buildup on the nuclear balance have been documented in an unusually thorough study of trends in US and Soviet strategic forces, carried out by the Santa Fe Corp. for the Pentagon's Defense Nuclear Agency. Measuring thirteen categories of strategic power, the study concluded that in ten of them the Soviet Union would be ahead of the US by 1982, while the US would be ahead in three. Most conspicuous Soviet leads, according to the study, include a 2.3 ratio of advantage in ICBM hard-target kill capability and a 2.2 ratio of advantage in combined ICBM/SLBM countermilitary potential.

The Survivable ICBM Challenge

Increasing Senate opposition to fundamental features of SALT II, including coordinated activity aimed at its defeat, makes it unlikely that such an accord will be submitted this year for the required two-thirds Senate approval. Even the Administration's interest in concluding SALT II before the November elections appears to be waning.

Sen. Sam Nunn (D-Ga.), speaking recently to an Air Force Association meeting at Warner Robins, Ga., reflected the Senate mood. He scored the absurdity of considering SALT II "in isolation from the general deterioration that has taken place in the overall military balance between the United States and the Soviet Union during the past decade," and of separating the treaty from recent Soviet behavior in Africa and elsewhere. "We spend more time fighting among ourselves as the SALT agreement is negotiated than we do quarreling with the Russians in Geneva," he said in arguing against the "simplistic and erroneous assumption that the world will be safe if we reach a SALT II agreement, but will be condemned to nuclear holocaust if we don't."

The US approach to SALT, Senator Nunn pointed out, puts the cart before the horse by first agreeing to terms and then, "almost as an afterthought," adjusting national security policies and arms-control philosophies to fit the *fait accompli*. The Soviets, by contrast, "plan their long-range strategic forces and then negotiate an agreement compatible with their program," he said. The US seems to have no long-range plans except those that evolve *after* SALT restrictions, already agreed to, are examined. Senator Nunn cited the US cruise missile program and the survivably-based ICBM, known variously as the multiple-aim-point (MAP) or MX programs, the development and nature of which are being debated "in the middle of strategic arms limitations negotiations."

This column learned from highly placed congressional sources that the National Security Council, in July, sought to introduce this country's right to MAP as a nonnegotiable, unambiguously stated precondition for SALT II, applicable both to the first three years—known as the Protocol period—as well as the remaining five years of SALT II's proposed life. At the last minute, however, the State Department's view prevailed in the White House with the result that Secretary of State Cyrus Vance merely informed the Soviets that this country reserved the right to deploy a survivably based ICBM system following termination of the Protocol. This step represented merely a clarification of the *status quo*.

Both Gen. David C. Jones, Chairman of the Joint Chiefs of Staff, and Gen. Lew Allen, Jr., USAF's Chief of Staff, have come out strongly in favor of a multiple-aim-point system (MAPS). The need for MAPS, General Allen told this column recently, is caused by the "awesome" pace and scope of Soviet ICBM modernization that in the 1980s will enable Moscow to deploy some 6,000 highly accurate warheads. Such a force, he emphasized, could destroy an "unacceptable fraction" of the silo-based Minuteman ICBMs "with a sufficient number of RVs [warheads] left over to wreak unacceptable damage" on the US in general. The problem's solution that the Air Force finds most cost-effective centers on alternate launch points "connected by either above-ground or below-ground roads, or tunnels," according to General Allen.

At a recent press conference, General Jones responded to a question whether or not the Pentagon insists that SALT II permit the deployment of MAP-based ICBMs: "I must say that I would have deep reservations about not being able to proceed with a survivable ICBM. . . . I consider that mobiles are authorized and therefore MAP is authorized. And to me that is not a matter for discussion and negotiation."

Generals Jones and Allen stress that MAPS can soak up, like a "sponge," more RVs than the Soviets can prudently target against it even if the Russians continue to increase the number of RVs their ICBMs carry. To counter such an eventuality, the US can simply increase the ratio between alternate shelters and deployed ICBMs to soak up even more RVs. Furthermore, the cost of building additional shelters appears to be considerably less than it would cost the Soviet Union to deploy a corre-

In Focus...

sponding number of additional RVs.

Nevertheless, in the manner of another "afterthought" for which Senator Nunn chastised the Administration, the US has injected a new goal into the SALT II negotiations. Known as the fractionation limit or "de-MIRVing," the US objective is to freeze—at least during the period of the Protocol—the number of MIRVs (multiple independently targetable reentry vehicles) per ICBM and SLBM at the highest number that each category of missile has been tested with. That means ten RVs for ICBMs and fourteen for SLBMs.

Considerable steam is building up in Congress in favor of a variation of MAPS advocated by the influential Committee on the Present Danger and its principal spokesman, Paul H. Nitze, a former Deputy Secretary of Defense. Known as Alternative Launchpoint Systems, or ALPS, its proponents see this approach as a shortcut to increased survivability for the ICBMs by providing initially an alternate basing mode for the 1,000 Minuteman missiles currently in fixed silos. Subsequently, ALPS could be adapted to a new missile with increased throw-weight. The first step of ALPS consists of providing each ICBM with one alternate launch point, modifying the missile itself to equip it with a special cannister, and making it horizontally transportable. Over time, the number of alternate silos for each ICBM would be increased in step with the severity of the anticipated threat.

MAPS differs from ALPS in two ways: First, MAPS usually is thought of as involving a new missile with greater throw-weight than Minuteman; second, the number of MAPS ICBMs is between about 150 and 300. Both MAPS and ALPS approaches consider deployment in the southwestern United States and the use of some form of decoys to reduce the risk of the Soviets' detection of "empty" holes.

While MAPS/ALPS obviously would hinder verification under present or future SALT agreements, that problem is not thought to be insurmountable. Presumably, deploying such a system would cause the Soviets to follow suit, but General Allen believes verification schemes can be devised to protect both US and Soviet interests. Considered here are the random opening up of individual MAPS/ALPS complexes for inspection by the other side's reconnaissance satellites, on-site inspection of complexes by "neutral," third-country observers, and the emplacement of mutually agreed to sensors coupled to delayed reporting of their information to safeguard the survivability of the missiles.

The Pentagon's reservations regarding ALPS stem mainly from concern that it might cause cancellation of present Administration plans for a new ICBM with more throw-weight than the 2,200 pounds of Minuteman III. The Defense Department and the Air Force are examining a range of new missile designs in connection with MAPS. They include an upgraded Minuteman, called Minuteman IV; two variations of new SLBMs—the 3,000-pound throw-weight C-4 and the 5,000-pound D-5—and the Air Force's 7,850-pound MX. Congressional pressure on the Administration to go ahead with development of a survivable ICBM in the second half of this year is mounting.

Washington Observations

• Fresh from its triumphal propaganda campaign that toppled US/NATO plans to deploy the armor-killing "neutron" bomb, the Soviets are after new prey: the depleted uranium rounds used by the A-10's 30-mm gun and by some US Army tanks. Watch out for "horror stories" about the alleged dangers that this material—essentially a heavyweight version of lead—poses to crews and the civilian population.

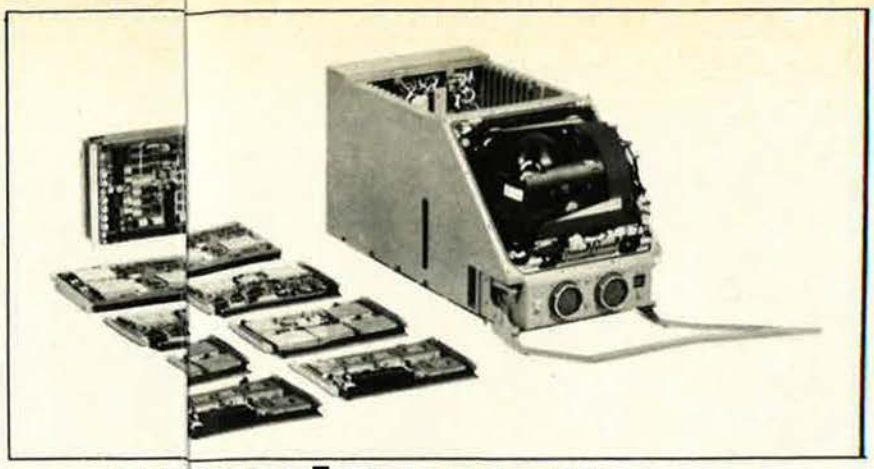
• Under conditions as hush-hush as the early years of the A-11—which evolved into the YF-12A and the SR-71—the United States is test-flying a "technology airplane" whose potential impact on military aviation is said to be at least as revolutionary as the A-11 was in the early 1960s.

• Development of an advanced, flexibly usable strategic nuclear bomb, the B77, is at a standstill along with work toward a substitute weapon, a modified B43 bomb, due to the continuing Mexican standoff between the Administration and Congress. Axed last year from the FY '79 Department of Energy budget by the White House Office of Management and Budget, the Full Fuzing Option B77 bomb has a special retarding feature that allows it to be dropped at low altitude without destroying the delivering aircraft. The yield, or explosive power, of the bomb can be varied to fit target requirements. The B77 is the only design acceptable to Congress. The option chosen by the Administration, a modified B43 bomb that dates back to the 1960s and lacks the flexibility of the B77, continues to be blocked on Capitol Hill. The bottom line is that four years after starting the B77 program, the US still lacks a badly needed modern strategic bomb.

• There is bad blood between the Air Force and elements of OSD concerning "territorial" disputes between the Defense Advanced Research Projects Agency (DARPA) and the Air Force and the US Army. Under the code name "Assault Breaker," OSD has centralized under DARPA a congeries of USAF and Army programs designed to cope with the Warsaw Pact's armored blitzkrieg and second-echelon targets. This caused DARPA to encroach on what USAF considers its assigned area of responsibility and created conditions of excessive interdependence between the Air Force and Army to a degree where neither service could autonomously function in case of contingency war.

• In yet another shift of the US position on a Comprehensive Test Ban Treaty (CTBT), the Administration has now proposed to Soviet and British negotiators in Geneva an unqualified "zero-yield" test ban outlawing all forms of nuclear explosions.

• The Joint Chiefs of Staff have initiated a series of unique annual studies, to be carried out by the Joint Chiefs' Studies Analysis and Gaming Agency (SAGA), to analyze the relative recovery capabilities of the US and the USSR following a hypothetical massive nuclear exchange. Known as the Comparative Postwar Recovery Analysis (CoPRA-78), the study's purpose is to provide the basis for improving the Single Integrated Operational Plan (SIOP), help improve the nation's policy on employing nuclear weapons, and assist the executive branch of government in functioning in a postwar environment, according to SAGA Director Brig. Gen. E. D. Scott. ■



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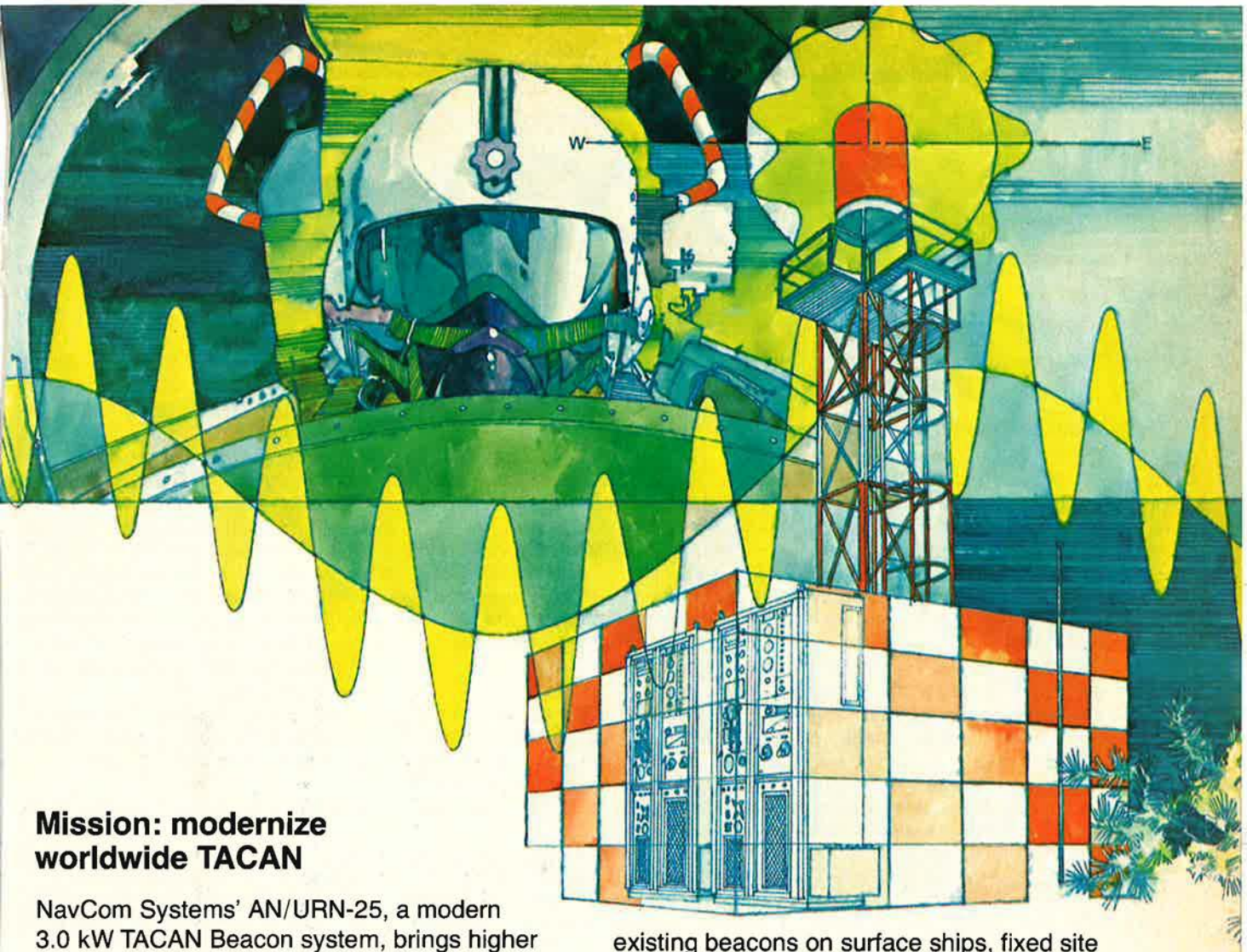

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Aerospace World News, Views & Comments

By William P. Schlitz, ASSISTANT MANAGING EDITOR

Washington, D. C., Aug. 7

★ In late July, two cosmonauts set a Soviet spacewalk record by remaining outside the orbiting Salyut-6 space station for more than two hours. It was the third spacewalk in the history of the USSR's manned space program.

In December 1977, Gregory Grechko stayed outside the space station for eighty-eight minutes, and in 1965 Alexei Leonov made a twenty-minute walk.

During their 125-minute excursion, Vladimir Kovalyonok and Alexander Ivanchenkov tested new spacesuits and life-support systems and dismantled external instrumentation for return to earth. They also inspected the station and docked Soyuz-29 and Progress-2, the unmanned resupply vehicle (*see also p. 37).*

The longevity of the Salyut-6 mission—the station was orbited last September—seems to underscore conjecture that the ultimate Soviet goal is the creation of permanent platforms in earth orbit.

★ In late June, the Military Airlift Command activated a new airlift division at Ramstein AB in Germany "in another step to improve airlift responsiveness to US forces" stationed in Europe.

The new division, the 322d, now controls all of MAC's airlift resources in Europe. Its new Commander previously wore a number of hats: As Commander of the 435th TAW, Rhein-Main AB, Germany, he also served as Commander of Airlift Forces (COMALF) in Europe and in that capacity responded to European Command requirements through the CINC/USAFE at Ramstein; he also managed host-base matters at Rhein-Main. As previously announced, Brig. Gen. Click D. Smith has been named Commander of the 322d, and as COMALF will be stationed at Ramstein to "devote his full attention to the European airlift mission."

Also under the reorganization, the Military Airlift Center, Europe (MACE), will report directly to the 322d and "will continue to provide flight-following services and a single line of communications with Twenty-first Air Force Headquarters, McGuire AFB, N. J., for MAC-assigned assets operating in Europe." (Previously, MACE operated as a unit of the 435th TAW.)

The action required "a minimum" of manpower shifts from Rhein-Main and other MAC bases.

★ NASA has given the green light for development of a sort of supertrolley that astronauts in orbit can employ to move objects about.

The Teleoperator Retrieval System (TRS), which Martin Marietta

The more than 300 McDonnell Douglas-built F-15 Eagles, such as this one at Bitburg AB in Germany, have passed the 100,000 mark in flight hours. F-15s now serve with TAC and USAFE and will serve in PACAF, as well as with Japanese and Saudi forces.

Left, former charter pilot Debra Langford prepares for a Cessna flight while at OTS at Lackland AFB, Tex. From there it was on to Undergraduate Pilot Training at Williams AFB, Ariz. Below, light at the end of the tunnel, the cargo compartment of USAF's mighty C-5 Galaxy transport.

Corp., Denver, Colo., will develop under a $32 million contract, will be equipped with a TV camera and propulsion system for maneuvering in space. It will enable Space Shuttle crews to deliver, stabilize, and recover satellites in orbit, among other tasks.

Plans call for the TRS to be carried back and forth in the Orbiter cargo bay or suspended in orbit after a particular mission. It will be operated remotely from the Orbiter cockpit.

Once it has delivered a payload to, say, a higher orbit, guided by an astronaut monitoring its television transmissions, the TRS will return to the vicinity of the Shuttle using its own guidance and control system.

It then can be inserted into the Shuttle cargo bay by the Orbiter manipulator arm for return to earth for refurbishment or left in orbit for the next mission.

Delivery of TRS hardware is expected by September 1979.

★ Two Britons got within 110 miles (177 km) of completing the first transatlantic balloon crossing before adverse winds forced them to ditch in choppy seas. Although their gondola was equipped for sailing, they were rescued by a trawler.

Royal Tank Corps Maj. Christopher Davey and aeronautical engineer Donald Cameron launched from St. John's, Newfoundland, on July 26 and came down four days later off the French coast near Brest. Other than the effects of lack of sleep and disappointment in not completing the flight, the two balloonists were in good shape.

All eighteen known attempts at crossing the Atlantic by balloon have failed, several with loss of life.

★ In the reversal of a Ford Administration policy formulated three years ago, the US has now cleared the way for the sale of Israeli jet fighters to Taiwan. *(See also "Airpower and US Interests in the Pacific," p. 130.)*

If the deal goes through, Israel will sell the Nationalist Chinese up to sixty home-built Kfir (Lion Cub) jets. *(For a look at Israel's Air Force and aircraft industry, see August '78 issue, p. 34.)* The US has a say in the matter because the Kfir is powered by the General Electric J79 jet engine. (The US has denied the sale of up to two dozen Kfirs to Ecuador.)

When its bid for purchase of the Kfirs was blocked, Taiwan then pressed the US to sell it F-4 Phantoms. A decision on that is still pending, officials said.

Thus, in one stroke, the Administration has potentially:

- Made good on the US promise to help strengthen Taiwan's defenses.
- Removed itself from directly supplying arms to the Nationalist Chinese, thus blunting objections by Mainland China.
- Bolstered sagging relations with Israel by giving its hard-pressed aircraft industry a financial shot in the arm that could total $500 million. (The gesture also may have a beneficial side effect in helping to nudge Israel toward renewed negotiations with Egypt.)

The Kfir is designed for both air defense and ground support.

★ DoD and the Japanese Defense Agency have agreed to the copro-

Aerospace World

duction of forty-two Lockheed P-3C Orion antisubmarine warfare aircraft in Japan.

The pact between Lockheed-California Co. and Kawasaki Heavy Industries, Ltd., covers procurement of forty-five aircraft, including three complete aircraft to be built in Burbank, Calif., by Lockheed and four unassembled P-3Cs ("knock-down units") for assembly in Japan. The rest will be built in Japan, with several hundred US firms participating in either licensing agreements with Japanese companies or as suppliers. (Ishikawajima-Harima Heavy Industries, Ltd., will build most of the engines under license from GM's Detroit Diesel Allison Division.)

The program, to be concluded by 1989, will have a value to Lockheed of more than $250 million.

The P-3Cs are to replace Japan's current force of Neptune ASW aircraft.

Above, Britain's new "Firecracker" two-seat civil and military trainer currently is undergoing a flight-test program. Left, USMC's Modular Universal Laser Equipment (MULE) target spotter is the subject of full-scale engineering development by Hughes Aircraft Co.

★ Anticipating a world market for up to 1,200 feeder jetliners by 1990, British Aerospace has initiated a $500 million program to develop a turbofan-powered plane that would have a seating capacity from seventy to 109.

The aircraft—dubbed the 146—is being designed to serve smaller cities and thus would be able to operate from short rudimentary runways. It is seen as replacing both turboprop and aging jet aircraft now flying feeder routes.

British Aerospace plans a military and two civil versions of the aircraft, with the first—the 146-100—transport entering service in 1982. It is to be powered by four Avco-Lycoming engines, each of 6,700 pounds thrust.

With the US engine-builder and other non-British contractors under consideration, up to forty percent of each aircraft could be built in the US and or in Europe, officials said.

Either the 146-100 (seventy to ninety passengers) or the longer 146-200 (up to 109 passengers) would have a 1,500-mile (2,410 km) range or be able to make short, unrefueled flights, thus permitting quick turnaround.

The military version would include a loading ramp in the rear fuselage, and the aircraft's high wing would allow loading and most maintenance from ramp level and without ground equipment, officials declared.

★ New and improved ammunition for the 20-mm M61 Gatling Gun is currently undergoing ballistics testing at the Armament Development and Test Center, Eglin AFB, Fla.

The upgraded 20-mm round is the result of a 1974 Tactical Air Command request for Gatling Gun ammunition with higher muzzle velocity, more high explosive, and a delayed-function fuze. The M61 gun is the prime air-to air weapon on the F-4E Phantom, F-15 Eagle, and F-16 fighters. The new round is to be flight-tested aboard the F-4E in October, with tests aboard the F-15 and F-16 following as program parameters are defined.

The new bullet is both lighter and faster than the M56 round currently in service. It has a muzzle velocity of 3,700 feet per second (1,125 m per second), 340 feet per second (103 m per second) faster than the M56. It is 240 grains lighter than the present bullet's 1,540 grains (7,000 grains per pound).

To meet TAC's requirement, the new round will be equipped with a delay fuze, which will cause the ammunition to explode after penetrating the target, thereby increasing destructive potential.

A mundane-sounding but important improvement to the new round is that the rotating band that acts as a seal in the Gatling Gun barrel is made of plastic rather than copper and thus will cost less and add to the life of the barrel because it is less abrasive. The band and barrel rifling cause the round to spin at 140,000 revolutions per minute while in flight.

★ Since we last reported on Hq. USAF departmental realignments *(see June '78 issue, p. 32)*, further changes in Air Staff functions and responsibilities have taken place. They include:

• The Directorate of Accounting & Finance has been redesignated Assistant Comptroller for Accounting & Finance directly within the office of the Comptroller of the Air Force; and the Directorate of Management Analysis has been relabeled Cost & Management Analysis.

• The Office of Air Force History will remain answerable to the Chief of Staff rather than to DCS Programs & Analysis.

• DCS Research & Development has been renamed DCS Research, Development, & Acquisition; under it, the Directorate of Development & Acquisition has been redesignated Development & Programming, and the Directorate of Procurement & Production has become the Directorate of Contracting & Acquisition Policy.

• Under DCS Operations, Plans, & Readiness, the Directorate of Intelligence & Reconnaissance has been abolished, and the Directorate of Command & Control has become Command Control & Communications.

• Under DCS Logistics & Engineering, the Directorate of Logistics Plans has been redesignated Logistics, Plans, Programs, & Transportation.

★ As a memorial to WW II's 509th

Soviet Airlift to Ethiopia

The Soviet Union's continuing airlift to the Ethiopian armed forces has impressed Western aviation experts more for its display of diplomatic skill than the actual transport of military supplies.

The airlift is much smaller than the Soviet effort in the 1973 Middle East War. But in the Ethiopian airlift, the Soviet Union has demonstrated it can get the Syrian and Iraqi governments to grant overflight rights even though that will hurt Somalia, a Moslem ally.

Western experts say that after the airlift began last November, there were fifty flights in the first sixty days. The flights then dropped to about two a week after shipments by sea began arriving. Altogether, it is estimated that the Soviet Union sent almost $1 billion of military equipment to Ethiopia between November and July 1978, of which the greater part went by sea.

The significance of the airlift is not in its volume, however, but in the speed with which the Soviet Union was able to get the first shipments to Ethiopia. These provided a boost in the morale of the Ethiopian forces during a critical point in their struggle against advancing Somali forces.

At the same time, the Soviet Union continued making routine supply flights to Syria, Iraq, and Aden. Angola flights were halted with the establishment of supply routes by sea.

To transport Cuban soldiers from Angola to Ethiopia, the Ethiopian national airline and Cuban ocean vessels were used.

Included in the Soviet air shipments to Ethiopia were a number of MiG-21 fighter aircraft. Soviet pilots also ferried twelve Antonov An-12 cargo planes for loan to the Ethiopian armed forces.

Aviation experts discount reports from Africa that the Soviet airlift was much greater and that the Soviet pilots have made up to 10,000 military flights to Africa and the Middle East since it began the Ethiopian airlift.

Whatever the number of flights, however, Soviet operations in Africa are not putting any strain on its air resources.

The An-12, a turboprop plane, is used for regular cargo. The larger and newer A-22, also a turboprop freighter, is used for outsized cargo. Few layovers or delays have been reported because of breakdowns.

To make the flights possible, Syria and Iraq have been put in the uncomfortable position of agreeing to overflights that aid non-Moslem Ethiopia, at the same time they have been sending aid to Somalia, a Moslem state, and to anti-government Moslem guerrillas opposing Ethiopia.

Western diplomats say that the Syrian and Iraqi governments apparently have granted the overflights in exchange for arms aid. Lending credence to these reports is the recent appearance in Iraq of Soviet military equipment never before seen in that country. Also, reports from Damascus indicate that the Soviet Union has forgiven some of the military arms debt the two countries have run up since the 1973 Middle East War.

The Soviet Union's airlift clearly shows the importance of military and diplomatic leverage in securing overflight rights.

Last November, Moscow sent out a flurry of requests to countries separating Ethiopia from the Soviet Union. When the requests were added up, the total indicated a massive effort that would strain the Soviet Union's air resources. It turned out, however, that Moscow's requests were a device to open as many routes as possible, rather than an indication of the actual number of missions that would be flown.

At first the overflights were routinely granted by low-level bureaucrats. But as their significance to the Somalian-Ethiopian War became clear, top policymakers ordered overflight rights withdrawn.

After flights over Pakistan, Iran, and Egypt were stopped, Soviet planes were left with only one route to Ethiopia: east from the Mediterranean, over Syria and Iraq, southeast over the international waters separating the Arab Peninsula and Iran to the Indian Ocean, and then south and west to Ethiopia.

To spare Ethiopia a drain on its oil supplies, Soviet planes have been refueling at Aden, Baghdad, or Damascus.

Most of these flights originate from the Soviet Union in Odessa, north of the Black Sea. From there Soviet planes fly over the Turkish-controlled Dardanelles strait; then east over the two Arab countries and the Persian Gulf to the Indian Ocean. Some flights have started instead in Hungary, flying south over Yugoslavia and Albania, then picking up the route east over the Mediterranean to Syria and Iraq.

In the case of the Dardanelles overflights, Turkey has the right, under the Montreaux Treaty governing the strait, to inspect overflights. Turkey, a NATO member, has not exercised that right, however, apparently because of its dependence upon Bulgaria, a member of the Soviet-dominated Warsaw Pact, for Turkish overflights to Western Europe.

The Soviet airlift, by US Air Force standards, is small. In the US airlift to Israel in 1973—Operation Nickel Grass—US pilots flew 421 C-141 and 145 C-5 missions in a single month, delivering 22,395 tons of military supplies. Of this total, 48.3 percent, or 10,763 tons, was carried by C-5s, including 100,000-pound M-60 tanks and 56,000-pound artillery pieces.

Even by Soviet standards, the current airlift is small. In 1973, Soviet pilots flew more than 900 flights to Egypt and other Arab states in less than thirty days.

In the five years since, the Soviet Union has added to its military airlift strength. It now has more than 700 An-12s, up to fifty An-22s, and a growing number of the new Ilyushin-76 turbofan planes, which are designed to replace the older and smaller An-12s.

In addition, Aeroflot, the Soviet national airline, has up to 1,500 planes, of which up to 300 can be made available for military flights without interrupting civilian schedules.

In short, barring a diplomatic reversal in Syria, Iraq, or Turkey, the Soviet Union can continue supplying Ethiopia indefinitely through the present airlift, or even one several times larger.

—BONNER DAY

Aerospace World

Maj. Vic Tucker and younger brother 1st Lt. Mike Tucker, both of the 36th TFW, Osan AB, Korea, make final preparations before a mission. The two are weapon systems officers.

Composite Group, which dropped the atomic bombs at Hiroshima and Nagasaki, thus shortening the war in the Pacific, volunteers at Pease AFB, N. H., are restoring a B-29 Superfortress.

The project began during the 1976 Bicentennial celebration, when 509th Bomb Wing Commander Col. Guy Hecker, Jr., provided guidelines for the procurement, transportation, and restoration of a B-29 on a voluntary basis and with the most stringent expenditure of funds.

A search led by Lt. Col. Steve Croker and 2d Lt. Rick Layman ended at Aberdeen Proving Grounds, Md., where twenty Pease volunteers, under the guidance of TSgt. Whitney Noyes, extracted a B-29 from its resting place in a swamp. Disassembled in eight days, the plane was then moved to Pease by the New York NG's 369th Transportation Battalion as a training exercise.

Initial stages of restoration were directed by crew chief A1C Wes Schaaff, who oversaw the efforts of officer and enlisted volunteers alike. When duty curtailed Schaaff's involvement in the project, A1C Rick Hessel replaced him. At this writing, the restoration was nearing completion.

Encouraged by this success, the 509th, now commanded by Col. "Kay" Greer, plans to expand the Air Park to include other aircraft flown by the unit—a B-47, B-52, FB-111, and KC-135, as well as a Hound Dog missile carried by a B-52.

★ Several years ago, the Officers' Wives Club at Hanscom AFB, Mass., initiated a modest recycling project

Discovered at the Aberdeen Proving Grounds, Md., this B-29 is now at Pease AFB, N. H., where it is being renovated as a memorial in honor of World War II's 509th Composite Group. See above.

Intelligence Briefing...A Roundup

According to *Foreign Report,* published by London's *Economist,* it has learned from usually reliable sources among West European arms dealers that Vietnam is offering for sale captured American weaponry and military equipment conservatively valued at £500 million. The arms are selected from the vast stocks the Vietnamese Communists acquired after the fall of Saigon in 1975. The Vietnamese regime is using Czech, Hungarian, and Yugoslav state-owned import-export companies as brokers. . . .

West Germany's Bundeskriminalamt in Wiesbaden—which keeps tabs on weaponry available to terrorist groups—is alarmed that arms from the Vietnamese stockpiles may already have filtered through to revolutionary political organizations in Europe. . . .

Foreign Report says that Vietnam's decision to sell American military equipment is probably related to its current economic problems and, in particular, the shortage of foreign exchange.

Another factor is that the stockpile of American arms has lost its value as a diplomatic bargaining card in talks about opening diplomatic relations between Hanoi and Washington. Negotiations in Paris broke down more than a year ago, because the Vietnamese insisted on the payment of American "reparations" as a precondition. . . .

The Vietnamese are offering for sale thousands of American standard-issue M-16 rifles, worth $230 apiece new, but now being unloaded at bargain basement prices. . . .

The total number of American aircraft left behind in Vietnam is estimated at about 1,000. But arms dealers are skeptical of published reports that the Vietnamese have any operative C-130 Hercules transport planes—which are highly prized and fetch large sums on the international arms market.

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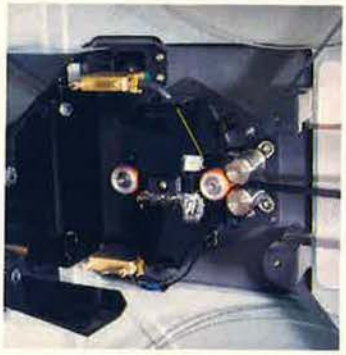

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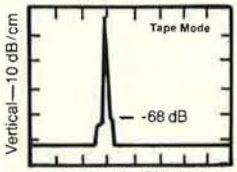

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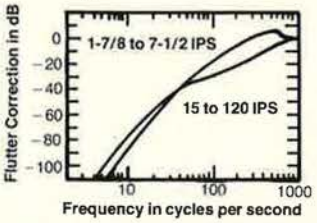

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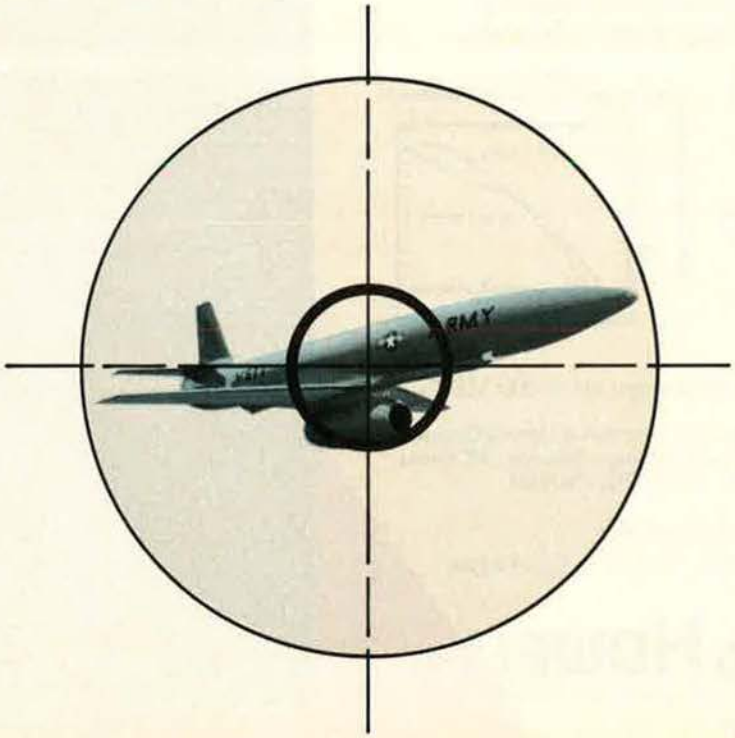

Aerospace World

Capt. (Maj. selectee) Charles G. Tucker has joined the staff of AIR FORCE Magazine as a Contributing Editor under USAF's Education With Industry program. In his last assignment, Captain Tucker was Special Assistant to the Air Force Director of Information (SAF/OI) in the Pentagon. Graduated from the University of Texas with a Bachelor of Fine Arts degree in 1961, he was commissioned in the Air Force in 1967, and earned an M.S. in Public Relations (summa cum laude) from American University in 1977. Captain Tucker was the recipient of AFA's 1976 Arno H. Luehman Scholarship for academic achievement during a course in communications at Oklahoma University. He replaces Capt. Anthony Lynn Batezel, who has been assigned to the Air Force Service Information and News Center, a newly established USAF separate operating agency at Kelly AFB in San Antonio, Tex.

to salvage valuable materials as a means of earning money for youth activities and base beautification.

By last year, the volunteer effort had grown to include a number of youth groups and not only was base-wide but reached into neighboring communities as well. Salvaging aluminum, paper, and glass earned, the group says, $6,500 last year and a whopping $35,000 over the past six years.

The operation has become highly efficient, with base workers and residents asked to sort their trash to separate out the recyclable items. There are weekly pickups of paper and centrally located bins where aluminum and glass can be deposited.

The aluminum—foil, frozen-food trays, pie plates, etc.—is sold to a Reynolds Aluminum Co. mobile collection unit, which pays seventeen cents a pound ($340 a ton). Glass and paper go to local dealers; the Hanscom recyclers turn in about three tons of glass and nine tons of paper a month.

Other bases and installations please copy.

★ **NEWS NOTES**—US Army has promoted its **first woman to the rank of major general.** Wearing two stars is **Mary Clarke,** former Commander of the discontinued Woman's Army Corps and currently Commander of the Army military police school, Ft. McClellan, Ala.

The **43d Tactical Fighter Squadron,** Elmendorf AFB, Alaska, in June was named the best USAF active air defense squadron worldwide, for which it was presented the Hughes Trophy (the twenty-fifth annual presentation of the award by the Hughes Aircraft Co.).

AFROTC Cadet **Mark D. Chouinard,** an aerospace engineering major recently graduated from Georgia Institute of Technology, has been awarded the **Air Force Historical Foundation's $1,000 annual scholarship.** The Decatur, Ga., native is to attend the University of Georgia medical school and hopes eventually to combine engineering and medicine in a research career.

The Soviets followed their recent double-docking with orbiting space station Salyut-6 *(see August '78 issue, p. 17)* with a **second successful resupply mission by unmanned spacecraft.** In early July, Progress-2 linked up with Salyut-6 after a two-day flight from earth. Twenty-five days later, with Progress-3 reportedly standing by for launch, Progress-2 was sent toward earth and destruction in the atmosphere.

Fourteen-year-old **Katherine Rinehart** on July 9 became the **National Air and Space Museum's 20,000,-000th** visitor in the two years the facility has been open.

Aerospace World

DoD's **Medal for Distinguished Public Service** has been awarded to **Ernest C. Brace,** McMinnville, Ore., in recognition of his activities under the most trying conditions as a civilian POW for eight years in Vietnam. Captured while a US contract pilot, he escaped three times only to be recaptured. He was eventually sent to Hanoi where he played a key role in the POWs' resistance.

Died: Ernest R. Breech, aviation and auto executive who headed the expansion of Bendix Aviation in the '30s, helped rebuild Ford Motor Co. after WW II, and became TWA chairman in 1961, of a heart attack in Royal Oak, Mich., in July. He was eighty-one.

Died: Kurt Student, who developed Hitler's airborne forces and planned the 1943 raid that freed Mussolini after he had been deposed and imprisoned, in Lemgo, West Germany, in July. He was eighty-eight.

Died: Otto W. Timm, aviation pioneer who reputedly gave Charles A. Lindbergh his first plane ride, in Newport Beach, Calif., in June following a long illness. He was eighty-four.

Died: Lt. Gen. Charles W. Westover, USAF (Ret.), in Del Ray, Fla., in July of cancer. He was sixty-three. ■

Air Force Pilot Honored

Funds are being solicited for a memorial scholarship in honor of Air Force Col. James H. Metz, shot down over North Vietnam in April 1968.

Colonel Metz's fate wasn't officially known until September 1976, when North Vietnam turned over to US officials the remains of twelve Americans. Colonel Metz is survived by his wife and three children.

The recipient of the memorial scholarship will be selected from among the following:

- A son or daughter of any member of the Air Force missing or killed in action during the Vietnam conflict.
- A member or honorably discharged veteran of the Air Force.
- A dependent of an Air Force retiree.
- A dependent of an honorably discharged Air Force veteran.
- Any US armed forces honorably discharged veteran or his dependent.
- Any person judged to be active and loyal in support of local, state, or national goals or objectives.

Inquiries regarding the scholarship fund may be directed to Central Methodist College, Fayette, Mo., or to Lt. Cmdr. J. M. Jacobs, USCG, 630 Sansome St., San Francisco, Calif. 94126. Phone: (415) 556-4562. Contributions should be marked James Metz Fund and sent directly to the college.

Index to Advertisers

The Navy joins the Air Force.

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Capitol Hill

By the Air Force Association Staff

Washington, D. C., Aug. 1

Authorizations

House and Senate conferees have agreed on a $36.9 billion defense procurement authorization for FY '79—$1.5 billion more than the Administration's request. The compromise version is $946 million less than the House had recommended, but $854 million more than the Senate wanted.

The Navy was the big winner. Its authorization includes $1.9 billion for a nuclear carrier the Administration does not want. Indications are this will be the last of the big carriers.

With the exception of some crucial R&D funding cuts, in the amount of $175 million, USAF was authorized nearly all of the $12.9 billion the Administration had requested. The Conference Committee approved two advanced tanker/cargo aircraft (ATCA), as requested, and added eight C-130H transports and sixteen A-7D trainers. The conferees authorized the full $158.2 million request for the advanced ICBM. The conference also went along with the Senate in cutting air-launched cruise missile production to twenty-four, rather than the thirty-six requested by the Administration and approved by the House. Conferees halved both the $40 million requested for the ground-launched cruise missile and the $41 million requested for an aircraft to carry cruise missiles, but rejected the Senate's demand that no funds be used for the missile carrier until the President gives Congress an arms-control impact statement.

The conferees included the proviso that the cruise missile carrier program be strictly exploratory and involve several military aircraft, including the B-1 bomber, C-141, C-5A, B-52, and Advanced Medium STOL Transport (AMST). The report further called on the Administration to provide progress reports regularly on the cruise missile carrier studies.

The conference cut by $50.5 million the Administration's $105.5 million request for the B-1 R&D effort.

In personnel areas, the compromise authorization bill:

- Provides for armed forces active-duty year-end strength of 2,055,750, including 566,400 for USAF. Although the total is essentially what the Administration requested, the Air Force authorization represents a cut of nearly 4,000 blue-suiters in the coming fiscal year;
- Sets DoD civilian personnel end-strength at 1,005,500, more than 13,000 below the current fiscal year. The Secretary of Defense allocates the total among the services, and may exceed the authorized number by 1.25 percent;
- Gives the Air National Guard an average strength of 92,150, and Air Force Reserve 53,075, both slightly lower than the current fiscal year. Total strength for all Reserve forces: 834,875;
- Allows a two-year test of enlistment and reenlistment incentives for the Reserves;
- Exempts commissary store baggers from the minimum wage law;
- Makes the Marine Corps Commandant a permanent member of the Joint Chiefs of Staff.

Turkish Arms Embargo

Congress has lifted the arms embargo against Turkey, but with some strings: The President must first report that Turkey is working toward a "just-and-peaceful" solution to the Cyprus problem, then give sixty-day progress reports. The Senate vote was by a surprisingly large 57 to 42 margin, but the House vote was a close 208 to 205. President Carter called this "the most important foreign policy issue facing Congress."

Civil Service Reform

President Carter's proposal for revising the Civil Service system now looks like an overdecorated Christmas tree, with congressmen stringing on new amendments daily. The House Post Office and Civil Service Committee version of the measure contains three major changes that already have stirred considerable debate in the House, and may force the Senate to reject it entirely. Those provisions deal with:

- **Dual compensation.** The Committee passed an amendment offered by Rep. Patricia Schroeder (D-Colo.) that would put a lid on total pay for military retirees working for the federal government. Under the amendment, the combined Civil Service pay and retired pay could not exceed the salary for the top Civil Service pay grade, currently $47,500. The amendment would not apply to military people who already are civil servants, and would remove current restrictions on retired regular officers.

The Schroeder measure eliminates the objections many had to other dual-compensation proposals, since it would have little effect on low-income former enlisted people.

- **Veterans' preference.** Representative Schroeder also was successful in her compromise proposal to limit preference given to veterans in Civil Service hiring and retention. Her version limits vets to one use of the preference within fifteen years after leaving the military, and would protect vets from layoffs for eight years. Her proposal also extends veterans' preference to more disabled vets.

On the other side of the Capitol, the Senate Governmental Affairs Committee had already voted to leave veterans' preference as is.

- **Hatch Act.** The Committee adopted a measure that would liberalize Hatch Act restrictions on political activity by government workers. The Senate bill does not include this liberalization.

Veterans

Both the House and Senate have passed bills that raise the basic support level for pensioners and tie pensions to the Consumer Price Index. Compensation also was increased for disabled veterans and dependents. The House measure, which is more generous than the Senate's, was attacked by the Administration as too costly. A conference committee will iron out the differences between the two versions.

Survivors' Benefits for Reservists

The House has adopted a bill that would allow Reservists who have retired, but who have not reached the age required to draw retired pay, to participate in the Survivors' Benefit Plan. At present, the family of a retired Reservist receives none of the retired pay if he or she dies before reaching age sixty. The Senate has not yet acted on the measure. ■

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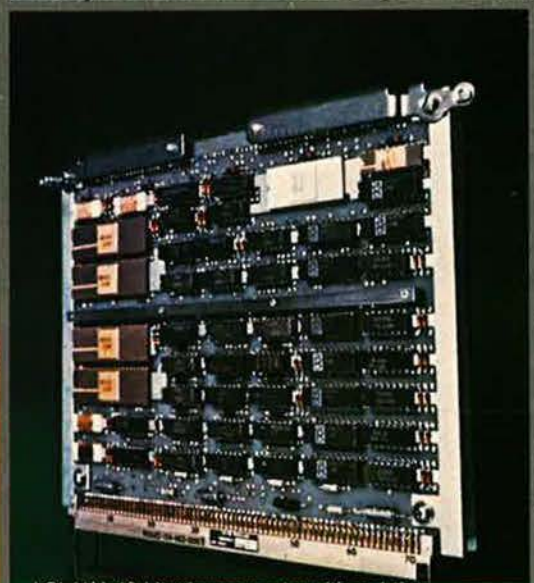

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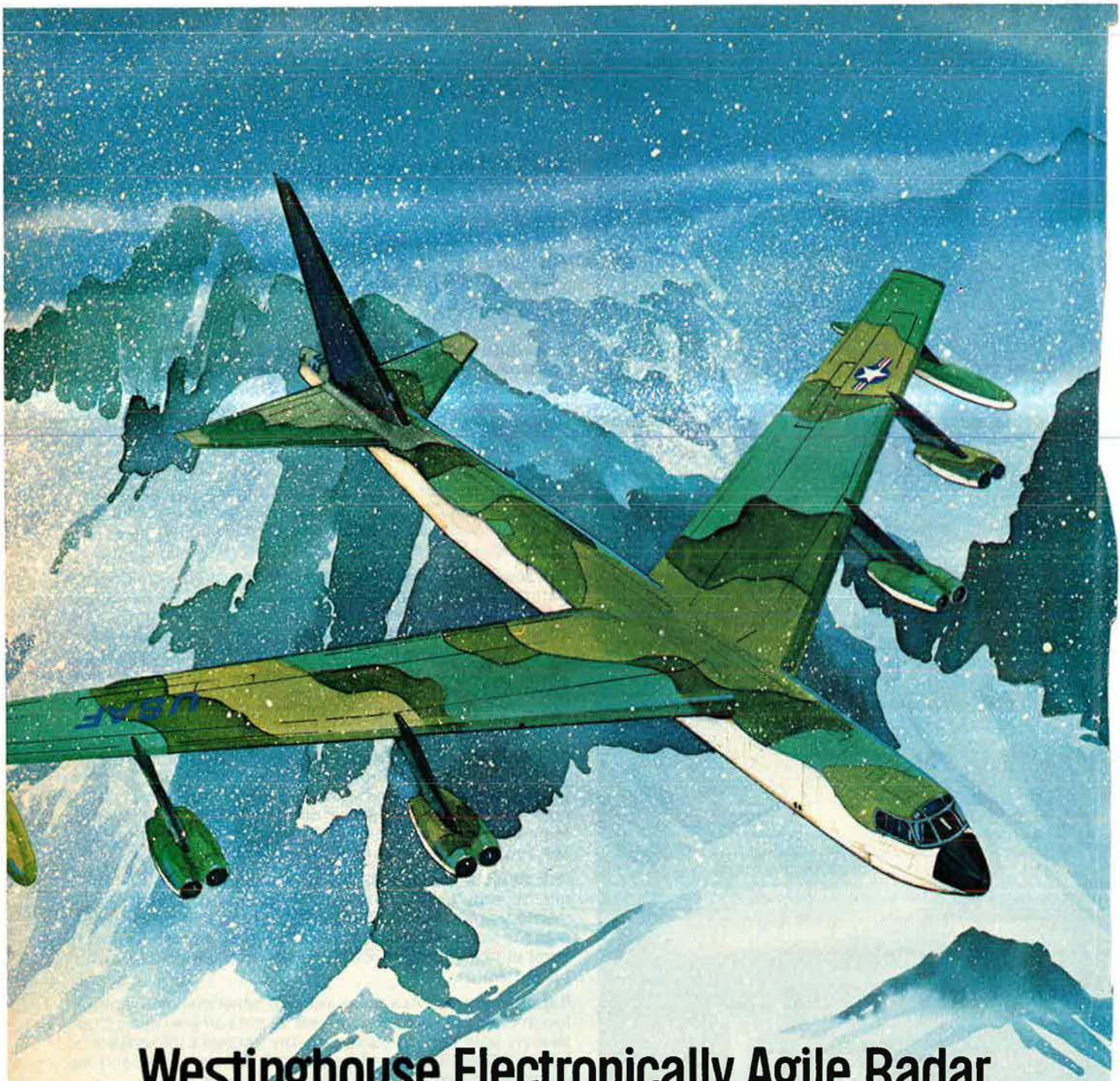

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The continuing, across-the-board modernization of the Soviet Union's offensive strategic capabilities could soon place at risk this nation's ability to deter nuclear war. How the Strategic Air Command is adjusting its concepts of deterrence is detailed in . . .

A STRATEGIC BLUEPRINT FOR THE '80s

BY EDGAR ULSAMER, SENIOR EDITOR

SAC's Commander in Chief, Gen. Richard H. Ellis, strongly supports MX.

THE Strategic Air Command (SAC), with grim professionalism, is picking up the pieces of a planned force structure and a doctrine shattered by cancellation of the B-1 bomber and deferral of a survivably based modern ICBM, the MX. Central to SAC's current readjustment is the role of the air-launched cruise missile (ALCM) and its ability to fill, at least temporarily, these critical voids.

SAC's Commander in Chief, Gen. Richard H. Ellis, who tends to let chips fall where they may, views the first-generation cruise missile as neither omnipotent nor impotent, but as the nucleus of a technology whose long-term potential is great yet conditional. Refusing to treat ALCMs as anything more than stilts that can stretch but not replace the air-breathing leg of the strategic triad, he is apprehensive about two contingencies that could "hurt and limit this system." One threat to ALCM—beyond US control and probably inexorable—is the increased reach of Soviet air defenses. "Being the kind of defensively oriented nation the Soviet Union is, we can be certain that it will bend every effort to counter these weapons. Moreover, we must expect the Soviets to go not only after the cruise missile itself with dense point defenses but to zero in also on the carriers," General Ellis fears.

The other factor that could affect ALCM's viability—and that *could* be

Boeing's version of the air-launched cruise missile, shown here in an early test configuration, will enter into a competitive flyoff with General Dynamics' missile.

controlled by the US—is SALT II, specifically, cruise missile range limitations sought by the Soviet negotiators in Geneva as part of the proposed accord's protocol section. (Congressman Richard H. Ichord [D-Mo.] commented during recent House Armed Services Committee hearings that the decision to limit ALCM's range at SALT II "is sheer idiocy" and that it was driving him "up the wall.")

Warning against dropping to range limits below those needed to cover potential target complexes, General Ellis cautioned against handicapping from the outset a major, new weapon system "by limiting its target coverage even before the Soviets have started extending the reach of their defenses against it."

General Dynamics' Tomahawk cruise missile is shown being launched by a B-52 in this artist's conception. ALCM is to reach IOC late in 1982.

SAC's Commander in Chief also expressed concern whether cruise missile range limitations—ostensibly applicable only to the three-year protocol and not to the remaining five years of the eight-year SALT II treaty—would be lifted on expiration of the initial three-year prohibition against building and testing ALCMs with ranges greater than 2,500 kilometers (about 1,500 miles): "Historically, it's always been extremely difficult, if not impossible, to turn around such commitments."

Extension of the Soviet air defense perimeter out to sea, "in the sense of the old picket ships," could become an acute threat to US ALCMs and probably would involve ship-based, advanced SA-10 surface-to-air missiles (SAMs). Such systems, supported and protected by the growing might of the Soviet Navy, could extend the reach of Soviet air defenses many hundreds of miles out to sea and be directed at the most vulnerable component of ALCM, the carrier aircraft. Additionally, "we have every reason to believe that the Soviets are working on new, more efficient versions of their AWACS, just as we know that they are developing look-down, shoot-down systems. It is just a matter of time before the Soviets deploy operational systems of this type" and thus achieve a layered, multiple defense capability against US cruise missile systems, according to General Ellis.

There is evidence also that the ALCM's radar cross section (RCS) is not as ideal as it was cracked up to be initially. USAF witnesses have informed congressional committees that while frontal radar returns are very poor and prevent easy detectibility, that is not true for the ninety-degree quadrant (lateral views) where they bloom out into strong signatures, mainly as a result of the missile's aerodynamic features. The relatively low subsonic speed and lack of evasive maneuver capability of the first-generation ALCM as well as the demonstrated low-altitude intercept capability of the Soviet Union's new SA-10 system suggest the potential for significant ALCM vulnerabilities.

SAC, at the same time, views with considerable concern the possibility of an intensive Soviet cruise missile development and deployment program. Such an eventuality—rated very probable by General Ellis—could cause the US cruise missile initiative to boomerang. "While the Soviets have a beautiful strategic option in Backfire [their supersonic strategic bomber], they have an even better one in ALCM. The absence of US air defense coupled with the fact that Soviet cruise missiles need not penetrate deeply to reach vital target areas in the US seems to provide Russia with strong incentives to deploy such weapons. We thus may have opened a Pandora's box with the cruise missile," General Ellis suggested.

SAC's Plan for ALCM

When ALCM reaches its Initial Operational Capability (IOC) late in 1982, it will be carried by a squadron of B-52Gs. At congressional insistence, the Administration recently dropped its tortuously reasoned claim that a "limited operational capability" would be reached in 1981 with the deployment of a single ALCM launcher. How ALCM will be mixed with other nuclear munitions carried by SAC's B-52G force is under intensive study and might well be affected by yet-to-be-defined counting rules of SALT II. Involved here is a possible trade-off between Soviet commitment to halt further *fractionation* of its ICBM payload, meaning Moscow would desist from putting still more warheads on each of its MIRVed ICBMs in exchange for the US limiting the number of ALCMs carried by each US carrier. Such a limitation could be attractive to the US in light of the Soviets' great lead in ICBM throw-weight—at least six times the US total—which provides them an enormous potential for outdistancing the aggregate of warheads deployed by this country's ICBM force.

In order to retain the penetration capability of ALCM-carrying B-52s, General Ellis, at least initially, prefers to hold each of the 151 B-52Gs earmarked to carry cruise missiles to twelve ALCMs, rather than carry twenty cruise missiles as suggested

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To handle its growing communications traffic, NASA would have had to build new, higher-frequency ground stations around the world. Capital, operating, and logistics costs would have been much higher than the cost of the TDRSS satellite system. Furthermore, TDRSS offers significantly greater orbital coverage than the coverage currently provided by a ground network.

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by the Defense Department. "If we were to put twenty ALCMs on each of the B-52Gs, we, in effect, would remove 151 B-52s from our penetrating force. SAC's preference, therefore, is not to so load down these aircraft initially with a full complement of ALCMs—twelve of which we would have to carry on the wing —that we can no longer penetrate enemy airspace," according to General Ellis.

A better alternative might be to carry ALCMs only externally, with SRAMs and gravity weapons inside, at least "until the critical mid-1980s [when the ICBM force's vulnerability is expected to peak, while modernization of the SLBMs will cause temporary numerical deficiencies] and thus preserve the B-52s' ability to penetrate with SRAM and gravity weapons after firing the ALCMs," he added. Modification of the B-52Gs to the ALCM carrier role would take until that time at any rate. "If by then we conclude on the basis of up-to-date experience that these aircraft should be used in an all-ALCM-carrier configuration, we would have that option," General Ellis said.

The notion of giving up on manned penetration is anathema to SAC. "We firmly believe that we should not give the Soviets a free ride on any aspect of our offensive capabilities. Every ruble they spend on defense won't be spent on offensive weapons. If we gave up penetrating bombers and instead relied on ALCM, we definitely would simplify their defensive problem," SAC's CINC pointed out. But while the Command prefers that the initial ALCM carriers also be capable of penetration, it favors the eventual augmentation of such a force with pure cruise missile carriers. "What we are looking for here is volume so that we can carry a large number of ALCMs. Equally important, we believe, is good survivability, extending from the carrier's ground basing to its recovery and reuse following launch of its ALCMs," General Ellis said.

The Air Force Systems Command in May of this year awarded several study contracts for the Concept System Definition phase of the USAF Cruise Missile Carrier Aircraft (CMCA) program. Three contractors—the Boeing Co., McDonnell Douglas Corp., and Lockheed Aircraft Corp.—are studying the potential of several aircraft for the CMCA role. The aircraft involved are four wide-body transports, the 747, the DC-10, the L-1011, and the C-5, as well as Boeing's YC-14 and McDonnell Douglas's YC-15, Advanced Short Takeoff and Landing Transport (AMST) prototypes.

SAC found that each of the several cruise missile carrier proposals submitted by industry "would provide some but not all the benefits we seek for this system," according to General Ellis. A key requirement for CMCA is the ability to maintain an extremely high alert rate. Large pure ALCM carriers lend themselves to high alert rates because "they are not all that demanding in terms of flying skill. Most of the training, we think, can be done on simulators, and this helps us boost alert rates, of course," General Ellis reported. Another crucial trait—fast, ganged engine starts—is harder to come by. "It takes quite a while to wind up the engines of wide-body transports, but they offset that disadvantage to a degree because they offer us so much volume that they can carry between sixty and eighty ALCMs per carrier."

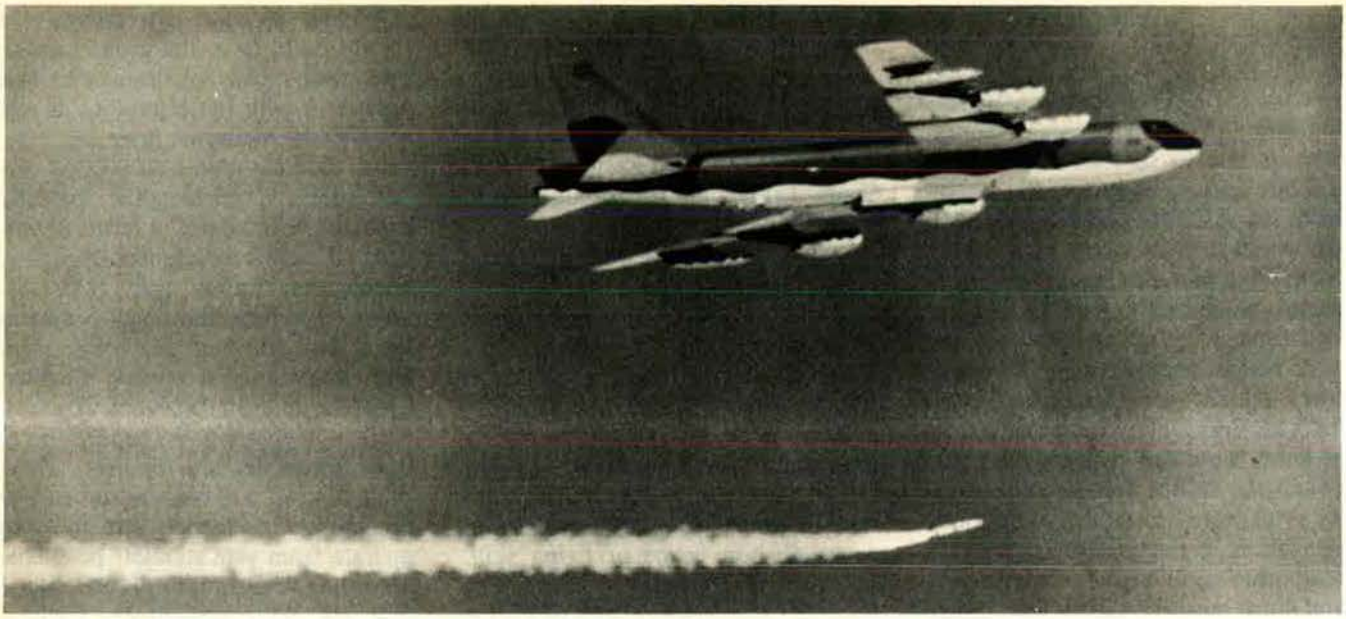
AMST, in contrast, offers great survivability because it would have access to several thousand dispersed airfields in the US. But an AMST carrier would drive up operating costs and be limited both in range and payload. A system dependent on many satellite bases obviously would be more expensive to operate than one involving only a few main bases. Further, SAC's analyses suggest that high alert rates and fast escape would be harder to attain in case of an AMST-derivative, located on dispersed sites, than for a wide-body aircraft operating from main bases. (A senior Defense Department official recently told this reporter that present plans call for the full prototype development and testing of one winning design from each category. This procedure, he said, will enable the Air Force to assess—with the help of flying hardware—the merits and drawbacks of both an AMST and a wide-body transport-derived CMCA.)

While pointing out that CMCA studies are still in progress, General Ellis told AIR FORCE Magazine, "It is obvious already that if we want a truly efficient system—one that is least burdened by the disadvantages exhibited by the derivatives—we should build from the ground up an optimized cruise missile carrier and provide it with the capability to add self-defense weapons later on." Because such an optimized ALCM carrier needs considerable payload capacity, particularly in terms of volume, it seems precluded from any serious penetration role. SAC believes, therefore, that such a system must be operated in conjunction with penetrating bombers. Further, CMCAs, like SLBM-launching submarines, represent extremely lucrative targets for the Soviets. Thus, these aircraft will require some form of external protection and need to operate from safe standoff positions, according to General Ellis. He added that for the near future, forward basing of strategic weapons is probably politically intolerable, thus confining CMCAs to bases on US territory.

Toward Improved ALCMs?

Congressional experts, concerned over what they consider excessive reliance by the Defense Department on ALCM, are pressuring the Administration to consider accelerated development of improved models of this weapon. A principal objective is to add a supersonic dash capability for more reliable penetration of terminal defenses. A number of schemes for such a supersonic stage are under study by the Defense Department and the Air Force, including an ALCM/SRAM combination. SAC's Commander in Chief expressed reservations about such an approach on grounds that a hybrid weapon might become unduly complex and expensive.

Two different technologies offer more cost-effective routes to improved penetrability, according to General Ellis. The first, which he rates as the front-runner, is the USAF ASALM—for Advanced Strategic Air-Launched Missile, an integral rocket ramjet—because "this technology offers us so many advantages, not just for the air-to-ground but also for the air-to-air roles." Two major ASALM projects are under way. The propulsion technology validation program involves building and flight testing the two propulsion components—a rocket motor that initially drives the weapon up to the super-



Above: A Strategic Air Command B-52 launches a Short-Range Attack Missile (SRAM). Left: The B-52 can carry up to twenty SRAMs on wing pylons and in a rotary launcher.

sonic velocity where a ramjet can begin to function, and the ramjet that then propels the weapon at several times the speed of sound.

The second ASALM program element pivots on integration of all ASALM-related technologies and involves a design and component prototype testing competition between McDonnell Douglas and Martin Marietta as the prime airframe contractors. The Air Force recently reported to Congress that "work is progressing satisfactorily, with the major technical challenges being ramjet insulation and guidance design."

Speeded up last year because of congressional pressures, the ASALM program could be accelerated further over the next two fiscal years if "slightly increased technical risk is acceptable," according to USAF testimony. Total RDT&E cost is estimated at about $900 million, the Air Force reported.

Extending the range of USAF's SRAM-A missile is the second means to improve penetrability. "We probably will be doing some work in this area very soon," General Ellis said. "SRAM is the one weapon against which no known defense exists, a fact the Soviets are quite aware of. We at SAC view SRAM as one of the most effective tools in our inventory and plan on a continuing mix of cruise missiles and SRAMs of one type or another."

SRAM's manufacturer, the Boeing Co., has proposed a longer-range version of this weapon, called the SRAM-L. The company claims that SRAM-L would have 160 percent of SRAM-A's low-level range—thought to be slightly more than 100 nautical miles—and three times its semiballistic range. It would be compatible with the enlarged rotary cruise missile launchers with which the ALCM-equipped B-52Gs are being retrofitted. SRAM-L is the standard missile mated with a second booster. The second booster stage could be fitted to SRAM-A in the field. SRAM, in a generic sense, does not count under present and proposed SALT rules. USAF and Defense Department studies indicate that SRAMs with even greater range could be designed.

Keeping the Penetrator Option Alive

"I look upon the B-1 as a near-term and the FB-111H as a mid-term option for modernizing our strategic bomber force. SAC remains convinced that the country should keep both options viable," General Ellis said. Specifically, this boils down to continuing the B-1 program through its full research and development and flight test cycles and building and testing "a couple" of stretched FB-111s, he explained. The latter aircraft, as yet a paper airplane for which only $10 million is in the FY '79 Air Force budget request, was described earlier this year in congressional testimony by then-Chief of Staff Gen. David C. Jones as having "roughly half the capability of the

B-1 [and] not as big as the Backfire but in many respects as capable as the Backfire." Cost of a fleet of 165 FB-111Hs, he testified, would be about $5.3 billion in 1977 dollars. The proposed aircraft would "borrow" important B-1 technologies, especially in the propulsion and avionics areas.

Just as important as keeping these two options alive, according to General Ellis, is "to take today's technology—which is fifteen years ahead of the B-1's—to see what we can come up with in terms of a truly modern weapon."

While it is not yet clear what form such an advanced strategic bomber might take, it seems almost certain that "it would resemble neither the B-1 nor the B-70. We are not sure whether it should have supersonic capability or not, and we have not determined whether it should be optimized for low-level penetration. We do know that such an aircraft must be able to counter sensor detection of all kinds by exploiting the latest advances in ECM technologies," according to General Ellis.

An advanced strategic bomber would more than likely capitalize on "some promising new propulsion technologies" that are being explored by USAF. The SAC commander predicted that "in a year or two we'll be in position to offer some highly interesting, economically feasible proposals about a new strategic aircraft." SAC detects considerable public and congressional support of a modern manned penetrator, and "if we can come up with a concept that is economically reasonable, I think we can get the necessary backing," he suggested.

Left: Experimental transporter/launcher for MX at Boeing Developmental Center. Below: Artist's concept of MX horizontal shelter, one multiple-aim-point approach under study.

The Future of USAF's ICBMs

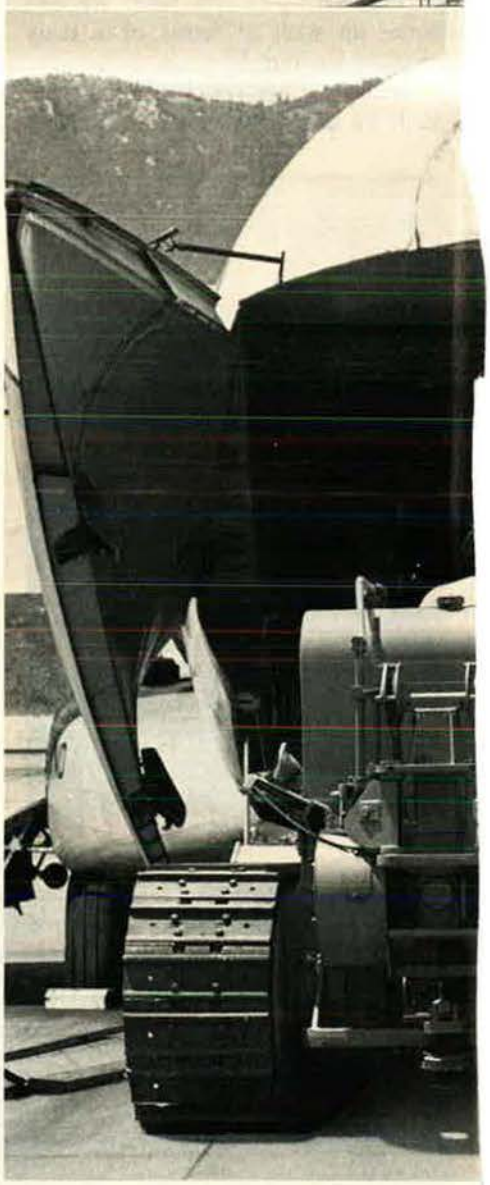
General Ellis, who also serves as Joint Chiefs of Staff Director of Strategic Target Planning, rejects as unsound and destabilizing the notion of some defense analysts that the present strategic triad should be abandoned in favor of an essentially sea-based strategic deterrent: "Over the past twenty years, we saw two legs of the triad slide from invulnerability to acknowledged degrees of vulnerability. In the case of the ICBMs, this happened because of things the Soviets have done; in the case of the bomber, we made vulnerability possible by an act of omission, namely not modernizing. I am convinced if the US were to turn its back on its ICBM force—thus allowing the Soviets to concentrate all-out on ASW [antisubmarine warfare] technologies against the fifteen or twenty Trident submarines [on station], they could solve the problem over time," General Ellis told AIR FORCE Magazine.

SAC's most pressing requirement is to assure the continued viability of the triad by assuring the survivability of the ICBM force. ICBM vulnerability stems from the fixed site basing of the Minuteman force: "If a certain number of warheads arrive with a certain accuracy, they will cause high attrition of silo-based missiles. Nobody argues that. Whether or not such an act represents a logical wartime decision is debatable, of course. Nevertheless, in the context of strategic nuclear forces, vulnerability of any key element of that force causes instability. Both the Defense Science Board and the Air Force Scientific Advisory Board, in preambles to their strategic studies, stress the categoric need for a survivable ICBM leg of the triad. My personal view is that proposals for different Minuteman basing would waste time and money and represent only a 'Band-Aid.' From the point of view of economics and resources, such an approach might preclude going after something that we want later on, namely MX," according to General Ellis.

SAC believes the long pole in the tent is the missile itself, which should be built first, "*before* we make up our mind about basing mode. We shouldn't trap ourselves into disqualifying one basing mode for technical reasons and then get disqualified on the one we picked because it might not be compatible with SALT, or for some other reason. SAC, therefore, will continue to make clear

The Lockheed

C-130 Hercules



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The C-141 StarLifter, with twice the capacity of Hercules, has ocean-spanning range and can carry up to 72,000 pounds of outsize cargo,

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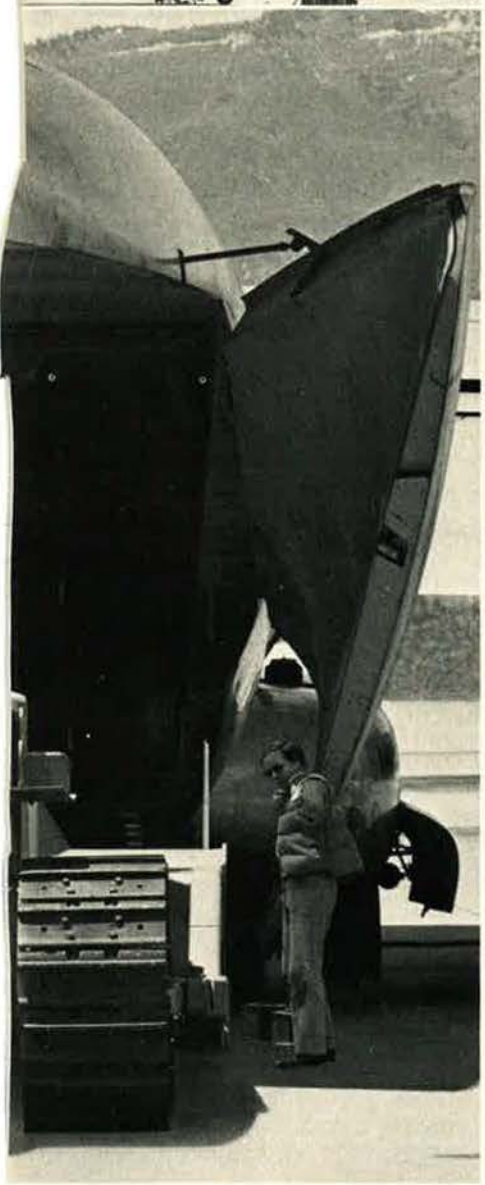
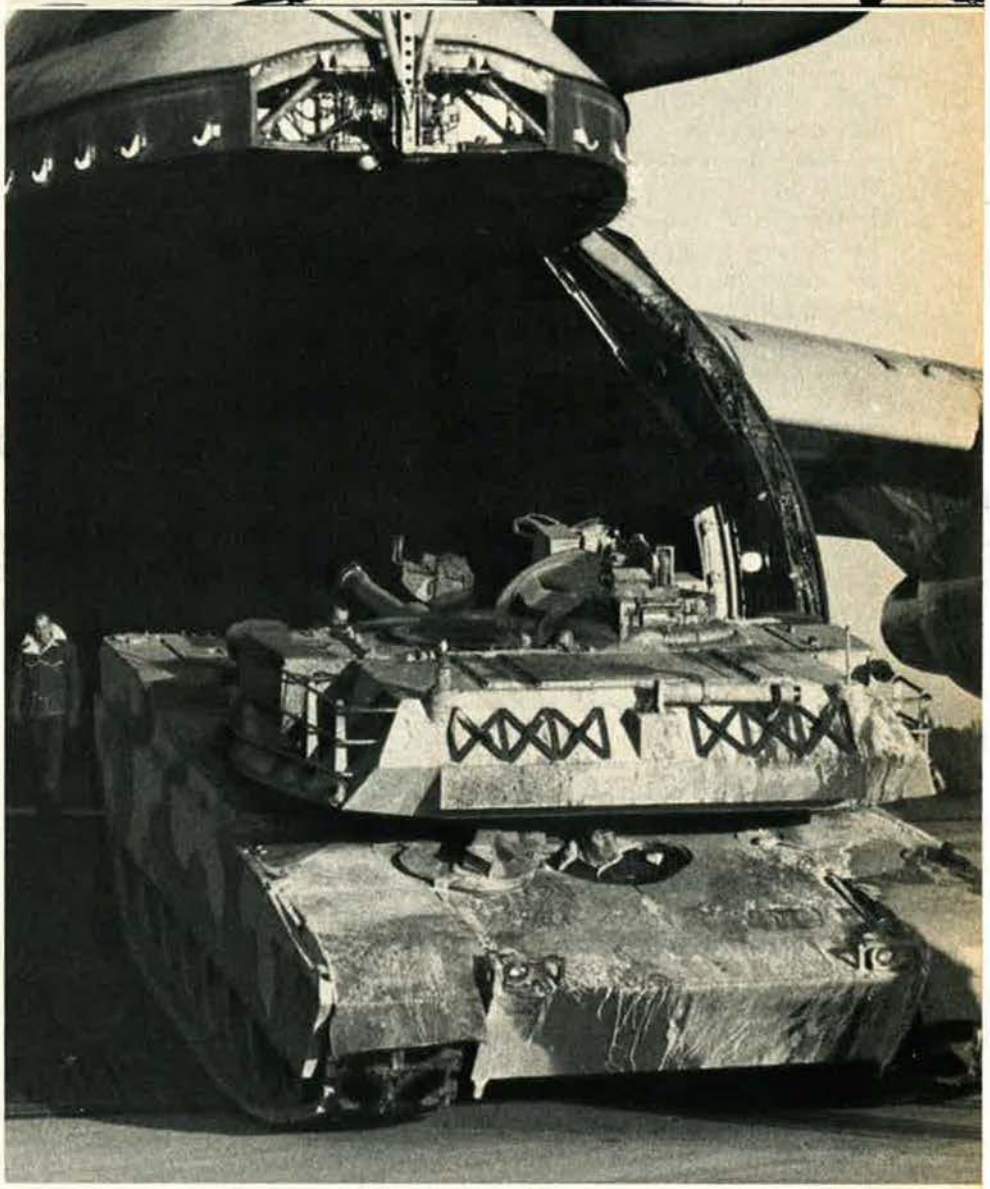
C-141 StarLifter



C-5 Galaxy



including vehicles as large as five-ton trucks.

The heavyweight is the C-5. In its 145-foot-long, 19-foot-wide cargo hold, it can pack 220,000 pounds of freight. And this drive-in can carry astonishing loads. Two 59-ton main battle tanks, for instance. That's airlifting.

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at every opportunity that we should keep our basing mode options open until we have started bending metal on the missile itself. Once we have reached that point, we can move toward a decision on basing in a timely fashion.

"Even if there were to be a lag between the availability of the missile and the basing mode—which is not very likely due to the greater lead time on MX—we temporarily could put the first few missiles into Minuteman silos. Obviously this is not a lasting solution, but would be useful because each MX that survives a Soviet attack represents several times the number of warheads carried by a Minuteman III. The big thing is to get started on MX now because, otherwise, I fear we will study this system to death," General Ellis said.

The Defense Department's desire to either build a common advanced ballistic missile for both the Navy and the Air Force or to build two versions of such a missile in order to reduce R&D and acquisition costs is not a new idea, General Ellis pointed out. DoD studies of such a hybrid system in 1974 and 1975 showed conclusively that unless both services used the same missile, there would be no saving over independent development of two separate missiles. Further, these studies concluded that building a common missile unavoidably compromises the capabilities and characteristics of the weapons sought by the two services.

The Navy, General Ellis said, because of its unique operational requirements, wants a different propellant than the Air Force, a different navigation system, and a different bus (post-boost vehicle) that would reduce the number of warheads the Air Force considers essential for its mission. "Obviously, such an approach would force both services to make major compromises that in SAC's view can only be justified if the resultant savings are major. Whether savings of this magnitude could be realized is not yet clear," General Ellis cautioned.

A senior Defense Department official told this reporter that if the Navy's D-5 ballistic missile were to be selected to serve also as the Air Force's MX, the difference in throw-weight—about 5,000 pounds for D-5 vs. about 7,850 pounds for the MX—would be taken into account. As a result, more D-5-derived MX missiles would have to be deployed than pure MXs to have the required aggregate number of reentry vehicles. The economics of such a boost in numbers becomes somewhat murky since either system would involve multiple aim point (MAP) basing. All the various MAP schemes under study entail "shell-game" techniques consisting of many more silos or other types of shelters than there are missiles. It follows that the larger number of D-5-type ICBMs would necessitate an increase in the number of costly shelters, which could soak up the savings realized through missile commonality.

Minuteman III ICBM, shown here during a test launch, is being considered for a multiple-aim-point role.

Substitution of the D-5 for USAF's MX could introduce significant drawbacks in what SAC lumps together under the term "economy of force," meaning the combination of accuracy and yield that can cope with the targeting task yet can get by with the least number of weapons and support facilities. The size of the proposed MX was influenced mainly by *economy of force* considerations, but also made allowance for splitting throw-weight between actual warheads and generous quantities of penetration aids to negate ballistic missile defenses.

Launch on Warning

There are three fundamental ways of reacting to strategic attack so far as the ICBM force is concerned. ICBMs can be launched once there is evidence that an attack is under way, which is referred to as Launch on Warning. Waiting until the first enemy warheads have gone off before launching is called Launch on Attack. Finally, of course, the National Command Authorities may decide to ride out the attack before responding. General Ellis emphasized that while the nation must retain the option to launch on warning or under attack, "we must not be driven toward that posture because it is our only option."

A force structure tailored exclusively to a launch-on-warning policy is of itself destabilizing and would be an open-ended invitation to the Soviets to probe for weaknesses in US resolve or ability to execute. Systemically, such a posture must

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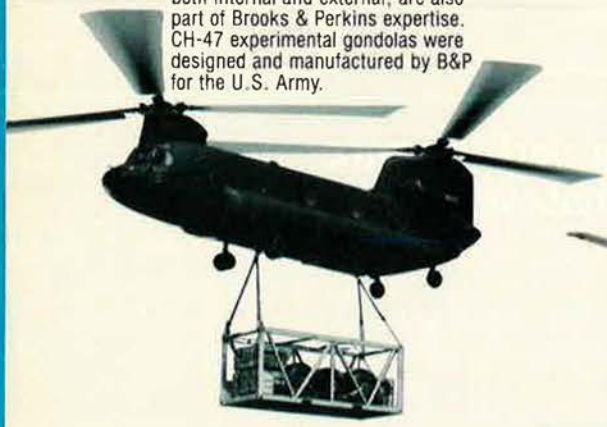
Brooks & Perkins has designed and produced the cargo handling system for the G-222, Aeritalia's STOL utility aircraft. This mock-up shows the dual rails with restraint locks and the roller conveyors.

Cargo handling systems and/or components by Brooks & Perkins are also in the C-141 Starlifter, C-5 Galaxy and deHavilland Buffalo. Recently, B&P has participated in the new USAF C-141B stretch program providing the cargo system fuselage plugs.

Helicopter cargo handling systems, both internal and external, are also part of Brooks & Perkins expertise. CH-47 experimental gondolas were designed and manufactured by B&P for the U.S. Army.



An internal dual-rail cargo handling system was developed and produced by B&P for the CH-53G (Germany) to increase cargo capacity and to provide rapid load/off-load capabilities. This system was recently demonstrated in a CH-53D for the U.S. Forces.

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have the ability to "acquire unambiguous threat information with our sensors, communicate that information to NORAD, assess that information, pass on these assessments to the NCA, have the NCA decide on appropriate action, and finally communicate the decision to the forces that must execute it. Disruption or failure of any of these technical or human links automatically means 'no go.'

"The awesome consequences of the decision to launch would seem to require absolute reliability and unambiguity of the information underlying it. With Soviet subs sitting off our coasts around the clock, the process of coming up with certain information on what the other side is about to do to us and completing this cycle of assessing, deciding, and executing the force, all within a few minutes, is asking a great deal from the system."

It is likely also that a US force pinioned by a "use or lose" straitjacket would invite the Soviet Union to concentrate maximal efforts on blinding the US command control and communications network—on which such a posture depends—or to generate "spurious signals" to compromise its reliability, General Ellis suggested.

Upgraded Reconnaissance and Tankers

SAC has three types of manned aircraft assigned to reconnaissance missions—the RC-135, U-2, and SR-71. "Each of these aircraft serves a very specific purpose and performs tasks that are beyond the capability of satellites, mainly because there's man in the loop. Also, it is possible to operate these systems in a way that induces the 'other fellow' to react in a way that tells us things we want to know. Again, this can't be done with satellites," General Ellis said. SAC's three recce aircraft need "some upgrading" through modification programs that are under study. Key areas involved are basic aircraft performance, sensor improvements, and the addition of advanced, real-time data links.

SAC's fleet of some 600 KC-135 tankers, according to present estimates, "will take us into the next century and provides us with a degree of flexibility—especially so far as the general-purpose force is concerned—that we probably won't be able to replace," according to General Ellis. Pointing out that optimal support of such weapon systems as tactical fighters, ALCM carriers, and penetrating bombers boils down to the availability of "lots of booms in lots of places," he said that USAF's new ATCA (advanced tanker/cargo aircraft—a modified McDonnell Douglas DC-10) is tailored toward long-haul support of tactical fighters and strategic airlift "but not a replacement of the KC-135." Plans to reengine the KC-135, presently powered by "obsolescent, noisy, inefficient engines," are under consideration by the Defense Department but because of the size of the fleet involve a heavy investment.

General Ellis is firmly committed to the basic need to pursue strategic arms limitation talks (SALT) with the Soviet Union: "But we must recognize that these negotiations are extremely difficult and will get even more complicated as we come down in numerical limits. Though we as a people tend to be impatient and want results quickly, we will have to practice patience on this crucial issue." ■

SAC's high-performance SR-71 reconnaissance aircraft, capable of operating at three times the speed of sound, is a candidate for upgrading.

ACT Ø1/182

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

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75TH ANNIVERSARY OF POWERED FLIGHT

AFA: A Unifying Element

BY THE HON. JOHN C. STETSON, SECRETARY OF THE AIR FORCE

THERE is no question that our national defense is a joint effort between citizens in and out of uniform. That has always been true —and always will be. Military manpower, the jets, the guns, the tanks are the most visible elements. But national will, natural resources, industrial capacity, technological skill, and a host of other factors combine to make and keep a nation strong.

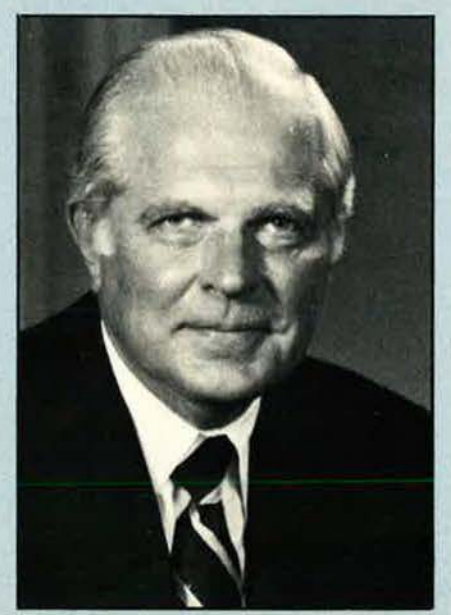
For more than three decades, the Air Force Association has provided an important link between the Air Force and the civilian community. AFA has raised issues, stimulated discussion, increased interest, and created awareness. As a result, the Air Force is strong today, and so is our overall security.

However, there is no end in sight. The dialogue, the exchange, the understanding, the flow must continue. Americans must know, for example, that Soviet military spending has grown three to four percent, compounded each year, for the last ten years. Today, in real terms, they outspend us by from twenty-five to forty percent. Because of this commitment of resources, they have made rapid progress in missile and aircraft technology and are converting that technology into an unprecedented range of operational weapons at an unprecedented rate.

Americans should realize that this spending imbalance has moved us from clear military superiority over the Soviets to an equivalent balance of power. There is a difference. Soviet confidence is growing. It is clear they are beginning to reach out, to make their presence felt in many parts of the world. Should the balance of power shift further in their favor, we could well find our economic, political, and allied interests threatened worldwide.

At the same time, Americans should be assured that their military managers know the value of the funds allocated to defense—that we are striving to squeeze every ounce of capability from those resources. We have cut our manpower levels, reduced the number of major installations, and used the savings to reinforce our combat units. In our development of new aircraft systems, we are emphasizing cost as well as performance factors. "Design to Cost" and "Design to Life-Cycle Cost" are now common phrases that carry great weight.

Finally, Americans should know that the Air Force is not standing pat—that we are not wedded to the past, that we are cautiously innovating to meet a changing world. Our people are increasingly better educated and are given opportunities to use their skills. The training accent is on realism to make sure our people know what to expect should hostilities start.



We are continuing to modernize our force. The F-15 is the finest air-superiority weapon in the world and will meet any threat the Soviets can pose in the foreseeable future. The F-16 will complement the F-15 and also assume an important air-to-ground role. The A-10 is now bolstering our close-air-support force and will address the Soviet advantages in tanks and armored vehicles. The new KC-10A tanker/cargo aircraft will give us better responsiveness and flexibility in our mobility forces. We are developing a new ballistic missile—the MX—and we are working hard to perfect the cruise missile. We are modifying the B-52 to extend its operational life and studying alternatives for a follow-on manned penetrating bomber. In the more distant future, our systems may take off and land vertically, change their shapes in flight, or maneuver by vectored thrust. But the Air Force will be on the leading edge of technology—developing the systems we need, with the capabilities we can afford, to meet the demands of security.

We will be successful if that civilian and military partnership remains firm; if Americans understand, accept, and support a strong national defense; if the dialogue and exchange continue to flow.

The AFA has been a vital instrument of rapport and cooperation. I see no changes in the future. The Air Force will continue to need AFA's help in forging the civilian-military unity so vital to preserving our national security in the years ahead. ■

75TH ANNIVERSARY OF POWERED FLIGHT

Choice and Commitment

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

THE United States Air Force is fortunate to have the support of the Air Force Association and concerned citizens around the nation as we look to our country's security.

There are many problems today associated with defense. These problems are complex. They involve our foreign policy, our economic health, our response to Soviet power, and the many questions invoked by technological choices and program expenses.

Our problems will be solved, as they typically are, after discussion and debate by a concerned public. The issues *are* complex, and the greater the proportion of the public that understands and cares about them, the more likely we are to reach acceptable solutions.

The Air Force Association and this magazine serve an important role in providing the understanding and concern so essential in our democratic process to reasoned, reasonable progress.

The challenges we face include the preservation of our internal sources of strength.

The Air Force is an institution of people who have made a choice, and a commitment. The choice is to serve our country—not to be served by it. The commitment is to its defense. Our people are interested in useful, meaningful service, and they find satisfaction in doing a job that *must* be done and done well. Our Air Force men and women around the globe do their job very well, indeed. By almost any measure, their performance is exceptional—and they usually know it.

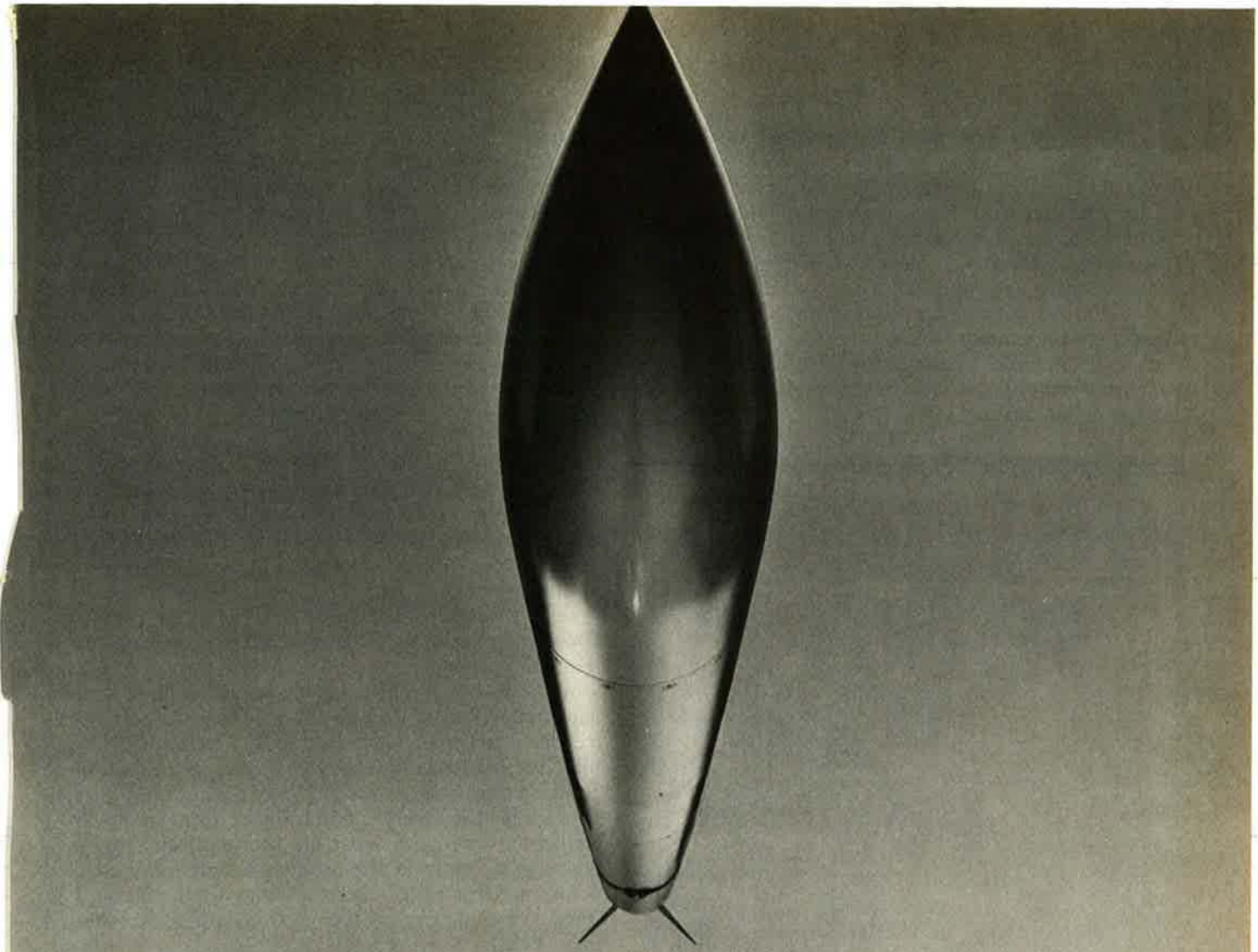
Among the values and attributes that distinguish our military forces, moral courage is a prime aspect of character. Their physical courage, which is tested occasionally and seldom found wanting, rests on a foundation of moral courage that is tested frequently. Its strength is evident in the willingness to stand a bit apart in terms of discipline and dress, to accept an institutional code of special standards. It is also evident in times like those during the Vietnam War, when our people held to duty in the face of difficult personal trial and social doubt.

We ask a lot of them. They don't ask that much in return—just a few essentials:

- The assurance that they are doing what the country needs and wants.

- The belief that they are part of a defense effort that promises continuing success; that the government and the people will provide for military forces with the strength to fight on reasonable terms when called upon.
- The knowledge that they, as individuals, are part of a team with a good record and important day-by-day tasks and goals.
- Leadership they can trust and respect.
- A reasonable standard of living, made up in part by the rewards of our "Air Force quality of life."

You, the readers, can help to keep the qualities we need in our Air Force men and women by continuing to recognize the significance of their choice, the value of their service, and the enviable standard of their achievement. Confidence in capabilities is one of the most powerful sources of individual combat readiness. Self-esteem, supported by public esteem, is another. We are grateful to the Air Force Association and our many other civilian friends, in and outside of government, for doing so much to foster both in the United States Air Force. ■



AMRAAM

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

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

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

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

NORTHROP

Making advanced technology work.

REFLECTIONS ON SEVENTY-FIVE YEARS OF POWERED FLIGHT

BY EDWARDS PARK
Illustrations by Jack Pardue

THE picture hung over the fireplace in the living room of our house in New Hampshire. It wasn't a notable work of art, just a print of unremarkable quality, but I would stare at it dreamily while being read aloud to or during those moments of hesitation that always followed the parental command to do some dull thing like pick up toys or go to bed. I remember it well.

The picture showed a woman working in a field with some primitive farm implement—a wooden hay rake, I think. She was looking up from her peasant labors at an airplane flying serenely far above. I wasn't too young to sense that the aircraft had taken a high and mighty leap away from the ordinary. The picture provided my earliest concept of human flight, and it was a concept of a sort of superlife, a special existence above and beyond the drudgery that lurked on land. I knew nothing about that drudgery, mind you. Life to me at that time was an absorbing adventure. But I suspected that somewhere there were people raking hay, and I felt that flying over them was a lot better than joining them.

The plane in the picture was probably a Wright model of about 1909. I don't base this on any hard fact, just a feeling I had when I used to walk under that same model on the way to my office at the Smithsonian Institution. The aircraft has now been moved to the new National Air and Space Museum, and you can look at it yourself. It has Signal Corps insignia on the rudders, and the fabric under the engine is stained from some mysterious oil leak that still apparently troubles it after nearly seventy years. The plane in the picture was too far away to show either of those two features, but I'm satisfied that I've got it pinned down.

Being an imaginative little boy, I retained that concept of superliving and reinforced it every time I saw a plane. That was not too often. We did not live in the Midwest where the fields were flat and the post-World War I barnstormers, including Captain Lindbergh, were doing their stuff. We lived in rocky, hilly New England. When a plane ventured over our terrain, it flew high and straight. Yet the sound of a Liberty engine—a Doppler effect going down the scale, then back up—would bring us all outdoors to stare up at the distant, purposeful Jenny.

We spent part of the year in the heart of Boston. On weekends we would take the ferry across to Revere and then a streetcar to the airfield. And there were the Jennys close at hand, awkward as buzzards on their narrow landing gear, but making that leap into the other life and turning graceful whenever someone came up with five dollars for a ride around the field.

Some of the Jennys had Army markings. But it was far more exciting to see an occasional Curtiss Hawk or Curtiss Falcon—the latter a two-seater—yammering overhead with their gold wings, struts whistling, wooden props slapping back the sound waves as their pilots reached for 150 indicated. These were real warplanes. They carried machine guns that fired through the propeller, and they were even better than the Spads and Nieuports and Sopwiths and Fokkers that were part of every small boy's reservoir of dreams.

We knew the names of heroes as well as planes: Richthofen, Fonck, Rickenbacker, Brown. And we began to hear new names as the notion of a transatlantic flight filled the headlines. I remember crowding the seawall of Boston's Esplanade to watch a gray biplane with a single float circle the Charles River Basin, then land with a feather of spray. An inflatable rubber dinghy was produced, blew away in the prop wash, was retrieved, and finally accommodated the glamorous Cmdr. Richard E. Byrd to a landing at the foot of Beacon Hill. We cheered and waved.

Nungesser and Coli took off in their white Levasseur and vanished. They were trying to cross the hard way, from Paris to New York against the prevailing westerlies. Their disappearance sobered us kids. Obviously, flying could be pretty mean even for a couple of French aces. So when young Lindbergh came out of nowhere with a single-engine plane, we didn't give him much of a chance. We liked him, though, and hoped for a miracle, and on a May afternoon in 1927 when bells began ringing and whistles blowing and one of my older brothers said he guessed Lindbergh had made it, I felt that justice had been done, the underdog had triumphed, and there was hope for all unheralded youth.

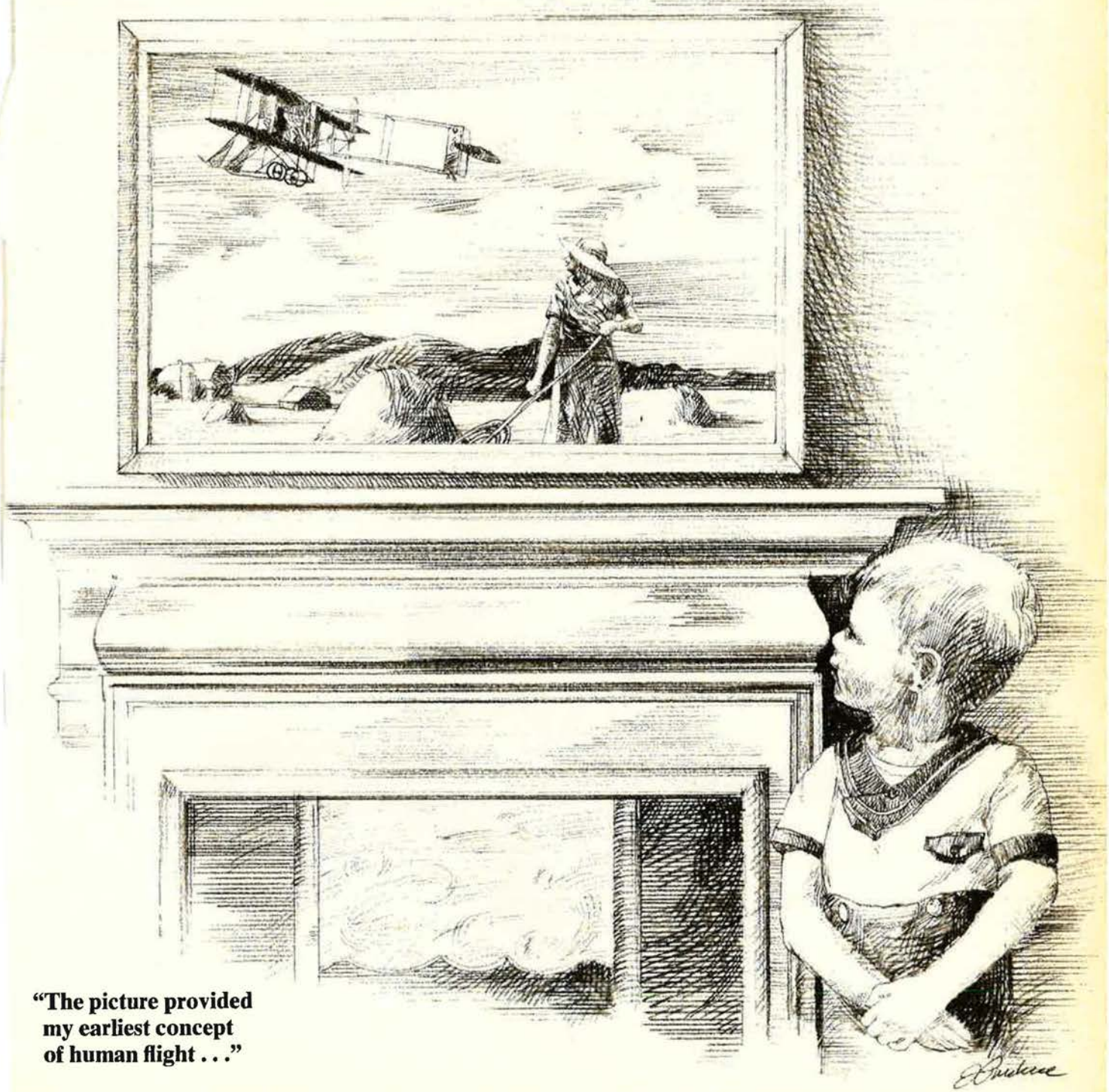
My job today allows me to touch base with some of the great planes of that era, either on display at the National Air and Space Museum or being restored at the Smithsonian's facility at Silver Hill, Md. The *Spirit of St. Louis,* of course, is still apparently in flight, hanging from the ceiling of the great central hall of the museum—the Milestones of Flight gallery. It looks as if it were just flaring for its landing at Le Bourget.

When the *Spirit* was hanging in the old Arts and Industries Building, before its new home was built, Charles Lindbergh would sometimes come and visit it. The curators found a secluded corner of a gallery, closed to the public, where he could look right into his cabin and no one would notice him except perhaps to see a tall figure beside a potted palm, staring at the old plane.

Paul Garber, the Smithsonian's flight historian emeritus, tells of Lindbergh dropping by one evening after visiting hours with the request that he be allowed to climb into the plane's cabin and check some pencil markings that he had made during his historic flight. They showed fuel levels on the old tubular gas gauge at various hours, and since Lindbergh was writing about fuel consumption in his book, *The Spirit of St. Louis*, he needed the recorded facts.

Garber got him a ladder and then sat down and waited for him to emerge from the cabin. He stayed for quite a time, and Garber began to think of other things, there in the great empty building. And then a voice said, "I'm all set, now," and Garber looked up with a start to see the *Spirit of St. Louis* swaying slightly and its pilot peering down from the cabin window. Weird.

I still drop in to look at the old Fokker T-2, the first plane to cross the United States nonstop—it has a strange, boxy fuselage with distinctive oval portholes—and the Douglas World Cruiser, which went around the world in 1924. And I save an admiring moment for the Curtiss racer, the float version, that looks so sleek and modern for its time. It reminds me of the long discussions I would have with my schoolmates about the Thompson Cup air races, about the glamorous Roscoe Turner and his pet lion, Gilmore, about whether the formidable little *Gee Bee* that Jimmy Doolittle flew was a "pilot beater," him sitting practically under the fin.



"The picture provided my earliest concept of human flight . . ."

Edwards Park was born in Boston, educated at Yale, and flew P-39s and P-47s in the Pacific during World War II. His P-39 experiences are recounted in a delightful small book, Nanette, *published last year by W. W. Norton. After the war, he spent five years in Australia as a journalist, married an Australian girl, then returned to the States to work on the* Boston Globe, *followed by several years with* National Geographic *Magazine. Mr. Park now is an editor of* Smithsonian *Magazine.*

I had finally gotten a flight when I was twelve. My sister was being courted—successfully, it turned out—by a young man who helped build Keystone bombers down in Pennsylvania and who owned a Waco 10. Partly to further his cause and partly because he enjoyed doing this sort of thing, he drove me to Lake Winnepesaukee and introduced me to a fellow pilot who flew people around in a float plane. We crammed into an open double cockpit in front, and for ten minutes I knew a kind of bliss that left me a little drunk and strongly addicted. What a first flight! Smooth air, crystal-clear mountain scenery, an open cockpit that put you right in the environment, feeling on your face the cool air layer at 2,000 feet, savoring the intoxicating whiff of exhaust in the slipstream, clearly sensing the lift of the fabric wings, the tug of the propeller. I never had much trouble, years later, learning about theory of flight. I'd seen it first-hand, the first time.

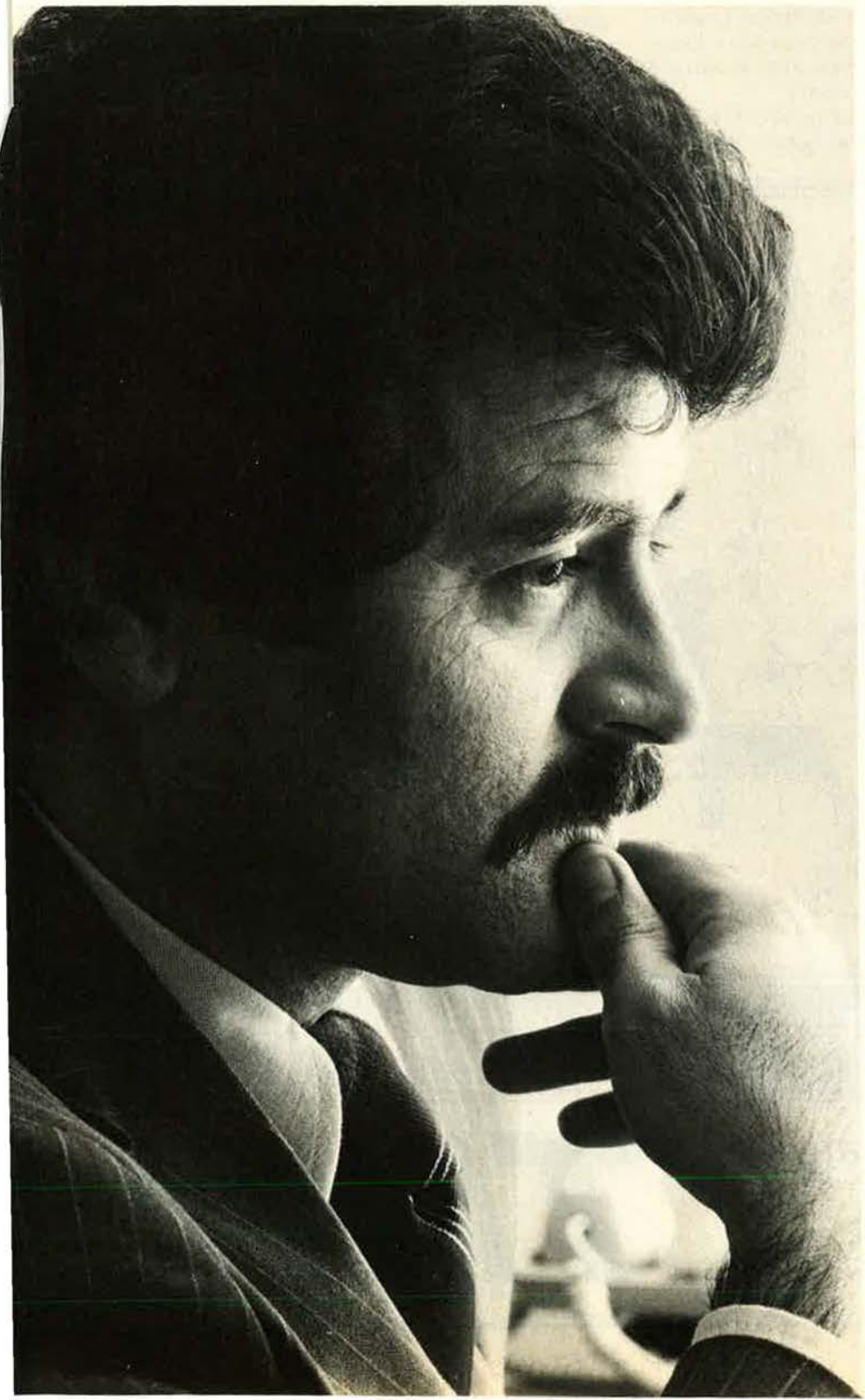
Throughout my teens I gravitated to airports whenever I could, sometimes with enough money to buy another ride. My fellow addicts and I saw the Acronca arrive, big, broad wings, narrow landing gear, and a little low-slung fuselage just right for a lad of fifteen to wriggle into. We all wanted one. We saw the Taylorcraft, and soon found ourselves talking about Cubs.

Military aviation in this country inched forward on the money that Congress begrudgingly appropriated. I remember the thrill of seeing a long, wavering echelon of P-26s on the newsreel. A low-wing monoplane! It seemed a marvelously exciting departure from the military tradition of biplanes. I felt a small, niggling itch to become a pursuit pilot some day, to sit in that cockpit, goggled and helmeted, white scarf streaming aft.

Curiously, I never saw a P-26 except in the newsreels until the Smithsonian displayed one, beautifully restored, when the National Air and Space Museum opened in 1976. The northeastern United States was not endowed with much military air activity because the weather wasn't as hospitable to those open-cockpit heroes as that in Texas or California.

"Overhead came three Hurricanes in a 'V,' tucking their wheels up under them."

Jim Frazier put over 150,000 businesses in touch with government.



A government agency planned on sending out questionnaires to business.

But the questionnaires were long and involved, and many respondents would obviously need help.

Jim Frazier, a Bell System Sales Supervisor to the Federal Government, recommended setting up an incoming WATS line—an 800 number—that 150,000 businesses could contact.

Then he suggested setting up outgoing WATS lines—so if businessmen couldn't be helped on the spot, they'd be called back.

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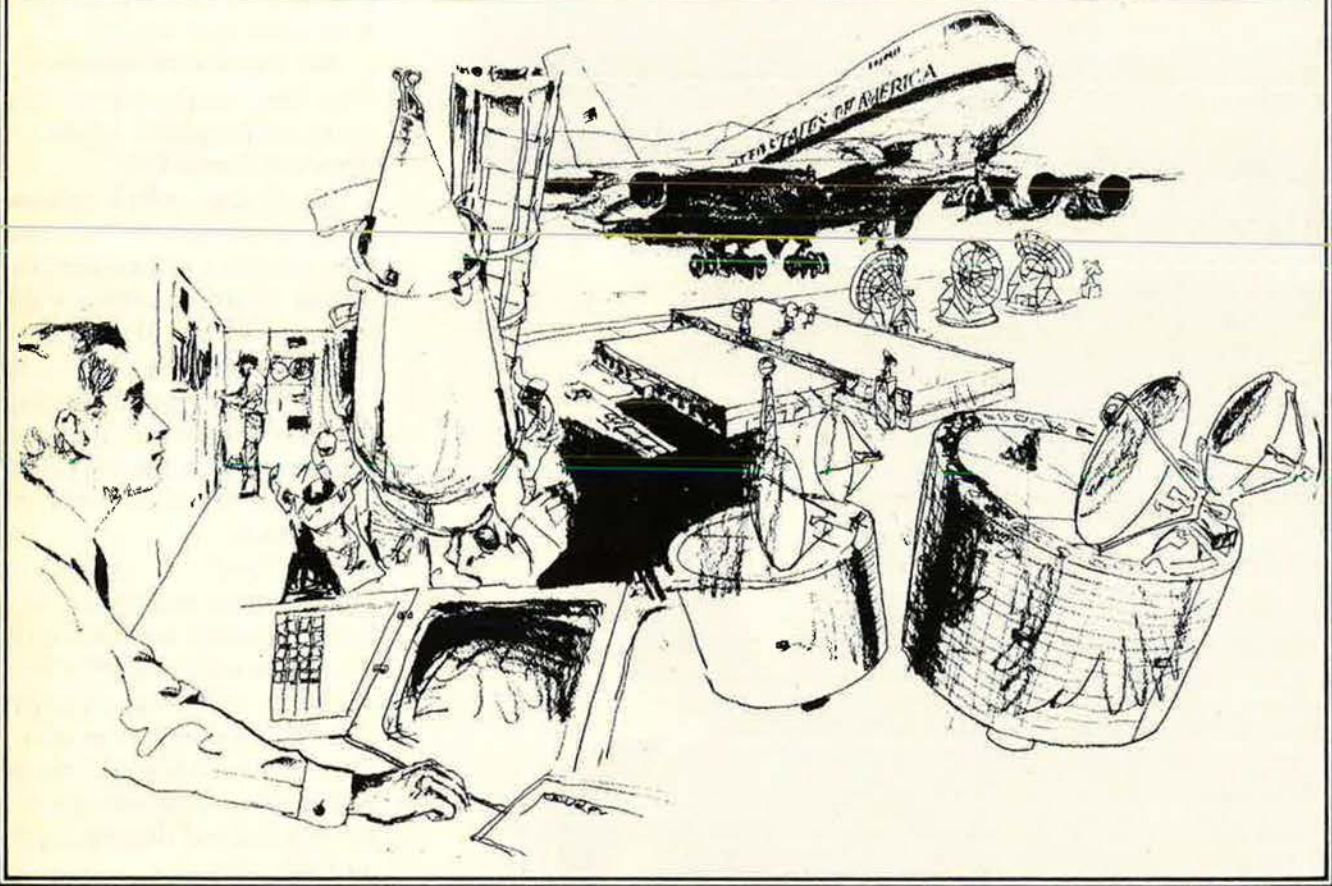

SYSTEMS SURVIVABILITY

from a company called **TRW**

Visiting England in 1938, I was pedaling my Raleigh past an RAF airfield when a sudden, vicious snarl of power almost sent me into the hedgerow. Overhead came three Hurricanes in a "V," tucking their wheels up under them. I looked at them with awe. We had P-40s and P-39s operating in the States by then, but I'd never seen one. These were the first of what was then the modern generation of warplanes that had ever crossed my path.

World War II, of course, made us all sophisticated about aircraft in a very short time. As the Battle of Britain raged, my friends and I talked knowingly about Hurricanes and Spitfires and Me-109s and -110s and Heinkels and Stukas. We were entranced by tight-lipped British understatement and imitated RAF pilots at every opportunity. We felt fairly certain that we would be involved eventually in the war. We might worry about this in the lonely reaches of the night, but at our parties—and there seemed to be an awful lot of parties back then—we bolstered ourselves with what we considered hilarious banter about how frightened we were at the prospect of combat. We successfully adopted the RAF technique of revealing bravery by bragging about cowardice.

As it happened, all six of us close friends did fly during the war. Two were killed.

The Army Air Corps put me in a Stearman PT-17 in Helena, Ark., and for those months of primary training I was able to recapture much of the delight of that first flight over Lake Winnepesaukee. I was in an open biplane again, head out in the air, able to feel on my face the very environment that was holding me up, to shiver deep within my fleece-lined jacket at its winter chill, to sniff the smells of early spring rising from a sun-warmed patch of plowed earth.

Beside the Mississippi, one farmer was plowing his cotton field with a mule, striping the greening soil moistly brown as though stroking it with a coarse brush. I chose this man as the audience for my solo acrobatics. Perhaps I thought his life needed some brightening, and I could at least supply him with laughter. So I would sail over him at 3,000 feet or so and then try my awkward loops and Immelmanns and split Ss and slow rolls and spins. It must have been pretty for him—that blue-and-gold biplane twisting and cavorting and whining far above him. I don't believe he appreciated the fact that every day I was a little better. I do know that sometimes he would halt the mule to watch, and I took that as his applause.

One day the field was all done, the fresh brown paint strokes completely covering it. I remember it because I was finished, too. I had mastered that glorious plane and would be leaving for basic training in a day or two. I was sorry to say good-bye to my field, mostly because I knew that from now on I would be cooped up in a closed cockpit, working as though in an office at new problems of flaps and wheels and prop pitch and radio.

So for three years I became a professional pilot. I flew the best fighters we could get in New Guinea (they weren't much at first), and I talked and thought flying almost all the time. I struggled against fear and for survival. When Lindbergh held a briefing session for my group to tell us how to get extra long range out of a Pratt & Whitney engine, I realized, with astonishment, that I had become part of the pattern of aviation. It was forty years old then, and I had barely scuffed its surface, but aviation is as open-handed and cordial as it is young. The mystique is not solely the province of priests; it's discussed endlessly and often very knowledgeably by the rawest laity. It is sort of a tradition that the true priesthood shares its secrets openly and generously with all who request them. Aviation is still in the evangelistic stage. Everyone who flies tries to convince everyone who doesn't that here lies Ultimate Truth.

I kept in touch with the ultimate truth only spasmodically after World War II, but recently I've returned to the fold, flying again as a student in order to learn the procedures that have changed and been added to the curriculum. The new little plane that I fly is superbly light on the controls. I am taught to stall it, but not to spin it. I am also taught a great deal of radio navigation, which I enjoy and appreciate. Best of all, when I do a cross-country on a lovely bright day and look down past my left wheel at the fields and woods and highways below, I find myself smiling with the same old delight.

So flying is three-quarters of a century old this year. And it's gone from Kitty Hawk to the moon, and I've only barely made its acquaintance. But when I slide across the countryside in that little Cessna, working out the problems of a cross-country with VOR, I wonder if somewhere below there may be a man plowing, or even a woman raking hay, who may pause and look up at me, momentarily free and clear in the superlife of 2,000 feet. ■

"I chose this man as the audience for my solo acrobatics"

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And then, two or three times faster than a helicopter, it speeds him back to safety. Or, it can stay out for more work with its extensive endurance — the TiltRotor uses about one-third the fuel.

The TiltRotor is adaptable for inflight refueling allowing rapid worldwide deployment. And it promises higher reliability and lower operating costs through longer TBO's.

Initial flight test and full scale wind tunnel tests have been completed so the TiltRotor is just around the corner. And it's just what the USAF will need for its combat rescue role.

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313th Air Div.
Brig. Gen. James R. Brown
Hq. Kadena AB, Okinawa

314th Air Div.
Maj. Gen. George A. Edwards, Jr.
Hq. Osan AB, South Korea

326th Air Div.
Col. Robert S. Johnson
Hq. Wheeler AFB, Hawaii

AAC
Alaskan Air Command

Lt. Gen. Winfield W. Scott, Jr.
Hq. Elmendorf AFB, Alaska

CMSgt. Richard P. E. Cook
Senior Enlisted Advisor, AAC

USAFSS
USAF Security Service

Maj. Gen. Kenneth D. Burns
Hq. Kelly AFB, Tex.

CMSgt. William C. Chapman
Senior Enlisted Advisor, USAFSS

The Major Commands
(Continued)

SAC
Strategic Air Command

Gen. Richard H. Ellis
Hq. Offutt AFB, Neb.

CMSgt. James M. McCoy
Senior Enlisted Advisor, SAC

8th Air Force
Lt. Gen. Edgar S. Harris, Jr.
Hq. Barksdale AFB, La.

19th Air Div.
Brig. Gen. Richard A. Burpee
Carswell AFB, Tex.

40th Air Div.
Brig. Gen. William E. Masterson
Wurtsmith AFB, Mich.

42d Air Div.
Brig. Gen. Louis C. Buckman
Blytheville AFB, Ark.

45th Air Div.
Brig. Gen. (selectee) Guy L. Hecker, Jr.
Pease AFB, N. H.

15th Air Force
Lt. Gen. Bryan M. Shotts
Hq. March AFB, Calif.

4th Air Div.
Brig. Gen. (selectee) John R. Lasater
F. E. Warren AFB, Wyo.

12th Air Div.
Brig. Gen. Dennis B. Sullivan
Dyess AFB, Tex.

14th Air Div.
Brig. Gen. Bill V. Brown
Beale AFB, Calif.

47th Air Div.
Brig. Gen. Irving B. Reed
Fairchild AFB, Wash.

57th Air Div.
Brig. Gen. Clyde H. Garner
Minot AFB, N. D.

1st Strategic Aerospace Div.
Maj. Gen. David L. Gray
Hq. Vandenberg AFB, Calif.

3d Air Div.
Maj. Gen. Andrew Pringle, Jr.
Andersen AFB, Guam

7th Air Div.
Brig. Gen. Jerome R. Barnes, Jr.
Ramstein AB, Germany

TAC
Tactical Air Command

Gen. Wilbur L. Creech
Hq. Langley AFB, Va.

CMSgt. Norman O. Gallion
Senior Enlisted Advisor, TAC

9th Air Force
Lt. Gen. Arnold W. Braswell
Hq. Shaw AFB, S. C.

12th Air Force
Lt. Gen. James V. Hartinger
Hq. Bergstrom AFB, Tex.

USAF Tactical Air Warfare Ctr.
Maj. Gen. (selectee) Gerald J. Carey, Jr.
Eglin AFB, Fla.

USAF Tactical Fighter Weapons Ctr.
Maj. Gen. James R. Hildreth
Nellis AFB, Nev.

US Southern Air Div.
Brig. Gen. Robert B. Tanguy
Albrook AFB, Canal Zone

USAFE
United States Air Forces in Europe

Gen. John W. Pauly
Hq. Ramstein AB, Germany

CMSgt. Sam E. Parish
Senior Enlisted Advisor, USAFE

3d Air Force
Maj. Gen. William C. Norris
Hq. RAF Mildenhall, England

16th Air Force
Lt. Gen. Devol Brett
Hq. Torrejon AB, Spain

17th Air Force
Maj. Gen. Walter D. Druen, Jr.
Hq. Sembach AB, Germany

USAF's Separate Operating Agencies

United States Air Force Academy
Hq. Colorado Springs, Colo.


Lt. Gen. K. L. Tallman, Superintendent


CMSgt. Elmer W. Wienecke, Senior Enlisted Advisor

Air Force Inspection and Safety Center
Hq. Norton AFB, Calif.


Maj. Gen. Robert W. Bazley, Commander


CMSgt. Philip A. Arvizo, Senior Enlisted Advisor

Air Force Test and Evaluation Center
Hq. Kirtland AFB, N. M.


Maj. Gen. Howard W. Leaf, Commander


CMSgt. Ralph V. McKeown, Senior Enlisted Advisor

Air Force Engineering and Services Center
Hq. Kelly AFB, Tex.


Brig. Gen. Clifton D. Wright, Jr., Commander


CMSgt. Fred K. Dickinson, Senior Enlisted Advisor

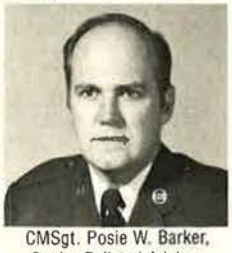
Air Force Manpower and Personnel Center
Hq. Randolph AFB, Tex.


Maj. Gen. LeRoy W. Svendsen, Jr., Commander


CMSgt. Ronald J. Esposito, Senior Enlisted Advisor

Air Reserve Personnel Center
Hq. Denver, Colo.


Col. Frank D. Hardee, Commander

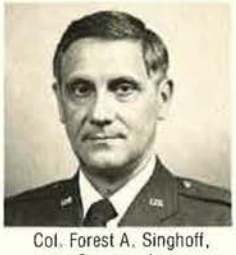

CMSgt. Posie W. Barker, Senior Enlisted Advisor

Air Force Intelligence Service
Hq. Washington, D. C.


Maj. Gen. James L. Brown, Commander


CMSgt. George L. Proud, Senior Enlisted Advisor

Air Force Office of Special Investigations
Hq. Washington, D. C.


Col. Forest A. Singhoff, Commander


CMSgt. Lawrence A. Shellhammer, Senior Enlisted Advisor

Air Force Service Information and News Center
Kelly AFB, Tex.


Col. Harry B. Casterlin, Jr., Commander

Senior Enlisted Advisor
(Temporarily Vacant)

Air Force Accounting and Finance Center
Hq. Denver, Colo.


Maj. Gen. Lucius Theus, Commander


CMSgt. Donald E. Lindemann, Senior Enlisted Advisor

Air Force Audit Agency
Hq. Norton AFB, Calif.


Brig. Gen. Joseph B. Dodds, Commander


CMSgt. Robert S. Wise, Senior Enlisted Advisor

Major Generals and Above Serving Outside USAF

Gen. James R. Allen
Chief of Staff, SHAPE
Casteau, Belgium

Gen. Robert E. Huyser
Deputy Commander in Chief
US European Command
Vaihingen, Germany

Gen. David C. Jones
Chairman, Joint Chiefs of Staff
Washington, D. C.

Lt. Gen. Ranald T. Adams, Jr.
Chairman Inter-American Defense Board
Washington, D. C.

Lt. Gen. Marion L. Boswell
Chief of Staff, Pacific Command
Camp H. M. Smith, Hawaii

Lt. Gen. John J. Burns
Deputy Command and Chief
US Readiness Command
MacDill AFB, Fla.

Lt. Gen. Charles A. Gabriel
Deputy Commander in Chief
US Forces, Korea
Deputy Commander In Chief
UN Command, Korea

Lt. Gen. Richard L. Lawson
Director for Plans and Policy,
J-5, Joint Chiefs of Staff
Washington, D. C.

Lt. Gen. Abner R Martin
Director, Defense Mapping Agency
Washington D. C.

Lt. Gen. Lee M. Paschall
Director, Defense Communications
Agency
Washington D .C.

Lt. Gen. Gerald J. Post
Director, Defense Logistics Agency
Washington D. C.

Lt. Gen. William Y. Smith
Assistant to the Chairman,
Joint Chiefs of Staff
Washington D. C.

Lt. Gen. Eugene F. Tighe, Jr.
Director, Defense Intelligence Agency
Washington D. C.

Maj. Gen. Anderson W. Atkinson
Deputy Director, Defense Attaché System
Defense Intelligence Agency
Washington D. C.

Maj. Gen. Melvin G. Bowling
Deputy Commander, 6th Allied Tactical
Air Force
Izmir, Turkey

Maj. Gen. Richard C. Bowman
Director, European Region,
Office of the Assistant Secretary
of Defense (International
Security Affairs)
Washington D. C.

Maj. Gen. Edgar A. Chavarrie
Director, J-5, US European Command
Vaihingen, Germany

Maj. Gen. Thomas E. Clifford
Deputy Assistant Secretary of Defense
(Public Affairs)
Washington D. C.

Maj. Gen. Richard N. Cody
Deputy Director, Operations and
Administration
Defense Nuclear Agency
Washington D. C.

Maj. Gen. James E. Dalton
Vice Director, Joint Staff,
Joint Chiefs of Staff
Washington D. C.

Maj. Gen. Van C. Doubleday
Deputy Director, Worldwide Military
Command and Control System and
Telecommunications, J-3, Joint Chiefs
of Staff
Washington D. C.

Maj. Gen. Howard M. Estes, Jr.
Deputy Chief, Central Security Service
Deputy Director, Field Management and
Evaluation
National Security Agency
Fort Meade, Md.

Maj. Gen. Lincoln D. Faurer
Director, J-2, US European Command
Vaihingen, Germany

Maj. Gen. Philip C. Gast
Chief, Military Assistance Advisory Group
Teheran, Iran

Maj. Gen. William H. Ginn, Jr.
Assistant Chief of Staff, Operations
SHAPE
Casteau, Belgium

Maj. Gen. Louis G. Leiser
Chief of Staff
Allied Air Forces Southern Europe
Naples, Italy

Maj. Gen. Harrison Lobdell, Jr.
Commandant, National War College
Fort McNair
Washington, D. C.

Maj. Gen. James E. McInerney, Jr.
Commandant, Industrial College of the
Armed Forces
Fort McNair
Washington, D. C.

Maj. Gen. Slade Nash
Chief, Military Assistance Advisory Group
Madrid, Spain

Maj. Gen. Jerome F. O'Malley
Vice Director, J-3, Joint Chiefs of Staff
Washington, D. C.

Maj. Gen. Cuthbert A. Pattillo
Director, J-5
US Readiness Command
MacDill AFB, Fla.

Maj. Gen. Carl D. Peterson
Air Deputy, Allied Forces Northern Europe
Oslo, Norway

Maj. Gen. Bobby W. Presley
Commander, Army-Air Force Exchange
Service
Dallas, Tex.

Maj. Gen. John E. Ralph
Senior Military Advisor to Director
US Arms Control and Disarmament
Agency
Department of State
Washington, D. C.

Maj. Gen. Stanley M. Umstead, Jr.
Deputy Assistant Secretary of Defense
(Military Personnel Policy)
Office of the Secretary of Defense
(Manpower, Reserve Affairs, and
Logistics)
Washington, D. C.

Maj. Gen. George M. Wentsch
Vice Commander
Military Traffic Management Command
Washington, D. C.

Maj. Gen. Robert M. White
Chief of Staff
4th Allied Tactical Air Force
Ramstein AB, Germany

Maj. Gen. Wayne E. Whitlatch
Deputy Chief of Staff
Operations and Intelligence
Allied Forces Central Europe
Senior US Representative
AFCENT
Brunssum, The Netherlands

Maj. Gen. James A. Young
Chief of Staff
Combined Military Planning Staff
Hq. CENTO
Ankara, Turkey

We'll keep the AV-8B one jump ahead.

The AV-8B Advanced Harrier now being developed by McDonnell Douglas is designed to fulfil the U.S. Marine Corps' requirement through the 1990's for a high performance, light attack V/STOL aircraft.

The Advanced Harrier will be capable of twice the range/payload of today's AV-8A.

Again, Rolls-Royce has been chosen to supply the power – the vectored thrust Pegasus turbofan.

After 15 years' V/STOL experience, this engine has proved an outstanding success as a highly dependable power unit, offering optimum take-off performance and cruising efficiency.

Like every Rolls-Royce engine, the Pegasus is backed by a tradition of proved gas turbine technology, unbeaten reliability and a worldwide product support reputation.

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Unrivalled experience in gas turbine design and development has made Rolls-Royce one of the world's principal suppliers of power with the resources to meet the demands of both today's world and tomorrow's.

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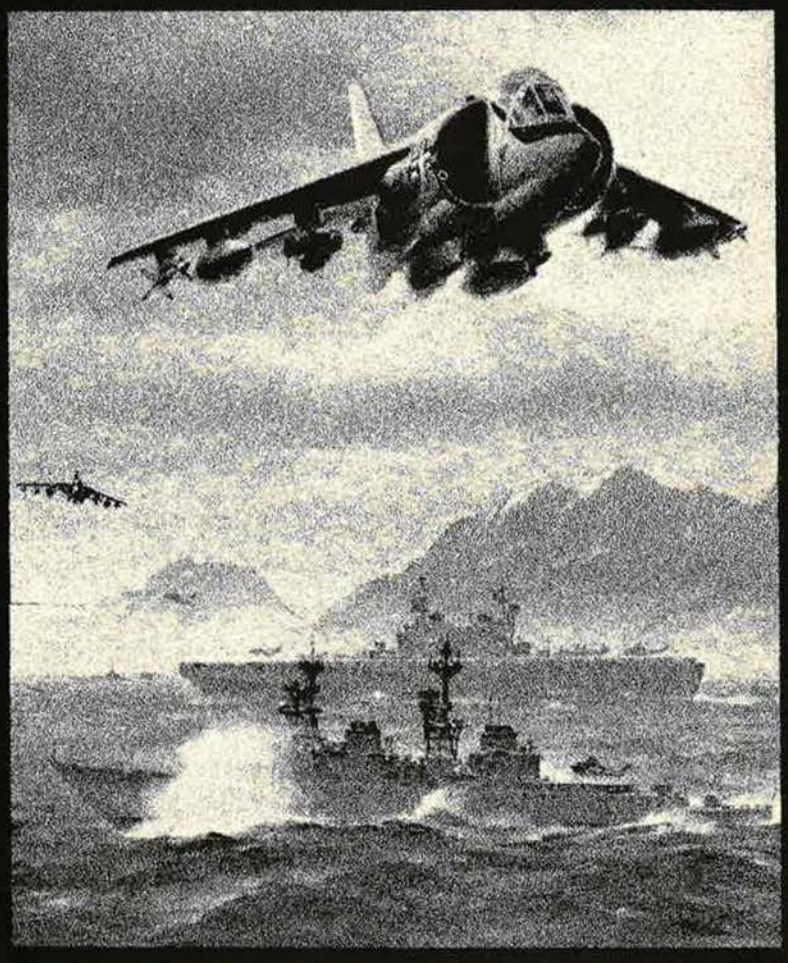


ROYCE

Sperry Update 5

A timely report of Sperry Flight Systems activities in the airline, defense, space and general aviation markets.

Sperry establishes new PQM-102B mod center.

Sperry Flight Systems is expanding its role as prime contractor for the U.S. Air Force PQM-102 airborne target program to include initial modification of F-102 fighters under a new $15 million contract.

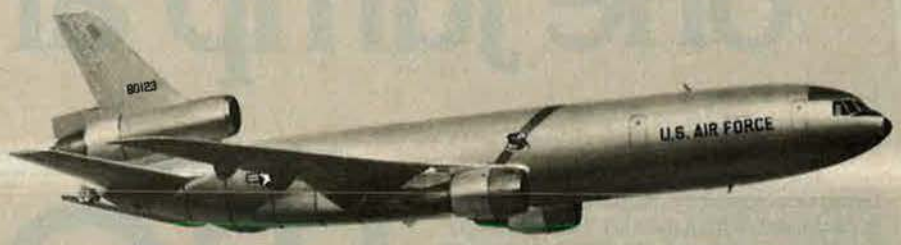
Sperry has set up a modification center near Phoenix to convert the Delta Daggers for unmanned flight. Airframe modification for the PQM-102A program, begun in 1974, had previously been done by a subcontractor.

Sperry has provided ground and in-flight remote control electronics hardware, personnel to control the unmanned aircraft from takeoff to landing, and exercised overall program management of the conversion and flight operations.

The new Air Force contract covers an initial quantity of 66 lower-cost PQM-102 droned aircraft, with options for a total of 145 through November 1981. Sperry has delivered 68 PQM-102A target drones. First PQM-102B delivery to the Air Force is scheduled for November 1978.

While retaining the same functional performance of the PQM-102A, the PQM-102B will be produced at lower cost through redesigned and simplified equipment and modification procedures.

Like the PQM-102A, the "B" will be used as a high-speed maneuvering target for air-to-air and ground-to-air missile development and testing. The PQM-102B will also be



a target for operational training of Air Force squadron aircrews.

Capable of up to 8G maneuvers and operation through the full performance range of the manned F-102, the PQM-102 is a realistic afterburning target, unlike the subscale drones with limited maneuvering capability formerly used by the Air Force as standard targets.

Sperry asked to develop KC-10A refueling boom.

Sperry Flight Systems will build an advanced digital fly-by-wire refueling boom control system for the Air Force KC-10A.

A letter contract from McDonnell Douglas Corporation, Long Beach, California, calls for Sperry to design, develop and flight test production configuration equipment with options for production equipment based on Air Force orders for the KC-10A. McDonnell Douglas is KC-10A prime contractor.

The digital fly-by-wire flight control system will allow the refueling boom operator to "fly" the boom into optimum position with the receiving aircraft. An automatic load alleviation feature will minimize forces acting upon the boom during fuel transfer maneuvers.

The KC-10A boom control system will be based on technology proven with a prototype Sperry digital system during almost 1,400 in-flight refueling hookups between an Air Force KC-135 and a variety of aircraft.

High Gain Antenna System developed by Sperry.

A High Gain Antenna System (HGAS) for data transfer between NASA's Solar Maximum Mission (SMM) spacecraft and the Tracking and Data Relay Satellite System (TDRSS) will be built by Sperry.

Delivery of the first HGAS to Goddard Space Flight Center is set for October 1978, 12 months before scheduled launch of the SMM spacecraft, first of NASA's Multi Mission Spacecraft (MMS).

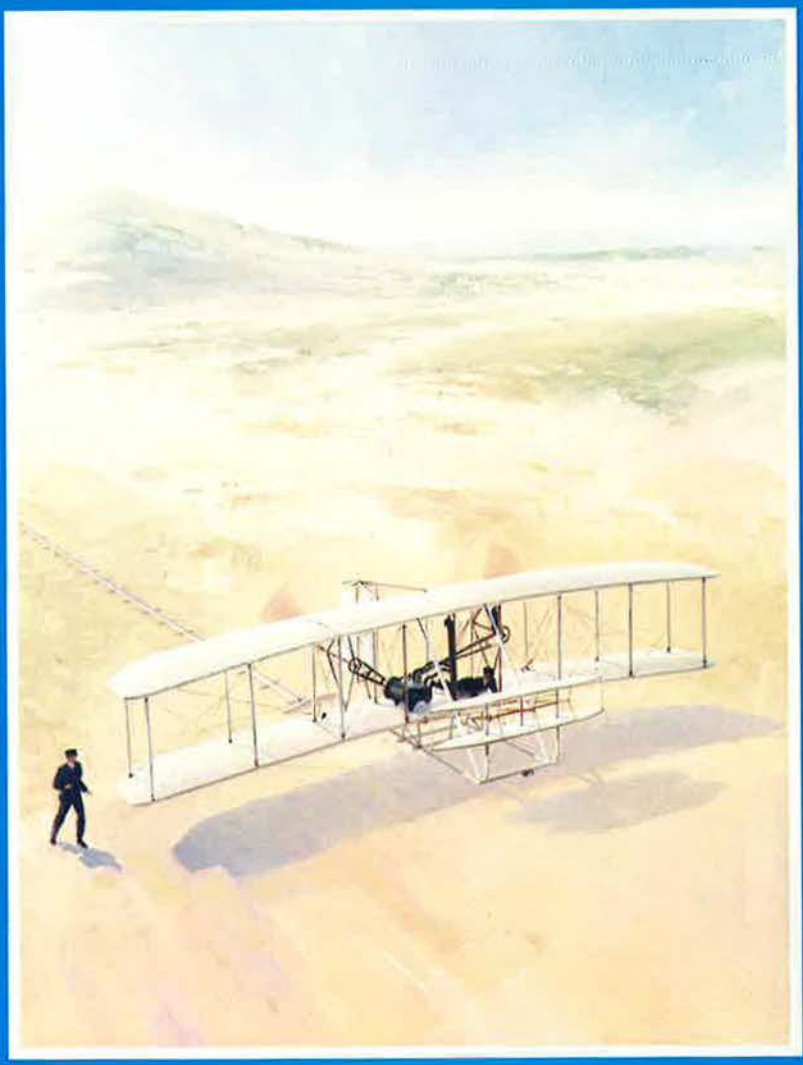
The HGAS is the first deployable antenna system for NASA's MMS series. It features improved life, reliability and accuracy through the use of redundant direct drive motors, resolvers, and electronics for controlling the two-axis gimbals which point the S-band antenna at the TDRS spacecraft.

Remember us.

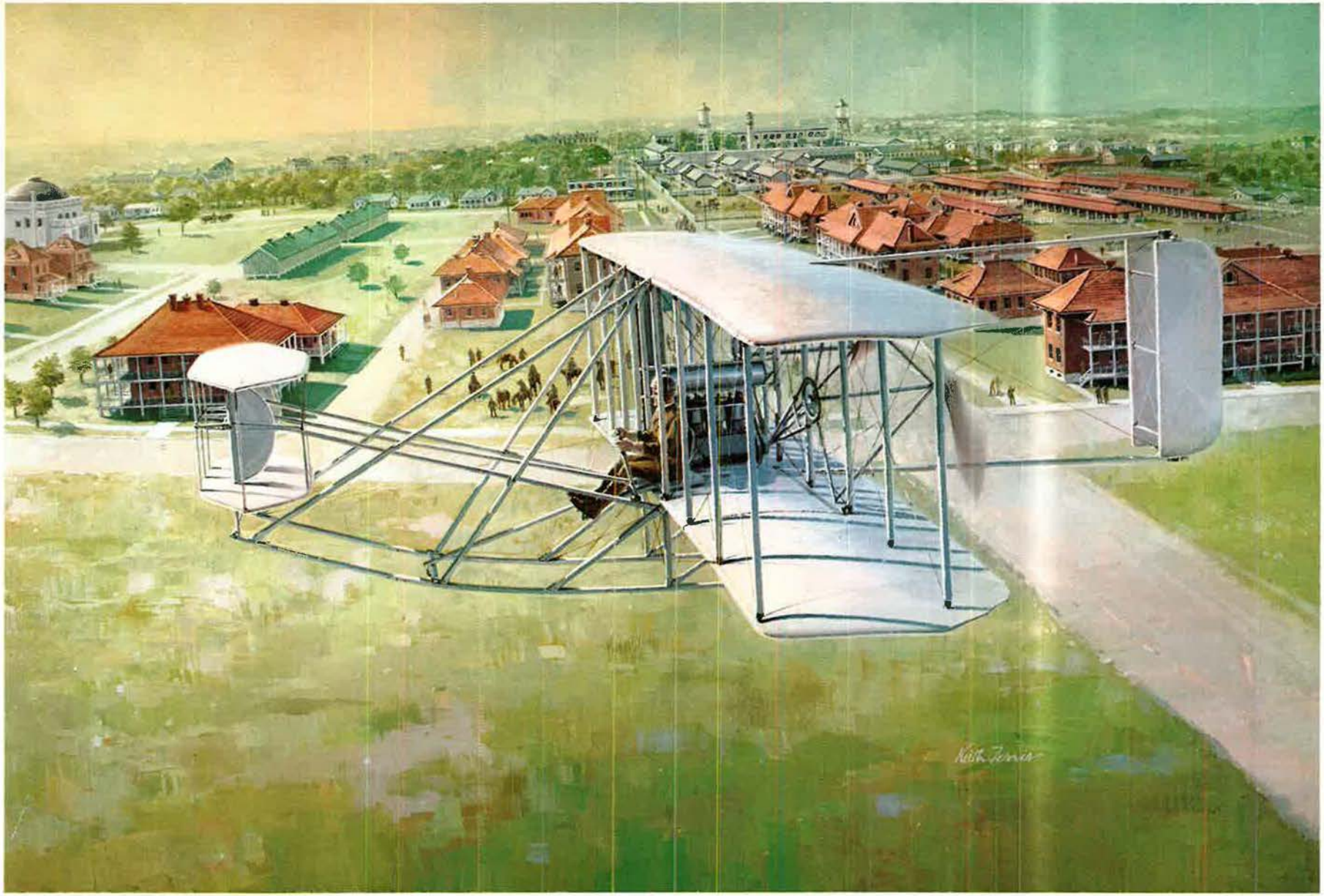
We're Sperry Flight Systems of Phoenix, Arizona, a division of Sperry Rand Corporation . . . making machines do more so man can do more.

SPERRY
FLIGHT SYSTEMS

A Gallery of Aviation Art by Keith Ferris



The painting by Keith Ferris that appears on the front cover of this issue, and is repeated above, was commissioned by the Air Force Association in commemoration of the Seventy-fifth Anniversary of Powered Flight. The prints of Keith Ferris paintings that follow are from The Aviation Art of Keith Ferris, published by Peacock Press/Bantam Books, 666 Fifth Ave., New York, N.Y. 10019 ($7.95 plus $1.00 postage), and are reproduced by permission of the publisher.

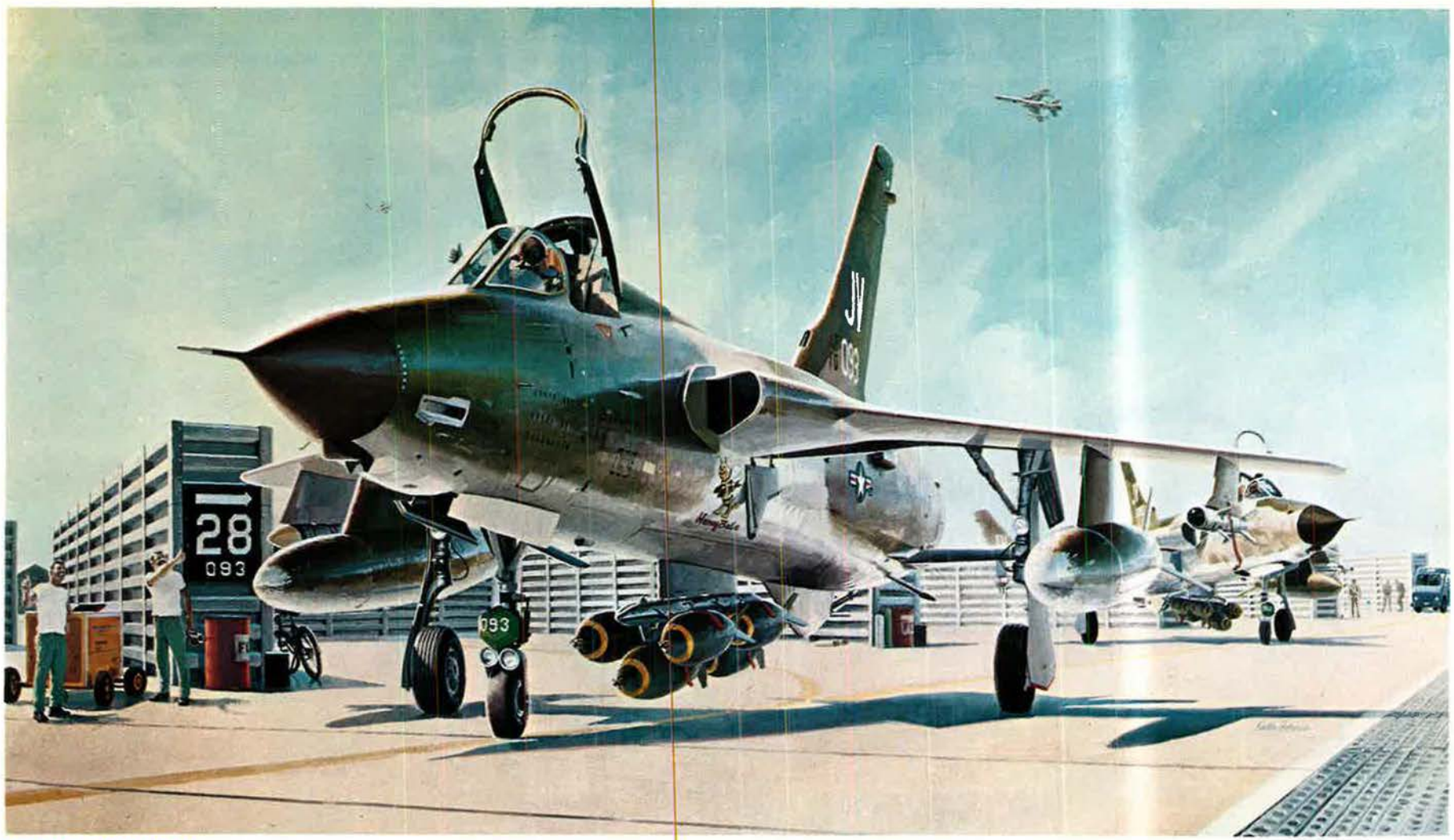


GALLANT BEGINNING. Lt. Benjamin D. Foulois is shown flying the Wright Type A Biplane at Fort Sam Houston, Tex. The original of this oil painting (30" x 44", 1975) is owned by the National Bank of Fort Sam Houston.

BOEING P-12. The original oil painting is 30" x 40" and was done in 1968. From the collection of Matthew C. Weisman, President, Executive Air Fleet Corporation.

FORTRESSES UNDER FIRE. This is a detail from a mural, 25′ x 75′ in oil, done in 1976 at the National Air and Space Museum of the Smithsonian Institution, Washington, D.C.

FIRST SWEPT-WING ENCOUNTER. Lt. Col. Bruce Hinton, of the 4th Fighter Interceptor Group, in his F-86 Sabrejet, shot down a Russian-built Chinese Air Force MiG-15 on December 17, 1950, in Korea. The original is an 18" x 24" oil, done in 1977. Willow Creek Publishers, 7070 Willow Creek Road, Eden Prairie, Minn. 55343.



ROLLING THUNDER. Taxiing out of spot 28 at Korat RTAFB, Thailand, in an F-105D, is Maj. George Avila of the 469th Tac Fighter Squadron at the start of a mission against North Vietnam. The original oil is 30" x 60" and was painted in 1969. It is owned by the Fairchild Republic Co.

MiG SWEEP. Col. Robin Olds, Commander of the 8th Tac Fighter Wing, is shown on January 2, 1967, in his F-4 Phantom, with his target, an enemy MiG-21, visible in the distance above the F-4's cockpit. The original oil, 30" x 40", was done in 1975 and is in the US Air Force Art Collection.

AIR SUPERIORITY, BLUE. This painting was done in 1972, before the F-15 Eagle's first flight. It was used as a cover on *Airman* Magazine. The original oil is 38" x 50" and is in the US Air Force Art Collection.

THE LORAL SYSTEM.

Radar warning/jammer management. The first software programmable system for the world's most advanced fighter, the USAF F-15 Eagle.

Loral's AN/ALR-56. Far and away the most advanced radar warning/jammer management system ever developed. The first to operate under the control of a computer that is flight-line software programmable for the expected threat environment while providing automatic jammer power management. It evaluates and counters literally thousands of emitter signals at speeds essential to survival.

Today, Loral's technical thrust is directed toward radar technology, tactics and countermeasures envisioned for the next decade. Research programs countering air defense systems that span the electro-magnetic spectrum from CW/CD band and agile radars to infrared, UV and optically guided missiles.

Our learning curve over thirty years in all technical disciplines of EW can be traced through many of the most important defense programs. Ours is a dynamic technology. We live on the electronic frontier. Loral Electronic Systems, 999 Central Park Avenue, Yonkers, New York 10704.

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LORAL
ELECTRONIC SYSTEMS

This is the third in a series of articles on men who made lasting contributions to the development of airpower. One of the early Chiefs of the Air Corps and a veteran of the Spanish-American War was General Fechet, whose homespun philosophy and frank manner made friends for the air arm in the power circles of Washington and throughout the country at a time when Air Corps fortunes and finances were at a low ebb.

Maj. Gen. James E. Fechet: Chief of the Air Corps, 1927–1931

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

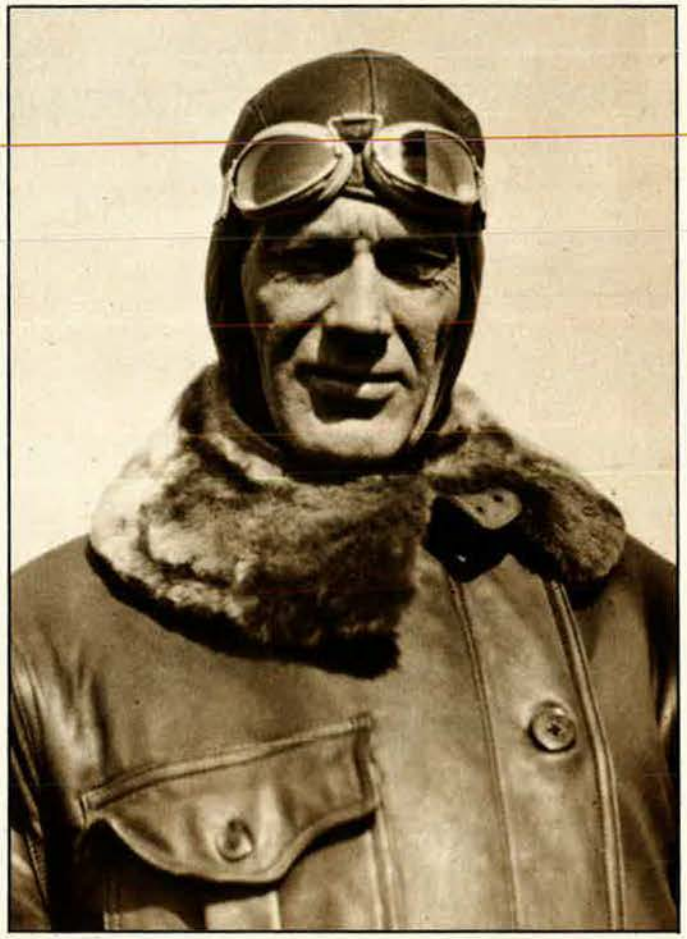
Two precedents were broken with the appointment of Maj. Gen. James E. Fechet as Chief of Air Corps in 1927: He was not a West Point graduate and he was an active pilot with ten years of experience in commanding flying schools.

I first met General Fechet (whose name is pronounced feh-SHAY) when he reported to Maj. Gen. Mason Patrick to become his Assistant Chief, replacing Billy Mitchell, who had been court-martialed in 1925.

After a half-hour closeted with the Chief, he came out through the Assistant Executives' office, where Maj. H. R. Harmon, Lt. David Lingle, and I roomed, and asked, "Can any of you guys fly?" I waited a moment for Major Harmon to respond. When he hesitated, I said, "A little, Sir." Fechet said, "Okay, let's go."

It turned out that General Patrick had asked him to take charge of maneuvers to start the next day at Wright Field, Ohio. We flew that afternoon to Dayton in poor weather and low visibility with heavy rain squalls. Only one other plane of several that departed from Bolling Field that day arrived. It was piloted by Maj. Carl Spaatz.

After our week together in the Dayton maneuvers, I became General Fechet's aide and pilot and continued with him full or part time for the next six years, until his retirement. In time, our relationship became very much like father and son. We not only flew together, averaging an hour a day with frequent flights to all Air Corps stations and activities, including Panama, but we hunted, fished, shot skeet, and played bridge together often.



General Fechet was described by a contemporary as "an operational man—a big, strong, loud-voiced, typical fighting man."

Early in our time together, he gave me some oblique advice that I never forgot. He said that an aide is often presumed to have influence with his boss, and his contemporaries may expect him to represent their interests with the general, including favorite assignments, etc. He concluded, "Influence is like money in the bank. You have it until you use it; then you don't have it any more."

Whenever friends and associates hinted that I might do favors for them, I always told them this story.

Since he was not rank conscious, but friendly, bluff, and hearty by nature, General Fechet sometimes seemed to not show proper respect to elders and seniors in government, civil and military.

On one occasion, he was appearing before the House Appropriations Committee, defending our annual budget. The Chairman, Congressman Collins from

Meridian, Miss., said, "General, I see here an item of several thousand dollars to maintain forty horses at the Air Corps Tactical School. Will you kindly tell me why the Air Corps wants horses; what would you say if I offered you some goats?"

General Fechet responded promptly, "If one of them was yours, Mr. Collins, I'd take it." Those of us who were sitting behind the Chief at the witness table figuratively fell off our chairs. I thought, "We were only allowed to ask for $26 million for the Air Corps for the whole year, and now we won't even get that, since our Chief has insulted the Chairman."

To our surprised relief, Mr. Collins passed to the next item without comment. When the hearing ended he came over to General Fechet and said, "I like your spirit. You and I are going to get along. How about flying me down to Meridian this weekend, where I can show you some good bird hunting."

After that, we had less difficulty getting our meager appropriations through the Committee.

An Unorthodox Chief

General Fechet was easily the most unorthodox of the Chiefs I was privileged to serve. He hated paperwork and the confinement of the office. He often said to us, his staff, "My job is to make the major decisions. There'll only be one or two of those each day. If you guys do your staff work properly, my decisions should be fairly obvious. Don't count on my doing your work for you. If you can't cut it, I'll get somebody who can."

When someone would send him a voluminous report, he'd ask, "What is it about? What does it say?" If he didn't get a satisfactory response, he would ring my buzzer, hand the report to me, and demand a brief. I learned early that a brief must never be more than one page. The next leader I came in contact with who had that well-known penchant was Winston Churchill.

When General Fechet was nearing the end of his four-year term, several members of Congress expressed the hope that he would be given a second term. The Secretary of War, Patrick Hurley, was a close friend and great admirer of the General. He insisted that Fechet stand for another term as Chief. The old General thanked his friends for their kindness, but firmly demurred, saying, "There are plenty of good officers coming along; I don't want to block their chances. It is best for Air Corps morale that I go now and give others a chance."

In World War II, General Arnold called General Fechet back to active duty from more than ten years of retirement to head the Promotion and Decoration Board. He offered Fechet a third star. General Fechet declined, saying, "It will be much easier for me to handle promotions for others without criticism for you and me if I take neither for myself."

General Fechet had always a deep interest in Air Corps people and their training. He had commanded three flying schools. Randolph Field, which he loved to call the "West Point of the Air," was his special project and pride. He selected the site, approved the plan, and followed its construction and development. Randolph will always be his principal memorial for those of us who know the facts.

The enlisted and noncommissioned ranks took pride in the fact that General Fechet had been one of them. They felt they shared his success since he started his military career as a private soldier.

Jim Fechet was a junior at the University of Nebraska in 1898 when the US declared war on Spain. He promptly left the university, without his father's knowledge or consent (his father was then a colonel in the regular Army), and enlisted for service in the Spanish-American War.

Young Fechet was shot through the abdomen at the battle of San Juan Hill. A regular Army surgeon, going over the battlefield, checking the work of his reserve medical officers, came upon a wounded boy with a yellow tag (white tags were placed on the wounded the litter bearers would carry to the aid stations, while yellow tags indicated those so severely wounded they should be left on the field for burial).

The old doctor recognized young Fechet as the son of a colonel of long acquaintance. They had lived in adjoining quarters at Fort Leavenworth when Jim was of teen age. The old doctor changed his tag to white, called stretcher bearers, accompanied him to the field hospital, and operated, re-

General Fechet with a Thomas-Morse O-6 while he was Assistant Chief of Air Corps. As Chief, he spent a great deal of time visiting Air Corps stations throughout the country.

moving the bullet from his intestines. The youngster recovered, returned to duty, and eventually was commissioned a lieutenant of cavalry.

Fifty years later, the General died in Walter Reed Hospital of abdominal cancer, originating at the location of that bullet wound from the Spanish-American War.

General Fechet was not a scholar, like General Patrick, but he had a keen practical intelligence, a personality of rare charm, a great zest for life and leadership, and an uncanny sensitivity for military morale. He excelled in horsemanship and marksmanship, being a member of the US Cavalry's equestrian team at the Olympic Games and several times a member of the US Army Rifle Team at national matches.

Homespun Philosophy

The Army Air Corps which General Fechet commanded was never large, averaging 1,500 officers and 15,000 men with niggardly budgets of $25 to $30 million annually, but our military flying arm never had higher morale in peacetime than during his tenure, despite a lack of new equipment and drastic reduction of flying hours as the Great Depression deepened.

He had the respect and confidence of Army seniors, including the General Staff, which often saved our pet projects and cherished plans. He also had great rapport with all other aviation agencies and departments of those times. Rear Adm. William Moffett, head of Naval Aviation, was a close friend, as were the Air Assistant Secretaries of Commerce and Navy. Our own Assistant Secretary of War for Air, Trubee Davison, greatly admired the General, and they worked together in closest harmony.

General Fechet had a simple, homespun philosophy and he possessed one of the most observant, perceptive minds I have known. During the six years I spent under his daily influence, I was still young enough to learn, and he taught me many things for subsequent use and career profit.

One time, after overhearing me berate a careless civilian mechanic, whose sloppy work might have jeopardized the Chief's safety, he said to me privately, "As you grow older, you will be surprised at how many stupid people you meet; you can never hope to educate and Christianize all of them. Besides, it is often more effective to chide gently, with a sympathetic smile rather than blaspheme or berate in a rage. For example, instead of calling a miscreant an SOB, say to him, 'When you go home tonight, throw your mother a bone.'" This kindly advice lengthened my fuse and increased my tolerance.

One of the principal problems I had with General Fechet (captains had prob-

Lt. Gen. Ira C. Eaker commanded the VIII Bomber Command, Eighth Air Force, and Mediterranean Allied Air Forces during World War II. Prior to the war, he served as Executive Assistant to General Fechet. He retired in 1947 as Deputy Commander of the Army Air Forces. Since his retirement he has written a syndicated column on defense affairs.

General Fechet supported many pioneering flights. Here he greets the Question Mark *crew after their 1929 endurance flight. From left, Capt. Ross Hoyt (refueling pilot), the author, General Fechet, Maj. Carl Spaatz, Lt. Elwood Quesada, MSgt. R. W. Hooe.*

lems with generals then as now) concerned my vain effort to get him to make a speech. Having been accustomed to listen with pride to General Patrick, his predecessor as Chief of Air Corps, and perhaps the finest military orator of his time, save Douglas MacArthur, I was keenly disappointed with General Fechet as an indifferent public speaker.

I held to the belief then, and now, that it behooved the Chief to tell the air story, to win friends and supporters for airpower.

Once we were due to attend an important professional convention, where our Chief had been invited to make the principal address at an evening dinner meeting. Believing this a great opportunity, I prepared the draft of a half-hour speech. When I presented this, my best effort, to him, Fechet asked, "How many new ideas have you got in that speech?" I proudly replied, "About six, Sir." He said, "You are much too generous. I understand there have only been a dozen or so new ideas since Christ and Mohammed, and one of them hit Newton on the head. Go back and develop one good idea in a few well-chosen words with short, simple sentences, and I'll endeavor to peddle it for you."

A Man for the Times

General Fechet had the best appreciation of the Air Corps need for popular support of any of our Chiefs, with the possible exception of "Hap" Arnold. He approved more special projects to keep the air effort in the headlines than any of his predecessors, including Billy Mitchell. His favorite slogan was, "I want the people to read about what we are doing instead of what we are saying."

He selected the crews for the Pan American Goodwill Flight, approved the *Question Mark* flight, which launched in-flight refueling, and the first nonstop flight to Hawaii. Army Air Corps pilots set many records for altitude, speed, and endurance during his term. In 1930, an annual training maneuver concluded with an unprecedented 300-plane formation, which flew over Boston, New York, and Baltimore, led, at Fechet's invitation, by Gen. Douglas MacArthur as it terminated over Washington, D. C.

General Fechet was an expert at selling military aviation to individual reporters and radio commentators. Ernie Pyle, later the most famous of war correspondents, was just starting the first aviation column in the Washington *Daily News*. He was one of General Fechet's favorites and was often invited to accompany us on cross-country flights.

I have often been asked, "What were Fechet's special contributions, as Chief of Air Corps?" To answer their question, one needs to have an appreciation of those times.

Billy Mitchell had just been tried by court-martial. This culminated a period of dissension and discord for the struggling air arm. The President had condemned our leader, the Army general staff was hostile, the Navy was especially vengeful over Mitchell's challenge to the battleships, and Congress had many members who were Army or Navy veterans, none with a flying background.

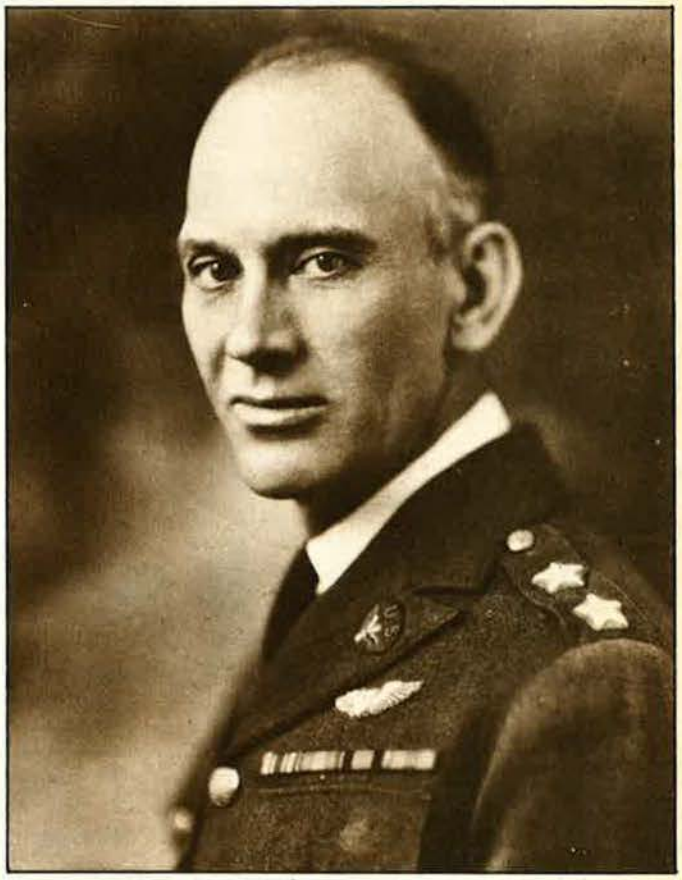
These were our main handicaps when General Fechet became Chief. When he left, four years later, all had been eliminated or considerably ameliorated, due to his effort and leadership. He was a healer. He accentuated the positive, never the negative. He developed friendships in high places where there had been indifference or open hostility.

The Secretary of War and Chief of Staff of the Army were now friends and supporters, the Army general staff now had Air Sections; Congress was showing an increasing interest due to the rapidly rising popular interest in aviation, civil and military.

Though not himself a graduate of any of the senior military schools, Fechet recognized his handicap and sent the young air officers he had selected as future leaders to the Army schools. When many of us complained about having to leave active flying as commanders of squadrons, groups, and fields to go to the Army schools and learn how to fight the Battle of Gettysburg, Fechet responded firmly and wisely: "The future military leaders are going to be graduates of the service schools; I am not going to have my boys passed over because they cannot write field orders, recite the principles of war, or quote glibly the lessons from the Battle of Cannae."

Finally, he taught leadership by example. Those of us who were on his staff or unit commanders under him, nearly all of whom became generals in World War II, unanimously acknowledged his beneficient influence on our own careers and in his examples of leadership and especially how to maintain morale in times of adversity.

The fates were especially kind to the struggling air arm during 1927 to '31 in providing a man of the personality, integrity, and courage of James E. Fechet to lead it through those critical times. ■



James E. Fechet—an unorthodox Chief, sensitive to morale and to the Air Corps's need for popular support.

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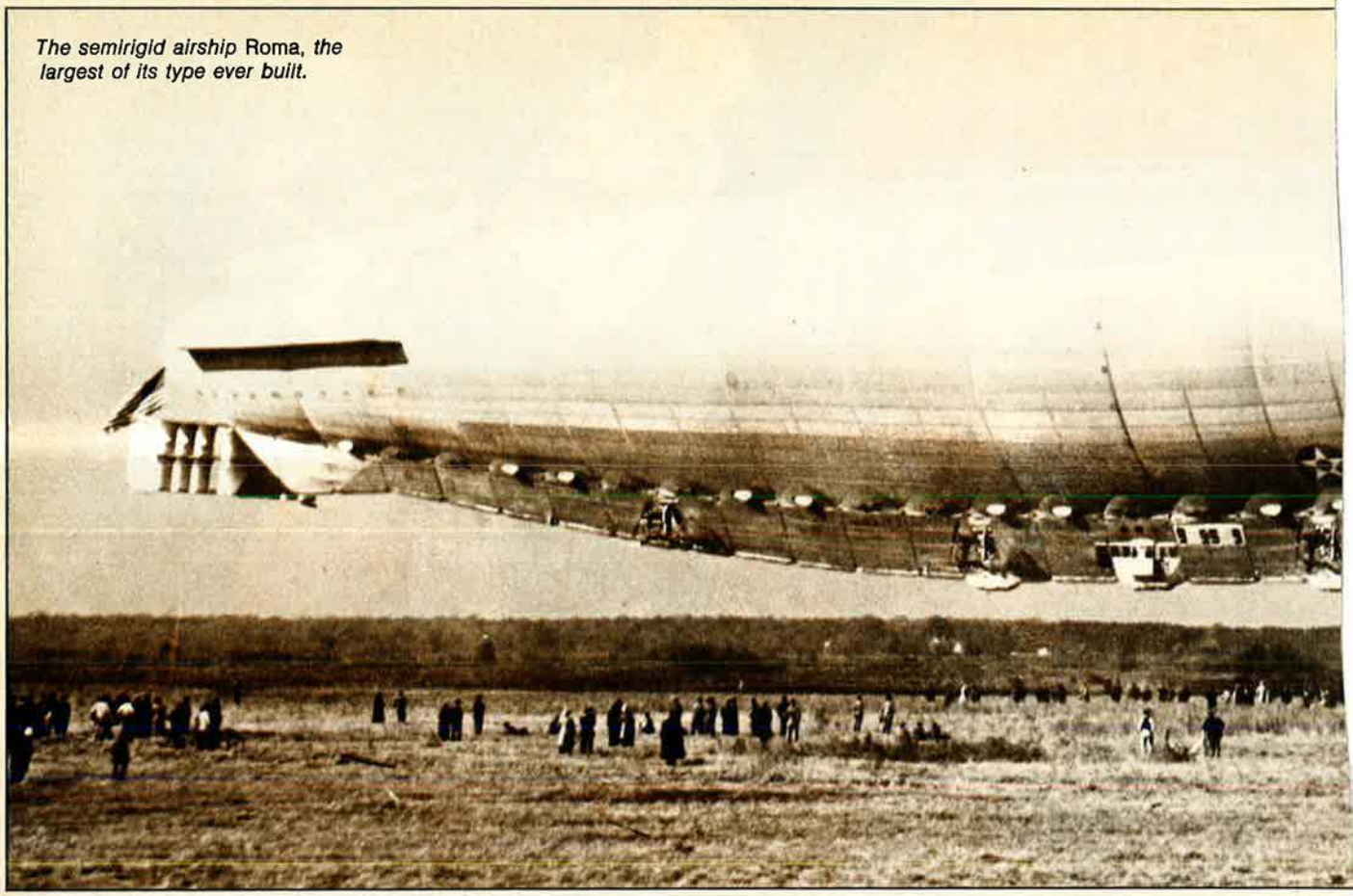
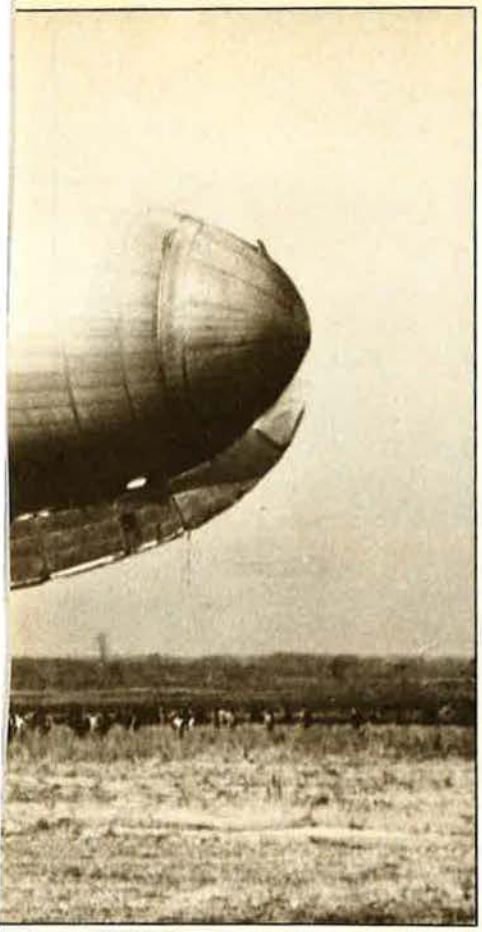


View from the top: Roma's *gas-release valves.*



In the years following World War I, the Air Service/Air Corps was active in lighter-than-air (LTA) operations with both captive balloon and airship units. LTA pilots—the author among them—represented this country in international balloon races and participated in high-altitude balloon experiments. Some triumphs and tragedies of the LTA era are recounted here in these...

Reminiscences of an LTA Pilot

BY LT. GEN. WILLIAM E. KEPNER, USAF (RET.)

IN THIS country, the use of balloons for military observation goes back to the Civil War, although both observation and bombardment from balloons were proposed during the Seminole and Mexican Wars.

After 1865, the US Army's interest in balloons waned until World War I, when this country found itself behind the major European powers in both airplanes and lighter-than-air balloons and airships. Belatedly, a balloon school was started at Omaha, Neb., in 1917 to train balloon pilots, observers, and support people. This school and other similar ones provided the American Expeditionary Force trained and equipped balloon companies used primarily for observation of enemy forces and adjusting artillery fire. The balloons were tethered, and made attractive targets for ground fire and enemy planes.

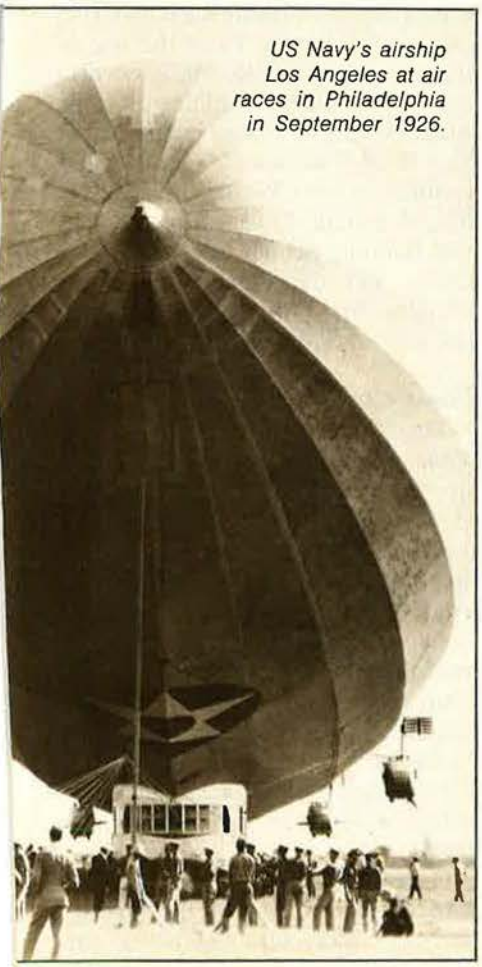
I saw many captive balloons at the front in World War I when I commanded I Company, 4th Infantry Regiment of the regular Army Third Division. It seemed as though, sooner or later, every balloon was shot down, but the pilots and observers usually parachuted to safety. Lt. D. M. Reeves, a bomber pilot who was transferred to the balloon section, was shot down twice within a few minutes, but on his third ascent of the day he had better luck and came back with his report. A couple of years later, he was my instructor at balloon school.

After Château-Thierry and St.-Mihiel, I asked, at an officers meeting, to transfer to the Air Service for airplane pilot training. Col. Halsted Dorey replied, "Yes, if you want to be a frill. You have a man's job where you are." When the meeting was over, he put his arm around my shoulder and promised me a battalion—which I eventually got, along with three wounds that kept me in the hospital for four months.

I came back to the US in 1919, commanded a ghost battalion, then requested a transfer to the Air Service, preferably at Arcadia, Fla., an airplane station. I got Arcadia, but it was in California, near Pasadena, where all the US balloon schools had been combined into one. I persuaded Miss Jean Wilcox to marry me on November 15, 1920, and hurried out to California from Atlanta, Ga., where I had been stationed.

Our class graduated in June 1921. I was ordered to command a separate balloon company at the Infantry School, Camp Benning, Ga., to observe infantry field problems during exercises.

While at Benning, I requested permission to make a practice parachute jump. Permission was refused with the admonition that you have to do it right the first time. Shortly after, the same office that turned me down ordered my company (the 32d Balloon Company) to make an exhibition parachute jump—but the company commander would *not* do it. So I proceeded to train a volunteer by a demonstration jump. I walked into the chute room, told a sergeant I wanted to see him pack a chute. I



US Navy's airship Los Angeles at air races in Philadelphia in September 1926.

asked if it was his best job. "Yes," he said. "Is anything wrong?" "No," I said, and picked it up. He suspected the truth and said, "Captain, are you going to use that chute?" I did not intend to tell anyone, in case I got up in flight and changed my mind. I laughed and said, "Yes, but you are not to tell anyone." He said, "Let me check it." "Oh, no," I said. "It's OK as it is."

I went straight to the balloon, got in with that chute, and up we went. I intended to look over the side at 1,200 feet, make up my mind, then go to 1,600 feet and jump if I still felt like it. I looked over and the whole area was filled with faces, all looking up to see me jump. The decision had been made by those people waiting to see. It was not difficult, but a relief when the chute opened. Later I was to make two more jumps—both unplanned. The next day the official "volunteer" needed some urging, but I persuaded him it was OK.

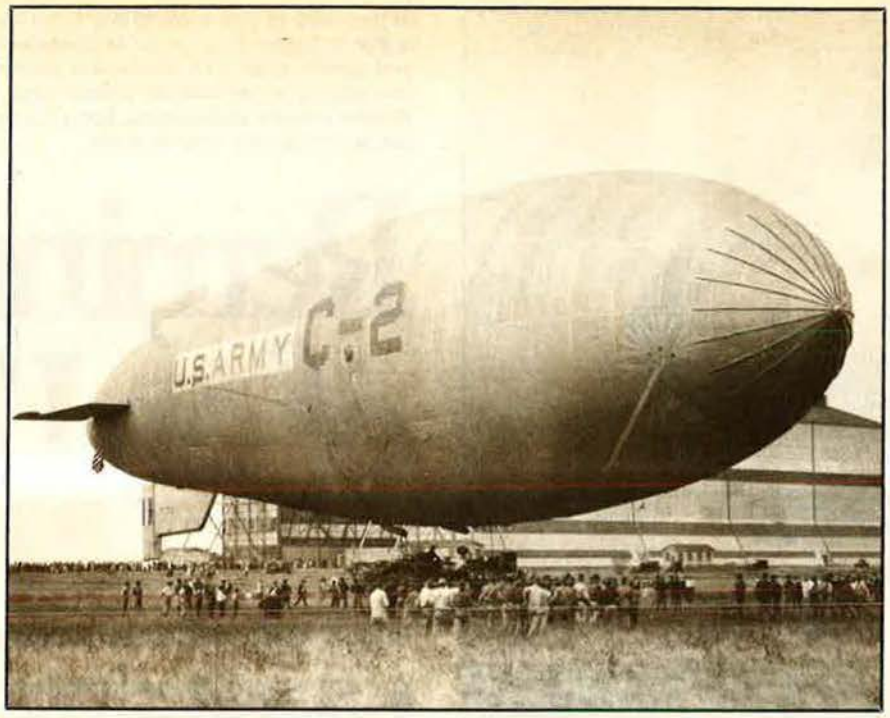
The Airship Era

I was soon ordered to Langley Field, Va., to command the 10th Airship Company, and take airship pilot training at the same time.

Nonrigid airships, like balloons, are lifted by a lighter-than-air gas. They have an elongated shape, a reinforced nose to overcome air resistance, a tail with movable surfaces to give the ship turning moments, or straight-ahead flight, and engine-driven propellers. An airship must have pressure inside to hold its shape, unless it has a semirigid or rigid outside surface. The names of types—rigid, semirigid, nonrigid, and pressure rigid—describe airships in broad general terms.

All airship pilot training for the US Army Air Service was at Langley Field, in nonrigids and semirigids. Langley had a large hangar with a "steam iron" for making hydrogen. Helium was extracted from natural gas facilities at Fort Worth, Tex.

The "Pony," "A-4," "C"- and "D"-type nonrigid airships were used in training. About a hundred new pilots were trained at the school plus refresher training for others who had not been actively piloting airships. The semirigid *Roma,* the largest airship of its type ever built, had recently been obtained from Italy, and was at Langley. All pilots were trained on nonrigids, with special individual training for those designated as crew members of the *Roma.* I was assigned to the *Roma* while familiarity tests were being run.



In the 1920s, the Army used nonrigid airships like the above "C"-type to train LTA pilots. Plans called for a considerable expansion of the airship fleet operated by the Air Service, with hangars and mooring masts in several locations.

In the early 1920s, the Air Service had discussed plans for about ten hangars, with a very large 800′ x 125′ x 125′ hangar at Scott Field, Ill., to be the system center. We were building a high mooring mast at Scott that would hold a Zeppelin-size airship. The Langley hangar was 500′ x 125′ x 100′. There were smaller hangars to take the "C" and "D" nonrigids at El Paso, Tex., and Aberdeen Proving Ground, Md., and a Langley Field-size hangar at Brooks Field, San Antonio, Tex.

Henry Ford was building a Zeppelin-type mooring mast at Detroit, and there was a nonrigid-size hangar on Grosse Isle in Detroit that housed the metal-clad ZMC-2 airship, built for the Navy. An Aberdeen-type hangar was planned for near Fort Lewis, Tacoma, Wash. The Goodyear Co., Akron, Ohio, was building a large semirigid airship for the Air Service, to be assembled and tested (using the large hangar and new mooring mast) at Scott Field, when the facilities were finished. We also had an active engineering section at Wright Field, Dayton, Ohio.

Military lighter-than-air (LTA) looked like a serious business that was well started. We expected to use at times the Navy LTA facilities at Lakehurst NAS, N. J., where there was a large Zeppelin-type mooring mast and a hangar twice the size of the one at Scott Field. The Navy also had small hangar facilities at Cape May, N. J., and a mooring facility at Key West, Fla. We planned to build facilities at Fort Worth, Tex., for refills of helium. It was expected that the Balloon School at Ross Field, Calif., and the Airship School at Langley Field would be combined into one at Scott Field.

Roma Crashes

Then, on February 21, 1922, the *Roma,* while on a test flight, was destroyed at Norfolk, Va., with a loss of thirty-four of the forty-five crew members aboard. I had expected to take my station on that flight, which would test a change of engines. The Italian Ansaldo engines were very hard to start. It had taken about five hours on the previous flight to Washington, D. C., to get them going. The Ansaldos were replaced by American Liberty engines. The flight had as one objective proof-testing the new engines.

I was told by the station commander to take the small D-4 airship, near the door, into the air so the

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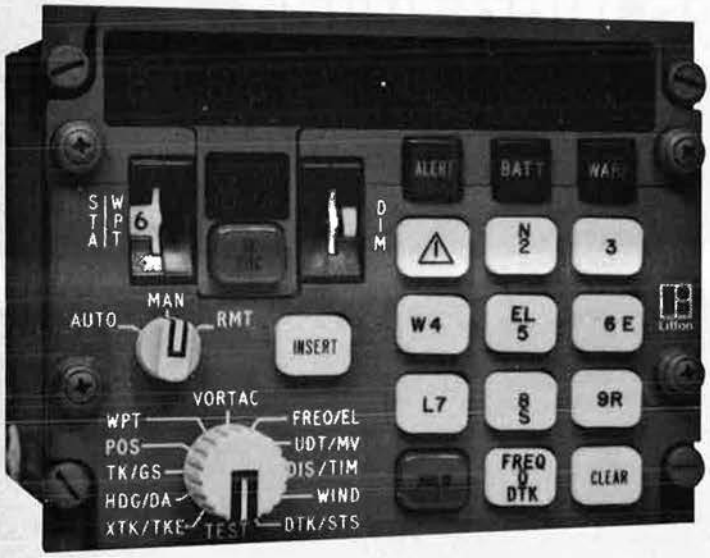

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Roma could be moved out of the hangar. (It was obviously the right decision, but why me? I belonged on the *Roma*). I took the small airship up, and from the air watched the *Roma* take off without delay—a beautiful sight as it circled to start its run from Norfolk. Then a horror! The *Roma* crashed into an industrial area of warehouses and high power lines. Flames completed the *Roma's* destruction. We flew over and around the burning wreck, and I thought I could see bodies hanging among the keel frames. Sick at heart, we flew back to Langley Field in great shock. News travels fast and apparently everyone at Langley felt sure all aboard *Roma* had been killed. I knew a few were walking about the ship on the ground, but who? I would not guess.

After putting the airship in its hangar, I hurried down to a funeral home where the bodies were brought in. Lt. Orvil Anderson, Lt. Junius Smith, a dentist with records, and I walked in, stepping over what looked like logs burned black. I wondered why burnt pieces of logs were here, then I realized these were the remains of human beings. We four went to work identifying the bodies. Arms and legs were gone in many cases, and sometimes there was only a head with teeth left for identification. The dental record was a final identification, after we three guessed at the identity of remains. Finally, about 3:00 a.m. the next day we had finished the grim job. I wanted to get clear away and breathe deep the fresh outside air.

Then came the most difficult part of that tragic event—informing the families of the men whose remains we four had identified. Sleep was put aside until that could be attended to.

Navigating for the Navy

After the *Roma* disaster, a reassessment of the Army Air Service LTA plan had to be made. The Air Service request to continue LTA activities was approved with some changes, and we were back in business to carry on as we must do when things should continue. Lost instructors were replaced, and some of us were graduated early as pilots.

I was ordered to command the 18th Airship Company at Aberdeen, Md., the Ordnance Proving Ground, testing bombs and bomb casings by a 2,000-foot drop on a hard, solid surface of reinforced concrete. There also were higher drops for bomb flight tests. It was interesting duty and appropriate for airships.

Then began a series of navigation flights. A very large and powerful searchlight had to be tested above the Battery in New York City. Night flights were a rarity in 1922. Nothing but an airship would try it low over the area. We were selected to fly the test and a couple of prominent news reporters went along. We took off from Washington, with Maj. Gen. Mason Patrick, the Chief of Air Corps, formally starting us at dark. We flew via Baltimore and Philadelphia. The reporters wrote that "we loafed over the cities, smoking cigarettes [not true], then proceeded through clouds to the Battery at New York to be picked up by the searchlight about 500 feet over the New York Battery, then returned to Aberdeen." (I later spent some time explaining that we did *not* smoke on board a hydrogen-filled airship. I learned to carefully check news items, because the reporters said I had concurred with their stories.)

We flew instrument from Princeton, N. J., via Staten Island to Coney Island. I expected to see the glow of New York City even through clouds, but did not. I let down to a couple hundred feet over what I hoped would be Coney Island. Guessing I was out over the Atlantic, I headed west and found a beach that had a large electric sign "The Heart of Coney Island." We followed the elevated railway at about a hundred feet until we came out over the Army warehouse pier. Then a most welcome sight—the Statue of Liberty directly ahead. We had slowed down to thirty mph and, circling the Statue of Liberty, came over the Battery on a wide circle. The searchlight came on, then immediately switched to point at the huge buildings inland so we would miss them. It was not necessary, but a most comfortable feeling for us. After a brief "hover," we headed back to Aberdeen and home.

On another trip, we flew to Lakehurst, N. J., where I saw the Zeppelin-type *USS Shenandoah* being built in the hangar. A few days later, I was told I would be one of eight officers and a detachment of NCOs to be attached to the Navy at Lakehurst for training in rigid airships. It was a wonderful tour of three years. I graduated as a Naval Aviator, Zeppelin Pilot, and served as a crew member, detailed as assistant navigator on the *USS Los Angeles,* a rigid airship. Ever since my free balloon training, I had wanted an opportunity to learn celestial navigation, and this Navy duty was a big opportunity. I made the most of it.

Why were we, the Army Air Service, at Lakehurst? To learn big airships and prepare for possible task forces with the Navy. The Army traded helium for Navy training of our crews.

Maneuvers With the Ground Troops

Scott Field in 1926 was handling all LTA training. There were four airship companies, a headquarters company, an airship school with ground courses, and student flight training.

The new semirigid airship RS-1 was being test-flown by the Air Corps (the Air Service was redesignated as the Army Air Corps in July 1926), and by civilian technical people from the factory. I was assigned to Scott, given command of an airship company, and prepared to take command of the RS-1, flying each time as a pilot for familiarization. The RS-1 had a 700,000-cubic-foot gas capacity—not quite as large as the *Roma,* but the

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Lt. Gen. William E. Kepner, USAF (Ret.), began his military career with USMC in 1909, later transferring to the Army's Infantry Branch and subsequent command of a combat battalion in World War I. From 1920 to his retirement in 1953, he served in the Air Force, first in lighter-than-air, then as a fighter pilot. In World War II he commanded VIII Fighter Command in Europe, the Eighth Air Force 2d Air Division, and at the end of the war both Eighth and Ninth Air Forces. He flew twenty-four combat missions in fighters and bombers. After the war, he was Chief of the Atomic Energy Division at Hq. USAF; Commander of the Air Proving Ground Command; and Commander in Chief of Alaskan Command. He holds six aeronautical ratings: command pilot, combat observer, senior balloon pilot, Zeppelin pilot, semirigid pilot, and metalclad airship pilot. General Kepner now lives in Orlando, Fla.

largest semirigid in existence then. It had two seventeen-foot props, each geared to two engines in side-by-side engine nacelle mounts, well back under the ship's keel. There was a fairly large control cabin below the keel forward, about seventy-five feet back from the rigid nose, which supported the bag at high speed (about seventy-five miles an hour). At the point of the nose was a fitting by which the ship could be moored to a high mast, with a mechanism to accomplish a mast hookup.

Later that year, we took a "C"-type airship to several Army exercises, first stopping at Fort Riley, Kan., where winds forced us to keep the airship in the air most of two days. From there to Fort Sill, Okla., where very high winds again forced us to fly for the ship's safety. After one day with winds thirty to forty mph we landed at night, and departed for San Antonio, Tex., but had to return to Fort Leavenworth, Kan., where we deflated the ship because of thirty-plus-mph gusts on the ground. We got another ship from Scott and flew to San Antonio to participate in Army exercises, doing night patrol observation. We had good luck finding enemy cavalry patrols. It was a very successful exercise.

On takeoff from Brooks Field for Scott, a handling cable became caught in an iron ground rail and jerked the tail loose from the gas bag. We dropped only a few feet to the ground with no casualties to the crew, but an airship wrecked, after commendable performance on its mission.

I then returned to Scott, took command of the RS-1 and the tests, and was appointed assistant commandant of the Airship School.

The RS-1 was directed to do some flying out of San Antonio, so I took it, with Capt. Lester Miller, who had been trained to take command of the airship, and his crew to the Brooks Field hangar as a base. On our first takeoff, with a new ground maneuver crew from Brooks, there was a heavy ground fog. When the signal to heave the ship up was given, men on the engine nacelles at the rear gave the stronger heave, and momentum took the tail up with the nose pointed down slightly. The engine started the props, and the ship headed down. We quickly stopped, then reversed the propellers, and flew back and up through 700 feet of fog, tail first. An airplane pilot along for a ride laughed and said, "You fly this thing like a ferry boat!" It was my first problem of that kind, but it worked.

Squall Line

After flights at San Antonio, we planned to fly to the Fort Worth helium plant to exercise procedure in helium refills. While in the hangar at San Antonio, the fabric at the top of RS-1 became very hot. Cement holding braces on the valves loosened up. We used most of our patching equipment, then decided to leave before further damage, but the weather was very bad, with a row of thunderstorms practically on top of the Fort Worth area. We decided not to land at the helium plant but to head east to try for Scott Field. We crossed the Mississippi north of Vicksburg at dawn, then headed north to Memphis and Scott Field. We soon ran into a squall line.

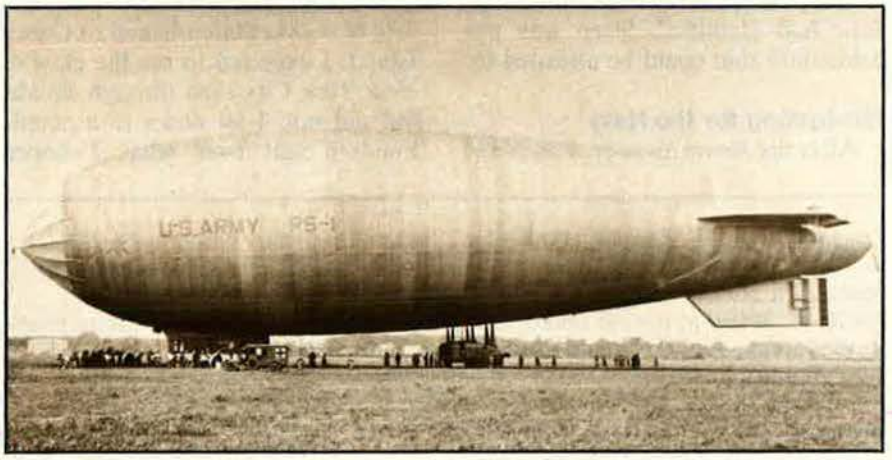
While flying between two storms, we were sucked tail first into a large cloud and very quickly up to 7,000 feet. We gave full power and pulled out, but were driven downward to a few hundred feet from the ground. I had the elevator controls and had to brace one foot on a vertical riser to keep my position and avoid slipping forward. I got the nose up less than a ship's length from the ground, where trees were bent half over. Then we went back up into a cloud, and again downward until we could see the ground, even though the engines were cut back to about two-thirds power. This happened seven times until we came out on the north side of the squall line in clearing weather.

We headed again for Scott Field from just south of Memphis at forty miles an hour airspeed, until we could inspect the ship. The engine crews had done a splendid job, but they said they were ready to jump at any time. If a handkerchief had come out of the control cabin, they would have left. The engineer officer went along the keel to inspect the ship. The rigid nose frame was crushed, and the ends of raw frame material had punctured the bag. We wrapped blankets around the ends of the frames and used all our patching material fixing helium leaks. We landed at Scott Field, still flying at slow speed, about 10:00 o'clock at night and worked all night, attaching the original flexible nose structure to replace the broken beams. Thirty hours later it was ready to leave the hangar, go on the mooring mast, and allow a rigid airship on a scheduled trip across the US in the hangar if emergency required it.

I left for Kelly Field to take a special course, and the base commander recommended dismantling the RS-1. That was the end of another semirigid airship. It had taken good care of itself in a terrible storm, and I have always valued the memory of flying through that storm.

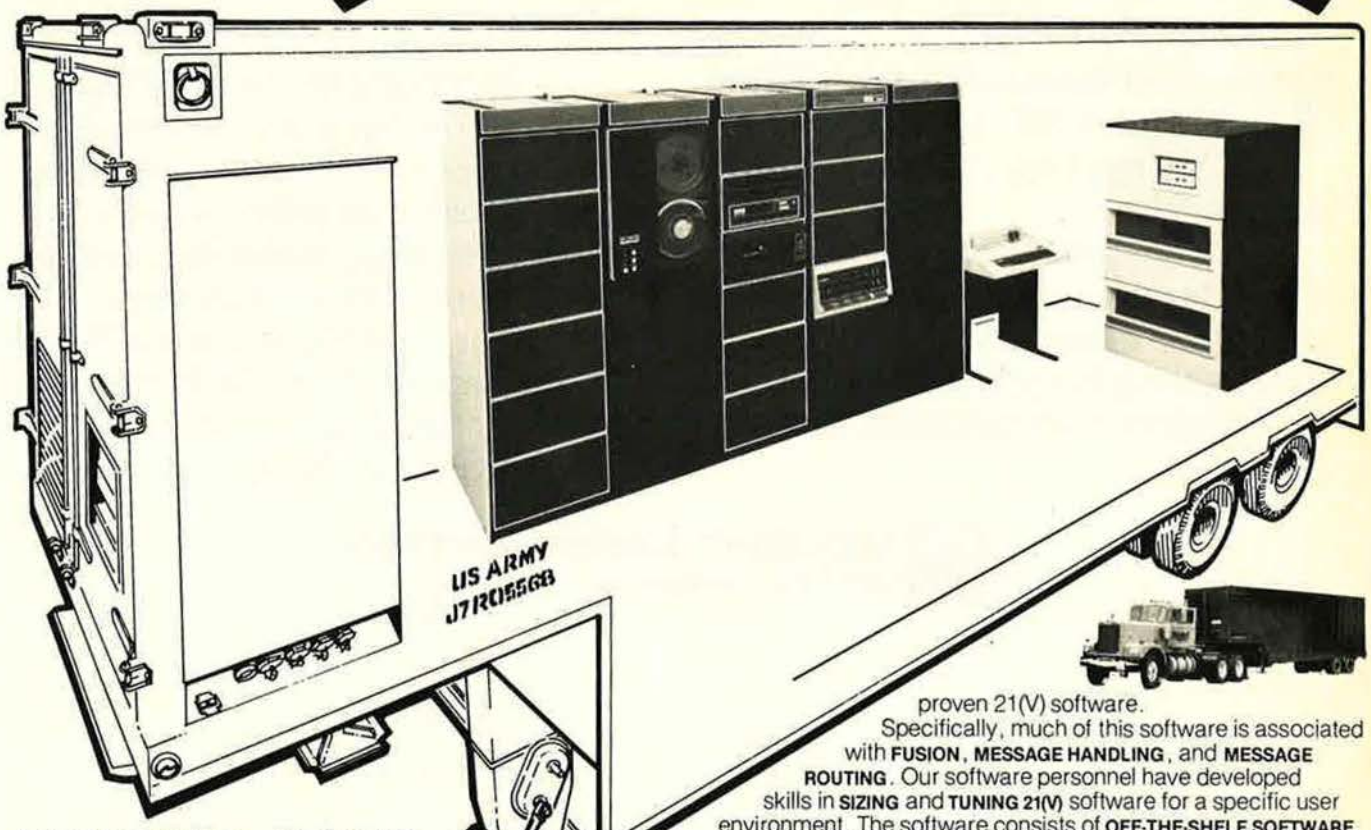
The Air Corps Abandons LTA

Finishing my school assignment in Texas, I was ordered to Wright Field, Ohio, in charge of the LTA engineering section. Airships still called, and I was permitted by the Air Corps to



The semirigid RS-1 at Bolling Field in Washington, D. C. It was the first and largest semirigid built in the US. The RS-1 was 275 feet long, carried a crew of ten, and was powered by four Liberty engines.

21(VICTOR)



AN/GYQ-21(V)

COMMITMENT / EXPERTISE

Bunker Ramo has the **HARDWARE** and **SOFTWARE EXPERTISE** to automate computer C^3I functions and a **COMMITMENT** to the C^3I market and to the **AN/GYQ-21(V)**. We have **INSTALLED OVER EIGHTY 21(V)s**. Most of these systems are **MULTI-PROCESSOR** systems, and some are **VAN MOUNTED**. Bunker Ramo has developed a **MANAGEMENT PROGRAM** and **PROCEDURES** that are tailored to the 21(V) – including reliability, maintainability, ILS, training and software development disciplines.

COST/SCHEDULE

Bunker Ramo's substantial expertise, favorable **OEM** arrangement and the cost-effectiveness of Bunker Ramo hardware and software products assure the operational user a **MINIMUM COST TURN-KEY SYSTEM**. Bunker Ramo maintains a 21(V) **INVENTORY** to insure turn-key systems are **AVAILABLE IN THE SHORTEST POSSIBLE TIME**. Some systems can be delivered within 90 days.

SOFTWARE

In its role as **AN/GYQ-21(V)** system integrator for the C^3I communities, Bunker Ramo has assembled and developed a large repertoire of proven 21(V) software.

Specifically, much of this software is associated with **FUSION**, **MESSAGE HANDLING**, and **MESSAGE ROUTING**. Our software personnel have developed skills in **SIZING** and **TUNING 21(V)** software for a specific user environment. The software consists of **OFF-THE-SHELF SOFTWARE**, available from government and industry sources. While most of these systems serve C^3I functions, the 21(V) is applicable to a wide range of other applications such as logistics support.

HARDWARE

The Bunker Ramo **AN/GYQ-21(V)** is based on the popular **DEC PDP-11** computer series **(PDP-11/34** thru **PDP-11/70)**. **DEC's** position and **STAYING POWER** in the computer business is well known. Bunker Ramo has designed a number of hardware and software components to provide price, performance, and flexibility advantages for the 21(V). Bunker Ramo is expert in configuring these systems and in selecting the appropriate components for the job. The Bunker Ramo hardware items include a **COMMUNICATIONS CONTROL UNIT**, **LARGE CAPACITY DISK SYSTEMS**, **MEMORY**, **THRU-PUT OPTIMIZER** (Smart Disc), a **COMMUNICATION FRONT END PROCESSOR**, a **DISPLAY PROCESSOR**, and an **AUTODIN INTERFACE**. The **STANDARDIZATION EFFORTS** by **WWMCCS**, the **MILITARY COMPUTER FAMILY ARCHITECTURE COMMITTEE**, and the **STANDARD SOFTWARE BASE** have focused on the 21(V). Fully **MILITARIZED PDP-11's** are available and **SOFTWARE COMPATIBLE** with the commercial **DEC** processors. Hence, the user can specify a fully **MILITARIZED PROCESSOR** for severe environment and the less expensive **COMMERCIAL COMPUTER** for normal environments.

Bunker Ramo has a commitment to expand our support, components, and our software systems for the 21(V). For additional information please contact:

BUNKER RAMO

ELECTRONIC SYSTEMS DIVISION
31717 La Tienda Drive, Box 5009
Westlake Village, California 91359
213/889-2211

Joe McKelvy
Director
Advanced Programs

OHIO: Claypool Building – Suite 302 / 4130 Linden Avenue / Dayton, Ohio 54432 / (513) 254-2659 • **VIRGINIA:** 1500 Wilson Boulevard – Suite 400 / Arlington, Virginia 22209 / (703) 524-8700 • **NEW YORK:** 1333 E. Dominick / Rome, New York 13440 / (315) 337-6100 • **MASSACHUSETTS:** 401 Belknap Road / Framingham, Massachusetts 01701 / (617) 877-1888

Right on target again!

The 23rd Tactical Fighter Wing, England AFB, Louisiana.

You can't beat a winner. And, nobody did.

The A-7D "Corsair" tactical fighter team was the overall team winner for the second consecutive year in the Royal Air Force Tactical Bombing Competition at Lossiemouth, Scotland, July 5-8.

In winning the Sir John Mogg Trophy as the top team, they made a single day score of 1733 out of a possible 1930, based on points achieved in bombing, strafing, leadership, navigation, and operational turnaround.

The men and women of Vought congratulate the U.S. Air Force, and especially the 23rd, on their outstanding achievement. Again.

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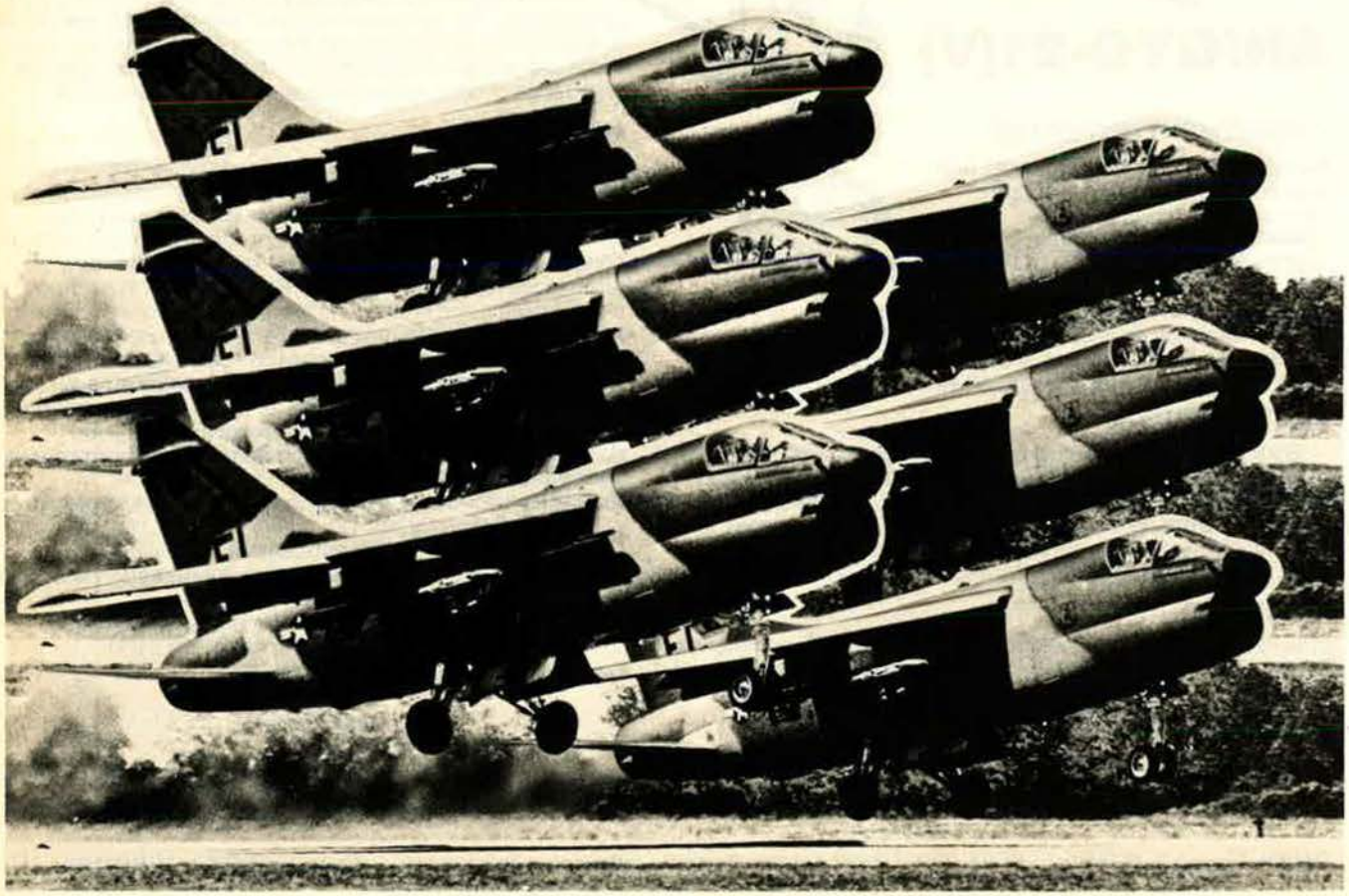


test-fly an entirely new design, the ZMC-2 "Metalclad" built in Detroit, Mich., by Carl B. Fritsche, President of Aircraft Development Corp., for the Navy. About the size of a nonrigid "C"-type airship with an aspect ratio similar to an egg, it was built of duralumin strips sewed together with bracing structural rings inside, supported by longitudinal members at regular spacings. The covering was aluminum-coated skin, tailored to fit tightly over the frame in strips sewed together by a special machine. It looked like a huge aluminum egg.

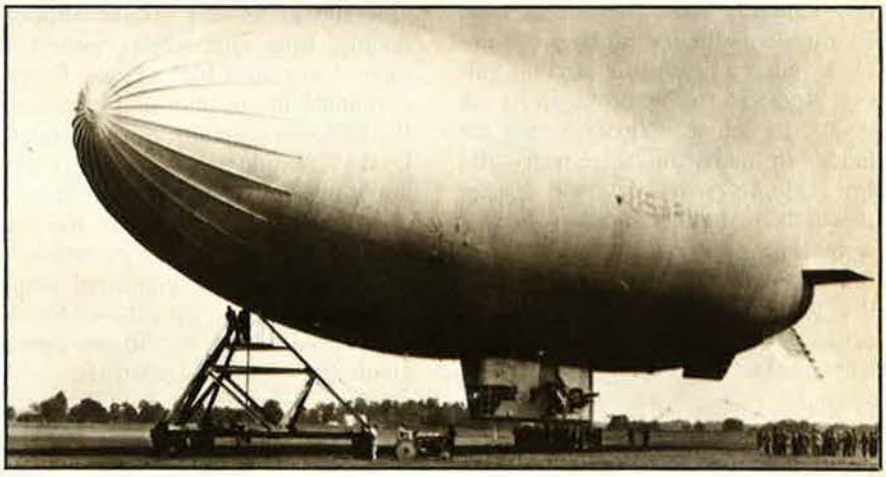
The ZMC-2 had internal cables for strength and a ballonet to allow for changes in internal gas volume. It stood up perfectly when completed, but full of air that had to be replaced by helium. This created a problem because to pull out the air would collapse the ship's gas-holding compartment. It was solved by filling the ship with a heavier-than-air gas to exhaust the air, then draining that off at the bottom while helium entered the top. It worked. Then, once inflated, we invented a "helium diving suit" for a man to enter and readjust cables, etc., inside the helium-filled ship. It held gas better than fabric did.

After test flights by the manufacturer, we flew the ZMC-2 to Lakehurst and finished the tests, exceeding all requirements. I believe it was the strongest-type airship ever built, and should have had more consideration by airship manufacturers at that time. I once offered to fly it through a line squall to prove it. The airship flew for about ten years, then was dismantled by the Navy. In my opinion it was a remarkable engineering development.

In 1932, I was assigned as Air Corps contracting officer at Wright Field, then detailed to conduct tests on another new internally rigged nonrigid airship, the TC-13, built by Goodyear Zeppelin at Akron, Ohio. It was about twice the size of a "C"-type, with a large control cabin, two reversible props, and air-cooled engines. It had a flying-time capability of seventy hours, with many improved qualifications for reconnaissance and observation.

We flew it to Langley Field, finished two months of tests and training for pilots and ground crews, then left it with the Langley Field airship company. It performed successfully, but along with the TC-14 was later turned over to the US Navy, when in 1934 the Air Corps, facing a complication of missions and shortage of funds, decided to leave all LTA activities to the US Navy and the US Army ground forces.

—Smithsonian Institution



Top, the ZMC-2 "Metalclad," built in the late 1920s, was considered by the author "a remarkable engineering development," and "the strongest-type airship ever built." It flew for about ten years. Another nonrigid craft, the TC-13, above, had a successful flying career, but in 1934 was turned over to the Navy when the Air Corps phased out its LTA activities.

Free Ballooning: Interludes and Postlude

Balloon Races

While I was assigned to airship duty, I kept up an interest in free ballooning, as did a number of airship and airplane pilots, some before my time. Lt. Frank Lahm (later a major general), who was US Army airplane pilot No. 1, became the first US officer to win the Gorden Bennett International Balloon Race, in 1906. In 1922, Maj. Oscar Westover, who later became Chief of Air Corps, won the National Balloon Race, which started that year from Milwaukee.

In early 1927, the Air Corps entered three free balloon teams in the National Balloon Race at Akron, Ohio. The third team, announced very late with about a month to prepare, was myself and Lt. William Eareackson. We entered our first race and won third place, landing at 2:00 a.m. the second day in a graveyard on the coast at Biddeford, Me. We barely missed going down in the Atlantic Ocean, as we were flying southeast above a fog when we decided to land.

That race put us on the US balloon team. About two months later, we placed midway down a list of fifteen balloons from various nations in the Gordon Bennett International Balloon Race. We did better in 1928, when we won both the National and Gordon Bennett races. In the former, we were awarded the Paul Litchfield Trophy, and by winning the latter, we brought the King Albert of Belgium Trophy to this country permanently. It now is on display at the Air Force Museum at Wright-Patterson AFB,

Ohio. I automatically became Captain of America's 1929 International Balloon Race contestants. Due to Eric's illness, Capt. James Powell, an experienced balloon pilot, flew with me. We won second place.

Sometimes Mother Nature takes a toll of all of us, and without delay. In the National Balloon Race of 1928 from Pittsburgh, Lieutenant Eareackson and I took off in the evening. We headed east into a towering thunderhead, in spite of our efforts to avoid it, and were sucked up to 7,000 feet, passing from a drenching rain to snow and ice with violent lightning, then down rapidly almost to the surface. By throwing out several bags of sand we avoided a crash in a circular valley. We had a rubber cover under the basket to act as a float in case we landed in the ocean, as we nearly did the previous year; thus our basket was a huge bucket, holding lots of weight in water. Fortunately, as it turned out, that weight kept us near the ground. Three other balloons came down near us, and all three were sucked right back up into the storm.

We went at great speed down a valley, took out three 20,000-volt electric lines, and crashed into a six-line assembly. Our wet drag rope crossed two of the lines and put out all electricity in the area. We then hit a two-arm railway telegraph pole and hung there until we could push off and go on through the night to win the race, landing the next morning at Weems, Va., just before going out to sea.

The three balloons we had seen during the thunderstorm were struck by lightning when they went back up into the storm. A pilot in each one was either killed or burned by the lightning.

The *Explorer I* Stratosphere Flight

In 1927, at Scott Field, I had helped Capt. Hawthorn C. Gray prepare for a high-altitude free balloon flight in which he lost his life. Five years later, Capt. Albert Stevens suggested we try to complete Gray's work. I agreed to help plan the flight, which ultimately became a joint National Geographic Society-Air Corps project. Its purpose was to study cosmic rays, the ozone layer, and the effects of high altitude on man, among other things.

The Society agreed to finance the flight, while the Air Corps would provide the pilots and ground support people. Brig. Gen. Oscar Westover, then Assistant Chief of Air Corps, appointed me to pilot and command the balloon. Captain Stevens was to be the scientific observer, and Lt. Orvil Anderson the operations officer.

Dr. Gilbert Grosvenor of the National Geographic Society assembled a committee of distinguished scientists to decide on what data we should gather and on the two dozen instruments that would be needed.

The Goodyear Zeppelin Corp. built the balloon, named *Explorer I,* which was more than three times as large as any previously built, and Dow Chemical Co. made the magnesium alloy gondola. When partially inflated, the balloon would stand more than 300 feet high, so we had to find an area where it could be protected from the wind while being inflated. Lieutenant Anderson and I, after a two-week search, found a 400-foot-deep depression near Rapid City, S. D., which was just right.

The flight generated national interest. It was what would be called a media event today, and was covered by the press and radio.

In due course, on July 28, 1934, the weather was right and everything was ready for the flight. I signaled and we lifted off at 5:45 a.m. through earth's dawn to the dawn of the space age.

We climbed to 15,000 feet, then stopped and squared off for a continued climb on up to the limit of the balloon's ability to rise. We hoped it would be 70,000 feet, or maybe even higher. The instruments would automatically record the unseen forces we were passing through. I felt I knew hardly anything, but I had faith in our scientific committee, who impressed me as the very best directors we could follow.

After more than an hour's stop, all instruments were checked and in place. We entered the gondola and closed the doors, checked our oxygen-producing units, then started up to the next planned stop at 40,000 feet.

We were now living and breathing from what the inside of the gondola supplied. It was comfortable. We breathed excellent air and talked by radio to our friends on earth from a 40,000-foot altitude, the first time such a planned high-altitude stop in a balloon had been done. Our controls and all equipment worked. The clicks of Geiger counters caused by cosmic rays had come at two or three a minute while on the ground. Here they sounded like chickens pecking corn on a tin pan—more than fifty times a minute.

After an hour and a half, we started up again, intending to stop at 60,000 feet to record data. All instruments except the one measuring diffusion of light, which hung 500 feet below on a rope, were photographed every ninety seconds. I kept a log, Steve made notes, and our remarks were recorded. The instruments never failed,

Contenders assembled for the 1930 International Balloon Race. After a long hiatus brought about by disillusionment with lighter-than-air craft, balloon racing—of the hot-air variety—has now come back into popularity.

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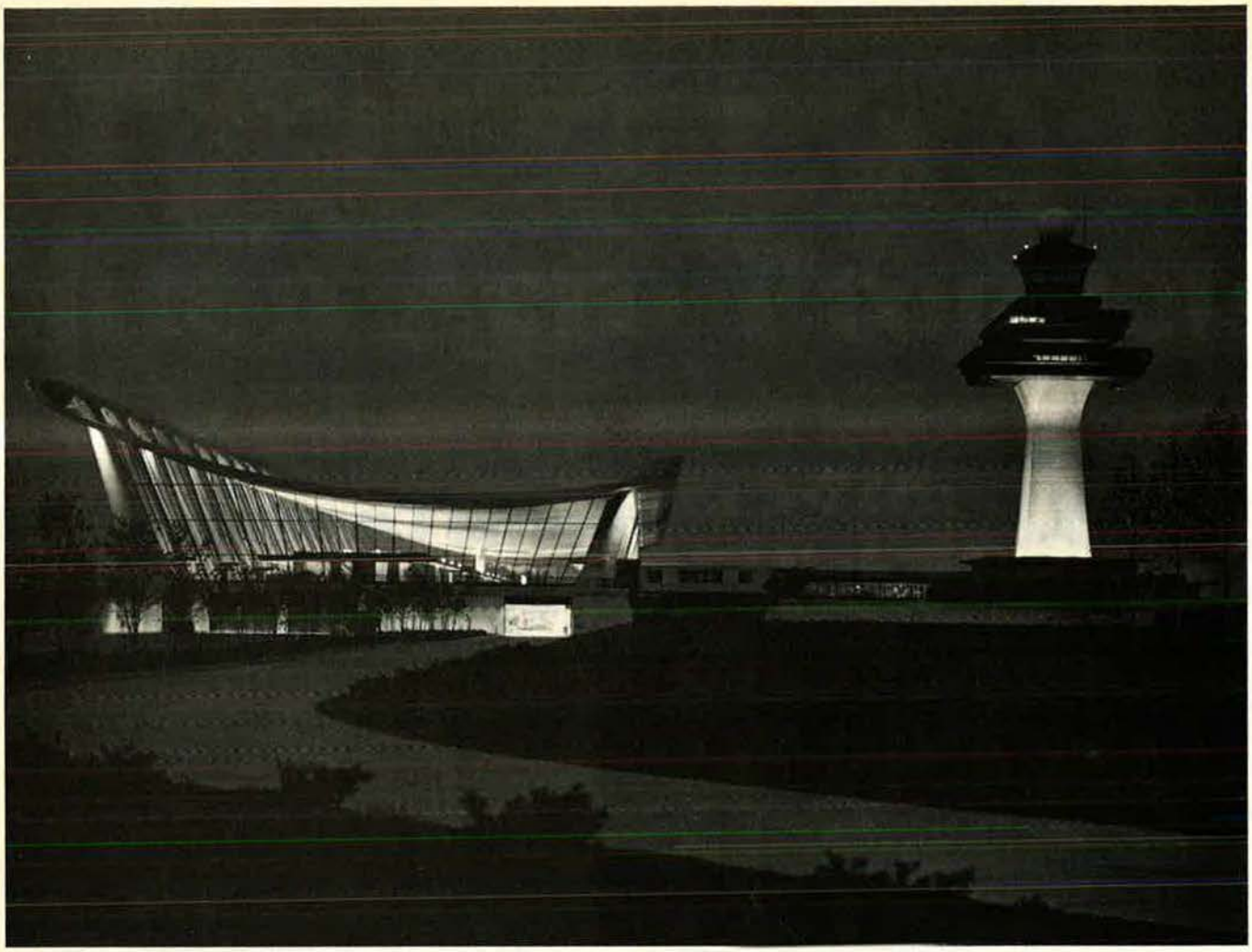

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World-renowned architect, Eero Saarinen, was pushing back frontiers with his "reaching for the sky" design for Dulles International Airport. In this same spirit, ITT Aerospace/Optical Division has pioneered advanced VHF/UHF Air Traffic Control communication systems renowned for unfailing performance. That's why you'll find them installed in major FAA-controlled airports and at virtually all Air Force, Navy and Marine bases and air stations in the U.S. and overseas.

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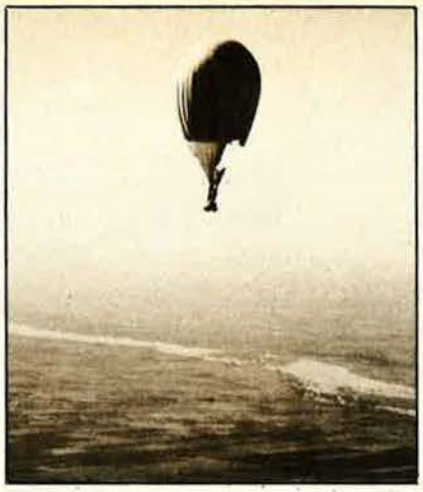
The best ideas are the ideas that help people.

and the film of the instrument recordings was recovered and developed after the balloon crashed. I believe the photo records gave us more than seventy-five percent of the results we sought.

The ascent was steady. Conditions as expected. We talked to Washington, D. C., to our scientists, to some news media. Communications seemed flawless. Near 60,000 feet, we prepared to make our third stop, then go on to the maximum altitude. We expected no visitors, but a noise like knocking sounded on the top of the gondola. I looked up through a Pyrex window. Hard to believe, but there it was, a thirty-foot slit in the bag, fortunately in thin fabric just below the heavy ring of suspension fabric that carried the weight of the gondola through ropes connecting it to the balloon. Andy was gazing over my shoulder. I stepped away, watching his face, which looked grim. I said, "Do you see what I saw?" He said, "Yes. There is a hole in the bag."

I stood with my hand on the trip to free a huge parachute in an emergency. We agreed it was time to start down, hoping everything would hang together. Our momentum carried us past 60,000 feet while the balloon spilled hydrogen in addition to our valving off some of the gas. Then it slowly started falling, with some mild oscillations. The rate of descent varied between 700 and 1,100 feet per minute, with the bag acting as a huge parachute. The air pressure forced



With its fabric torn, Explorer I *falls to earth from an altitude of 60,000 feet. Its scientific mission was, nevertheless, a success.*

the light fabric up and the hole enlarged to about sixty by six feet, then the fabric finally tore half loose until we looked up into a 3,000,000-cubic-foot parachute.

At about 25,000 feet, we heard an airplane. Lt. James F. Philips was circling us, while MSgt. Gilbert took pictures as we dropped. At 22,000 feet, we cracked the doors, and equalized pressures inside the gondola with outside. We climbed out and surveyed the damaged bag. It was a "parachute" full of very impure hydrogen likely to explode any time. I ordered the others to jump.

The ripcord of Andy's chute had been tripped accidentally, and he had gathered up the canopy in his arms. He discussed the advisability of jumping while he stood on the door under my feet as I stood on top of the gondola. It was settled for him. There was a bang overhead. The hydrogen had exploded at 5,000 feet. I yelled, "Jump!"

Andy went backward through the dangling fabric as he said, "OK." I was relieved to see his chute open.

Steve, who had been standing at the eighteen by twenty-two-inch door behind me, was gone. I slid down from the top of the gondola to jump. I yelled, "Everybody out?" I heard Steve inside the gondola say, "I'm coming." He came out under my feet, but got stuck in the upward rush of air. Fortunately, I was able to give him a shove with my feet. He cleared the gondola. His chute opened and was roughed by whipping suspension ropes. I recall hoping he would clear them.

I next remember looking back through my legs at the gondola. My chute opened as the gondola hit about 125 feet below me with a large splash of dust. I landed near the wrecked balloon; Steve and Andy a little further away. We had returned safely, with sincere thanks to our good Lord and a good balloon. Even though crippled, it had held together until we could jump in individual parachutes.

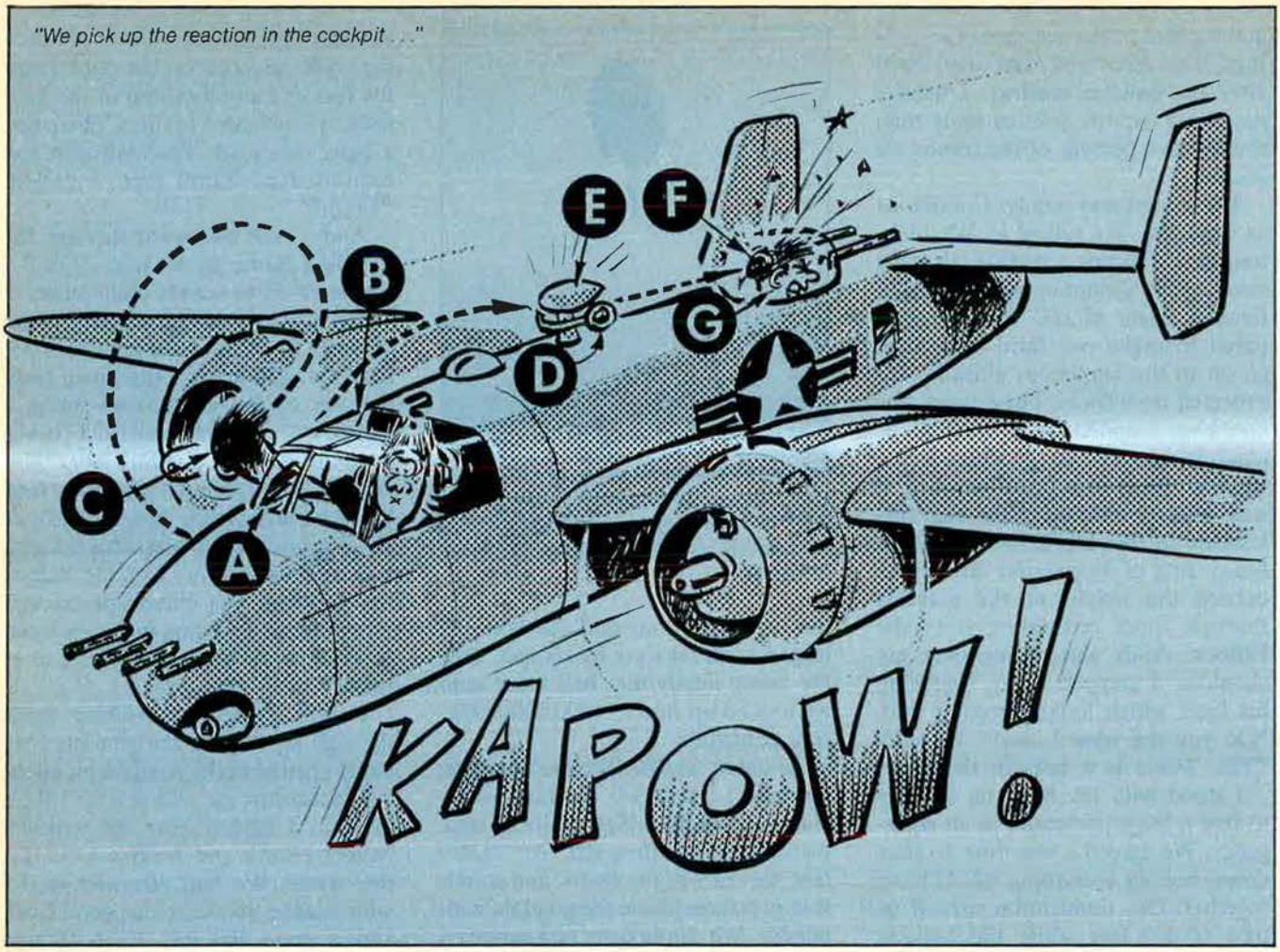
Lieutenant Philips landed his plane nearby. He and Andy took care of the wreck while I went with Steve to a Mr. Reuben Johnson's house to telephone headquarters. While I talked, a voice came on to say, "Major Kepner, we are going to put you on radio by phone to tell the news." And we did.

It was time to pack up and get back to the business of living more lucky days. The data our balloon collected was used on later flights and began scientific studies for space explorations. After difficult starts in 1935, Steve and Andy flew to a balloon altitude record of 72,000 feet in *Explorer II.*

My years in lighter-than-air were full of challenges, some of which could not be won, but all were worthwhile as part of a young man's life. To me, those years proved at least two great adages: Opportunity does not knock only once—it keeps on knocking; and in the solution of a great problem, be bold but not rash—be prudent but not timid. ■

—National Geographic Society

The author and Mrs. Kepner at left, with South Dakota Governor Berry and Mrs. Berry, who christened Explorer I *before liftoff on July 28, 1934.*



Mating the AAF's B-25 Mitchell bomber with the Army's 75-mm cannon, and combining a squadron of the resulting B-25Gs with a wing of RAF Beaufighters, didn't always produce synergistic results. It did guarantee some zany combat capers in the little-known Middle East Theater of World War II during . . .

THE PRIVATE WAR OF GAMBUT THREE

BY LT. COL. JIM BEAVERS, USAF (RET.)
CARTOONS BY BOB STEVENS

It was a sequence that Rube Goldberg might have thought up—and then discarded as being too improbable. Nevertheless, it happened, as did a lot of other wacko things in World War II, and maybe the best way to describe it is with some sort of word diagram.

Let's begin with a B-25G carrying a 75-mm cannon in its nose—an improbability in itself—flying at only about fifty feet above the eastern Mediterranean among enemy-held Greek islands. An incredibly loud explosion started the sequence. Any sudden, unexplained noise has always been an instant cathartic to a flyer, but this one was enough to straighten a man's shoelaces. It was like one of those mid-August thunderclaps out of nowhere—nature's original *gotcha*!

We pick up the reaction in the cockpit. Copilot (A) bolts erect in shock and yells, "My God, we've been *hit*!" Not much gets past the copilot. Presumably to inspect for aircraft damage, he reaches for handle of right-hand cockpit window (B), yanks it open, and tries to stick head (C) out into 200-mph slipstream. While A is lucky to retain C, his headset (D) is swept off and begins a circuitous journey. Rotation of right prop, in combination with airflow near wing root, causes headset to be lofted to clockwise motion, looking aft, to upper fuselage area behind pilot's escape hatch, where it makes a perfect ringer on radio antenna mast (E), there to be found after landing ninety minutes later.

But rubber-covered earcups (F) detach themselves from headset and continue due aft, as crow flies, to strike upper turret (G), which happens to be rotated to rear because gunner (H) does not care for frontal view at the moment. Earcups penetrate turret and, their energy spent in the process, rap gunner lightly on posterior cranium. Gunner, who has also heard loud explosion and is expecting the worst, descends from turret and lies down on deck to expire with dignity. Radio operator inspects gunner, finds that he could pass Form 64 flight physical standing on one hand if necessary, and assists him back into turret with toe of GI brogan (J).

Meanwhile, back in the cockpit, pilot hesitantly tries controls to confirm presence of right wing, left wing, elevators, rudders, or all of the above. Everything responds in cockpit except copilot, who, from facial expression, is still out to lunch. Situation is upgraded from instant disaster to ditchable emergency. Pilot is not in best of form either, since he is picking and choosing between wave troughs and trimming to ditch with (1) both engines performing flawlessly, (2) all controls responding, (3) no casualties aboard, (4) airspeed indicator still reading normal cruise, and (5) aircraft out of range of enemy fire.

Some twenty feet above sea level, it dawns on pilot (me) that disposing of a perfectly good airplane in the drink is not a recognizable stroke of genius. I pull up, gather together my dispersed four-ship formation, and fly back to our African base without further incident.

After landing and parking, I filled out the Form 1, entering "C"—for Comedy—in the mission symbol square, and just sat there awhile to think things over. That had been my thirtieth or so combat sortie, and should have been conducted with elder-statesman aplomb. Instead, it had resembled something out of a very bad movie.

I had blundered head-on and at low level into a miniature invasion of one of the Aegean islands by the Germans, and found myself and my flight sitting ducks between two beachheads, one of them the port of embarkation and the other the port of entry, with maybe a quarter-mile of water between them. I had just rounded one island and there we were, upstage center and the focus of multiple gun emplacements on both sides of us.

Naturally enough, the noise of four clattering B-25s had preceded us around the corner, and the opening barrage was orchestrated with flawless timing. We were being shot at instantaneously from so many directions that it was very difficult to guess which way was out of trouble. What's more, we were still in the fingertip fighter formation that we used, and I couldn't turn abruptly in any direction without getting personal with one of my wingmen.

They solved that problem in a hurry. One came under me, in a masterpiece of precision flying that somehow kept his wingtip out of the water. The other two just disappeared, and suddenly I was doing a solo for the fans in the front row. It was at that point that the incredibly loud explosion occurred, and it had to have been the nearest high-caliber miss, without doing any visible damage, that I've ever heard about.

It took the crew chief to unravel the sequence of events that almost had us manning the life raft. It was he who found the remains of the copilot's headset on the radio antenna mast, and he who pieced the evidence together to trace the flight of the earcups. With more patience than we deserved, he carefully explained it all, pausing only from time to time to look at the copilot and me and shake his head sadly.

I believed him. If we had been somewhere else, fighting a logical campaign in a combat theater that could be taken seriously, and using an airplane that made sense, I might have sneered at that ridiculous story. Where we were, it fitted right in. It was that kind of war anyhow.

Birds of a Feather

Detached from our parent bomb group in Italy in the fall of 1943, we were a single squadron of B-25s and the only US combat force in a theater of operations few ever heard of—the Middle East. We were in the Libyan coastal desert, 500 miles west of Cairo, at an RAF base called Gambut Three. There wasn't a Gambut One or a Gambut Two, and the only explanation I could think of was that whoever had named it had also rated the place on a scale of ten.

Why we were sent there was a matter of conjecture. The Army Air Forces was not big on detailed explanations in World War II, but it seems likely that the reason for the assignment had something to do with the indeterminate nature of our cannon-toting airplanes, with a popular guess that they were intended for use against naval targets, and with the fact that the RAF wing at Gambut Three was mostly in that kind of business. It had seemed pretty obvious back in Italy, and earlier in Tunisia, that whatever the intended purpose of our B-25s, medium altitude bombing wasn't it.

The British at Gambut Three were equipped chiefly with two versions of the twin-engine Beaufighter. One version was a torpedo carrier. The other version was more generalized. It had the same four 20-mm cannons in the nose, but carried only rockets and small bombs that were rack-mounted on the wings. If it had been an American make, it would probably have been designated an attack aircraft, like the A-20 or the A-26 of the day.

Our B-25s were the "G" model, with a 75-mm cannon installed in what had been the bombardier's crawlway, and what had been his greenhouse compartment now housed four .50-caliber fixed machine guns in addition to the cannon. It, too, might logically have been redesignated as an attack aircraft, but, at least in Europe, its combat role was never really clarified. Having a more descriptive nomenclature was the least of its problems. (*In "AAF's Flying Artillery—The 75-mm Baker Two-Five," April '76 issue, the author described in humorous detail the trials and tribulations of going to war with the B-25G.—The Editors*)

What all three types of airplane had in common was that they were designed primarily for use at low altitude, and each had a fatal flaw—besides that, I mean. In some disastrous prior engagements, the pilots of the torpedo-carrying Beaufighters had confirmed once more what the US Navy had learned early in the war, at the Battle of Midway—that the torpedo was meant to be delivered by submarine.

Human ingenuity has been credited with some remarkable innovations, but we have often fallen victim to the notion that if two devices work well separately, it follows that they will work even better together. Historically, that sort of thinking has produced the rocket-propelled sedan chair (only one known prototype tested) and the musical sewing machine, among others. More recently, it produced the torpedo bomber and the B-25G. The root difficulty for the torpedo-carrying Beaufighter pilot was that it required some complex inflight trigonometric solutions, a slow and steady hand on the controls, and a strong suicidal tendency. Its Achilles' heel was its extreme vulnerability to antiaircraft fire when making a torpedo run at anything worth a torpedo.

The more generalized version of the Beaufighter was, with its array of cannons, formidable to the front but a pussycat aft. It had a single .30-caliber machine gun, drum fed, for protection to the rear. The gun was right out of *Dawn Patrol,* and was unpopular from the beginning because it was hard to make drums and enemy airplanes come out even.

As an early experiment in psychological warfare, the RAF loaded the drum with tracers only. An observer crew member told me that the accepted drill, when under attack from the rear, was to reach one hand up to the gun, which was mounted on a ring outside an open cockpit facing aft, and to gyrate it while holding the trigger down, producing as big a display of tracer fire as possible. That reduced the gunner's exposure and left the other hand free to unstow the life raft, which was going to be needed momentarily.

One RAF pilot flying the standard Beaufighter was an American who had thus far resisted repatriation. His name—perhaps inevitably—was Tex. His chance for glory came one day when he was flying a lone reconnaissance mission and happened upon a lone Me-109 doing the same thing. About to give it wide berth, Tex discovered that he was behind the fighter and evidently unnoticed to that point. The temptation was too great. Hunkering down slightly below and dead astern of the Me-109, he crowded on the manifold pressure and began inching up on it, much to the horror of his observer. The two airplanes were flying at low altitude among islands occupied by the Germans, and Tex's observer was certain that some blabbermouth was going to call the Me-109 pilot any second now to tell him he was being stalked. The closure rate was painfully slow, and the tension became unbearable.

"For God's sake, man—*shoot!*" the observer pleaded.

Against his better judgment, Tex raised the nose of the Beaufighter, lined up his target, and cut loose with all four cannons.

He missed, and in a few short minutes, Tex and his observer were squabbling over the single one-man dinghy that had survived when they ditched after being thoroughly ventilated from the rear by the Me-109. Fortunately, Tex had possessed the foresight to head for the coast of Turkey, only a mile or so away, when the German fighter whipped into a turn to come after them, and when he planted the riddled Beaufighter in the waves, they were within swimming distance of an officially neutral —but in practice friendly—shore.

Tex and his observer were back at Gambut Three in a couple of weeks, but not on speaking terms. Humility was not one of Tex's long suits, and as far as he was concerned, the observer had botched up an unparalleled opportunity for Tex to be one of the very few—if not the only—Beaufighter pilot to shoot down an Me-109.

Those of us flying the B-25G had already learned that the airplane was too big and slow—and hence too vulnerable—to perform well in the low-altitude antishipping business. We had also learned that the 75-mm cannon was essentially unaimable—that hitting anything with it was a matter of blind, dumb luck.

Incompatibilities—Alimentary and Otherwise

Our joint efforts with the British got off to a bad start. In twos and threes, we had flown down to Gambut Three from Italy, arriving in time to unload our personal baggage, select one of the tents that the RAF had set up for us, and make our way around the field to the officers' mess for supper. The main course was mutton stew, and one of us raised the possibility that the recipe had included sheep dip. Tired and hungry from a long day's flying, we ate it nevertheless, gagging as inconspicuously as possible in the interests of international harmony, and turned in early to let our digestive systems fight the problem out on their own.

But breakfast the next morning showed us what we were really up against. I sat at a long table and was served a plate on which rested a square of what looked and tasted like composition board, but which proved to be toast. On top of the toast was a layer of baked beans, and on the baked beans there reposed a small, very dead fish, lying in state and staring up at me with one glazed eyeball. As the RAF crews around me wolfed at theirs, holding their

forks upside down and shoveling food onto them, continental style, I nudged the small corpse off its bier and began interring it with beans, thinking how moving it would be if someone sounded "Taps" on a tiny bugle. With the fish laid to rest, I ate the toast. Man may not live by bread alone, but there are worse things, let me tell you.

It was a portent of things to come. We flew several joint missions with the RAF and found that, like our tastes in food, our aircraft and tactics weren't especially compatible either. Normal cruise in a B-25G was about 200 mph, while the Beaufighter was substantially faster. That in itself was no big deal, and since a combat tour for an RAF pilot was based on total flying time rather than a specified number of missions, I'm sure they didn't mind slowing down. It did mean that we became separated immediately when a target was sighted, because the Beaufighters needed the performance that came with higher power settings.

Also, a standard practice with the Beau was to open up with all four cannons in the nose and use the tracers to get on target—something we could do with our fifties but not with the big gun, and it was axiomatic that if we were within .50-caliber range of any sizable vessel that was so far undamaged, we were by definition too close. That for us was a "can't miss" distance, but it was unfortunately a bilateral arrangement. The Beaufighter was smaller, faster, and much more agile than the B-25G, and could poke its nose into questionable situations and get out of them in a hurry if the odds were bad. The B-25G pilot had to have some better idea of what he was getting into, because once he lumbered into a sure-loser circumstance, he had no choice but to lumber out again, displaying a glassy smile and hoping he hadn't offended anybody in passing.

The joint missions died out of their own accord. There was no evidence that we were making life easier for each other, and none that we were accomplishing more together than we did separately. In no time, the Beaufighters were back to plying their trade alone, and we were back to flying four-ship missions by ourselves.

And as an act of great mercy, the mideastern theater commander dispatched a US service squadron, well supplied, to Gambut Three to cook for us. Flown in from Cairo by C-54, they set up shop in less than two hours, and we celebrated independence from the British once more that night with some of the most stirring words I've ever heard: "How do you want your steak, Mac?"

Gentleman's War—Well, Almost

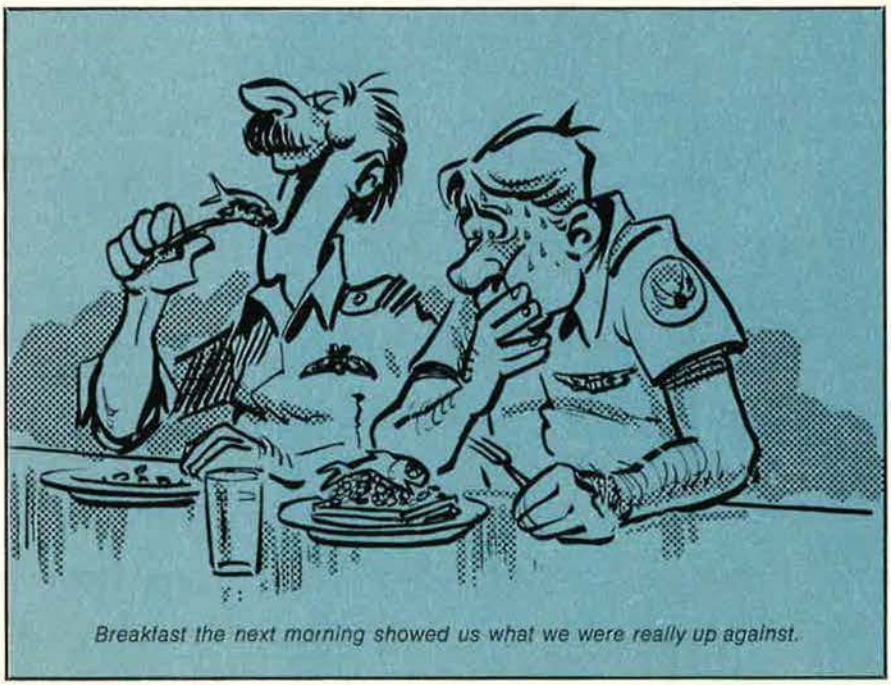
British intelligence reported that there were two full German divisions, numbering about 45,000 men, on the island of Crete, about 200 miles to the north of us. They were not there merely to occupy the large island, but to use its harbors, which sheltered a part of Germany's shrunken naval forces in the Mediterranean, consisting of a few U-boats, some armed trawlers, a few PT-type surface craft, and some freak odds and ends that fitted nicely into that screwball war in the middle of nowhere. In addition to Crete, German forces occupied a number of smaller islands to the north and east. One contained a sub pen, another an airstrip, and all had port facilities of some sort.

The true purpose of those deployments was obscure. Allied shipping through that part of the Mediterranean was almost nonexistent, and on the rare occasion when a major convoy came through en route to a mideastern port, it was so heavily escorted by US and British naval forces that the German high command surely had to weigh expected losses against expected gains before attacking it.

That was the general situation that made for such a peculiar war in that neighborhood: German forces there were largely antishipping in nature, with nothing to shoot at most of the time and too much to tackle the rest of the time. Events proved that we were in pretty much the same bind.

Early each morning, the RAF dispatched a Martin Baltimore, a twin-engine light bomber roughly equivalent to the Douglas A-20 of the day, on a reconnaissance flight to Crete and on north through the Greek islands. The Germans had Me-109s on Crete, and the Baltimore would have been a pushover if attacked, but it never was. It was embarrassingly clear that the Germans didn't think it was worth the effort. On the other hand, the Germans also dispatched a recce ship—usually a Ju-88—through the same area and south of Crete from time to time, and it was no match for one or two of the Beaufighters the RAF had in abundance at Gambut Three. It, too, got an unhassled free ride, and for the same reason. Nobody cared. Besides, it was too early in the morning.

It seemed to be the unvoiced conclusion on the part of both sides that what the other was doing was devoid of military significance. The real war was hundreds of miles away. The



Breakfast the next morning showed us what we were really up against.

Germans in the Aegean weren't much of a threat to Allied forces anywhere. Crete was off the beaten path and in the backwash of a major thrust through Italy. It was serving so nicely to keep two German divisions out of action that I suspect the Allies would have haggled about taking it back if Germany had offered to give it up.

We rummaged around the islands almost daily in what were euphemistically called "sea sweeps." Most of us who were flying B-25Gs had developed real and justifiable doubts about this particular model of a generally outstanding airplane, as well as whatever passed for war in that area. Very little was worth getting steamed up over. We routinely shot our 75-mm cannons at anything that moved and routinely missed.

The German garrisons on the several Aegean islands were resupplied by small vessels—caiques—most of them sail-powered but with auxiliary engines. I spotted a fairly large one during the course of a sweep, signaled for echelon right, set the gunsight at an arbitrary value, fired the cannon, and began a turn to the left to set up a gunnery circle. I was trimming for the turn when my copilot grabbed me by the arm.

"You *hit* it!" he shouted in amazement.

Jim Beavers's whimsical accounts of B-25 adventures in World War II, transitioning from recips to jets in the early postwar years, and life as an Air Staff planner—all adorned with Bob Stevens's cartoons—have enlivened earlier issues of AIR FORCE Magazine. Retired since 1963, Colonel Beavers now lives in Winter Park, Fla., where he divides his time between running his own business and writing.

I rolled out of the turn and looked. Sure enough, a column of black smoke was pouring up from the deck and all sorts of rigging was collapsing. I rolled back into the turn. That lucky shot was better ignored. Otherwise, some ding-a-ling up the chain of command was liable to conclude that I could do it again, on order, and I knew better.

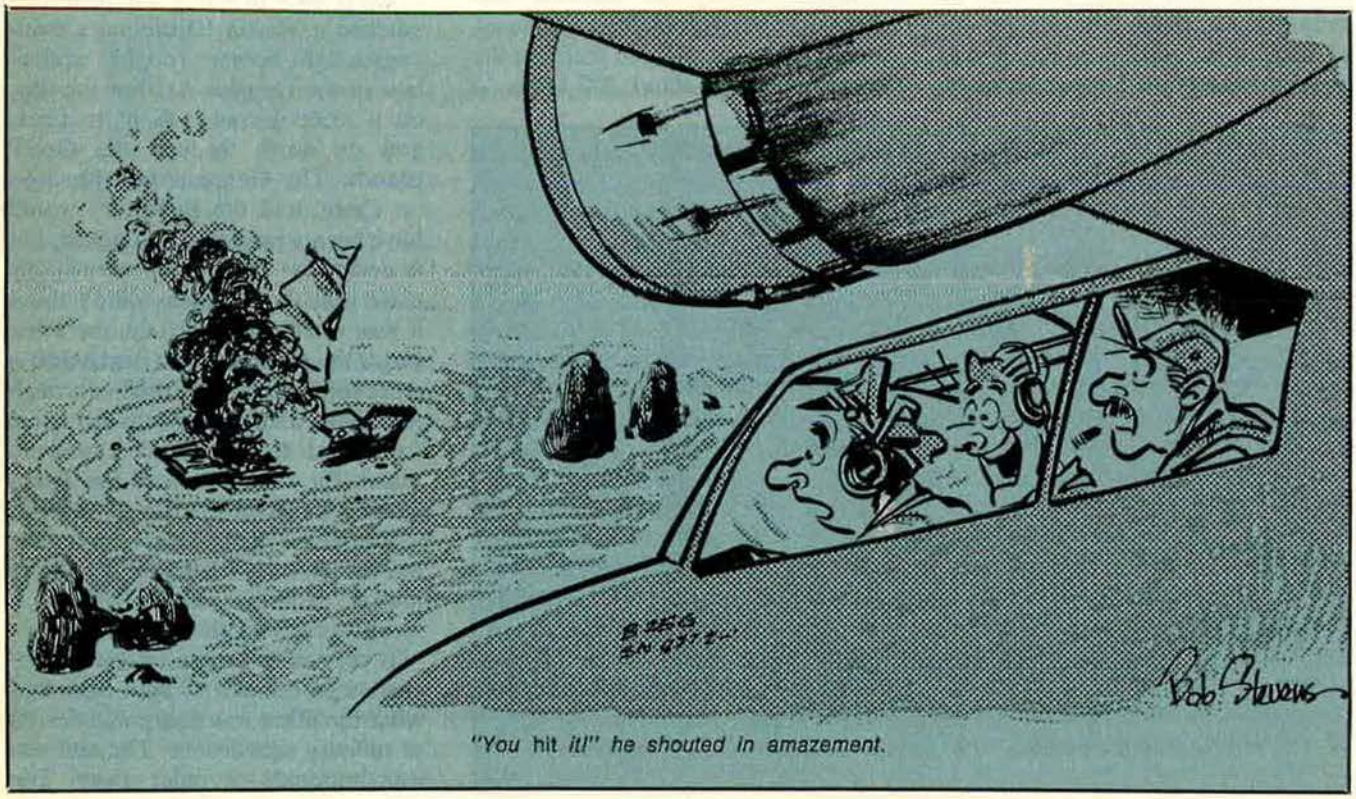
"I didn't see a thing," I said, "and neither did you."

Lurking here and there among the caiques were Q-boats, and I never learned what prompted the designation. They were decoys. My first encounter with one was in an open area northeast of Crete. As sailing vessels went, it was very large, and I decided that I'd found the mother ship of all the rest. Without bothering to form a gunnery circle, I opened fire with the cannon and watched as the shell, which was quite visible from the cockpit, sailed over the ship to impact beyond it. As I stared, a massive gate in the ship's supposedly wooden hull dropped open and an 88-mm cannon behind it flashed. My mouth hanging agape, I watched *that* shell as it sailed over *my* head. I recovered in time to conclude that perhaps a gunnery circle—a hell of a big one—wasn't such a bad idea after all.

That wasn't the end of the slick tricks devised by the Germans to keep the mail and groceries moving in the Aegean. Another was a howitzer of sorts that sat on the deck of a supposedly vulnerable caique and fired a length of steel cable into the air just as an attacking aircraft flew over. The idea was absurd, but it worked.

Gambut Three's Hour of Glory

My mother used to assure me that there is some good in everything, and she was right. However vulnerable the B-25G was to antiaircraft fire, it presented a nasty target, in formation and at low altitude, to enemy fighters. Even a four-ship flight was pretty secure against numerical odds as high as two to one. For starters, a head-on attack was apparently out of the question. If the cannon served no



"You hit it!" he shouted in amazement.

other purpose, it buffaloed the hell out of enemy fighters. Four Ju-88s in a formation identical to mine came across my one o'clock position once, and I turned the flight to meet them nose to nose. There promptly ensued the wildest *auf Wiedersehen* maneuver I'd ever seen, and I hadn't even fired a shot. I am positive that no enemy aircraft had ever been hit by the cannon in that theater, but it was crystal clear that nobody wanted to be first.

If head-on attacks were out, that left high-deflection shots from both sides, which nobody I ever saw was very good at, or the more traditional quartering attack from behind that usually curved in trail to become dead astern. Being much slower than the Me-109, the B-25s forced the fighter to reduce throttle if he was to have any hope of a well-aimed pass, and that was dangerous. Four B-25s could throw a surprisingly effective flood of .50-caliber slugs to the rear, and the closer the fighter curved in to the dead-astern position, the easier it was to saturate the space he occupied. Turning into the direction of attack compounded the fighter's problems.

Four or five hundred feet was about an optimum defensive altitude. It was low enough to preclude the rolling breakaway maneuver that Me-109s used against B-17s, and high enough to prevent them from walking shots through the formation by observing shell impacts in the water beneath us.

The day came when all of the elements at Gambut Three had to combine our several talents, whatever they were, in an attempt to compensate for our several infirmities. The Baltimore on reconnaissance radioed back, early in the morning, that a major convoy was headed south from Greece to Crete. It had apparently left port at sundown the day before, and on the basis of its observed speed was estimated to arrive in midafternoon. It consisted of one 5,000-ton merchant vessel and two destroyers, and for the Germans in that time and place, that *was* a major convoy. It was escorted by Ju-88s (the fighter version of the Luftwaffe's medium bomber) and Me-109s.

With all the ritual and easy formality for which the British are noted, orders emerged from some hitherto unknown war room in Cairo to lay on a combined operation. A flight of B-25Gs would attack the convoy from the west. A flight of standard Beaufighters would attack simultaneously from the east, and in the ensuing turmoil, a flight of torpedo-carrying Beaus would sneak in from the northeast with the big punch.

The B-25Gs—and my flight specifically—were to take on the fighters, and—just as specifically, it was hoped—the Me-109s. The standard Beaufighters were to engage the Ju-88s and strafe the destroyers—whichever came first—while the torpedo carriers held an earnest prayer meeting offstage in the wings to the northeast.

In spite of a predictable number of glitches, one of which worked in our favor, the mission was a qualified success. The convoy was already in the channel leading into the harbor when we arrived a little early in the B-25Gs. Everybody's timing was off, and we managed to get a real rumble going with the Me-109s before the Beaufighters got there. From the standpoint of overall benefit to the mission, that was good, although I had some difficulty in appreciating the larger view at the moment. I had made a slow, miles-wide circle, had climbed to 500 feet, and was working my way in a generally easterly direction with the fighters in dogged pursuit, when through the haze I caught a glimpse of the Beaufighters, far away and below, heading into the target on the deck. Since the fighter passes at my flight continued unabated for at least another ten minutes, I guessed I could assume that the B-25Gs had finally done one job right.

The Beaufighters had the most dangerous assignment by far. Their torpedoes left the merchant vessel in flames, and I never learned whether the Germans got them under control or not. It was pretty much academic in that theater anyhow. In a matter of months, the two divisions on Crete would be evacuated, the war in the Aegean sort of canceled for lack of interest.

Back to the Real Wars

Our squadron was also about to be recalled—not to Italy, but to Corsica, where we would trade our B-25Gs for conventional models and start earning a living at medium-altitude bombing. Enough, somebody had finally decided, of that low-level nonsense and wishful thinking about the cannon. It suited me fine. I'd have been the last to point out that we had finally demonstrated a useful purpose for the airplane—as a target decoy for fighters that others couldn't handle. No thanks. They don't make medals that size.

As a byproduct of our move back to the real wars, my copilot got his own crew, which he more than deserved. I briefly considered telling his new colleagues about his headset-on-the-radio-mast trick, and decided against it. He wasn't likely to repeat it—couldn't do it again if he tried. It was like my random hit on the caique and a lot of other freak occurrences associated with more than six months of combat flying at an altitude of fifty feet, all of them better forgotten.

Better remembered, however, was the reaffirmation of a lesson that has been there for the learning since medieval days, when a wealthy Chinese merchant had his servants attach forty-seven large rockets to his sedan chair, and with the experimenter deservedly aboard, caused them all to be ignited at once in order to become the world's fastest traveling salesman to that time. History records that little incident in the Smithsonian's magnificent new Air and Space Museum, and some references to the B-25G and the torpedo bomber belong on the same display panel. The lesson is that one good sedan chair plus forty-seven good rockets do not necessarily add up to one good rocket-propelled sedan chair.

A footnote about such innovations is that history, while it usually takes note of them promptly, is a long time in passing judgment. Thus far, the Chinese merchant is viewed as a classic case of being short one marble. But let somebody discover a practical use for a suborbital sedan chair, and historians will begin to refer to him as an early visionary. I know of several innovators in the aircraft industry of a few decades ago who, like that merchant, are still waiting for history to bail them out. It may take a while. ■

The USSR's negotiating positions at SALT have been, and will continue to be, based on the Soviet concept of how they would use nuclear weapons in war. Understanding that concept, which is drastically different from US nuclear strategy, is one key to assessing Soviet SALT II objectives.

Soviet Targeting Strategy and SALT

BY WILLIAM T. LEE

SALT IS A political dialogue not about how many and what kinds of weapons each superpower will have on hand to deter the other, but also about the forces each would have left after an initial exchange if deterrence fails. Both the US and the USSR reject initiation of nuclear war by an "out-of-the-blue" surprise attack as an instrument of national policy. Both expect nuclear war, if it occurs, to arise out of a crisis. At the same time, each superpower suspects the other of harboring dark designs for a surprise attack should the circumstances appear propitious, or if some desperate and reckless leader comes to power. In all cases, the "bottom line" is how each superpower proposes to use its weapons: What targets are to be attacked? What degree of damage is to be inflicted? What are the politico-military objectives, if any, of strategic nuclear strikes once deterrence has failed?

Public discussions of such matters in the US are dominated by two perceptions of how the Soviets would use their nuclear weapons. The most prevalent perception is a "mirror image" of the US "assured destruction" concept: attack US cities with large weapons to inflict as many millions of casualties and as much damage to production facilities as possible. The second, less prevalent, perception stresses the danger of a Soviet attack on US strategic nuclear delivery systems—ICBMs, heavy bombers, and submarine-launched ballistic missiles (SLBMs) in port—while withholding strikes on our cities to see if the US would capitulate after losing most of its land-based strategic nuclear forces.

In SALT, the US has sought to constrain or reduce Soviet forces so that they would be effective only against US population and urban infrastructures. Thus, we have tried to limit the number of "heavy" Soviet missiles that threaten our land-based missiles while granting the Soviets numerical advantages in missiles that are effective against US cities and other soft targets. The Soviets, on the other hand, have held out, very successfully, for high limits on both "heavy" ICBMs and total "strategic" launchers while avoiding specific constraints on missile characteristics.

There are two essentials to understanding Soviet performance at SALT. First, Soviet targeting strategy differs from popular US perceptions, more so from the purely countervalue perception than from the mixed counterforce/countervalue version. Second, Soviet strategic targeting strategy applies to both Eurasia and the United States. While we equate "strategic" to "intercontinental," the Soviets do so only in the context of SALT, where accepting our definition of "strategic" is in Soviet interests. To the Soviets, Europe and adjacent areas in Asia are of equal, if not greater, strategic importance than the "transoceanic" dimension. Both Soviet targeting strategy and the Soviet concept of strategic dimensions have had, and probably will continue to have, much influence on SALT negotiations.

Many factors, of course, have been involved in SALT, not least of them Soviet fear of the consequences of the ten-to-fifteen-year lead the US had in antiballistic missile (ABM) technology when SALT began. Understanding the implications of Soviet nuclear targeting thus is not the single necessary condition for understanding what has happened in the SALT process, but it is one necessary condition.

Specifically, Soviet nuclear targeting strategy appears to have played an essential role in negotiating the Interim Agreement on Offensive Forces signed by the two superpowers in May 1972 and in the negotiations leading to that agreement. Consider:

- The Soviets attempted to include in the US strategic aggregate those US tactical aircraft and missiles deployed in Europe that conceivably could deliver nuclear weapons in Soviet territory—the so-called "forward-based" systems.
- The relatively high ceilings—far more than required to destroy US cities under the most adverse second-strike conditions—of about 1,600 ICBM launchers and 740 to 950 SLBM launchers.
- The Soviet refusal to join in the US unilateral declaration designed to limit the payload (throw-weight) of all but the largest of the four Soviet ICBMs now being deployed, the SS-18.
- The absence of any constraints on development of the current generation of ICBMs and SLBMs, early prototypes of which were already at or en route to the flight-test range when the Interim Agreement was signed, or of the generation now under development.

Similarly, both the limits agreed at Vladivostok and Soviet insistence that that agreement serve as the basis for limits on offensive systems after October 1977 are intimately bound up in the requirements of Soviet targeting strategy. The Vladivostok accords gave both sides

high ceilings of 2,400 total strategic delivery systems, including 1,320 MIRVed missiles, provided freedom to mix delivery systems, and permitted the Soviets to retain 308 "heavy" ICBMs.

In order to understand the relationship between the provisions of these agreements and Soviet targeting strategy, it is necessary to examine the content and origin of that strategy, how it is applied, and trends in the capabilities of Soviet forces.

Soviet Targeting Strategy

Since World War II, the Soviets have consistently argued that defeat of an adversary's armed forces is the first and primary objective of military operations in a nuclear war. To defeat a nuclear-armed enemy, it is necessary first to destroy his nuclear weapons and means of delivering them.

One of the most authoritative public statements of Soviet targeting strategy was made by the Commander of the Strategic Rocket Forces (SRF), Marshal Krylov, in September 1967. (Krylov was SRF Commander from 1963 until his death in 1972.) Consistent with the view that even a nuclear war should be conducted for positive ends, Marshal Krylov stated that the objective of such a war would be "victory" for the USSR. According to Marshal Krylov, the principal targets of the SRF would be the enemy's delivery systems and weapons storage and fabrication sites; military installations; military industries; centers of politico-military adminstration, command, and control.

This listing of targets, presumably in approximate order of priority, is designed to fight a war rather than to retaliate against cities. It has nothing in common with "maximum-fatality" targeting, and is not consistent with any simple "assured-destruction" objective. The list is, however, consistent with the damage-limiting missions of Soviet forces, and is consistent with the "victory" objective interpreted to mean survival as a national entity, and postattack recovery.

Targeting Origins

Despite his public statements denigrating nuclear weapons and evident internal restrictions on discussions on their military significance, Stalin probably understood their political and military potential quite well. He spared no effort to develop nuclear weapons as rapidly as possible and gave equal priority to strategic nuclear delivery systems. Shortly before or just after the end of World War II, Stalin created two supraministerial organizations: one to develop nuclear weapons; the other to develop missiles to deliver them. Meanwhile, much effort was devoted to developing and producing long-range bombers until missiles became available.

Recent articles by General V. F. Tolubko, Commander of Soviet Strategic Rocket Forces since 1972, throws fresh light on Stalin's appreciation of both nuclear weapons and strategic missile delivery systems. The first operational unit for future ballistic missile delivery systems was formed in 1946 on the basis of a tactical rocket regiment. Research organizations and design bureaus for ballistic missiles were formed around a scientific-engineering cadre. Among those who served on the supraministerial organization charged with missile development were such prominent Marshals of the Soviet Union as G. K. Zhukov and R. Ia. Malinovskiy. Two nominal civilians who served as missile czars are still prominent: L. I. Brezhnev, First Secretary of the Communist Party since 1964 and Marshal of the Soviet Union since 1976; and D. F. Ustinov, Central Committee member of the Military Industrial Commission for more than a decade, and Marshal of the Soviet Union and Minister of Defense since 1976.

As a result of the organizational efforts begun under Stalin, the Soviets were able to arm some of their missile units with nuclear weapons in the mid-1950s. These units apparently included not only tactical missiles but also the first Soviet "strategic" missile, the medium-range ballistic missile (MRBM) designated as the SS-3 by the US and NATO. Operationally, all strategic missiles—

William T. Lee has been a CIA specialist in Soviet military and economic affairs, and a staff member of the Stanford Research Institute. He now is a consultant on Soviet affairs to several government agencies. Mr. Lee is the author of many articles on Soviet defense economics and has written or contributed to several books on Soviet military developments. This article is an abridgement of a chapter for Contemporary Problems of Comparative Communism, *edited by Steven Rosefielde and Joseph Leutze, to be published later this year by the University of North Carolina Press.*

SS-3 and later SS-4—may have been under the Soviet Air Forces' Long Range Aviation (LRA) before the Strategic Rocket Forces (SRF) were formed as a new branch of service in 1960. Alternatively, the early strategic missile units may have been directly controlled by the Council of Defense.

The nuclear targeting doctrine stated by Marshal Krylov in 1967 was worked out by LRA not long after World War II, probably before the USSR began to stockpile nuclear weapons. The early strategic missile units evidently shared LRA's nuclear-targeting strategy and carried it over to the SRF.

It is essential to understand that the SRF consisted entirely of MRBM units when it was formed in 1960, with the possible exception of a handful of SS-6 ICBMs, and that the SRF had more IR/MRBMs than ICBMs until 1968–69. The early history of Soviet strategic-missile targeting, therefore, focused primarily on the European and Asian theaters of military operations (TVDs).

Theaters of Military Operations

The general principles of Soviet nuclear targeting strategy must be applied to specific geographic areas of strategic military operations. The targets located in each geographic area differ, and Soviet politico-military objectives are not identical in all potential areas of conflict. Each area must be analyzed for differences in the targets, and the most vulnerable points of each target, in order to maximize the military effectiveness of an attack with the least collateral damage commensurate with Soviet politico-military objectives in that area.

Whereas the prevalent US concept of "strategic" nuclear operations is limited to intercontinental exchanges, to the Soviets "strategic" operations begin at their bor-

ders. While this geographic definition of "strategic" may be a very natural result of Soviet history, geography, and physical juxtaposition of those states the Soviets regard as their probable enemies in the event of nuclear war, it is a fact of far-reaching consequences for the size and characteristics of Soviet strategic nuclear forces.

In the Soviet view, "the theater of military operations (TVD) is defined as the land or sea area within the limits of which armed forces during war execute a single strategic mission. The boundaries of probable theaters of war, along the front and in depth, are established in consideration of their political-economic and military-geographic conditions, and also the possibilities of deploying the forces and material on one or more fronts (fleets)." Politically, a TVD may include Soviet/Warsaw Pact territory and "that of the enemy as well," and "its boundaries may change in the course of the war."

For the conduct of strategic nuclear operations, NATO probably represents at least three, probably four, TVDs—one or two in Central Europe and one each on the north and south flanks. China, Japan, Korea, and Okinawa probably constitute one or two more TVDs. Finally, there is the "transoceanic" TVD: the US and its military bases in the Atlantic and Pacific basins. To the Soviets, each of these TVDs is equally "strategic" although the Central European TVDs may be first among equals in Soviet strategic force planning and resource planning.

The Soviets have deployed, and continue to deploy, four basic types of strategic weapon systems for strategic nuclear operations in all of the prospective TVDs: IR/MRBMs, SLBMs, medium and heavy bombers, and ICBMs. In the Soviet scheme of things, all of these weapons are equally strategic, and Soviet forces must be able to destroy or neutralize all targets located in each TVD.

Targeting Strategies for the TVDs

Certain general factors affecting the conduct of strategic nuclear operations in the TVDs are stated in Soviet writings. Although these factors apply to all TVDs, variations probably exist because the Soviets recognize the differences in the target arrays found in each TVD, and Soviet politico-military objectives vary with the TVDs. The principal factors governing targeting strategy for each TVD appears to be:

- The political objectives set by the Soviet political leaders.
- The nature and objectives of planned Soviet military operations in each theater.
- The requirement to limit collateral damage to population, industry, and urban infrastructure commensurate with achieving military objectives.
- The most vulnerable components of the targets to be attacked.

Although these factors either have been explicitly stated or have been inferred from Soviet unclassified military and political literature for nearly two decades, they have not been widely accepted in the West. Recently declassified issues of the Soviet general staff journal, *Military Thought*, contain discussions of Soviet targeting that, while quite consistent with the open literature, are more explicit and detailed in most cases. The following summarize pertinent points from articles in this journal:

- Political factors will dominate the course and conduct of a nuclear war between the USSR/Pact and US/NATO because in such a war both sides "will pursue their own decisive political ends."
- The theses and application of Soviet military strategy are derived from the political strategy of the Communist Party of the Soviet Union (CPSU). Soviet strategic nuclear forces will be under the direct command of the top political leaders.
- Two basic options exist: (a) use large weapons that can inflict heavy damage on "individual states" and "would retard the social progress of their peoples for a long time," and (b) use smaller weapons that can defeat the enemy "without doing essential injury to the economy or populace of states whose aggressive rulers unleashed the war." Only the Soviet political leaders can make the decision as to which option would be exercised.
- First-priority targets are the enemy's nuclear delivery systems, nuclear weapons stocks, and associated command control and communications, followed by other components of the enemy's military forces.
- In attacking the enemy economy it is essential to select the most vulnerable points where destruction would disorganize economic support of the war effort. While collateral destruction cannot be avoided, "the objective is not to turn the large economic and industrial regions into a heap of ruins."

This general principle of destroying only what is necessary to achieve Soviet political and military objectives is further expressed in discussions of what are the most vulnerable (*i.e.*, vital) components of any given target array. Some of this discussion is related to contemporary economies; some of it appears in Soviet critiques of Allied strategic bombing operations in World War II.

In planning attacks on industrial targets, the Soviets stress analysis of the regional distribution of industry, interindustry relationships, plants and facilities that produce modern weapons, and "the quantity of forces and means required for the destruction of the target and the capabilities of the enemy to rebuild." Destroying one or two key branches of transportation may be sufficient to sap or "significantly weaken" a country's military potential. Similarly, it may not be necessary to attack all of the plants and facilities engaged in missile production, since it is "sufficient to destroy a few enterprises producing transistors in order to extremely restrict the production of missiles for all branches of the armed forces."

In general, the following economic activities appear to be the most lucrative first-priority targets for prohibiting the replacement of nuclear delivery systems, nuclear weapons, and other military assets and for limiting capabilities to use surviving military forces effectively: transportation, power stations, facilities producing liquid fuels, chemical industries, selected bottleneck facilities in other industries.

The Soviets do not consider general attack on all types of industrial targets to be either necessary or militarily effective. They are particularly critical of the political and military futility of attacking population and cities.

Most of the latter arguments appear in Soviet critiques of Allied strategic air operations in World War II, for which the Soviets display considerable practical and moral disdain. Their analyses of the military effect of Allied bombing of German and Japanese industry and cities are not much different from the findings of the US Strategic Bombing Survey, or the observations of Ger-

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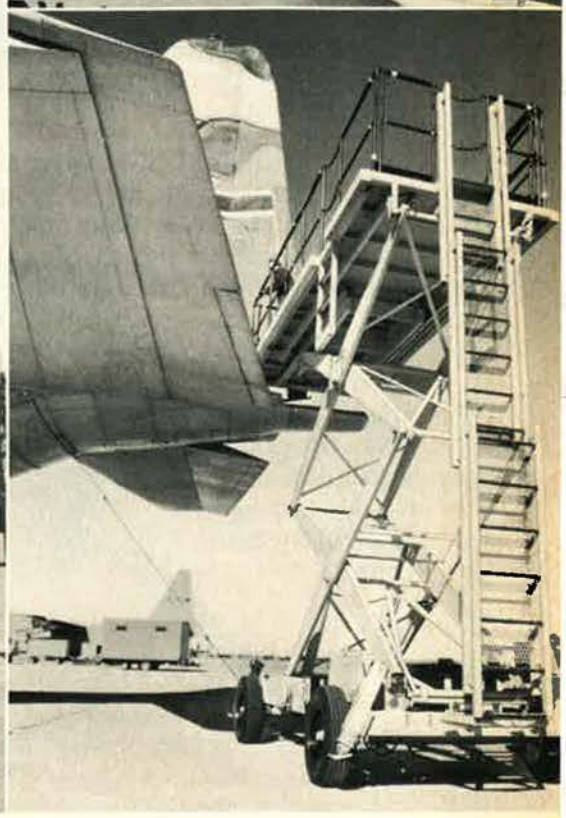

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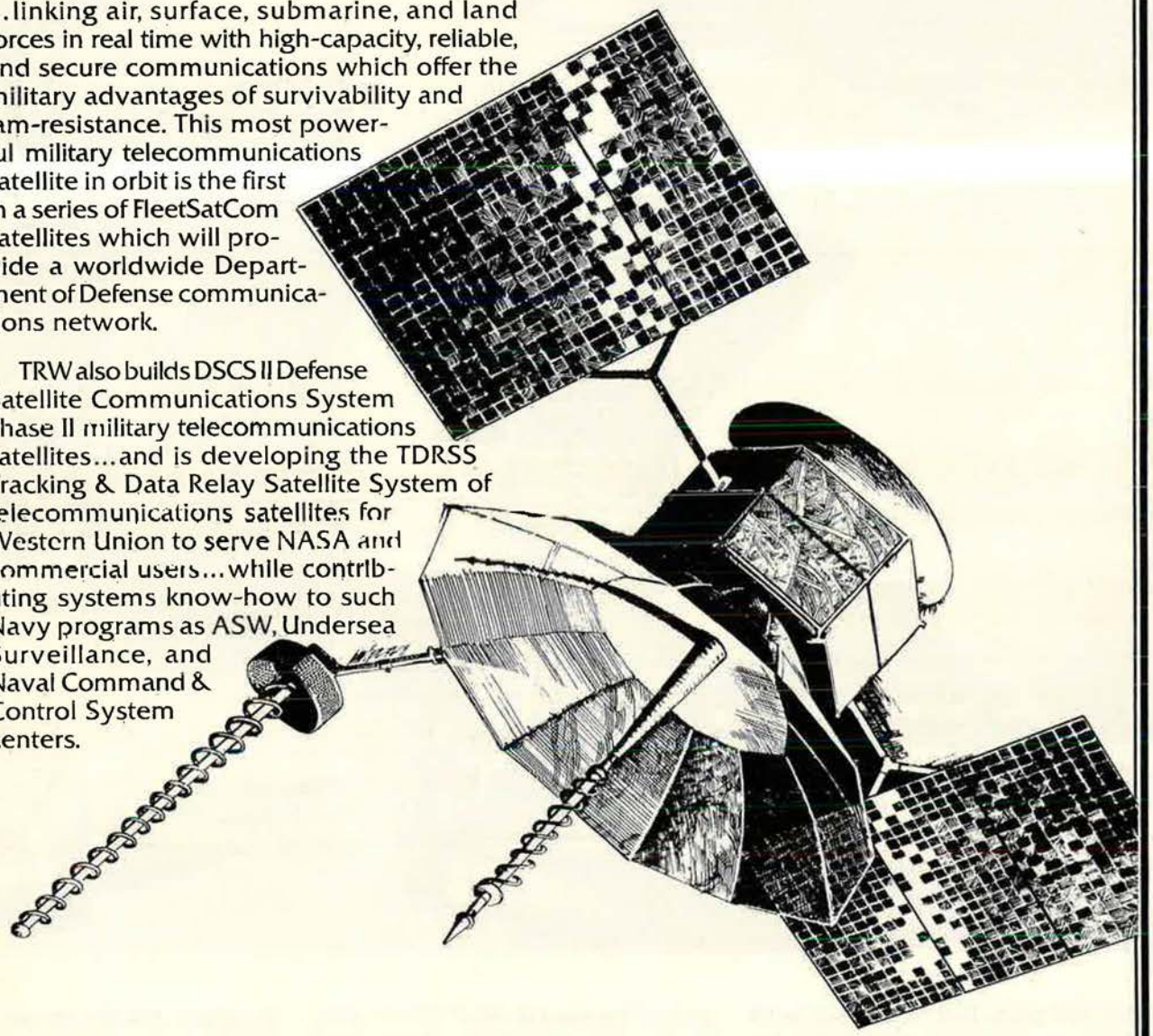

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many's wartime production czar, Albert Speer. The Soviets also note that until nearly the end of World War II, when the Allies systematically concentrated on German liquid fuel production and selected components of the rail and barge transport systems, German war production showed steady growth. At the same time, the Soviets give the Allied strategic bombing campaign no credit for tying down large German military assets for air defense.

US incendiary bomb attacks on Japanese cities are said to have been ineffective, and destruction of Hiroshima and Nagasaki pointless. In general, the Soviets charge that both the bombing of Japanese cities and the militarily pointless destruction of Dresden at the close of the European war were designed to intimidate the USSR rather than to break Japanese or German morale. The Soviets do not consider population and cities to be valid targets on political, military, or moral grounds, but rather another manifestation of the evils of "imperialism" as expressed in such strategic concepts as "mutual assured destruction." On the other hand, this does not mean that the Soviets would not target some selected population groups such as business and government elites—the "ruling groups" who are the "class enemy"—and possibly selected concentrations of scientific-technical personnel.

While these targeting principles apply to all TVDs, there may be some variations in applying them to different TVDs in order to achieve differing Soviet politico-military objectives. In the European TVDs, Soviet objectives are clear: defeat and disarm NATO forces and occupy Western Europe as intact as possible. Politically, they want to bring their version of "social progress" to Western Europe in the wake of the next war, just as Eastern Europe was "liberated" after the end of World War II. Two practical considerations also guide Soviet nuclear targeting in the European TVDs. First, the prevailing winds are from the west, so it is very much in the Soviet interest to target selectively and avoid "overkill" with large weapons in order to limit fallout on Eastern Europe and the USSR and on the Soviet/Pact occupation forces. Second, the Soviets could make good use of Europe's economic resources during the course of protracted military operations and to help rebuild their own in the aftermath of a nuclear war. They have said so quite explicitly.

In the Far East, Soviet objectives probably would be more complex. They might wish to occupy sparsely populated regions outside China's Great Wall, and possibly Manchuria, but probably consider it quite infeasible to occupy China proper, where the population density would support a "people's war." In China proper, the Soviets probably would use strategic nuclear force to disarm China and to destroy sufficient industrial and transportation facilities to ensure that China could not become a nuclear or conventional military threat to the USSR for some time. Against Japan, on the other hand, Soviet targeting might be much more selective because Japan, like Europe, could contribute to Soviet postattack recovery.

All the evidence known to the author explicitly or implicitly indicates that Soviet nuclear targeting strategy against the US is generally the same as for other TVDs. On the other hand, since the Soviets have no ambition to occupy the US they not only must seek to destroy our military forces in being at the beginning of the war but also must prevent the US from reconstituting its military forces. Hence, Soviet targeting of US industry might be more extensive than in Europe and Japan, and targeting selected US cities might be more comprehensive than in Europe. Soviet literature indicates that nuclear targeting in all TVDs would be selective both with regard to the targets attacked and the degree of damage inflicted.

Soviet Missile Trends

In order to understand the relationship between SALT agreements and Soviet targeting strength, it is also necessary to examine trends in the capabilities of Soviet strategic missile forces against each TVD. In the European TVDs generally, and in NATO in particular, most of the targets are relatively "soft," which is to say that nuclear weapons with submegaton rather than multimegaton yields are adequate, even with relatively inaccurate missiles. As missile accuracy improves, even lower-yield weapons will suffice, unless something is done to make the targets less vulnerable.

In the period 1958–64, the USSR deployed a force of more than 700 SS-4 and SS-5 IR/MRBMs, backed up by about 100 SLBMs, to deal with all classes of targets, mostly soft, in Eurasian TVDs. As further insurance, the Soviets maintained most of their medium and heavy bombers. Given the state of missile technology at the time, the SS-4 and SS-5 were not particularly accurate. But since most targets in the Eurasian TVDs were, and still are, "soft," *i.e.*, capable of resisting blasts of fifteen pounds per square inch (psi) or less, these relatively inaccurate missiles were effective with warheads yielding kilotons (KT) rather than megatons (MT).

Most targets in the Eurasian TVDs could be destroyed with weapons in the fifty to 500 KT range, if missile Circular Error Probable (CEP) were in the 0.5 to 1.0 nautical mile (NM) range, which probably is the best the Soviets could have achieved with the IR/MRBMs designed in the 1950s.

In the transoceanic TVDs, however, target vulnerabilities are much more varied. SAC airfields in the US are soft, and many military and virtually all US industrial targets are as soft as their Eurasian counterparts. Megaton weapons are as superfluous against many targets in the US as they are against most targets in Eurasia. But the US contains a large number of really "hard" targets—more than 1,100 ICBM silos and launch control centers, nuclear weapons storage facilities, command and control facilities—that have few, if any, counterparts in the NATO area. To destroy these targets requires overpressures of several hundred to several thousand psi. Given the CEPs of Soviet ICBMs, the hard targets located in the US have required multimegaton weapons.

For first- and second-generation Soviet ICBMs—the SS-6, SS-7, SS-8, SS-9, and SS-11—very large yields, on the order of five to twenty-five megatons, were required to destroy US ICBM launchers and nuclear-weapon storage sites because first- and second-generation Soviet ICBMs hardly could have had CEPs of less than 0.5 to 1.0 nm. The same reasoning applied to the SS-N-6 and SS-N-8 SLBMs on Yankee- and Delta-class submarines.

When attacking soft targets, wider variations in CEP factors are tolerable since the probability of damage is not very sensitive to small differences in planned vs. actual CEPs. But against hard targets, particularly ICBMs that

can reach the USSR in thirty minutes if not destroyed, Soviet planners probably want very high confidence factors. And because of the danger of fractricide and other characteristics of a nuclear-attack environment, multiple attacks on each ICBM silo provide a low confidence of success. For high confidence, one-to-one attacks must be effective, and this means megaton weapons until CEPs drop to 0.1 nm or less.

These requirements for large yields to compensate for the modest accuracy of Soviet strategic missile systems when attacking hard targets in all TVDs led the Soviets, very naturally, to develop large warheads in the 1950s and 1960s. This, in turn, led to the very questionable perception that, since all Soviet strategic missiles could deliver multimegaton weapons, every missile in the Soviet inventory was armed with as much megatonnage as the missile could carry. Given also the popular "mirror image" that the Soviets target population masses (which is the foundation of our concept of assured destruction but which we do not in fact follow), one of the popularly perceived functions of the SALT process is to restrain "overkill" of cities.

Recently released data on Soviet strategic missile accuracies and yields provide the basis for a more realistic assessment of what the Soviets have been doing and why. There has been a sharp decrease in CEPs from the initial systems deployed two decades ago to current and projected systems. The most plausible explanation is that accuracy must be improved for effective counterforce capabilities against hard targets, and in order to use smaller warheads effectively against soft targets while limiting collateral damage. Concurrently, there has been a declining trend in the yields of Soviet strategic warheads. As accuracy increases and yields decline, effectiveness against most industrial and military targets—except missile silos, hardened command control installations, and the like—holds constant or improves with each generation. Multimegaton single-warhead options have been retained in some SS-17, -18, and -19 missiles for attacks on some classes of hard targets. The high side (1.0 MT) of the yields reported for the MIRVed SS-17s and SS-19s may be the maximum these missiles can carry. But 0.2 to 0.5 MT may well be more representative yields because such yields are quite adequate against most industrial and military targets, which are relatively soft—five to fifteen psi.

These trends in Soviet strategic-missile characteristics also illustrate Soviet requirements for future generations of strategic-missile systems. Even the SS-18 is marginal for its primary mission of destroying hard targets. The SS-17 and SS-19 MIRV versions are effective against targets up to about 100 psi but are not likely to be very effective against US missile silos. For flexibility and greater effectiveness, the Soviets probably want at least two of their ICBMs to be effective against hard targets. Meanwhile, the SLBMs still are relatively inaccurate as the yields required are much larger than for the current ICBMs. Deployment of the SS-NX-18 SLBM will improve force characteristics considerably. Deployment of the Typhoon system should make Soviet SLBM capabilities at least comparable to the current SS-17 and SS-19 ICBMs.

Implications for SALT

Against this background it is not difficult to understand why the Soviets have held out in SALT negotiations for high ceilings on total delivery vehicles, on "heavy" ICBMs, and on MIRVed missiles. When the SALT negotiations started in 1969, the Soviets were far short of the forces they needed to satisfy their targeting requirements in the transoceanic TVD. By the middle of 1969, the Soviets had about 1,000 ICBMs, some operational Yankee-class SLBMs, and many more such missiles in production. But the force was still much too small and inaccurate to be effective. Originally designed to immobilize the US ICBMs by destroying the 100 Launch Control Centers that control the 1,000 Minuteman ICBM launchers, the SS-9 deployments were frustrated by the US airborne launch control system, which can launch missiles from each silo even if the Control Centers are destroyed.

Building enough SS-9s to attack every Minuteman silo was not a feasible course of action. The Soviets experimented with a three-RV version of the SS-9 that probably was an attempt to acquire a limited MIRV capability against the silos, which are relatively closely spaced. But this approach either did not work or, more likely, was dropped in anticipation of achieving full MIRV technology. However, the first generation of true Soviet MIRVed ICBMs, probably approved for development in 1966 and part of the eighth Five-Year Plan military programs, were still three years from flight-testing when SALT began. Even with accuracy improvements, the current generation of new systems (SS-16 through SS-18) required much larger payloads (throw-weight) to carry MIRVs with megaton yields.

In 1969, Soviet requirements for hitting soft targets in the transoceanic TVD also were far from being satisfied. The new SS-11 ICBM and the SS-N-6 SLBM were effective against such targets, with warheads in the KT range in most cases. But there were a lot of targets. US and allied military bases and facilities located in Asia (beyond IRBM range), the Atlantic and Pacific basins, and in the US and Alaska must number at least 600 and possibly more than 1,000. Some of these are large complex installations requiring several warheads to destroy all of the facilities. And then there are all the industrial, transportation, communications, and administrative targets specified by Soviet targeting strategy.

It is no wonder, therefore, that the Soviets stretched out SALT until they had some 1,600 ICBMs, agreed only very reluctantly to a limit of just over 300 launchers for SS-9-type ICBMs (so-called "heavy missiles" in SALT jargon), and insisted on an upper limit of 710 to 950 SLBMs. Equally unsurprising, the SALT agreements were not concluded until the Soviets were nearly ready to start flight-testing their four new ICBMs in 1972, all of which have the MIRV system required to cover all the targets.

As has been noted, the US tried to limit the throw-weight of all new missiles, except the successor to the SS-9 "heavy" missile, to roughly the throw-weight of the SS-11. But this was futile since the new liquid fuel successors to the SS-11—the SS-17 and SS-19—were designed in 1965–66 as "heavy" missiles, having throw-weights approximately two to three times that of the SS-11 in order to carry enough MIRVed warheads to cover the entire target array in the transoceanic TVD and other areas outside the range of the IR/MRBMs.

This is not to argue that the Soviets made no concessions at all in SALT. They may have intended to replace many, even all, of their IR/MRBMs with ICBMs, which they began to deploy with IR/MRBM units some time

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For the first time, airborne radar can be reprogrammed without the expense and delay of changing hardware. A new Programmable Signal Processor (PSP), developed for use in the U.S. Navy and Marine Corps F/A-18A Hornet, the Navy F-14 Tomcat, and the Air Force F-15 Eagle, gives their radar systems exceptional automation and mode flexibility. The processor's heart consists of 21 circuit boards, some with as many as 256 chips, each chip the equivalent of 4000 transistors. These highly complex circuits enable the radar systems to be reprogrammed almost immediately, and on a service-wide basis to meet future threats, or to be upgraded as new weapons are introduced. Developed by Hughes, this new design is expected to effect substantial cost savings now and in the future.

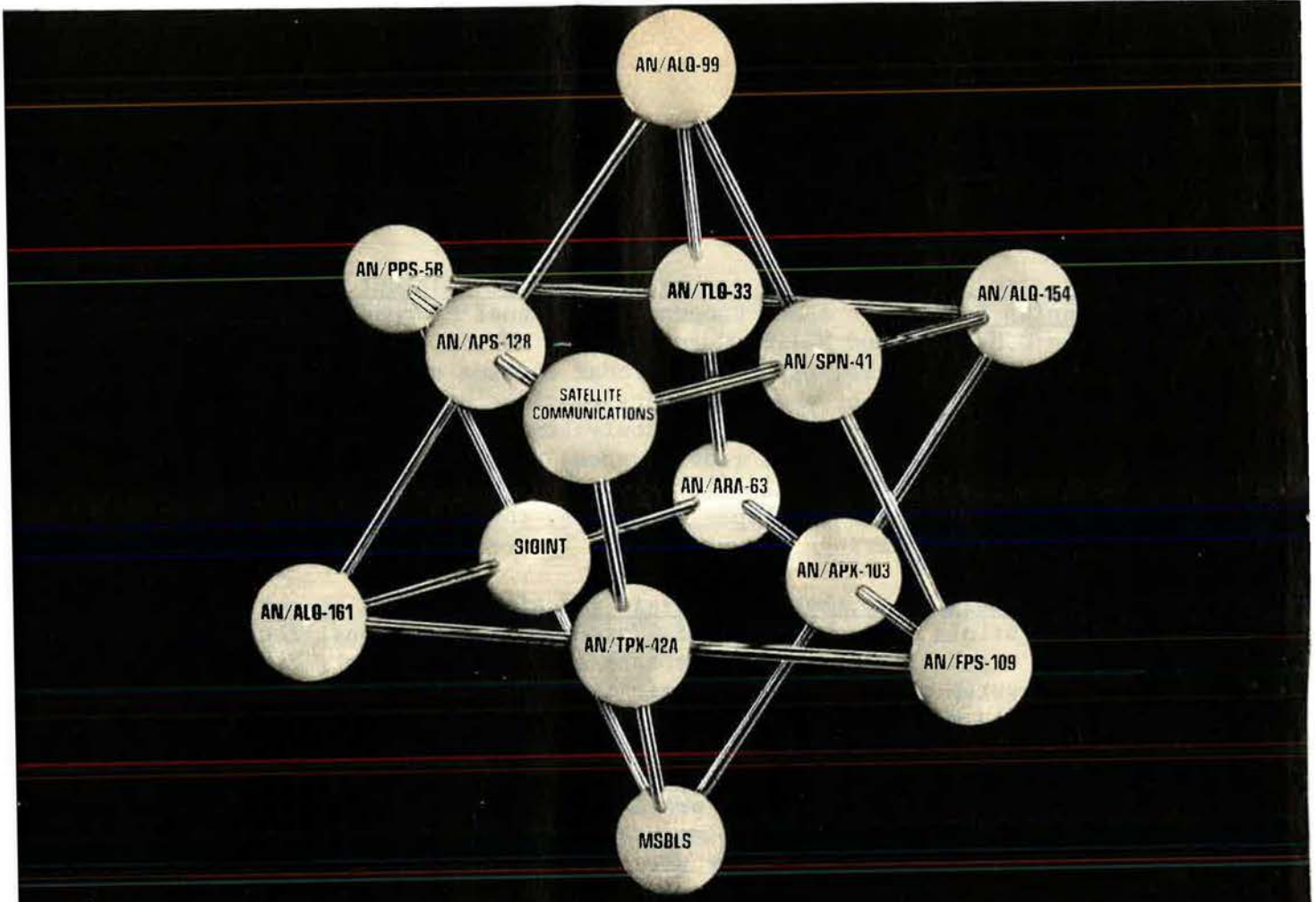
The first radar designed for both air-to-air and air-to-ground operation gives Navy and Marine pilots flying the F/A-18A Hornet more operational flexibility than previously available on a fighter/attack aircraft. This all-digital, multimode AN/APG-65 system offers all air-to-air capabilities, including track-while-scan, dogfight, and missile guidance. It also provides complete air-to-ground or attack modes.

It has an exclusive new air-to-ground feature called "Doppler beam sharpening." This data processing technique provides the pilot with a very-high-resolution ground map. As the antenna points to angles other than dead ahead, the computer breaks each reading into tiny pieces, then assembles it as a map, using the Doppler effect to eliminate background clutter. The radar system was developed by Hughes under contract to McDonnell Douglas.

A bright, high-resolution, large screen liquid crystal projection system that can display dynamic tactical military situations in real time has been delivered to the U.S. Navy for evaluation. It can project virtually anything that can be displayed on a cathode ray tube either in raster scan or random scan mode. Typical applications include symbols, alphanumerics, geographical maps, and text. Its bright, clear display reduces requirements for specially controlled lighting during briefing sessions or command conferences.

The system uses a liquid crystal light valve developed by Hughes, and has a reliability never before achieved in large screen displays. Mean-time-between-failure is estimated at 5000 hours, and, as no consumables are required, this results in lower operating and maintenance costs. Other features are 1000 line resolution and 30 millisecond response time.

An improved version of the U.S. Navy's Phoenix air-to-air missile, designed to meet airborne threats through the 1990s, is now under development. The radar-guided AIM-54 is the primary long-range armament for the Navy F-14 Tomcat fighter. The improved Phoenix (AIM-54C) will feature increased operational performance and reliability. Under a Naval Air Systems Command contract, Hughes is developing a new digital electronics unit, a solid state transmitter/receiver, and a digital autopilot. In addition, the Naval Weapons Center is perfecting a new target detecting device. The contract includes construction of a "breadboard" model of the guidance unit plus 15 engineering models for joint Navy/Hughes testing.



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after the SALT negotiations began. On the other hand, they have intended to replace most of the SS-4 and SS-5 missiles with the SS-20 IRBM from the beginning, since the latter missile is the first two stages of the SS-16 ICBM.

The SALT agreements permitted the Soviets to go ahead with their new ICBMs and placed no restrictions on the SS-20. This missile will be much more effective than the SS-4s and SS-5s for strategic operations in the Eurasian TVDs. It reduces collateral damage as well. To satisfy requirements of Soviet targeting strategy in the transoceanic TVD, yet another generation of ICBMs will be required. The next generation of Soviet strategic missiles, now being developed, will provide a large MIRVed force to cover all of the military and industrial targets.

The Vladivostok agreement limiting Soviet peripheral *i.e.,* transoceanic, strategic delivery systems to 2,400, without placing any limits on central Soviet strategic systems for the Eurasian TVDs, was made to order for the Soviets. Development of the next generation of Soviet ICBMs probably had been approved in 1970–71 as part of the ninth Five-Year Plan's military programs, and flight-testing probably will begin in 1978–79.

Most important, at the start of SALT I negotiations, the Soviets probably intended to build many more SS-9-type silos than the 308-odd launchers of this type they finally agreed to. Because they desperately wanted agreements to prohibit large-scale US antiballistic missile (ABM) deployment, which would have frustrated all of their nuclear targeting ambitions and, in their view, would have given the US a great military advantage, the Soviets had to make some concessions. But the limit on SS-9-type silos is about the only concession that mattered since the unconstrained SS-20 will more than make up for ICBMs the Soviets may have planned as replacements for their SS-4 and SS-5 MR/IRBMs.

Anticipating the Vladivostok limits, the Soviet approved completing development and initial deployment of the new systems in 1975–76 as part of the tenth Five-Year Plan's military programs. Sometime in the early to mid-1980s, the combination of the current ICBMs plus the four to six next-generation ICBM and three SLBM systems now under development finally should provide sufficient accuracy and enough warheads to satisfy the transoceanic TVD requirements that Soviet military planners have been struggling to meet since the late 1950s.

Strides in Counterforce Weapons

The Soviets also are continuing to improve the performance of one or more of their current-generation ICBMs. One report stated that an improved version of the SS-18 has a CEP of only 0.10 nm. The first flight test of the SS-18 occurred nearly six years ago, which may have been enough time to have developed a new guidance system to retrofit into the basic airframe. With this reported accuracy and a one to two MT warhead, the SS-18 would be a very effective counterforce weapon. Given the uncertainties concerning test-range CEPs applied under operational conditions, a prudent Soviet planner might well count on only 0.2 nm CEP. Even so, the SS-18 is well on its way to becoming a very effective counterforce system, and the SS-17 and SS-19 may not be far behind. And whatever capabilities these systems lack, almost certainly will be included in the four or more new ICBMs under development. There are also indications that the Soviets are pressing for the right to test only one new ICBM during a three- to four-year Protocol period that may accompany a treaty on offensive system limitations. This appears to be a substantial Soviet concession even if it is tied to Soviet efforts to block development of a new US Air Force ICBM.

On the other hand, if the accuracy of the current generation of Soviet liquid-fueled ICBMs has been improved to the extent reported, some delay in testing the next generation could be tolerated. The single new ICBM the Soviets reportedly are holding out for may represent an effort to get some return on the Soviet investment in solid fuel missile development which, except for the SS-20 (and some sixty SS-13s), has not paid off very well thus far.

Summing Up

To recapitulate, Soviet nuclear targeting strategy is reflected in most aspects of Soviet performance in SALT, from the Interim Agreement through the Vladivostok Accord to what appears to be emerging from the current negotiations.

- The Soviets have insisted on high ceilings for total delivery vehicles (2,200 or more), MIRVed missiles (1,200–1,300), and "heavy" ICBMs (more than 300).
- The Soviets summarily rejected the US proposals of March 1977 that would have made it impossible to meet their targeting requirements—granted that the timing of those proposals also was not propitious for other reasons.
- The agreements have permitted replacing the S-11 with the SS-17 and SS-19, which have three times or more throw-weight than the SS-11, in order to accommodate large MIRV payloads and a high-yield single RV version of these missiles. The MIRVed versions are needed to complete coverage of all soft military targets and selected industries, and perhaps to cross-target Minuteman silos as well. The single warhead versions of the SS-17 and SS-19 will be useful against certain classes of hard targets, particularly command control and communications facilities.
- Thus far, limits on new missile-system R&D have been avoided while the Soviets are free to modify, modernize, and improve all performance parameters of the current generation of ICBMs.
- Understandably, the Soviets have been reluctant to delay testing of the new ICBMs and the large SLBM they have under development, but they may make some concessions in this area in order to get an agreement. Meanwhile, they are continuing to test and improve current ICBMs and SLBMs.
- They have built to the limit of their sixty-two boat–950 launcher SLBM ceiling under the Interim Agreement, giving them a secure reserve force to conduct war after the initial exchange, and probably also as a hedge against future US counterforce capabilities.
- For the purposes of SALT, the Soviets created a definition of "strategic," (*i.e.,* systems that can reach each superpower's homeland from existing bases) in order to exclude much of their strategic forces from SALT limits while trying to include US tactical assets in SALT ceilings.

No wonder the Soviets do not want to give up their policy of "peaceful coexistence," which we call "détente." It has served them well in acquiring grain, technology, credits, and SALT agreements compatible with their strategic targeting requirements. ■

The author, who visited Air Force installations throughout the Pacific in mid-June, reports that while the tempo and extent of USAF Pacific activities have declined since 1973, US interests and USAF readiness in that area are undiminished, despite some changing interallied relationships.

Airpower and US Interests in the Pacific

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

SITTING in the jump seat of the C-141 as we rolled down the Travis AFB runway, it all seemed very familiar. We coasted out past the Golden Gate Bridge and took the same old heading for Hawaii, on a well-remembered path. It was the first time back in the Pacific for a good many years.

Travis itself had been strangely quiet. With the frantic activity of the Vietnam War long since ended, the pace now reflects our scaled-down Pacific presence. The Pacific theater of war is still a military theater, the domain of the Commander in Chief, Pacific, but the emphasis in that sunny ocean is now more on the playground aspects. The jumbojets have seen to that.

These jets flog into Honolulu International in an unbroken stream. By mid-morning, any morning, fifteen hundred or so Japanese will have arrived from Tokyo on this dreamed-of vacation of a lifetime, a vacation made doubly attractive to them by our shrunken dollar. Dallas, Denver, Kansas City, and Chicago, along with the West Coast cities, send in their daily consignments of fun lovers to Waikiki. At any moment during the peak arrival hours, there is a gaily colored airliner on final. Since Hickam AFB shares the runways with these aerial cruise ships, there is the occasional C-141 or C-5 in the pattern, along with the F-4 Phantoms of the Hawaii Air Guard. Once in awhile, as happened in the aftermath of the tree-cutting murder episode at Panmunjom in Korea, there is a flurry of military activity through Hickam to interrupt the flow of the cruise ships. But day in and day out, the emphasis in Hawaii is on pleasure, not national defense.

The city of Honolulu has adjusted, if that is not too much of an understatement, to its enlarged role as chief playground of the Pacific. Little houses now bring $100,000 or more. Ordinary houses, depending on where they are, cost almost anything you can imagine. Somewhere along Waikiki there is still that fine old pink landmark, the Royal Hawaiian Hotel, but it is lost in the forest of new high-rises that have sprung up along the beach.

Affluence seems to pervade everything in Hawaii these days. It has a very definite and depressing effect on the people in the military who find themselves, despite their trained skills, poor relations in this fast-buck society. Take the pilots of the Military Airlift Command, for example. They are college graduates. They've had the finest sort of pilot training a rich country can provide, and even to enter and survive that training means they are members of a select group.

In their mid-twenties, they have the responsibility for a $7 million airplane—or, in the case of the C-5, name your own figure—and its passengers. It is no overstatement to say these young pilots have responsibilities equal to those of an airline captain. When you consider the places they go and the decisions they sometimes have to make, you realize that their true responsibilities may be somewhat greater. But when you compare salaries, time away from home, transient billets vs. hotels, it's no contest. So it is no

PACAF personnel and aircraft—such as this F-4 Phantom—have a major role, along with US naval airpower, in protecting US interests throughout the Pacific.

surprise to learn these Military Airlift Command crews are leaving USAF at a very high rate—about two out of three—when their obligated tour is up. And while it must be something of a comedown for a pilot who has commanded his own big airplane and crew to find himself low man on the pole in an airline, there are, as we have noted, compensations. For that matter, there are compensations to the taxpaying and the traveling public who paid for the training of these military aviators gone commercial. Those who understand the value of military pilot training are comfortable knowing their airline captain began that way.

As a matter of fact, about a third of the pilots now flying MAC runs are Reserve officers whose civilian job, likely as not, is with an airline. They fly the same airplanes, and meet the same proficiency standards, as the crews on active duty. Unless you are a student of unit patches, there's no way of telling the Reserves from the regulars, although a haircut does raise suspicion from time to time. This Reserve augmentation is perhaps the most effective return we get anywhere on our Reserve investment. Nevertheless, the fact that MAC needs so much Reserve help to do its job in peacetime is a commentary on the relative attractiveness in these times of civilian and military life.

Anyway, Reserves or regulars, the airlift across the vast stretches of the Pacific goes on pretty smoothly. As we all know, the fewer the stops, the fewer the hitches. The C-141s and C-5s make scarcely any fuel stops anymore. In the old days, Midway and Wake were essential way stations on the long drag across the Pacific. They are still there, but they are no longer needed for the airlift birds. Instead, eight long hours gets you to Andersen Air Force Base on Guam, the last US-owned base on the road to Southeast Asia.

It is somehow reassuring to see how little things have changed at Andersen. The B-52s are still on their hard stands in reduced numbers but looking, as always, very businesslike. The solid buildings, good and plentiful family housing, and a generally purposeful air about the place all add to the reassurance. Andersen depends, of course, on airlift for parts, medical evacuation, and a good many of life's necessities, but when it is only eight hours to Hawaii, and another four or five to California, the great distances begin to lose their meaning.

Negotiations and Nationalism

It is only three more hours to Clark Air Base in the Philippines. Somehow the old name, Clark Field, had a better ring, but there is no use fighting the problem. Clark Air Base it is. Whatever its name, it is still a wondrous place as air patches go. The old quarters lining the parade ground are just as they were in 1915 when an indignant young post engineer denounced them as being too flimsy to last another five years.

When the rainy season has done its work, there are few more beautiful spots in the tropics than Clark and the hills that loom over it. The horse cavalrymen knew what they were doing, back there in 1903, when they pitched their tents in those Pampanga foothills. During the war, the Japanese also evidently enjoyed the place, along with making important use of it. Then, as now, Clark was ideally located for operations in the Southwest Pacific. Even those ultimate patriots, the kamikaze pilots, made their first sorties out of Clark. As a reliable indication that World War II is finally over there is a seedy little memorial to these kamikazes on the road to Tarlac. Judging from what four years and irreverent visitors have done to this monument, its days are numbered. It is probably just as well, for there are other memories of that same road that are going to take a long time to die.

Anyway, there is another monument in the area that is as truly magnificent as the kamikaze one is shabby. That one is the American Cemetery on the edge of Manila. Like all the memorial cemeteries we created after World War II, this one is beautifully conceived and immaculately kept. The rows of crosses, with here and there a Star of David, fan out from the memorial arcade in the center. There, on the walls, you will find the names of friends who died those many years ago in what were then such far distant places. With its murals depicting the decisive battles, and the names of the dead in those battles on the walls, the cemetery has, in its silent way,

—Photo by Maj. Toby van Rossum Daum, USAF

The final resting place for many Americans who died in the Pacific War: the US military cemetery at Manila, Republic of the Philippines.

a great deal to say about our inescapable role and obligations in the Pacific. We have lost too many men out that way for it not to have had any meaning.

There was a time, not too long ago, when it looked as if those obligations might fall victim to the Vietnam syndrome. Our national overreaction to that botched experiment seemed to threaten some really important things, like the future of Clark, for instance. Happily, we seem to be emerging from that funk, and the base negotiations with the Philippines, after some pretty shaky periods, are apparently now moving toward a settlement everyone can live with. This is not the same thing as saying everyone will be happy with the results, but these are tough negotiations. If an agreement is reached—and the cautiously optimistic sounds you hear around Luzon indicate the negotiators must be getting close—it will reflect some changes in the way things have always been.

The country itself has changed in a number of significant ways since President Ferdinand Marcos came to power. Or, to put it more accurately, since Marcos and his wife, Imelda, came to power, for Imelda has her hand in a great many things. Greater Manila, for instance, is under her rule, not to use the term carelessly, and the results are, at least to the casual eye, impressive. The new convention center, an imposing group of buildings on a landfill jutting into Manila Bay, is one of the new achievements ascribed to Imelda. The clean streets, constantly attended by a yellow-shirted army of the otherwise unemployed, is another.

The public display of guns is gone. Guns were something you were once requested to check, along with your umbrella, in the bistros along Roxas Boulevard. Both the cities and the countryside are, compared to the wild days of the fifties and sixties, peaceful and law abiding. Chalk one up for martial law.

The Marcos regime has also brought with it a heightened sense of nationalism. It is something that has complicated the base negotiations, and it will undoubtedly cause us some difficulties in the years to come, especially if we fail to understand it. In Turkey, Spain, the United Kingdom, and everywhere else where we have bases on foreign soil, we moved in only after negotiations had first taken place. National sensitivities were an understood factor from the outset. Because we began differently in the Philippines, with US bases on US territory, this latter-day adjustment seems hard. Nonetheless, it is certain there will be some adjustments if we intend to remain.

Gen. T. R. Milton, a regular contributor to AIR FORCE Magazine, served in the Pacific from 1958 to 1965 as an air division commander, Commander of Thirteenth Air Force, and Deputy Chief of Staff for Plans and Operations on the staff of the Commander in Chief, Pacific. Prior to his retirement in 1974, he was US Representative to the NATO Military Committee. General Milton now lives in Colorado Springs, Colo.

Some years ago we hoisted the Philippine flag alongside our own outside the Thirteenth Air Force Headquarters and added the playing of both national anthems at retreat, nice gestures that we hoped would keep things running along. The current negotiations are evidence that the Philippines want more than gestures. How much more is the question that will determine the future usefulness of Clark and Subic Bay.

There has been, clearly enough, a perceptible change in this long-running love/hate relationship between the two countries as the Republic of the Philippines itself has changed. Under the new constitution, the government, which started out as a copy of our own style of democracy—a copy, moreover, that seemed to exaggerate all our own bad features—no longer bears much resemblance to the US model. There is even an imperial note of permanence as you become aware of the state photographs of Ferdinand and Imelda looking down from the walls.

Clark AB—Anchor for a Frayed Chain

Meanwhile, USAF continues much as always while the negotiations take place. The atmosphere at Clark itself is reminiscent of the early sixties. The fevered activity of Vietnam is long gone, with only some new buildings here and there serving as a reminder that something big went on there a few years back. Still, it is not exactly reminiscent of the early sixties, either, for reasons we will deal with in a moment.

In those same early sixties, we used to view our peripheral bases along the Asian coastline as a sort of strategic entity. At the northern end of the line we had the Japanese bases of Misawa, Yokota, and Itazuke. True,

The Marcos regime has brought to the Philippines a new sense of nationalism—and martial law. One of its physical achievements is this new convention center in Manila.

—Photo by Maj. Toby van Rossum Daum, USAF

here were some restrictions on our operational flexibil-ty from these bases, but they were solid holding points or forces we might need in Korea, as well as for other urposes. Those were the days when the tactical forces ainly played at being a sort of minor league SAC, and he bases in Japan, while out of bounds for that game, ere good home ports, so to speak.

Then there were the Korean bases of Osan and Kun-an, where we operated with no strings attached. Taiwan provided alert pads for contingencies, as well as bases for a rapid buildup. There was, of course, our principal Far East bastion, Kadena, on Okinawa, where we poured concrete in a never-ending stream, preparing for anything we might have to do. Kadena was, after all, on what was essentially US territory with a US Army general functioning as the governor. Finally, there was Clark, a base we had come to think of as ours in the purest sense of the word.

In the late seventies, that nice little string of American military bases has become badly frayed. Essentially, we are out of Taiwan, nearly out of Japan proper, and no longer on our own territory in Okinawa, which is now very definitely a part of Japan. In these circumstances, the old base at Clark begins to look more important than ever.

Clark's bombing and gunnery range, in a place called Crow Valley just fourteen miles from the end of the runway, is one reason Clark looks so attractive these days. Crow Valley has been bombed and strafed for a good many years, but never with the attention it is now getting. The valley has become the site for Cope Thunder, the Pacific Air Forces' version of TAC's Red Flag.

An Aggressor Squadron of Clark-based F-5s lies in wait for units attending these realistic seminars on how to fight in the air. Each PACAF fighter squadron gets four of these sessions a year, sessions in which the friendlies have to fight their way into Crow Valley past the F-5 bad guys, who usually eat them alive the first sortie or two.

Once into Crow Valley, there are realistic surface-to-air missile simulations, puff-ball flak, and some visual bits of flimflammery just to make it all seem more like the real thing. These exercises, which include Navy and Marine air units as well as Army and Marine ground troops, are doing great things for our readiness in the Far East. In a world where real estate for bombing ranges is becoming ever more difficult and noise abatement a constant threat to air training, Crow Valley is almost priceless.

The local residents are a tribe of pygmies, Negritos to the Filipinos, who have established a cottage industry fabricating bamboo trucks and airplanes for use as targets, all under the paternal supervision of some Air Force noncoms. Payment for the targets is made in rice, not because the Negritos are suspicious of the dollar, but for the simple and practical reason that rice is what they want. With plenty of rice, an occasional python or fruit bat, and brass-picking privileges, life is apparently sweet. It would be interesting to get these pygmies' views on the relative effectiveness of various air tactics, if anyone could figure out a way to do it. They are surely among the world's most experienced observers of these tactics.

Service Life in Japan

If Clark is old and picturesque, with its colonial atmosphere, its turn-of-the-century tropical houses, and its aboriginal target builders, Kadena, on Okinawa, just two hours to the north, is very much late twentieth century. Every square foot of that huge base seems either occupied or has something under construction, for Kadena is fast becoming our last redoubt on the island. F-4s, C-130s, Navy P-3s, Marine Harriers, and a steady stream of transports compete for the runways. Next year the activity will be heightened as the 18th Tactical Fighter Wing converts to F-15s.

The relentless slide of the dollar is depressing the quality of life for our servicemen on duty in Japanese territory, and Okinawa is now very much a part of Japan. During the Occupation, and again after the Korean War, life in Japan was pretty soft. In all fairness, the units did train hard and by and large they were pretty good, but the mission was simpler in those days and off-duty time was something to look forward to, with everything affordable in a fascinating land. Now, young officers and airmen, and old ones for that matter, are spending their free time inside the compounds. They simply cannot afford even the simple pleasures like dining out on the Japanese economy. Yet, from watching the activity on the flight line, you would never know there were any problems at all.

—Photo by Maj. Toby van Rossum Daum, USAF

Old quarters line the parade ground at semitropical Clark AB, long a bastion of US airpower in the Pacific.

The other main Japanese base is Yokota, now the headquarters of Fifth Air Force, US Forces Japan, and a considerable airlift operation. Anyone who has not been back to the Kanto Plain for a few years will have trouble getting oriented. The Japanese boom has transformed that rural area. Yokota, an island in a sea of Nipponese activity, is itself now covered with buildings as it tries to absorb all the things we still have to do in Japan.

Even more than at Kadena, the fall of the dollar has cast a pall over life at that base near Tokyo, a city that is essentially off limits for economic reasons. There are, to be sure, the housing allowances and the cost-of-living allowances that do make it possible for families to exist, but the little frivolities that made service life in Japan so attractive in other days are now out of reach. With the Japanese spending less than one percent of their GNP on national defense, and with these economic hardships added to the frustration that always attended military operations in that country, it is at least worth wondering why we stay there.

Korea—On a War Footing

Across the Sea of Japan there is a better story. In Korea, the bases at Osan and Kunsan were once primitive places, outposts in a grim and rocky land. They are now excellent bases, permanent and solid. The grim and rocky land, moreover, has become a verdant and prosperous country.

The Koreans, not only staunch allies but true friends, have even resisted paying any attention to the poor beleaguered dollar, at least thus far. While there are a few mutterings in the Seoul press about the way the dollar is pulling the Korean unit of currency, the won, down with it, the rate has remained firmly pegged at about 500 won to the dollar, an act of generosity that seems to have escaped the attention of our Congress.

It is too bad more service families cannot be in Korea, instead of Japan. Most tours are still unaccompanied in Korea, as they have always been. Some family housing added to the already good facilities at Osan and Kunsan could change that.

The really important thing, however, is preparing for whatever North Korea's Kim Il Sung has in mind. Traveling along the road to Panmunjom, a visitor is reminded that this prosperous and hard-working country is still on a war footing. The tank traps are not relics of past troubles, but there for a present purpose. The soldier in his sandbagged gun position is not just playing games.

The training of our forces in Korea thus takes on an edge not gained anywhere else. It seems a happy land in this twenty-fifth year of the truce, with new hotels, a horde of tourists, and a well-turned-out citizenry, but there is always the shadow cast by that strange man in Pyongyang. He is getting on, old Kim Il Sung, and he has promised to unify Korea before he is through.

The possibility of war in Korea is something we have lived with for a long time, and maybe the danger is receding, although how anyone can make a definitive judgment on that is not clear to me. The North Koreans are modernizing their already formidable army, and their air force is equipped with late-model Soviet fighters. It is also quite evidently well trained. Beyond their obvious military capability—they spend sixteen percent of their GNP on the military—there is a fanaticism in the North that is not easily assessed. The tunnels under the DMZ, the axe murders of our two officers, the behavior of the North Koreans over any incident all tend to complicate the normal process of judging an enemy's intentions. Since they are not reasonable people, they could well do something unreasonable, like attacking the Republic of Korea.

Our own behavior in the Far East these past few years tends to make us a little inscrutable as well. There is the Koreagate business, which is getting in the way, in the opinion of some Koreans at least, of the vital business of defense. Beyond that, there has never been a clear rationale for the reduction of our ground forces, a matter that causes some speculation as to our true motives. The congressional action of tying military aid to the Washington bribery scandal is a more immediate worry because it is taken, by some Koreans at least, as an indication of a changing US attitude toward our traditional Far East allies.

The Republic of China

Thus, the Republic of China is being watched with

A reinforced concrete tank trap, a common sight along the highways near South Korea's border with its northern adversary.

—Photo by Maj. Toby van Rossum Daum, USAF

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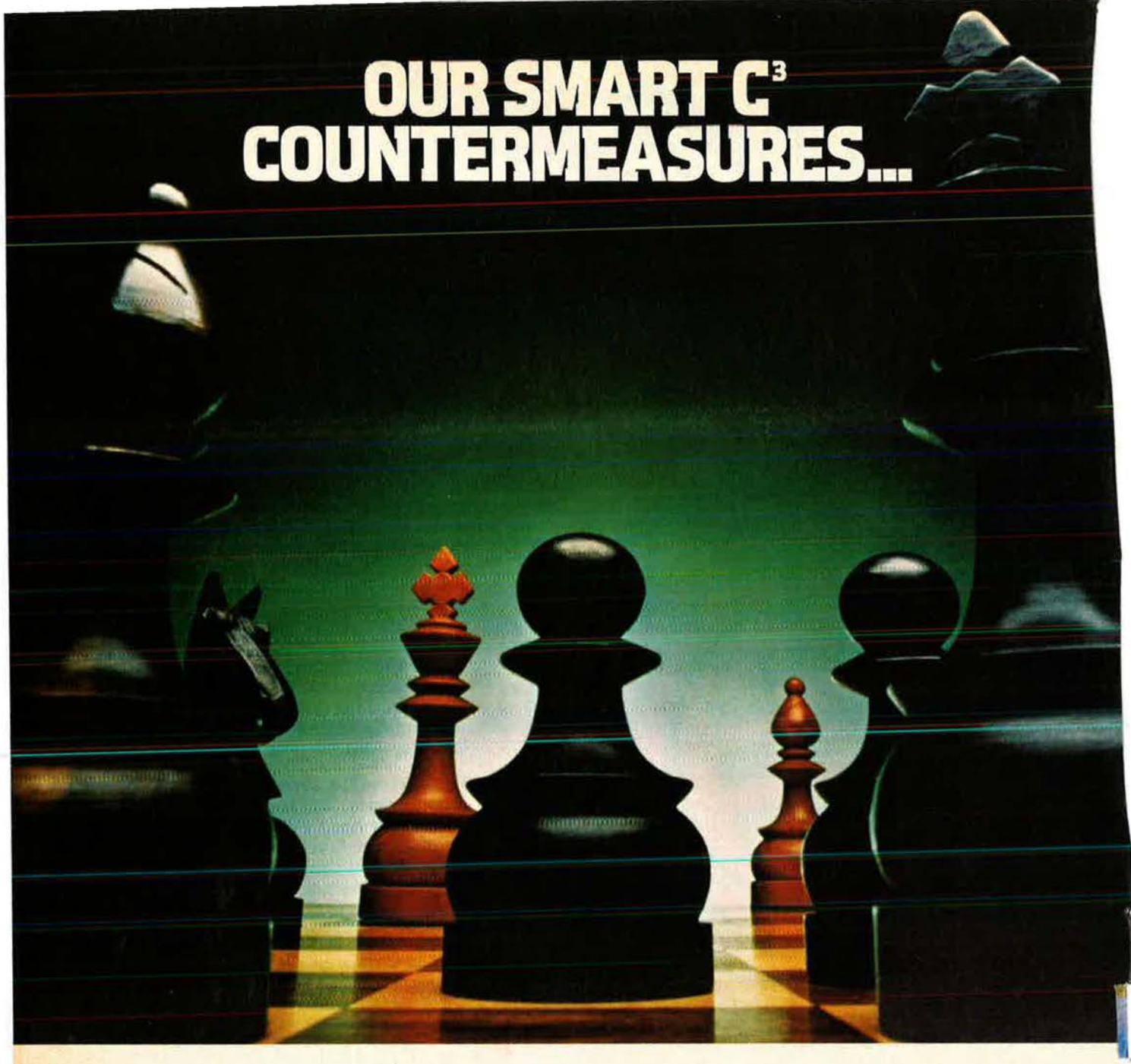

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ntense interest by the Koreans and, for that matter, the ilipinos. Even though the Philippines government has ecognized Communist China—the People's Republic f China, as we must say these days—the question of ur reliability as an ally has been raised by our move way from the Nationalist Chinese.

There is no question about it. We are moving away at good clip. The US military population on Taiwan is down to about a thousand. It is scheduled to drop to fewer than five hundred along with the ending of all military aid. Other signs can be read in the severe restrictions we, not the Chinese, have placed on the visits of general and flag officers, and the reduced circumstances of our embassy in Taipei.

The Chinese military forces have not yet felt the pinch, but the time is coming when they will if we proceed on our present course. At the moment, the great problem facing the Chinese Air Force is one of modernization. The F-104s are getting old, the F-86s and F-100s even older, and the F-5Es, while a popular airplane with the Chinese, lack the punch they feel they need.

On their wish list are F-16s, or something along that line, as their next-generation air-superiority fighter. They would like to have F-4s—fifty or sixty of them—right now. Failing that, they would like to buy some F-104s to fill out their own depleted inventory.

Thus far, they seem to be drawing a blank. We have authorized an Israeli sale of Kfirs, with General Electric J79 engines, to the Chinese, but these are not what the Chinese want. They are probably not interested in establishing what might be a tenuous supply line to the troubled Middle East unless, perhaps, there is no alternative. Besides, their ties to the United States have been the essential element in their survival since that day Chiang Kai-shek brought the remnants of his shattered army to the provincial, and backward, island of Taiwan. It is an island that now, thirty years later, is a shining example of what those most intelligent people, the Chinese, can do when they put their minds to it.

The world at large, in particular the Western-developed world, does not recognize the Republic of China. With the exception of Latin America, the embattled and themselves somewhat isolated nations of Israel and the Union of South Africa, and ourselves, formal diplomatic recognition is mainly reserved nowadays for the folks in Peking. Or, if your sympathies are with the Nationalists, Peiping.

Considering the importance the Western world seems to attach to the diplomatic trade, the scarcity of embassies in Taipei might seem a form of blight, a foreboding of bad things to come. The place is, in fact, booming. You can scarcely get a hotel room for all the tourists from countries that do not have diplomatic relations there. The Grand Hotel is now a giant Chinese red pagoda. The old Grand, that delightful inn that combined East and West so gracefully, is hidden behind this new monster whose lobby is wall to wall with guests.

They are not all tourists. There is a lot of business to be done in Taiwan, and much of the world is there to do it. The harbor at Keelung looks as though it could not take another ship. The airport at Taipei is pretty well saturated and so a new one is abuilding outside the city. The new freeways look like freeways anywhere, wide, modern, and fast. Ford builds cars there, and Northrop, in a coproduction venture with the Chinese, is building F-5Es, an activity that will end in 1980.

Along with all this bustling activity, perhaps even a factor in it, is a feeling the Chinese business community has already discounted our eventual recognition of the People's Republic of China. If that is a correct perception, then these traditionally pragmatic types must have some confidence that their world will not soon come to an end under our recognition formula. There is no pragmatism, if that is what it is, detectable in the military or the political leadership. They are still professed, and presumably true, believers in one China, a China under Nationalist rule.

How it will all come out is still one of the mysteries of the Orient. Those who have seen at first hand what allies we have in the Nationalist Chinese can only hope a US sellout is not part of what the future holds for these people.

Meanwhile, the US military forces in Asia prepare for whatever may come. The mission out there is one that will put increasing emphasis on airpower, both that of the USAF and the still-powerful Seventh Fleet. It is some comfort to know US airpower, in the time I have been around, at least, has never been more obviously ready to fight than these units in the far Pacific. ■

—Photo by Maj. Toby van Rossum Daum, USAF

The negotiating table at Panmunjom, where the Korean War was ended twenty-five years ago and where efforts to maintain the peace continue.

Thousands of feet in the night sky over the Pacific, C-141 crews discuss one of the major concerns facing the Air Force today . . .

WHY PILOTS GET OUT

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

SANDBAGGING around the Pacific Ocean in a C-141 is a mind-improving experience, if not exactly a luxurious one. That cavernous airlift workhorse has none of the usual distractions associated with modern air voyages. No bouncy stewardi, no movies, no stereo, no booze. Instead, there is plenty of time for the old-fashioned pastimes of conversation and reflection.

My conversations, especially on the long night hauls, were mainly with the only other people awake, the aircrews. We talked about a variety of things as the miles of ocean flowed below us. They showed me how the marvelous inertial navigation system can, at the touch of a button, tell you your position, ground speed, winds, and the time and distance to your destination. The navigator still faithfully shoots the stars, but it has become a ritual, a means of keeping his hand in against the day when Murphy's Law, in its inexorable way, affects the magic gadget.

The talk moved on to places they had been, places like Israel, Zaire, Indonesia, and Diego Garcia. Inevitably, however, we got around to the Air Force and the pros and cons of an Air Force career. As we have all read, the cons seem to be running strong. The Air Force is losing about forty percent of its pilots at the end of their obligated service. The bull sessions on the flight deck seemed to verify the statistics. More often than not, the pilots I talked to had decided to leave when their time is up.

If these were not big hiring years for the airlines, the loss rate of military pilots would certainly be down. The pay, fringe benefits, and domestic stability of an airline pilot's career are powerful attractions. Still, there are offsetting drawbacks to an airline career: long years of riding sideways in the third seat before advancement to copilot, and more long years before reaching captain. The Air Force would appear to have a clear edge in the job-satisfaction department. Responsibility comes early in the military, and the pilots I talked with both recognize and appreciate that side of the military life. In fact, there was a note of regret that ran through most of the rationales for leaving the service, regret at abandoning a career that had a lot to offer and a few things wrong with it, some tangible, some less so. It is the things that are wrong, rather than the attractions of civilian life, that seem to influence their decisions.

On the tangible side, there is the OER, the rating system. The sharp young captains in the squadrons appear to feel the deck is stacked against them, that there is no way they can emerge and be recognized for outstanding work so long as they are flying an airplane for the Air Force. This perception is not limited to transport crews who are simply more visibly a problem for the moment. Fighter pilots, while holding firmly to their unshakable belief that there is no one quite like them, share this uneasy feeling that gold-plated effectiveness reports are reserved for people in the high-visibility jobs next to the brass, not for squadron pilots. To put it simply, the present rating system is detested by the average young pilot. Since it is clearly seen as one of the reasons for becoming a civilian, either the system is faulty or the Air Force needs to put on an intensive education program to correct this wrong impression.

There are other reasons for getting out, of course, and some of these tend to be a little intangible. They have to do with the quality of life—to use that hackneyed sociologist's phrase—in an Air Force career. The flying part is all they ever thought it would be. Like pilots from the earliest days, they love their airplanes, the mission, and the companionship of like-minded people. It is the off-duty side of things that no longer seems competitive.

The social changes of our democratic society have long since made their way into the Air Force. Some, like the enlightened programs for racial understanding, have improved everyone's quality of life. But there has also been, in the name of democracy, or cost-effectiveness, or whatever, a steady chipping away at the little things that made military life so distinctive. Officers' clubs, once dignified and even a little stuffy with their strict dress codes, are now, often as not, just come-as-you-are hangouts.

There is nothing wrong in that, I suppose—the clubs do have to be competitive—but it is a commentary on our changing times. Being an officer has become, to many of these young men, just another job.

It is not a job that has much to offer anymore in the way of fringe benefits, in the opinion of those pilots I talked to. The sight of a colonel and his wife hanging forlornly around the passenger terminal hoping for a space-available ride to somewhere is just a reminder, to these pilots weighing the future, of the comparatively lavish treatment the airlines give their pilots and the pilots' families. Six or more free trips a year, and no limit on trips at fractional fares. There are even free trips for parents. By comparison, military space available does not even compete as a fringe benefit. And neither, increasingly, do dependent medical care, exchanges, and commissaries. Foreign duty, once an inducement, is becoming unaffordable in what used to be the most desirable places.

Well, these seem to be the reasons pilots, at least, get out. Sooner or later, the airlines will fill their rosters. That will slow the drain, but it is not the solution. Perhaps there is no solution in times like these. But if there is one, part of it may lie in a determined effort to restore some of the dignity and little privileges that used to accompany increased rank. ■

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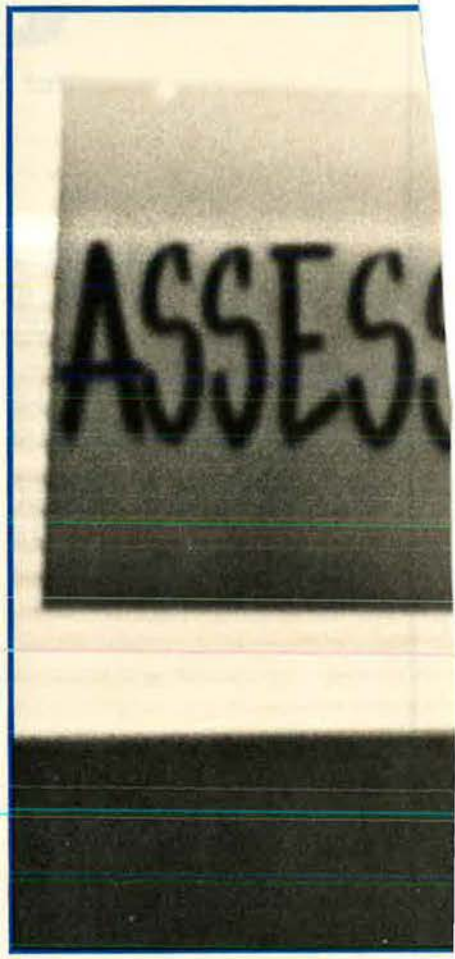
BLUE FLAG: BUILDING THE BATTLE STAFFS

This TAC training program is growing in size and importance. Designed to whet the skills of senior commanders and their staff, Blue Flag also is helping Air Force leaders spot weaknesses in Air Force readiness.

BY BONNER DAY, SENIOR EDITOR
USAF Photos by Maj. Bob Whelton



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BLUE FLAG, the quarterly exercise here at the Air Force's Tactical Air Warfare Center, has become one of the service's most important training programs.

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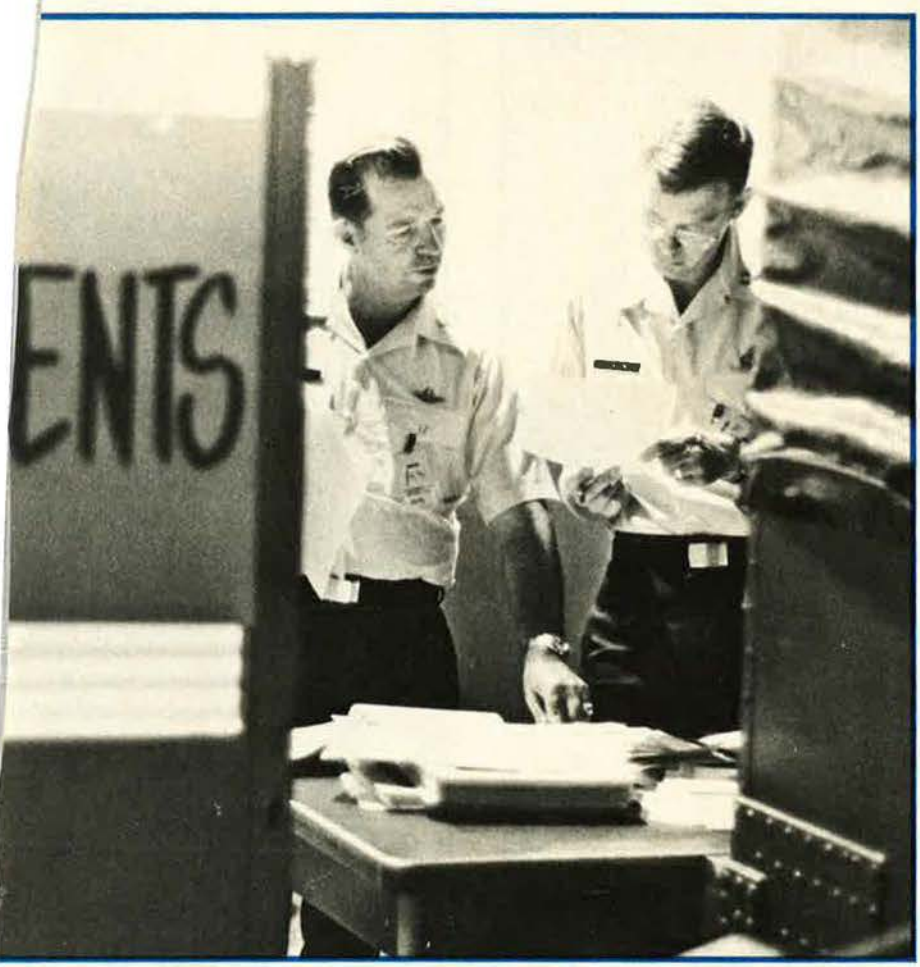
The goal is to train commanders and staff officers so that, in a war emergency, they can immediately participate in directing an air war and avoid the traditional high casualty rates in the first days of combat.

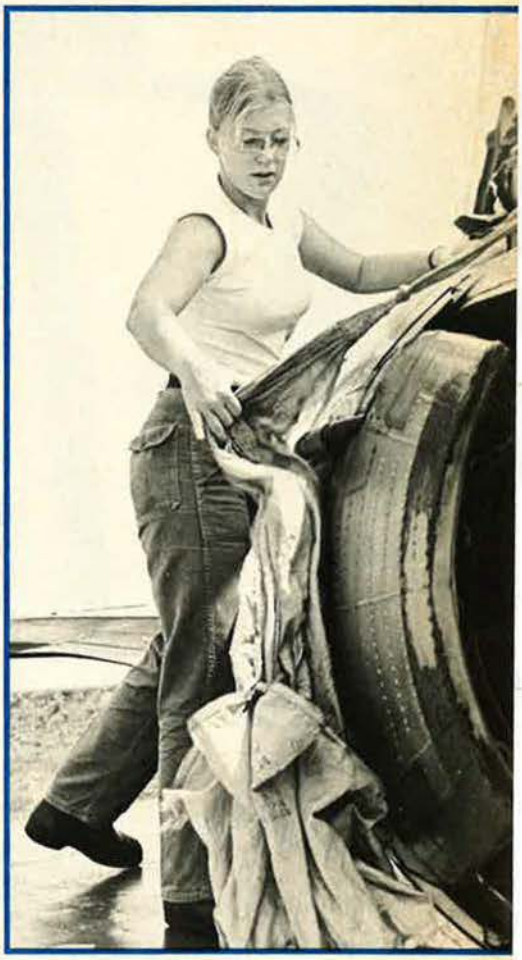
Blue Flag fills two of the Air Force's identified needs. As older officers retire, the Air Force is confronted with a growing number of senior officers who have not had experience in directing large air elements in a war. Blue Flag attempts to provide that experience to colonels and lower grades in conditions as close to war as safety restrictions permit.

Also, as a peacetime economy measure, overseas air battle staffs are undermanned. In an emergency, these positions are expected to be filled by officers and enlisted men from the US. Blue Flag is organized to train combat staffs in the US so that they are qualified the moment they arrive in a war theater.

The key to the success of Blue Flag exercises is realism. The Tactical Air Warfare Center, using some of the latest computers, a sophisticated air defense range, and Air Force aircraft from bases across the country, provides that realism to a degree never before possible during peacetime.

Using the experience of the Blue Flag exercises, the Tactical Air Command this year set up the Battle Manager Course at the Eglin complex. Students are Air Force and Army officers with command, operations, intelligence, and communications backgrounds. Blue Flag supervisors also exchange experiences





Left, Col. Royce Jorgensen, Director of Blue Flag, checks progress of exercise. On temporary duty from George AFB, Calif., crew chief A1C Diane Martin, above, prepares an F-105 for flight.

with instructors of the Combined Air Warfare Course at the Air War College, Maxwell AFB, Ala.

Practical Experience

But the practical experience is provided by Blue Flag. Started in 1976, the first exercise trained 375 officers and enlisted men. The one held this June trained 923. More than 900 are expected to participate in the September exercise.

Blue Flag is designed particularly for regular and Reserve Forces units assigned to the Tactical Air Command.

It could be argued that Blue Flag is the most important training conducted by any of the services. Many military men believe that the first moments of a conventional war, which is the period that Blue Flag is concerned with, will be decisive—and will be decided in large measure by airpower.

There is no doubt that what is learned here at Eglin AFB's Tactical Air Warfare Center will be a major factor in determining how effective the US is in employing its aircraft in war.

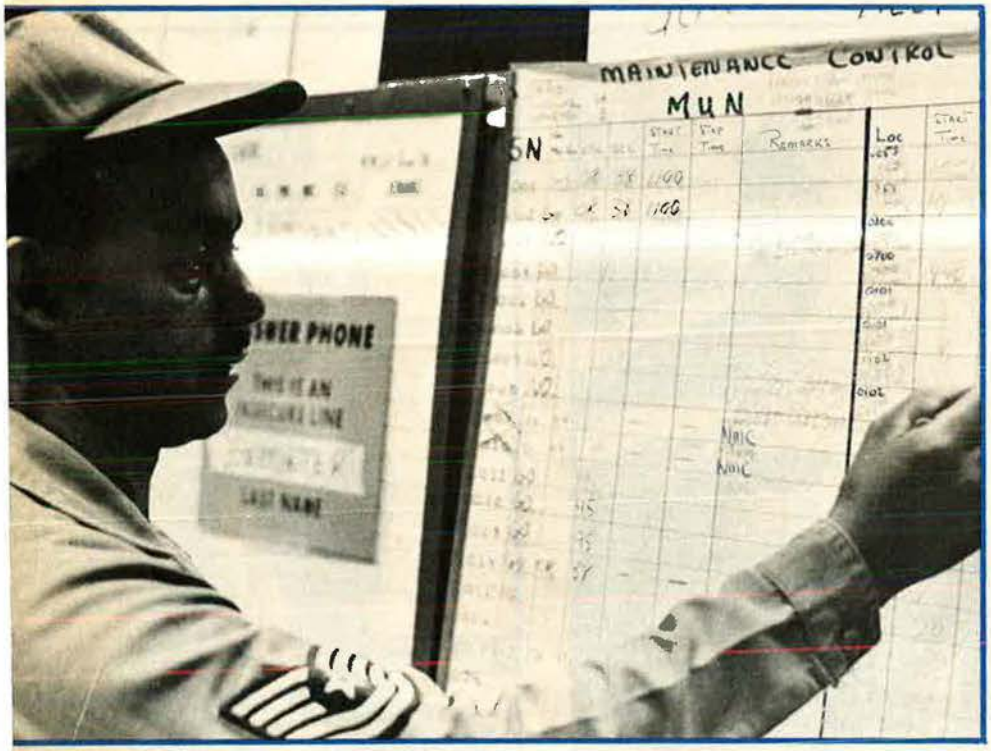
The exercises have already exposed some deficiencies in current air operations, particularly in the way orders are prepared and transmitted to combat units.

Training is provided in five primary areas: command, control, communications, intelligence, and the relationship of these elements.

In the latest exercises, the friendly, or Blue, side poses as a real unit in the NATO command and the aggressor, or Red, side simulates forces of the Warsaw Pact countries.

A Blue Flag exercise involves a lot of preliminary work. Officers at the Tactical Air Warfare Center gather weeks in advance of the actual exercise to decide on the scenario. The first Blue Flag scenario in 1976 was a response to a terrorist attack in an area with light air defenses. It was similar to the Israeli Air Force raid on Entebbe, Uganda. The next two Blue Flags involved combat operations on the Korean peninsula, where air defenses are more sophisticated. The last three exercises have been based on a war

—USAF Photo by SSgt. Steve Taylor



Above, round-the-clock status was kept on aircraft, fuel, and munitions by maintenance units. Right, one of the paratroopers who jumped into Eglin to set up a command post.

in Europe, where the most sophisticated air defenses are deployed.

After the scenario is approved, Tactical Air Warfare Center officers plan the simulated war, using real intelligence and assessments of the resources that would be available to US commanders.

Most of the "players" are selected from the Tactical Air Command's Ninth or Twelfth Air Forces. In addition, players come from the US Air Forces in Europe and from the Army.

The players are assembled at Eglin and briefed on their jobs in the exercise. In the Blue Flag held in June, the friendly forces posed as the 4th Allied Tactical Air Force (ATAF), which is based in the southern half of West Germany.

For the exercise, Col. R. L. Meyer served as Commander of the 4th ATAF, the top player in the Blue Flag exercise. Colonel Meyer at the time was Commander of the 49th Tactical Fighter Wing of F-15s at Holloman AFB, N. M.

Named to serve as Vice Commander for the exercise was Col. D. P. Wright, who was from 12th Tactical Air Force Headquarters at Bergstrom AFB, Tex.

Col. Donald Snyder, acting as the deputy commander for operations, was serving as Deputy Commander of the 58th Tactical Training Wing at Luke AFB, Ariz.

Col. Robert D. Williams, Commander of the 460th Reconnaissance Technical Squadron at Langley AFB, Va., acted as the friendly force intelligence officer.

Col. Leland T. Kennedy acted as Commander of the Allied Tactical Operations Center at Sembach AB in West Germany. Colonel Kennedy at the time was assistant deputy commander for operations of the 602d Tactical Air Control Wing at Bergstrom AFB, Tex.

The friendly ground forces were led by Lt. Gen. Volney F. Warner, Commander of the Army's 18th Airborne Corps at Fort Bragg, N. C. He and eighty-three other soldiers parachuted into the Eglin complex on June 17 and set up a Corps Tactical Operations Center, simulating that of V Corps in Germany.

The enemy forces were led by members of Eglin's Tactical Air Warfare Center, under the supervision of Brig. Gen. Robert E. Kelley, Vice Commander of the center at the time.

Col. Royce Jorgensen, operations director for the 441st Tactical Training Group, has been operations director of all but the first exercise.

Assisting him in leading the Red aggressor forces in exercises is his deputy, Col. Roland Nordlie.

Intelligence Briefings

A Blue Flag exercise begins after the players have been briefed on the duties of their positions and the military forces available to them.

Controllers begin feeding intelligence information into the Blue Flag Combat Intelligence Center, and from there to the Tactical Air Control Center.

As the intelligence picture is pieced together, the commander of the Blue Forces issues alerts and other orders.

The friendly forces use a mixture of actual Air Force planes and simulated planes and ground forces. Most of the aggressor forces are simulated.

In the June exercise, the friendly forces used units from Moody AFB, Ga.; Shaw AFB, S. C.; Tinker AFB, Okla.; Keesler AFB, Miss.; and George AFB, Calif.

The 347th Tactical Fighter Wing, operating from Moody, flew eighteen F-4s for three days in the exercise. Its role was that of the 50th Tactical Fighter Wing based at Hahn AB in West Germany.

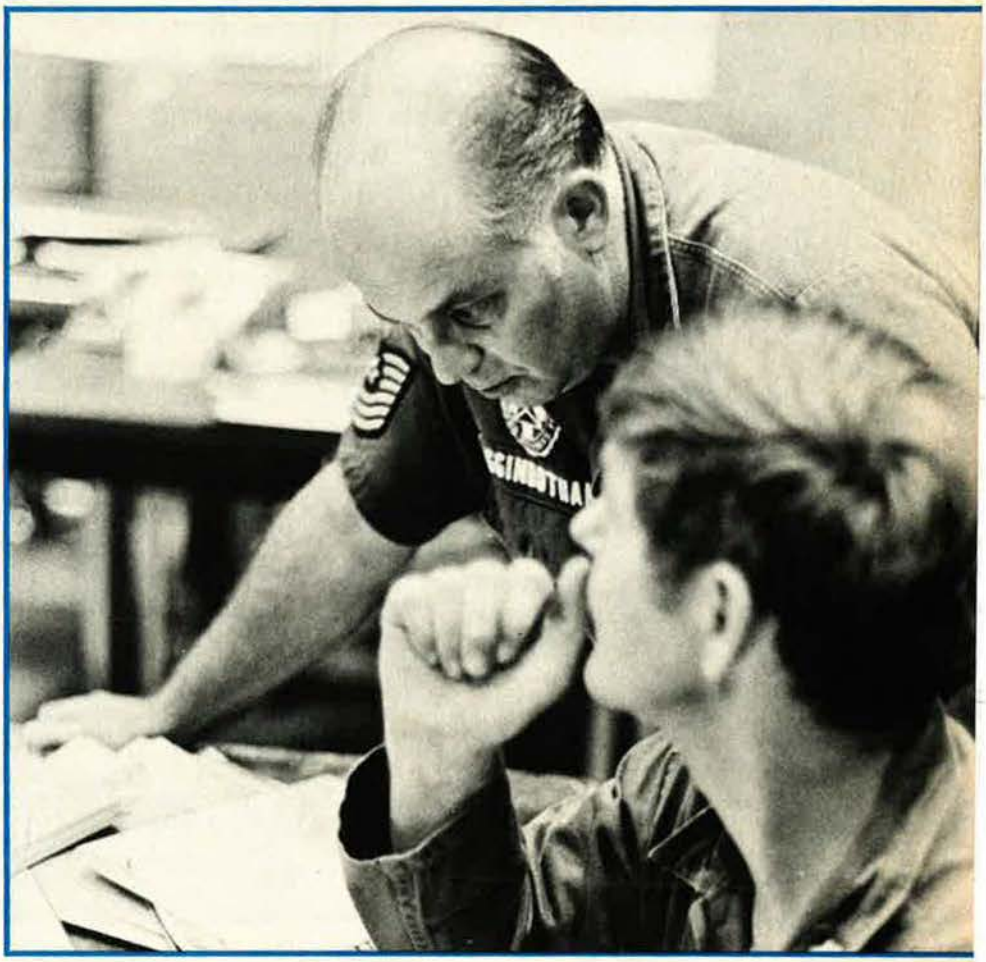
The 355th Tactical Fighter Wing at Davis-Monthan AFB, Ariz., flew six A-7s to Hurlburt Field, part of the Eglin complex, to be in position for the exercise.

The 363d Tactical Reconnaissance Wing launched four RF-4s in flights from Shaw, posing as the 26th Tactical Reconnaissance Wing at Zweibrücken, West Germany.

One E-3A aircraft from the 552d Airborne Warning and Control Wing flew missions from Tinker AFB for two days.

One Airborne Command and Control Aircraft flew missions for two days from the 7th Airborne Command and Control Squadron at Keesler AFB.

The 35th Tactical Fighter Wing sent six F-105s from George AFB to fly Wild Weasel missions against Eglin's antiair ground defenses.



Two members of the friendly forces prepare operations orders at Wing Operations Center, modeled on one at Ramstein Air Base in West Germany.

The 738th Tactical Control Squadron worked with the AWACS aircraft to control air traffic during the exercise.

In addition to the planes that flew missions, Blue Flag controllers introduced additional aircraft by computer and plotting board, and also simulated the majority of the aircraft for the aggressor forces. To the commander, however, the "constructed" aircraft were as real as the actual planes.

In the June exercise, Scenario Translator computers were used for the first time. With this addition, there was more interaction between the decisions of the Blue friendly forces and the reaction of the Red aggressor forces.

Also for the first time, the System 34 computer was used in June to speed air tasking orders from commanders to the units. The computer cut the time for tasking significantly, and also helped to recapitulate the day's activity during the evening critiques. Air Force officers credit the introduction of the System 34 computer to Lt. Col. John Taylor of the 602d Tactical Air Control Wing at Bergstrom AFB, Tex.

As intelligence continued to pour in during the June exercise, Colonel Meyer, the friendly forces commander, responded with orders to the air units, using the computer.

All of the planes in the exercise,

Using computers and plotting boards, air staffs track the planes of aggressor and friendly forces in the simulated war.

real or "constructed," were carefully followed on plotting boards to reflect the decisions of the Blue and Red Forces. To the commanders in the headquarters, it was as realistic as if they were in a real war. During the heat of the exercise, officers and enlisted men manned the command centers around the clock, as they would in wartime.

Altogether, some 1,232 people were involved: 923 players, including eighty-four from the Army, and 309 Blue Flag controllers. It was the largest of the Blue Flag series to date.

Much of the realism of the Blue Flag exercises is owed to the electronic warfare ranges of Eglin AFB. Here the defenses that combat pilots would face over the Warsaw Pact countries are duplicated through simulation. Defenses consist of Soviet-type surface-to-air missiles and anti-aircraft artillery electronically simulated at sites on Okaloosa Island and inland ranges. Radar emissions from these defenses appear as electronic pulse signals to pilots, just as actual Soviet defenses would register.

Friendly Blue force aircraft in turn are picked up on aggressor radars and the simulated enemy weapons sites are alerted.

Evasive tactics and electronic countermeasures, including radar jamming and chaff-dispersing, are all used in the battle between pilots and the Blue Flag controllers manning the air defenses.

A ground radar signal held on too long leaves an electronic signature that reveals the location of the radar to the pilot and allows him to knock it out of commission. If the pilot reacts too slowly, he can be eliminated in the electronic war game.

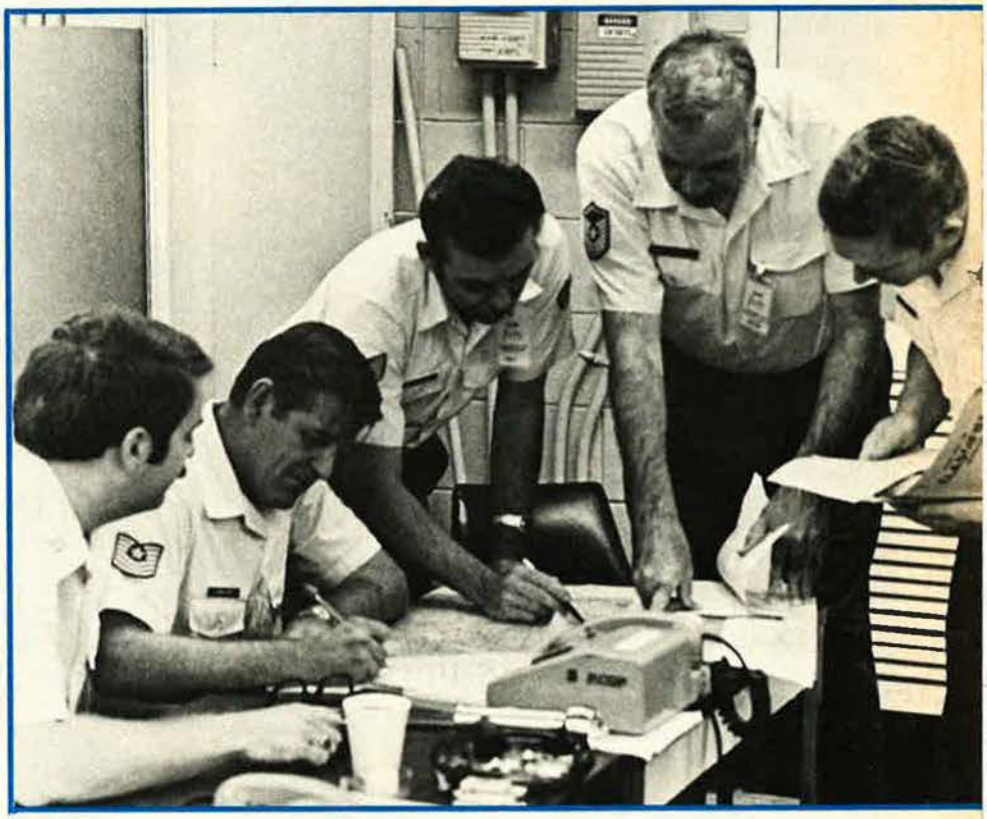
Later, analysts study the computer readouts of the actions to determine which pilots win or lose to the ground defenses.

Errors Reviewed

Each night, all Blue Flag activities are reviewed and assessed. Errors are pointed out and solutions discussed. Players are told the damage, the kill ratio, and the losses.

The results are tabulated by computers and analyzed by Tactical Air Warfare Center experts in command, control, communications, and intelligence.

The pressure of war is clearly present because actual battle plans and intelligence information are used



A Blue team member, above, queries a mobile computer on the progress of the "war," while a logistics team, right, discusses fuel restrictions.

at a pace that reflects actual combat.

Mistakes or unusual delays in the operations, or weaknesses in the function of the Tactical Air Control System are identified for corrective action.

Blue Flag events also are used to test new equipment. And the exercise helps in standardizing procedures used by air and ground forces in war.

Though Blue Flag is a training exercise, the realistic atmosphere has created a laboratory test of the planning and resources of the Air Force against those of the Soviet Union and the Warsaw Pact.

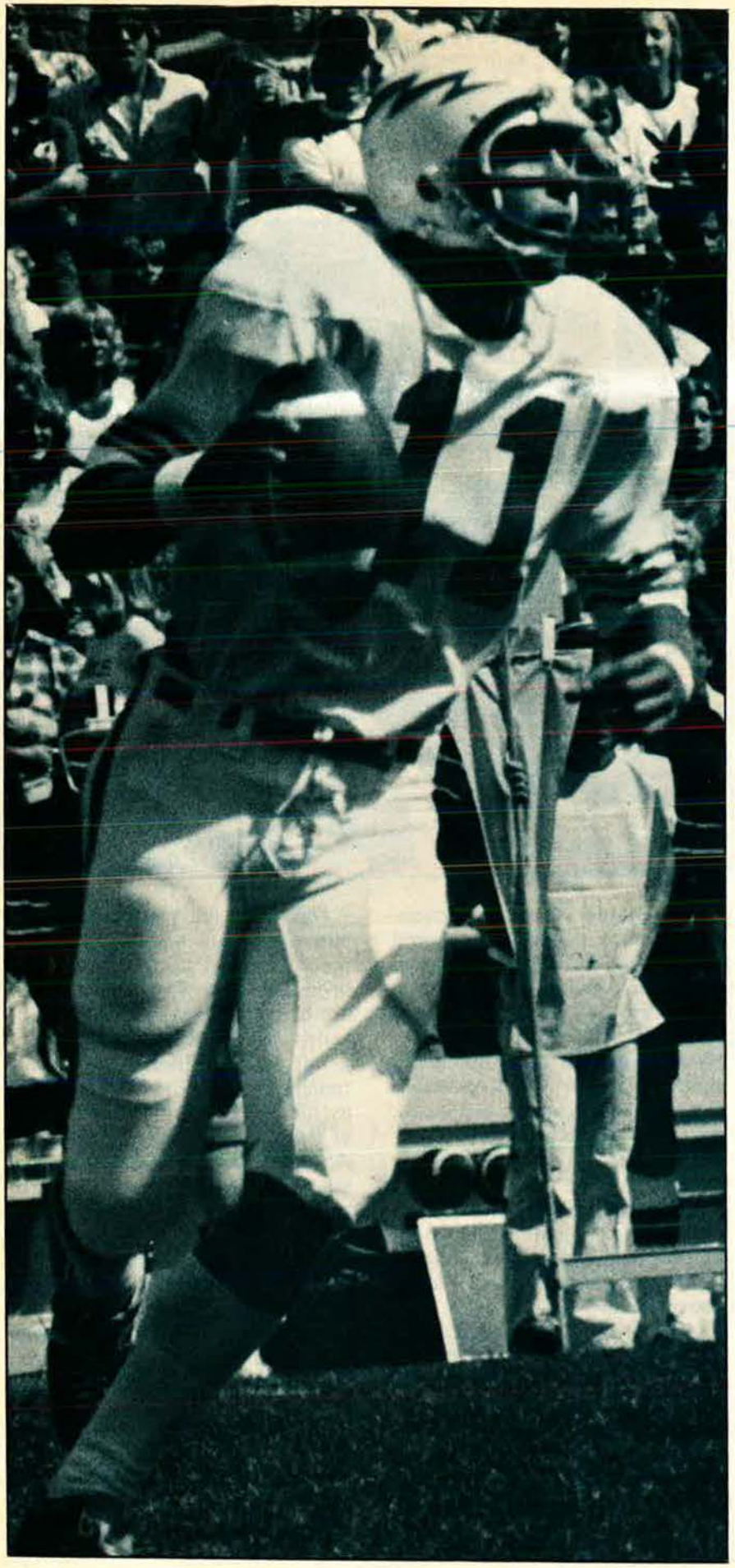
Because actual intelligence information on Warsaw Pact and NATO strength and equipment is used, the exercise gives some indication of how the two forces would fare in a real war. It cannot be an exact test, because there are so many unpredictable factors in war. But the exercises are accurate enough to have turned up some disturbing deficiencies. Some preliminary conclusions:

- The present method of assigning targets to aircrews is too inefficient to suit Air Force commanders. Present tasking systems are excessively time-consuming. The general complaint is that orders sent from allied commands to operational units to aircrews are late and without sufficient information.
- Staff officers have insufficient knowledge of how allied operations in NATO or Korea are conducted. Officers do not have an overall picture of allied air staff operations in war.
- Without constant exercise, aircrews get lax about techniques of authenticating orders over radio to prevent the enemy from ordering false missions.
- There is growing evidence that NATO and the US do not have a sufficient number of deployed or rapidly deployable aircraft to hold back the Soviet Union from a nonnuclear invasion of West Europe. This is true despite the assumed superiority of US aircraft and pilots over their Warsaw Pact counterparts.

Officers at the Tactical Air Warfare Center are searching for new procedures and tactics for air staff operations. Blue Flag exercises also are being modified to address problems that have been exposed.

But Air Force leaders say that the training and combat readiness gained by aircrew members in the process of learning by doing is invaluable. And they put even greater importance on the experience Air Force commanders and battle staffs gain from thinking out the moves of potential adversaries, and, under the simulated pressures of war, working out counterstrategy and tactics.

After the first six exercises, 4,982 officers and enlisted men had been trained in Blue Flag. And future exercises will add to the total Air Force experience. Thus, Blue Flag ensures that in a future war or military crisis there will be commanders and staffs who already have been confronted with a similar challenge. ■



At the Air Force Academy, the slogan of the Athletic Department is "Not all athletes are cadets, but all cadets are athletes." The heavy emphasis on athletics is part of the cadets' training in leadership.

Acade Labora

BY CAPT. ANTHONY LYNN BATEZ

AN AGED USAF maxim, almost as canonical as "our mission is to fly and fight," is the more benign "the Air Force takes care of its own." For some 4,400 blue-suiters known as Air Force Academy cadets, it's no empty expression.

The Air Force takes care of its Academy cadets on 18,000 postcard-famous acres of former ranch land north of Colorado Springs. From 1955 to 1959, USAF transformed the ragged mesas beneath Pikes Peak into a citadel on a hill, buttressed by rigorous academic standards and remote from the diversions of civilian society. Today, at 7,000 feet, life at the gleaming glass and steel campus that the cadets call "Aluminum U" is rarefied, literally breathtaking for visitors unprepared for both the oxygen-thin ascents of the Rocky Mountains and the resplendent facilities, albeit Roman regimen, of the student residents. It is a magnificently accoutered but disciplined world.

Nowhere is the discipline meted as unstintingly as in the Academy's athletic program, a bracing series of physical education courses and intramural and intercollegiate sports—all sustained on a $4.8-million-a-year budget. Nearly half the money is spent on the intercollegiate program, which is funded exclusively through ticket sales and other nontaxpayer dollars. Unlike most college students, cadets must go out for athletics all four of their undergraduate years, a

Academy quarterback Dave Ziebart prepares to pass during the Falcon's game against the University of Wyoming last season.

y Athletics: ry for Leadership

requirement reflected in the Athletic Department's slogan: "Not all athletes are cadets, but all cadets are athletes."

The cadet athlete's life is a toughening but not drudging four years. Cadets exercise and compete in athletic facilities that occupy nearly as much land as the 160-acre academic quadrangle, and, depending on the season, are often booked solid.

Why this heavy emphasis on athletics? It's all part of the cadets' training in leadership, the military's word for a combination of brains, interpersonal skills, and pluck. The Academy's mission is producing about 1,000 embodiments of this combination each year to stock Air Force officer ranks. Since the first graduating class of 1959, the Academy has commissioned more than 12,000 officers, about seventy-five percent of whom are still on active duty.

Despite the steady flow of graduates into active duty, the Academy finds leadership a complex ideal to teach because it has diverse meanings. There is no simple synonym for the word. It variously denotes, among other things, acceptance of responsibility, organizing skills, high ethical and moral convictions, and the ability to inspire followers to selflessness and devotion to duty.

These are traditional traits of military leaders, but no snap to instill in any postadolescent group, even highly qualified young men and women. In USAF's estimation, however, the challenge is unavoidable: The size and mission of the Air Force—budgeted next year at $35 billion—require a substantial investment for future leadership, and the Academy's disciplined and competitive athletic program is one element in the portfolio.

In addition to athletics, the Academy has two other major programs for leadership preparation—both equally unsparing in discipline. The military training program, beginning the summer before the fourth class (freshman) year, covers the soldierly aspects of the cadets' development, starting with rifle instruction, marching drills, survival training, and lessons on military customs and courtesies. As the cadets advance through their four-year stay at the Academy, they learn military doctrines and tactics, and assume increasing responsibility for the military training of lowerclassmen. During summers, cadets are assigned to USAF installations around the country where they get first-hand experience with active-duty life and missions. Graduates earn regular commissions as second lieutenants and serve a minimum of five years on active duty, longer if they take postgraduate flying training.

The school's academic program, responsible for the cadet's intellectual development, leads to baccalaureates in twenty-three subjects, most in the science and engineering disciplines. The curriculum of more than 180 semester hours per student is rarely matched by civilian universities. It is supported by first-rate instructional equipment and laboratories, including two wind tunnels, a planetarium, a human cardiovascular research facility, and an antenna range for measuring electromagnetic phenomena. The 461,000-volume reference library will be expanded by more than 100,000 titles in the near future. Most of the top fifteen percent of each newly commissioned class are provided postgraduate education sometime during their first eight years on active duty.

Notwithstanding the keen academic and military training, it's the athletic program that gives cadets their most personal and permanent leadership lessons. Unlike the parade ground, the athletic field is no respecter of persons. Cadet military rank and class seniority are left in the lockers, replaced by an egalitarian etiquette that recognizes only individual ability. An upperclassman may learn humility on the playing field from a junior cadet he chastened for a military infraction the day before, when both wore insignia-laden blue shirts, not white gym jerseys. Thus, in athletics, relationships are not between cadet grades but personalities; by the same token, leadership in sports does not depend upon vested military responsibilities but upon the cadet's capacity —regardless of his position on the team—to inspire his teammates to wholehearted competition.

Leadership traits do not necessarily indicate athletic prowess, however, and neither does the ability to toss deft laterals in flickerball mean you're a born leader. A cadet can be a second-string player, but a first-rate "motivator"—and leader.

The Academy is not the only Air Force institution developing leader-athletes. Squadron Officers School (SOS) at Maxwell AFB, Ala., pursues the same goal in its "leadership

—USAF Photo by Sgt. Wally Roct

In addition to participating, cadets officiate and administer the Academy's intramural sports program.

laboratory"—code for sports competition. Both SOS and the Academy believe athletics contribute to the kind of personal leadership ability that produces close-knit squadrons, effective missions—and successful ORIs. It's an ability neither school believes can be wholly learned apart from athletic competition.

Hence the Academy's sizable commitment to athletics. And its resolute policy of continuous cadet participation through all four years.

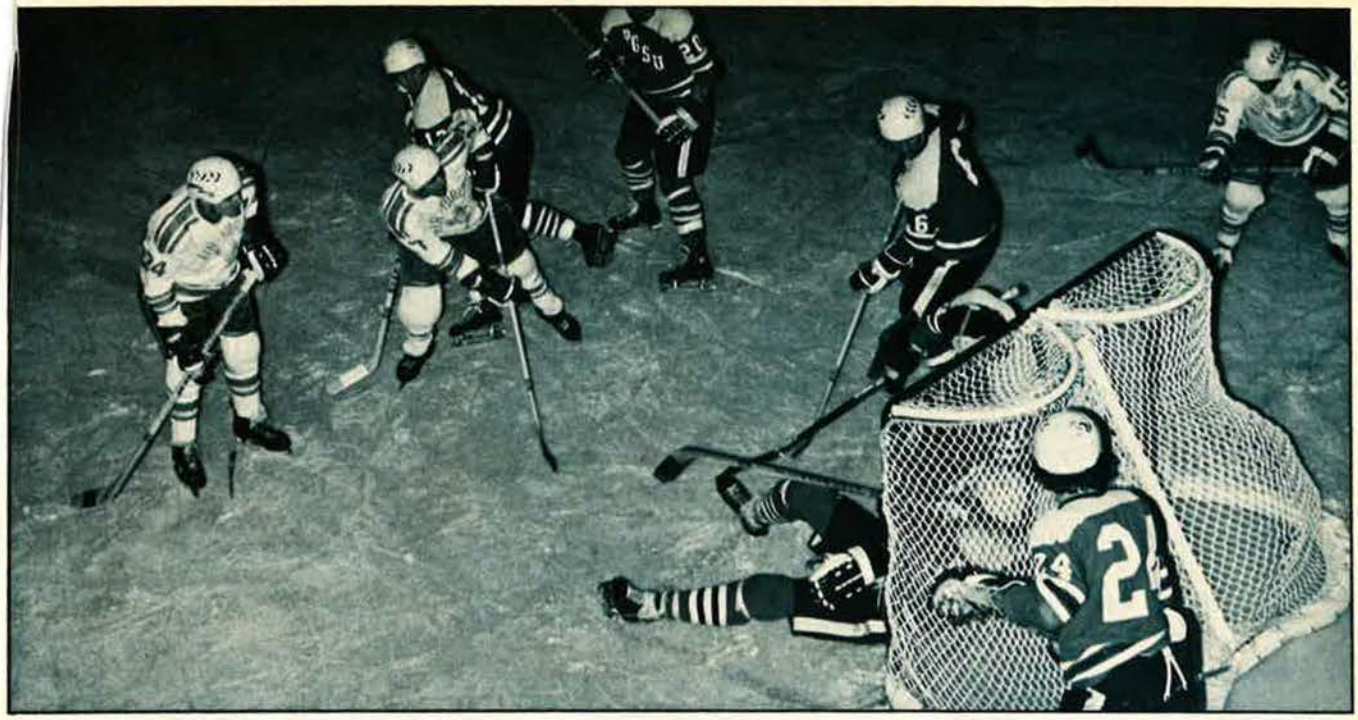
Cadets engage in athletics in two of three ways: All cadets take instruction in physical fitness and sports, and most compete in intramural matches between Academy squadrons. Superior athletes, however, are excused from intramurals to play in intercollegiate games. Physical education classes and intramurals are conducted coeducationally except for contact sports (football, wrestling, boxing, and lacrosse) and where physiological differences require separate training for women. Men and women play separately in intercollegiate sports except pistol and rifle, which are coeducational. (*See box.*)

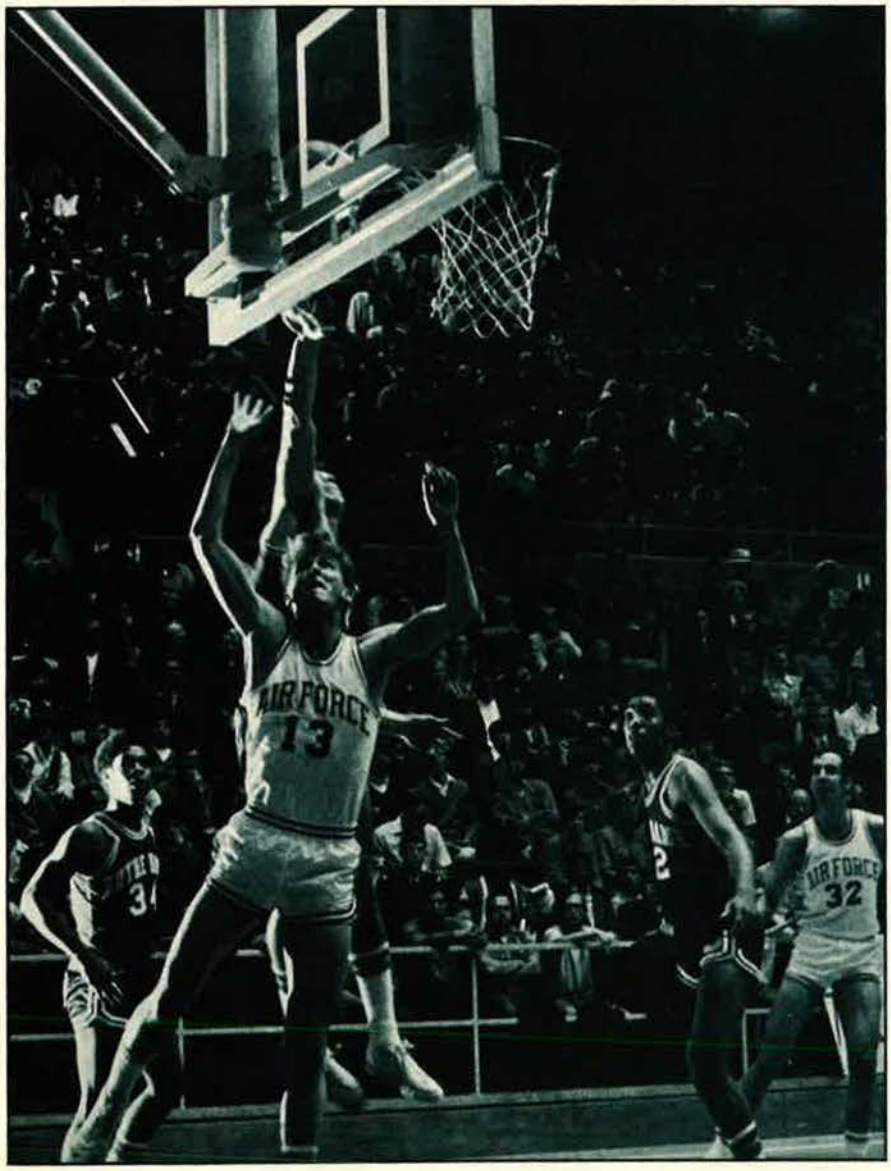
Besides giving each cadet about six hours of field leadership experience a week, the sixteen intramural sports develop managerial leadership since cadets must handle the scheduling and administration of the 640 squadron teams and officiate at all contests themselves. The squadron cadet officials determine has the best intramural record by year's end receives the Academy's Malanaphy Trophy.

Compared to intramurals, intercollegiate sports have a more galvanizing impact on cadet spirit and pride since games are against major colleges around the country, and because athletes who distinguish themselves in such matches can compete in prestigious postseason bowl games and tournaments. Competitiveness at this level, says the Academy, reflects the "leadership traits desired in future military officers." After four years saturated with sports, the cadets doubtless agree.

Running the sports program is

Captain Batezel wrote this article while assigned to AIR FORCE *Magazine in the Education With Industry (EWI) program. He has now finished his year's EWI tour with us and is serving as an Information Officer at Kelly AFB, Tex.*





Above, ice hockey is one of nineteen intercollegiate sports offered at the Academy. Left, the Falcon basketball team battles the Fighting Irish of Notre Dame University.

The Academy's Record in Intercollegiate Sports

The Air Force Academy fields nineteen intercollegiate sports, some with both varsity and junior varsity squads. Men and women participate coeducationally in pistol and rifle, but play separately in other intercollegiate sports due to physiological differences and rules of the National Collegiate Athletic Association (NCAA) and the Association of Intercollegiate Athletics for Women (AIAW).

During the 1977–78 season, Academy athletes won 70.7 percent of their contests with other colleges and universities around the country, compared to 70.2 percent for the previous season. Last season's record was deflated by heavy football and ice hockey losses, but success in such other sports as water polo, basketball, baseball, tennis, gymnastics, and cross-country kept the Academy's overall reputation respectable.

Director of Athletics Col. John Clune, a 1954 Naval Academy graduate and basketball All-American. The forty-five-year-old electrical engineer and senior missileman has the assertive personality usually associated with fighter pilots. He probably needs it. His "territory," comparable in scope to the responsibilities of the Faculty Dean and Commandant of Cadets—both brigadier generals—includes not only the administrative and personnel matters associated with any large university department, but a more than $2-million-a-year organization called the Air Force Academy Athletic Association. The Association's purpose, as a "nonappropriated fund instrumentality" established by the Secretary of the Air Force in 1954, is to help finance the Academy's athletic program through dues from members (largely Academy alumni and faculty), public donations, intercollegiate sports ticket sales, and refreshment and gift concession revenues.

It's a successful operation, last year bringing in some $2.1 million. The Association pays all intercollegiate coaching salaries and team travel expenses plus most intercollegiate equipment costs.

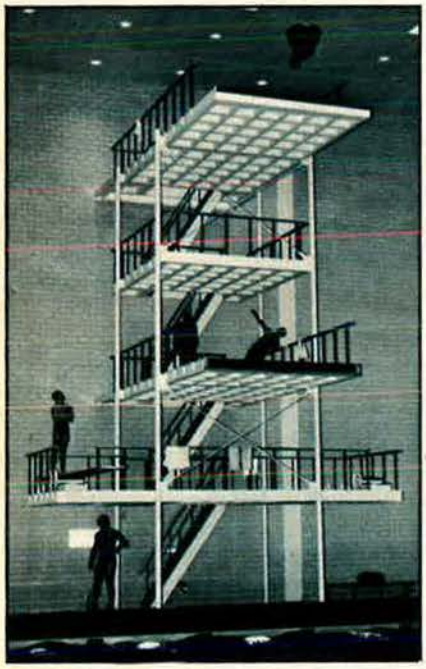
The Association is Big Business—and must stay that way to continue paying major athletic costs. Colonel Clune particularly keeps his eye on varsity football ticket sales, the consistent revenue leader (nearly $1 million last year, in contrast to Notre Dame's "take" of about the same amount from last year's Cotton Bowl alone) and is counting on new Head Coach Bill Parcells to keep the ticket machines clicking. A substantial football "gate" underwrites not only the football expenses but some costs incurred by low or zero revenue sports like baseball, soccer, and track.

By "taking care" of its own Academy cadets with first-rate athletics, not to mention quality academics and military training, USAF is banking on a leadership payoff several years hence that will amortize—and justify—the investment. The Air Force may well be taking care of its own—not only its cadet leader-athletes of today, but the leaders, and the led, of tomorrow as well. ■

THE FALCONS' 1978 SCHEDULE

Date	*Opponent*
September 9	Texas-El Paso
September 16	Boston College
September 23	Holy Cross*
September 30	Kansas State
October 7	Navy*
October 14	Colorado State**
October 21	Notre Dame*
October 28	Kent State*
November 4	Army
November 11	Georgia Tech*
November 18	Vanderbilt

*Home game **Homecoming



Quality facilities are provided for all sports. In 1977–78, the men's swimming team was undefeated.

Bill Parcells—A "Reasonably Emotional Man"

Bill Parcells, whom the Air Force Academy signed the day after last Christmas to coach its varsity football team to a glory greater than the previous season's record of two wins, eight losses, and one tie, calls himself a "reasonably emotional man" who lets his six-foot-three, 220-pound frame and the "expression on my face" do a lot of the talking during workouts. He says his players never have to guess what he's thinking.

What he's thinking, besides how to beat the University of Texas at El Paso September 9, is stamina and selflessness, two words that sum up his philosophy of football—and winning. And qualities Parcells's squad has been hammering away at since spring training when he kicked off a vigorous "strength-building" program of weightlifting and grueling field exercises. Parcells wants the Falcons to accumulate enough physical and emotional momentum to rocket through the season, starting with the El Paso game.

The Falcons aren't Parcells's first experience coaching service academy football. From 1967 to 1969, in his third coaching job, he coordinated West Point's defense under head coach Tom Cahill, who had some ten years earlier coached Parcells in a New Jersey high school.

It was Parcells's two-year run as an All-Missouri Valley Conference linebacker at Wichita State, Kan., from which he was graduated in 1963, that helped bring him his first coaching assignment at Nebraska's Hastings College and, later, a defensive coaching job back at Wichita State. After West Point, Parcells continued his defensive coaching career at Florida State, where he met offensive coordinator Steve Sloan, who later became head coach at Vanderbilt and then Texas Tech. Sloan enlisted Parcells to supervise defensive action at both schools.

With a defensive coaching background, will Parcells prove short on offensive savvy at Air Force? No, he told AIR FORCE Magazine. The thirty-seven-year-old coach, who undisguisedly desires to surpass last year's two victories, is taking no chances with his offensive know-how. He's hired Ken Hatfield, the University of Florida's offensive backfield coach for three years, to coordinate the Falcons' offense. Joining Hatfield as his defensive counterpart is Al Groh, the defensive end coach at the University of North Carolina for five years. Both men were coaches with Parcells at West Point.

The game in El Paso may not give Parcells many clues to how well the Falcons will play November 18's final season match with Vanderbilt since Texas at El Paso, with a previous year's record of one win and ten losses, may not prove much of a yardstick. But by the October 21 home game with Notre Dame (the 1977 national college champion with eleven wins, one loss), Parcells will surely know whether the Falcons have got stamina and selflessness. Air Force has never beaten Notre Dame, and it will take plenty of both qualities to redress the record.

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Perspective
Comment & Opinion

By Capt. James P. Qualey, Jr., USAF, LAS VEGAS, NEV.

The Pilot Exodus—A Pilot's Opinion

A recent Headquarters USAF Military Personnel Center briefing has highlighted a problem known to exist in the Air Force, namely the shortage of pilots. Some figures released by the TAC Directorate of Information indicate that the shortfall in two pilot career fields—fighter pilots and instructor pilots—is 900 and 380 respectively. These facts, coupled with known shortages in other pilot career fields, lead up to the inevitable question: Why?

A good amount of the blame for this exodus from the Air Force is laid to the fact that the airlines are hiring again, and a lot of career briefings mention that the "grass only *seems* greener on the other side." The fact that the grass on this side doesn't appear to be green at all is a cause factor that seems to be receiving too little attention from the Air Staff.

One thing that may be a prime cause of this dissatisfaction is the lack of emphasis on the importance of the pilot; he is treated as a team member of equal status with everyone else. Nothing seems wrong with this team concept from the point of view of equal opportunity, but, from a psychological aspect, we may be committing a grave error. In the past, to be a pilot meant to be someone special, someone who could do something few others could do, fly an airplane; everyone else supported him in the performance of this duty. There is an inherent danger in this attitude; namely, to inflate the pilot's image and make him appear to be something he isn't. In the effort to counter this, the Air Force may have overreacted.

A second source of dissatisfaction is the lack of authority we delegate to the pilot. Everything he does is controlled as much as possible. Management techniques designed to ensure operational control of this individual's performance of duty have replaced leadership. The pilot isn't expected to fly his aircraft well out of a desire to please his leader as much as he is expected to follow a "challenge-response" routine, which, from a management viewpoint, will generate a behavioral pattern resulting in a successful flight. He doesn't feel he has the authority to make any significant decisions regarding the performance of his duty; individualism is stifled and conformance becomes the norm.

On a larger scale, the Air Force's apparent preference for management over leadership techniques has taken the individuality out of operational units; *esprit de corps* is encountered rarely. We standardize units to such a degree and move people around so much that it seems to make little difference whether a pilot flies for one unit or another.

Another irritant to pilots (fighter pilots especially) is the Air Force's program of career development. It is true that a good number of pilots also aspire to and should advance to positions of responsibility other than flying aircraft. They are talented people who would do credit to any organization and should be utilized to the maximum. The rest of the pilot force (and probably a lot of those who are leaving) do not aspire to any job other than flying airplanes. They enjoy what they do, and they become good at it. The prospect of filling a staff position, something so necessary to career progression, is a great irritant to the dedicated pilo a lot of them fly as much as they ca in the Air Force and then leave t join a Guard or Reserve unit.

Considering the dollar cost o training the average fighter pilo (somewhere around $800,000, from initial flight training to combat-ready status), this seems a waste of resources—even after a six- or seven-year commitment is tacked on to the individual's career. The chances are he won't fly the entire six or seven years, and even if he does and then elects to leave, we now lose something a price tag cannot be applied to—an *experienced* fighter pilot.

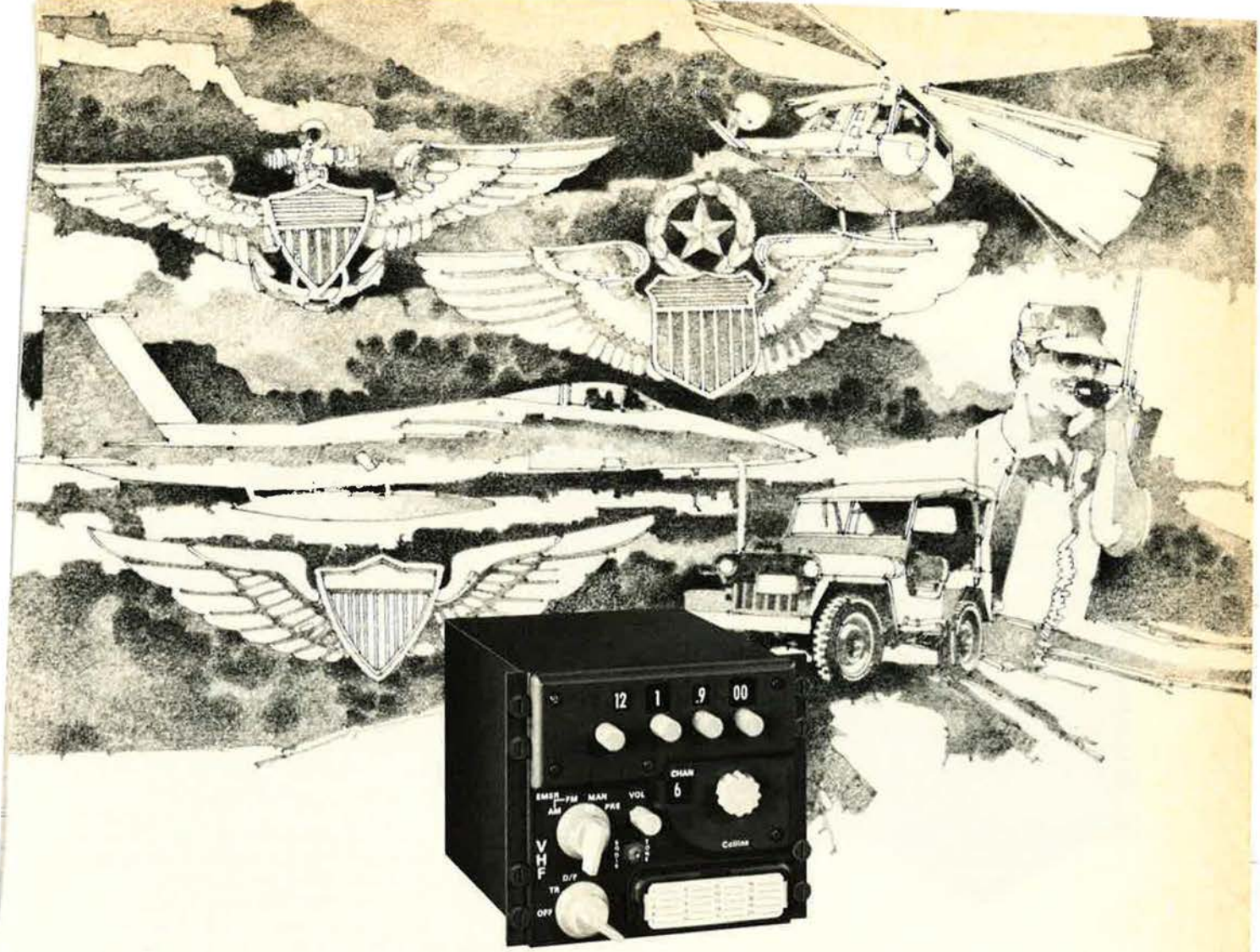
The Air Force is not like any civilian organization. It produces no material product, sells no commercial services, and yet its function is vital to society, namely the defense of that society. Civilian operational methods should be examined to see if they are detrimental to the pursuance of this unique mission. The yardstick that measures success in the civilian world cannot always be applied to the military organization.

I have never heard of a flight leader "managing" his flight of aircraft over a target or an infantry platoon leader "managing" his men into battle. We need leadership; we need something that can stir a person's soul, something that will make him accept a responsibility he might otherwise shun. We pilots have to feel proud to be in the Air Force, secure in the knowledge that our actions contribute something worthwhile to other people; we have to have job satisfaction and other intangible "rewards"; we want to feel *needed*. Then we might stay.

So far, this article has addressed pilots exclusively. With some minor modifications the arguments presented here could be applied to other career fields, both officer and NCO. The Air Staff might consider reevaluating its set of career-management policies; the exodus of pilots we are now experiencing is only the tip of the iceberg. ■

HOW TO SHARE YOUR PERSPECTIVE

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



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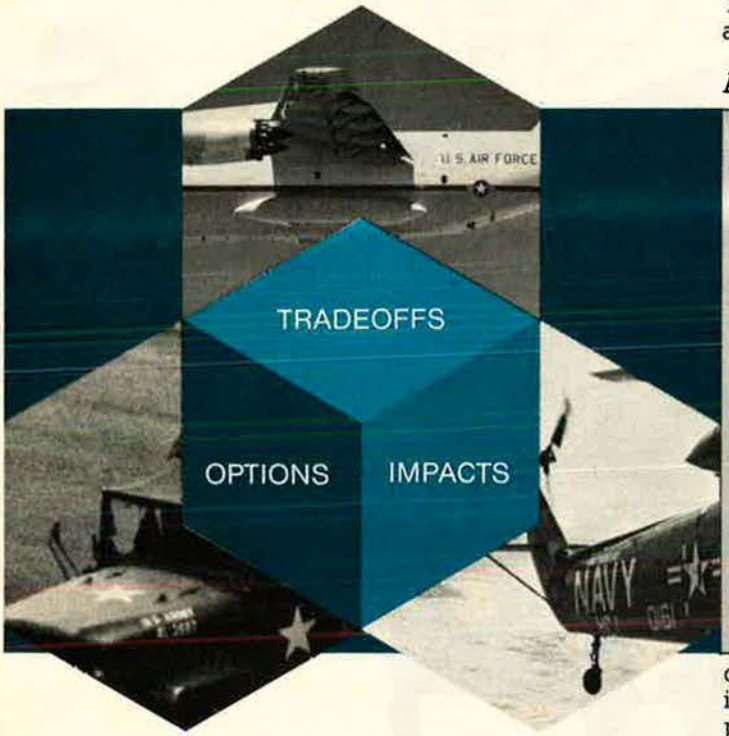

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CHANGING THE COURSE OF MANAGEMENT

Airman's Bookshelf

Strategy for the '80s

Grand Strategy for the 1980s, edited by Bruce Palmer, Jr. American Enterprise Institute for Public Policy Research, 1150 17th St., N. W., Washington, D. C. 20036, 1978. 113 pages. $3.25.

The five contributors to this book are widely experienced retired military men: Gen. Maxwell D. Taylor, former Army Chief of Staff and Chairman of the JCS; Gen. Bruce K. Holloway, former USAF Vice Chief of Staff and former Commander in Chief of the Strategic Air Command; Adm. Elmo R. Zumwalt, former Chief of Naval Operations; Gen. T. R. Milton, who was US Representative to the NATO Military Committee before his retirement and who is now a regular contributor to this magazine; and Gen. Bruce Palmer, Jr., former Army Vice Chief of Staff, and Commander, US Readiness Command.

The reader will not find here a detailed outline of national strategy for the coming decade, but rather a series of thoughtful essays that address the continuing threat to US interests, the authors' assessment of what those interests are or should be, and their observations on how best to protect them. General Taylor and Admiral Zumwalt seem the most pessimistic about the future and General Palmer the most optimistic.

Throughout the essays, there is a general concern with the potential loss of raw material sources (oil among them) and markets, the viability of the all-volunteer force, our mobilization base, strategic mobility, and the security of our lines of communication. Here are a few comments on these, and related, issues:

General Taylor, stressing the need for an assured supply of raw materials, believes we should reduce our reliance on the Middle East as rapidly as possible, as that area is likely to be inaccessible in time of war. General Milton sees a blurring or elimination of traditional roles and missions, since we are not likely to have much larger US forces in the future. General Holloway advocates a strategic command to control the strategic nuclear forces of the specified and unified commands. He believes, also, that the biggest gap in our planning is lack of a doctrine for use of tactical nuclear weapons. Admiral Zumwalt thinks we should extract more leverage from US aid programs by adopting a tougher attitude toward their political use. He scores the Administration for refusing to "present the blunt facts of the deteriorating US strategic position to the American people."

One of the most useful elements of the book is General Palmer's geopolitical look at US interests around the globe. He concludes that the Pacific area will assume increasing importance in the years ahead.

A short review can do no more than hint at the scope of these essays and the range of adapted and novel ideas they contain. For anyone interested in foreign and defense policy, this book is one of the best buys on the market today.

—Reviewed by John L. Frisbee, Editor.

Keith Ferris: USAF Artist

The Aviation Art of Keith Ferris, edited by Ian Ballantine. Peacock Press/Bantam Books, Inc., 666 5th Ave., New York, N. Y., 1978. Contains forty full-color prints and an eleven-page introduction. $7.95.

Keith Ferris, the son of a career Air Force officer, started drawing pictures of airplanes at the age of five. His subjects were the Boeing P-12s, Curtiss A-3s, Douglas O-2s, and other planes at the Army Air Corps Advanced Flying School at Kelly Field in Texas, where his father was stationed.

He never outgrew his love for airplanes or for capturing them in art.

Though originally set on following his father as a military aviator, Ferris learned while an Air Force ROTC student that an allergy requiring inoculations would make him ineligible.

But it was the Air Force, which hired him as an art trainee, that steered him to his ultimate career as an aviation artist.

This book attests to the impressive results. The paintings are particularly notable for the way they capture moments in aviation history. Selections include scenes from the two World Wars, Korea, and Vietnam. Short captions describing the historical significance of each painting accompany the prints.

Among the prints is one of the seventy-five-foot-wide mural of Eighth Air Force B-17s on the World War II Aviation gallery wall of the Smithsonian Institution's National Air and Space Museum. There are three prints of this favorite of Washington tourists: one a two-page rendering, followed by two page-size enlarged details.

A selection of prints from the book appears as a special insert section following p. 84 of this issue.

—Reviewed by Bonner Day, Senior Editor.

The Few, the Foe, and Their Aircraft

Fighter—The True Story of the Battle of Britain, by Len Deighton. Alfred A. Knopf, Inc., New York, N. Y., 1978. 245 pages plus introduction by A. J. P. Taylor, bibliography, and index. $12.50.

Len Deighton is an uncommonly good British writer, noted for his sophisticated and fast-paced spy novels (*The Ipcress File, Funeral in Berlin, Horse Under Water,* among others).

In *Fighter,* he applies his talents to a history of the Battle of Britain, and very comprehensively for such a thin volume. It is obvious that Deighton culled selectively from the mass of material available for what he considered the historic hardpoints of the battle and the events that led up to it.

Airman's Bookshelf

Actually, Deighton has written two books, one about the technical and operational development of the Battle of Britain aircraft (and other hardware) and meshes into it a second, in which he introduces the key players and the roles they played in the unfolding drama. (The final portion of the book is a day-by-day chronology of the aerial combat and how it drew to a conclusion.)

Deighton goes right back to the origins of flight in tracing the development of the famous aircraft. (It is curious that he dismisses the Wright brothers' contribution to powered flight perfunctorily, which is certain to raise an argument: "It was their assistant, an unsung hero named Charles Taylor, who took only six weeks to build a lightweight petrol engine from scratch. . . . His engine was based upon an earlier gas-engine design . . . but that does not alter the fact that Taylor was more important as a pioneer of powered flight than were the Wright brothers.")

Among the technical details are line drawings and other illustrations that help explain the text (aircraft design, radar operations, etc.). Throughout, there are maps and charts to make clear the importance of geographical factors. Included are forty-eight pages of photographs of the men and machines of both sides.

In describing the technical evolution of the aircraft, Deighton says: "The history of invention often shows a pattern of acceleration, in the later stages of which inventors take it for granted that some other element they need will miraculously appear." This proved true in the melding of the classic fighters' airframes, engines, and armaments, and in the case of Great Britain, crucially in the nick of time.

In the account of the battle itself, *Fighter* is no "Tally-ho!" shoot-'em-up kind of book, but an evenhanded and thoughtful presentation of the actions—and blunders—on both sides. The tales of combat the book is laced with seem included more to flesh out Deighton's narration than to add excitement to the story. Thus, the emphasis is on strategy and tactics as the two sides grappled for air superiority. This in no way detracts from readability.

As do other military historians, Deighton credits England's radar net—and the Germans' failure to grasp its significance—as the technologic key to the ultimate victory. The Germans also decisively underestimated Britain's staying power in keeping sufficient numbers of fighters flying combat.

On the human side—other than the courage of the pilots—he cites Air Chief Marshal Sir Hugh Dowding, head of RAF Fighter Command, for foresight and determination in his careful husbanding of Britain's meager fighter forces. Deighton excoriates Dowding's back-stabbing subordinates and Air Ministry opponents. These latter held right up through the battle, and were proved wrong, that "the bomber will always get through" and would overwhelm fighter defenses. Despite Dowding's successful strategy, it still was a near thing. After the initial attacks, the Germans more and more sent fighter aircraft to protect the bomber fleets. These fighters' limited range was to prove a crucial factor.

Deighton denies the importance—at least in this battle—of British intelligence's ability to decipher German Enigma-coded radio traffic and thus give Britain a stunning advantage: "When reading about Enigma it must be remembered that armies and air fleets received orders by landline teleprinter. Radio communication was not reliable enough. . . ."

Deighton blames the Luftwaffe for failing in managing the battle to provide an overall plan with concrete goals. He notes also that there was no radio communication between the German fighters and the bombers it was their mission to protect.

On the other hand, Deighton wonders why RAF youngsters fresh from flight training (some hadn't even fired their guns in practice) were sent immediately into action without instruction on survival tactics by veteran pilots rotated from the fighting for rest. His speculative answer: Hearing exhausted and discouraged survivors discuss heavy combat losses might have been too devastating a blow to morale.

In his introduction, British historian A. J. P. Taylor praises publishing czar Lord Beaverbrook, put in charge of aircraft production and repair by Winston Churchill, for the way he trampled "over all bureaucratic obstacles" in getting Fighter Command the planes it so urgently needed.

Taylor also has high regard for Dowding's handling of the battle and the way he fought the government for the things Fighter Command needed. A famous story is of the fighter chief's confrontation with the Air Ministry over bulletproof windscreens for his aircraft. He argued overwhelmingly that if American gangsters could have bulletproof glass in their automobiles, Fighter Command pilots could bloody well have it in their cockpits.

But as history records, with the victory in the Battle of Britain assured, Dowding was brought down by his foes within and outside the Air Ministry. He was dismissed from his post and passed into oblivion. Writes Deighton: "And when the Air Ministry issued its official account of the battle, Dowding's name wasn't even mentioned."

—Reviewed by William P. Schlitz, Assistant Managing Editor.

Errors of the '70s

American and Soviet Military Trends Since the Cuban Missile Crisis, by John M. Collins. The Center for Strategic and International Studies, Georgetown University, Washington, D. C., 1978. 496 pages, with index. $6.95.

"The cumulative course of events since 1962 . . . causes substantial uncertainties in the US defense establishment and among many concerned citizens, who sense that America's nuclear deterrent powers, while still strong, could be slipping away."

The author thus states the central problem for America's defense policymakers, who have been very much aware of America's decline in comparative strength, but have been unsure or in disagreement about what to do about it. The result, since the Cuban missile crisis, has been to pour billions of dollars into programs, only to discard some of them at the last moment. And while US military power has been frozen in numbers or cut back, the Soviet Union continues to add to its armed might.

Collins, a retired Army colonel, is employed by the Library of Congress as the Senior Specialist in Na-

"I saw you stack the deck."

– Capt. William Monay
Mindanao, Philippines, April, 1942

The 13,000 American troops who still had a tenuous hold on Corregidor were badly in need of medical supplies.

For months, a nerveless band of winged warriors called "The Bamboo Fleet" had provided shuttle service between Bataan, Corregidor and Mindanao. Capt. Bill Bradford, the most seasoned pilot of the lot, had logged more than 5,000 hours over the islands.

Now, one by one, the Philippine Islands had fallen to the Japanese. No one knew better than Bradford how improbable it had become to land anything on Corregidor's minuscule, shell-pocked airstrip. But somebody had to do it.

The pilots gathered to determine who would fly unarmed over enemy territory in the one bucket-of-bolts they had left, an arthritic 10-year-old Bellanca. A deck of cards would decide who would make the trip. Low man would go. Bradford shuffled, cut and drew the lowest card.

Capt. William Monay watched the proceedings with interest. "I saw you stack the deck," he whispered to Bradford.

Bradford vociferously denied it. "But the others wouldn't have a chance of getting into Corregidor," he said. "I know where to make that last dogleg turn and find it in the dark."

On a wing and a prayer, Bradford reached Corregidor, shaken but intact. As the medical supplies were being unloaded from his battered old plane, Gen. Jonathan Wainwright gratefully shook the courageous captain's hand. "Brad," he said, "I thought you'd get through!"

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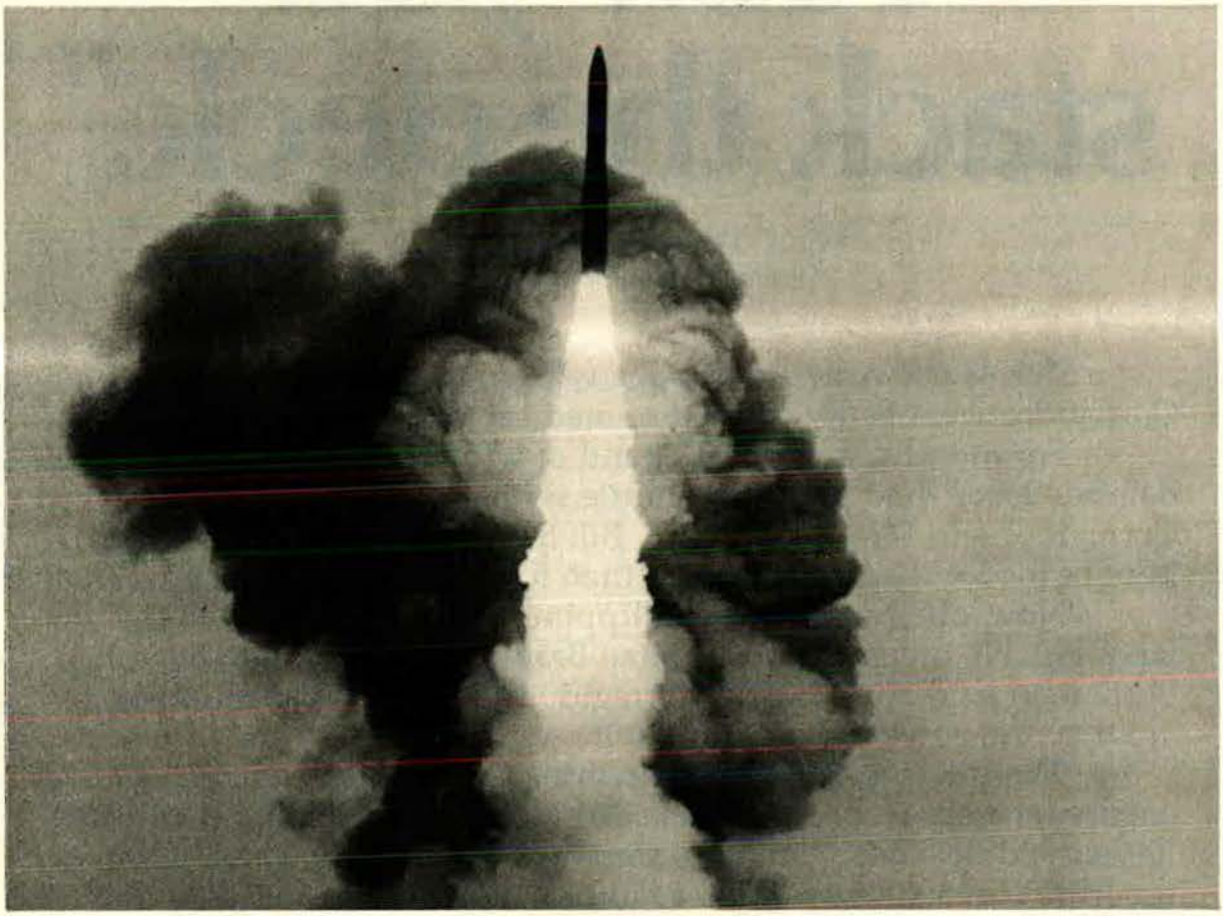

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We're also helping the Air Force look ahead, working with them now on ways to utilize Shuttle.

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Airman's Bookshelf

tional Defense. His first study of the US-Soviet military balance was published by the Senate Armed Services Committee in January 1976. A later study was not published by the committee, because its gloomy conclusions upset some of the committee members.

This book includes the two studies, but also goes into greater detail. Collins compares US and Soviet security interests, objectives, policies, commitments, organizational structures, and strategies.

And he concludes: "The United States is well on its way to becoming a second-class military power and, in some cases, has already achieved that status."

The present state of US defenses, he says, is due less to Soviet strength than to deliberate US policy decisions that make it difficult or impossible to compete successfully.

Says Collins: "Our strategic nuclear posture, which relies on a shaky retaliatory triad and scorns strategic defense, creates an age best described as 'Assured Anxiety.'"

His conclusions are not unique. But a growing number of Americans is becoming concerned about the decline that has taken place. This year, for the first time in memory, Congress is expected to add to, rather than cut from, the military budget submitted by the President. The problem of what should be done is complicated by politics: No recent President has been satisfied that he cannot achieve a better record than his predecessor in arms control. And no President wants to expose himself to charges of abandoning efforts toward world peace or of resuming the arms race.

What years of vacillation have meant to US military strength is documented in this book.

—B. D.

New Books in Brief

The 8th Air Force Album, by Lt. Col. John H. Woolnough. "Most of us had an awful time in England," the author notes. "Never warm enough, food fit for Germans, fog, lumpy-damp beds, and warm beer." In retrospect, he says, "we see that period now as the most remarkable time in our lives." Eighth Air Force members may relive the war years they experienced when they were young and away from home in the more than 1,150 photos appearing in this album. Available from: 8th Air Force Album, P. O. Box 4738, Hollywood, Fla. 33023, 1978. 224 pages. $20.30 (Florida residents, $21.06; foreign, $20.40).

Eighth Air Force Story, by Kenn C. Rust. In the making for twenty years, this book summarizes significant events of the Eighth Air Force from birth to V-E Day. It covers all combat units and includes at least one aircraft photo from each of the Eighth's bomber and fighter groups. Also included: performance records; combat missions; aces; and photos, profile drawings, and markings of aircraft. May be ordered from Aviation Book Co., 555 West Glenoaks Blvd., Glendale, Calif. 91202, 1978. 72 pages. $7.50.

Japan's Longest Day, by the Pacific War Research Society. Here is an hour-by-hour account of the twenty-four hours preceding Emperor Hirohito's surrender broadcast, prepared by a group of Japanese historians after eight years' research and interviews with the participants. Photos. Ballantine Books, 101 Fifth Ave., New York, N. Y. 10003, 1972. 245 pages. $1.65.

A Pictorial History of the United States Army: In War and Peace, from Colonial Times to Vietnam, by Gene Gurney. Every major battle, strategic maneuver, or border skirmish from the Revolutionary period through Vietnam is covered in text, pictures, illustrations, and maps. Index, appendix. Crown Publishers, Inc., New York, N. Y., 1978. 815 pages. $14.95.

Very Special Intelligence, by Patrick Beesly. Not until 1975, thirty years after World War II, were the British Admiralty's special intelligence operations made known. The author, who served in the Admiralty's Operational Intelligence Centre or OIC from 1940 to 1945, reveals the full extent of its operations. Doubleday & Co., Inc., New York, N. Y., 1978. 282 pages. $10.

—Reviewed by Robin Whittle

The Bulletin Board

By James A. McDonnell, Jr., MILITARY RELATIONS EDITOR

Officer Recalls Under Way

For the first time in seven years the Air Force is recalling—voluntarily—Reserve and Air Guard officers to active duty. The first increment of forty-one lieutenants and captains will be on board by the end of this month. The group will include twenty-nine scientific-engineering (S&E) types and twelve pilots and navigators.

The rated recallees are among 630 pilots and 224 navs released during FY '75–77 under PALACE FURLOUGH, but with the option of returning five years later when the rated surplus was to have disappeared. But, with heavy losses to the airlines, the surplus has been melting away faster than expected.

The second increment is planned for the year beginning October 1, 1978, when about 300 young officers, including 100 PALACE FURLOUGH returnees, will be recalled. The master plan calls for all 854 pilots and navs released under that program to receive come-back bids. The majority, in all probability, will have launched new careers and will not be interested in recall.

Although S&E and rated officers are the major participants in the new recall effort, Reservists and Guardsmen in other specialties may receive recall bids if manning requirements dictate. Applicants should send two copies of Air Force Form 125 to the Air Reserve Personnel Center, Denver, Colo., by October 1, for consideration for the FY '79 program. A selection board will meet in November.

Headquarters, meantime, has disclosed that it will give a group of young nonrated officers out of AFROTC a good shot at undergraduate pilot training (UPT). In 1975 and early 1976, USAF found itself with a surplus of AFROTC grads slated for UPT, so it steered more than 500 of them into nonrated posts. Since then, about 200 have applied for UPT under the quarterly selections open to all nonrateds. However, only sixteen have made it under the small quotas of fifteen per quarter. Many have complained and asked for a better selection chance. *(See "Airmail," p. 9.)*

Now, officials say they're setting up a special board in October to pick about 100 of the pre-March 1976 AFROTC group for UPT. And the quarterly board quotas will be raised, to twenty-five per quarter in FY '79 and to fifty in FY '80. So, all young nonrateds will enjoy a better shot at pilots' wings.

These quota increases will not raise overall pilot training production, now at a thirty-year low of 1,050 this fiscal year.

Leave-Takers Beware

If a member returns from leave on a nonduty day like Sunday, he need not count that day as a day of leave. Right? Wrong. It "will be" counted as a day of leave (even if he checks in at 11:59 p.m.), Air Force is telling all hands. It's part of a large internal campaign designed to educate all leave-takers on all aspects of the complex leave rules. Many, of course, have fudged on the above example by counting the return date as a day of duty. The Air Force wants strict compliance with all the leave rules.

USAF Study: "Navs Future Bright"

There will be "a continuing, firm need for Air Force navigators into the foreseeable future . . . and the career field will continue to be both demanding and rewarding. Excellent opportunities for advancement in both the operations and staff arenas continue through the foreseeable future. . . ."

These are among the conclusions of a special Hq. USAF probe of what's in store for the navs, now about 10,800 strong. The study estimates the present force will drop only to about 9,000 a decade from now, because of the transfer of two-seat fighters to the Reserve Forces and their replacement with single seaters. Planned use of inertial-navigation systems aboard airlift and tanker aircraft will also have an impact.

The reassuring findings follow months of speculation that the navi-

—Staff Photo by Rick Knapp

AFA President Gerald V. Hasler, center, ponders a point raised by MSgt. Dale A. Lucas, AFCS, right, during the recent AFA Enlisted Council meeting. Looking on is CMSgt. Walt Scott, Chairman, AFA Enlisted Council. The Council, meeting in conjunction with AFA's Junior Officer Advisory Council, is vitally concerned with future retention in the Air Force.

tor force might soon shrink due force structure and technologi- al changes. FY '78 undergraduate avigator production is dropping to ist 775, lowest in many years. lowever, plans call for annual in- reases to nearly 900 in each of the ext two years and 927 in FY '81.

As active-duty nav strength dips a bit, Air National Guard needs for he skill will rise because of re- olacements of F-100s by F-4s. Guard units, through "intensified prior-service recruiting," hope to sign up some of the flyers leaving active duty.

USAF Adopts AFA Panel Proposals

Air Force has approved six of the nine recommendations advanced by AFA's First Annual Senior Enlisted Advisors Conference, according to Maj. Gen. Harry A. Morris, the Hq. USAF Director of Personnel Plans. The event was held in conjunction with the Association's National Convention last September.

The first approval provides for senior NCO Academy selections to be made with selection to SMSgt., "those showing the greatest potential to be chosen without regard for career area or command assignment." It will be implemented with NCOs attending Academy Class 79-A starting January 3, 1979.

Headquarters, General Morris added, also approved the advisors' request that USAF (1) allow chief master sergeants to serve longer careers; (2) broaden their areas of responsibility; (3) promote to E-9 based on managerial skill as well as technical skill; (4) assign them based on service needs; and (5) develop a chief master sergeant orientation course. Morris said MAC recently established such a course, and the other commands are working on theirs.

Air Force rejected recommendations that would assign two instead of the present one E-9 to each E-8/E-9 selection panel and deny promotion to E-8 of NCOs in an overage skill who decline retraining to a needed AFSC. A final recommendation, to expand career broadening, remains under consideration.

General Morris disclosed the results as AFA and Air Force staffers prepared for the Second Annual

AFA Believes . . .

Sometimes We Can Do It Ourselves

Retention is undoubtedly one of the most hotly discussed topics among Air Force personnel planners today—as well as among blue-suiters in general. Any discussion of retention inevitably centers on those external factors that people say cause the exodus—erosion of benefits; proposed legislation that further hacks at established benefits; Administration-generated budgetary restrictions; lack of public support for the military; and so on. In short, a whole complex of issues adds up to the vaguely expressed belief that "somebody out there doesn't like the military."

And indeed there is a basis for such concern. This column highlights, each month, a "people situation" that AFA believes needs correction or improvement. We have discussed both real and imagined inequities, offered constructive suggestions, and called on the responsible agency or branch of government for corrective action.

However, we believe it behooves all of us to step back once in a while and look at those areas of concern that perhaps we ourselves can do something about. These are the kinds of internal problems that Air Force people themselves, and their acknowledged supporters, can contribute to solving.

Let's take "impersonalization," which no one can deny is present in any large organization, be it the Air Force or General Motors. One key to soothing this irritant is the first-line supervisor, who—whether NCO, officer, or civilian—is often "the Air Force" to those supervised. How he or she implements institutional policies frequently determines if they are accepted with good will or ill. Whether it be promotion policy, OER and APR directives, retraining, or whatever, immediate supervisors set the tone to which the person at the far end of the organizational chain reacts. In many cases, timely, accurate, and frank information from the immediate supervisor will go a long way toward making the Air Force member feel that somebody cares.

And many do care. Some examples come to mind—and there undoubtedly are many others. For instance, one base commander has started a number of local programs to improve the living and working conditions at his base, many through self-help. He arranged for modification of the dormitories, stressing single rooms and coordinated decor. He developed an ice-cream parlor, much treasured by the people assigned to and visiting his desert-based installation. A delicatessen—believed to be one-of-a-kind—was installed in the commissary, along with a bakery and a fresh-fish outlet. Small things, but thoughtful ones.

A wing commander, faced with an overseas deployment, anticipated the myriad potential problems associated with moving large numbers of people, and the special problems faced by families forced to move after the member's departure. Within his wing, he organized an *ad hoc* action committee to work across functional lines. He set up one contact point between all base agencies concerned and the individuals and families who were moving to ensure personalized attention when the institutional system failed or lagged. He insisted that this committee respond to requests from members within two hours (or within twenty-four when additional information was needed).

He not only made sure all outbound personnel were briefed, but sent personal letters to each individual and family telling who to contact if problems developed. For those families moving out of the area without member assistance, specially appointed sponsors were on hand to ease family concerns during the packing and loading operations. Then he insisted that unaccompanied families be "tracked" until finally settled, and followed this with a personal message to the overseas member letting him know that the family had completed its move.

Other examples can be found. A first sergeant, at an overseas base, sometimes at his own expense helps newly assigned young airmen and families find housing. The Air Force sponsor program for members newly assigned to a base, when it works as designed, is a wonderful "self-help" tool. Many AFA Chapters have developed programs to show the neighboring base members that at least one part of the civilian community does recognize and appreciate the service being performed by the people in uniform and the civilian employees stationed there.

Maybe more of us, more often—not only Air Force members, families, and civilian employees, but civilian AFAers as well—should, before saying "There ought to be a law. . ." look first at what we, as individuals, can do to become part of the solution and not the problem. Both external and internal factors aggravate the retention problem. It's important to recognize that all of us can help alleviate many of the internal ones.

The late Walt Kelly's comic strip character, Pogo, often commented, "We have met the enemy—and he is us." Friends can be "us," too.

—JAMES A. McDONNELL, JR.

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SEA Conference convening at the Association's National Convention in Washington later this month. Letters to field commanders from AFA President Gerry Hasler contained Convention invitations to commanders and members of the Association's Junior Officer Advisory Council and the Enlisted Council.

The Enlisted Council membership is based on a nucleus of last year's Outstanding Airmen, with some additions. Each command is represented by one junior officer on the JOAC.

Both the JOAC and the Enlisted Council are concentrating on personnel retention. They will report their findings and recommendations to President Hasler and the Air Force.

Members of both Councils met with AFA leaders at a two-day working conference in Washington in early July. General Morris, the leadoff speaker, noted the tough retention problems the service faces. Other air staffers made presentations on personnel issues, pending legislation, pay studies, etc. Lt. Gen. George E. Shafer, who since has retired as the USAF Surgeon General, delivered the principal address at the main luncheon.

Vet Benefits Bills Move

The House has approved a veterans pension reform package that will substantially boost monthy pension checks for more than 2,200,000 needy veterans and survivors. It will also tie future pension increases to the CPI. These pensions are for war veterans with non-service-connected disabilities. They are not to be confused with the disability compensation (DC) paid veterans with service-connected disabilities.

Senate passage of a similar pension bill was expected sometime in August. (*For more on vet pensions, see "The VA's Bountiful Benefits," p. 60, August '78 issue.*)

The House has also voted a 6.5 percent increase in DC and dependency indemnity compensatic (DIC). It will be the fourteenth boos in DC and DIC rates since the sum mer of 1952. DIC goes to 471,00 survivors of veterans and service men.

Other recent House-passed vet erans bills will, when the Senate acts, (1) lower from fifty to forty percent the disability rating a vet must have to receive added compensation for dependents; (2) continue the VA's authority to furnish hospital care to vets living outside the forty-eight contiguous states; (3) provide a $150 reimbursement to states or local governments for burial of each veteran in a state or local cemetery; (4) lay on a two-step "aid-and-attendance" compensation payment for certain severely disabled vets; and (5) increase the annual clothing allowance fror $203 to $216 for service-connected veterans using prosthetic devices.

Better Severance Deal Pushed

Air Force, in toiling over the Pentagon's upcoming proposals to revamp the military compensation system, has advanced a vastly improved severance pay formula. In-

Ed Gates . . . Speaking of People

What Will Replace 20-Year Retirement?

The military compensation proposals due out of the Pentagon in January almost certainly will jettison the twenty-year retirement system. In its place, the Defense Department indicated at midsummer, will be a complex package composed of a trust fund and a deferred annuity.

"Twenty's" image has been badly tarnished. Much of the public and Congress are fired up because service careerists retire at forty and fifty while most civilians normally wait until age sixty or older for a pension. And there are rising costs.

USAF officials for a time this year bucked the end-the-twenty movement within the Pentagon, but retreated when the odds against retaining the system became overwhelming. Instead, they and Army authorities have advanced a compromise plan that would retain some of the twenty's best features.

We'll examine the different proposals below, but first some good news: Defense at mid-year had tentatively agreed to "grandfather-in" all members on active duty on the date the new compensation package becomes law, exactly as AFA has been urging all along. The Department, in addition, plans to give members with less than fifteen years of service (YOS) at enactment time a choice of the old or new systems. USAF officials lauded this generous approach, which contrasts sharply with the plan of the President's Commission on Military Compensation (PCMC) to deny grandfathering to all first-term members. USAF officials would also like to grandfather-in Academy and ROTC cadets and other persons "under contract" to join the services.

Defense's replacement for the twenty-year system, applicable to future members, features first an old-age annuity, with payment starting at the ages shown in the table, and amounts determined by the multiplier schedule in the paragraph that follows:

Years of Service	Age Annuity Begins	
	Officer	Enlisted*
10–19	62	59
20–25	60	57
26–plus	58	55

* Enlisteds would collect sooner because they normally enter service three to four years before officers.

Annuity payments would be computed on a high-two average basic pay, with the following multipliers for each year of service: 1–5 years, 2.00%; 6–10 years, 2.25%; and 11–30 years, 2.75%. There would be no multiplier for service beyond thirty years.

Defense's old-age annuity plan is a modification of one submitted by the PCMC. Air Force staffers favor the old-age annuity concept, but believe payments should begin closer to the retirement date for those with more than twenty years of service. USAF, accordingly, recommended that annuities start at age sixty for persons separating with ten to nineteen years' service. But those leaving with twenty or more YOS would receive the annuity at the age when they would have completed thirty years' service had they stayed aboard. Normally, this is well before sixty. Bu Defense hasn't bought this.

Still, USAF doesn't seriously object to the Defense position or old-age annuities. It does object—and strenuously—to part two of Defense's proposed retirement overhaul—the trust fund. DoD officials have indicated approval of a noncontributory trust fund for each member who completes five years of service on the following basis:

A COMPARISON OF SEVERANCE PAYMENTS

GRADE/YOS	CURRENT	PCMC	USAF ALTERNATIVE
E-4/5	0	$ 721	$ 2,883
E-5/10	0	1,643	6,837
E-6/15	0	4,057	12,173
O-3/5	$12,804	1,600	6,402
O-3/6	15,000	2,012	8,050
O-3/8	15,000	2,780	11,122
O-3/10	15,000	3,662	14,646
O-4/15	15,000	8,493	25,479

voluntarily separated officers and enlisted members with more than five but less than twenty years of service would receive one month's basic pay per year of service.

Thus, a ten-year service E-5 would receive more than $6,800, an eight-year O-3 more than $11,000. In all cases the rates would far exceed those proposed by the President's Commission on Military Compensation (PCMC). However, the PCMC plan, as modified by the Defense Department, would provide trust-fund payments for persons with ten years of service, thus reducing the need for substantial severance payments. *(See also "Speaking of People" column, below.)*

Despite lots of lip service in high places for enlisted severance pay, year after year, nothing has materialized. Officer force-out pay cannot exceed $15,000, although the House-passed DOPMA bill would double that, but for officers only. The Defense Department at midsummer had not yet hammered out a specific severance formula.

The accompanying table is a comparison of severance payments under the current system, the PCMC recommendation, and the Air Force "alternative" plan.

Years of Service	Percentage of Basic Pay Per Year	
	Officer	Enlisted
1–10	15%	15%
11–20	40%	40%
21–25	15%	25%
26–plus	0%	0%

Under this plan, a member at the ten YOS point could withdraw up to half the amount of money credited to his account and continue to gain credits while staying on active duty. If he separated, he could enjoy several options: convert the trust fund to a monthly annuity, leave the money in the fund and build interest for later withdrawal, or elect annual payments.

Hq. USAF officials hold that making trust payments available at the ten YOS point will create a tremendous incentive for people to leave service. Put another way, Air Force officials say the services would lose the selectivity they now have to determine who stays and who leaves." Middle-management inventories could be severely damaged. Pilot losses, already up due to airline hirings, would increase.

Many long-service members, of course, could be expected to let their trust-fund dollars sit, accumulate interest, and grow for twenty-five, thirty, and even more years. But this would create a special problem in the form of huge lump-sum payments. For example, a general commissioned at age twenty-three, retiring with thirty-five YOS, would receive a lump-sum trust-fund payment of more than $150,000, in addition to immediate receipt of the old-age annuity. A colonel commissioned at twenty-three who retires with thirty years of service would receive a trust fund of about $141,000—just five years before his old-age annuity would begin under the DoD proposal.

Air Force officials have correctly surmised that the public isn't likely to stand for such largess. Nor would Congress. So what's the point of antagonizing the lawmakers and John Q. Public with such an unrealistic proposition?

Taxes pose another problem. While the tax situation so far is vague, one study suggests that if the trust fund is accessible while members are on active duty, as Defense requests, the Internal Revenue Service will be dogging them for big payments each year. The study cites a typical O-5 now paying $3,721 in federal income tax on annual basic pay (October 1, 1977, rates) of $24,519. With the government financing his trust fund, his federal tax bite for the year would jump by $3,238 to a total of nearly $7,000, or more than twenty-eight percent of his basic pay! Members simply won't buy it.

Another pitfall with the trust fund, Air Force adds, is the paperwork empire and costs it would generate. Envisioned are separate fund accounts for all active-duty people with more than five YOS. The services not only would track all retirees, as they do now, but also all separatees with more than ten years of service. There are also potential problems with estates and survivorships.

Furthermore, the trust fund—although the PCMC was supposed to try to simplify the pay system—is likely to thoroughly confuse uniformed personnel.

The many drawbacks in the trust-fund plan led USAF and Army officials to endorse a substitute called a "deferred compensation annuity." Simpler than its title suggests, it would be computed on the basis of two percent times years of service times high-two average basic pay. It would be paid all members leaving with more than twenty YOS until they are eligible for the earlier-cited old-age annuity at the thirty YOS point. No break in arrival of checks.

Supporters say that these two annuities, together with reasonable separation pay for involuntarily separated members, would constitute a "modified retirement system" that would reduce the incentive for persons to shed their uniforms after the ten YOS point. They feel it would allow the services to "equitably shape the forces while retaining selectivity to determine who can serve a full career." Sounds logical.

But what if Defense and the Administration, as the pay package receives the final massaging late this year, insist on the cumbersome trust fund? Maybe Congress will see the light. ■

Two Survivor Bills in Works

The House recently passed a survivor benefits bill for Reservists and Guardsmen. It would provide an annuity of up to fifty-five percent of the retired pay a member would receive if he had been sixty at time of death. The bill also provides for reduced annuities when death occurs as early as age fifty.

The Senate, meanwhile, defeated a move by Sen. Strom Thurmond (R-S. C.) to tack the long-pending active-duty survivor benefits (SB) bill as an amendment to the FY '79 military authorization measure. The House unanimously had approved the SB improvements last year. Supporters, including AFA, are not writing the measure off, however, because Chairman John Stennis (D-Miss.) of the Senate Armed Services Committee has promised to hold hearings on the plan this year. Early Senate approval could follow. In other recent congressional actions:

- The House Post Office and Civil Service Committee voted, as part of the Civil Service reform bill, to limit to $47,500 the total compensation future retired military

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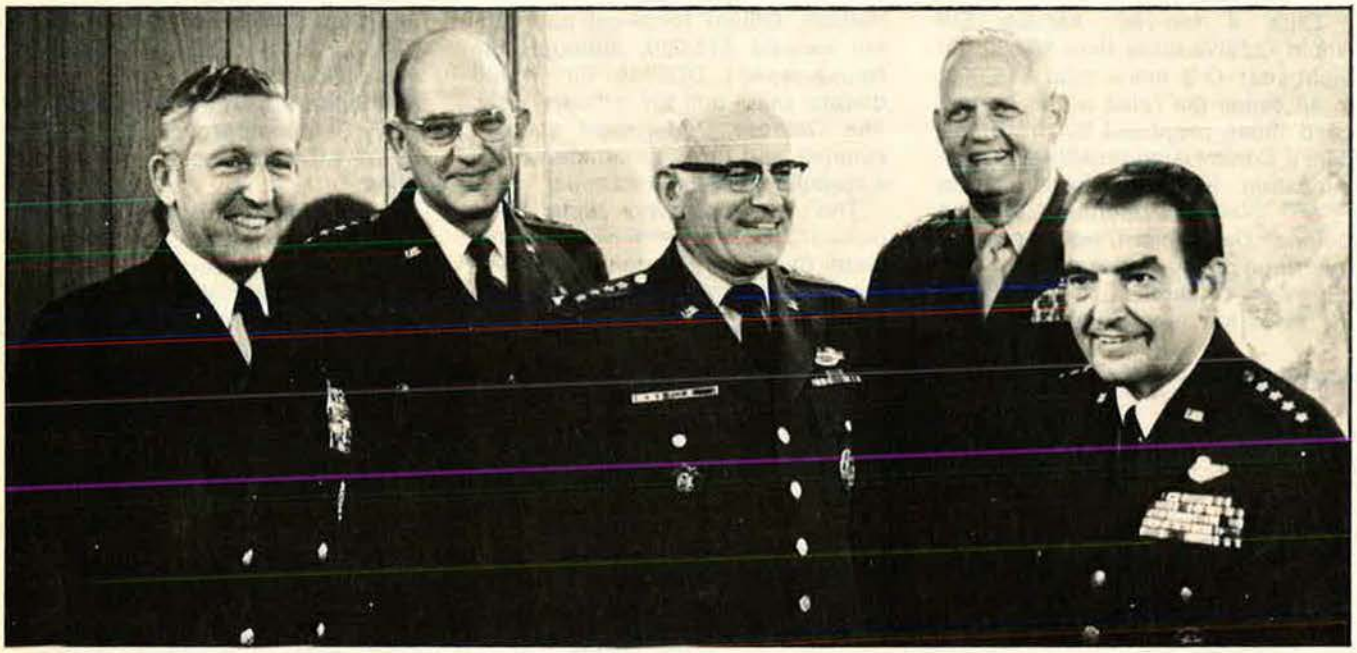
personnel could receive from the government.

- The 261 dependent schools abroad would, under recent Senate Governmental Affairs Committee action, move from control of the Defense Department to that of the proposed new Department of Education.
- A bill by Rep. Melvin Price (D-Ill.) would extend the maximum age for ROTC financial aid by up to four years, for students who previously served on active duty. Meanwhile, the House Armed Services Committee, which Mr. Price heads, has approved a bill to allow foreign nationals, as well as citizens of the US, to participate in Junior ROTC programs.



An informal group photo of the Joint Chiefs of Staff. From left, Adm. Thomas B. Hayward, Chief of Naval Operations; Gen. Lew Allen, Jr., USAF Chief of Staff; Gen. Bernard W. Rogers, US Army Chief of Staff; Gen. Louis H. Wilson, Jr., US Marine Corps Commandant; and Gen. David C. Jones, USAF, Chairman, Joint Chiefs of Staff.

Complaint System Defended

All is well within the Air Force grievance system, even though each year some 6,000 members write the President, and 35,000 level their complaints with members of Congress. Giving the system high marks, in an appearance before a House Armed Services subcommittee, was Assistant Air Force Secretary (Manpower, Reserve Affairs and Installations) Antonia H. Chayes. The subcommittee is probing each service's complaint programs.

Secretary Chayes described the Air Force's Inspector General establishment, which she said fields more than 15,000 gripes yearly, as the "heart" of the internal complaint-grievances-suggestions system. She acknowledged that placing the IG directly in the command structure "might be viewed as compromising his objectivity." But she said the system works well and she has received very few complaints.

Hill, DoD Lodging Fight Intensifies

Late last year Congress decided that service civilians on official travel must occupy government quarters, if adequate and available. Otherwise, they would not be reimbursed for lodging expenses. This seemed reasonable. After all, military TDYers for years have been subjected to similar rules.

Furthermore, according to the cost-conscious House Appropriations Committee, the order is saving Uncle Sam well over $5 million this year.

However, ever since the committee stuck the requirement in the FY '78 military spending bill, civilians working for the services have protested. Some claim implementation of the rule has resulted—particularly in the Navy—in their staying in filthy, crowded barracks, and having to put up with central latrines, no telephones, and a dearth of other conveniences. They also gripe about being isolated at night on bases when their TDY business is miles away.

The DoD Assistant General Counsel recently demanded that the committee revoke the rule and let TDY employees stay in commercial facilities and get reimbursed. Otherwise, he advised the lawmakers, many civilians would resign, retire, or seek transfers to jobs not requiring travel. He also noted that of all federal workers, only those with the Defense establishment are subject to the despised rule.

But the committee isn't bending. It's keeping the same restriction in the FY '79 military appropriations bill and telling the services to make sure such quarters are kept up to standard. The committee report on the measure gives Air Force good marks for its handling of the problem.

Mail Curb Hits Retirees Abroad

Effective September 21, US mili-

tary retirees living overseas will no longer be able to mail or receive parcels of more than fifteen ounces through the Military Postal System (MPS). Proponents of the crackdown, designed to save the government money, note that nonmilitary US citizens living abroad cannot use the MPS, so there is no firm basis for allowing retired military to do so. Then mail costs figure to rise sharply. Retirees overseas with the US government or working under a government contract are not affected by the ruling.

Senior Staff Changes

RETIREMENTS: B/G William R. **Coleman;** Gen. William J. **Evans;** L/G John P. **Flynn;** M/G Harrison **Lobdell,** Jr.; M/G Billie J. **McGarvey;** L/G Lee M. **Paschall;** M/G Don D. **Pittman;** B/G William T. **Woodyard.**

CHANGES: B/G Christopher S. Adams, Jr., from Cmdr., 12th AD, SAC, Dyess AFB, Tex., to Asst. DCS/Ops., Hq. SAC, Offutt AFB, Neb., replacing B/G (M/G selectee) Jack L. Watkins . . . **B/G James P. Albritton,** from Sp. Asst. to ACS/Studies & Analysis, Hq. USAF, Washington, D. C., to Dep. Dir., Concepts & Analyses, DCS/P&A, Hq. USAF, Washington, D. C. . . . **M/G Walter H. Baxter III,** from Cmdr., 313th AD, & Cmdr., 18th TFW, PACAF, Kadena AB, Okinawa, Japan, to Cmdr., 24th NORAD Region, & Cmdr., 24th AD, ADCOM, Malmstrom AFB, Mont., replacing retiring M/G Don D. Pittman . . . **B/G William J. Becker,** from Vice Cmdr., Warner Robins ALC, AFLC, Robins AFB, Ga., to Cmdr., Def. Property Disposal Svc., DLA, Battle Creek, Mich., replacing retiring B/G William R. Coleman . . . **L/G Benjamin N. Bellis,** from Cmdr., Sixth Allied Tactical Air Force, SHAPE, Ismir, Turkey, to Vice CINC, USAFE, Ramstein AB, Germany, replacing L/G (Gen. selectee) John W. Pauly . . . **B/G Robert M. Bond,** from Dep. Dir., Gen. Purpose Forces, DCS/RD&A, Hq. USAF, Washington, D. C., to Cmdr., Armament Development & Test Center, AFSC, Eglin AFB, Fla., replacing M/G (L/G selectee) Howard M. Lane . . . **M/G James R. Brickel,** from Dir. of Concepts, DCS/OP&R, Hq. USAF, Washington, D. C., to Asst. DCS/P&A, Hq. USAF, Washington, D. C., replacing retiring M/G Billie J. McGarvey . . . **Col. (B/G selectee) James R. Brown,** from Cmdr., 3d TFW, PACAF, Clark AB, R. P., to Cmdr., 313th AD, & Cmdr., 18th TFW, PACAF, Kadena AB, Okinawa, Japan, replacing M/G Walter H. Baxter III.

B/G (M/G selectee) Gerald J. Carey, Jr., from Asst. DCS/Ops. for Cont. & Spt., Hq. TAC, Langley AFB, Va., to Cmdr., USAFTAWC, TAC, Eglin AFB, Fla., replacing M/G Malcolm E. Ryan, Jr. . . . **B/G Robert E. Chapman,** from Asst. Dir., Data Automation, ACS/KR, Hq. USAF, Washington, D. C., to Dir., Computer Resources, AF Comptroller, Hq. USAF, Washington, D. C. . . . **B/G Murphy A. Chesney,** from Command Surgeon, Hq. TAC, Langley AFB, Va., to Dir. of Prof. Svcs., OTSG, Hq. USAF, Washington, D. C., replacing B/G Ernest J. Clark . . . **B/G Ernest J. Clark,** from Dir. of Prof. Svcs., OTSG, Hq. USAF, Washington, D. C., to Spec. Asst. to Surgeon General, OTSG, Hq. USAF, Washington, D. C.

M/G George A. Edwards, Jr., from V/C, 12th AF, TAC, Bergstrom AFB, Tex., to Cmdr., 314th AD, & Cmdr., USAF Korea, Osan AB, Korea, replacing M/G Robert C. Taylor . . . **Col. (B/G selectee) Kenneth R. Fleenor,** from Asst. DCS/Ops., Hq. ATC, Randolph AFB, Tex., to DCS/Ops., Hq. ATC, Randolph AFB, Tex., replacing B/G Dennis B. Sullivan . . . **B/G Irwin P. Graham,** from Asst. Dep. Dir. for Politico-Military Affairs, J-5, JCS, Washington, D. C., to Dep. Dir. for Politico-Military Affairs, J-5, JCS, Washington, D. C.

B/G Richard D. Hansen, from Surgeon, AFMPC, Randolph AFB, Tex., to Command Surgeon, Hq. TAC, Langley AFB, Va., replacing B/G Murphy A. Chesney . . . **M/G (L/G selectee) Howard M. Lane,** from Cmdr., ADTC, AFSC, Eglin AFB, Fla., to IG, Hq. USAF, Washington, D. C., replacing retiring L/G John P. Flynn . . . **M/G (L/G selectee) Lloyd R. Leavitt, Jr.,** from C/S, Hq. SAC, Offutt AFB, Neb., to Vice CINC, Hq. SAC, Offutt AFB, Neb., replacing L/G Edgar S. Harris, Jr. . . . **Col. (B/G selectee) John F. O'Donnell,** from Cmdr., Tac. Tng.–Luke, TAC, Luke AFB, Ariz., to Asst. DCS/Ops. (Ops. & Tng.), Hq. TAC, Langley AFB, Va., replacing B/G Robert D. Russ . . . **B/G John W. Ord,** from Dir. of Med. Insp., AFISC, Norton AFB, Calif., to Surgeon, Hq. USAFE, Ramstein AB, Germany, replacing B/G Donald N. Vivian . . . **Col. (B/G selectee) William A. Orth,** from Permanent Professor & Head, Dept. of Physics, US Air Force Academy, Colo., to Dean of Faculty, US Air Force Academy, Colo., replacing retiring B/G William T. Woodyard . . . **B/G Marvin C. Patton,** from Dir. of Materiel Mgt., Oklahoma City ALC, AFLC, Tinker AFB, Okla., to Vice Cmdr., Warner Robins ALC, AFLC, Robins AFB, Ga., replacing B/G William J. Becker . . . **L/G (Gen. selectee) John W. Pauly,** from Vice CINC, Hq. USAFE, Ramstein AB, Germany, to CINC, Hq. USAFE, and Cmdr., Allied Air Forces, Central Europe, Ramstein AB, Germany, replacing retiring Gen. William J. Evans . . . **M/G Earl G. Peck,** from DCS/Ops., Hq. SAC, Offutt AFB, Neb., to C/S, Hq. SAC, Offutt AFB, Neb., replacing M/G (L/G selectee) Lloyd R. Leavitt, Jr.

B/G Robert D. Russ, from Asst. DCS/Ops. (Ops. & Tng.), Hq. TAC, Langley AFB, Va., to Asst. DCS/Ops. for Cont. & Spt., Hq. TAC, Langley AFB, Va., replacing B/G (L/G selectee) Gerald J. Carey, Jr. . . . **M/G Malcolm E. Ryan, Jr.,** from Cmdr., USAFTAWC, TAC, Eglin AFB, Fla., to V/C, 12th AF, TAC, Bergstrom AFB, Tex., replacing M/G George A. Edwards, Jr. . . . **M/G (L/G selectee) Winfield W. Scott, Jr.,** from Asst. DCS/P&O, Hq. USAF, Washington, D. C., to Cmdr., Alaskan Air Command, and Cmdr., Alaskan NORAD Region, Elmendorf AFB, Alaska, replacing L/G M. L. Boswell . . . **B/G Dennis B. Sullivan,** from DCS/Ops., Hq. ATC, Randolph AFB, Tex., to Cmdr., 12th AD, SAC, Dyess AFB, Tex., replacing B/G Christopher S. Adams, Jr. . . . **M/G Robert C. Taylor,** from Cmdr., 314th AD, PACAF, & Cmdr., USAF Korea, Osan AB, Korea, to Dir. of Ops. & Readiness, DCS/OP&R, Hq. USAF, Washington, D. C. . . . **M/G Hoyt S. Vandenberg, Jr.,** from Dir. of Ops. & Readiness, DCS/P&O, Hq. USAF, Washington, D. C., to Asst. DCS/OP&R, Hq. USAF, Washington, D. C.

B/G Donald N. Vivian, from Surgeon, Hq. USAFE, Ramstein AB, Germany, to Dir. for Med. Insp., AFISC, Norton AFB, Calif., replacing B/G John W. Ord . . . **B/G (M/G selectee) Jack L. Watkins,** from Asst. DCS/Ops., Hq. SAC, Offutt AFB, Neb., to DCS/Ops., Hq. SAC, Offutt AFB, Neb., replacing M/G Earl G. Peck . . . **M/G Jasper A. Welch, Jr.,** from ACS/Studies & Analysis, Hq. USAF, Washington, D. C., to Dir., Concepts & Analyses, DCS/P&A, Hq. USAF, Washington, D. C.

SENIOR ENLISTED ADVISOR CHANGES: CMSgt. Arthur L. Andrews, from Hanscom AFB, Mass., to Senior Enlisted Advisor, Hq. AFSC, Andrews AFB, Md., replacing CMSgt. Robert D. Harrison, now at Directorate of Administration, AFSC, Kirtland AFB, N. M. . . . **CMSgt. William C. Chapman,** from PACAF Security Service, Hickam AFB, Hawaii, to Senior Enlisted Advisor, Hq. USAFSS, Kelly AFB, Tex., replacing CMSgt. Thomas J. Echols, reassigned to PACAF Security Service, Hickam AFB, Hawaii. ■

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Technician Plan Eyed

A legislative proposal circulating in the Pentagon would reduce union interference in the work rules applying to the 7,000 "technicians" employed in various USAF Reserve Forces units. The technicians are civil servants with the units during the week who automatically switch to Reserve status for weekend drills.

At some locations the arrangement works well. But Air Force officials say that at others, like McGuire AFB, N. J., where union contracts affect thousands of base civilian employees, including the technicians, problems in Reserve units arise dealing with leave, days off, wear of the uniform, etc. The legislative proposal would not bar technicians from union membership, but would prohibit them from bargaining. Technicians are also employed in the Army Reserve Forces.

The overall technician problem continues to draw fire. Critics assert that union activity reduces military command authority. They say technicians are older than nontechnicians, create grade stagnation, and are questionable mobilization assets.

During recent Capitol Hill hearings, Harold Chase, Deputy Assistant Secretary of Defense (Reserve Affairs), said the technician problems are not serious enough to cause the Pentagon to convert technicians to active-duty military status, as some quarters propose.

Short Bursts

Portraits—either paintings or photographs—of service secretaries, chiefs of staff, and other high-level officials are now on display throughout the Pentagon, on corridor walls. So, the Air Force is about to add portraits of the **Chief Master Sergeants of the Air Force.** The Air Force Orientation Group is preparing the CMSAF display.

Of the Veterans Administration's 226,000-person work force, 38,000 are **handicapped persons.** And of the latter, 14,000 are service-connected vets. VA Chief Max Cleland is going to improve that already impressive record by setting aside 250 VA job vacancies to be filled by vets paralyzed by spinal-cord injuries.

The service is looking for (1) colonel **volunteers for AFROTC posts** opening up next summer and (2) eight officers and eighteen NCOs to join the **Community College of the Air Force** (CCAF) staff when it moves from Lackland AFB, Tex., to Maxwell AFB, Ala., next spring.

Officials, meanwhile, are lauding the fact that the CCAF has been chosen a candidate for accreditation by the Southern Association of Colleges and Schools. "Another great step forward for the CCAF," is the way ATC's Gen. John W. Roberts characterized it.

This is going to surprise some USAF families, but the **Air Force Commissary Service** reports that, overall, prices in Air Force stores are **twenty-five percent less** than at nearby supermarkets. A couple of years ago the official savings figure was twenty-two percent. Overseas, the service reports, commissaries are knocking down prices on detergents, prepackaged meats, and canned fruits and vegetables by thirty-three percent.

Just **six states**—Illinois, Massachusetts, Michigan, New Hampshire, North Dakota, and Vermont—are still paying **bonuses to Viet-era veterans.** A recent Hq. USAF memo to the field has all the details, including a summary of all bonuses paid to vets of WW I, WW II, Korea, and Vietnam. Interesting note: Twenty-one states have never paid a bonus for any of those wars, a list that includes what are normally thought of as the "big military states" of California, Florida, and Texas. New England and the Midwestern states have paid most of the state bonuses.

Lieutenants up for temporary captain and regular commission consideration by this summer's selection board are getting a break: the regular Air Force appointment rate for them has been raised to sixty-five percent for pilots and fifty-five percent for navigators and nonrateds. Last year's rates were forty-five and forty, respectively. Reason for the raise: smaller numbers of eligibles in this year's contenders.

The **22,000 Japanese nationals** working for the US Forces in Japan are paid above prevailing local rates, according to the General Accounting Office. It wants "corrective action." ■

Industrial Associates of the Air Force Association

"Partners in Aerospace Power"

Listed below are the Industrial Associates of the Air Force Association. Through this affiliation, these companies support the objectives of AFA as they relate to the responsible use of aerospace technology for the betterment of society, and the maintenance of adequate aerospace power as a requisite of national security and international amity.

Aerojet ElectroSystems Co.
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New affiliation

This Is AFA

The Air Force Association is an independent, nonprofit, aerospace organization serving no personal, political, or commercial interests; established January 26, 1946; incorporated February 4, 1946.

OBJECTIVES

The Association provides an organization through which free men may unite to fulfill the responsibilities imposed by the impact of aerospace technology on modern society; to support armed strength adequate to maintain the security and peace of the United States and the free world; to educate themselves and the public at large in the development of adequate aerospace power for the betterment of all mankind; and to help develop friendly relations among free nations, based on respect for the principle of freedom and equal rights to all mankind.

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Air Force Association, Suite 400, 1750 Pennsylvania Ave., N.W., Washington, D.C. 20006

AFA News

By Don Steele, AFA AFFAIRS EDITOR

Units of the Month

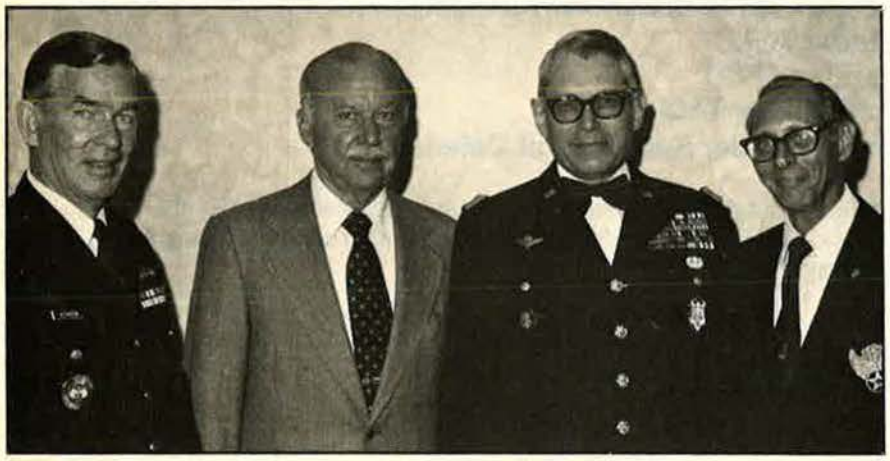
THE LANGLEY CHAPTER, VA., AND THE WRIGHT MEMORIAL CHAPTER, OHIO . . . cited for consistent and effective programming in support of the missions of the Air Force and AFA.

During the Organizational and Individual Cadet Awards Ceremonies at the Air Force Academy, AFA President Gerald V. Hasler presented AFA's Outstanding Squadron Award for outstanding achievement in all areas of unit endeavor to the 18th Squadron. The award consists of a trophy, an engraved plaque, and a navy-blue guidon streamer. Shown during the presentation are, from left, Cadet Lt. Cols. George Kailiwai, III, Winter Term Commander, Douglas N. Barlow, Fall Term Commander, and Jeffrey D. Brake, Spring Term Commander; Mr. Hasler; and Capt. Robert G. Whitcher, the 18th's Air Officer Commanding.

More than 400 leaders of the Air Force, aerospace, the community, and AFA attended the Langley, Va., Chapter's recent black-tie reception and dinner welcoming the newly assigned Commander of the Tactical Air Command, Gen. W. L. Creech, and Mrs. Creech. Shown with General Creech, right, is Chapter President Rex Frey. In recognition of this outstanding program, AFA President Gerald V. Hasler names the Langley Chapter as a corecipient of the "Unit of the Month" award for September.

—Photo by Don Dodd

AFA President Gerald V. Hasler was the principal speaker at the Third Annual AFLC/AFA Awards Banquet sponsored by AFA's Wright Memorial Chapter at the Wright-Patterson AFB Officers' Club. Award recipients and program participants were, from left, Richard T. Gibbons, Logistics Distribution Award; Duane H. LaRue, Outstanding Engineer Award; Col. Monroe T. Smith, Logistics Maintenance Manager Award; Chapter President N. C. "Dutch" Heilman; Mr. Hasler; Gen. Bryce Poe II, Commander, Air Force Logistics Command, and the toastmaster; Barbara E. Mage, Logistics Procurement Professional Award; John S. Root, Logistics Materiel Manager Award; and SSgt. John L. Litton, Community Relations Award. In recognition of this outstanding program, AFA President Gerald V. Hasler names the Wright Memorial Chapter as a corecipient of the "Unit of the Month" award for September.



The Connecticut State AFA's 1978 convention was held in Windsor Locks. Lt. Gen. David Adamson, Canadian Forces, Deputy Commander in Chief, North American Air Defense Command, was the guest speaker. Pictured are, from left, General Adamson; retired Air Force Gen. James Ferguson; Maj. Gen. John Freund, Adjutant General for Connecticut; and AFA State President Joseph Falcone, who was reelected for another term.

chapter and state photo gallery

More than 500 military, aerospace, and AFA leaders attended the Los Angeles Air Power Chapter's annual "Salute to SAMSO" luncheon, which was held recently in Los Angeles and featured Lt. Gen. Thomas P. Stafford, former Apollo astronaut and now Air Force Deputy Chief of Staff for Research and Development, as the keynote speaker. In photo above left, Lt. Gen. Richard C. Henry, center, SAMSO Commander, accepts the Air Force Association's Bernard A. Schriever Award on behalf of Brig. Gen. Forrest S. McCartney, Deputy for Space Communications Systems at SAMSO, as AFA National Director Ed Stearn looks on. General McCartney also was named the Chapter's "Military Man of the Year," and his unit, the Deputate for Space Communications, received the Chapter's "Aerospace Unit of the Year" award. In photo above right, from left, Lt. Gen. Thomas P. Stafford, DCS/R&D, the speaker; Capt. Patricia E. Wong, "Military Woman of the Year"; MSgt. David A. Kujawa, "Humanitarian of the Year"; TSgt. Donald A. Stokes, Airman of the Year; Capt. Terry J. Piddington, "Junior Officer of the Year"; Col. Hugh Wyarn, who accepted the "Aerospace Unit of the Year" award for SAMSO's Deputate for Space Communications; and Lt. Gen. Richard C. Henry, SAMSO Commander.

AFA's Anchorage, Alaska, Chapter joined with the Anchorage Armed Services YMCA and other community groups to organize a "Salute to the Armed Forces Dinner," a community-wide program to recognize junior enlisted military personnel for their professional accomplishments, and to instill a stronger feeling of togetherness and patriotism among those in attendance. More than 400, including the five senior general and flag officers representing all commands in Alaska, attended the dinner. US Sen. Ted Stevens (R-Alaska) was the guest speaker. Among those receiving an award was SrA. James E. Mitchell from Elmendorf AFB, Alaska's "Airman of the Year." Mitchell, center, is shown receiving a gold pan award and congratulations from Senator Stevens, left, as AFA's Anchorage Chapter President Adam Johnston, Jr., right, looks on.

The Michigan State AFA's 1978 convention was hosted by the Battle Creek Chapter and featured an address by AFA National Director Steve Ritchie, the Air Force's only pilot ace of the Vietnam conflict. Shown following the dinner are, from left, Michigan AFA Secretary Marjorie O. Hunt; State President-elect Howard C. Strand; Mr. Ritchie; Alexander Field, Vice President for AFA's Great Lakes Region; and State Vice President Dorothy Whitney.

AFA News

In observance of Patriotism Week, AFA's Middle Georgia Chapter of Warner Robins, Ga., sponsored an essay contest for students at the Linwood Elementary School at Robins AFB. The essays were on the subject, "I Am Glad to be an American because...". Pictured are first- and second-place winners in grades one through six. The adults in the back row are, from left, Mrs. Cheryl Moore, school sponsor; CMSgt. Jack Steed, Senior Enlisted Advisor, Warner Robins Air Logistics Center; and Chapter President Betty Clark.

The Steel Valley Chapter recently celebrated its seventh anniversary with a black-tie dinner at the Duquesne Golf Club in West Mifflin, Pa. During the program, Maj. Tom Collins, Assistant Professor of Aerospace Studies at the University of Pittsburgh, presented Chapter President Pat Logan a Commendation Award in recognition of the Chapter's outstanding service to and support of the Air Force ROTC Detachment at the University. Pictured are, from left, Corresponding Secretary Mary Filo; Vice President Mary Ann Lash; Major Collins; President Logan; "Sunshine Girl" Olive Hickey; and Secretary Teresa Jenkins.

During the Military Ball, sponsored recently by AFA's Red River Valley Chapter of Grand Forks, N. D., Lt. Col. Richard J. Klingelsmith was presented the Chapter's "Man of the Year" award. Shown during the presentation are, from left, Mrs. Klingelsmith, Colonel Klingelsmith, Chapter President Maury Rothkopf, and Hoadley Dean, Vice President for AFA's North Central Region.

COMING EVENTS

AFA's 32d Annual National Convention, Sheraton-Park Hotel, Washington, D. C., September 17–20 . . . **AFA's Aerospace Development Briefings and Displays,** Sheraton-Park Hotel, Washington, D. C., September 19–21 . . . **AFA National Symposium,** "Toward a New World Strategy," Hyatt House Hotel, Los Angeles, Calif., October 26–27 . . . **Seventh Annual Air Force Ball,** Century Plaza Hotel, Los Angeles, Calif., October 27.

photo gallery

AFA's Rushmore Chapter was a co-sponsor of the Doolittle Raiders' 1978 reunion, which was held recently in Rapid City, S. D. Hoadley Dean, Vice President for AFA's North Central Region and Secretary of the Chapter, was Chairman of the Host Committee for the reunion. In the photo, retired Air Force Col. Henry Potter, right, Doolittle's navigator, presents a drawing of his plane to Mr. Dean in appreciation of his efforts in making the reunion such an outstanding success.

The New Jersey State AFA's 30th Anniversary Convention at Cape May saluted "Women in Aviation." Among the guests were four former WASPs, shown here with State President Leonard Schiff. They are, from left, Dr. Dora Strother, Director of Human Factors, Bell Helicopters, Textron, Tex., the dinner speaker; Ann Shield, Pa.; Selma Cronan, N. J.; and Virginia Watry Harris, Va. Delegates reelected Mr. Schiff for another term as State President.

The Tucson, Ariz., Chapter's annual business meeting featured a presentation by Art Littman and Bob Hazeleaf, President and Vice President, respectively, of AFA's Travis, Calif., Chapter. Shown following the meeting are, from left, Mr. Hazeleaf; Brig. Gen. W. D. Curry, Jr., Commander, Tactical Training, Davis-Monthan AFB; Chapter President-elect Fran Thompson; Mr. Littman; and William Chandler, Vice President for AFA's Far West Region.

NEW FOR MEMBERS UNDER 30—MAJOR BENEFIT INCREASES!

Now . . . The Sixth Major Benefit Increase fo

$85,000 STANDARD PLAN

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 (16.67% for 1977) to insured members in thirteen of the past sixteen years, and has now increased basic coverage on six separate occassions.

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 Military 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 active duty personnel of the Armed Forces of the United States and members of the Ready Reserve* and National Guard* (under age 60), Armed Forces Academy cadets*, and college or university ROTC cadets* are eligible to apply for this coverage provided they are now, or become, members of the Air Force Association.

*Because of restrictions on the issuance of group insurance coverage, applications for coverage under the group program cannot be accepted from cadets or Reserve or Guard personnel residing in Florida, New York, Ohio or Texas. Members in these states may request special application forms from AFA for individual policies which provide coverage quite similar to the group program.

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.

CURRENT BENEFIT TABLES

AFA STANDARD PLAN

PREMIUM: $10 per month

Insured's Attained Age	Basic Benefit*	Extra Accidental Death Benefit*	Total Benefit
20-29	$85,000	$12,500	$97,500
30-34	65,000	12,500	77,500
35-39	50,000	12,500	62,500
40-44	35,000	12,500	47,500
45-49	20,000	12,500	32,500
50-54	12,500	12,500	25,000
55-59	10,000	12,500	22,500
60-64	7,500	12,500	20,000
65-69	4,000	12,500	16,500
70-74	2,500	12,500	15,000

Aviation Death Benefit:*

Non-war related	$25,000
War related	$15,000

AFA HIGH OPTION PLAN

PREMIUM: $15 per month

Insured's Attained Age	Basic Benefit*	Extra Accidental Death Benefit*	Total Benefit
20-29	$127,500	$12,500	$140,000
30-34	97,500	12,500	110,000
35-39	75,000	12,500	87,500
40-44	52,500	12,500	65,000
45-49	30,000	12,500	42,500
50-54	18,750	12,500	31,250
55-59	15,000	12,500	27,500
60-64	11,250	12,500	23,750
65-69	6,000	12,500	18,500
70-74	3,750	12,500	16,250

Aviation Death Benefit:*

Non-war related	$37,500
War related	$22,500

*The Extra Accidental Death Benefit is payable 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.

OPTIONAL FAMILY COVERAGE
(may be added to either Standard or High Option Plan)
PREMIUM: $2.50 per month

Insured's Attained Age	Life Insurance Coverage for Spouse	Life Insurance Coverage for each Child*
20-39	$10,000	$2,000
40-44	7,500	2,000
45-49	5,000	2,000
50-54	4,000	2,000
55-59	3,000	2,000
60-64	2,500	2,000
65-69	1,500	2,000
70-74	750	2,000

*Between the ages of six months and 21 years, each child is provided $2,000 coverage. Children under 6 months are provided with $250 coverage once they are 15 days old and discharged from hospital.

e Association Military Group life Insurance

127,000 HIGH OPTION PLAN

APPLICATION FOR AFA MILITARY 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

Please indicate category of eligibility and branch of service.

- ☐ Extended Active Duty
- ☐ Ready Reserve or National Guard
- ☐ Air Force Academy
- ☐ ROTC Cadet _____ Name of college or university
- ☐ Air Force
- ☐ Other _____ (Branch of service)
- ☐ _____ Academy

Name and relationship of primary beneficiary

Name and relationship of contingent beneficiary

This insurance is available only to AFA members

- ☐ I enclose $13 for annual AFA membership dues (includes subscription ($9) to AIR FORCE Magazine).
- ☐ I am an AFA member.

Please indicate below the Mode of Payment and the Plan you elect.

HIGH OPTION PLAN		Mode of Payment	STANDARD PLAN	
Members Only	Members and Dependents		Members Only	Members and Dependents
☐ $ 15.00	☐ $ 17.50	**Monthly** government allotment. I enclose 2 months' premium to cover the period necessary for my allotment (payable to Air Force Association) to be established.	☐ $ 10.00	☐ $ 12.50
☐ $ 45.00	☐ $ 52.50	**Quarterly.** I enclose amount checked.	☐ $ 30.00	☐ $ 37.50
☐ $ 90.00	☐ $105.00	**Semiannually.** I enclose amount checked.	☐ $ 60.00	☐ $ 75.00
☐ $180.00	☐ $210.00	**Annually.** I enclose amount checked.	☐ $120.00	☐ $150.00

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, sanitarium, 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

9/78
Form 3676GL App

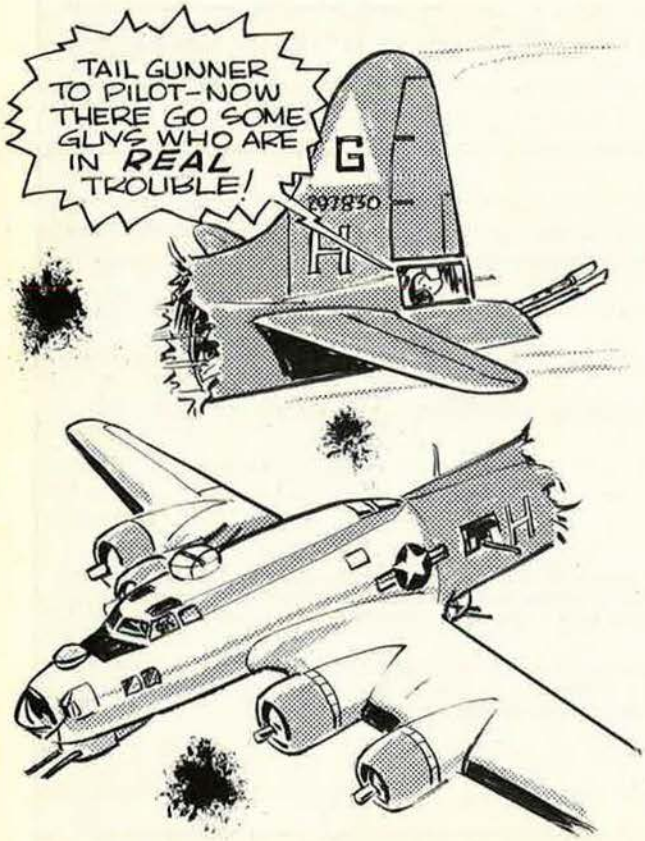
Application must be accompanied by check or money order. Send remittance to: Insurance Division, AFA, 1750 Pennsylvania Avenue, NW, Washington, D.C. 20006

Bob Stevens'

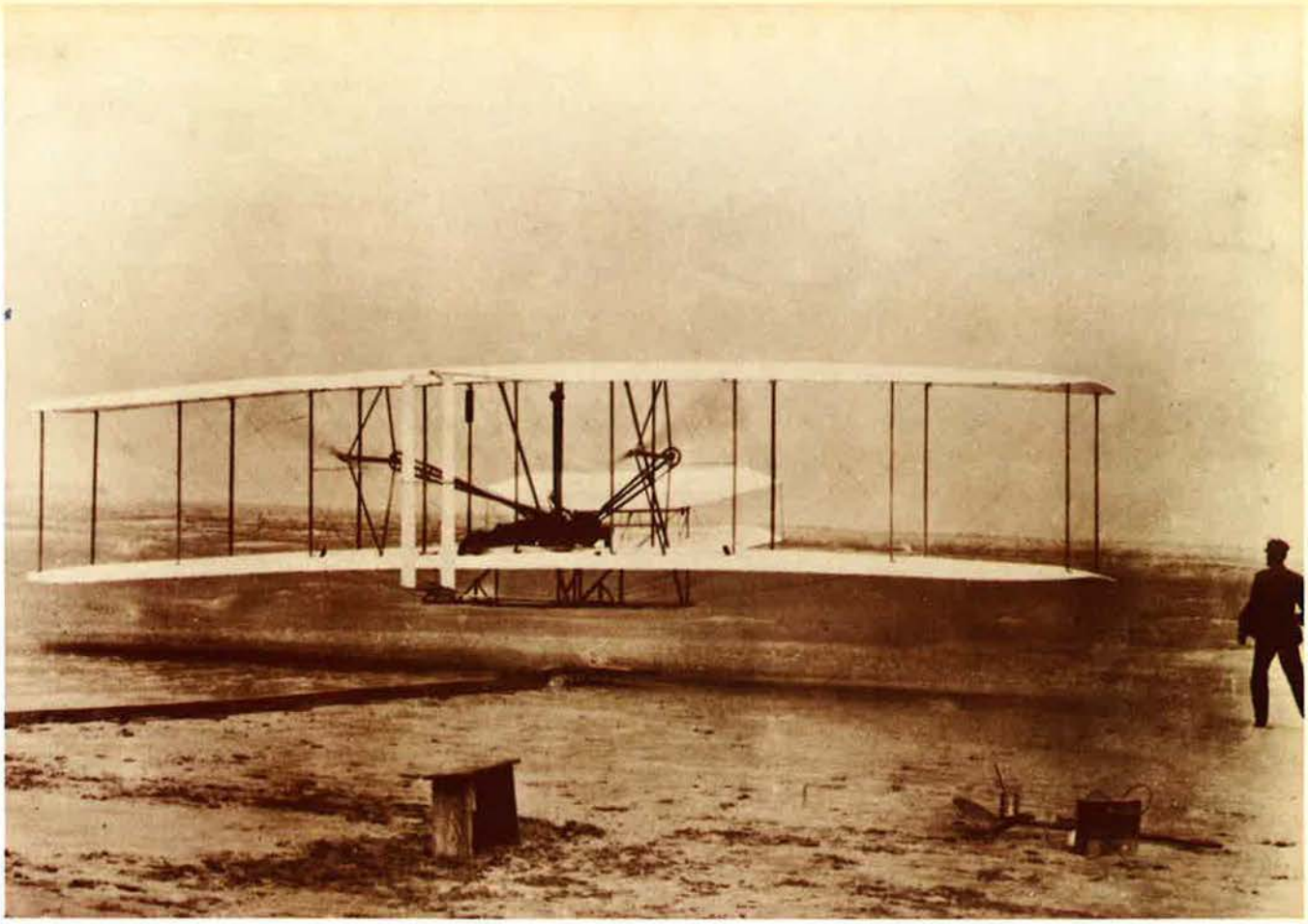
"There I was..."

HERE'S A CLUTCH OF B-17 STORIES. THE VENERABLE "FORT" PRODUCED AS MANY STORIES AS BOMB TONNAGE DROPPED... MAINLY BECAUSE THERE WERE TEN CHARACTERS ABOARD EACH BIRD. MOST OF 'EM WERE LIKE THOSE SHOWN HERE:

THANKS TO COL. BOB M. JOHNSON (RET)
WORTHINGTON, PA.



THEN THERE WAS THE HARRIED B-17 CREW TAKING A LOT OF FLAK, COPILOT OUT and A BLOWN #4...



Who will help compress 75 years of electronics and aerospace progress into the next 5?

In the next five years, we at E-Systems predict the aerospace industry's technology could advance as far as the difference between the Wright brothers' historic first flight at Kitty Hawk and the *Viking* mission to Mars. The industry's solid electronic technological base provides an excellent foundation for the developments we see coming. But to make the advance will require new approaches to virtually every system used by the industry. And new approaches in electronics happen to be an E-Systems specialty. Our people have a remarkable ability to develop and uniquely blend technologies to produce highly advanced systems. Already we're at work on the navigation, command and control, flight control, and data gathering systems the industry must have to compress 75 years of technology into the next five.

For the systems approach to the solutions you need, write: E-Systems, Inc., P.O. Box 226030, Dallas, Texas 75266.

E-Systems is the answer.

E-SYSTEMS

See us at the AFA Show

Inflation-fighter fighter

The F-15 Eagle. It's the best fighter aircraft in the world and now it's an even better value. Because cost reduction steps instituted as of December 31, 1977, have saved more than $274 million.

And that's just savings so far. When projected over the life of the F-15 program the figures climb far, far higher. We've revised materials, manufacturing and testing procedures, inspection, purchasing, etc. Anything that can help us cut costs and save tax dollars.

And we'll do anything we can to help save even more—except one thing. We will never sacrifice F-15 performance. We built it to be the best fighter in the world and it is.

Now it's just a better value.

F-15 Eagle

MCDONNELL DOUGLAS