

AIR FORCE

PUBLISHED BY THE AIR FORCE ASSOCIATION

MAGAZINE

First Flight of Orbiter/747



What's our mild-mannered civilian turbofan engine doing in a tough bird like this? Just proving a point, just proving a point.

The bird is the new CASA C-101 trainer/light attack aircraft.

The engine, Garrett's TFE 731 turbofan.

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The C-101, being developed by CASA (Construcciones Aeronauticas S.A.) for the Spanish Air Force, is a basic and advanced trainer, with an air-to-air and air-to-ground weapons delivery capability. Armed recon, ECM and photo recon missions are also planned because of the CASA's maneuverability and long endurance at low level.

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The CASA 101. As the forerunner of a new breed of economical, virtually smokeless combat aircraft, it makes sense to power it with the turbofan that powers the economical clean-flying business jets.



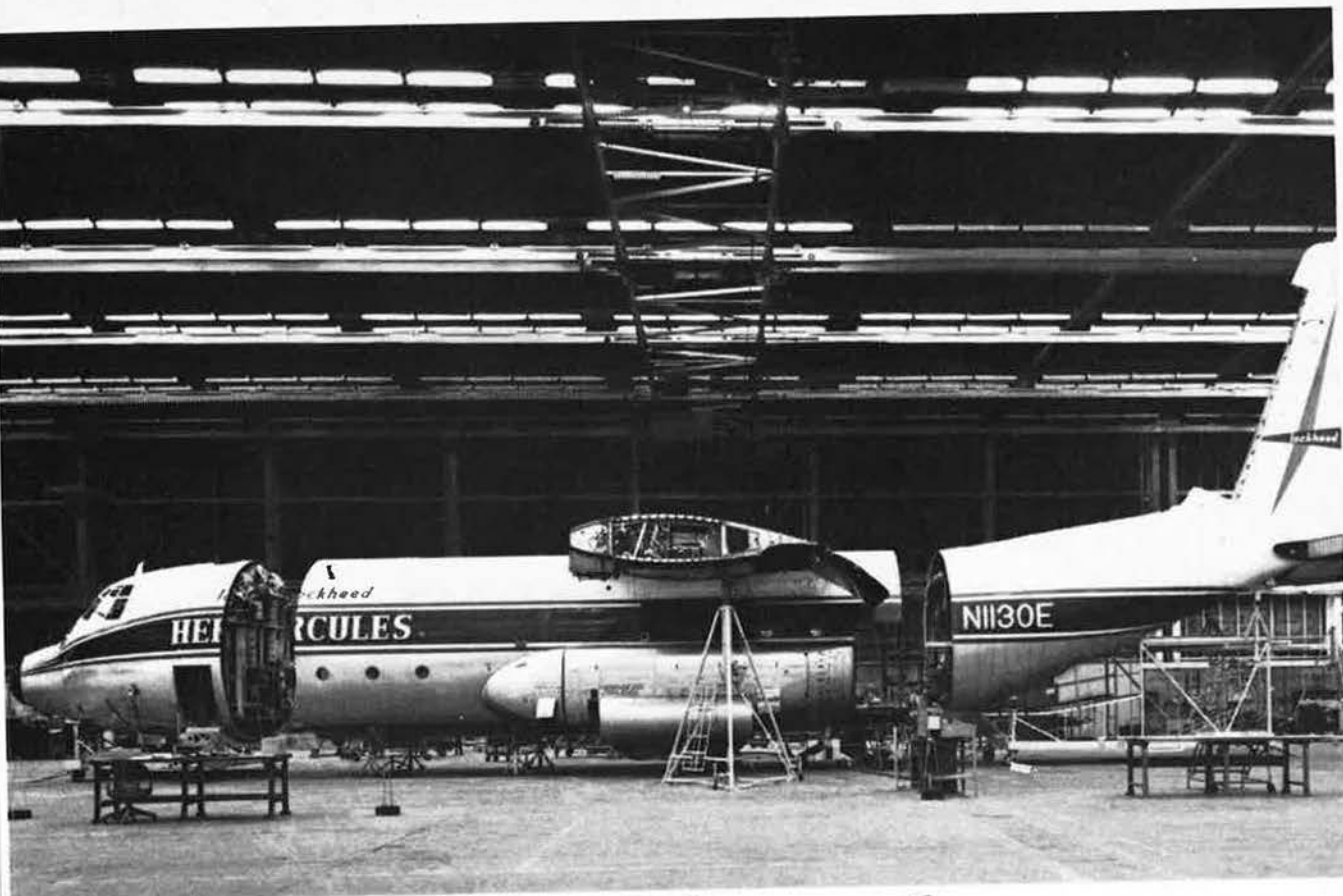
The Garrett Corporation One of The Signal Companies



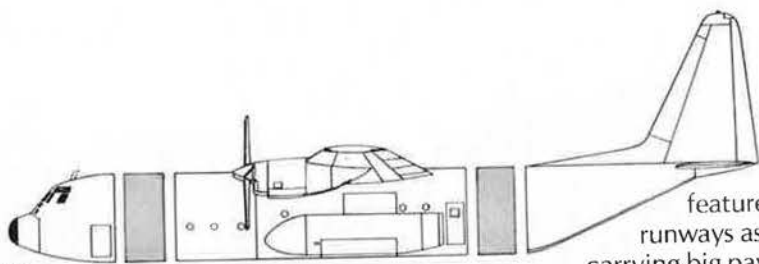
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BOEING YC-14



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AIR FORCE

PUBLISHED BY THE AIR FORCE ASSOCIATION

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AIR FORCE

First Flight of Orbiter/747



NASA's Space Shuttle 747 carrier aircraft and Space Shuttle Orbiter take to the air in their first flight at Edwards AFB, Calif. (USAF photo by Senior Airman Georgia Marchbanks, Hq. AAVS, Norton AFB, Calif.) For Orbiter details and equipment, see p. 45.

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AN EDITORIAL

Thoughts on the All-Volunteer Force

By John F. Loosbrock, EDITOR

THE all-volunteer force has been the manpower base for the US military establishment since the draft officially ended in 1973. It is not a new concept for the Air Force, of course, which has prided itself since its beginning on the voluntary nature of service in its ranks. At the same time, the lack of a draft and dependence on volunteers across the board, in all services, produces important and complicated side effects that bear heavily on Air Force personnel management.

Foremost among these side effects are, first, the steeply rising people costs in the Department of Defense (a sixty percent increase since 1968 accompanied by a forty percent reduction in strength); second, the experience, new to the Air Force, of concern about meeting its recruiting goals (particularly for the Reserve components), both in numbers and in quality, in the continued absence of the draft as a motivating factor toward Air Force service; and, third, the rapidly materializing specter of unionization as, in the view of many, military service takes on more and more of the characteristics of a job and loses more and more of its traditional charisma as a calling.

Complicating this already complicated situation are such across-the-board factors as the drop in unemployment, making military service less attractive in comparison to civilian-sector job opportunities; the shrinking pool of potential prospects, brought on by the so-called "baby slump" that began about fifteen years ago; and the racial imbalances, largely peculiar to the Army, engendered by the fact that military service attracts a high proportion of blacks who rightly view it as an easily available means of achieving both economic and social upward mobility.

Assessing the success or failure of the all-volunteer force reminds us of the answer purportedly given by the late Maurice Chevalier when he was asked how it felt to be eighty years old. "Not bad," he said, "when you think about the alternative."

Criticism of the all-volunteer force is mounting, very nearly in proportion to the rise in military people costs. But there is little that is new or imaginative about alternatives being proposed. The quick and easy answer is to revive the draft. It may be the only answer, but there is little appeal in it for those of us who recall the divisiveness of a decade ago when the sons of the affluent, safely deferred in their campus sanctuaries, bitterly, actively, and often violently, opposed a war that posed no personal risk to them. Certainly, in our view, a new draft must be a pure lottery, with no deferments permitted for socioeconomic reasons. It must be applied evenly across the country, with little or no latitude given to local boards. And it must include women as well as men.

The concept of some kind of national service, not necessarily military service, has been injected and, indeed, has already been specifically raised, in a fragmentary way, in President Carter's proposal for a Youth Conservation Corps for rural unemployed and a similar arrangement for the young in urban areas. Presumably, such service would serve as a substitute for military duty should the draft be revived. Ironically, the President's proposal recalls the Civilian Conservation Corps of the '30s, which was administered by the Army, first because it was organized to do the job and, second, because it had so little else to do!

What military manpower problems a new draft and/or universal service program would really solve is unclear. It presumably would address the issues of quality and quantity, although the maintenance of high physical and mental standards might find the best and the brightest in uniform while the worst and the dullest are safe in make-work projects, thus turning the situation prevalent in the '60s wrong side out. Voluntary enlistments in the Air Force would be infinitely easier to sell. But the draft *per se* would not enlarge the manpower pool which, as we have seen, is growing smaller. And it is extremely difficult to see how it would cut people costs significantly without sharp reductions in military pay and benefits across the board, a phenomenon which would severely shake the professional structure of the military.

Can one imagine for an instant the political viability of a dual pay structure wherein a draftee, serving against his will, is paid less than the volunteer doing the same job? So where are the payroll savings? Might it not be better to look to increased utilization of womanpower or to increased use of civilian contractors for work that is essentially noncombat related?

Nor would the draft diminish the prospect of unionization. It could well encourage it, as the experience of West European countries would indicate. A more fruitful approach might be to halt the erosion of military benefits and look to strengthening the role of the chain of command in people matters, especially with regard to improved grievance procedures. Both factors weigh heavily in any assessment by the rank-and-file of the potential attractiveness of a military union.

President Carter has promised a hard look at these and all military people-related problems by a blue-ribbon panel. We have a shelfful of such studies in our own files. How to reconcile all the contradictions and loosen all the Gordian knots with full attention to justice, equity, and, above all, to the nation's defense needs, calls for fertile minds, tough wills, and sensitive consciences. We hope the President finds them, for he will need all the help he can get. ■

These days the Air Force takes the telephone instead of a jet.

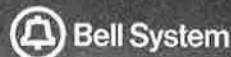
The Air Force is saving money by cutting down on travel.

Instead of flying to periodic meetings at their Division Headquarters at Kirtland Air Force Base in New Mexico, staff personnel in 27 different contract management detachments around the country sit in specially-equipped conference rooms and make reports to the commander and his staff over telephone lines. Overhead speakers and microphones in each conference room let dozens of people participate.

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SIMULATION SYSTEMS AND PRODUCTS

Link, originator of the "Blue Box" trainer, has expanded its simulation capability to include the range from single engine private aircraft to NASA's Space Shuttle Orbiter. In addition, advancements in the field of visual simulation include digitally generated full

color presentations and night visual systems containing in excess of 6,000 light points capable of including such features as horizon glow, runway texture and landing light effects. Simulation in the form of complex naval tactics trainers including radar and sonar sensors provide the capability for training in all phases of naval warfare. Systems for simulating tracked vehicles, ships, and nuclear and conventional power generation facilities are also available.

COMMAND AND CONTROL SYSTEMS

Naval Electronic Systems produced by Librascope for Digital Fire Control and Acoustic Counter-Measures are now in service aboard strategic and attack submarines and surface ships. Librascope also supplies the Query Control Station (QCS), a stand-alone tactical data and communications terminal, which is part of the U.S. Army's Tactical Data System (ARTADS). The QCS functions as a tactical computer system, a remote access to large data processing centers and as a multi-function secure communications link. The division also produces dynamic, large screen laser generated situation displays.

INFORMATION SCIENCES

Primarily in support of the U.S. Intelligence Community, HRB-Singer activities include the collection, processing and analysis of electromagnetic signal information. Specifically, HRB defines the user's requirements, formulates the system hardware and software and performs the data processing operations to provide analysis of the information received.

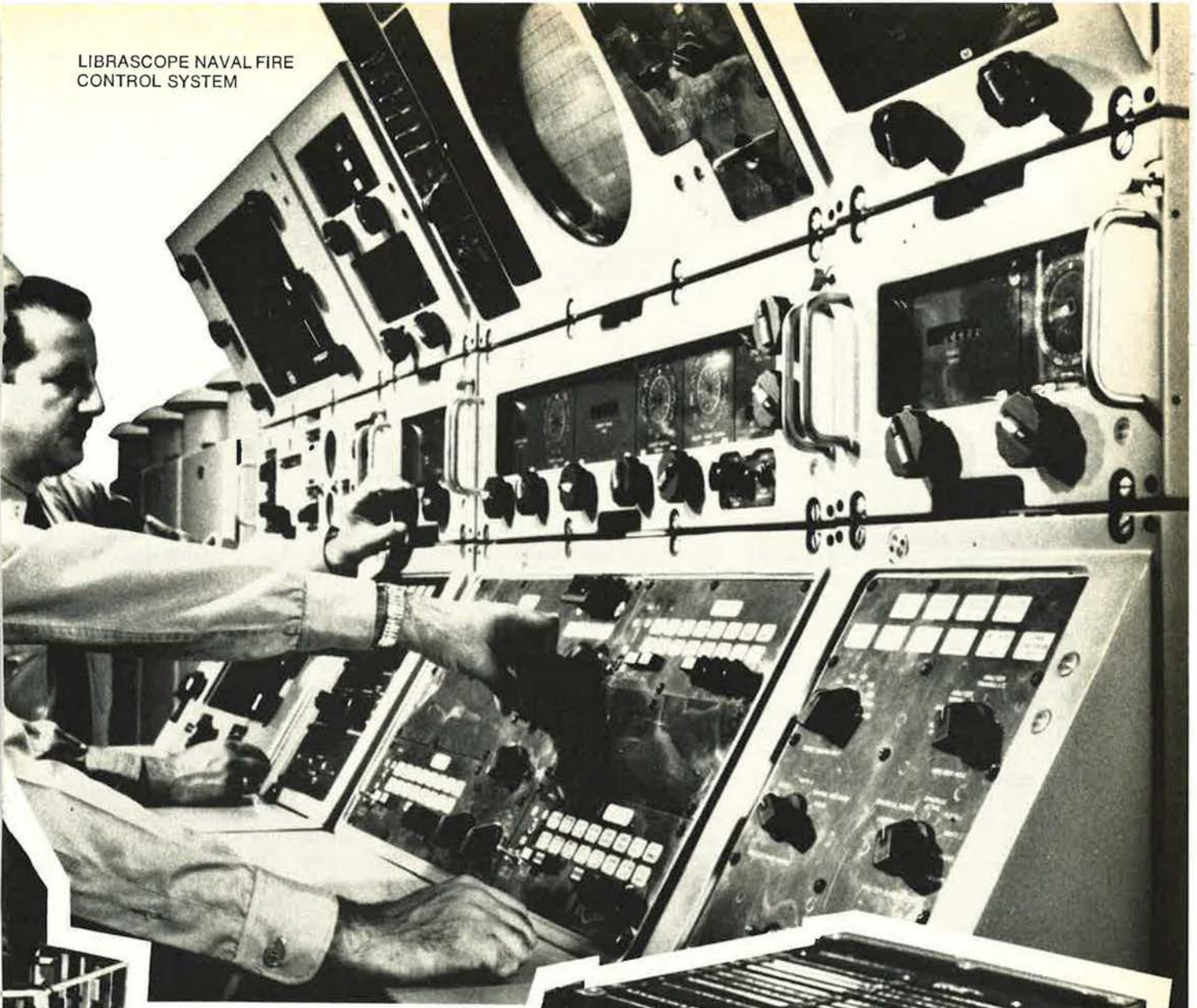
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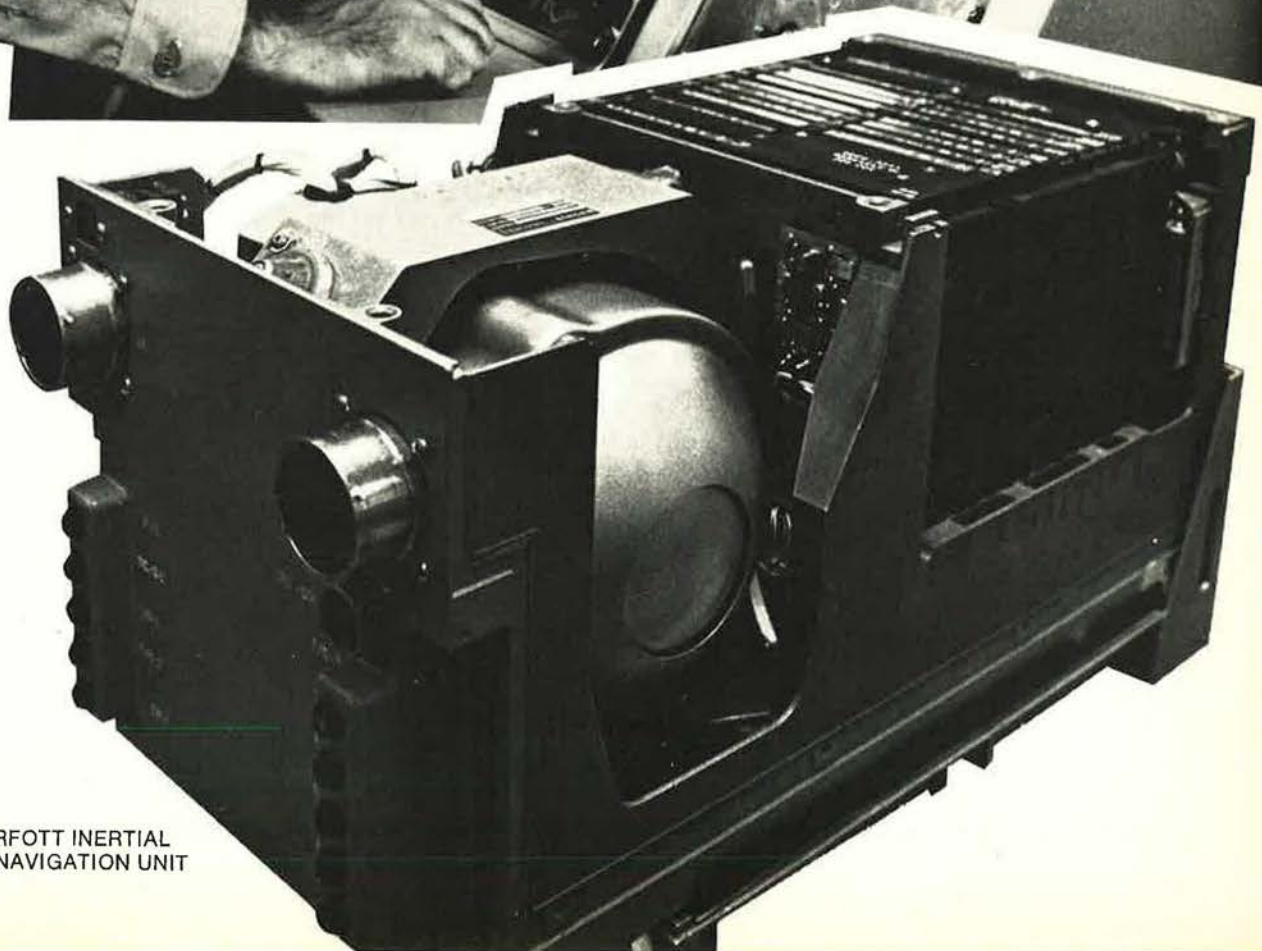


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Airmail

Action Needed Now

I have followed with great interest the Air Force Association's position on the formation of a union for the military. I get the impression that a Soviet request for an F-15 would get a warmer response.

In almost every issue of your magazine we see articles concerning the constant erosion of our military benefits and strength. It seems that if the Air Force raised as much cash about the B-1 as it does about hair length, we would get twice the number we requested. But it seems that the NCOA and AFA, with all their lobbyists, are powerless to stop this erosion. After all, congressmen fly to Europe with luggage weighing more than a young airman is allowed to take. And the congressmen fly free on Air Force planes. The Air Force does take care of its own—congressmen, at any rate.

Unless something is done, and soon, the troops are going to demand something be done. It has nothing to do with patriotism or communism. The troops just want to enjoy the American way of life we defend. And the elite of the Air Force must fear a union the way a slaveship captain feared the sound of native footsteps in the dark. But with common sense and intelligence, lots of trouble can be averted. A desire to unionize results from mistreatment, so the message should be clear. As clear as the message from two privates concerning a large blip indicating a large number of planes approaching Hawaii. The problem will be, now as then, the interpretation and action resulting from that message.

SSgt. Joseph H. Murphy
Langley AFB, Va.

Those Inspiring Early Birds

I have greatly enjoyed reading "Flying the Early Birds," by Brig. Gen. Ross G. Hoyt, USAF (Ret.). I particularly enjoyed reading the latest article in the February issue, on the P-36.

It was the sight of the P-26, the predecessor to the P-36, "rocketing" off the runway at Patterson

Field back in 1938 that made up my mind I would be a fighter pilot.

Later, having been assigned to the 20th Pursuit Group at Hamilton Field in the spring of 1941, I arrived about the time General Hoyt turned over command to General Eaker, who was to lead us in the intensive preparations for wartime capability.

General Hoyt can correct me if I'm wrong, but I seem to recall that upon arrival at Hamilton he was seen occasionally riding a horse with full Sam Browne belt and boots. In any case, it is a thrill to read about those days from a real pioneer and I would like to see more articles of this nature.

Col. Ralph J. Watson, USAF (Ret.)
Arlington, Va.

• *General Hoyt says he believes in the equestrians' adage—the outside of a horse is good for the inside of a man. So it's quite true, you probably did see him riding horseback—but not wearing a Sam Browne belt. According to the General, they had long since been discontinued.*—THE EDITORS

Out at Twenty

I am writing concerning the article by Ed Gates in the January issue, titled, "Second Careers in Civil Service."

The article states that dual compensation discriminates against the Regular officer. In a pure context I would have to agree. However, in the overall context of a military/civilian career I would like you to consider the following:

While on active duty, the Regular officer has so many advantages over the Reserve officer that it may be a way of balancing the scales. Just consider—

1. The Reserve officer is forced to retire at twenty years, thus depriving him of O-6 rank, command, and an opportunity to retire at twenty-eight or thirty years at three-quarters pay. He retires at the twenty-year point at fifty percent pay.

2. The Reserve officers normally get a small percentage of promotions on any promotion list. Just

check the last lieutenant colonels list.

3. In most commands, Reserve officers cannot serve as tactical squadron commanders. Check the Strategic Air Command and determine how many Reserve officers are squadron commanders.

The conclusion might be drawn that the Reserve officer is discriminated against while on active duty.

I was dual rated with more than 5,000 flying hours, including 236 combat hours in Vietnam. In addition to flying, I had ten years' staff duty at all levels of command, i.e., squadron, division, numbered Air Force, and major command headquarters. I am a college graduate, and my last ten OERs were rated 9 (highest possible under the old system). Yet, I was forced to retire at age thirty-eight as a lieutenant colonel. Many Regular officers still on active duty do not have the qualifications or experience I have. Additionally, I was never passed over for promotion. Had I been allowed to stay on active duty, I would have been in the primary zone for brigadier general at age forty-one.

In conclusion, I will agree with the statement. However, when it is made, the advantages the Regular officer has over the Reserve officer on active duty should be mentioned.

Name Withheld by
Request of Writer

Security Specialists

Please accept my utmost appreciation for the security police article, "New Reflections From a Brighter Badge," by Maj. Terry A. Arnold, in the February issue. It was the most professional presentation of today's security police that I have read since assuming my current position. An article so tastefully done in a publication of your reputation will have a major impact on winning friends for security policemen and women around the world.

All of us who wear the badge thank you for the contribution you have made in our behalf.

Maj. Gen. Thomas M. Sadler
The Chief of Security Police
Hq. USAF
Washington, D. C.

Air Force Assistance Fund

I am writing to alert our retired friends of an event in which you may choose to participate. The Air Force and Patrick Air Force Base

kicked off their 1977 Air Force Assistance Fund Campaign on February 28 and it will run through April 15.

This is not a solicitation—only an invitation. Retired persons in the past have not been included in this program; however, we here at Patrick consider the active-duty and retired community as one family of concerned individuals.

The proceeds raised from this campaign will be utilized to support the needy at the Air Force Village and the Enlisted Widows' Home. I am sure you can identify with this cause. If you wish to participate and desire our assistance in the establishment of a fund-raising project, do not hesitate to contact me.

2d Lt. William H. Allen, Jr.
6550th Air Base Wing (AFSC)
Patrick AFB, Fla. 32925

Candidates for Honor

The Wright-Patterson Air Force Base Memorialization Committee is compiling a list of candidates in whose honor buildings and streets of this installation could be named. The memorialization program, conducted in accordance with AFR 900-9, honors only deceased uniformed members of the USAF and its predecessors, *i.e.*, Army Air Service, Army Air Corps, and Army Air Forces.

We are especially looking for any officer or enlisted person who was either born in Ohio or who entered the service from Ohio and who served with any component (Regulars, Reserve, or National Guard) of the USAF and its antecedents. To be considered, a candidate must have died while on active duty or else separated honorably.

Essential biographical data including the potential candidate's name, rank, service, inclusive dates of service, aeronautical rating (if applicable), awards and decorations, and place and date of death should be forwarded to me. Also helpful for required additional research in official records would be the individual's serial or Social Security number.

Shelby E. Wickam, Wing Historian
2750th Air Base Wing (AFLC)
Wright-Patterson AFB, Ohio 45433

Venerable Veteran

The Pima Air Museum has in its collection a real war veteran—one which flew at least thirty-two bombing missions, but with which squadron we do not know.

Accepted by the AAF on April 5, 1945, B-29-BW 44-70016 was delivered to Second Air Force at Kearney, Neb. On or about April 24, the big bird departed for the Pacific arena. While there it was flown by a Lt. L. E. Gilbert. His name and the mission symbols were carefully and permanently marked on the aluminum of the nose with a scratch awl!

The aircraft returned to the ZI on November 7, 1945, and in time found its way to the 4713th Revron [Radar Evaluation Squadron] at Griffiss AFB. In June of 1959, the old veteran retired to the sunny desert of Davis-Monthan to await the ultimate fate of obsolete aircraft. Luckily, #16 was selected for public viewing along the north boundary of the base, along with a batch of other war wearies. Finally, this valuable relic was permanently spared an ignoble fate by being placed on loan to the Museum.

We wonder if any readers can help us find Lieutenant Gilbert and his crew. Any information about our bird will be very much appreciated. We also are interested in hearing from former members of the 77th Bomb Squadron (Attu) and the 404th Bomb Squadron (Shemya).

Rhodes Arnold, Vice Pres.
Tucson Air Museum Foundation
P. O. Box 5825
Tucson, Ariz. 85703

Aviation History's Stepchild

As an enlisted man in aircraft maintenance for many years, and as an amateur historian and sometime writer on Air Force history, I have been concerned at the way Air Force history has been distorted over the years. I refer to the fact that almost nowhere in our writings do we acknowledge the role of the aircraft mechanic. He is not, and never was, the nonentity his image provides, but is absolutely essential to the operation of any flying organization. A few commanders have acknowledged the fact. In his memoirs, Maj. Gen. Benjamin Foulois stated that without the dedicated ground crews there would be no air force. Another man, not so much admired, Herman Göring, said es-

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 interests of space or good taste. Names will be withheld on request, but unsigned letters are not acceptable.

entially the same thing about his Luftwaffe ground crews.

Yet, a perusal of aviation history writings covering all eras reveals that the maintenance side receives scant attention. It is not so much that the mechanic has received a bad press, it is just that he is totally ignored as an object of no historical interest. To produce an objective history, it is essential that maintenance, and the men who provide it, be given their due.

For almost seventy years of Air Force history they have remained on the lowest rung of aviation's social ladder. I would hope that future writers for AIR FORCE Magazine, and others, would attempt to enhance the negative image that this essential man has been given in our history. If not, it will remain a distorted history.

MSgt. Merle C. Olmsted,
USAF (Ret.), Director
American Aviation Historical
Society
Salinas, Calif.

Plane Maintenance

I've been a member of AFA for three years and enjoy AIR FORCE Magazine very much. Your reports on new aircraft are both enlightening and interesting as far as they go. It would seem that shortcomings and maintenance are either ignored or mentioned very briefly.

We would all like to believe that our weapon systems are above reproach and maintenance free, but that isn't very realistic. In the wild blue yonder an aircraft may be a dream to fly but on the ground a real nightmare to maintain. Needless to say, the ground crews spend the most time with a plane and get into it a little deeper than just the cockpit.

So why not let us know both the pros and cons, as well as the ease of maintenance, of the aircraft being tested? It would cover the interests of both pilots and ground crews.

Dan Hackett
East Haven, Conn.

• *Good point. We'll encourage the next pilot who reports on a new aircraft to enlarge his comments about maintenance, as did Maj. George Larson, who reported extensively on maintenance in his June 1976 article on the B-1.*—THE EDITORS

P-38 Lightning Association

In May 1976, the 474th Fighter

Airmail

Group Association (WW II) held a reunion in Bloomington, Minn., in conjunction with the "World's First P-38 Convention" and conventions of Region 5 (USA) of the International Plastic Modelers' Society and the Twin City Aero Historians Chapter of the American Aviation Historical Society.

At that convention, the subject of forming a P-38 Lightning Association was discussed. The response of P-38 unit associations as groups of people was good, but the official reactions in each case were to not get involved as associations. However, the degree of individual enthusiasm was judged to be high in each case.

The 474th Fighter Group Association will be having another reunion in May [see *February issue*, p. 9]. At that time we will again discuss the subject of forming a P-38 Lightning Association, with membership in it primarily sought from interested individuals. This is similar to the P-47 Thunderbolt Association and the Liberator Club, to the best of our knowledge.

We would appreciate hearing from anybody, individual or group, who would be interested in this subject.

Col. Robert D. Hanson,
AFRES (Ret.)
Sec'y, 474th Fighter Group Assoc.
7515 Wayzata Blvd., Suite 226
Minneapolis, Minn. 55426

Oh, Those Awful Words

I would like to comment on a trend in writing in the magazine that I would like you to consider changing. As I was rereading an article ("The Technological Case for a Supersonic Cruise Aircraft," June '76), I began to get frustrated by the overuse of little used or understood words. Such things as a caveat or fiat or two are acceptable as such words are widely used in government and law. But, sirs, *ineluctable*? Why not insurmountable, which most people understand and are familiar with.

Reading articles like this is important for the general public to keep abreast of what's going on in aerospace research. It's important to the Air Force to have such information disseminated to keep public

support for Air Force research. But to write articles where the reader has to refer to a dictionary every other paragraph is not conducive to support. One gets the feeling the author is trying to write over the readers' heads.

Please, try to make the articles straightforward and a pleasure to read. The Air Force will only benefit.

1st Lt. Michael S. Larson
Columbus AFB, Miss.

Tracing the B-29s

I am researching the history of the Boeing B-29 bomber in Royal Air Force service. Over here the aircraft was known as the Washington.

In the early 1950s, I flew in these planes as a gunner with No. 149 Squadron.

Of the eighty-seven Superforts supplied to the RAF under the terms of the Mutual Aid Defense Pact, some seventy were flown back to the USA during 1953-54.

USAF Historical Records show that these aircraft were initially in storage at Davis-Monthan AFB, Ariz., following their return. Several were later assigned to Dover AFB, Del., and five, serial numbers 44-61585, 44-62129, 44-61978, 44-62006, and 44-62046, were transferred to the US Navy. Official USAF and USN sources are unable to supply further information on these aircraft.

I would welcome any information and/or photographs from anyone who may have been involved with these planes. I am particularly interested to find out what they were used for and what finally became of them.

J. Brown
173 Chadderton Hall Road
Chadderton
Oldham, OL9 0QP, Lancaster
England

Paging David

I would like to credit our Cadet Commander with a significant and quotable remark. While discussing the B-1 bomber, Cadet Capt. Scott Legg stated: "I hope that whoever is briefing the new Administration about the B-1 bomber makes it clear that we are not arguing for a bigger rock, but a better sling-shot!"

CMSgt. H. Naumann, USAF (Ret.)
Assistant Aerospace Education
Instructor
761st AFJROTC Cadet Sqdn.
El Cajon Valley High School
El Cajon, Calif.

Mach 12 Research Vehicle

I am researching a proposed project by which a Mach 12 hypersonic research vehicle, powered by liquid hydrogen-fueled scramjets, was to be launched at Mach 3 from between the vertical tails and above the aft fuselage of the XB-70. However, this effort was aborted when the second XB-70 crashed in mid-June of 1966.

I would very much like to contact anyone who could help me in piecing together this portion of the history of the XB-70 bomber.

Gerald L. Borrowman
720 Temperance St.
Saskatoon, Saskatchewan
Canada S7N 0M7

Aircraft Art

I am compiling material for a book, soon to be published, on World War II USAAF "nose art," but still need additional photos of nose art on glider, cargo, and liaison aircraft. I would appreciate hearing from any reader with clear photos of artwork of this type which they would be willing to loan. Photographs of unusual nose art on combat-type aircraft, particularly those serving in theaters other than Europe, also would be of use to me.

Any material borrowed for copying will be handled carefully, will be returned quickly, and will be credited in the book.

Michael Gregory
P. O. Box 33584
Dayton, Ohio 45433

Ian Logan and I are currently doing research for a book devoted exclusively to the girl art paintings on American aircraft from World War II to Korea. The English publisher is Matthews Miller Dunbar of London, and there is also an American copublisher. Publication is expected in October 1977.

We are anxious to hear from any individual or bomb group associations who have photographs of this art. Color, particularly, would be most valuable, though black and white is most welcome.

Henry Nield
Ian Logan Associates
33 Shelton Street
London WC2, England

Articles On the JROTC

I have often wondered why AIR FORCE Magazine has not presented an article in recent years dealing with the Air Force Junior ROTC

graduate. As a graduate of the California 85th AFJROTC Cadet Group and presently an Air Force Academy cadet, I feel fortunate in having been exposed to this specialized high school training.

Apparently, many AFJROTC graduates are well on their way toward an Air Force career. I believe this aspect of the AFJROTC program is well worth your attention.

C/4c Michael J. Opatowsky
USAF Academy, Colo.

Women In the Services

I am in need of assistance in researching and writing a series of articles on the Women's Services of the World.

Can use any documentation (books, brochures, training manuals), glossies, illustrations, insignia (cap badges and collar brass) of the Women's Services (US and foreign). I have been able to obtain standard information (fact sheets) but nothing on specifics concerning the wonderful gals in uniform, past and present.

Please help! Every letter and/or contribution will be acknowledged.

Mrs. Edythe Shepard
1334 E. Suncrest Dr.
Tucson, Ariz. 85706

Anyone Know Colonel McGowan

I have a .455 Colt Automatic pistol, together with a custom-made shoulder holster rig produced in Auckland, New Zealand, which is stamped in gold: "Lt. Col. McGowan, 18th FGT [flight or fighter] GP."

I am seeking any historical, World War II information about Colonel McGowan's service record. Any assistance would be appreciated.

Kenneth G. Michalske
1402 E. Orchid Lane
Phoenix, Ariz. 85020

Pilot From New Jersey

I am in search of an old friend. His name was John Okenfus, who was inducted or drafted into the Air Force as a captain at the beginning of World War II. He was a pilot from Newark, N. J.

Any information at all will be greatly appreciated.

Charles F. McClure
158 Liberty Way
Ft. Pierce, Fla. 33450

C-46 and ARRS Research

During the past two years, I have been trying to compile factual in-

formation concerning several phases of Air Force operations in the SEA conflict, and have had little luck.

First, I seek to verify that the C-46 Commando aircraft was actually flown in operational USAF service during the early opening days of the conflict. And that it was USAF-operated and not flown under any other flag, namely, the SVAUF.

Second, I would appreciate hearing from any members or former members of the Aerospace Rescue and Recovery Service who served in the conflict. I am trying to compile personal accounts, photographic material, written data, etc., in order to construct a scale display representative of the entire scope of the ARRS's record in retrieval of

FLYING THE XP-55: 'INTERESTING, BUT NOT NECESSARILY PLEASANT'

Walt Boyne's article, "Weird, Wonderful Warplanes," in the June 1975 issue of AIR FORCE Magazine, told about four AAF experimental fighters that were tested early in World War II. The depression years had put this country far behind in developing aircraft engines, and we needed somehow to explore the possibility that unique arrangements might result in fighters to match the performance of the best enemy planes.

One of the experimental fighters was the Curtiss XP-55—a canard (tail first) pusher. It provided forward visibility, located the engine close to the center of gravity, left the forward fuselage clear for gun installations, and promised an efficient structure. As Boyne noted, the XP-55 had some ominous stall characteristics, which resulted in the loss of the first prototype.

In February 1943, I had the interesting, but not necessarily pleasant, experience of flying one of the three XP-55s at Muroc while I was chief of the AAF Materiel Command Pursuit Branch. Before flying it, I was told that the test pilots had run into some unusual stall characteristics and was asked to try some stalls and give my impression.

The slow, steady stall was quite satisfactory, and the plane behaved normally in the usual intentional maneuvers. Because some aircraft have different characteristics when a stall is initiated abruptly, I tried a sharp pullup. The nose came up rapidly to a very high angle, and forward nose-down control was ineffective in checking the pitch-up. What happened next was a series of completely confusing out-of-control gyrations. Eventually a wobbly sort of spin developed from which recovery was possible.

After trying a few more violent stalls, all of which went through the same out-of-control contortions, I thought I knew what happened, but I am still not sure. Initially the plane, without the damping of a conventional tail to slow the rate of pitch, came up to such a steep angle that the forward elevator could not be moved enough to get any down force on the nose. What must have followed was a stall with the nose pointed nearly straight up. This much and the beginning of a rolling motion was fairly clear.

Assuming that with the swept wing, one side or the other stalled first, the plane did a kind of twisting cartwheel, first rotating about the fuselage and then pivoting on one wingtip. As it went over the top in something like a hammerhead stall, the top advancing wing seemed to roll the plane partially onto its back. This rotation of the aircraft about its fuselage axis and in the plane of the wings was like an autorotation spin except that the axis of the spiral was falling through the horizontal so that it was probably more nearly a very wobbly snap roll. With the rudder surfaces located on the wingtips and the fin surface close to the center of gravity over the engine, these vertical surfaces weren't effective in slowing the spinning.

All of this occurred in very rapid sequence, and nothing was effective until a recognizable spin had developed. If one visualizes the movements of outside references—the horizon, sky, and earth—it will be readily apparent that the pilot was in no position to provide a precise description of what went on.

Although the speed and general performance of the airplane were interesting, they were not sufficiently promising to justify the prolonged development of satisfactory damping and control to make a suitable combat plane. The other planes in the same group (the XP-54, -56, and -62) indicated pretty clearly that there were no mysterious bonanzas awaiting unconventional and daring development, but at the time, it was imperative that they be tried.

Even if the performance of our four X fighters had been exceptional, they introduced other characteristics requiring probably prolonged test and development. Also the promise of the jets, with their high thrust in small packages and their reduced susceptibility to transonic difficulties, was on the horizon.

—Brig. Gen. Benjamin S. Kelsey, USAF (Ret.)
Stevensburg, Va.

Airmail

downed aircrews. These materials may depict every phase of the structure, from the base of operations to the aircraft itself.

Any member is assured that whatever material is loaned to me will be copied and returned (upon approval) as soon as possible in its original condition.

Francis A. Carberry
Knollwood Dr., RR #3
East Hampton, Conn. 06424

71st TFS Heritage

The 71st Tactical Fighter Squadron is constructing a comprehensive photo history of the squadron's heritage. We request that former members of the 71st Tactical Fighter Squadron, 71st Fighter Interceptor Squadron, or 71st Fighter Squadron who have pictures showing aircraft in squadron markings or personnel participating in significant events, please contact the addressee below. All pictures will be promptly returned after copying.

Of particular interest are the squadrons' World War II activities and F-102s bearing squadron markings.

Capt. Gary R. Porter
Historian
71st Tactical Fighter Squadron
Langley AFB, Va. 23665

UNIT REUNIONS

FAC Association

The Forward Air Controllers and their associates have reorganized. All former members of the 19th, 20th, 21st, 22d, or 23d TASS units who are not members please contact

T. A. Spada
1902 Alabama
Blg Spring, Tex. 79720

Green Hornets

The Green Hornet reunion will be held May 13-14, at Hurlburt Field, Fla. All Green Hornets, or anyone who was associated with them, please send names and addresses for compiling a roster. Contact

Capt. Frank W. Wald
14 Cypress Dr.
Hurlburt Field, Fla. 32544
Phone: 872-8471/6179 (Autovon)
(904) 581-2342 (Home)

Paratroopers

World War II Marine and Navy Paratroopers will hold their annual reunion at the Marines' Memorial Club in San Francisco, Calif., June 24-26. For information write to

Association of Survivors
c/o Col. D. E. Severence,
USMC (Ret.)
P. O. Box 1972
La Jolla, Calif. 92037

Retirees' Day

A program designed to keep retired Air Force personnel informed on current AF programs and policies will be held at McGuire AFB, N. J., on April 23. A reception at the Base Recreation Center at 9:30 a.m., briefings on a variety of subjects, and a film of current military interest are program features. A luncheon will be available. McGuire welcomes all who have served in the Air Force and retirees from other branches of the armed forces. Those planning to attend send a card or call (indicating attendance at the luncheon).

Retirees' Day Committee
Personnel Division (DP)
McGuire AFB, N. J. 08641
Phone: (609) 724-3914

3d Strategic Air Depot

Members of the 3d Strategic Air Depot Association (Watton, England, 8th AF, WW II) are holding their reunion July 28-30, in Denver, Colo. Contact

W. S. Noble
7266 Goodwood Ave.
Baton Rouge, La. 70806

3d Strategic Support Sqdn.

The 3d Strategic Support Squadron (SAC/C-124s) will hold a reunion for all officers and enlisted members July 21-24, in the Bossier City, La., area. Need names and addresses of former 3d SSSers. Contact

Francis P. Zimmer
2920 Kirk Lane
Bossier City, La. 71112
Phone: (318) 746-7802

or

Ray Torgeson
1703 Airline Dr.
Bossier City, La. 71112

14th Wing WW II Glider Pilots

Bash III of the 14th Wing, WW II Glider Pilot's Association, will be held April 30 at the Sheraton Motor Inn, New Carrollton, Md. All GPs invited. Ex-Glider Jocks interested in but not familiar with the Association also invited. Contact

Jess B. Sylvis
231 Ironshire South
Laurel, Md. 20810

Phone: (301) 725-6359

16th SOS

All Spectres and others associated with the 16th SOS are invited to the 2d annual AC-130 Gunship minireunion to be held at the Fontenelle Hills Country

Club, Omaha, Neb., May 27-29. Contact
Col. R. A. Wicklund
602 Martin Drive North
Bellevue, Neb. 68005
Phone: (402) 291-4690

47th Bomb Group

The 47th Bomb Group and attached units, 12th AF, WW II, will meet in Denver, Colo., July 14-17. For details send stamped, addressed envelope to
Ted Broman
1629 Fruitwood Court
San Jose, Calif. 95125

80th Fighter Squadron

The next reunion of the 80th Fighter Squadron "Headhunters," America's top-scoring P-38 outfit, WW II, will be held in Dayton, Ohio, July 7-10. Contact
Yale L. Saffro
7841 Kildare Ave.
Skokie, Ill. 60076
Phone: (312) 673-9040

98th Bomb Group (H)

The "Pyramidiers" 98th Bomb Group Veterans Association is having a reunion July 18-21 at the Pick-Congress Hotel in Chicago, Ill. All former members who wish to be put on the mailing list, or attend the reunion, contact
W. H. Bolling, Jr.
Rt. 3, Box 67
Gonzales, La. 70737

314th Troop Carrier Group

All former members of the 314th Troop Carrier Group, 61st Squadron, WW II, interested in a reunion in Dayton, Ohio, later this year, please contact
George C. Marz
4035 Silver Oak St.
Dayton, Ohio 45424
Phone: (513) 236-1678

361st Fighter Group

Help is needed to locate any WW II members assigned or attached to the 361st Fighter Group, 374th, 375th, and 376th Fighter Squadrons, 8th AF. Your reply will assist us in keeping you informed of upcoming reunions in Wisconsin in July and St. Louis in October.
John H. Hoffman
365 N. E. 28th Terrace
Boca Raton, Fla. 33431

366th Tac Fighter Wing

The Gunfighter Association is compiling a roster of current addresses of all former members of the 366th Tac Fighter Wing. If you were a crew member, send name and address to
The Gunfighters
Box 377
Randolph AFB, Tex. 78148

7330th Flying Training Wing

The 24th reunion of the 7330th Flying Training Wing, Furstenfeldbruck, will be held at Nellis AFB, Nev., June 24-26. Father William L. Travers
350 Stinson Ave.
Vacaville, Calif. 95688

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Airpower in the News

By Claude Witze, SENIOR EDITOR

The Cloud Over Mr. Warnke

Washington, D. C., March 9

The debate that preceded the approval of Paul C. Warnke to be our nation's chief executive and spokesman in the field of arms control and disarmament is one that should have taken place years ago. Early in the Kennedy, Johnson, and Nixon-Ford Administrations it would have been timely and helpful. In fact, this department is guilty of having anticipated it a couple of times, only to have the issue brushed aside in the flood of events that have distracted us.

The press, now near the end of its period of enchantment with Jimmy Carter, whose cardigan sweater and daughter Amy do so well as features in the news, did not do justice to the Warnke debate. It was underplayed, underwritten, and unappreciated. This is not difficult to understand. The debate over national security issues that I expected was one that would grow out of the budget, for example, or any effort to press harder on the question of congressional prerogatives vs. those of the White House. That was not to be, and when the Warnke selection came along, the headline hunters fell into the rut of portraying the argument as one between hawks and doves—a sort of afterthought to those about the efficacy of bombing in North Vietnam or how President Ford handled the *Mayaguez* incident.

Of course, the Warnke dispute had to share space with some other issues of critical importance to national security. The Carter Administration altered the Ford Administration's proposed defense budget, but not much. The Carter campaign talk about cutting up to \$7 billion remains campaign talk. It is spending,

or outlays, that the average citizen of Plains, Ga., expected to be slashed by \$7 billion. Proposed outlays were cut by \$400 million. Congress can do more than that, and probably will. The best single-sentence portrayal of what happened was in the *Wall Street Journal*.

"President Carter proposed modest reductions in the defense budget that are designed to spend money more efficiently and to slow expensive strategic programs that may be limited by agreements with the Soviets," wrote Dick Levine, the *Journal's* veteran defense reporter. He hastily pointed out that spending still will hit \$109.7 billion, which is 11.4 percent more for Fiscal 1978 than provided for Fiscal 1977. Defense Secretary Harold Brown, appearing on "Meet the Press," acknowledged that a cut of \$5 billion to \$7 billion is a long way off, if it can be achieved at all. He seems to think it can be, which is another way of saying that the Secretary of Defense, in so young an administration, can only blink when faced with such rude realities.

A security issue in sheep's clothing is the best label I can stick on this Administration's insistence that the White House can alter the policy of totalitarian governments toward their internal dissidents. There must be easier targets, such as demanding that the Berlin Wall come down, simply because it is indecent and an affront to civilized people on this side of it. A smart lawyer, an expert on international law, should be able to argue that The Wall is a violation of the Helsinki accord, or some other agreement signed by Russia. Instead, we are lending moral support—the only kind we have at the moment—to Soviet dissidents. Most of them are locked firmly behind

The Wall, which we are not trying to tear down. It was the Russians, not the West Europeans, who built the Berlin Wall.

On top of this, Idi Amin has been told by the White House that what he is doing in Uganda has "disgusted the entire civilized world." Of course it has, but is it wise to tell this to a dictator as irrational as this one? By this time, it appears that Idi Amin has been dissuaded from humiliating the United States, as he did Great Britain. Cooler heads in the Moslem world are given credit. For a few days, a confrontation appeared possible, and there is reason to believe President Carter learned something from his experience. He now is more soft-spoken when the subject of Uganda is brought up, although the reports of atrocities in that country escalate as more and more bodies are spotted floating down the Nile. The differences between The President and The Presidency are easier to distinguish after a single shot from the hip has brought about such consequences as the temporary detention of more than 200 Americans in a distant and primitive country.

There are other items. Both the White House and the State Department are honeying up to Cuba, while human rights command no more respect in Havana than they do in Moscow, Hanoi, or Kampala. The Administration now has a delegation slated to visit the capital of Vietnam. Nothing has been said about the possibility of interviewing Vietnamese dissidents. Some of them must have been our allies.

It was against this background that Congress discussed the wisdom of naming Mr. Warnke both Director of the Arms Control and Disarmament Agency (ACDA) and to the rank of ambassador to the SALT negotiations. The atmosphere was, to put it mildly, squeamish. Especially for a Congress that, while new, is essentially unchanged from the one that, a year ago, reversed a six- or seven-year decline in military budgeting to meet a soaring challenge from the Soviet Union. As Rep. Sam Stratton of New York suggested in an unpublicized appearance before the Senate Foreign Relations Committee, what kind of a "signal" will Moscow get out of the selection of Mr. Warnke as our arms-limitation negotiator?

There are millions of words in the debate. It was on January 31 that

Mr. Warnke's name was first mentioned as the Carter choice for the two jobs. At once there were arguments put forth that Mr. Warnke would be "soft." These were based on his recorded statements, his writings, and his affiliation with such groups as the 1972 McGovern Panel on National Security and the Center for Defense Information. The consistent philosophy of Warnke associates in the past has been that the use of nuclear arms is forestalled by the size of our arsenals and that the United States can safely show the way to Russia by unilaterally restraining its own development and deployment of armaments.

On the stand, the Warnke approach was reversed. This led some to express simple confusion. Paul Nitze, a former Deputy Secretary of Defense who once was Mr. Warnke's boss, appeared before both the Foreign Relations and Armed Services Committees to oppose the confirmation. At one point Sen. Howard Cannon of Nevada asked Mr. Nitze: "Based on Mr. Warnke's previous positions and previous statements, how do you perceive him to appear to the general public?"

"I have a hard time evaluating that," the witness replied. "I know that he leaves me at one point thinking I understand very clearly what he is saying and at other times feeling I haven't understood a thing. He mystifies me at times."

Retired Adm. Thomas H. Moorer, former Chairman of the Joint Chiefs of Staff, said that if he were a Soviet negotiator, Mr. Warnke would be the one American he would like to face across the table. He added: "When Mr. Warnke arrives as head of the delegation in Geneva and Helsinki, I would think that the Soviet negotiators would be completely armed with all the statements he has made in the past—which are very consistent up until February—and I do think that this gives the Soviet side an advantage in the negotiations. I can tell you . . . those guys are no one to give an advantage to."

One of the senators most disturbed by the Warnke choice was Henry M. Jackson of Washington. He listed thirteen instances in which Mr. Warnke had publicly opposed the development of new weapon systems or favored cut-backs in military strength and spending. These ranged from de-

clared opposition to the B-1 bomber, the Trident submarine and missile, AWACS, MIRV, the mobile ICBM, and the submarine-launched cruise missile to the withdrawal of 30,000 troops from NATO and substantial budget cuts. The Warnke response was that he did not "oppose" weapon and spending proposals. He "questioned" them.

When the debate got to the Senate floor, Senator Jackson got specific, leaning toward the Moorer thesis that Mr. Warnke would not be a thoroughly credible man to represent the United States in arms-control talks. His floor speech is worth quoting:

"The issue is not whether Mr. Warnke's views, expressed over many years, are consistent with my own. They are not; but that alone would not justify opposition to the President's nominee.

"The issue is not whether, or to what degree, one supports a serious effort to obtain stabilizing arms-control agreements. I support such efforts; and I am as concerned as anyone, perhaps more than many, that the American delegation to the SALT negotiations be headed by a man of intelligence, judgment, clarity, and candor.

"I believe the record of Mr. Warnke's past views and recommendations raises a serious question as to the quality and reliability of his judgment in matters affecting national security. I believe it to be a record of imprudence, of careless advocacy often reflecting cavalier and summary judgments rather than careful, deliberate, and precise analysis. It is a record marked by a glib and superficial appreciation of issues that are far too complex to

justify Mr. Warnke's easy certitude."

Mr. Jackson then was precise about the issue:

"What troubles me most about entrusting the leadership of the US SALT delegation to Mr. Warnke is my belief that the lack of clarity and candor that he has demonstrated, privately and in hearings before the Senate, would make it difficult or impossible to hold him to account in his future dealings with Congress."

This is the issue of Mr. Warnke's credibility, not only in the eyes of the Russians who have studied his record with care, but on the Senate floor. Any agreement reached must win the approval of two-thirds of the US Senate. In view of the temper of the times, the polls that show the American people are concerned about our security, and the record of the Ninety-fourth Congress on defense questions, it is likely that any pact will get close scrutiny and some negative votes.

Senator Jackson fingered the record:

"Mr. Warnke's views on our defense programs and on arms-control matters, expressed over many years and in many different forums, are—or I should say, were—well known to the Senate. He has been a tireless advocate of deep and I believe irresponsible cuts in the defense budget; of unilateral restraints in our defense programs as a means of inducing the Soviets to show restraint in theirs; of the notion that nuclear superiority is meaningless; of the view that an ability to damage the civilian population of the Soviet Union should be the strategic basis of our national defense; of the notion that Soviet

Warnke Confirmation

As this issue of AIR FORCE went to press, the Senate confirmed Paul C. Warnke as chief arms negotiator by a vote of 58 to 40. He then was approved as the director of ACDA. This time the vote was 70 to 29.

Only a few hours earlier, President Carter made a strong final appeal for his nominee, charging that the primary opposition came from "those who don't want to see a substantial reduction in nuclear weapons." The immediate interpretation of this view was that the White House has served notice it will fight in Congress, if necessary, for approval of any arms agreement worked out by Mr. Warnke and the Russians. The Senate must give this endorsement by a margin of at least two-thirds. The fact that more than one-third voted against the choice indicates there may be a stiff challenge to any pact considered risky.

Airpower in the News

strategic nuclear weapons have been largely a response to our own, and that they mindlessly and mechanically 'ape' the United States.

"When Mr. Warnke came before the Senate to be confirmed for the two posts to which he has been nominated he had, of course, the honorable option of defending his long-nurtured views. He had the opportunity to elaborate. He was free to continue the uninterrupted advocacy of positions with which he has long been associated. He could have stood up for, and by,

his convictions. He chose not to do so. Rather he chose to describe his views in quite different, and often contradictory, terms."

It was Chairman John Stennis of the Armed Services Committee, a man rightly jealous of his jurisdiction, who suggested that he did not want ACDA Director Warnke making critical decisions about weapon systems. And he referred to the stands taken in the past, as delineated by Senator Jackson:

"How can you avoid being confronted with all of these positions you have taken, sound or unsound, that you have changed your views on . . . as a negotiator and as a barrier or a stumbling block to your effectiveness?" the Chairman asked.

"Yes, sir, Mr. Chairman, I have been thinking lately, thinking of

anything I have said that would diminish my effectiveness as a negotiator," Mr. Warnke replied.

"What I have said in some instances is perhaps some of the weapon systems that we were building were too good. I haven't said they were bad."

The witness went on to insist there is nothing in the record "that could be used against me by the Soviets or anybody else in a negotiating sense." In fact, he believes that because he is a "student of these problems" and "willing to participate in the debate" he now is so well informed that his negotiating capability will be improved.

That remains to be seen. Also remaining will be the US Senate's opportunity to pass judgment on any deals Mr. Warnke makes with Soviet Russia. ■

The Wayward Press

The selection of Adm. Stansfield Turner to head the Central Intelligence Agency brings an old friend of the press corps back to Washington. It was about five years ago that the Admiral brought about the first, and certainly most provocative, confrontation of the press and the military at the Naval War College in Newport, R. I. He was president of the college at the time, and an innovative one. In November of 1972, he invited about thirty press and television representatives to the college for a two-day conference on "The Military and the Media: Toward an Understanding."

There was no understanding. The 400 military students were on their best behavior, displaying an eagerness to know more about the press and what makes it tick. A substantial number of their guests, still seething from the indignities heaped upon them while covering the war in Vietnam, turned out to be surly, belligerent, and outspoken defenders of advocacy journalism.

One of the worst offenders, it turned out, was a liberated woman named Gloria Emerson, who worked for the *New York Times*. My notes from the meeting show that she appeared at times to approach a state of hysteria in her loud denunciation of all things military. If there was any single thing that she was adamant about, it was her refusal to comprehend that the uniformed men running MACV—the American headquarters in Saigon—did not like what they were doing or the way they had to do it. They were following orders issued by their civilian superiors in Washington.

At the Newport seminar, where Admiral Turner always kept his cool and scholastic approach, Ms. Emerson stood up, at one point, and declaimed loudly that she did not take orders from anyone, and that included her publisher and managing editor, much less an admiral or general. I still doubt that her publisher and managing editor ever knew she spoke of newsroom anarchy.

Now, Ms. Emerson has written a book, which reads at points more like a tract, about some of her experiences that she can relate, one way or another, to the war in Vietnam. It is not a book about the war. Huge chunks of it are about war-related encounters she had after the war. The book is called *Winners and Losers*, with a subtitle that speaks of "Battles, Retreats, Gains, Losses and Ruins from a Long

War" (Random House, New York, \$10.95). The publishers see here a "nerve-touching perception of what conflict does to ordinary lives."

Ms. Emerson's book includes a short report on her visit to Admiral Turner's Naval War College in 1972. She makes it part of her war story. Here is what she says about one of the sessions:

"What I remember most clearly is another officer—most of them wore civilian clothes, which disguised nothing—who rose, after one panel finished, to ask why correspondents were sent to cover the war in Vietnam when they knew nothing about war or the military. It was a stunning question because he asked it sadly and sincerely.

"'A sports editor wouldn't send someone to cover a football game who was a novice, would he?' the officer said. He felt it was a shame that the press corps knew so little. . . ."

Well, Ms. Emerson's notes are not accurate. It is characteristic of advocacy journalists to change things just a mite, if that will serve the cause. She also fails to give the answer to the question.

I happen to be the man who asked that "stunning" question. She has both misidentified me and misquoted me. Like her, I was one of the civilian guests invited by Admiral Turner. My question was directed, specifically, to a network television executive who was on the panel.

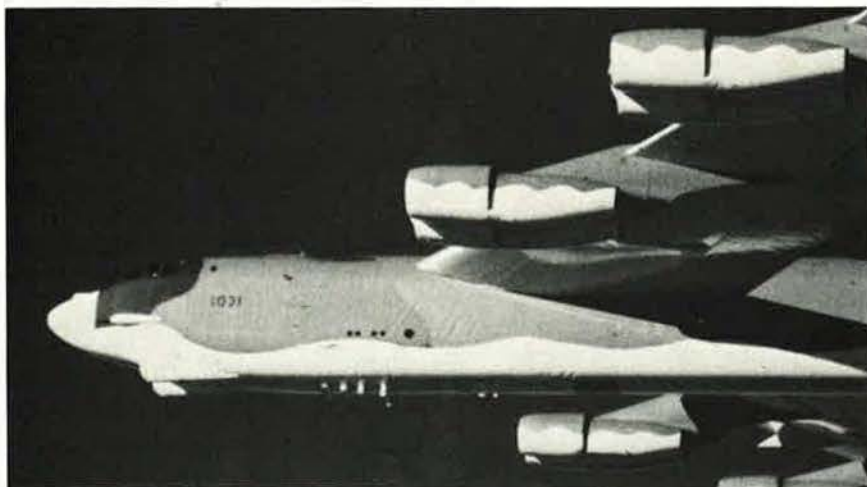
I asked him to explain, if he could, why a national TV network will send a battalion of experts to cover a football game, while its national security news, including Pentagon coverage, depends on the capability of a single man from the Washington bureau, usually one not high in the TV news pecking order? His reply:

"That's a good question. It is a matter that gives us great concern."

It is typical of Ms. Emerson that she assumed I was a military officer. I never have been in the military service, but was accredited as a military correspondent for a metropolitan daily early in World War II. There was another panelist at the 1972 meeting in Newport who put considerable emphasis on the fact that the reporters sent to Vietnam had never seen a war before. Ms. Emerson apparently didn't hear that.

—CLAUDE WITZE

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200 miles, respectively, and will transmit secure digital information with much greater efficiency.

(2) Under a program managed by the Project Manager, Multi-Service Communications System, Raytheon is developing a family of digital group multiplexers (DGM) and cable transmission equipment for the U.S. Army's Electronics Command. DGM interfaces with virtually all key elements of the TRI-TAC communications system.

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Aerospace World News, Views & Comments

By William P. Schlitz, ASSISTANT MANAGING EDITOR

Washington, D. C., March 4
★ AFSC's Armament Development and Test Center, Eglin AFB, Fla., has in the works the improvement of both the 20-mm M61 Gatling gun and its M50 family of ammunition. This armament, developed shortly after World War II, is still the first-line system for high-altitude, air-to-air combat.

The M61 firing rate of 6,000 rounds per minute (RPM) through six rotating barrels is to be increased to 7,200 RPMs, with the

more uniform dispersal of the projectiles over a larger area "for increased target hit potential," officials said.

Likewise, the series of M50 ammunition (mainly MK5 target practice rounds and M56 high-explosive incendiary used in combat) will be modified for higher muzzle velocity, shorter time to target, and upgraded hitting power on impact. The combat round will be redesignated PGU 17/B and the training round PGU 18/B.

To attain the more effective ammunition, the projectile's shape, the propellant, explosive and incendiary materials, and the fuze have all been altered.

★ Japan picked the McDonnell Douglas F-15 over the Grumman F-14 and General Dynamics F-16 as its new fighter. (Several aircraft from other nations also received preliminary consideration.)

The choice was made following an extensive analysis of the three aircrafts' capabilities *vis-à-vis* the island nation's special geographical requirements. The process of evaluation is described in detail in the January 1977 issue of *Defense Antenna*, a Japan Defense Agency publication.

According to the Japanese, in their "comparison of performance of candidate aircraft," the F-15 shaded the other contenders in four important categories:

- Climb capability (the average climb rate);
- Acceleration capability (average rate);
- Maximum speed;
- Turn rate capability.



Ground crews of the 355th Tactical Fighter Wing, Davis-Monthan AFB, Ariz., check out an A-10 close support aircraft during a recent sustained operations demonstration. Two A-10s flew thirty-four simulated combat sorties in eleven hours. See item, p. 23.

Concluded the Japanese: The "F-15 is considered most suitable to satisfy the operational aims of Japan. It is considered as a well balanced and outstanding aircraft which can respond to the various air violations and attacks that can be anticipated from the mid-1980s, under subsonic through supersonic speed conditions and to cover broader areas at varying speeds from extreme low to very high altitude."

The Japanese plan to purchase 123 F-15s to equip five fighter squadrons for service through the 1980s.

★ USAF's new A-10 close-support aircraft was put to a stern test in February. Two combat-configured A-10s from Davis-Monthan AFB, Ariz., flew a total of thirty-four simulated combat sorties in eleven hours.

From an austere "forward operating base" in south-central Arizona, the planes flew missions of more than 100 nautical miles and attacked realistic targets with a combination of munitions. In all, they delivered 70,000 pounds (31,751 kg) of bombs and 3,610 rounds of ammunition.



Now entering the second phase of its development program is the Marine Corps' Rolls-Royce Pegasus-powered AV-8B Harrier V/STOL aircraft. First flight of the prototype YAV-8B (converted AV-8A) is set for December '79.

The "missions" flown included low-level bombing and strafing of an armored column, with the test objective of determining the ability of the A-10s' air and ground crews "to reload, refuel, perform minor maintenance, and put weapons on

the target in minimum time over a sustained period."

Officials said they had underestimated the A-10s' capability and that the two aircraft completed their preset number of missions three hours early and with little maintenance.

★ Western intelligence agencies are pondering the recent promotion of Soviet civil defense chief Colonel General Aleksandr T. Altunin to the rank of General of the Army.

Sovietologists consider the promotion announcement significant because the Russians seldom single out an individual by public acknowledgment of his elevation to a higher rank.

Word of the promotion also comes at a time of growing concern about the continuing emphasis by the Soviets on their civil defense program. (See "The Imbalance in Civil Defense" in the February '77 issue, p. 53.)

The big fear in the West is that the USSR's civil defense effort will provide the capability of surviving a nuclear exchange and of fighting—and winning—a war following it.

The fifty-five-year-old Altunin was assigned to the civil defense post in 1972.

★ After lengthy consideration, in February the Defense Department designated MAC a specified command and as such it will report to the President through the Secretary of Defense and the Joint Chiefs.

MAC's Commander is charged with providing "military airlift during wartime, periods of crisis, JCS exercises, and as necessary to insure operational support to the other unified and specified commands." In this role, MAC is under the National Command Authorities in the operational chain of command.

MAC, headquartered at Scott AFB, Ill., joins two other commands—ADCOM and SAC—in the specified command category.

★ MAC's Aerospace Rescue and Recovery Service is credited with saving the lives of 1,352 persons during 1976, 1,311 of them civilians.

Since being constituted on March 13, 1946, ARRS has averaged a human life saved in war or peace every fifteen hours for a total of 17,493 in its thirty-year history.

NEW HARD EVIDENCE ON SOVIET CIVIL DEFENSE

Dr. Leon Gouré, Director of Soviet Studies at the Center for Advanced International Studies of the University of Miami, is a leading US expert on Soviet civil defense. At a recent news conference in Washington, D. C., he discussed new hard evidence based in part on interviews with some twenty émigrés recently arrived from the USSR who have been directly involved in Soviet civil defense. Gouré's conclusion is that the much-debated massive civil defense buildup in the Soviet Union not only is taking place, but at a far faster pace and a more extensive scale than previously indicated.

According to Dr. Gouré, the Soviets have developed standard designs for shelters with a capacity of from 100 to 1,000 persons. There are extensive underground production complexes with blast-protected water and power systems and standby facilities outside the cities, to which defense-related plants could be evacuated. Mountainsides in Sevastopol have been excavated for underground factories. Very hard underground complexes for party and governmental elites already exist throughout the USSR.

Some US skeptics believe that Soviet civil defense is largely a paper exercise. Dr. Gouré reported that city-wide drills have been held throughout the USSR, including such large cities as Leningrad and Kharkov. Media coverage of civil defense within the Soviet Union is too extensive and "far too detailed and specific to be phony or to reflect a mere paper program," Dr. Gouré said.

He believes that US arms control negotiators must recognize the importance the Kremlin attaches to its civil defense program in altering the strategic balance in its favor. "The concept of 'mutual assured destruction' . . . is a myth; 'assured destruction' is becoming increasingly true only for the US."

The University of Miami expert warned that the asymmetry in war survival capabilities between the USSR and the US will increase as a consequence of any reductions in strategic force levels, "whether by unilateral US actions or by agreement with the Soviet Union. . . . The Soviets are getting themselves in a position, as yet insufficiently appreciated by the Western world, which gives them major military and political advantages in any crisis situation."

And USAF's seven Military Assistance to Safety and Traffic (MAST) units saved 203 lives last year, totaling 500 since the Air Force began participation in the program. MAST provides air ambulance service, crews, medical specialists, equipment, and supplies to designated civilian communities around the country and is an interagency effort among DoD, DoT, and HEW.

★ Responding to this past winter's snow crisis in the Buffalo, N. Y., area, MAC transports airlifted more than 2,000,000 pounds (907,180 kg) of snow-handling equipment and 300 relief workers into Niagara Falls International Airport.

The more than forty flights of C-5s, C-141s, and C-130s brought in, among other things, snow blowers from as far west as Colorado, and the 20th US Army Engineer Battalion from Ft. Bragg, N. C.

Other heavy equipment included fire-fighting vehicles, front-end loaders, scoops, and road graders.

★ Picked to participate in the first Spacelab flight set for 1980 are 222 scientists representing the US and fourteen other nations.

Spacelab, a joint NASA/European Space Agency project, will feature a pressurized module orbited via the Space Shuttle in which scientists will be able to work in a shirtsleeve environment. Spacelab will be reusable and is designed to make scientific orbital missions more economic and frequent.

Besides verifying Spacelab systems and subsystems, the 1980 flight, to last a week, will conduct a broad range of investigations dealing with stratospheric and upper atmosphere research, plasma physics, biology, botany, medicine, astronomy, among others.

Two payload specialists—an American and a European—will actually man Spacelab, working with scientists and technicians on the ground.

★ Two Soviet Air Force Cosmonauts—space veteran Col. Viktor Gorbatko and Lt. Col. Yuri Glazkov,

AIR PIONEER HONORED

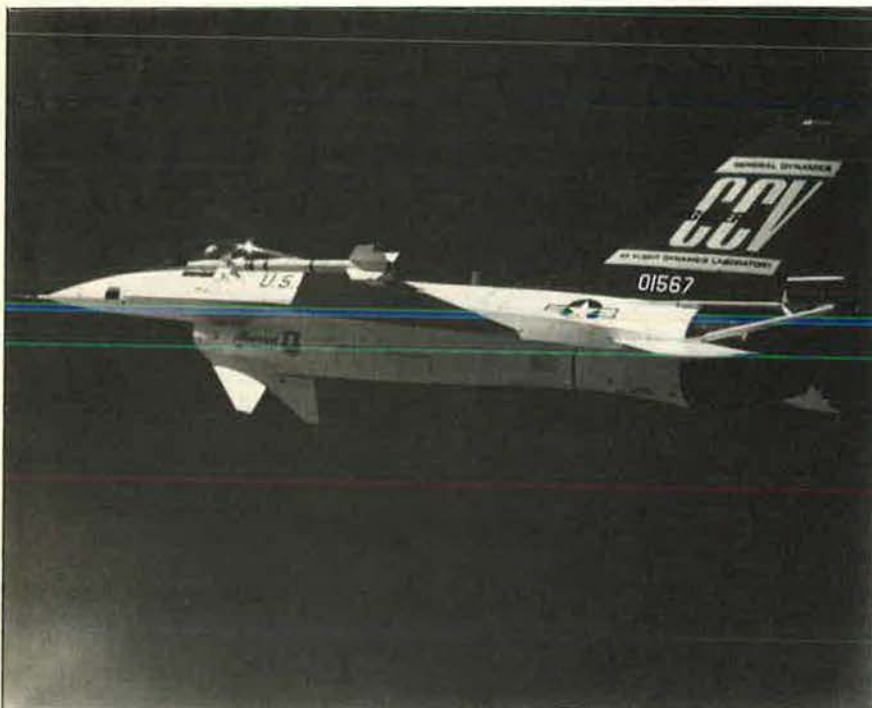
The widow of one of military aviation's early pioneers was recently honored by the Air Force in a ceremony at Davis-Monthan AFB, Ariz.

Gen. Russell E. Dougherty, SAC's Commander in Chief, presented an Air Force scroll to Mrs. Lowell E. Smith, eighty, of Tucson, Ariz.

The scroll, signed by both Air Force Secretary Thomas C. Reed and Chief of Staff Gen. David C. Jones, was in recognition of her late husband, Col. Lowell H. Smith. As a lieutenant in the Air Service, Smith assumed command of the first Round-the-World Flight in 1924, when the Initial Commander, Maj. Frederick Martin, crashed in Alaska.

The scroll's citation pointed to Smith's role in the flight and called him a "giant among the great men of early American military aviation history."

Colonel Smith served as Davis-Monthan's base commander from 1943 until his death in 1945. His Douglas World Cruiser aircraft is at the National Air and Space Museum in Washington, D. C., and his bust is prominently displayed at the Air Force Museum at Wright-Patterson AFB, Ohio.



A YF-16 Air Combat Fighter prototype modified as a test-bed for the Air Force Flight Dynamics Lab's Control Configured Vehicle (CCV) resumed flight testing late in February at Edwards AFB, Calif. Damage sustained in an accident last June has been repaired. CCV may mean less pilot work load, better aircraft performance.

who made his first orbital flight—returned safely to earth on February 25 following an eighteen-day mission in space.

The Soyuz-24 crew docked with the orbiting Salyut-5 space station, the first since the Soyuz-21 mission of eight months ago. (Last October, Soyuz-23 failed in a rendezvous attempt with the station.)

Many Western observers believe that the latest visit to Salyut-5 was cut short prematurely and also that the mission was military in nature.

★ NASA is planning twenty-three space launches in 1977, compared with sixteen the previous year.

Consistent with NASA policy, the launch schedule is weighted heavily toward the use of space to benefit mankind, with seventeen launches in the applications satellite category—communications, geodetic, environmental, navigation, meteorological, and earth resources.

In August, a spacecraft will be sent on a one-and-a-half-year journey to Jupiter and another on a three-and-a-half-year trip to Saturn.

For launches other than NASA's



There he was: Cartoonist and author Bob Stevens recently paid a visit to the 58th Tactical Fighter Training Wing, Luke AFB, Ariz., to view the new F-15 Eagle. Mr. Stevens' cartoons are a veteran feature of AIR FORCE Magazine.

"in-house" shots, the sponsoring agencies—whether US or foreign—will reimburse the space agency for launch costs and associated services.

★ By the end of January 1977, NASA had received in the vicinity of 1,200 Space Shuttle astronaut candidate applications from the civilian sector alone. The military services plan to submit their candidates just prior to the application deadline on June 30, 1977.

From those applying, NASA will select at least fifteen pilot and fif-

teen mission specialist candidates to begin two-year training in July 1978.

Committed to a program of affirmative action, the space agency is making a strong effort to attract qualified minority and women applicants.

Military candidates assigned to the Johnson Space Center, Houston, Tex., for Shuttle training and evaluation will remain in active military status for pay, benefits, leave, and other considerations.

The Orbiter stage of the Space Shuttle is currently undergoing a

series of flight tests "piggyback" aboard a modified Boeing 747 at Edwards AFB, Calif. (see front cover), and special areas have been designated for public viewing of these flights, which will continue through the summer.

For invitation and schedule information, write to the attention of ALT Spectator Control, Dryden Flight Research Center, Box 273, Edwards AFB, Calif. 93523, or to NASA Headquarters, Attn: Public Services Div., Code FG, Washington, D. C. 20546.

For an extensive rundown on the Orbiter's capability and equipment, see *Jane's Supplement*, p. 45.

★ Even before going operational, USAF's newest Arctic radar—Cobra Dane—had monitored Soviet missile flights over the north Pacific, Air Force Systems Command officials said.

The giant precision phased-array radar, located on Shemya island, at the westernmost tip of the Aleutians, has produced data that "have exceeded all expectations and are extremely useful to the intelligence community," an official said.

Essentially involved in intelligence gathering, Cobra Dane will also be on guard against missile attack against CONUS as well as help keep track of man-made objects in space.

The radar, designated AN/FPS-108 and built by Raytheon Co.'s Equipment Division, has a face that

REPORTING ON REPORTS FROM THE READERS

Results of the recently completed survey of 17,000 members who joined AFA in the late spring of 1976 have been tabulated and, once again, we can report that AIR FORCE Magazine scored well. Seventy-five percent of the officers, eighty-seven percent of the enlisted members, and seventy-eight percent of the civilians responding said they spend from one to more than three hours each month reading the magazine.

Survey questions ranged from how often the new member reads the monthly departments—always, frequently, seldom, or never—to rating article categories as very interesting, interesting, or uninteresting. Results were tabulated by age groups—under forty and over forty—and by officer, enlisted, or civilian status.

Overall responses closely matched those of previous years. The top four

departments were "Airpower in the News," "Aerospace World," "There I Was," and the Editorial page. Departments with the lowest readership were "Airmen's Bookshelf" and "Senior Staff Changes." Enlisted members were found to read "Airmail" and "Airmen's Bookshelf" more often than did other members, and civilians read "Jane's All the World's Aircraft Supplements" more often than do their military counterparts.

Article categories most interesting to readers were weapon systems, combat operations, congressional activities, international relations, and history and nostalgia. Strategy and tactics, personnel actions, and training and instruction followed closely. The least interesting categories were management practices and logistics reports.

Written comments were generally positive and constructive. This year's

survey showed a marked reduction in comments that the magazine was not sufficiently oriented toward the enlisted force.

One AFA member wrote, "Your increasing recognition of enlisted members of the Association and topics of interest to enlisted personnel is very responsive to their needs." There apparently is a growing perception of AIR FORCE Magazine as a professional journal for all Air Force ranks.

For those members who have not been asked to fill out a questionnaire, there is an alternate route for letting us know what you like, or do not like, about AIR FORCE—and about the Air Force Association. It's called "Airmail," our letters-to-the-editor department. We urge you to use it as a channel to express your sentiments.

—THE EDITORS

Aerospace World

contains 16,000 active elements and, run by computer, is capable of scanning great expanses of space in fractions of a second. (For other details about *Cobra Dane* and about our defenses in Alaska, see p. 39.)

★ A super-high-speed space laser communications system is currently under development by AFSC's Space and Missile Systems Organization (SAMSO). When operational, LASERCOM will be "capable of transmitting in only one second all the text information contained in a set of encyclopedias. This is many times the volume presently sent via a commercial satellite communications link," said officials.

Currently, operational satcom systems can process up to 24,000 phone calls or eight color TV channels simultaneously. The laser device would transmit about 40,000 voice channels plus twelve color TV channels at one time. (If confined to telephone relay, it could handle more than 250,000 calls simultaneously.)

According to USAF, LASERCOM could be ready for launch aboard a satellite by late 1982—to provide the first evaluation of such a capability in space.

The Air Force's Optical Receiver Ground Station in the mountains near Cloudcroft, N. M., would act as ground terminal for the orbiting LASERCOM, with the facility's high-speed recorders and computers processing data beamed to its telescope.

★ USAF has begun the test-and-evaluation phase of a four-phase program to retrofit the C-5 fleet of seventy-seven aircraft with new wings having an expected service life of 30,000 hours.

Under a long-lead contract to Lockheed-Georgia Co., builder of the C-5, subcontractor Avco Aerostructure Division of Nashville, Tenn., has been authorized to build two sets of the redesigned C-5 wing. One set will undergo extensive structural fatigue testing while the other will be flight-tested aboard

JOHN STETSON NOMINATED TO BE AIR FORCE SECRETARY

President Carter has nominated Mr. John C. Stetson, President of A. B. Dick Co., Chicago, Ill., to become Secretary of the Air Force.

A native of Chicago, Mr. Stetson received a BS degree in Aeronautical Engineering from MIT in 1943. During World War II, he was with Douglas Aircraft Co. as a structural design engineer, later serving in the Navy as a communications officer.

Following the war, Mr. Stetson attended Northwestern University Business School and was employed in the Chicago area in various engineering capacities. In 1951 he joined the management consulting firm of Booz, Allen, and Hamilton. As a partner in that organization, he was responsible for a number of consultative assign-

ments dealing with the management of military and commercial aircraft programs. He also was in charge of the firm's consulting work for major oil companies in Iran and Kuwait, living for some time with his family in the Middle East.

From 1963 to 1970, Mr. Stetson was President of the publishing division of the Houston Post Co., publishers of newspapers in Houston, Galveston, and Texas City. From 1970 to the present he has been President of A. B. Dick Co., an international manufacturer and distributor of business machines.

Mr. Stetson married the former Gayle McDowell in 1946. They have three children—Sherry, Robert, and Susan.

the Air Force's giant transport plane.

The four-phase wing replacement project is of long duration, with production of wings for the remaining C-5s not to begin until January 1980 and with installation scheduled to begin in early 1982.

★ Hundreds of hours of flight and lab tests have confirmed the high accuracy of a new navigation system for future strategic bombers, long-range transports, and reconnaissance aircraft.

Flight tests of SPN/GEANS—for standard precision navigator gim-balled electrostatic aircraft naviga-

tion system—aboard three aircraft have demonstrated error growth rates of less than one tenth of a nautical mile per hour. This compares with the 1.0 nautical mph error growth rate of most navigational systems now in use.

SPN/GEANS was developed by AFSC's Air Force Avionics Lab at Wright-Patterson AFB, Ohio, and built by Honeywell's Aerospace Division, St. Petersburg, Fla.

According to officials, the key to the system's extreme accuracy is its electrostatic gyroscope, "a hollow beryllium sphere suspended in an electrostatically charged field inside

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For assistance in evaluating your HF needs, or for more information on the HF-80 family, contact HF Marketing, Collins Government Telecommunications Division, Rockwell International, Cedar Rapids, Iowa, U.S.A. 52406. Telephone: 319/395-4014.



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Aerospace World

an evacuated envelope." The lack of contact with chamber walls decreases the drift inaccuracies associated with conventional gyros, they said.

SPN/GEANS is being flown aboard a C-135 out of Andrews AFB, Md.; a B-52 at Barksdale AFB, La.; and a C-141 from Wright-Pat, AFSC said.

★ **NEWS NOTES**—USAF recently took delivery of the 3,000th Northrop F-5/T-38 series aircraft.

Laurence G. Hanscom AFB, Mass., home of AFSC's AF Electronic Systems Division and AF Geophysics Lab, has been renamed simply **Hanscom AFB**.

The original **Norden bombsight**, the production models of which earned fame during World War II, was recently presented to the

Smithsonian Institution's **Air and Space Museum**.

Four **US Coast Guard officers** have joined the Navy and Marines at Mather AFB, Calif., in the 323d FTW's interservice **undergraduate navigator training program**.

Dr. J. Wesley Crum, Chairman of the Department of Aerospace Education, Central Washington State College, has been named the 1976 recipient of the National Aeronautic Association's **Frank G. Brewer Trophy**, awarded annually for outstanding contributions to aerospace education.

The seventeenth **NATO Tiger Meet** kicks off June 20 at RAF Upper Heyford, UK. Host will be the originator of the Tiger concept, **USAF's 79th TFS**.

Died: H. Julian Allen, a major figure in aerospace technology who, among many contributions, originated the **blunt reentry capsule** for the manned spaceflight program, of a heart attack in California. He was sixty-six. In 1958, Mr. Allen was awarded AFA's prestigious **Airpower Trophy for science**.

Died: Charles F. Willard, one of the earliest American pilots and barnstormers, in Glendale Community Hospital, Calif. He was ninety-three.

Died: Helen MacCloskey Rough, aviation pioneer and widow of pilot and government aviation official Howard F. Rough, in Washington, D. C., after a long illness. She was sixty-seven.



GLADYS E. WISE

Gladys E. Wise, fifty-one, Associate Chief of the Public Information Division, Hq. USAF, died suddenly on March 3, 1977.

Mrs. Wise began working for the Air Force in 1950 with the Air Attaché Office. In 1960, she began employment with the Office of Information, where she became widely known to Washington journalists and aviation enthusiasts.

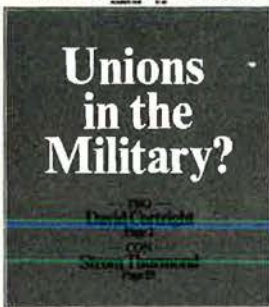
She was a member of the American Newspaper Women's Club, Zonta International, the Ninety-Nines International organization of licensed women pilots, the Aviation Space Writers Association, and the Aircraft Owners and Pilots Association. She was also a graduate of the Industrial College of the Armed Forces, class of 1975.

Mrs. Wise was also an aviation author, as well as a licensed pilot, and had articles published in many civil and general aviation magazines. She has been listed in Who's Who of American Women annual since 1971.

She is survived by her husband, retired Air Force Col. H. Grady Wise. The couple lived in Centreville, Virginia.

Unions in the Military?

AEI Defense Review



To foster public debate on critical national security issues, the American Enterprise Institute has established a Public Policy Project on National Defense. As part of the project, the Institute will publish the **AEI Defense Review** approximately six times per year. The first issue tackles the hotly debated question of unions in the military.

David Cortright, an expert on European military unions, takes the positive viewpoint. He contends that the shift to an all-volunteer force carries within it the seeds of military unionism.

Senator Strom Thurmond (R-S.C.) expresses the opposite side. He describes legislation he has introduced to prohibit unionization of the military and the reasons he so strongly opposes the idea.

Forthcoming Issues

- The future of U.S. forces in South Korea
- The 1978 defense budget: assumptions and projections
- The future of the Panama Canal
- The all-volunteer force: problems and prospects
- Standardization of equipment in NATO

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What They're Saying...

Richard Pipes, professor of Russian history at Harvard University, in an article headlined "Strategic Superiority," in the *New York Times*, Sunday, February 6, 1977. Reprinted by permission. Copyright © 1977, by The New York Times Co.

CAMBRIDGE—Having recently chaired, at the initiative of the President's Foreign Intelligence Advisory Board, under Gerald R. Ford, the so-called "Team B" whose task was to reevaluate the data on Soviet strategic objectives, I have become painfully aware of the emotion and confusion that surround this subject.

As soon as the story of "Team B" was leaked to the press, in the usual garbled fashion, a campaign got under way to discredit the effort, partly on the ground that the panel consisted of "well-known hard-liners" and/or "right-wingers" who merely found what they had set themselves out to find (that the Soviet Union is out to obtain strategic superiority), and partly that such superiority made no sense in any event.

The *ad hominem* argument can be quickly dismissed: It belongs to the nursery, not the world of adults. By questioning motives, one seeks to avoid responsibility for dealing with the issues, but one does not thereby dispose of them. Suppose that a panel composed of civil-rights activists were charged with investigating the status of minorities. Would one deny the existence of civil-rights violations on the ground that the panel reporting them found what it wanted to find?

More subtle and more pernicious is the argument, backed by the prestige of Henry A. Kissinger, that nuclear superiority is meaningless. This view was essential to Mr. Kissinger's détente policy, but it rests on flawed thinking. Underpinning it

is the widely held notion that since there exists a certain quantitative level in the accumulation of nuclear weapons that, once attained, is sufficient to destroy mankind, superiority is irrelevant: There is no overtrumping total destruction.

Unfortunately, in nuclear competition, numbers are not all. The contest between the superpowers is increasingly turning into a qualitative race whose outcome most certainly can yield meaningful superiority. This might entail the following considerations, among others: improving the accuracy of one's missiles to the point where they can preventively destroy all, or virtually all, of the opponent's fixed intercontinental ballistic missiles and submarine-launched ballistic missiles as well as strategic bombers not on alert; hardening one's command posts so effectively as to make them invulnerable to an enemy attack; organizing large-scale civil-defense programs able to save essential political and industrial cadres.

Dealing with these matters, one often runs into confusion between "intentions" and "capabilities." Intention, of course, denotes what



JCS Chairman Gen. George Brown says "evidence suggests the USSR is engaged in a program to achieve" superiority.

one desires; capability, what one is able to achieve with the forces at one's disposal. The distinction might appear elementary. Yet in the public discussions over the strategic situation stimulated by disclosures of "Team B's" report, these two factors have been persistently confused.

Reports that the Russians were striving for strategic superiority were usually interpreted to mean that they have already attained it; refutations of the latter proposition have been greeted with relief and used to discredit the former.

Recently, for example, Gen. George S. Brown, Chairman of the Joint Chiefs of Staff, informed Sen. William Proxmire that the Soviet Union does not enjoy strategic superiority over the United States but that the "available evidence suggests the USSR is engaged in a program to achieve" such superiority.

This information, the newspapers report, gratified Senator Proxmire and moved him to congratulate General Brown for not having engaged in "scare tactics." Why Mr. Proxmire should be cheered by information that the Soviet Union is striving for strategic superiority over the United States baffles me. Or does he perhaps think that Soviet capabilities can never catch up with intentions?

Unless we are so blinded by arrogance as simply to preclude *a priori* the possibility of ever forfeiting the ability effectively to defend ourselves, the very striving of the Soviet Union for strategic superiority, of which General Brown speaks, should give us cause for concern.

Strategic superiority, one must bear in mind, has many uses besides its application in nuclear war: It can be used to shield a conventional war, to extract political or economic concessions, to intimidate, to compel acquiescence.

The capability of the Soviet Union to attain such superiority, its implications if and when realized, the measures to be taken with a view to preventing it—all call for a reasoned, informed national debate. In such a debate, "right-wingers" and "left-wingers," "hard-liners" and "appeasers" should freely question each other's judgment, but not motives, mindful of Thomas Jefferson's admonition that differences of opinion are not differences of principle.

STRATEGIC ISSUES

BY GEN. DAVID C. JONES
 CHIEF OF STAFF, UNITED STATES AIR FORCE

On February 1, 1977, Air Force Chief of Staff Gen. David C. Jones presented to the Committee on Armed Services, US Senate, a noteworthy appraisal of the strategic issues that form the basis for force planning. The excerpt that follows introduced General Jones's discussion of three strategic aerospace systems—the B-1, the MX, and the Air-Launched Cruise Missile—that are essential to counter successfully the military dimension of the threat to US security.

COMMON usage in the US has tended to make "strategic forces" almost synonymous with intercontinental nuclear forces in the minds of many. This conception is not shared by the Soviet Union and, in my judgment, forms far too narrow a basis for US strategic thought.

Viewed more realistically, strategic forces include those which are aimed at deterring interference with our strategic interests, whether those interests be to protect the physical security of the United States, the independence of allies, or the distant terminals and avenues of our economic welfare. In the current context of essential equivalence in nuclear forces, the deterrent value of nonnuclear forces assumes even greater strategic importance than during the earlier period of US nuclear superiority. Conventional capability is especially critical in providing a deterrent shield for protecting strategic interests overseas and supporting alliance commitments at great distances from our shores.

The more restrictive common usage is appropriate in

certain specific contexts such as Strategic Arms Limitation Talks (SALT). However, we should not overlook the strategic importance of conventional forces by artificially concentrating exclusively on the intercontinental nuclear component of our military capability. Furthermore, when judging the total contribution of our strategic nuclear forces, due consideration should be given both to their synergistic relationship with nonnuclear forces and to the conventional capability of such strategic systems as the B-52 and the B-1. . . .

Strategic Perspective

I have expressed many times in the past, both in congressional testimony and elsewhere, that the Air Force's principal concern is not confined to the relative balance as it exists today. Our broader concern is with the diverging trends in resources devoted to defense and—more specifically—the prospects for future deterrence if, one by one, a large proportion of our few quantitative and many qualitative advantages were allowed to be overtaken or surpassed. . . .

The critical issue is not whether the USSR spent X or Y billion rubles in absolute terms during this or that year, but rather the protracted pattern of a large share of national wealth directed to armaments. The way a nation distributes its wealth over time must certainly stand as a reflection of its priorities, and one of the Soviet Union's principal priorities for more than a decade has clearly been to amass the greatest destructive arsenal the world has ever seen. Consequently, from a strateg

standpoint, more important than the dollars or rubles from national treasuries going to military capability are the forces and capabilities which those resources have bought. . . .

Whether one interprets the Soviet buildup as evidence of a coldly calculated drive for military superiority or as the product of exaggerated precautions for national security, the *fact* of the buildup and the *reality* of the momentum remain. The responsible strategist is forced to deal dispassionately with the strategic implications of potential Soviet military preponderance, whatever the motivations impelling the USSR toward this status. All the components of national power—political, economic, military, and psychological—must be blended to ensure that, regardless of Soviet intentions, the US need never bend to the threat of superior force.

In fashioning the strategic programs which military professionals judge necessary to offset and, hopefully, to moderate further Soviet buildup, we are guided by a number of explicit and implicit premises. In the interests of broader public understanding of our strategic rationale, a review of key guiding assumptions is in order.

In an earlier era, a British strategist is reported to have summarized his country's strategic perspective with the dictum that Britain had neither permanent friends nor permanent enemies, only permanent interests. For the last quarter of the twentieth century and beyond, no such simple formula will suffice as a guide for US strategic policy.

While there are few constants in a rapidly changing world in which national self-interest still guides relationships among nations, the US does have many friends. We consider most of the friendships permanent into the foreseeable future, based on the fact that overarching bonds of enduring common interest have proven remarkably resistant to the normal stresses and strains of transactions among interdependent nations.

This friendship is often buttressed by formal alliances (e.g., NATO), but sometimes only by declaratory policy or unilateral action (e.g., support for Israel). However, the essential glue of these relationships is a variable mixture of political, economic, psychological, and cultural ties which would likely endure regardless of perceptions of an "external threat."

On the other hand, the US has no permanent enemies. We have no imperial ambitions—territorial, economic, or otherwise. No US national objective requires for its fulfillment a military threat to the stability, security, or well-being of any other nation; we have no latter-day "mission" to impose our political, economic, or cultural values upon another people by external force or evolution.

Specifically, as regards the USSR and her allies, we have no policies which threaten either their sovereign security interests or their ability to function as legitimate members of the family of nations. We do, however, have profound aversion to Marxist values and institutions which, in various forms, serve as virtually a secular religion in Communist states. We oppose the social and

political systems which these regimes impose as utterly alien to our values . . . and vice versa. The critical difference in this superpower antipathy lies in the nature of the opposition.

For our part, even during the depths of the cold war, our national policy never went beyond "containment." Communist orthodoxy, in contrast, regards capitalism and capitalist states as implacable and intolerable (*i.e.*, permanent) enemies. The "class struggle" is openly viewed as a permanent, worldwide revolution. (The inconsistency in rhetoric [between] "permanent revolution" and "peaceful coexistence" has never been satisfactorily explained.) In neither public pronouncements nor actions have we discerned any deviation from this revolutionary priority.

Finally, the articulation of interests (and their relative constancy) is more properly the province of political authority. However, there is no escaping the fact that divergencies in nations' interests contain the ingredients which can produce friction and conflict. The latter are clearly a concern of the strategist.

In my view, the strategic significance of these broad points of US-USSR friction can thus be summarized as follows:

- While US goals, *as we perceive them*, do not pose a threat to the sovereignty or security of the USSR or her allies, the USSR regards the US as the principal opponent to world socialization/communization and all non-communist states as fair game for "conversion."

- US interests depend on political and economic stability; Soviet objectives require disruption and turmoil—except within its sphere of control, where political and economic changes are greatly feared.

- The US favors a free and peaceful choice of system of government by nations; the USSR supports transformation by any means, including violence—again, while resisting, by any means, any tendency within its sphere toward free and peaceful choice of alternatives to the existing regimes.

- US strategy seeks to stabilize the world situation and diminish the USSR capability to disrupt friendly governments. USSR strategy involves the active support for the spread of communism and the increase of Soviet influence and, as a result, threatens the international stability sought by the US.

These differences, *from our perspective*, imply neither a permanent enmity nor inevitable violence. We recognize, however, that Soviet perceptions might differ substantially from ours. Consequently, the potential for confrontation, the differing nature of US and USSR objectives, and the high level of nuclear forces define the boundaries of our strategic concerns.

In addressing these concerns and the . . . question, "Where should we go from here?", our concepts and programs respond to five overlapping but separate considerations: deterrence, stability, arms control, strategic policy, and force structure.

Deterrence

Much has been written about the previously mentioned buildup of Soviet military forces, which even some of the most sanguine observers of Soviet policy now view with some perplexity. However, in public discussions of the basis for US force levels and readiness, a subtle disconnect sometimes occurs. One frequently heard view is that military establishments are self-fueling engines of unchecked growth, blindly committed to as much new weaponry as the traffic will bear. Even more disturbing, there are even some who apparently believe that the US military relish the prospect of engaging any forces in combat and that this propensity induces pressures for ever-increasing defense budgets.

This belief misses the essential point that our prime strategic objective is not to *fight* Soviet forces, but rather to *deter* their use either directly or as a coercive tool against US and allied interests. Clearly, the forces designed to support this objective must be highly capable and backed by the national will to employ them (selectively and flexibly) if necessary; otherwise, deterrence becomes a fig-leaf strategy and invites the very behavior it is designed to discourage. But capability and will—whose product equals deterrence—are *characteristics*; deterrence is the *goal*.

One of the first things learned by most civilian and military strategists is the difficulty in quantifying the measures of merit of deterrence. No single, all-encompassing standard has yet been discovered and ambiguities abound:

- What deters us may not deter an adversary, a fact which highlights the dangers inherent in "mirror-imaging," or ascribing our own values, perceptions, and priorities to an opponent.

- What deters some opponents may not deter others. For example, overwhelming military advantage might prevent weaker nations from taking any form of military action, but pose no constraint for a stateless terrorist group.

- What deters one party in one set of circumstances may not deter that same party in other (e.g., crisis of "back to the wall") circumstances.

- What deters one level of violence may not deter other levels. For example, US nuclear forces have been a major factor in deterring a direct military challenge to US interests by the Soviet Union for over thirty years. Yet these same forces were essentially ignored by North Vietnam with impunity because they correctly calculated that US

restraint would neutralize this element of power in Southeast Asia.

- What deters military violence may not deter other actions detrimental to US interests and vice versa. Thus, forces which deter direct Soviet military intervention might not deter their support for disruptive actions by clients.

- Deterrence is dynamic, subject to changes in weaponry (e.g., "breakthrough" deployment of ABM), perception (e.g., conclusion that an opponent's interests and/or "defense perimeter" might have shifted), or national will.

We cannot offer a formula for precisely calculating the adequacy of deterrence. To gauge deterrence in any circumstances or at any level, it is necessary to assess the circumstances through the eyes of those we wish to deter. In doing so, we must always be careful not to confuse our desire to avoid violence with an adversary's interpretation of deterrence.

The Air Force believes that adequate deterrence at all levels can only be achieved if a potential adversary perceives that, of all the conceivable options open to him, the action to be deterred represents his least attractive alternative. In terms of the US-USSR strategic balance, this belief accounts for our strong support for the Triad concept and implies a mixture of flexible force structure, warning mechanisms, command and control infrastructure, and national resolve, which are the underpinnings of our current strategy. This mixture must provide deterrence options for the National Command Authorities throughout the range of threat, maintain stability at all levels of tension, and provide incentives for reductions in strategic arms.

Stability

Like deterrence, stability tends to be in the eye of the beholder. Also, there are different kinds of stability (e.g., day-to-day political stability, arms control, and crisis stability) which are influenced in different ways by nations' policies, force levels and characteristics, and perceptions. Objectively, however, stability might be said to exist (a) when neither side perceives an advantage (or preferably, perceives a net disadvantage) in initiating or escalating conflict, and (b) when each side is denied incentives (by deterrence or agreement) for seeking strategic advantage. Subjectively, however stability is a more elusive quality.

For example, a relationship might appear stable to one side if that side held an overwhelming military advantage. Yet, this condition could have inherent instabilities, particularly in periods of tension or confrontation, in that it might create an incentive for the weaker side to consider a "crippling" first strike (e.g. Japan's attack on Pearl Harbor). Stability is essential during normal periods, but the ability to sustain stable deterrence is even more crucial in crisis situations.

For this reason, US strategic programs must continue to contribute to stability in the US-USSR strategic relationship. The retaliatory diversity of the Triad provides a visible, credible, and enforceable deterrent posture, yet our current and projected forces are manifestly neither intended nor structured for a disarming first strike. Hence, they contribute to stability in all its dimensions.

It goes without saying that deterrence would be compromised and stability undermined if the Soviets *believed* they possessed a disarming or coercing first strike potential. Our modernization efforts are aimed at preventing this perception from forming. We are working to contribute further to a perception by the Soviets that equitable arms limitations, rather than their present buildup, offer the best means for mutual security.

At present, however (disarmament rhetoric notwithstanding), Soviet trends in both nuclear force levels and characteristics raise serious questions concerning their perceptions and priorities. Of greatest concern are:

- Increasing throw-weight;
- Increasing numbers of MIRVs;
- Increasing accuracy of their missile warheads;
- Massive military hardening;
- Increasing civil defense preparations;
- Sustained, across-the-board buildup in virtually every dimension of conventional capability.

In my judgment, these trends pose a threat to both stability *and* deterrence which our force planning must counter.

Arms Control

In the past, the US has made frequent attempts to slow the pace of strategic competition through unilateral restraint. Some of these self-imposed limitations included halting the Minuteman deployment at 1,000 missiles of limited throw-weight, reducing the projected purchase of Polaris submarines to forty-one boats, and inactivating many older B-52s, to name but a few.

I do not mean to imply that arms control was the sole motivation for our decisions; there were clearly other political, economic, and technical considerations which contributed to these and other unilateral limitations. However, as I view the US record of self-restraint, the key points are these: first, had the US been committed to unchallengeable strategic superiority, this commitment would have overridden the other factors and our force levels and defense budgets would likely have been far higher than they have been; and second, we have seen little evidence of an inclination toward reciprocal self-restraint on the part of the Soviets.

More recently, we have relied upon negotiations to achieve both lower levels of forces and improved stability. Objectively, establishing lower aggregate levels of nuclear weapons/forces would appear beneficial to both the US and the USSR. It should result in:

- Greater stability with equal security;
- Adequate deterrence with reduced defense expenditures;

- Some US advantages (technology, diversity, etc.);
- Some Soviet advantages (easier targeting problem due to the concentration of [the] US urban/industrial base, better Soviet civil defense, etc.).

The position of the Air Force on arms control can be stated very simply. We believe that arms-control agreements which equitably reduce force levels, contribute to greater global stability, and maintain effective deterrence are fully in the US national interest. While we would consider unilateral disarmament or retarded US force modernization unwise so long as the Soviet force buildup and modernization proceed at the current pace, we strongly favor reductions in nuclear forces on both sides. The Air Force supports exploring every avenue to achieve this goal.

Strategic Policy

The precepts and principles of our current strategic policy of essential equivalence are too well known to this Committee to require elaboration. This policy has served the nation well and has been repeatedly endorsed by the JCS and the services. It received the specific support of Congress in the Joint Resolution on the Interim Offensive Agreement in 1972. It is the explicit basis for current SALT negotiations. I have discerned no alteration in Soviet capabilities or announced objectives which might make any lesser policy appropriate.

I have likewise found no basis for reducing our reliance on the Triad of nuclear forces as the foundation of our strategic policy. . . . As we look to the future, the flexibility and synergism of our Triad forces are even more critical in light of the growth and momentum of Soviet nuclear offensive capability. Each leg of the Triad possesses unique and mutually reinforcing characteristics which remain essential to deterrence and stability. . . .

Therefore, the Triad supports the key premise of the essential equivalence policy, which is that deterrence is most credible and enforceable when aggregate force capabilities are roughly in equilibrium. A collateral principle is that the range of deterrence options available to the National Command Authorities must be commensurate with the range of threats to strategic interests.

In the face of the expansion of virtually every dimension of Soviet military capability, and particularly their growing capacity to project significant forces beyond [their] borders, the range of deterrence required of our total force extends beyond attacks on US cities and forces, to include preventing infringement of US interests abroad and coercion of allies. The flexibility of our Triad forces, in concert with our equally flexible and ready conventional capability, permits credible and enforceable deterrence at all levels of confrontation and conflict. Moreover, the Air Force believes that a clear and unmistakable commitment to essential equivalence and a modernized Triad provides strong and mutual incentives for arms control and the attendant prospects for reduced defense expenditures. . . . ■

Among the key requirements spelled out in the new Defense Department budget request are space defense and strategic deterrence. To a major extent, both missions involve the Air Force. The outgoing civilian leader of the Air Force talks about USAF's plans for major weapon systems.

ON ONE of his last days in office, outgoing Secretary of the Air Force Thomas C. Reed talked to AIR FORCE Magazine about the "imperative" of starting full-scale engineering development of the advanced, medium-sized MX ICBM *this year*. No "serious technological challenges remain" regarding this strategic weapon that can boost the effectiveness of the US land-based strategic deterrence "tenfold," he said.

The case for getting on with MX is compelling. The Minuteman production line will close down this year, thereby depriving this country of leverage against the massive modernization of the Soviet ICBM force until MX enters production. In addition, there is evidence that the Minuteman force, as presently constituted, will not be able to provide essential deterrence over the long term because of changes in the Soviet target base. Hardening Soviet ICBM silos to a level significantly above 2,000 psi is continuing and will jeopardize, if not eliminate, Minuteman III's ability to cope with Soviet ICBMs withheld for restrike. Minuteman's throw-weight capacity cannot be increased without major modification and cannot accommodate the number of warheads needed to neutralize all time-urgent, hard targets in the future. Finally, Minuteman is confined to deployment in fixed silos and, therefore, will become increasingly vulnerable in the next decade.

Some modification of Minuteman is economically attractive and is being undertaken. It is proposed that Minuteman III guidance and propulsion components be incorporated into Minuteman IIs. Minuteman III's guidance system is being improved. The higher-yield MK 12A reentry vehicle will replace the older MK 12 warhead on part of the Minuteman III force. The synergism of higher yield and greater accuracy will increase significantly Minuteman III's effectiveness against hard targets and decrease unintended collateral damage.

Also, a real-time linkage between individual ICBM silos and the Airborne Launch Control Centers (ALCCs) will soon become operational. It then will be possible to monitor, command, and retarget single ICBMs from the air, improving the National Command Authorities' ability to "manage" the residual force more rapidly and flexibly.

But modifications represent only an interim solution. Studies by OSD and USAF show that drastic modification to increase Minuteman throw-weight would cost almost as much as acquiring MX, without coming close to MX's throw-weight, effectiveness, and survivability. The possibility of making Minuteman mobile was examined also and found to be unattractive in cost and performance.

Intensive research over several years on an advanced-technology ICBM have culminated in MX, a "missile about twice the weight of Minuteman, delivering a much greater payload, with warhead accuracy and yields that would result in an order of magnitude improvement in capability and that should be ready for operational deployment by the end of 1983," according to Mr. Reed. The deployment date is predicated on funding levels and schedules proposed by the Ford Administration. The current review by the new Administration may result in change.

In his first news conference as Secretary of Defense, Dr. Harold Brown said he had not made a final recommendation, and President Carter had not decided, whether the initial operational capability (IOC) of MX is to be put off a year.

The MX Budget Request

USAF's original FY '78 budget request allocated \$245.4 million for developing the MX missile and \$49 million for "advanced ICBM technology," meaning new

SAFEGUARDING SPACE

BY EDGAR ULSAMER, SENIOR EDITOR

basing modes. Late in February, the new Administration reduced FY '78 funding of MX to \$134.4 million and deferred the decision on full-scale development by one year. At this writing, congressional reaction to this funding cut is mixed, but not sufficiently clear to support prognosis. The bulk of the \$245.4 million was to pay for starting design and fabrication of three propulsion stages, the post-boost vehicle, and guidance and control subassemblies. Augmenting these efforts will be work in support of MX on basing and other survivability features; by the joint service ABRES (Advanced Ballistic Reentry System) program; and by the Energy Research and Development Administration's weapons branch. Past work by the Air Force on MX, according to Secretary Reed, has led to more powerful propellants, "improved engine nozzles, and new launch techniques. Test firings to date suggest that these efforts, taken together, should result in a substantial increase in missile payload."

USAF has been working also on a new generation of missile guidance equipment. The advanced inertial reference sphere, known as AIRS, is revolutionary in that it has no mechanical gimbals. Its associated computer package uses extensive microcircuitry. The result is a guidance system that is hardened against nuclear effects—debris as well as electromagnetic pulse—through which an exiting missile might travel, that can be launched from a quasi-mobile platform without external alignment references, and that offers potentially significant improvements in accuracy. "We have flown one of these devices as a passenger on a Minuteman test flight. It has met our every expectation," according to Secretary Reed.

Other technological advances have been achieved in the design of sophisticated ballistic reentry vehicles and new miniaturization fuzing techniques for warheads. ABRV, the advanced ballistic reentry vehicle of MX, is scheduled for its first test flight during the new fiscal year. Tailored to at least double the yield of MK 12A, ABRV is to furnish the highest accuracy "that can be achieved with a ballistic reentry vehicle," according to Defense Department testimony. "Flight tests will be used to identify the combination of shape and materials which result in the desired accuracy and which do not degrade survivability." Tests so far confirm expectations concerning ABRV's potential accuracy, increased compactness, and reduced vulnerability, according to Mr. Reed. In addition, he stressed, all facets of the MX program are oriented toward lowering maintenance and other O&M costs.

Because of USAF's comprehensive, thorough "homework" on MX, "there are no technical breakthroughs that we are awaiting. The open question, of course, is basing mode and its effect on the system's cost. It is, therefore, imperative to start this year with full-scale development, which means selecting the integrating contractor, identifying a program, and getting on with the design of a missile," according to the outgoing Air Force Secretary.

The R&D cost of MX, in Mr. Reed's view, is influenced mainly by the nature of the missile itself and so are the program's schedule, timing, and operational availability. The basing mode, which does not need to

be determined now, presumably will have significant impact on deployment cost."

MX is envisioned as a medium-size, highly accurate missile capable of being moved from launch point to launch point in a manner that will conceal its location. Thus, MX will compensate for imbalances between the US strategic Triad and the accelerating Soviet development and deployment of advanced, high-performance strategic weapons. MX will enhance the



Key feature of MX is the variable-geometry of its upper stage nozzle, shown here in an Arnold Engineering Development Center test cell.

Triad's ability to deter by holding at risk the Soviets' residual ICBM force after a first strike against the US. The Defense Department says both accuracy and mobility are vital to "maintain stability by creating the perception that the Soviets can gain no advantage by a first-strike attack."

On the other hand, MX force characteristics will not "threaten a US disarming first strike against the USSR," mainly because of numerical and throw-weight limitations. Nevertheless, as the Air Force's FY '78 Report to the Congress (in previous years called the Posture Statement) points out, "MX would have significantly increased effectiveness against the increased hardness

of the Soviet target base, and a larger throw-weight to maximize the potential of each missile in a Strategic Arms Limitation (SALT) constrained environment." Further, USAF argues, "serious pursuit of the MX capabilities also has some potential as an inducement for the Soviets to negotiate verifiable lower limits on the quantity of nuclear arms and could perhaps delay the need to deploy a new ICBM until the Minuteman can no longer be economically maintained."



Former Air Force Secretary Reed asserts that a "flood of the most sensitive and complete intelligence leads me inescapably to the conclusion that the Soviet Union is driving for strategic and tactical superiority by the early 1980s."

A pivotal objective of MX is to graft the beneficial traits of a fixed silo system—high accuracy and readiness—onto a design capable of some mobility to demonstrate to the Soviets that they are not likely to reach first-strike posture by continuing the arms race.

MX, according to Mr. Reed, eventually will need "some sort of quasi-mobility that will retain the high accuracy and fast response capability of the land-based system, yet soak up a lot of Soviet warheads if they attack our missile force. We have examined everything from air mobility to the storage of missile canisters in swamps and lakes."

Tentative findings from these studies suggest that "putting our missiles in a system of tunnels or hardened trenches appears to be the best new basing alternative if we are forced to move out of today's silos," Mr. Reed said. The tunnels, he explained, will be "covered with a keystone structure, hardened to attack from above but easily broken through from below by a mis-

sile being erected in its canister for launch. Because the missiles and launchers would move periodically on rails within the tunnels, an attacker would never know the exact location of the missiles. With miles of tunnel to hide each missile, much of the ICBM force would be certain to survive. Any growth in Soviet capability could be countered simply by lengthening the tunnel system. Taken as a package, this technology of the 1970s offers us an order of magnitude improvement in our ICBMs, enough to restore the strategic balance in the 1980s." (See "M-X, A New Dimension in Strategic Deterrence," by Lt. Gen. Alton D. Slay, September '76 issue.)

The final decision on basing can wait until 1979, according to Mr. Reed, thus allowing plenty of time to explore other basing options. Primal among those options is the shelter technique, a form of "shell game." It has been investigated for several years by USAF and calls for each encapsulated missile to be moved periodically on a transporter/launcher from one hardened shelter to another. During attack, the shelters, which outnumber the missiles by whatever ratio is deemed adequate to assure survival, provide protection against blast and radiation. The transporter/launcher and missile canister combined furnish protection against electromagnetic pulse and ground shock. Prior to launch, the shelter door is opened, debris from nearby bursts swept away, the transporter/launcher moved out of the shelter, stabilizing jacks set, the canister erected, and the missile launched. Random movements of the ICBM from shelter to shelter, using a manned Launch Vehicle Transporter, provide concealment.

Multiple aim-point basing appears not to run afoul of existing or anticipated SALT constraints but would be affected by whatever limits a new SALT accord might set for MIRVed systems, and how the new Administration might allocate MIRV quotas to USAF and the Navy. MX could replace Minuteman III on a one-for-one basis. The problem of verification of semi-mobile MXs, in DoD's view, is no different from the challenge of verifying SLBM force levels. The national technical means of verification—treaty jargon for reconnaissance satellites—would count MX transporter/launchers in the same manner as nuclear-powered SSBN submarines are counted. The US proposed that mobile ICBMs should count within SALT limits as soon as they are brought from the final assembly facility. USAF analysts believe that, while verification won't be as simple as in the case of fixed silo ICBMs, no insurmountable obstacles to relatively exact counting of the other side's force levels exist.

Secretary Reed tempers advocacy of planning MX from the outset for mobile deployment with this caveat "Until it is quite clear that the Soviets can achieve the accuracy and the intricate timing required to attack our silos, we may do better by basing any new missile in the existing Minuteman silos." The case against future silo basing rests mainly on the assumption that the US ICBM force will have to ride out a first strike before retaliating. It is declared national policy never to fire first, reinforced by the procedural decision "await nuclear detonations of known origin on US soil before retaliating."

But it is possible, if not likely, that this nation

policy won't force the ICBMs to sit out a first strike, according to Mr. Reed. There is, he theorizes, only one reasonable Soviet attack scenario that would result in silos being attacked first: "That is if the Soviets target for simultaneous impact of all weapons—land-launched and submarine-launched—on all targets. But that gives the bombers twenty-five to thirty minutes' warning to escape. It also gives us time to alert the missile submarines at sea, and to arrange an orderly transfer of authority to the National Emergency Airborne Command Post." By 1985—under such conditions—as few as one-fourth of the US ICBMs might survive, compared to about three-fourths at present. At the same time, USAF's strategic bombers would be airborne and the Navy's SLBMs could be launched.

Therefore, Mr. Reed argues, it would make more sense for the Soviets to plan toward a simultaneous launch rather than simultaneous impact: "In the case of simultaneous launch, submarine-launched missiles could hit bomber bases and command posts within a few minutes of launch. Can we assume that the surviving National Command Authorities would sit idly by for another twenty minutes, watching the Soviet ICBMs come in? I think it is reasonable to assume that our ICBM force would be launched in retaliation *before* the Soviet missiles hit the silos." Presumably, the Soviets would think so too.

The need for MX, in Mr. Reed's view, is not diminished by any potential change in national policy, such as reliance on deterrence by assured destruction only, *without* provision for limited response, or by drastic reductions in the number of offensive strategic weapons: "I can't foresee any conditions where MX would not be vital. No matter what reductions in weapons limits SALT may produce, it is imperative that the forces we do have be as modern and capable as possible." This imperative, he stressed, applies equally to the other two components of the strategic Triad, modernizing the submarine-based force with the Triad missile and the strategic bomber forces with the B-1.

USAF's New Cruise Missiles

The Air Force, according to Mr. Reed, "would like to get on with the full-scale development and initial deployment of cruise missiles in order to get some operational experience with these weapons." Two separate systems are involved—the purely strategic air-launched ALCM B and the ground-launched cruise missile (GLCM), a nuclear-armed theater weapon. The 1,500-mile-range ALCM standoff weapon is "essential to extend the useful life of the B-52 into the 1980s and 1990s." The Department of the Air Force's FY '78 Report to the Congress elaborates: "Employed as an adjunct to the penetrating bomber it will increase the composite system's lethal 'footprint' by allowing greater flexibility in routing and target coverage while diluting the effectiveness of area air defenses. The high accuracy of cruise missiles gives them great utility against a wide range of targets while minimizing collateral damage." The Report explains that "the proper role for the cruise missile in our strategic arsenal is as a bomber weapon and not as a bomber replacement."

GLCM, by contrast, is a theater weapon that can

perform a role similar to that of the new Soviet intermediate-range SS-20 ballistic missile as well as of "our quick-reaction, nuclear-armed aircraft assigned to theater interdiction of support and logistics targets," according to Mr. Reed. GLCM, he said, is the Navy's Tomahawk cruise missile deployed on some form of mobile launchers, "probably something like a standard truck with tubes in the back, into which we'll put Tomahawk and then take off into the countryside."

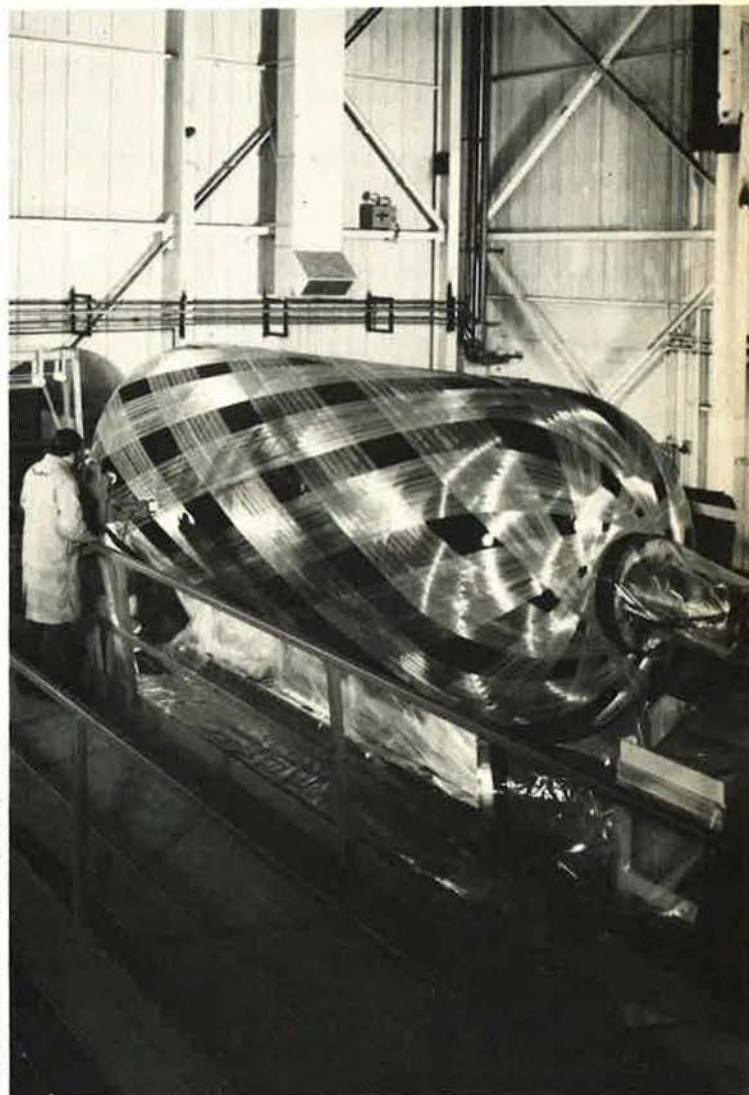


PHOTO COURTESY THIKOL CORP.

Preprototype first-stage motor provides a clue to MX size. The motor is wrapped in kevlar to provide a light but strong casing.

Space Survivability

After a hiatus of more than four years, the Soviet Union last year resumed testing its ASAT antisatellite interceptor, a provocative step in the face of deliberate restraint on the part of the US in developing space weapons. While there is clear-cut need for the US to react, it is as yet unclear how to do so cost-effectively, according to Mr. Reed. "There exists today significant vulnerability in the case of some of our military space systems and very insignificant vulnerability in the case of some others. Much depends on what specific satellites do, on what their hardness is, and, perhaps more than any other factor, on their altitude," Mr. Reed told AIR

FORCE Magazine. The US, he added, "doesn't necessarily have to match [ASAT] on a one-for-one basis. What the US needs to do is take a hard look at its space usage in the context of all military information systems." For the time being, military utilization of space is confined to information functions—command control and communications, navigation, surveillance, and warning. An important form of space defense, Mr. Reed said, is to provide "a hedge whenever possible through redundancies in our 'central nervous system' that are not located in space, such as the Pave Paws SLBM warning radars."

Another effective form of passive space defense is attainable through hardening, redundancy, and "invisibility" of satellites. Extremely high orbits also can help increase survivability. Other prospects for enhancing survivability include maneuvering satellites that incorporate attack warning sensors or are linked to a LWIR (longwave infrared) surveillance satellite.

The current DoD/USAF budget request "initiates prototype design of an LWIR space-based proof of concept so that deployment of this . . . capability could begin in the 1980s. . . . We are emphasizing the development of such critical components as a sensitive multi-spectral band LWIR sensor and a cryogenic cooler required for this concept. The launching of an experimental satellite to integrate these technologies and examine the validity of this approach is planned for 1980."

The Directorate of Defense Research and Engineering's annual report tells of an extensive study "to assess and reduce the vulnerability of US space systems." This study is "expected to lead to programs for improved survivability . . . against a broad range of attacks."

The operation of US satellites could be impaired by "an attack on the satellite or its ground station, the use of electronic countermeasures, and the radiation of a satellite with a laser device to either inflict damage or generate false target returns. Inasmuch as satellites are designed to perform their functions within a stringent weight allowance that does not permit the inclusion of burdensome defensive measures, achieving a high survivability level represents a difficult task," according to DDR&E.

The DDR&E report asserts that studies are being conducted to "examine the vulnerability of ground stations to attack and jamming and to investigate methods for increasing their survivability by inter-netting existing stations or developing simplified new stations. We are also investigating the vulnerability of our satellites to laser radiation and are examining techniques for reducing radiation damage to the more vulnerable satellite components."

The Defense Advanced Research Project Agency (DARPA) appears to be the only Defense Department component involved in space weapon research. Under the rubric of "Space Defense," DDR&E states that "almost from the inception of the high-energy laser, people have speculated on the possibility of deploying them in space. The technical problems are formidable, requiring major advances in chemical laser devices; precision pointing and tracking; and large, high-power

optics. Nevertheless, space is a favorable element for chemical lasers. . . . DARPA pioneered high-energy chemical laser technology and is now exploring the feasibility of incorporating future chemical lasers in a space environment." Other DARPA research is directed at inuring satellites against some laser radiation effects.

The FY '78 Defense budget earmarks \$126 million for space defense. Two other DoD activities also can be assumed to affect space defense. Under major strategic programs, DoD's budget request lists an item labeled "continued improvements in the Defense Support Program," a classified military space program, and reports funding requests of \$125 million for FY '78, and of \$230 million for FY '79, compared to a current level of \$60 million. Although the nature of the "improvements" was not disclosed, it is reasonable to assume that they involve increased satellite survivability.

The Defense Nuclear Agency (DNA) continues to probe one of the most difficult aspects of space defense—the effects on military spacecraft and their communications link of large nuclear detonations above the atmosphere. DNA this year will focus major research efforts on "the hardening of satellite-based communications systems as well as examining the interference along propagation paths caused by nuclear bursts in the ionosphere." Large high-altitude bursts propagate radiation energy far out into space and possibly affect even satellites in geosynchronous orbit (22,300 miles up). When this energy strikes a satellite, it generates strong electric currents that can temporarily put the spacecraft out of commission. It is possible to reduce or even eliminate damage of this type by designing spacecraft with proper redundancies but only if propagation of the radiation energy is understood in minute detail. This requires elaborate simulation in DNA's test facilities and through such techniques as the release of barium clouds at high altitude to duplicate the disturbance of the ionosphere caused by nuclear explosions.

The cumulative result of US research concerning space defense presumably will make it easier to answer what Secretary Reed terms the fundamental question of how much increased emphasis should be placed on the survivability of individual satellites and "how much are we willing to pay for it." It may turn out that proliferation rather than added complexity is the cost-effective solution, he suggested.

As Secretary Reed leaves government service, he imparts a cardinal message: "In the privacy of my office I have seen a view of the world—particularly the Soviet world—that seizes the attention and gives one pause. Three and a half years' access to a flood of the most sensitive and complete intelligence leads me inescapably to the conclusion that the Soviet Union is driving for strategic and tactical superiority by the early 1980s; that they do not wish nuclear war, but that they plan to win should one come; that they are improving their forces and digging in their society for that purpose; and that they may use the resulting military muscle and social survivability to force a geopolitical showdown in the early 1980s. It is to protect against such a contingency that the American people support and maintain a Department of Defense, and," he adds with conviction, "the best Air Force in the world." 1

The forty-ninth state's location and abundant resources make it an area of great strategic importance. Primary responsibility for defending this northern bastion rests with the men and women of . . .

USAF IN ALASKA

BY ALLAN R. SCHOLIN

THERE are about 12,000 Air Force people stationed in Alaska on tours of from one to three years, depending on whether they're at a remote site or on a major base. Because that is a comparatively small percentage of Air Force people, many officers and airmen may never have a chance to serve in our forty-ninth state.

To those who haven't been there, Alaska conjures up images of silent glaciers, vast snowfields, Eskimos in igloos chewing whale blubber, and, more recently, shadowy figures stringing a pipeline across a dark and frigid wasteland.

If you scrub the igloos, which we're told even Eskimos don't build anymore, Alaska is like that, in part. But Alaska is far too vast to be

categorized in a few phrases, and those who have been there find it contagious.

The magnificent view of Mt. McKinley and its neighboring peaks bathed in the afternoon sun, the lights of Anchorage twinkling bright in a field of snow at the end of a lonely night flight, a row of parked aircraft shrouded in ice fog, the squeak of boots on hard-packed snow, the cheery warmth of the dining hall at Eielson AFB—these are among hundreds of images that remain sharply etched in memory long after a visitor has departed. And they are all a part of Alaska's haunting appeal.

You'll find homesteaders on Alaskan air bases as elsewhere in the US and abroad. SSgt. Gil Brisson

has spent six years at Eielson—long enough to become a walking encyclopedia on the base and the region. Capt. Hank Alau, a navigator in SAC's 6th Strategic Wing at Eielson, is a native Hawaiian, from Maui. He prefers Alaska because, he says, there's room to stretch and breathe. How right he is. The state averages one inhabitant per eight square miles. He also likes to hunt and fish—but that's true of ninety-five percent of Alaskans, whether they come from Hawaii or Hoboken. That, incidentally, is another characteristic of Alaskans. Just about all of them came from somewhere else.

Here, then, are some sketches of Air Force operations in Alaska, and how Air Force people help preserve





As senior military officer in the state, Lt. Gen. Marion L. Boswell coordinates all military matters.

the peace and security of the nation and the free world.

The Units and Their Jobs

Air defense is the primary mission of the Alaskan Air Command (AAC), providing, as the command boasts, "Top Cover for America."

Lt. Gen. Marion L. Boswell is the AAC Commander, with headquarters at Elmendorf AFB, just outside Anchorage. He is concurrently Commander of NORAD's Alaskan Region. And he is the coordinating authority for all joint military administrative and logistical matters in Alaska, giving him supervision over the Army's 172d Infantry Brigade and the Navy's sea patrol base at Adak in the Aleutians.

The AAC operates three air bases—Elmendorf, Eielson, and Shemya—and shares facilities on two FAA-operated airports at Galena and King Salmon. It has thirteen aircraft control and warning squadrons, including six surveillance stations, five surveillance and ground-controlled intercept (GCI) stations, and two intermediate regional control centers.

AAC's 21st Composite Wing at Elmendorf is the command's principal flying unit. It is made up of the air base group at Elmendorf, the 43d Tactical Fighter Squadron, and the 5041st Tactical Operations Squadron.

The twenty-six F-4E Phantoms of the 43d TFS are AAC's interceptor

force. From headquarters at Elmendorf, flights of F-4s regularly rotate to forward air bases at Eielson, King Salmon, Galena, and Shemya. From these bases they can be scrambled to intercept bogies under direction of one of the five GCI sites. The Phantoms also perform the corollary mission of close support for the 172d Infantry Brigade, whose elements are stationed at Fort Richardson near Anchorage and Fort Wainwright, Fairbanks.

The Wing's 5041st Tactical Operations Squadron at Eielson operates T-33s that are used primarily to simulate enemy aircraft, checking the alertness of detection and intercept systems of the air defense net.

AAC's other flying unit is the 5010th Combat Support Group at Eielson. Under it is the 25th Tactical Support Squadron, equipped with O-2 Skymasters to perform forward air control missions for the Army.

While the AAC is the principal Air Force command operating in the state, it is not the only one. The Strategic Air Command's 6th Strategic Wing flies KC-135 tankers and RC-135 reconnaissance planes from Eielson AFB, near Fairbanks in central Alaska, and from Shemya AFB, almost at the tip of the Aleutian chain, 1,500 miles from Anchorage.

The Military Airlift Command provides the 17th Tactical Airlift



Looking like a tire track in the snow, the runway at Tin City AFS is just fifty miles from the Soviet Union. The station is home for a NORAD radar site.

Allan R. Scholin was an Associate Editor of AIR FORCE Magazine from 1962 until 1968, when he accepted a position as Special Assistant to the Public Affairs Officer at US Readiness Command, MacDill AFB, Fla. In 1973, he retired from the Air Force Reserve as a colonel. He is the winner of several awards for aviation writers. Now retired from government service, he lives in Tampa, Fla.

Squadron and 71st Aerospace Rescue and Recovery Squadron, both headquartered at Elmendorf and under General Boswell's operational control. C-130 Hercules transports of the 17th TAS fly resupply missions to remote stations, each of which has an airstrip, usually gravel-topped, at least 3,500 feet long. Bulk supplies, including fuel, are shipped to most stations under Navy auspices in Operation Cool Barge during the summer when for a few weeks the shorelines are free of ice.

The 71st Aerospace Rescue and Recovery Squadron is equipped with Sikorsky HH-3s and HC-130 search and tanker escorts. They're based at Elmendorf, but range throughout the state and surrounding waters on rescue missions under direction of AAC's Rescue Coordination Center (RCC).

The Air Guard's 176th Tactical Airlift Group, with MAC as its gaining command, operates eight C-130s. They support the Army National Guard, fly emergency civil relief missions, and back up MAC's C-130s in resupply runs.

Among other agencies and commands that operate in the Alaska Air Command area are the Air Force Communications Service and Defense Communications Agency. In addition, the USAF Security Service has people around, doing what Security Service people do, and the Air Training Command runs the Arctic Survival School at Eielson.

The Rescue Coordination Center

Search and rescue is an unending task in a state with few roads and 400 times as many private planes per capita as the national average.

No one knows how many airplanes and pilots there really are in Alaska. In the more remote areas—of which there are plenty—people learn to fly without bothering to apply for licenses, and a substantial number of airplanes may also be unlicensed.

Private pilots often don't bother to file flight plans, even when the

weather is marginal. This creates an air safety problem that would be far more serious if there weren't so much wide open airspace.

Even so, accidents are frequent. And when crashes occur the aircraft, if not their victims, often remain where they fall. The country is too rugged and roadless to make retrieval practical.

In the RCC at Elmendorf, a large state map on one wall bristles with more than a thousand pins locating sites of crashed airplanes that have



F-4E Phantoms from the 21st Composite Wing at Elmendorf AFB provide close air support for ground forces during a joint exercise in Alaska's frozen interior.

not been recovered. Maj. Rufus Clark, one of six USAF officers who share the task of operating the RCC twenty-four hours a day, explained that the map helps avoid a lot of wasted effort.

"These crashed aircraft are reported again and again by pilots, especially if they're not familiar with the locale," he said. "Because of the normally cold weather and low humidity, many planes that crashed years ago still look shiny and new. Without this map and our file of carefully plotted coordinates, we'd be calling out rescue people needlessly time after time."

As it is, the RCC relies on a wide network to help in search and rescue

operations, using facilities of the AAC, FAA, Army, Navy, Coast Guard, Army and Air National Guard, and Civil Air Patrol (CAP).

Alaska's CAP has units throughout the state with 1,300 members. They include 562 pilots, of whom 263 own their own planes. The CAP flies two-thirds of all rescue missions and leads CAP units of all other states in people found, assisted, and saved.

Not all rescue operations are related to downed aircraft. The RCC and its participating elements are active in the MAST—Military Assistance to Safety and Traffic—program, and are often called on to fly sick and injured patients to hospitals. They have also helped to pluck stranded climbers off the

slopes of Mt. McKinley—all compliments of Uncle Sam.

The Air Defense Net

Tin City Air Force Station is the US military installation closest to the Soviet Union. Located on Seward Peninsula near the tip of Cape Prince of Wales that juts into the Bering Strait, Tin City AFS is barely fifty miles from the northeasternmost tip of Siberia at Mys Dezhneva.

Tin City is a NORAD surveillance station, home of the 710th Aircraft Control and Warning Squadron, with a radar site perched atop a 2,275-foot mountain connected to a base camp below by a

7,200-foot-long tramway, reputedly the longest in North America. A total of 105 people is assigned to Tin City, which derives its name from tin mines nearby.

Five other NORAD surveillance stations in western Alaska, each close to the shore of the Arctic Ocean or the Bering Strait, provide overlapping cones of coverage to produce a composite picture of air activity to the north, west, and south of Alaska.

Even more lonely than Tin City's contingent, perhaps, are the 103 members of the 711th AC&W Squadron who operate a surveillance station at Cape Lisburne, the north-

Like other remote stations, Cape Lisburne has a base exchange, a theater showing free—if old—movies, a gym with basketball court, a two-lane bowling alley, hobby shops, recreation hall, off-duty education program, and officers' and NCO clubs. During the winter months, weekly telephone bowling matches between remote stations are a favorite diversion, and competition is fierce to qualify for, and remain, a member of each station's five-man "intercollegiate" team.

The forward surveillance stations are tied in to one of two regional control centers—in the north at

western anchor of the Ballistic Missile Early Warning System (BMEWS) that also includes stations in Greenland and at Fylingdales Moor, England.

Three antennas at Clear are each 400 feet wide and 165 feet high, designed to detect the launch of a Soviet ballistic missile and predict its trajectory in time to provide about twenty-five minutes' warning to its intended target. There's also a tracking radar to determine the trajectory of satellites and other objects in earth orbit.

A new long-range radar at Shemya is a phased-array system. Called Cobra Dane, it is housed in a build-



C-130s wear a mantle of snow at Elmendorf AFB. The rugged aircraft fly resupply missions to remote Arctic stations.

westernmost point on the North American mainland. It is 170 miles north of the Arctic Circle, and from December 4 to January 8 each winter the sun doesn't rise there at all.

Paradoxically, military personnel at these remote sites are encouraged to wear summer uniforms the year around. Facilities are available to launder wash-and-wear clothing, but clothes to be dry-cleaned must be flown to Elmendorf, and it can take weeks to get them back.

Women airmen are currently stationed at six remote sites. By September, however, they will be gone from all but Galena, King Salmon, and Shemya. The restriction doesn't apply to women officers who at present are stationed at Shemya, Murphy Dome, Fort Yukon, and Campion.

Murphy Dome, near Fairbanks, and in the south at King Salmon, on the mainland end of the Aleutians.

Under the Murphy Dome Center are the stations at Tin City, Cape Lisburne, and midway between them at Kotzebue, plus three GCI sites, providing intercept control as well as surveillance, at Campion, Indian Mountain, and Fort Yukon.

King Salmon's control center handles five sites—three surveillance stations at Cape Newenham, Cold Bay, and Cape Romanzof, and two GCI sites at Sparrevohn and Tataлина.

Two other NORAD sites in Alaska are less concerned with tracking aircraft than with intercontinental ballistic missiles. The older of the two is at Clear, eighty miles southwest of Fairbanks. It is the

ing 100 feet high with a slanted wall in which are imbedded 15,000 transmitting and receiving elements. Instead of rotating, the signals are steered electronically, covering a 120-degree sweep in milliseconds and enabling the system to track 200 space objects simultaneously. Cobra Dane is a second-generation version of the phased-array radar that has been operating at Eglin AFB, Fla., since 1968.

The information produced by all these systems is displayed at the Alaskan NORAD Region Control Center at Elmendorf, and is simultaneously relayed to the NORAD headquarters control center in Cheyenne Mountain at Colorado Springs, Colo.

Soviet military aircraft show up often on radar screens at Murphy

Dome and King Salmon. During our visit to Murphy Dome, Maj. Fred Dorr, operations chief, pointed out blips of Soviet planes flying within their own borders to and from such forward bases on the Chukotskiy peninsula as Lavrentiya, Provideniya, and Mys Shmidta.

But almost daily, one or more Soviet aircraft move out over the Bering Sea, traveling southeast below St. Lawrence Island, down toward the Aleutian chain. Numerous Soviet fishing trawlers work those waters and presumably the planes warn them of ice formations.

Back at Elmendorf, Col. A. D. Thomas, AAC Director of Intelligence, described how the command's F-4s regularly check on Soviet patrol planes flying in international waters.

"We have two intercept lines," he said. "One is the DEWIZ—Distant Early Warning Identification Zone—and when Soviet aircraft penetrate that line, which they're free to do since they're over international waters, we scramble our Phantoms to look them over, which we're free to do as well.

"The second intercept line is our ADIZ—Air Defense Identification Zone. When a bogey penetrates that line, he'd better be friendly, for otherwise we would force him to land or, if necessary, we'd shoot him down."

Each time AAC F-4s meet Soviet patrol craft, the crew takes a picture of the Soviet plane.

"We find the same types of planes each time," said Colonel Thomas, pointing to enlarged photos on his office wall. "They even carry the same tail numbers."

Contrary to reports by columnist Jack Anderson, Colonel Thomas said AAC's surveillance radars and interceptors have turned up no evidence of MiG-25 Foxbats operating over or near Alaskan skies. Nor have they seen any supersonic Backfire bombers.

"The most modern aircraft operating in our area is the Tu-16 Badger," he said. (The Badger is a twin-jet roughly comparable in performance to USAF's long-retired Boeing B-47.) "We also see the turboprop-powered Tu-95 Bear with its counterrotating props, and occasionally the An-24 Coke medium transport."



Galena Airport, located by the famous Yukon River, is operated by the Federal Aviation Administration. An AAC aircraft control and warning unit shares the facility.

A Coke was responsible for the most excitement AAC's radar scanners have experienced in recent years when one landed on US-owned St. Lawrence Island with engine trouble. Its passengers were scientists and meteorologists studying ice-clogged waterways. AAC technicians helped the Russians repair their engine, and the Coke returned to its Siberian base.

Colonel Thomas denied that AAC aircraft seek to test Soviet air defenses by flying a course that would carry them toward Siberia, then turning back at the last possible moment.

"We don't test the Soviet inter-

ception capability," he declared. "There are those who do, but not us. We're concerned only with the defense of Alaska."

He acknowledged, however, that the Soviets occasionally make such feints, and as soon as F-4s scramble to intercept them, reverse course to avoid contact.

SAC in Alaska

SAC is the only other Air Force command flying aircraft beyond state lines in Alaska. Its 6th Strategic Wing operates KC-135 tankers that rotate to Eielson on sixty-day tours, and RC-135 reconnaissance craft whose crews perform three-



Life at remote radar sites in Alaska can be pretty lonely. Extensive recreation activities make the long days—and nights—pass more quickly for those assigned.

year tours at Eielson, but spend about two weeks in every five on temporary duty flying from Shemya.

The tankers refuel the 43d Fighter Squadron's F-4s and SAC's RC-135s, and deploy to Shemya on occasion to refuel RC-135s, F-4s, and other military aircraft flying to and from the Far East. The RC-135s' operations are kept under wraps, beyond the acknowledged fact that they perform a variety of intelligence-gathering tasks.

SAC's RC-135s also draw interceptor escorts now and then, usually MiG-19s or -21s that come up from Petropavlovsk, on the Kamchatka peninsula, about 650 miles due west of Shemya. The photos they take of the RC-135s probably decorate the walls of Soviet intelligence offices at their air force regional headquarters in Magadan or Okhotsk.

Soviet Pilots Know the Territory —Or Used To

A lot of Soviet aviators have flown over Alaska. They've landed and taken off from Eielson, Cold Bay, Galena, and other airstrips in the state. Most of them are probably retired by now. Those bases during World War II were vital way stations in ferrying US-built fighter planes to the USSR.

Eielson, in fact, was built originally to handle the backlog of Soviet-destined aircraft held up in Alaska awaiting favorable flying weather. At that time Eielson was known as Mile 26, its distance from Fairbanks, and was a satellite of Ladd Field at Fairbanks. In 1960, Ladd, its runways too short for the big jets, was turned over to the Army and renamed Fort Wainwright.

Arctic Survival School

Also at Eielson is the Air Training Command's Arctic Survival School. The "cool school," oldest continuous survival school operated by USAF, is one of three detachments of ATC's 3636th Combat Crew Training Wing at Fairchild AFB, Wash., others being the Water Survival School at Homestead AFB, Fla., and the Desert Survival School at Nellis AFB, Nev.

One of the cool school's instructors, rounding out his third year at

Eielson, is SSgt. Bill Joiner, ATC's Outstanding Airman of the Year for 1974.

Each year, some 700 students complete the five-day course, which includes forty-eight hours in the field where they must build their own shelter, forage for food, and learn how to signal their position to search aircraft. Students include aircrew members, security police, and others whose duties might subject them to extended exposure. The school laboratory exhibit and museum, assembled over the seventeen years it has been at Eielson, is one of the base's more popular attractions.

Instructors from the school have assisted Alyeska, the Alaska pipeline company, in setting up survival programs for its people, and they are called on frequently to address civic and social groups in the Fairbanks area.

Guarding the Frontier

Anthropologists are generally agreed that Alaska's original settlers came from Asia, crossing the Bering Strait into Alaska. Some remained, others continued south. There is evidence that the Athabaskan Indians in Alaska's interior are closely related to the Apaches of Arizona.

In the years before World War II and the ensuing cold war, inhabitants of Alaska and neighboring Siberia moved freely back and forth across the Strait. Ben Eielson, the pioneer Alaskan pilot for whom Eielson AFB is named, crashed into a Siberian hillside in November 1929 while attempting to bring food to the crew of an ice-locked ship off the Siberian coast. It took three months for a joint US-Russian search team to find the wreckage of his plane.

If such traffic is still going on, it is on a far smaller scale. The Eskimo villages that dot the coastline are close-knit communities where visitors are readily spotted. The Eskimo Scouts, that unique organization of the Alaska National Guard, are the "Royal Mounties" of the region, and, unless the strangers can prove they're on legitimate business, they're hustled back across the Strait or turned over to higher authority.

It isn't likely that Soviet forces would try to invade Alaska via the Bering Strait. But if the Soviets were to launch an attack on the US by missiles and long-range aircraft, many of them would pass over or near Alaska. Thus, radar stations for air defense and ballistic missile early warning are vital military installations. They could be important enemy targets. If they should suddenly be silenced, defenses would be seriously crippled.

Also vulnerable is the Alaskan pipeline, stretching 800 miles from Prudhoe Bay on the North Slope to Valdez on Prince William Sound, south of Anchorage. Since the North Slope in full production is expected to provide ten percent or more of the nation's oil supply, pipeline sabotage is no small threat.

The Joint Chiefs of Staff have plans, which are exercised regularly, for the rapid reinforcement of Alaskan defenses. Any incursion would trigger an immediate response, initially by forces within the state, but swiftly augmented by ground, air, and naval forces earmarked and trained for speedy response.

Crossroads of the World

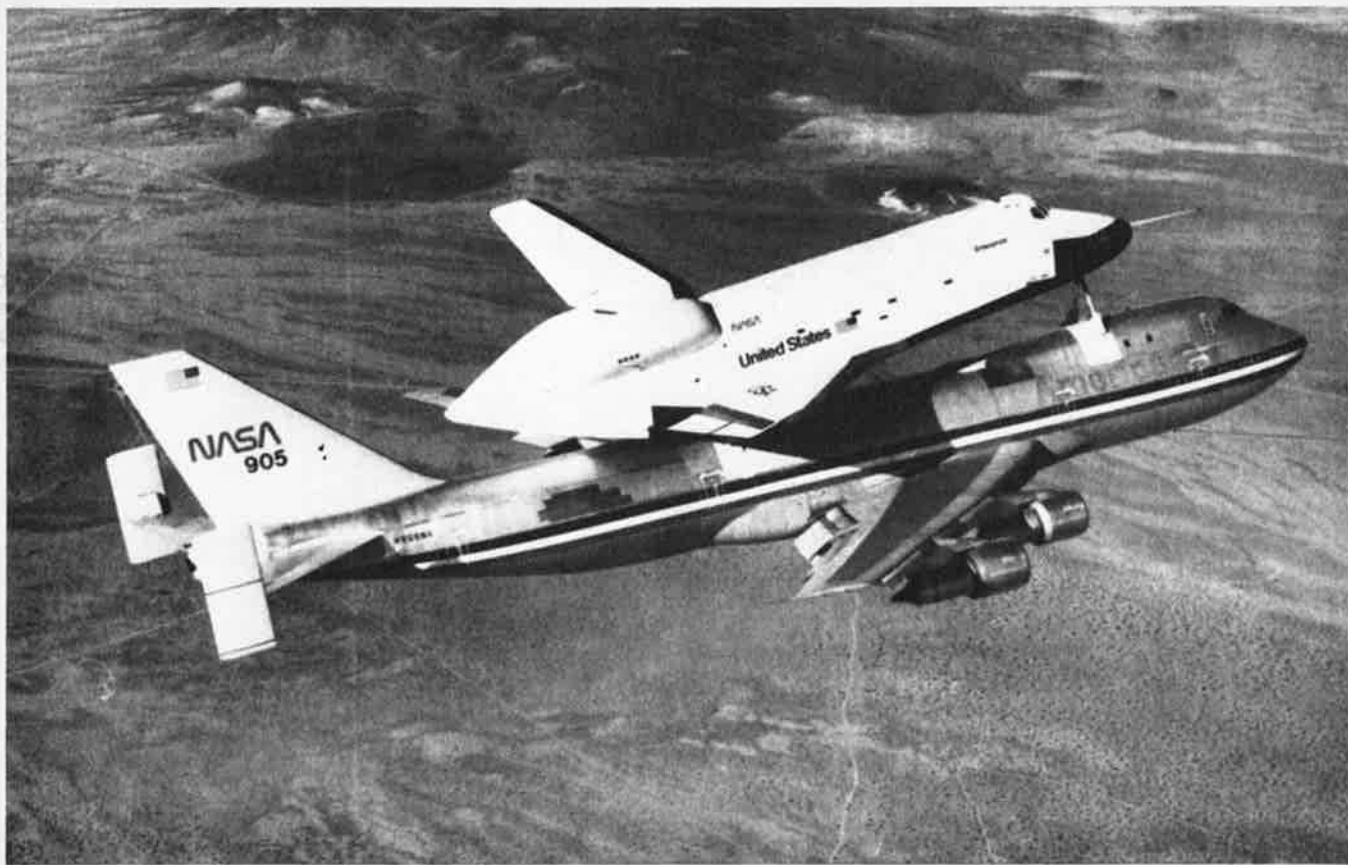
Many Americans think of Alaska as a remote, vast, cold region having little in common with the rest of the continental US. Alaskans, on the other hand, consider themselves pretty much in the center of the northern hemisphere. Anchorage is closer to the major cities of Europe and Asia than are San Francisco, Chicago, Atlanta, or New Orleans. Passenger and cargo aircraft of many nations fly to and from Anchorage International Airport, bound for destinations across the top of the world.

"He who holds Alaska will hold the world," predicted Brig. Gen. Billy Mitchell to the House Military Affairs Committee half a century ago.

In the age of missiles and space-flight, Alaska may no longer be the keystone of global strategy as Mitchell envisioned it for the air age. But, in addition to its valuable natural resources, its location, nose to nose with the USSR, is reason enough for maintaining alert forces there to guarantee its inviolability. ■

JANE'S

ALL THE WORLD'S AIRCRAFT SUPPLEMENT



First flight of the Orbiter Vehicle Enterprise on 18 February at Edwards AFB, California, on the back of the specially modified Boeing 747. The two stayed aloft for some two hours. The Enterprise was unmanned for this test flight. Later this year, the vehicle will be released and allowed to glide to a landing on the Edwards AFB runway (Wide World Photos)

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ROCKWELL INTERNATIONAL/NASA
SPACE SHUTTLE ORBITER VEHICLE
The National Aeronautics and Space Administration's Space Shuttle will be the

world's first re-usable space transportation system, capable of up to 100 missions, and will be the keystone of America's space programme throughout the remainder of this century.

Basically, the Space Shuttle consists of two stages: a booster and an orbiter. The Orbiter Vehicle is capable of carrying up to 29,485 kg (65,000 lb) of varied cargo into Earth orbit. It has a double-delta wing and

looks very like a conventional aeroplane, but will lift off from Earth like a rocket, operate in orbit as a spacecraft, and return to land in a manner similar to that of a conventional aeroplane. It is powered by three Rocketdyne high-pressure rocket engines, the liquid oxygen/liquid hydrogen propellants for which are carried in a large external jettisonable tank, on which the Orbiter will be mounted at lift-off. Two large

solid-propellant jettisonable rocket boosters will be mounted on opposite sides of the propellant tank for lift-off.

On 26 July 1972, North American Rockwell (now Rockwell International) Corporation's Space Division at Downey, California, was selected by NASA as prime contractor for design, development, and production of the payload-carrying Orbiter Vehicle, and its integration with all other elements of the Shuttle system, under a six-year \$3,111 million contract.

The Orbiter will normally be operated by a crew of three, comprising pilot, co-pilot, and a mission specialist. For multi-payload missions, up to four additional payload specialists can be carried. Hatches in the top of the fuselage give access to the cylindrical payload compartment, which is 18.29 m (60 ft) long and 4.57 m (15 ft) in diameter; this large space is made possible by the fact that the main propellant tank is external. The interior of the Orbiter is pressurised, enabling the crew to work without spacesuits, and minimal astronaut training will be needed by passengers.

In operation, the Shuttle will be launched vertically, with all five engines firing (the two boosters and the three main engines in the Orbiter Vehicle). At an altitude of about 43 km (26.5 miles) the booster stages will separate and descend into the sea by parachute for recovery, refurbishing, and re-use. The Orbiter will continue under its own power, and will jettison its large underbelly propellant tank just before attaining orbit.

In space, the Orbiter will manoeuvre by means of two smaller rocket engines, also mounted in the rear-fuselage propulsion cluster. For minor course corrections and adjustments of attitude, the Orbiter has a series of small thrusters at the front and rear of the fuselage.

On conclusion of its mission, the Orbiter will fly back into the atmosphere towards its land base, protected by a new form of heat-shielding which will survive 100 missions, unlike current ablative-type heatshields. As the dynamic pressure increases during re-entry, control will be transferred progressively to the aerodynamic surfaces: the elevons, the rudder/speed brake, and the large underbody flap beneath the rear fuselage. Once through the re-entry phase, the Orbiter

will be able to glide up to 950 nm (1,760 km; 1,100 miles) to its base, steered by the aerodynamic controls.

The first Orbiter Vehicle, designated OV-101 and named *Enterprise*, was rolled out at Palmdale, California, on 17 September 1976. In late January 1977 it was delivered to NASA's Dryden Research Center at Edwards AFB, California, where the initial flight stage of the Shuttle programme began on 18 February. This stage, known as ALT (Approach and Landing Test), involves the Orbiter being carried aloft to an altitude of about 7,620 m (25,000 ft) on the back of a specially modified Boeing 747. A series of 20 unmanned and manned non-release flights are being carried out before the first 'free' flight, later in 1977, in which the *Enterprise* will be released at about 260 knots (482 km/h; 299 mph) EAS and glided down to a runway landing at Edwards AFB.

Two crews have been nominated for the early flight test programme, the first comprising Fred W. Haise (commander) and Charles G. Fullerton (pilot), and the second Joseph H. Engle (commander) and Richard H. Truly (pilot). For the ALT phase the *Enterprise* will not be fitted with engines, payload, radar, or other equipment, but will carry ballast to represent their weight; for the early flights also, a tailcone fairing will cover the main propulsion cluster. After atmospheric flight test, OV-101 is scheduled to be transferred to NASA's Marshall Space Flight Center on 17 March 1978 for vertical vibration tests.

Following completion of these, the first flight into space, from the Kennedy Space Center, is scheduled to take place on 1 April 1979, and will be made by the second Orbiter, OV-102. Three months later, on 1 July, OV-102 will be sent into orbit around the Earth, carrying the Shuttle's first fare-paying payload. NASA has a provisional list of payloads, known as the mission model, defining some 572 flights during 1979-1992, the first 14 years of Shuttle operation; about one-quarter of these flights are expected to be sponsored by the Department of Defense.

It is planned that OV-102 will become fully operational by mid-1980; OV-101 will be refurbished to full operational standard, and will follow it into service in March 1981. These first two Orbiter Vehicles are

expected to be followed by three others, of which OV-103 and OV-104 would enter service in March 1983 and OV-105 in March 1984. A second launch facility, at Vandenberg AFB, California, is expected to be available from late 1986.

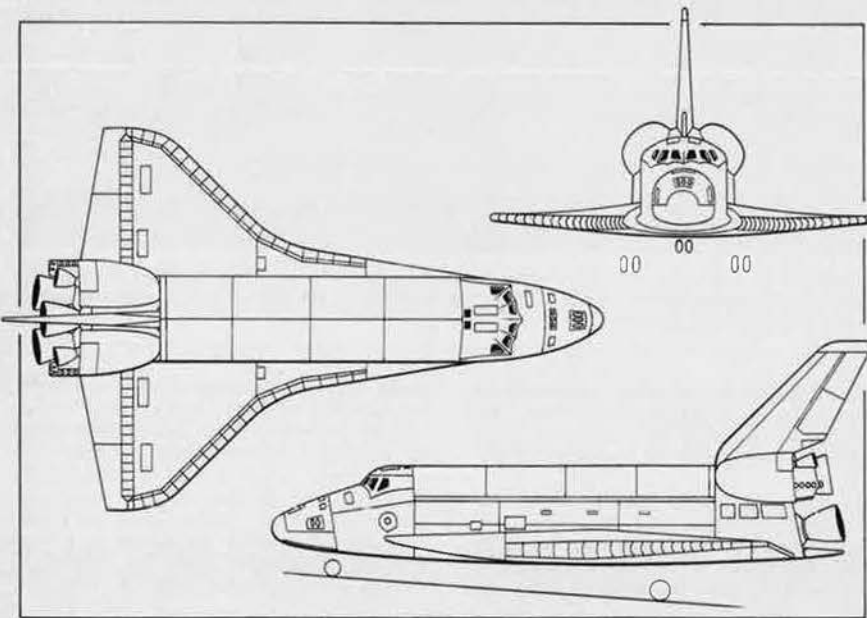
The following description applies to the first two Orbiter Vehicles, OV-101 and OV-102:

TYPE: Re-usable space transportation vehicle.

WINGS: Cantilever low-wing monoplane, of double-delta planform. Wing section NACA 0010 (modified). Sweepback 81° on inner leading-edges, 45° on outer leading-edges. Dihedral 3° 30' on trailing-edges. The main wing assembly, for which Grumman is responsible, is primarily a conventional aluminium alloy structure made up of a corrugated spar web, truss-type ribs, and riveted skin/stringer and honeycomb skins. Upper and lower surface loads are carried through the mid-fuselage by uniformly loaded skins. Additional wing and fuselage attachments transmit wing drag and torsion loads. Wing has a very blunt leading-edge of reinforced carbon-carbon and is more than 1.52 m (5 ft) thick at the thickest point. Two-segment elevons on each trailing-edge, for pitch and roll control, are of aluminium honeycomb construction with a titanium rubbing strip on each of their leading-edges. Each elevon has -35/+20° of travel, with 5° of over-travel each way, and is actuated by a Hydraulic Research Textron hydraulic linear servo-actuator. Hinged panels on the wing upper surface, of titanium sandwich, are used to seal the wing/elevon gap; these are the only areas of the wing not covered by the thermal protection system.

FUSELAGE: Conventional semi-monocoque structure, built in three main portions. Forward fuselage is of 2024 aluminium alloy skin/stringer panels, frames, and bulkheads, and contains the crew module, four forward electronics bays, and the nosewheel unit. The mid-fuselage portion, of basically rectangular cross-section, is an 18.59 m (61 ft) long section of primary load-carrying structure which is built by General Dynamics (Convair) and includes the wing carry-through structure and payload bay doors. Skins and stringers are machined as integral aluminium panels. Frames are constructed as a combination of aluminium panels with riveted or machined integral stiffeners and a truss-structure centre-section. Upper half of the mid-fuselage consists of structural payload bay doors, hinged along the side and meeting at the top centreline. These doors are of graphite epoxy bonded honeycomb sandwich construction, with a Nomex core, and are opened and closed by Curtiss-Wright actuators. The forward 9.14 m (30 ft) of each door incorporates Vought radiator panels that are hinged and latched to the inside of the door and can be deployed in orbit. Fixed aft radiator panels are attached to the remaining inner surface of each door. The aft fuselage includes a truss-type internal structure of diffusion-bonded elements (titanium and boron epoxy) that transfers the main engine thrust loads to the mid-fuselage and external tank. This portion supports and/or interfaces with the removable orbital manoeuvring system (OMS) pods, the wing rear spar, the vertical tail assembly, the underbody flap, the external tank rear supports, the main propulsion system, the launch umbilical panel, the three aft electronics bays, and other discrete system equipment. The external surface of the aft fuselage is of standard skin/stringer construction except for the removable OMS pods. The secondary structure is also of

Rockwell International/NASA Space Shuttle Orbiter Vehicle (Michael A. Badrocke)



conventional aluminium alloy construction, except for the use of titanium and glass-fibre for thermal isolation of interior systems equipment. A bulkhead heatshield at the rear of the vehicle protects the main engine systems. A large body flap under the rear fuselage, originally intended as a fixed shield to protect the main engine nozzles during re-entry, is now hinged to serve also as a trimming surface, particularly to compensate for the nose-up pitching moment induced when the rudder is in use as a speed brake. This body flap is actuated by a Sundstrand hydraulic rotary actuator, and has a travel of $-11.7/ +22.55^\circ$. During the atmospheric flight test phases, OV-101 will have a Boeing Aerospace tailcone fairing over the rear fuselage engine cluster.

TAIL UNIT: Vertical surfaces only, built by Fairchild Republic, of wedge-shaped section with 45° sweepback on fin leading-edge. Fin is a conventional aluminium alloy structure consisting of two machined spars, multiple sheet metal ribs, and integrally machined skins, and is attached to aft fuselage by bolted fittings at the two main spars. The rudder/speed brake assembly has an aluminium honeycomb skin and is divided into upper and lower sections, each of which is also split longitudinally and actuated individually to serve as both rudder (27° travel each side) and speed brake (60° travel each side). The rudder/speed brake sections are operated by Sundstrand hydraulic rotary actuators; the Inconel honeycomb seal over these is the only part of the vertical tail not covered by the thermal protection system. Mission requirements call for a locked rudder/speed brake during boost, orbit, and re-entry. The speed brake control is provided from approx Mach 10 to Mach 5; from Mach 5 to landing, the rudder and speed brake controls are combined as required. Primary system control is automatic, with manual override.

THERMAL PROTECTION SYSTEM: Almost the whole of the exterior of the Orbiter, a total area of some $1,099.32 \text{ m}^2$ ($11,833 \text{ sq ft}$), is covered in one of four main types of thermal insulation. Two of these, known as HRSI (high-temperature re-usable surface insulation) and LRSI (low-temperature re-usable surface insulation), are the responsibility of Lockheed Missiles and Space Company, and are in the form of silica fibre-based quartz tiles. Some 34,000 of these tiles, numerically milled with no two tiles identical, will cover approx 70% of the surface of the OV-102 (475.38 m^2 ; $5,117 \text{ sq ft}$ of HRSI and 281.68 m^2 ; $3,032 \text{ sq ft}$ of LRSI, covering most of the wings, fuselage, and tail areas). The tiles are coated with reaction cured glass (RCG), the HRSI tiles giving protection from temperatures of $649\text{--}1,260^\circ\text{C}$ ($1,200\text{--}2,300^\circ\text{F}$) and the LRSI tiles from temperatures of $371\text{--}649^\circ\text{C}$ ($700\text{--}1,200^\circ\text{F}$). For temperatures below 371°C , some 304.36 m^2 ($3,275 \text{ sq ft}$) of the surface, mostly on the rear and mid-fuselage, are covered with Nomex felt. The nose-cap, and most of the wing leading-edges, a total of 38.00 m^2 (409 sq ft), are covered in a reinforced carbon-carbon (RCC) composite for which Vought is the subcontractor. On OV-101, during its flight tests within the atmosphere, the thermal tiles and RCC areas will be simulated respectively by plastics and glassfibre.

LANDING GEAR: Retractable tricycle type, with twin wheels and Menasco oleo-pneumatic shock-absorbers on each unit. Hydraulic actuation, nose unit retracting forward into fuselage and main units forward into wings. Nose unit is steerable; main units

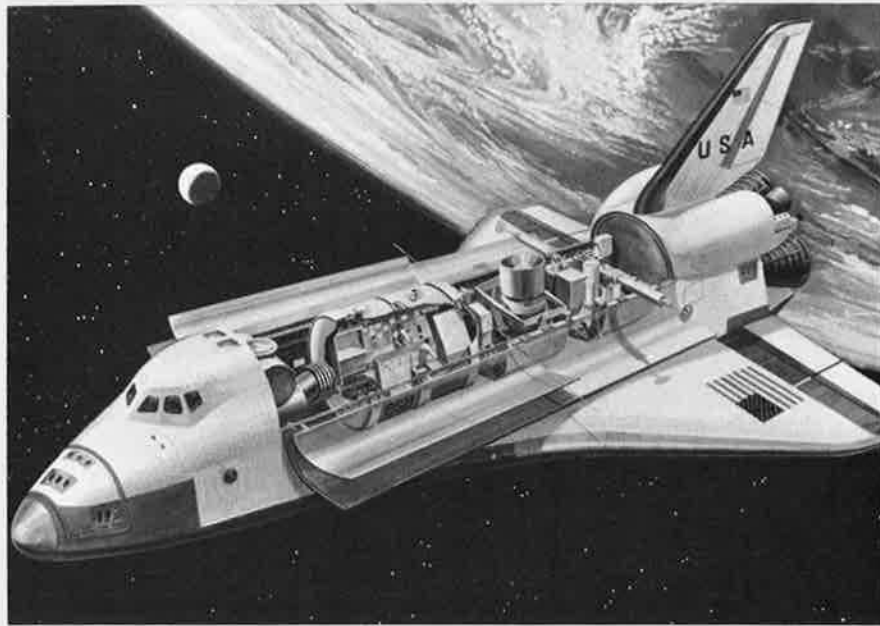
are fitted with Menasco brakes and Hydro-Aire anti-skid units. All units have Goodrich wheels and tyres. Landing gear is designed to facilitate safe landing at speeds of up to 221 knots (409 km/h ; 254 mph). The main gear tyres are rated at $20,410 \text{ kg}$ ($45,000 \text{ lb}$) and the brakes at $240 \times 10^6 \text{ foot-lb}$.

BOOSTERS: Two Thiokol solid-propellant rocket boosters, together with the Orbiter's main engines, will power the Orbiter from lift-off to approximately 43 km

for re-use. The boosters will each develop $13,789 \text{ kN}$ ($3,100,000 \text{ lb st}$) for lift-off and will be positioned under the wings of the Orbiter, attached one on each side of the Orbiter's external propellant tank. **MAIN PROPULSION:** Three Rocketdyne SSME (Space Shuttle Main Engine) high-pressure liquid oxygen/liquid hydrogen engines, each developing $2,277.5 \text{ kN}$ ($512,000 \text{ lb st}$) for lift-off and $2,090 \text{ kN}$ ($470,000 \text{ lb thrust}$) in space, provide the main propulsion for the Orbiter, to propel



ABOVE: Artist's impression of Space Shuttle launch. The two solid-propellant rocket boosters and the Orbiter main engines fire in parallel. BELOW: The cutaway drawing shows how the Orbiter will look in mid-mission. The first Orbiter spaceflight is scheduled for 1 April 1979



(26.5 miles) altitude and a speed of approximately 2,650 knots ($4,910 \text{ km/h}$; $3,050 \text{ mph}$). They will be jettisoned about two minutes into the flight, dropped by parachute into the ocean and recovered

it into initial orbit before the external propellant tank is jettisoned. **EXTERNAL PROPELLANT TANK:** Being developed and built by the Denver Division of Martin Marietta, the external propellant

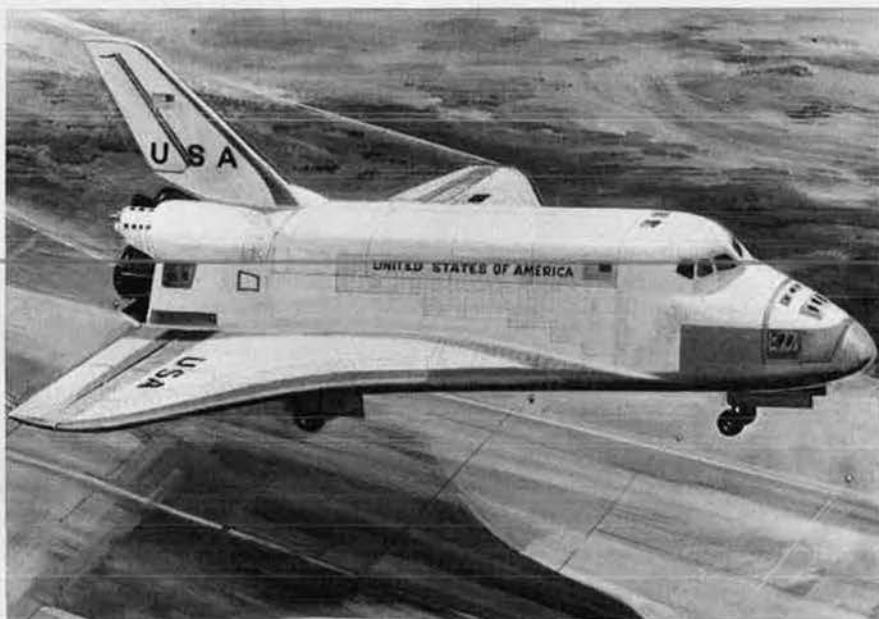
tank contains the main propellants for the Orbiter. It is of aluminium alloy monocoque construction, with a 25 mm (1 in) thick foam external insulation. In the forward end of the tank is a 552.2 m³ (19,500 cu ft) tank holding 606,615 kg (1,337,358 lb) of liquid oxygen; in the aft end is a 1,523.5 m³ (53,800 cu ft) tank holding 101,812 kg (224,458 lb) of liquid hydrogen. Total propellant weight 708,427 kg (1,561,816 lb).

ORBIT MANOEUVRING ENGINES: Two Aerojet Liquid Rocket Company (ALRC) bipropellant liquid rocket engines, running on monomethylhydrazine (MMH) and nitrogen tetroxide (N₂O₄), are used for the Orbiter's orbit manoeuvring subsystem (OMS). These engines are housed in pods, one on each side of the Orbiter's aft fuselage; pod system integration is the responsibility of McDonnell Douglas

mid-section, and a hatch from the airlock into the payload bay. It is divided into three levels, the upper (flight deck) level having side-by-side seating for two flight crewmen (pilot on the right, commander/co-pilot on the left) with dual flight controls and (for atmospheric flight tests) Lockheed-California ejection seats. Behind them are seats for one or two mission specialists. On the middle deck are seats for three more mission specialists, three bunks, galley, hygiene section, airlock, four electronics bays, and payload bay access; for rescue missions, seats for three more persons can be fitted in place of the bunks. The lower deck contains environmental control equipment and crew equipment storage. There are two payload observation windows in the rear wall of the flight deck, and two windows in the flight deck roof for external observation.

a 276 bar (4,000 lb/sq in) helium storage system with 52 bar (750 lb/sq in) regulation. Electrical power subsystem (EPS) consists, functionally, of a fuel cell power plants (FCP) subsystem, by Pratt & Whitney, and a Beech power reactant storage and distribution (PRSD) subsystem. There are three FCPs, each providing power at 27.5V to 32.5V DC over a power range of 2-12kW and each connected to one of the three main DC buses; these supply the primary in-flight electrical power used by the Shuttle, generated through the chemical combination and conversion of cryogenic oxygen and hydrogen. In the PRSD subsystem, enough of these materials is stored to provide a total of 1,530kWh of electrical energy to the Orbiter, including 50kWh to a payload over a seven-day period. Westinghouse remote power control system and master timing unit. Honeywell four-channel fly-by-wire electrical flight control subsystem for operation of all control surfaces and main engine controls. Electro-mechanical actuators for payload bay doors (including radiator panel latch/unlatch and deploy/stowage), vent doors (in forward fuselage, payload bay, wings, and aft fuselage), star tracker door, and separation system close-out doors. APU subsystem consists of three Sundstrand independent APUs (each 100.7kW; 135 shp), deriving their energy from the decomposition of hydrazine (N₂H₄). The APU subsystem provides mechanical shaft power for the hydraulic pumps during pre-launch, ascent, orbital checkout, main propulsion system purge, re-entry, and landing. Each APU drives a hydraulic pump that supplies power for each of the three hydraulic systems.

ELECTRONICS AND EQUIPMENT: Fully fail-operational/fail-safe guidance, navigation, and control system, including three Singer-Kearfott KT-70/SKN-2600 type inertial measuring units; triplex Ku-band microwave scan beam landing system, by the AIL Division of Cutler-Hammer; three Northrop rate gyro assemblies; three Hoffman L-band Tacan; three Bendix accelerometer assemblies; two Honeywell C-band radar altimeters; four AiResearch air data transducers; two rudder pedal transducer assemblies; two Honeywell speed brake thrust controllers; three Honeywell rotation hand controllers; three Honeywell translation hand controllers; two Lear Siegler attitude director indicators; two Collins horizontal situation indicators; two Sperry alpha/Mach indicators; two Bendix altitude/vertical velocity indicators; two Bendix surface position indicators; two Sperry barometric altimeters; and two Sperry ATC transponders. Communications and tracking equipment includes one (optionally two) Ku-band rendezvous radar/satellite comm; three Ball star trackers; two one-way Doppler extractors; Conrac mission and event timers; two 100W Watkins-Johnson S-band TWT amplifiers; two P-band UHF for EVA/ATC comm; Conrac S-band FM for Orbiter/ground and Orbiter/payload comm; Ku-band radio for Orbiter/ground comm; and Watkins-Johnson antennae for S-band comm, telemetry, Tacan, UHF/ATC, rendezvous radar, and radar altimeter. Central data processing is by means of five IBM Advanced System/4 Pi Model AP-101 (modified) digital computers (each with a capacity for 65,000 32-bit words) and two mass memory units (each with capacity of 134 megabits). Four of the computers are interconnected to process guidance, navigation, and control inputs and to relay commands to FBW flight control systems; the fifth is provided as an independent backup. Other electronics and



At low altitude, the Orbiter goes into horizontal flight for an aircraft-type approach and landing, as shown in this artist's impression

Astronautics Company. The OMS engines, for which a usable total of 10,830 kg (23,876 lb) of propellant is carried, are used to position the Orbiter in orbit; each develops 26.7 kN (6,000 lb thrust) in space.

REACTION CONTROL ENGINES: The Orbiter's reaction control subsystem (RCS) utilises thirty-eight Marquardt R-40A bipropellant liquid rocket engines (each 3.87 kN; 870 lb vacuum thrust) and six Marquardt R-1E bipropellant liquid rocket vernier thrusters (each 0.11 kN; 25 lb vacuum thrust). Fourteen of the R-40A engines are on the Orbiter's nose and 24 on the aft end, 12 in each OMS/RCS pod; there are two of the R-1E verniers on the nose and two in each aft pod. Propellants are the same as for the OMS engines; 1,096 kg (2,418 lb) is carried in the RCS tanks, and there is provision for crossfeed between the OMS and RCS tanks.

CREW COMPARTMENT: A self-contained crew module, machined from 2219 aluminium alloy plate with integral stiffening stringers and internal framing, is supported within the forward fuselage by four attachment points, the whole module assembly being welded to create a pressure-tight vessel. The module has a fuselage-side hatch for access, a hatch into the airlock from the

PAYLOAD BAY: In centre of fuselage, 18.29 m (60 ft) long and 4.57 m (15 ft) in diameter. Retractable manipulator arm on left hand side (with provision for a second one on the right), for deploying and retrieving payloads. Television camera and lighting mounted on manipulator arm(s) and in payload bay area, to facilitate payload handling.

SYSTEMS: Environmental control and life support system, made up of four subsystems: atmosphere revitalisation subsystem (ARS), to control atmospheric environment for occupants and thermal environment for electronics; food, water, and waste subsystem (FWW), to provide cooking, hygiene, and other life support functions; active thermal control subsystem (ATCS), by Hamilton Standard, to maintain subsystems and components within specified temperature limits and to provide, via payload door radiator panels, active heat rejection to protect payloads; and an airlock support subsystem. Three redundant hydraulic systems, each of 207 bars (3,000 lb/sq in), supply actuators for the elevons, body flap, rudder/speed brake, and power to actuate main engine thrust vector controls, landing gear, brakes, and steering. Pneumatic requirements of the main propulsion system are supplied by

equipment include flight control system panel; three Aerospace data display units; three keyboards; four Norden (UTC) cathode ray tube displays (three in OV-101); nineteen Sperry MDM (multiplexer/demultiplexer) units; three Conrac engine interface units; Martin Marietta electronics warning system; and Westinghouse solid-state power controllers and master timing unit.

DIMENSIONS, EXTERNAL:

Orbiter:
 Wing span 23.79 m (78 ft 0.68 in)
 Wing aspect ratio 2.265
 Wing mean aerodynamic chord 12.06 m (39 ft 6.81 in)
 Length 37.26 m (122 ft 3.06 in)
 Length of fuselage 32.775 m (107 ft 6.3 in)
 Height 17.25 m (56 ft 7 in)
Boosters (2, each):
 Length 45.47 m (149 ft 2 in)
 Diameter 3.71 m (12 ft 2 in)
External propellant tank:
 Length 46.89 m (153 ft 10 in)
 Diameter (excl external insulation) 8.41 m (27 ft 7 in)

Shuttle complete:
 Length overall 56.14 m (184 ft 2.4 in)
 Height overall 23.35 m (76 ft 7.2 in)

DIMENSIONS, INTERNAL (ORBITER):

Payload bay:
 Length 18.29 m (60 ft 0 in)
 Diameter 4.57 m (15 ft 0 in)
Crew module: volume
 71.50 m³ (2,525 cu ft)

AREAS (ORBITER):

Wings, gross 249.91 m² (2,690 sq ft)
 Elevons (total) 38.38 m² (413.14 sq ft)
 Rudder/speed brake 9.09 m² (97.84 sq ft)
 Vertical tail surfaces (total) 38.39 m² (413.25 sq ft)
 Body flap 12.61 m² (135.75 sq ft)

WEIGHTS:

Orbiter:
 Weight empty 68,040 kg (150,000 lb)
 Atmospheric ferry weight 70,805 kg (156,100 lb)
 ALT landing weight 68,040-77,110 kg (150,000-170,000 lb)
 Design landing weight 85,275 kg (188,000 lb)
Orbiter payload:
 due east 29,485 kg (65,000 lb)
 at 104° 14,515 kg (32,000 lb)

Boosters (2, each) 583,573 kg (1,286,560 lb)
 External propellant tank:
 empty 33,300 kg (73,415 lb)
 full 741,727 kg (1,635,231 lb)
 Shuttle complete 1,998,500 kg (4,406,000 lb)

PERFORMANCE:

Shuttle, total thrust at lift-off 34,410 kN (7,736,000 lb)
Orbiter:
 Orbital speed approx 15,295 knots (28,325 km/h; 17,600 mph)
 Orbit (14,515 kg; 32,000 lb payload) 50 x 100 nm (92.5 x 185 km; 57.5 x 115 miles)
 Orbit (29,485 kg; 65,000 lb payload) 150 nm (277.5 km; 172.5 miles)
 L/D ratio (hypersonic) during re-entry approx 1.3
 LD ratio (subsonic), max trimmed with speed brake closed approx 4.9
 Nominal touchdown speed (unpowered) 175 knots (324 km/h; 201.5 mph) EAS
Manoeuvring g limits:
 ALT +2.0; -1.0
 Atmospheric ferry +2.25; -1.0

DASSAULT-BREGUET

AVIONS MARCEL DASSAULT/BREGUET AVIATION; Head Office: 27 rue du Professeur Victor Pauchet, 92420-Vaucresson, France

When Dassault-Breguet released preliminary details of the Garrett-engined version of its Falcon 20 twin-turbofan business jet in the late Spring of 1976, it stated that the new power plant, complete with nacelles and thrust reversers, would be offered initially as a retrofit for existing Falcon 20 aircraft, with full production of the new model, designated Falcon 20G, scheduled for a later date.

A further statement, in the Autumn of 1976, announced that a tender by Falcon Jet Corporation, distributor and support centre for Falcons in the USA, had proved the lowest bid to meet a US Coast Guard requirement for a medium-range surveillance aircraft known by the project designation HX-XX. This was confirmed on 5 January 1977, when William T. Coleman Jr, then US Secretary of Transportation, authorised

the Coast Guard to award a contract for 41 aircraft to Falcon Jet Corporation. Cost of each aircraft, as tendered, will be \$4,996,251.

DASSAULT-BREGUET FALCON 20G

The 41 Falcon 20Gs ordered by the US Coast Guard will be delivered at the rate of one a month, beginning in mid-1979. In choosing the type to meet its HX-XX requirement, the Coast Guard had expressed a preference for a turbofan-powered aircraft, with a minimum cabin/cockpit volume of 17 m³ (600 cu ft), able to perform the full range of MRS (medium-range surveillance) missions. These are listed as search and rescue (28.5% of total flight hours), marine environmental protection (30.3%), enforcement of laws and treaties (18.9%), marine science activities (10.6%), logistics support (5.4%), engineering support (3.8%), domestic icebreaking (1.7%), and short-range aids to navigation (0.8%).

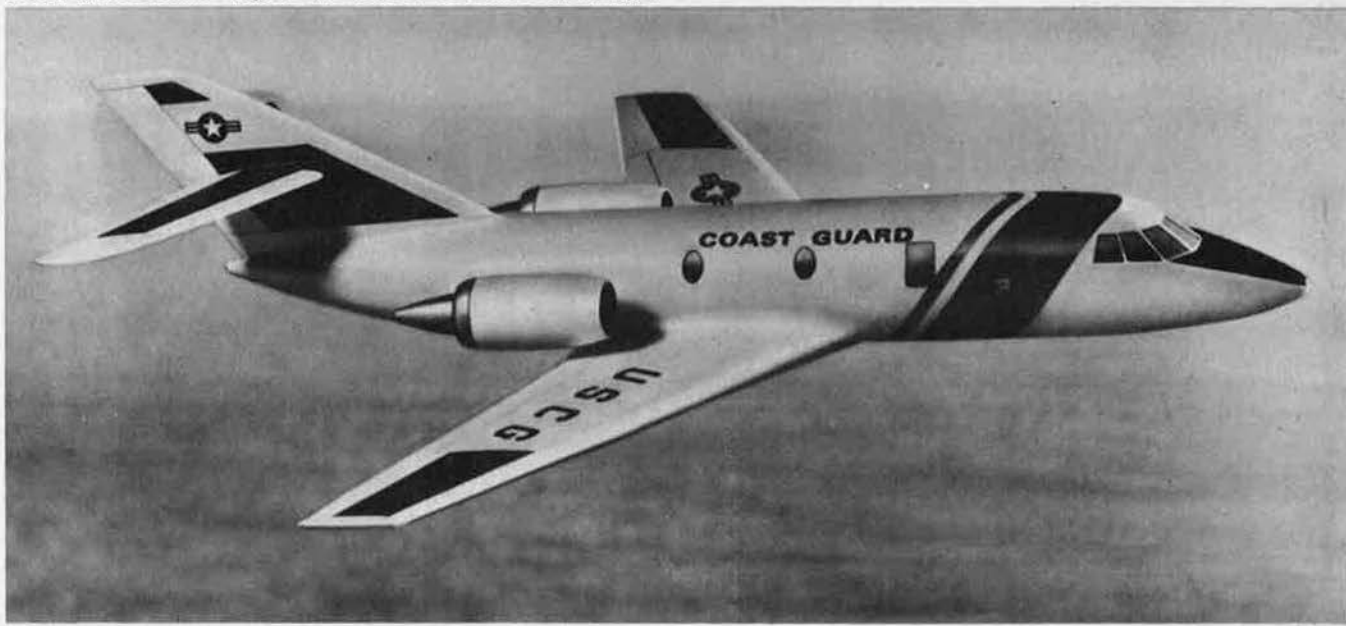
The basic airframe of the HX-XX version of the Falcon 20G will be similar to that of the Falcon 20F, described fully in the current *Jane's*. Changes to the power plant, systems, and electronics are summarised as follows:

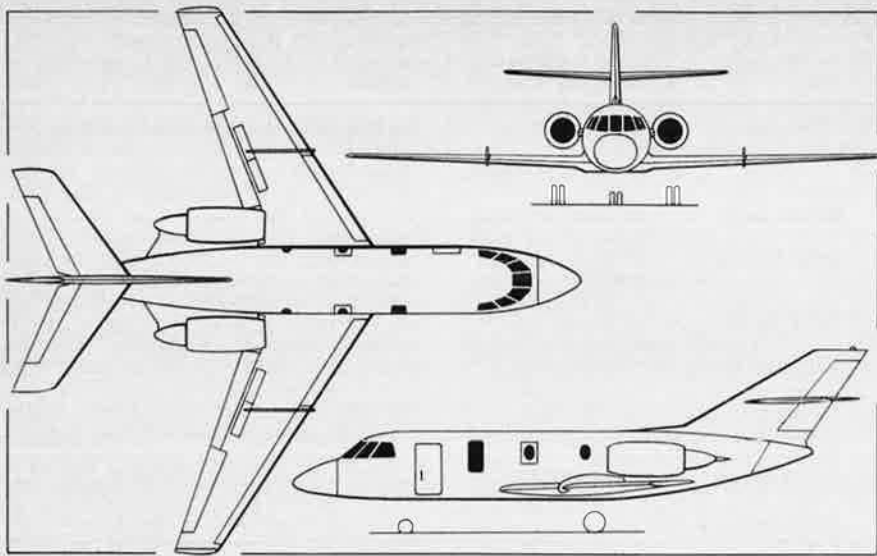
POWER PLANT: Two Garrett AiResearch

ATF 3-6 turbofan engines (each 23,575 kN; 5,300 lb st), meeting current and proposed FAR Pt 36 noise standards. Entire engine open to borescope inspection. Fuel tankage, total capacity 5,810 litres (1,278 Imp gallons; 1,535 US gallons), divided into two identical halves, one for each engine with cross-feed capability. Wing feeder tanks pressurised with bleed air, so that fuel will continue to flow to engines with all pumps turned off. Single-point refuelling in about 12 minutes. Fuel heaters and bacterial protection standard.

SYSTEMS: Pressurisation and air-conditioning by engine bleed air; max pressure differential 0.585 bars (8.5 lb/sq in). Two independent hydraulic systems, with twin engine-driven pumps; electric standby pump to power primary flight control system in emergency. All primary flight controls utilise dual hydraulic actuators, artificial feel, electric trim, and manual backup. Each half of the dual actuator is fed by one of the hydraulic systems;

Model of the Dassault-Breguet Falcon 20G in US Coast Guard insignia





Dassault-Breguet Falcon 20G (two Garrett AiResearch ATF 3-6 turbofan engines) (Pilot Press)

failure of either system will not affect handling, as each actuator has sufficient power for full control deflection. DC electrical system, with two 9kW engine-driven starter/generators, two nickel-cadmium batteries, and static inverters. Ground power receptacle. One 15kVA alternator driven by Garrett APU. Wings and nacelles anti-iced by engine bleed air, permitting flight under maximum icing conditions with one engine out.

ELECTRONICS AND EQUIPMENT: Basic electronics package, supplied by Collins, will include an area navigation system, inertial platform, digital air data system, UHF, VHF, and HF communications, VOR, Tacan, all-weather radar, dual flight directors, IFF, dual radio altimeters, and UHF, VHF, and LF direction finding equipment. Provision for future integration of a special sensor package by the Coast Guard.

DIMENSIONS, EXTERNAL:

Wing span	16.30 m (53 ft 6 in)
Length overall	17.15 m (56 ft 3 in)
Height overall	5.32 m (17 ft 5 in)
Tailplane span	6.74 m (22 ft 1 in)

WEIGHTS:

Weight empty	7,960 kg (17,550 lb)
Operating weight empty	8,142 kg (17,950 lb)
Max T-O weight	13,270 kg (29,255 lb)

PERFORMANCE (estimated):

Max cruising speed at	12,200 m (40,000 ft)	Mach 0.8
Econ cruising speed at	12,500 m (41,000 ft)	Mach 0.72
Initial cruising height	12,500 m (41,000 ft)	
Range, commercial version with 4 passengers and baggage, reserves for 150 nm (275 km; 172 mile) diversion and 45 min hold	2,100 nm (3,890 km; 2,415 miles)	

BELL
BELL HELICOPTER TEXTRON; Head Office: PO Box 482, Fort Worth, Texas 76101, USA

BELL MODEL 301

US Army designation: XV-15

Bell Helicopter announced in May 1973 that it had been chosen by NASA and the US Army to build and test two twin-engine tilt-rotor research aircraft, known as Bell Model 301 and by the Army designation XV-15. Estimated cost of the four-

year programme is \$29.2 million; it is being funded and managed jointly by NASA Ames Research Center and the US Army's Air Mobility Research and Development Laboratory.

Roll-out of the first XV-15 took place on 22 October 1976 at Bell's Arlington Flight Research Center, after which a programme of ground tests was initiated on a specially built test stand. This permitted operation of the aircraft's power plant in cruise, intermediate, and helicopter modes, for evaluation of engine and rotor performance, prior to the first hovering flight which was scheduled for early 1977. Following preliminary hovering tests it was planned to deliver this first XV-15 to Ames Research Center at Moffett Field, California, for extensive testing in NASA's 12.2 x 24.4 m (40 x 80 ft) large-scale wind tunnel. On completion of wind tunnel testing, airworthiness flight tests by Bell will begin in mid-1977, to establish a safe operating envelope, evaluate the aircraft's perfor-

mance, dynamic stability, and handling characteristics, and assess the potential of this concept to meet military and civil transport needs.

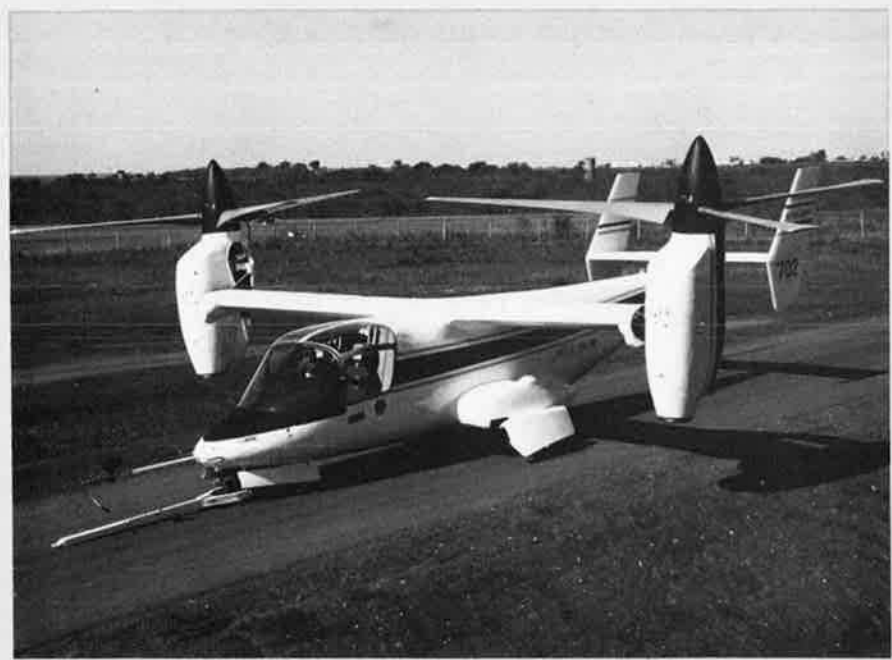
Bell Helicopter has been involved in tilt-rotor technology since 1951, proving the concept feasible with its XV-3 prototype, described in the 1962-63 *Jane's*. Since that time development of tilt-rotor systems has progressed steadily, leading to the Model 301 which Bell proposed to meet the NASA/Army requirement, and which received the official designation XV-15 on acceptance. Each aircraft has a fuselage and tail unit built under subcontract by Rockwell International's Tulsa Division. Other major items produced under subcontract include automatic flight controls by Calspan Corporation of Buffalo, New York; conversion and flap drive systems by SPECO Division of Kelsey Hayes Company, Springfield, Ohio; landing gear actuators by Heroux Ltd, Longueuil, Quebec; hydraulic pumps by Abex Corporation, Aerospace Division, Oxnard, California; hydraulic components by Hydraulic Research Textron, Valencia, California; and radios by King Radio Corporation, Olathe, Kansas.

The airframe configuration of the XV-15 is basically that of a conventional fixed-wing aircraft. However, the wingtip-mounted engine nacelles and rotor driveshafts can be swivelled to a vertical position for VTOL operation, when the aircraft's handling characteristics are similar to those of a tandem-rotor helicopter. Control is like that of a conventional helicopter, and no auxiliary devices are needed. The downwash velocity, manoeuvre capability, and hover endurance are equivalent to those of a helicopter.

Speeds at which conversion to the cruise mode are practicable extend over a range of more than 60 knots (110 km/h; 70 mph). Rotor controls are phased automatically throughout the operation, and complete conversion or reconversion can be accomplished in 12 seconds.

The XV-15 has a stability and control augmentation system to improve handling qualities and enhance pilot efficiency. Ejection seats, by the Columbus Aircraft Division of Rockwell International, Columbus,

Bell XV-15 tilt-rotor research aircraft, with wingtip power plants tilted to helicopter mode





First XV-15 on ground test stand, with propeller/rotors in cruise configuration

Ohio, have been installed as a safety feature during flight trials.

Future commercial and military aircraft which might derive from the XV-15 would have a wing span of about 10.67 m (35 ft) and fuselage length of 12.50 m (41 ft). They would carry 15 troops in military service or 12 passengers as civil transports. **TYPE:** Twin-engined tilt-rotor research aircraft.

WINGS: Cantilever high-wing monoplane of all-metal construction. Dihedral 2°. Single power plant in tilting nacelle mounted at each wingtip. Wide-span flap/aileron occupy approximately the outer two-thirds of each wing. Hydraulically-operated trailing-edge flaps mounted between flap/aileron and fuselage.

FUSELAGE: All-metal semi-monocoque struc-

ture, with sponson on each side of fuselage to accommodate main landing gear.

TAIL UNIT: Cantilever all-metal structure, with conventional elevators and twin end-plate swept fins and rudders.

LANDING GEAR: Hydraulically-retractable tricycle type with twin wheels on each unit. Menasco oleo-pneumatic shock-absorbers. Nosewheels retract aft. All units fully enclosed by doors when retracted.

POWER PLANT: Two 1,342 kW (1,800 shp) Avco Lycoming LTC1K-4K turboshaft engines (uprated examples of the T53 turboshaft, qualified for operation in the vertical mode). Each drives a Bell three-blade all-metal stiff-in-plane gimballed rotor, with an elastomeric hub spring to increase control power and damping.

Rotor blades are of high-twist design and of advanced aerofoil section, optimised for operation in both helicopter and high-speed fixed-wing aircraft configurations. Interconnecting driveshafts and redundant tilting mechanism permit single-engine operation and fail-safe tilt capability. Engine nacelles tilted for conversion by double ball screw hydraulic actuators with manual backup. Advanced-technology transmission design will provide up to 45 minutes' safe operation following loss of lubrication. Four Uniroyal crash-resistant fuel cells, two in each wing; total capacity 676 kg (1,490 lb). Rotor rpm: helicopter mode 565; propeller mode 458. Rotor tip speed: helicopter mode 225.5 m (740 ft)/second; propeller mode 183 m (600 ft)/second.

ACCOMMODATION: Crew of two, seated side by side on ejection seats in enclosed cabin. Door on starboard side, forward of wing.

SYSTEMS: Three independent hydraulic systems, each of 207 bars (3,000 lb/sq in). Dual DC and AC electrical systems, with two 300A starter/generators. Two 13Ah nickel-cadmium batteries.

DIMENSIONS, EXTERNAL:

Rotor diameter	7.62 m (25 ft 0 in)
Rotor blade chord	0.36 m (1 ft 2 in)
Wing span, between rotor axes	9.80 m (32 ft 2 in)
Wing chord (constant)	1.60 (5 ft 3 in)
Wing aspect ratio	6.12
Width overall, rotors turning	17.42 m (57 ft 2 in)
Length overall, excl instrument boom	12.83 m (42 ft 1 in)
Height overall, rotors in hover mode	4.66 m (15 ft 3½ in)
Tailplane span	3.91 m (12 ft 10 in)
Wheel track	2.95 m (9 ft 8 in)
Wheelbase	4.80 m (15 ft 9 in)
Nacelle ground clearance in hover mode	0.97 m (3 ft 2 in)

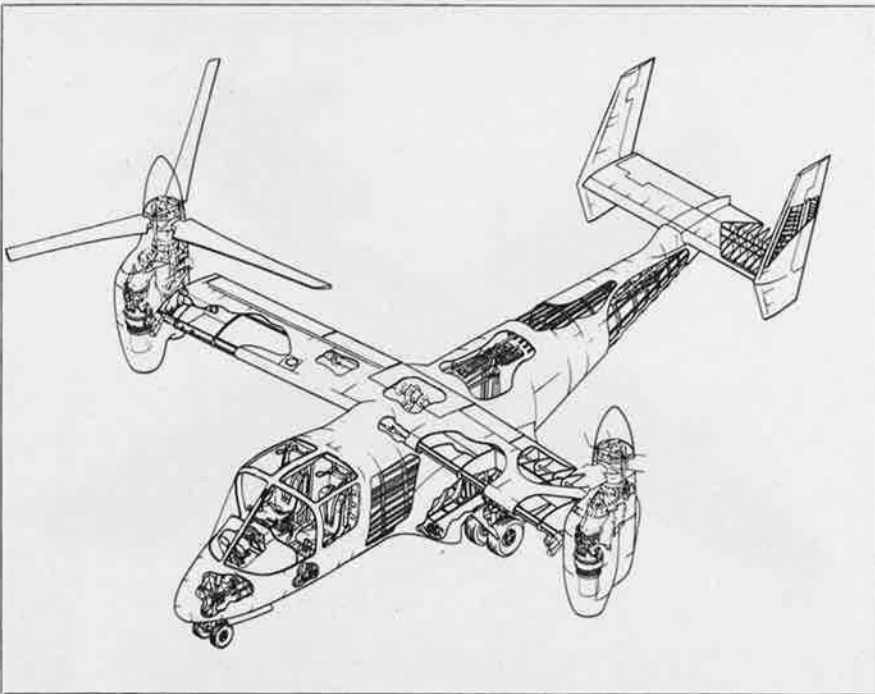
DIMENSIONS, INTERNAL:

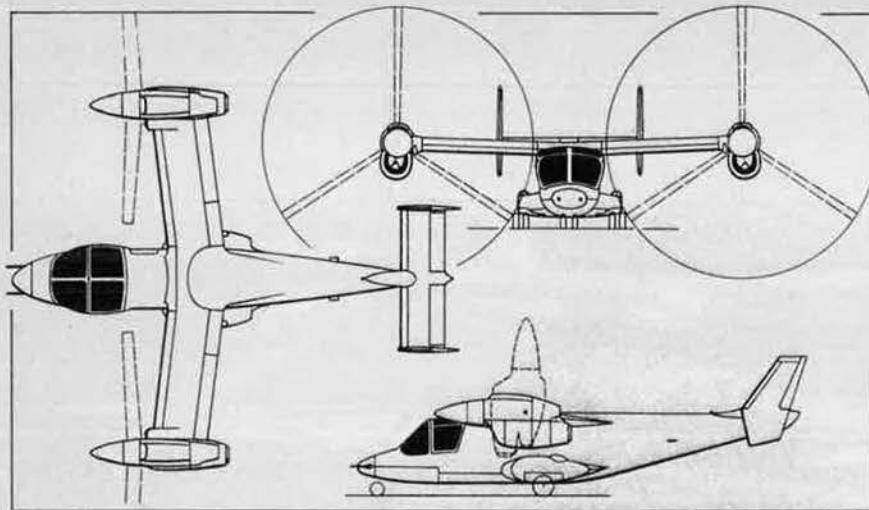
Cabin: Length	3.96 m (13 ft 0 in)
Max width	1.52 m (5 ft 0 in)
Max height	1.52 m (5 ft 0 in)
Volume	8.50 m³ (300 cu ft)

AREAS:

Rotor disc (each)	45.60 m² (490.87 sq ft)
Wings, gross	15.70 m² (169 sq ft)
Trailing-edge flaps (total)	1.02 m² (11 sq ft)

Cutaway drawing showing structural layout of XV-15. Note interconnecting driveshaft passing through leading-edges of sweptforward wings





Bell XV-15 prototype tilt-rotor research aircraft (Pilot Press)

Flap/ailerons (total)	1.88 m ² (20.2 sq ft)
Fins (total)	3.99 m ² (43.0 sq ft)
Rudders (total)	0.70 m ² (7.5 sq ft)
Tailplane	3.46 m ² (37.25 sq ft)
Elevators (total)	1.21 m ² (13.0 sq ft)
WEIGHTS AND LOADINGS (estimated):	
Weight empty	4,341 kg (9,570 lb)
Design VTOL gross weight	5,897 kg (13,000 lb)
Max VTOL gross weight	6,804 kg (15,000 lb)
Rotor disc loading at 5,897 kg (13,000 lb) AUV	64.66 kg/m ² (13.24 lb/sq ft)
Wing loading at 5,897 kg (13,000 lb) AUV	375.6 kg/m ² (76.92 lb/sq ft)
PERFORMANCE (estimated, at design VTOL gross weight, unless stated otherwise):	
Max diving speed at 3,810 m (12,500 ft)	360 knots (666 km/h; 414 mph)
Max cruising speed at 5,180 m (17,000 ft)	330 knots (612 km/h; 380 mph)
Max speed in helicopter mode, mast angle 75°	120 knots (222 km/h; 138 mph)
Min control speed with rotors acting as tractor propellers	120 knots (222 km/h; 138 mph)
Endurance in hover mode at S/L, ISA, 10% reserve fuel	1 hour
Endurance, cruising at 200 knots (370 km/h; 230 mph) at 6,100 m (20,000 ft) with 10% reserve fuel	2.2 hour
Max range at optimum speed and height, 10% reserve fuel	410 nm (760 km; 472 miles)

BRITTEN-NORMAN
BRITTEN-NORMAN (BEMBRIDGE) LTD;
 Head Office: Bembridge Airport, Bembridge, Isle of Wight PO35 5PR, England

On the basis of experience with the Defender military version of the Islander, Britten-Norman has proposed development of a similar military variant of the three-engined Trislander.

BRITTEN-NORMAN MILITARY TRISLANDER

The Trislander's rough-field characteristics, lack of complicated systems, large volumetric capacity of 9.27 m³ (328 cu ft), and disposable load of more than 1,680 kg (3,700 lb) well suit it for military support roles. Five large doors allow quick loading

and unloading of troops, supplies and ammunition. Conversion from troop carrying to freighting takes five minutes, with seat stowage in the baggage bay if required. A maximum floor loading of 585 kg/m² (120 lb/sq ft) permits carriage of high-density loads. An unobstructed cabin 8.24 m (27 ft 0½ in) long allows loads such as spare gun barrels or piping to be accommodated. Ease of loading and unloading is enhanced by the door sill height of only 0.45 m (1 ft 6 in) above the ground.

Up to sixteen 90 kg (200 lb) or eleven 150 kg (330 lb) parachutists can be carried, and deployed quickly by free fall or static line. Supplies can be airdropped through the rear doors.

An endurance of up to nine hours with underwing tanks gives the Military Trislander an effective range of more than 1,000 nm (1,850 km; 1,150 miles). Combined with provision for advanced search radars, this enables the aircraft to fill the gap between types like the Maritime Defender and Breguet Atlantic for maritime patrol, search

and rescue. The large payload/range capability permits a wide variety of electronic communications and detection equipment to be installed, as well as SAR stores on underwing attachments. Crew rest, cooking, and toilet facilities would be standard on such versions.

DIMENSIONS, EXTERNAL:

Wing span	16.15 m (53 ft 0 in)
Wing chord (constant)	2.03 m (6 ft 8 in)
Wing aspect ratio	7.95
Length overall	15.01 m (49 ft 2½ in)
Fuselage:	
Max width	1.21 m (3 ft 11½ in)
Max depth	1.46 m (4 ft 9¾ in)
Height overall	4.32 m (14 ft 2 in)
Tailplane span	6.44 m (21 ft 1½ in)
Wheel track (c/l of shock-absorbers)	3.60 m (11 ft 10 in)
Wheelbase	7.11 m (23 ft 4¼ in)

WEIGHTS (Provisional):

Weight empty	2,631 kg (5,800 lb)
Max disposable load	1,700 kg (3,745 lb)
Max T-O weight	4,536 kg (10,000 lb)

PERFORMANCE (Provisional):

Max level speed at S/L	157 knots (290 km/h; 180 mph)
Cruising speed (67% power) at 1,525 m (5,000 ft)	135 knots (249 km/h; 155 mph)
Stalling speed, flaps down	50 knots (93 km/h; 58 mph)
Max rate of climb at S/L, ISA	305 m (1,000 ft)/min
Rate of climb at S/L, ISA +30°C	260 m (850 ft)/min
Service ceiling, ISA	3,780 m (12,400 ft)
Service ceiling, ISA +30°C	3,350 m (11,000 ft)
T-O run, ISA	412 m (1,350 ft)
T-O run, ISA +30°C	500 m (1,643 ft)
T-O to 15 m (50 ft), ISA	585 m (1,919 ft)
T-O to 15 m (50 ft), ISA +30°C	759 m (2,490 ft)
Range with max payload at 67% power	225 nm (416 km; 259 miles)
Max range, with thirteen 90 kg (200 lb) troops, at 59% power	650 nm (1,203 km; 748 miles)
g limit	+3.3

Britten-Norman Military Trislander. This model of the maritime patrol version shows the aircraft with underwing tanks and life raft/survival packs



On October 21, 1976, retired Air Force Lt. Gen. Ira C. Eaker, who commanded both VIII Bomber Command and then Eighth Air Force in 1942-43, and Dr. Arthur G. B. Metcalf, Chairman of the Board of the United States Strategic Institute, met with Albert Speer, Hitler's minister of armaments production, at Mr. Speer's home in Heidelberg. These highlights of their discussion concerning the effects of Allied airpower on German production have been made available to AIR FORCE Magazine by General Eaker and Dr. Metcalf. The insights that were revealed in the conversations are a significant contribution to understanding the development of strategic airpower and its contribution to victory in World War II.

Conversations With Albert Speer

BY LT. GEN. IRA C. EAKER, USAF (RET.), AND ARTHUR G. B. METCALF

EAKER: Mr. Speer, it seems we worked at cross-purposes in the last war. It was your mission to supply the weapons for the Nazi land, sea, and air forces. It was my job to prevent your accomplishing that by bombing your munitions factories and their supporting systems—oil, ball bearings, power, and transportation.

If I had had a more accurate estimate of your problems, it would have improved our chances of accomplishing our mission.

Now, more than thirty years after Allied bomber operations began in World War II, there is a renewal of interest in airpower operations in that war. One of the major current interests concerns this question: Which hurt you more, the RAF night bombing or the American daylight bombing? Or was the combination, called "round-the-clock bombing," the most effective Allied strategy?

SPEER: At first, of course, it was the British night

bombing. We had that to deal with a year before the American daylight raids began, and a year and a half before you made significant attacks with a hundred or more of your daylight bombers.

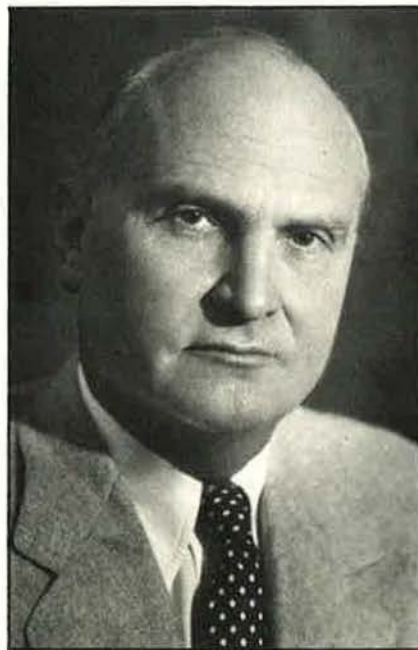
After the British night bombing raids on our industry in the Ruhr, and especially their heavy raids on coastal cities like Bremen and Hamburg, I was directed to concentrate on night-fighter production. Eventually, we began to take heavy toll of the British night bomber force as a result of devising tactics and techniques and developing equipment to deal with the night bombing effort.

I often wondered why the RAF Bomber Command did not continue their thousand-plane raids on our cities. Had they been able to do so, the morale of the German population and the German labor force might have been significantly weakened.

Of course, one reason why the burning of Bremen did not hurt the morale of our people more was because they



Albert Speer



Lt. Gen. Ira C. Eaker, USAF (Ret.)



Dr. Arthur G. B. Metcalf

did not know at the time the full measure of that catastrophe. Hitler's Propaganda Ministry had full control over all communications. Naturally they did not play up bad news. I, myself, did not know the full extent of the fire bombing of Bremen, the horrible loss of civilian life, until much later.

Later on, when American bombers came in daylight in ever-increasing numbers, attacking our munition factories very effectively, our military leaders repeatedly told Hitler that unless the daylight bombers could be stopped, the end of the war was clearly in sight. So I was ordered to concentrate on day-fighter production. For a time we held our own, often causing your raids heavy losses, as at Schweinfurt and Regensburg on August 17, 1943, but eventually you overwhelmed us. So I should suppose that it was the combined air effort that destroyed our means to wage war, and eventually the will and resources to continue.

You will note that in my book *Spandau* [see "Airman's Bookshelf," p. 87] I pointed out that you in fact had started a second front long before you crossed the Channel with ground forces in June 1944. Air Marshal Milch told me that your combined air effort forced us to keep 900,000 men tied down on the so-called "West Wall" to defend against your bombers. This, of course, included the fighter defenses, the antiaircraft artillery people, and the fire fighters, as well as a large number of workmen needed for repairing damaged factories. There was also the large number of artillery pieces required all over Germany because we never knew which of our industrial cities you would attack next. It was your freedom of target choice and our uncertainty that enabled a limited number of bombers to tie down such tremendous numbers of people and equipment in our defense effort.

I suspect that well over a million Germans were ultimately engaged in antiaircraft defenses, as well as 10,000 or more antiaircraft guns. Without this great drain on our manpower, logistics, and weapons, we might well have knocked Russia out of the war before your invasion of France.

EAKER: Your view of the bomber offensive as constituting a second front is one I have never seen advanced elsewhere. I know you called it to the attention of Sir Arthur Harris, and he quoted it in an address he delivered last September.

[The summary referred to by Speer appears on page 339 of the English translation of *Spandau, The Secret Diaries*. An excerpt follows:

August 12, 1959. Recently a book was smuggled into my cell, *The Army Air Forces in World War II*, a semiofficial history by Craven and Cate. . . . It seems to me the book misses the decisive point. . . . It places its emphasis on the destruction the air raids inflicted on German industrial potential and thus upon armaments production. . . . The real importance of the air war consisted in the fact that it opened a second front long before the invasion of Europe. That front was the skies over Germany. . . .]

Lt. Gen. Ira C. Eaker, USAF (Ret.), completed pilot training in 1918. Prior to World War II, he served as Executive Assistant to the Chief of the Air Corps and participated as a pilot in many pioneering flights, including the Question Mark endurance flight and the Pan-American flight of 1926. During the war, he commanded successively VIII Bomber Command, Eighth Air Force, and Mediterranean Allied Air Forces. General Eaker flew on the first heavy bombing raid against Occupied Europe and the first shuttle bombing mission to bases in Russia. Retired since 1947, he writes a syndicated column on defense affairs, and has been a frequent contributor to AIR FORCE Magazine.

Dr. Arthur G. B. Metcalf is the Chairman of the Board and President of Electronics Corp. of America, the founder and Chairman of the US Strategic Institute, and Strategic Studies Editor of Strategic Review. A former faculty member at MIT and Harvard, Dr. Metcalf has been a test pilot and was a pioneer in the field of aircraft control and stability. During World War II, he served as a lieutenant colonel. He is the author of many articles in the fields of mathematics, aerodynamics, and strategy and doctrine.

EAKER: Which of the target systems—shipbuilding, fighter plane and engine factories, oil, ball bearings, or transportation—was most decisive?

SPEER: It was the combination. At first I was most worried about ball bearings. If you had repeated your bombing attacks and destroyed our ball-bearing industry, the war would have been over a year earlier. Your failure to do so enabled us to get bearings from Sweden and other sources and to move our damaged ball-bearing machines to dispersed localities.

EAKER: There were several reasons why we did not repeat our attacks on Schweinfurt immediately. In the first place, the strike photos showed great damage. Secondly, we sent out 376 bombers that day against Schweinfurt and Regensburg and lost sixty. No air force can sustain that loss rate. We always tried to hold our operational losses below the programmed number of replacement bombers and crews. I was determined that our bomber force should always be a growing force.

In addition, we had other target systems of high priority, such as aircraft production, oil, transportation, etc. If we had continued all our effort against one of these systems, you would have concentrated your defenses around that system, and our resulting losses would have been unacceptable. Further, we always endeavored to send our daylight bombers against a high-priority target, which was for that particular day free of cloud cover. All these conditions naturally diversified our bombing attacks.

SPEER: You are quite right. Ball bearings were not our only critical weapons production system. Your attacks on our petroleum supply, for example, were also decisive in our pilot training program. After your successive raids had severely damaged Romanian oil sources, you followed up by mining the Danube and by constant attacks on locks and barges so that eventually our supply of gasoline and oil from natural sources was greatly diminished. Then you turned, quite logically, to our synthetic oil production. By that time you had such overwhelming air superiority that your long-range fighters were not all required to protect your bombers, but

began very disastrous attacks on fighter planes on our airdromes.

Your air attacks on our transportation system were also very effective. They not only interfered with transport of troops and their equipment, but also disrupted my weapons production system. We often were producing engines and planes in required numbers, but we could not get them together from our dispersed factory sites. This was particularly true with respect to rail and barge transportation throughout Germany, especially in critical locations like the steelmaking Ruhr, which also supplied coal and coke to other critical industries.

The Allied air attacks on our shipping did much more damage than you apparently realized at the time—not only the destruction of the shipbuilding facilities in our coastal cities, but the attacks on our submarine pens in the occupied Channel ports as well. And, of course, it was your long-range air reconnaissance over the Atlantic sea lanes that eventually reduced our submarine effectiveness and enabled the Americans adequately to supply those vast invasion forces. Sir Arthur Harris undoubtedly was correct in his contention that the so-called Combined Bomber Offensive was critical, perhaps decisive, in the three great campaigns he described: land, sea, and air. [See also *"The Three Victories of the Bomber Offensive,"* December '76 issue.]

EAKER: Aside from the bombing of German industry, a very high priority with the Allies was the destruction of the Luftwaffe. Since the Luftwaffe did not show on June 6, 1944, when that great naval armada appeared off the three French invasion beaches, we thought we had positive evidence that our Allied air offensive had largely destroyed the Luftwaffe.

SPEER: I think your surmise was essentially correct. I was still turning out the required number of fighter planes, but by that time we were out of experienced pilots. We were so short of fuel that we could give the incoming pilots in our flying schools only 3½ hours flying training per week. These poorly trained and inexperienced Luftwaffe pilots, by that time, were suffering heavy losses. A pilot only survived for a maximum of seven missions against your bombers and their accompanying long-range fighters in 1944 and '45. This was very discouraging to German pilots. It represented an attrition of fourteen percent for each mission. I do remember Hitler had ordered that 1,000 fighters take to the air on the day of the invasion. I do not know the reason for their not showing up. Perhaps General Galland [chief of German fighters] could tell you.

METCALF: Do you believe, as some do, that the Luftwaffe was misused?

SPEER: Yes, I do. First of all, the performance of our fighters and bombers, which had been developed well before the war, was inferior to your military aircraft.

Hitler insisted that the Me-262, the twin-jet fighter we developed, be converted to a bomber, since Hitler was interested only in *offensive* weapons. It was a great mistake. I believe that as a fighter, it would have offered much more serious opposition to your bombers than the fighters we did use. When we removed the guns, ammunition, and other fighter armament from the Me-262, it was capable of carrying only a single 500-pound bomb, which was hardly worthwhile. Also, the shift of our aircraft industry from the production of bombers to the production of fighters and then back to the production of bombers was a nightmare. This disruption was hardly conducive to producing the aircraft we needed with which to fight the war.

METCALF: Was Göring's leadership of the Luftwaffe bad?

SPEER: One would have to say yes. After all, he spent most of his time at Karinhall, his country estate, dressed in long, exotic robes, heavily bejeweled, etc. As you know, he was on drugs for a time. At the time of the Nuremberg trials Göring was, of course, off the drugs and he had lost a great deal of his excess weight. At that time he behaved like a new person and exhibited many qualities of leadership and clearheadedness. It was quite a surprising transformation.

METCALF: Was the German failure to execute the cross-channel invasion of England ("Sea Lion") due to your inability to gain command of the air over Britain?

SPEER: Yes. And here again, the need was for a superior fighter capable of knocking down the Royal Air Force, which would have played havoc with our invasion flotilla and our troops on invasion barges during the long passage across the Channel.

METCALF: Was it a mistake to interrupt your campaign against the Royal Air Force, whose fighters were having such telling effects on the Luftwaffe during the Battle of Britain, in order to bomb population centers? That shift in strategy gave the RAF a breather—a chance to recover from the systematic attrition of its fighter forces.

SPEER: Yes, it was. Here again was seen the influence of Adolf Hitler.

EAKER: As I remember, you were charged at the Nuremberg trials with the use and abuse of a so-called slave labor force of some 6,000,000 conquered people.

SPEER: The foreign labor force was guarded, housed, fed, and under the general supervision of Himmler. I only made requisitions and was allotted the labor required in our factories. In hindsight, I should have been more concerned about the treatment of this labor force. My factory managers complained about the training

problem resulting from the frequent loss of labor, probably due in part to lack of proper housing, feeding, and care.

This labor force had some distinct limitations. As you probably know, the loss of our code machine, which enabled your Ultra process to intercept [and decode] our radio communications, was due to this labor. There were many factory fires that probably were set by the laborers, and continual reports of sabotage.

How much wiser you were to bring your women into the labor force. Had we done that initially, as you did, it could well have affected the whole course of the war. We would have found out, as you did, that women were equally effective and, for some skills, better than male labor. We never did, despite our hard-pressed munitions production in the late years of the war, make use of this great potential.

METCALF: Was foreign labor worth the number of occupation troops you had to use to combat local resistance activities that were heightened by taking those workers out of the countries?

SPEER: We had an expression that "Sauckel [Fritz Sauckel, Gauleiter of Thuringia, who was in charge of all foreign labor] was the greatest ally of the French Maquis," whose activities pinned down large numbers of military manpower. On balance, I guess it was not worthwhile. It also was a management problem within our own country to guard these people to prevent sabotage, etc. It was through [Polish workers] that the cryptographic machines for Ultra were handed over to the enemy. No, I don't think the foreign labor program did as much good as it did harm.

EAKER: In your book you refer often to the unity of effort of the whole German people behind Hitler and his war effort. Would you anticipate that the people of West Germany would be equally unified under their present government if the Warsaw Pact countries attacked across the NATO line?

SPEER: Your premise that the German people were all united behind Hitler I do not believe to be entirely valid. You will recall, there were many attempts to assassinate him. As the dreary war years wound on, there was great disaffection about various phases of his leadership. Undoubtedly Hitler's early successes in the Low Countries and in France gave our people hope that all Germany would again be reunited, that all the territories lost in the First World War would be recovered. Also, as you may remember, we had been suffering great economic depression and deprivation with many people out of work and with the tragic depreciation of the mark. With the Second World War, all that changed, of course. This undoubtedly made a tremendous impression on our people, and I can see where you, on the other side, would get the idea of our united effort.

There was great doubt about the wisdom of attacking Russia. I believe most of our military leaders and knowledgeable civilians doubted the wisdom of fighting

on two fronts. After 1944, we frequently heard of Churchill's remark that Hitler was the Allies' secret weapon, and that was probably true.

I have little doubt that the German people will support their NATO commitment and will fight with their accustomed valor against any invasions of our Homeland. The great difficulty NATO faces, in my judgment, is that it is composed of fourteen separate nations. It must be very difficult to get concerted action and quick decisions from such a conglomerate.

Now I would like to ask some questions about the Allied air effort in World War II. I have often wondered why you began your bombing attacks with such limited forces. Would it not have been better to have waited until you had several hundred, perhaps a thousand, bombers available?

EAKER: We did not have that option, for several reasons. After Pearl Harbor, there was great pressure, both at the political level and among the military leaders, to send all our bombers against the Japanese. If we had not begun operations against the Nazis, according to our prewar plan, this Pacific deployment would have taken place. The RAF bomber force would then have been left to deal alone with the Luftwaffe and German weapons production. It was only by demonstrating, as early as possible, that the daylight bombing offensive against Germany was feasible and productive that we were able to sustain our bomber buildup for operations out of Britain, as originally planned.

We learned during those limited early operations how to operate bomber forces under the conditions that then prevailed. If we had waited for the arrival of a thousand bombers before making attacks on German-occupied Europe, it probably would have been a tragic disaster. We learned how to deal with the weather, what kind of training we would have to give our combat crews, what types of formations to fly, and what communications we would require. We also learned that significant changes would be required in our aircraft.

Here is another consideration you may not have taken fully into account. Armies and navies have clashed for centuries, and their battles, strategies, and tactics have been recorded, studied, and analyzed by historians and war colleges of many nations. Prior to World War II, airpower had never had similar experience. Although Lord Trenchard of Britain, General Douhet of Italy, and Gen. William Mitchell of the US had prophesied that strategic airpower could exercise a decisive influence on warfare, those theories had never been tested.

The airplane was less than fifty years old. Flying machines with the power and capacity to test the visions of Trenchard, Douhet, and Mitchell had not been developed. For the first time, the US Eighth Air Force, operating out of Britain, and Britain's own Royal Air Force were to be given the resources to test those theories of the use of strategic airpower.

Gen. H. H. Arnold, head of the US Army Air Forces, was a dedicated Mitchell disciple. His instructions to Gen. Carl Spaatz and to me were clear-cut, specific, unmistakable. We were to take the heavy bombers General Arnold would send us and demonstrate what airpower could do. Could it, as he hoped and believed, exercise a decisive influence on warfare by destroying the weapons-making capacity of an industrial nation like Germany?

General Spaatz was diverted from the test temporarily when he was ordered, in October 1942, to accompany General Eisenhower to Africa to conduct the campaign against Rommel and to seize North Africa. I moved up from leading VIII Bomber Command to be Eighth Air Force Commander. Air Marshal Arthur Harris had been RAF Bomber Commander for six months. This responsibility for the vital test of airpower fell upon us for the next two critical years.

So, during 1942 and '43, this process continued, co-operatively, out of Britain—the RAF by night, the US Eighth Air Force by day.

SPEER: Why did you not attack our sources of electrical power upon which our weapon production so largely depended? We were always apprehensive about the vulnerability of our dams, our transformers, and our electric grid, so essential to continued war production.

EAKER: Our target planners had suggested electric power as one of the critical Nazi targets. However, the operational people, including myself, pointed out that the bomber was not an effective weapon against electric power production and distribution. We had no bombs available of a size and characteristic needed to destroy your dams, and thus interrupt your water power. Transformers could not be seen at night, or even in daylight from bomber altitudes, and they were much too small to be attacked successfully. The power lines were discernible, but any bomb damage could be quickly repaired, and we realized you undoubtedly had provided for quick repairs of lines and transformers.

You will recall that the British spent a great deal of effort in the development of a bomb large enough to damage your dams. But the work of the dam-busters, though spectacular, did not accomplish decisive results.

As late as the Vietnam War, with the great technical advances that had been made in the meantime, the North Vietnamese powerplants, transformers, and electric grid did not become especially lucrative targets until the smart bombs were available. Of course, with nuclear weapons, power sources of the enemy would be productive, perhaps decisive, targets.

SPEER: Why did you not join the British in attacking civilian industrial centers and our labor force?

EAKER: Airpower pioneers, including Lord Trenchard, General Douhet, and General Mitchell, had long believed that bombardment aviation might be able to reduce the will of civilian populations to resist. Our own doctrine held that the way to reduce civilian morale was not by killing people, but by depriving them of the resources for further resistance.

The US airpower doctrine, which covered the employment of the Eighth Air Force out of Britain, never contemplated attack on civilian populations, other than that incidental to attacking munition factories. A letter I wrote to General Spaatz in 1943 contained this oft-quoted observation: "We must never allow the record of this war to convict us of throwing the strategic bomber at the man in the street."

I do not imply any criticism of the Royal Air Force bomber effort. Their position was entirely different. German planes had brutally attacked London, Coventry, and other cities, inflicting heavy loss of life. When the RAF began to retaliate with the limited resources available, all they could do with their night operations was to hit German industrial areas. As the bomber force grew, they were able, as you have said, to effect considerable destruction of your war effort by bombing German industrialized areas.

METCALF: At what time in the war did you feel that the Allied bombing was becoming unbearable to the German people?

SPEER: The best answer I can give is that the gradual buildup of your bombing attacks permitted the German people to become accustomed to and fortified against the great increase in destruction. So it is difficult to say at what point the tolerance of the population may have shown signs of being exceeded. Of course, the fire bombing of Hamburg, Dresden, and the like, were great disasters locally. It would have been better if you had been able early in the war to have abruptly increased the size and weight of these bombing raids.

EAKER: I believe you have expressed some surprise that there was not closer cooperation between the British night bomber and American daylight operations. It was realized early that the British and American bombers had differing characteristics and limitations and crews with different training and experience. This made it advisable for each to be assigned the distinctive air task that each was best qualified to perform. Occasionally there was close collaboration. The RAF attacked targets we had hit and set afire in daylight, bombing on our fires. We in turn made daylight attacks on installations they had hit at night and which were discernible, even in bad weather, by the fire and smoke.

There was close cooperation in the exchange of target data, operational data, and in logistics and communications. This was necessary with so many planes operational in such a limited airspace as the British Isles. I would not want to leave the impression that there was any lack of mutual support and cooperation. Seldom, if ever, have two national military forces cooperated as effectively as did the RAF and the US Eighth Air Force in the war years. ■

A good start toward continuing, rational debate of major defense issues was made in February at the first session of . . .

The New Civilian/Military Institute

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

THERE is scarcely anything in recent history that has given rise to so much debate, and all too often uninformed nonsense, as has the subject of national defense or, if you will, national security. In spite of what we sometimes hear, the two are indivisible.

However, it is not my purpose to resurrect old arguments but rather to discuss instead an event that seems to herald a trend toward maturity in debating our national defense. Considering the growing Soviet threat, our coming energy crisis, and our fast-disappearing geographic barriers as we enter our third century, it is high time.

This past February, a group drawn from the worlds of business, academia, and the military, along with a few from that nether world called retirement, dropped what they were doing and came out to the Colorado foothills under the auspices of the newly created Civilian/Military Institute, located at the Air Force Academy. The assemblage was a thoroughly disparate collection of hawks, doves, pragmatists, and theoreticians. Its purpose was to establish an on-going forum for a civilian-military dialogue on national security. While it is a concept of classic simplicity, carrying it out will take a little doing, for the concept will be useless if the dialogue is only between members of the same faith.

In that respect, this first session of the Civilian/Military Institute, or CMI as it inevitably will be called, was encouraging. David Packard, the former Deputy Secretary of Defense and a quintessential example of the American success hero, was the chairman. There was a detectable trace of skepticism in his opening remarks. Discussion groups are clearly not his usual avocation. When Mr. Packard made his closing remarks three days later, the skepti-

cism was gone. This eminently practical man felt something important had been accomplished.

The idea behind this CMI has been awhile germinating. Former Secretary of State Dean Rusk was a prime mover in the process. William T. Seawell, Chairman of Pan Am and a retired Air Force brigadier general, another. Former Air Force Secretary Dudley Sharp has contributed time, energy, and money, as has Donald R. Seawell, Chairman of the Board and President of the *Denver Post*. Gen. George Brown, JCS Chairman, put his considerable prestige behind the idea. Lt. Gen. James Allen, the Air Force Academy Superintendent, refined the concept, and put the Academy facilities at the disposal of this first session.

Nonetheless, and in spite of the undeniably conservative tinge of its founding fathers, CMI's first session was not marked by sermons to the choir. Adam Yarmolinsky led off the program with a paper entitled "The Military in a Civilian Society." Before he had said a word, there was a noticeable tensing in the military segment of the audience, as past memories of Mr. Yarmolinsky came to mind. There was no need to worry, just a need to pay attention. An attentive listener was rewarded with a remarkable statement coming, as it did, from Professor Yarmolinsky. "In my own experience, military professionals are at least as responsive to civilian leadership as civil servants or foreign service professionals. But that extraordinary responsiveness must be matched by extraordinary managerial ingenuity, wisdom, and understanding on the civilian side. . . ."

It occurs to me the Pentagon is singularly without inscriptions. They could do worse than carve that one over the River Entrance.

There were presentations by Dr.

Samuel F. Wells of the Woodrow Wilson International Center for scholars, and Dr. Peter F. Krogh, Dean of the Georgetown School of Foreign Service. Dr. Sidney Drell, a Stanford professor whose views on arms control and the strategic balance are at considerable variance with what might be called the Schlesinger School, read a provocative paper prefaced by a strong endorsement of the Institute's goal.

The seminar sessions were a continuation of that theme. As producers of discussion and debate they were entirely successful. Prof. John T. Dunlop of Harvard, and once Secretary of Labor, was a chairman. Gen. Andrew Goodpaster, former SACEUR and now Professor Goodpaster of the Citadel, was another. Sitting around the classroom in chairs normally occupied by cadets were people like Paul Nitze, fresh from denouncing Paul Warnke's qualifications as an arms negotiator; William Colby, the old CIA man; businessmen, scientists, and military people. Lt. Gen. Edward Rowny, wise in the ways of the Soviets after years of representing the JCS in the SAL Talks, listened with obvious enjoyment, if perhaps a little cynically, to the wide spectrum of opinions on how to deal with the Soviets.

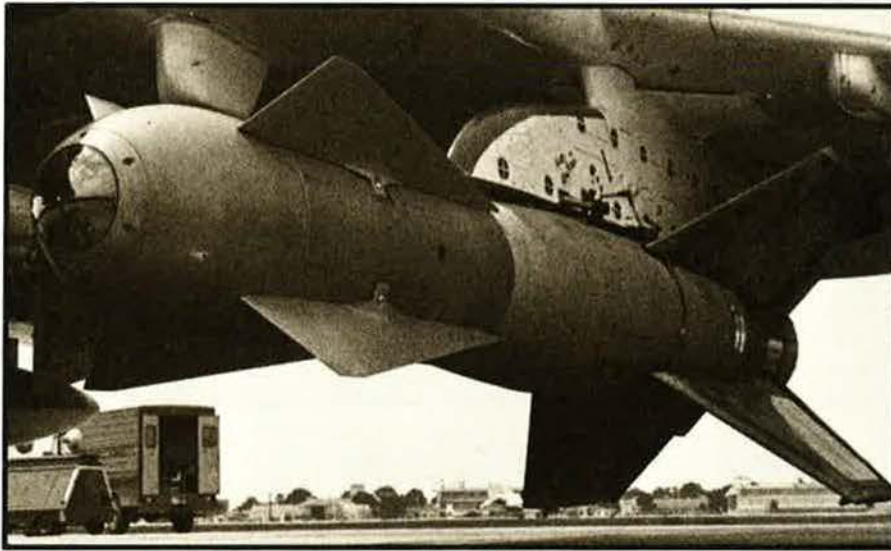
One night the symposium adjourned to the elegant Broadmoor West to hear, after dinner, the views of a wise old diplomat, Mr. George Kennan, on the Russians, past and present. For those seeking a little reassurance in a gloomy world, Mr. Kennan had some to offer. Murphy's Law, he said, is operative in Russia. He went on to say, with the credentials of a man over seventy, that men over seventy prefer comfort and reflection to new adventures, and the Soviet leaders are over seventy.

It was, all in all, a good beginning for the Civilian/Military Institute. Regrettably, the great names of television and the press chose not to come, although they were invited. There were only a few women—Jeanne Holm, Maj. Gen. USAF (Ret.), was perhaps the most prominent—and no true dissidents, although some came close. Still, it was a good start and an encouraging augury for the future. Mutual understanding and respect between the thinking people of this country, military and civilian, however far apart their views, would seem to be an essential contribution to our future security and survival. ■

Defense Department and Air Force concerns in the coming year will be directed at developing more and better defense-suppression capabilities in the tactical arena and at improvements in strategic defense . . .

Invisible Airplanes and Super-Smart Weapons

BY EDGAR ULSAMER, SENIOR EDITOR



GBU-15 air-to-surface standoff weapon is shown here in the cruciform version.

THE Defense Department's FY '78 budget request for almost \$12 billion in research, development, test, and evaluation (RDT&E) funds is an increase of nearly \$1.5 billion from the current fiscal year. Of this amount, programs relating to tactical warfare capabilities absorb more than thirty-six percent, followed by twenty-one percent to strengthen the technology base, and twenty percent in support of strategic requirements. The remainder is divided between general management and support, and intelligence/communications programs. The Air Force gets the largest share of the RDT&E budget, \$4,223 million or 35.2 percent. USAF's requested total budget authority of almost \$35 billion trails the Navy by more than \$5 billion, but leads the Army by a similar amount.

While DoD's R&D programs cover myriad missions and interests, there is evidence of a new, broad emphasis on two fundamental areas: defensive and warning sys-

tems, and technologies that synergistically increase force effectiveness.

According to the Directorate of Defense Research and Engineering (DDR&E), about \$285 million is being allocated to R&D on ballistic missile attack warning and ballistic missile defense. This does not include the cost of the Perimeter Acquisition Radar (PAR) of the US Army's deactivated Safeguard ABM, which is being turned over to the Air Force. PAR will undergo minor modification to serve as an ICBM warning/attack characterization radar. It will provide the National Command Authorities rapid assessment information about what specific targets are being threatened.

The same goal is being pursued by USAF's Missile Surveillance Technology Program, an ambitious attempt to vastly boost the nation's warning and attack assessment capabilities with the help of new technologies. The idea behind this program is to show that in terms of

warning information, "mosaic sensor" technology can cope "with advanced Soviet missiles under development," according to DDR&E's Annual Statement. Presumably this reference includes mobile systems.

The underlying principle, according to Dr. George H. Heilmeier, Director of the Defense Advanced Projects Research Agency (DARPA) is this:

"We currently have warning satellites that can detect ICBM launches via the relatively strong signals emitted by such missiles. Such systems consist of detectors which are hard-wired to a limited amount of processing circuitry in the satellite. The information is processed [by computer] to reveal a missile launch signature in the presence of a huge amount of extraneous, noise-like information. The current system, however, is somewhat limited in its ability to detect signals."

The DARPA Director asserts that two technological breakthroughs could, "in the coming decade, en-

able us to deploy a single system featuring millions of detectors together with on-board processing to ease the need for wideband data links." One is the mosaic sensor, a quantum jump in silicon integrated-circuit technology that crams thousands of signal detectors *plus* the associated signal processing capability into a single silicon chip. The other advance is "adaptive optics," also called the "rubber mirror," that compensates in real time for mechanical or thermal distortions of optical systems in order to filter out the effects of atmospheric turbulence. The result, according to DDR&E and DARPA, is space-based warning and surveillance that can "observe small-scale events such as tactical missile launches and aircraft flights." It would be difficult to overstate the military importance of being able to monitor from space even the dimmest surveillance targets and to trigger an instant alarm in case of ominous strategic or tactical activities, or to conduct battle management remotely.

The first comprehensive test of the new technology, a "proof-of-concept demonstration from space in the detection of weak targets," is scheduled for February 1980, according to Dr. Heilmeier.

Short-Term Improvements

Warning systems improvements of immediate concern that are provided for in the new budget include an upgrading of the ground-based Ballistic Missile Early Warning System (BMEWS). The expected payoff is twofold—greater systems reliability and better resolution—according to USAF's congressional testimony.

The Air Force's Pave Paws phased-array radars, one scheduled for Otis AFB, Mass., and the other for Beale AFB, Calif., continue in their developmental phase and, once operational, will decisively improve submarine-launched ballistic missile (SLBM) warning and attack assessment information.

The budget request initiates two new bomber warning programs in response to the significant number of Backfire bombers joining Soviet Long-Range Aviation, the apparent development of a still more advanced long-range bomber, and evidence of a new tanker aircraft. The



DARPA's Dr. Heilmeier envisions "invisible" airplanes.

first initiative centers on replacing the twenty-year-old Distant Early Warning (DEW) Line radars in Alaska, Northern Canada, and Greenland with a new class of "short-range, low-cost, unattended radars," according to DDR&E. The current DEW radars can be under-flown or "end run" to seaward and are becoming increasingly difficult to maintain and operate. The proposed replacement radars, which will close the low-altitude gap, are to be funded jointly with Canada as a North American Air Defense Command program.

The Surveillance Radar Stations/Sites Program, in similar fashion, aims at replacing air defense radars in Alaska with new, low-cost "minimally attended" radars to provide a modern, economical air defense and surveillance system.

Cost and schedule problems of the CONUS OTH-B long-range bomber warning system have placed this program in limbo, at least until current reevaluation and restructuring are completed. If OTH-B development is continued, and technical feasibility tests are favorable, the Air Force plans to install two systems—one near Moscow, Maine, and the other in the Pacific Northwest. Each would provide coverage over a 180-degree arc extending up to 2,000 miles out to sea.

New Momentum for Defensive Systems

As a counter to the Soviet Union's "substantial" research and develop-

ment work in ballistic missile defense (BMD), the Defense Department proposes to accelerate the US Army's R&D in that field—the Advanced Technology and the Systems Technology Programs. Two options are to be kept open: development and deployment of a BMD system to defend ICBM forces, command control and communications systems, and other high-value targets; and maintaining the "US lead in BMD technology through investigation of advanced components, technologies, and systems concepts that could yield a technological breakthrough." Major emphasis, according to DDR&E, is on charged particle "beam weapons [the extension of linear accelerator technology into the weapons field], lasers, and space-borne sensors." Special focus is on attacking MIRVed enemy ICBMs prior to separation of the individual warheads from the post-boost "bus" vehicle that directs them against their separate targets, thus destroying all RVs at once. This also is the most vulnerable phase of the ICBM's flight profile.

"If and when such breakthroughs [in BMD technology] are achieved, it is necessary that we find them first and not be caught unaware," according to DoD's Annual Report.

A new BMD technology program will be launched this year, involving "research and development on the key technologies for a very low altitude [intercept] concept applicable to defense of a mobile ICBM force." With such a system, DDR&E's analysts believe, "a small number of interceptors can substantially increase the number of ICBM survivors."

DoD's incentive for maintaining BMD capabilities is, on the one hand, review of the SALT I ABM treaty scheduled for this fall and, on the other, the fact that, "since the ratification of the ABM treaty in 1972, the Soviets have increased their emphasis on BMD development. Their efforts to improve their early warning systems, develop phased-array radars [whose enormous power output is causing wholesale disruption of communications systems in Western Europe], and improve their interceptors indicate a strong Soviet desire to overtake the United States in the area."

Concern over Soviet BMD capabilities also underlies new US research and development in connection with maneuvering reentry vehicles (MaRV). Classified as "pre-prototype activity" by DDR&E, the MaRV program has three key components: development of an advanced MaRV; R&D on terminal sensing by extension of precision guided or "smart" tactical weapons into the strategic field; and guidance technology improvements. The advanced MaRV's initial flight testing is keyed to development of a vehicle that "can perform evasive maneuvers to elude ABM interceptors without sacrificing the accuracy which is possible with a ballistic reentry vehicle. Although [the 1972 SALT] treaty prohibits deployment of ABM systems, such a treaty can be abrogated. The availability of an effective counter to an ABM system discourages the abrogation of the treaty by denying the achievement of a gain by so doing," DDR&E reported to Congress.

Flight-testing components of the advanced MaRV is to begin this year. MaRV is being developed as a part of ABRES, a series of programs carried out by the Air Force to provide advanced reentry technology for all the services. ABRES includes a related new program, development of a replica decoy that faithfully matches MaRV's observable characteristics to "counter" fu-

ture high-performance, homing Soviet ABM interceptors. (The US Army's own Homing Interceptor Technology or HIT vehicle, according to DDR&E, recently completed a "highly successful series of ground tests" and USAF is now applying the underlying technology to other, unspecified requirements. Presumably these include space defense.)

Active Air Defense, an anemic component of US strategic defense, receives little succor from the FY '78 budget. USAF's FY '78 Report to Congress describes the malaise: "Radar surveillance and control without adequate numbers of interceptors could not enforce sovereignty over US airspace. Our current interceptor force of F-106s is reaching twenty years in age and is steadily decreasing in numbers due to attrition. Active and Air National Guard F-106 units are under-equipped, with only fifteen aircraft in each National Guard unit, and no nonoperational spares for active units. Further, lack of F-106 assets has resulted in Tactical Air Command F-4s having to assume four of the twenty-six alert locations, the minimum required for peacetime control of US airspace."

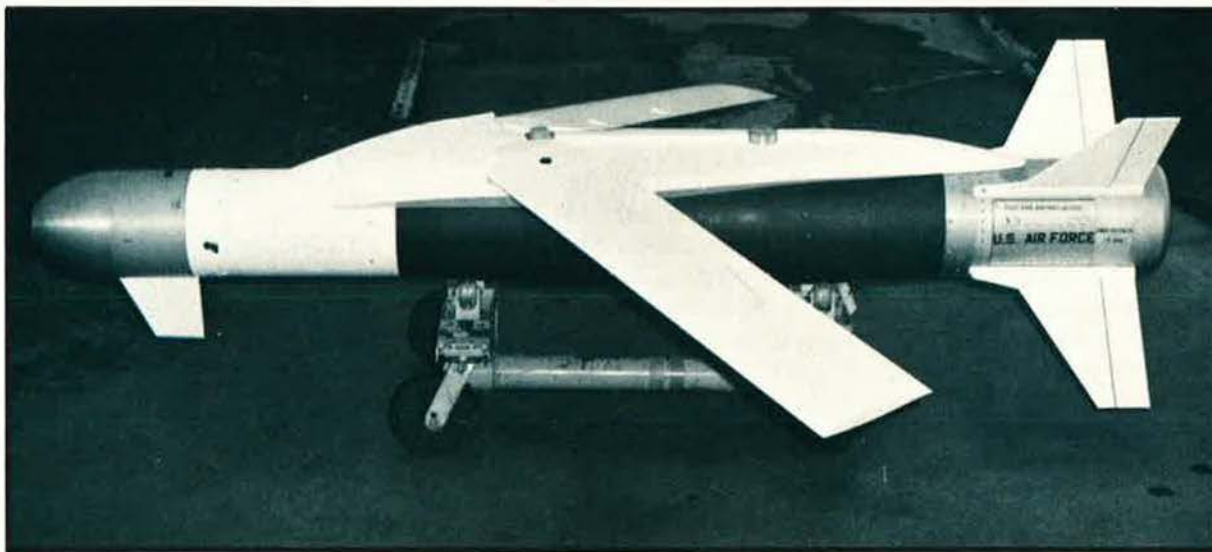
A Follow-on Interceptor (FOI) could cure the problem, but it again was deferred, according to the Defense Department's Annual Report, because of "uncertainty concerning our future air defense requirements

and sensitivity of candidate aircraft—F-14, F-15, or F-16—to mission requirements." The revised budget deferred FOI funds for at least a year.

Advanced Tactical Warfare Technologies

The most direct and economical means for boosting tactical aircraft effectiveness is to improve their ordnance. The new budget request concentrates on this goal with single-minded zeal. A joint BVR (Beyond Visual Range) air-to-air missile program office under USAF leadership is being established. It will initiate prototype development of a new generation of radar-guided missiles unencumbered by the "excess weight, cost, and complexity" of the current family of AIM-7F and AIM-54 missiles.

By using advanced technology in microprocessors, array antennas, and aimable warheads, DARPA and the new program office expect to achieve an all-weather, air-to-air missile with performance comparable to the AIM-7 Sparrow at one-third its weight. Key technical issues, according to DARPA, are "low miss distance consistent with use of lightweight warheads, ECM resistance, high target detection ratios for a lock-on-after-launch missile, maneuvering target performance, and high reliability. We believe use of advanced digital processing techniques



Planar wing version of GBU-15 guided flying bomb, shown here at AFSC's Armament Development and Test Center, can be configured for various missions.



The twenty-year-old DEW Line radars are to be replaced by new systems that are unattended and perform better.

can provide ECM resistance, a launch-and-leave firing capability, and miss distance reduction.”

A joint Navy/USAF Within Visual Range (WVR) missile development program is being organized to provide for a follow-on to the AIM-9L Sidewinder. No lead service has been designated as yet, but the Air Force is charged with “homework” on dual-mode seekers and the potential of “futuristic warheads and fuzes.”

DDR&E’s forecast of trends in enemy air defense capabilities is grim; the threat will increase while “aircraft performance remains relatively fixed. Signal density and complexity are increasing the technical challenge [to] effective countermeasures.” Enhanced defense suppression and standoff capabilities become imperative and are being emphasized in USAF’s R&D programs. The Precision Location Strike System (PLSS), Lt. Gen. Alton D. Slay, USAF’s Deputy Chief of Staff for Research and Development, told Congress, “is being developed to alleviate critical deficiencies in our all-weather tactical target location and strike capabilities” by permitting standoff strikes against emitting and nonemitting targets. Tailored to future NATO war requirements, PLSS will enable tactical commanders to conduct all-weather strikes under near real-time control, and will provide badly needed force modernization while

helping to reduce aircraft attrition.

Another counter to the improving Soviet air defense system is USAF’s development of the GBU-15 air-to-surface weapon. This modular guided glide bomb can be tailored to several missions by using various aerodynamic surfaces, warheads, and guidance seekers, according to General Slay. The weapon, he said, “is optimized for use day or night and in various weather and target conditions, and fulfills an urgent requirement in both the defense suppression and antishipping mission.” The GBU-15 comes in two basic versions, one tailored for low- and the other for high-altitude standoff operation. Among its various mid-course and terminal guidance options are TV, Imaging Infrared, Laser, and Distance Measuring Equipment (DME). The latter can be linked to PLSS.

Still another key defense suppression weapon is the High-Speed Anti-Radiation Missile (HARM), under development by the US Navy for joint service use.

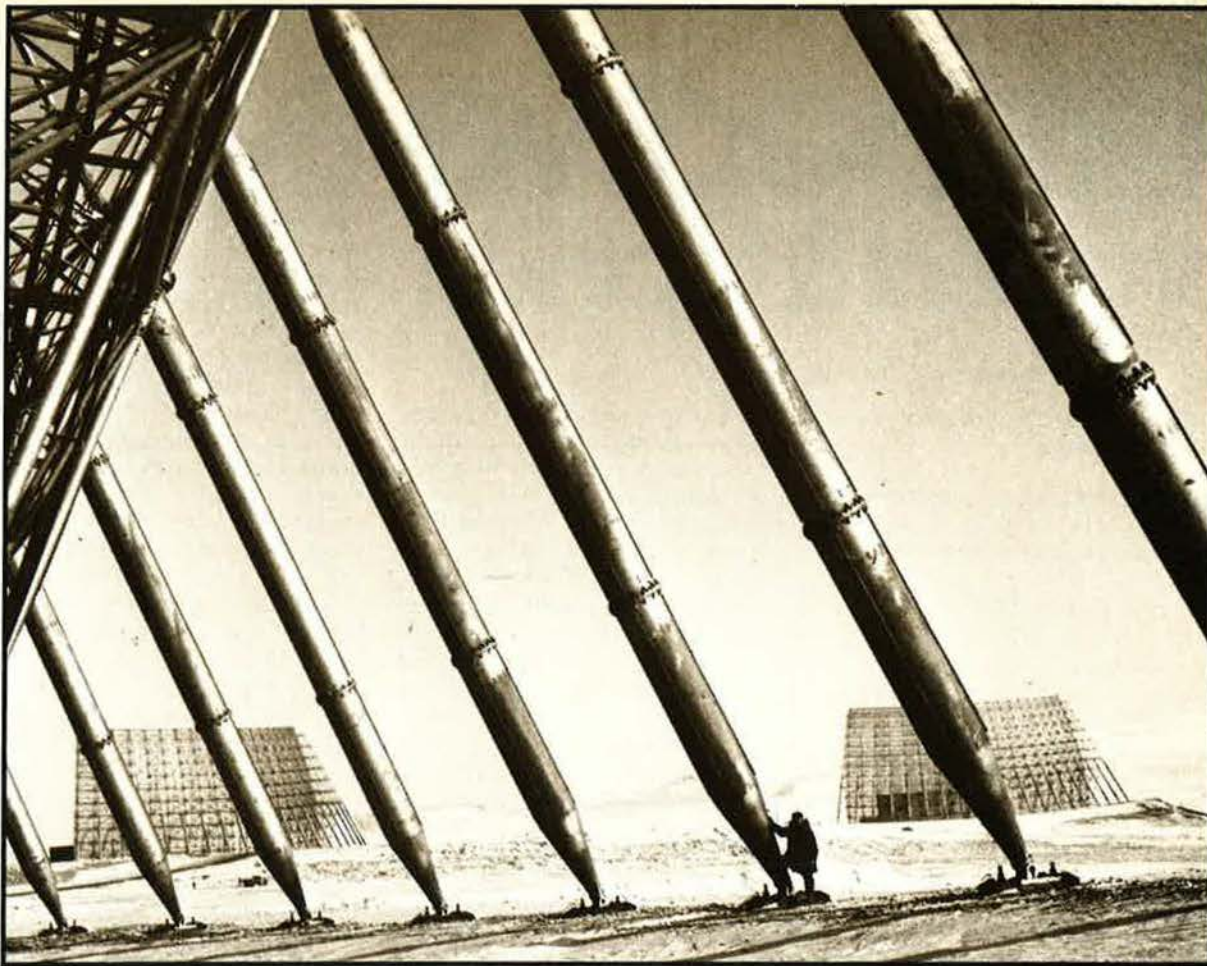
A particularly noteworthy aspect of defense suppression was highlighted by Gen. David C. Jones’s congressional testimony: “We have given priority to developing joint defense suppression tactics and concepts to maximize the Air Force and Army capabilities to supplement one another in suppressing defense in the forward battle area. Army systems can attack air defenses if

Air Force target acquisition systems can provide location data to the Army fire direction center. We are developing and testing improved procedures to exploit these joint capabilities and optimize defense suppression tactics.”

DARPA is augmenting USAF’s defense suppression through its “high-stealth sensors” program, which seeks to significantly reduce the vulnerability of aircraft radar systems by reducing the ranges at which radar electromagnetic signals can be intercepted, located, classified, and the aircraft attacked.

At the heart of this development is the Low Probability of Intercept fire-control program, which achieves stealth by reducing peak radiated power and by constantly shifting signal frequencies, timing, and spacing.

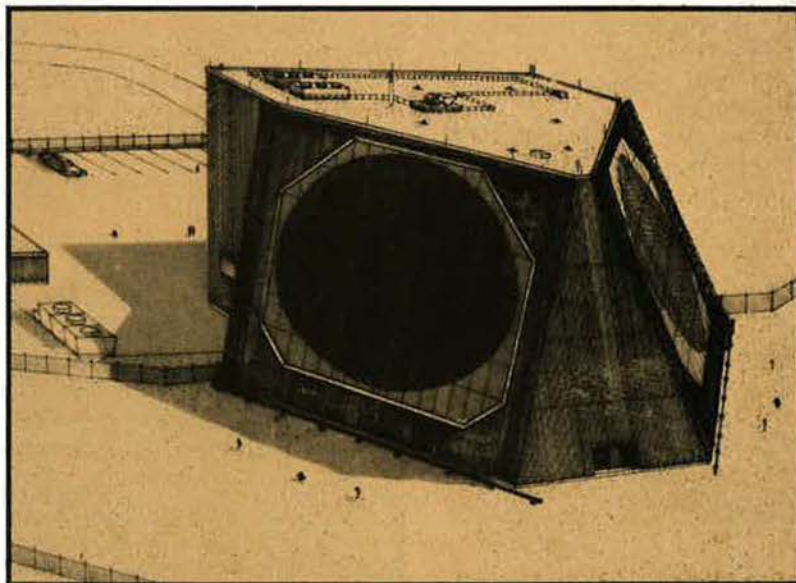
With an eye on the more distant future, DARPA is exploring the potential of “really smart” weapons. Dr. Heilmeyer described them: “Current smart weapons require clear weather and a man in the loop, vulnerable to counteraction, to accomplish their mission. Ponder the consequences of weapons that seek out and destroy specific targets such as tanks and surface-to-air missile sites without the need for a designator; weapons that can wait for their specific targets to appear; weapons so accurate that conventional warheads could perform some of the tasks reserved today for nuclear weapons.”



If the foregoing suggests that life for the fighter pilot of the future will be a bed of roses, DARPA is breaking other technological ground that could spoil that notion. There is a program to develop the capability to detect aircraft over long range, using only passive means, thereby eliminating the masking effect of countermeasures.

Another program, keyed to netting radar systems, seeks to defeat antiradiation missiles, and "sanctuary radar" technology could lead to a long-range air defense radar that does not reveal its presence to penetrating aircraft and, therefore, can't be jammed or attacked.

If military aviation's past can serve as its prologue, future advances in air defense will be met by gains in aircraft and subsystems efficiency to assure that airpower remains the key to military strength. The Defense Department seems to think so. The new budget request calls for buying 335 Air Force aircraft, the highest number since 1970. ■



TOP: USAF's Ballistic Missile Early Warning System (BMEWS) is to be upgraded to provide greater reliability and automation and to increase radar resolution. ABOVE: Pave Paws phased-array radar installations, one on each coast, will provide rapid and detailed information on SLBM attacks.

Perspective

Comment & Opinion

By Capt. James P. Qualey, Jr., NELLIS AFB, NEV.

OERs and Career Progression— One Captain's View

Much has been written about the new OER system; a lot of it dedicated to explaining this new method of evaluating officers, a lot complaining about its unfairness. Officers feel that failure to receive a promotion potential rating of the top-block, "1," places their promotability in jeopardy; those receiving a "3" are certain they will be passed over. Raters, additional raters, and reviewers feel some consternation trying to fit their rates into the top two blocks so that no more than twenty-two percent receive 1s, or twenty-eight percent receive 2s. In a large group of fine officers this can indeed be painful.

So far, these concerns appear to be justified. Promotion selectees seem to be those officers whose overall promotion potential is rated in the top two blocks. There are officers selected for promotion whose OERs are 3s, but they are mainly individuals who are being considered for the first time. Those officers who are being considered for the second or third time have a greatly reduced chance of selection. The last temporary majors' board (CY '76), for example, gave the nod to fewer than one percent of officers who had suffered one or more pass-overs and had a "3" lying on top of their stack of OERs.

These statistics indicate that OER inflationary pressures will continue to exist just as they have in the past. It would be interesting to find out just how many controlled groups of OERs had fewer than twenty-two percent 1s, and twenty-eight percent 2s. Looking at the temporary majors' board statistics, any reviewer concerned about his people is going to assure that as many as possible receive overall ratings in the top two blocks.

According to AFR 36-10, "ratings

in the top box should be reserved for those extremely rare individuals who should be advanced in grade or job responsibility ahead of their contemporaries." In all honesty, it is difficult to accept the idea that twenty-two percent of the officers in any group being rated are "extremely rare" individuals. A similar argument applies for the second highest box. Perhaps five percent to ten percent would realistically qualify for top-block rating, and maybe twenty percent should be allocated to the second block. In this way a distribution curve could be applied to a given group.

What about the other end of this distribution curve? There are, after all, three more blocks. (It might be interesting to learn how many officers got 4s, 5s, or 6s.) A "4" rating states that "Performance during the period reflects less than average potential, needs to improve before being awarded increased grade and responsibility." We all have encountered individuals who fit this category, yet the lowest block they get is probably a "3." The "5" rating

states that "Performance during this period indicates no potential for increased grade and responsibility." In other words, an individual rated in the fifth block has zero promotion potential. The "6" rating is a referral report as discussed in AFR 36-10, and I shall not address it further.

With the inflationary pressures still in existence, raters are going to shy away from 4s and 5s, much to the disadvantage of some officers given a "3" rating. Furthermore, promotion selection boards are denied this tool for discrimination, and the 3-rating takes on the connotation of a "kiss of death." The idea of establishing a quota for 4s and 5s is a very unpopular one, but one which, at least from the point of view of applying a statistical model to a group, might be correct.

The bulk of the officers should be in the third block if a normal distribution curve is to be applied. Of course, this makes it a little more difficult for a member of a selection board to weigh an officer's folder. A closer reading of the OERs would be necessary; consequently, the word picture of an individual's performance would take on added importance. Individuals assigned to "select" units would stand out more clearly and have a better chance at being promoted even if they had a "3" as an overall rating.

Those select groups whose mission is other than ordinary might be allowed higher percentages of officers getting the top two ratings. This is as it should be, since officers assigned to these units will have

SSgt. Dan Altenes of Recruiting Service Wins Name-the-Department Competition

In the December 1976 issue, AIR FORCE Magazine inaugurated a new department, tentatively titled "Comment & Opinion," and announced an award of \$100 for the best title received from readers by March 1, 1977. Of the more than 100 suggestions that arrived before the deadline, we have chosen "Perspective," submitted by SSgt. Dan Altenes of USAF Recruiting Service, Torrance, Calif.

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.

higher-than-average promotion potential. Thus, someone on the Air Staff, working in a command-level position or even assigned to a special mission unit in the field, would have a better opportunity at getting a "1" or a "2." The advantages are obvious: more officers would volunteer for this type of assignment since their promotion potential would be objectively rather than subjectively increased. Promotion board members cannot be expected to be aware of the relative importance all special units might possess. A SAC colonel might not be aware of the unique mission of a particular TAC unit; a TAC colonel might not appreciate the significance of the mission of a particular ATC unit, and so on. Presently, we are relying on the subjectivity of the board member to weigh an individual's promotion potential. It's a difficult task at best. A 3-rating awarded a member of a select unit carries the same weight as a 3-rating awarded a member of a line organization. Awarding 3-ratings is required due to the limitations of the present system.

Reducing the percentage of offi-

cers awarded the top two blocks shifts attention to other areas of an officer's career. His professional military education, academic education (graduate work), awards and decorations, and other factors would receive more weight. The officer is positively motivated to pursue achievement in areas other than his primary duty; the "whole man" is evaluated.

Of course, a lot of problems could be eliminated if the "up-or-out" philosophy were changed. Perhaps an attrition system could be introduced that calls for elimination based on OERs whose overall rating is a "4" or a "5." Individual officers could be identified based on a series of low ratings over a given number of rating periods. Theoretically, officers would be tapped to leave the force if their performance is less than satisfactory. Officers would be working to stay out of the lower boxes and less concerned about the upper ones. Emphasis would be on good-quality work rather than attention-getting busy-work of no intrinsic value. This suggestion is nothing new; many younger officers (and a few seniors)

have voiced it at one time or another. It does have merit; most corporations follow this policy and some manage to function more efficiently than our Air Force.

Our officer corps is a heterogeneous group, composed of individuals of very different backgrounds, talents, attitudes, and aspirations. We can't all expect to be Chief of Staff, and we shouldn't all be expected to try to be. Some desire to go so far and no further, others wish to reach for the top and go as far as they can. Perhaps there is room in our Air Force for both. To be sure, career progression might slow down. Officers and their families would enjoy longer tours and a higher degree of stability; Air Force organizations would tend to stabilize from more consistent leadership; management policies would tend to be more predictable, and the upward pressures on the younger officer would lessen.

The statistical distribution curve could be applied to the officer corps with a high degree of exactness. We could release those who do not measure up to standard, but not penalize those who do. ■

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LAS LOCKHEED AIRCRAFT
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Flying the U-2

BY CAPT. ROBERT GASKIN, USAF

A 9th Strategic Reconnaissance Wing pilot describes a U-2 mission, from suiting up to shut-down. A beast on the runway, the still mysterious long-winged bird is "a thing of beauty" in its own element—above 60,000 feet.

OF ALL the aircraft that have ever flown, few are so shrouded in an aura of myth and conjecture as the Lockheed U-2, now in its twenty-second year. Since 1956, a year after its first flight, the U-2 has been the mainstay of the 4080th Strategic Wing at Laughlin AFB, Tex., and then of the 100th Strategic Reconnaissance Wing (SRW) at Davis-Monthan AFB, Ariz. Now it has joined the 9th SRW at Beale AFB, Calif., where it flies worldwide reconnaissance missions along with the famous SR-71 reconnaissance jet.

The U-2 was conceived in 1954 when the Air Force and the Atomic Energy Commission gave Lockheed Aircraft Corp. a contract to design and develop a single-seat reconnaissance jet, capable of very-long-range missions at altitudes above the reach of fighter-interceptors. According to an old story, Lockheed's famous designer, Clarence L. "Kelly" Johnson, was doodling on a pad

while the specifications were being briefed. At the end of the briefing, he held up a sketch of a truly weird-looking aircraft—a drastically modified F-104. A year later, the "doodle" flew under the designation U-2. The bird has undergone many modifications, taking advantage of advances in technology to update equipment and improve reliability.

Despite these evolutionary modifications, some of which have made the U-2 pilot's life easier, not every man is cut out to fly long, hazardous missions in a pressure suit, with no company but the sound of his own breathing. And not every jock who has wings can fly the airplane. The selection process involves an evaluation of flying experience, interviews, physicals, and tryout rides.

Only one applicant out of the ten who meet preliminary qualifications is selected for a series of interviews by 9th SRW people, including the wing commander. Survivors of the interview phase, and of Fifteenth Air Force and SAC Headquarters reviews, get tryout rides in the two-seat U-2 trainer (there is no simulator). Those who do well begin ground school and lead-in flying, culminating weeks later in a check-out in the single-place tactical model.

The qualified U-2 pilot is then, and forevermore, a single-seater, very much alone.

The Airplane

At first glance, the U-2 gives the impression that someone has played a dirty trick on a fighter. First, they painted it jet black. Then they took off the swept wings and stuck on two tremendously long glider wings. Next, they replaced the tricycle landing gear with a set of wheels well aft of the cockpit, a smaller set of tail wheels nearly under the tailpipe, and small "pogo" wheels near the tip of each wing. Definitely a weird-looking thing on the ground, but in the air it flies . . . brother, does it ever!

Once in the cockpit, things look a little more familiar, especially to a fighter pilot. The flight director system is there, along with the familiar array of engine and performance instruments. One odd thing is a huge optical scope directly before your face. It gets in the way of things generally and restricts landing visibility significantly. A few instruments may be unfamiliar. On the left side of the cockpit is a large digital display with three windows. This is called the Triple Display Indicator (TDI). It



gets readouts from an on-board air data computer and constantly gives indicated Mach altitude to a very close tolerance in feet, and KEAS (Knots Equivalent Airspeed)—a handy gadget at high altitude. But in the traffic pattern, most U-2 pilots rely on the standard dial type of altimeter and airspeed indicator.

An odd-looking vernier wheel on the throttle quadrant controls engine tailpipe temperature (EGT). The engine is firewalled from takeoff un-

puter, and the rear-seat man works all the systems and navigates, the U-2 driver has to do it all. He is his own pilot, systems operator, and navigator.

To save weight, the U-2 does not have a capsule ejection system. It does have a sophisticated, reliable (100 percent success rate) ejection seat system, good from maximum altitudes and supersonic airspeeds down to zero-zero (sitting still on the ramp).



“... there is a feeling of light-headedness as the airplane leaves the ground. There is no rotation; the U-2 simply jumps off the ground from a two-point stance when it is ready to fly.”

til the descent is started, so the EGT must be watched very closely; for peak performance it needs to be maintained as high as possible above 60,000 feet (FL600). The vernier wheel can back off the EGT to the nearest half degree with the aid of a primary digital readout on the EGT gauge itself.

The U-bird has ILS and TACAN as well as ADF capability; however, TACAN, the standard navigational aid, is a backup system in the U-2.

Due to low wind velocity at cruise altitude, usually less than fifteen knots, the extremely accurate autopilot Mach hold function, and unbelievable visibility, dead-reckoning navigation is used as the primary method of getting from Point A to Point B. Unlike the SR-71 where the mission is canned into a com-

As a U-2 pilot, you begin your day at the Physiological Support Division (PSD). You chat with your backup pilot who is also your launch control officer. You eat a high protein breakfast of steak and eggs. After breakfast, the flight surgeon gives you a brief physical exam. A medical problem that would be trivial below 50,000 feet may be deadly at high altitude. There's nobody there to take the stick if you pass out.

Once the Doc clears you, it's time to suit up. You enter the suit from the rear. First the legs go on, then you put your arms down the suit's sleeves. You duck your head and crawl through the rear of the suit and stand up, pulling it comfortably around you. Every wrinkle and bulge must be smoothed out because you

may be in this thing for the next nine or more hours, unable to wiggle around much, or even to scratch. Next the outer garment containing water wings and parachute harness goes on, then the silk glove liners, gloves, boots, and, finally, the fish-bowl helmet.

When the helmet is locked on, you denitrogenate your blood by breathing oxygen for at least an hour before takeoff. Following a few minor checks, you sit it out in a recliner until launch time. Then the crew van transports you to the aircraft.

Getting It Airborne

You can't move easily in the pressure suit while on the ground, so your launch control officer, or "Mobile," preflights the aircraft and "sets it up" right to the point of engine start.

Now all seems to be noise. The roar and hiss of the ground power unit, whining of the gyros, and babble of conversation accentuate the activity around the huge black aircraft. Inside the cockpit, Mobile's face glows a garish green and red from panel lights' reflection in the early predawn darkness. In the crew van, parked beside the aircraft, you're a bulky figure in a fishbowl helmet, extended full back on a recliner.

When preflight is completed, you climb into the cockpit, sit down, and raise your arms. Immediately you're surrounded by a swarm of men in white who check, connect, strap, and double check. The pilot is not allowed to touch a single item during the strap-up. When PSD people are through, Mobile gives you one last check, a tap on the helmet with a thumbs-up sign, and closes the canopy. All is ready.

Gradually, a rumbling growl grows to a continuous whine as the J75 engine ignites and stabilizes at idle. The start is cool, rarely over 275 degrees EGT. You and the ground crew all now work feverishly to bring systems on line, check trim, and get configurations set for takeoff, under the watchful eyes of Mobile, who has contact with you via the UHF in his chase vehicle.

You switch to internal power and give the signal to turn off the ground power unit. When the ground crewmen are clear and all checks are

complete, Mobile gives you clearance to move to the runway.

The run from the U-2 ramp to runway lineup position is done frequently in one continuous roll. The ground crew then pull the safety pins that allow the spring steel pogo wheels to fall clear on takeoff.

Meanwhile, Mobile has made a quick run down the 800 feet of runway the U-2 will use for a takeoff roll to ensure that there is no debris to blow a tire and cause disastrous loss of directional control.

When you get takeoff clearance, you take a deep breath, pump the brakes, and bring the big J75 to eighty percent power. Any more power could damage the tires. All systems needed during climbout are turned on, engine instruments are double checked, and, to prevent flameouts, the continuous ignition system is activated. Mobile tells you when your ground crew is clear. You confirm that your canopy is locked and ejection seat pin pulled. Tower makes one last check for overhead traffic that may conflict with the vertical climbout, then . . . the U-2 rolls.

There is no need for takeoff computations in case of engine loss. Acceleration to takeoff is so rapid that the last time you look inside the cockpit is to perform a last-minute check of engine instruments and to hack the clock. Boots come off the brakes as the throttle moves smoothly from eighty percent to full power,

and then back off slightly to avoid an overtemp about the time the bird becomes airborne.

The roar of the engine and vibration of the aircraft are noticeable now. You accelerate faster and faster until you literally *feel* that the U-2 is ready to fly. Suddenly, the left wing drops; instinctively you apply opposite aileron to keep the wings level. You know the pogos have dropped off and that you are clear of external rigging. Because of simple exhilaration or the effect of the cockpit pressurization, there is a feeling of light-headedness as the airplane leaves the ground. There is no rotation; the U-2 simply jumps off the ground from a two-point stance when it is ready to fly. From the ramp, it appears to have been catapulted from the earth. The nose climbs higher and higher until it is nearly vertical. And then the U-2 is gone, leaving behind only a thin, vertical column of black smoke pointing into the morning sky.

In the cockpit, it is all you can do to keep the stick coming back into your gut in a mad race with the air-speed indicator. Finally, the needle slows but since you are still close to Tech Order climb speed you must pull the nose even higher. At last the digits on the TDI slow down so that you can at least read them. A glance at the altitude indicator tells you that you are climbing and accelerating at a pitch attitude that you would never have thought possible. Now nearly flat on your back, you turn your head

to stare at the earth. The departure end of the runway falls away so rapidly you're reminded of an early movie shot from an ascending rocket.

High Flight

Time to do the departure. Mobile, who has patiently been watching all this time, acknowledges the handoff to departure control. But he will watch winds and weather like a mother hen until the U-2 once again is safe on the ground.

Center clears you on course, to call when above FL600. The bird is climbing rapidly now and more systems are brought on line and run through a test cycle—systems that could not stand the heat or the reflectivity of the earth at ground level.

The roar of the cabin air-conditioner has changed to a dull hollow hiss, overpowered by the deep rumble of the engine thrusting you higher and higher at what seems incredible speed. You are passing 60,000 feet now and climbing.

At this point, there is no need for exterior lights. They are all shut down, and the pitot heat is also turned off, for no weather will ever reach you where you are going.

Your eyes move to the TDI. The desired Mach is approaching; slowly, inexorably it climbs until, with a short stab at the autopilot, you stabilize the airplane at that particular Mach. A double check of the EGT tells you that you are creeping close to the redline limit. A gentle, almost imperceptible touch to the vernier on the throttle quadrant causes the last window to unwind two digits—that's more like it.

It is now two minutes to your mission start point, or IP. The green card, an enormous version of the Standard Form 70, tells you precisely when you will be at the IP.

As you are waiting, a movement to the left catches your eye. A rear-view mirror attached to the outside of the canopy shows a dancing, wafting, pluming monster of a contrail, at your six o'clock position, blindingly white against the dark blue of the sky. Soon you will be above the contrail level and it will be gone. The sun seems especially bright now; colors have taken on tones and hues that no earthling ever sees.

One minute to go. You peer through the optical scope that lets



"The bird must be landed in nearly a full stall; a knot or two hot will cause it to bounce back up into the air, probably causing a wing to drop, and making the nose swing in that direction."

you view the earth as it passes underneath. Here it comes, a small grass airstrip. The sight's crosshairs creep toward the strip. As they center on it, you spin the heading bug marker toward your new heading, causing the U-bird to literally pivot around on those long wings. You still remember your first surprise at how the aircraft handled up here in its element. During the many check-out rides at low altitude, you were frustrated at times by the sheer physical strength it took just to get the bird turning. At the end of a traffic pattern sortie, you were soaked in perspiration, just like in the old days when you would practice aerobatics and combat maneuvers in the "fun" birds.

But in its high-altitude element, the U-2 is a thing of beauty to fly. A fighter pilot, at high altitude, has to nurse his turns and altitude in order to hold his Mach, or else he suffers a flameout or a drastic loss of airspeed. So the fighter must be maneuvered very gently, with small bank angles and pitch changes. Not so the U-2. At max altitude, it can stand on its wing and turn 180 degrees with no addition of power to maintain Mach. In just a few seconds, you can turn completely around and level out, maintaining basically the same altitude. But the turn radius is fantastically small. You're still over that little grass strip, but heading in the opposite direction.

Off in the distance, the thunderheads from that front that passed last night are still there. The morning sun has turned them into dark purple, brown, and pink puffy monuments, against an incandescent backdrop of pale yellow. To other pilots, these thunderheads would be something to reckon with, but to the U-2 driver they are simply objects of beauty, nothing more, as, far, far below, they slide beneath the nose.

The earth from this altitude looks like a wrinkled peachskin, dark spots swimming with light spots, all dappled with big and little wrinkles. To your right, you peer at the Grand Canyon. The awesome creation of nature can be covered by your thumb against the canopy.

All the Dirty Tricks Known

After a while, it is time to descend. Your mission is complete.

Today it was a short one; tomorrow's may be longer. The descent from altitude is slow and laborious because, initially, the engine's RPM can be only slightly reduced or flameout would occur. Also the indicated airspeed cannot be allowed to climb too high lest the tail separate from the fuselage. The enormous lift provided by those wings is definitely a problem when one wants to go down instead of up. The U-2 has to be coaxed, argued with, and finally forced to stop climbing by playing all the dirty tricks in the book to increase drag and destroy lift. Even so, the descent must be planned hundreds of miles from home in order to get into the flow of conventional jet traffic.

A comforting thought passes through your head. If you happened to have complete simultaneous electrical, hydraulic, and engine failure, you could still leisurely fly over several states, picking and choosing an emergency airfield. You could then spiral down and make a "deadstick" landing. No other aircraft can do that.

The earphones crackle with center's response to your request for descent. You move your left hand forward and put the gear handle down as the first step in the descent checklist. There is no need to worry about limiting airspeed with gear down. The airplane will come apart before the gear is overstressed.

Then, you manually open the bleed valves, just in case they don't open automatically in time, as the throttle is pulled back to a precomputed power setting. Too rapid a power reduction with the bleed valves closed will almost guarantee a flameout.

Other drag devices come out of the fuselage and wings, all designed to produce drag and destroy lift. External lights and pitot heat are turned on as are heaters and blowers that preheat the canopy to prevent frost at lower altitudes.

Shuddering, shaking, and groaning, the nose finally gives up and grudgingly drops to maintain descent Mach. Now at lower altitude, the power is further reduced, to increase rate of descent. The controls are once again heavy and sluggish, causing you to wrestle with the bird. You must lead your roll-out from turns by as much as twenty or thirty degrees.

Before landing, it is best to get comfortable. The faceplate of the helmet comes up and you shut the oxygen off because you can now breathe ambient air. Your first breath exposes you to the smells you have been missing inside the goldfish bowl helmet. The heater has stirred all the lingering smells to life to an almost overpowering degree—old leather, paint, electrical motor scents—all the smells that identify an aircraft to its pilot.



The author, Capt. Robert Gaskin, is a 1966 honor graduate of Clemson University. An Officer Training School graduate, his first duty assignment was at Webb AFB, Tex., where he received undergraduate pilot training. As a forward air controller in Southeast Asia, he flew 225 combat missions in the O-2A and OV-10. He returned to the United States as a T-38 instructor pilot at Columbus AFB, Miss., until he was reassigned as an instructor and flight examiner with the Pilot Instructor Training School. He was accepted into the U-2 flying program in 1974, and has accumulated more than 400 hours in the U-2.



The few U-2 pilot applicants who survive a rigorous screening get their flight training in this two-place U-2CT. Once qualified, the U-2 pilot is "forevermore a single-seater."

Final Check for Landing

Wiping the sweat off your face, you prepare for landing. Local approach comes up on the radio and puts you in the groove for final approach. Now you are incredibly busy turning off equipment that cannot tolerate close proximity to the earth. You recheck your landing configuration; gear down—check; speed brakes—out; stall strips—extended. Closer and closer you come to the runway. Airspeed is further reduced. The engine's whine is very loud now as it operates at low RPM.

Before descent to final approach altitude, you must check for wing balance. As you slow the aircraft, the heavy wing—the one with more fuel in it—will drop. This is your cue to use your pumps to transfer fuel to the other wing. Satisfied, the fuel transfer switch is shut off. You are ready to land! Left hand selects full flaps; the nose sharply pitches down, but by force of habit the right hand runs the rim button back so that, when the flaps are fully extended, pressure is simultaneously relieved on the control stick. A little nudge on the throttle brings the bird back up to approach speed.

"Begin descent," crackles the laconic voice of the GCA controller, probably bored with the slow final approach speed compared to the zip-pier aircraft he's been controlling all day. As you near the runway, an-

other voice comes up on the radio—"Mobile's up." Hearing this, the controller passes you off to him.

Meanwhile, you are working the ailerons and rudder to keep lined up with your touchdown spot exactly on the center stripe. As you pass over the threshold, you become aware of how limited your visibility really is, especially forward; but Mobile has accelerated in his radio-equipped pickup truck to catch you and soon you begin to hear his altitude calls. The bird must be landed in nearly a full stall; a knot or two hot will cause it to bounce back up into the air, probably causing a wing to drop, and making the nose swing in that direction. In turn, the landing gear would be aimed off toward the Sierras. (See "Learning to Land the U-2," by Capt. Glenn Perry, January '76 issue.)

As you get closer and closer to touchdown, you hear Mobile call, "There's ten feet . . . eight . . . down to six . . . four . . . three . . . two . . . holding at two." You frantically move the controls from side to side to keep the wings level while increasing back pressure on the stick and working the rudders to keep that large nose tracking straight down the centerline. Then you feel it, the tail begins to drop, indicating stall. Still, the control column comes back until the pronounced thud of impact announces contact with the runway.

Can't let up now! Working like mad, you bang the controls around to keep the wings level. Rudders are now used for the tailwheel steering to keep tracking straight down the runway. You retract the flaps to make wing control easier at the slower airspeeds. Then, gently touching the very sensitive hydraulic brakes, you smoothly come to a stop.

Looking out, you see that your wings are still level—a rarity. This indicates your feel for fuel balance was right on the money. The ground crew, like a swarm of bugs, now mills around the bird to reinstall the pogo wheels for taxiing. You return Mobile's grin and thumbs-up gesture.

When the ground crew is finished and clear, you follow Mobile off the runway and back to the parking spot. As you roll down the taxiway, activity on the ramp assaults the senses. JP-4 fumes, faint but identifiable, whirl around the aircraft waiting for you to taxi by. Now a touch of the throttle increases the engine's growl to a louder pitch as you taxi up slope into your parking slot, stop, and shut down.

Canopy open! The cool morning breeze feels unusually sharp to your sweaty face. You are aware of the tick—tick—tick of the compressor as it winds down and stops. All is now quiet. Motions and sounds seem slow and muted. Another high-in-the-sky mission accomplished. ■

AIR Force leaders as far back as Hap Arnold have long proclaimed that their service "takes care of its own."

Do the troops agree? Does the Air Force really try hard? According to a recent Air Force-wide survey, a clear majority endorses these official claims. "Both officers and airmen think the Air Force takes care of its own people, and most see it as more

than just a place to work," Hq. USAF said after analyzing the results.

It would indeed be surprising if the outcome were otherwise; the lineup of these special "people programs" is impressive. It includes at least forty separate projects ranging from aero clubs to retired activities, from legal assistance to loans for dependents' college expenses. The

To counter the perception of eroding personnel benefits, USAF is mounting a drive to remind its members of the forty Air Force "people programs." Ranging from aero clubs to loans for dependents' education, they help shape the Air Force as . . .

More Than Just a Place to Work

BY ED GATES, CONTRIBUTING EDITOR

lineup also features such time-tested items as CHAP (helping handicapped children), sports-athletics, and NCO and officer clubs, along with more recent but less known ones such as Project Concern (family alcohol prevention) and MAST (airmen families sharing together).

These programs, it should be noted, are the Air Force's own doing. They are separate and distinct from commissaries, exchanges, survivor benefits, retirement, and other more publicized personnel benefits that apply Defense-wide. The latter, of course, carry big price tags. They are the showcase trophies that figure in the discord over perceived erosion of military benefits.

Air Force's "own" forty-odd people programs, seldom in the limelight, definitely are not being eroded or curtailed, according to Maj. Gen. B. L. Davis who, as the Hq. USAF Director of Personnel Plans, keeps close tabs on them. These programs, General Davis told AIR FORCE Magazine, "provide cohesion in our units and help shape the Air Force as an institution rather than just a place to work. They are part of the total effort that binds us in the Air Force together."

USAF Assistance Fund

It is difficult to put a price tag on these projects. They are financed from many accounts, with both appropriated and nonappropriated money. Much of the latter, such as profits from exchange stores and income from base bowling alleys and golf courses, supports hobby shops and other recreation projects that operate in the red. And the total outlays, in the multimillions, include financial support from the membership, via their contributions to USAF's annual Assistance Fund drive.

This year's campaign, preceded by what Air Force acknowledges was a "massive" publicity effort, is seeking a record-breaking \$1.4 million, double last year's goal. Some critics say this is not realistic and could invite undue pressures to participate, followed by complaints to members of Congress. The 1977 drive is now winding up, and results should be available soon.

Three major projects share in the funds: The Air Force Aid Society; the Air Force Enlisted Men's

Widows and Dependents Home, Fort Walton Beach, Fla.; and the Air Force Village, San Antonio, Tex. Of the three, the EM Home's need for funds is the most pressing.

Many contributors designate a recipient. Forty-five percent of the undesignated donations this year will go to the Aid Society, while the EM Home and the Village will receive thirty-five and twenty percent respectively. Commands are assigned fund "goals," not quotas. SAC's \$267,000 is the largest. The contributions for the two facilities will help ensure for many elderly retired members and their dependents comfortable living among people of similar interests and backgrounds.

The thirty-five-year-old Aid Society is USAF's own charitable organization, though its role has changed somewhat. Unlike yesteryear, when it provided loans and outright grants to families in need, AFAS now deals almost exclusively in loans, mostly to defray the college expenses of sons and daughters.

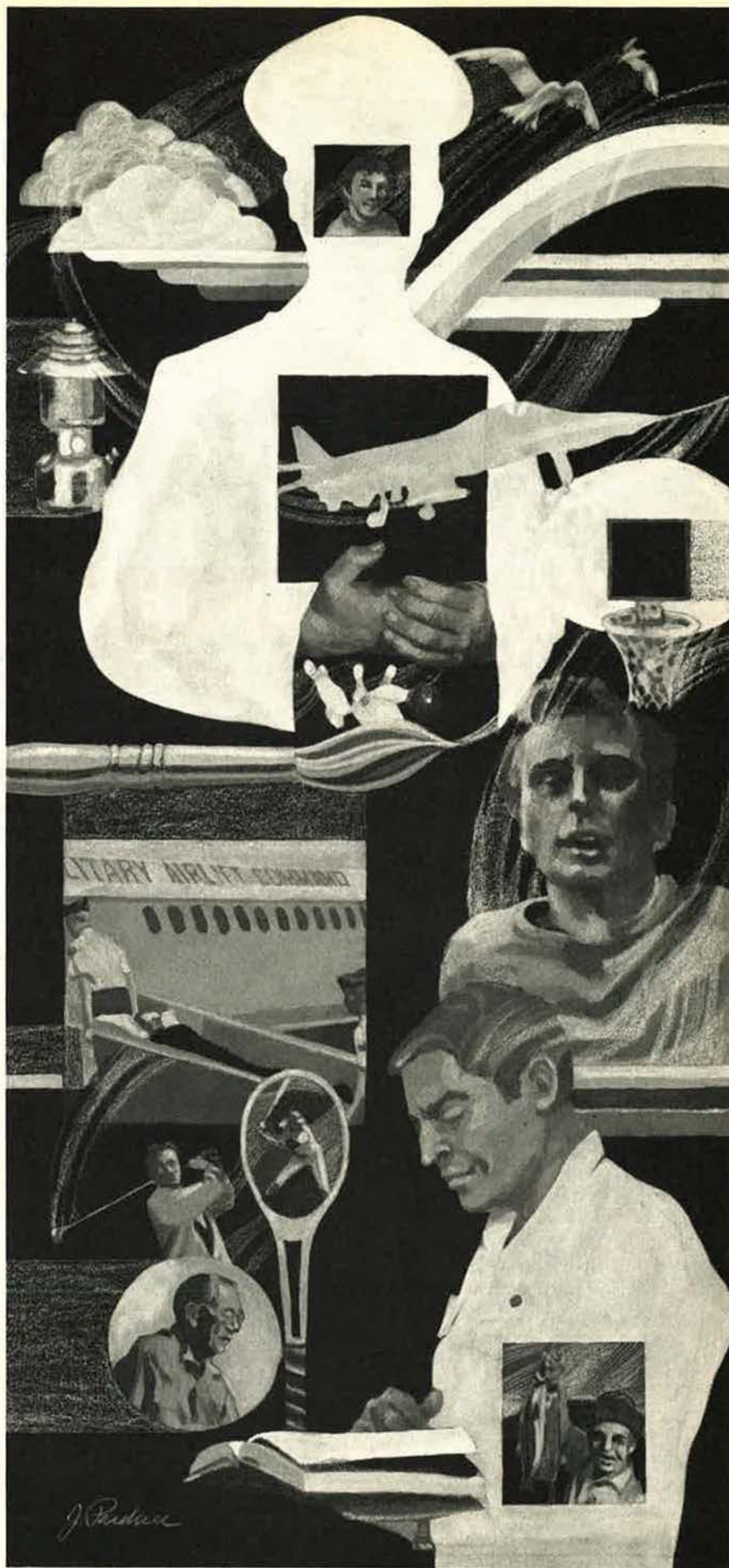
In 1966, for instance, Society grants totaled \$434,000, but by 1975 they had dwindled to less than \$28,000. Conversely, in 1966, AFAS loans totaled about \$2.1 million, compared to nearly \$4 million in 1975. Most of the latter was for college tuition.

Recent pay increases, liberalized credit union loan policies, and more working wives are among reasons given to explain the reduced grants, although there is a growing feeling that the Aid Society should be more responsive, especially in cases involving lower-ranking airmen.

The MWR Program

Morale, Welfare, and Recreation (MWR) Activities—this uninspired heading in no way does justice to the first-rate Air Force programs it covers: sports-athletics, hobby shops, recreation centers, officer and NCO clubs, entertainment, youth activities, outdoor recreation, FAMCAMPs, recreation supply, movie theaters, libraries, child care centers, aero clubs, and other "special interest" clubs.

At some sites, of course, these may not add up to much, but at most major bases they generally make an attractive package unmatched in the private sector.



—ILLUSTRATION BY JACK PARDUE

USAF's Forty "People Programs"

Officials feel strongly that these forty USAF "people" programs fully support their assertions that "We take care of our own":

Aero Clubs	Legal Assistance
Air Force Aid Society	Libraries
Air Force Village	MAST—EM Sharing
Chapel Retreats	Movie Theaters
Child Anti-Abuse	NCO, Officers Clubs
Child Care Centers	Off-Duty Education
CHAP	Outdoor Recreation
Community College of Air Force	Personal Claims Aid
Defend Oversea Offenders	Recreation Centers
Designated Move Abroad	Recreation Supply
EM Widows Home	Retired Activities
Entertainment	Retirement Move
Family Anti-Alcohol	Rod-Gun, Special Clubs
FAMCAMS	Space-A Travel
Family Services	Single EM Ministries
Health Benefits Adviser	Sports-Athletics
Hobby Shops	Student Travel Option
Humanitarian Air Evac	Tooth-Decay Prevention
Humanitarian Reassignment	Tuition Assistance
INTRO-Newcomer Aid	Youth Activities

Sports and athletics in particular, backed up with adequate equipment and facilities, are standard at most Air Force locations. There are gyms, swimming pools, and athletic fields. The service maintains more than 100 golf courses, charging fees well below those on the "outside." The same goes for bowling centers, also found at most Air Force bases, and at the rare locations where there are roller skating rinks.

The Air Force also conducts training camps and participates in interservice championships in nine sports, seven of which lead to international competition. Bases and commands hold numerous tournaments.

There is a major drawback—tennis, which is pretty well neglected at most military installations, Air Force included. This is exemplified by dirty, cracked court surfaces, inadequate backstops and windbreakers, raveled nets minus centerstraps, and little or no court supervision, among other things. The local tennis "program," as a result, takes on a "public parks" rather than a genuine "tennis club" appearance. All this at a time when tennis has overtaken golf as the nation's leading participation sport. Also disappointing is the Air Force's withdrawal from the annual service-wide tennis championships.

Thousands of Air Force people, meanwhile, pursue photography, auto

repair, ceramics, fine arts, and many other activities at base hobby shops. And there are more than 200 Air Force recreation centers that feature game rooms, recreational classes, tickets and tour centers, dances, etc. Off-base outdoor recreation areas are found at forty-three locations.

Many sites provide "recreation supply" offices that allow Air Force campers and sportsmen to rent fishing gear, sleeping bags, and other equipment at cut-rate prices. And the FAMCAMS, or family campgrounds found at thirty-four Stateside bases, make for good low-cost vacations and PCS stopovers.

NCO and officer clubs remain the center of social activities throughout the Air Force. To restrain soaring operating costs, some bases have centralized NCO-officer club management and food-buying functions. But full consolidation leading to "all-rank" clubs, is not in the cards, General Davis said.

Also under the MWR heading is an entertainment program embracing little theater projects, theatrical shows, the Air Force Talent Contest, and the Tops in Blue road show; a youth activities program that includes camping, dances, etc., for teenagers; libraries; more than 100 child care centers where small fry are attended to for modest fees; and movie theaters. The last, though admission fees are up, still present first-

run films at well below commercial ticket prices.

Many bases also support aero clubs, rod and gun clubs, and other special activities. Aero clubs operate at fifty-two bases where 7,000 members flew about 200,000 hours last year in the Cessna 150, T-34, Cessna 172, and other light planes, for as little as \$12 an hour.

The quality of MWR activities varies by base. Some commanders emphasize them more than others. And there are built-in roadblocks for all, such as rising minimum wage rates and cuts in military manpower. Nevertheless, Air Force says that it is pushing MWR managers to maintain strong local programs.

Letting the Members Know

The service, furthermore, is not letting the membership forget the existence of the many "take-care-of-its-own" projects. The Secretary of the Air Force's Office of Information currently is sending bases a series of new pamphlets under the general heading, "It All Adds Up." While the spotlight focuses on commissaries, compensation, military retirement, and other major personnel programs, they also plug the MWR, humanitarian, legal, and other special projects covered in this report.

Behind the Secretary's "It All Adds Up" pamphlets is the leadership's desire to counter the widespread perception that benefits are being eroded.

Early this year, Headquarters launched a separate drive to make members with personal problems more aware of their options under the CHAP (Children Have A Potential) program. Certainly the most humanitarian of USAF's "care" projects, CHAP gives parents of handicapped children special assignment consideration. This can mean transfer to a base with suitable medical facilities for treating the particular ailment. The recent move of CHAP approval authority to the Military Personnel Center should assure more consistent and faster decisions for all Air Force members, Headquarters says. Family deaths, child custody, and severe financial difficulties are also grounds for special treatment under the humanitarian reassignment program.

The Family Services (FS) Program

A Helping Hand From USAF's Legal Officers

The Air Force's nearly 1,200 legal officers extend a helping hand to members and their families. But unlike civilian life, where the legal profession normally separates clients from large chunks of their bankrolls, there is no charge.

Air Force people appreciate and take advantage of this. They swarm to base JAG offices. In 1975, for example, Air Force legal assistance officers served more than 381,000 members and dependents.

JAGs draw up wills and powers of attorney. They help with tax problems, debt woes, citizenship difficulties, and a host of other matters. They assist with insurance claims, act as notaries public, and make full use of the Soldiers' and Sailors' Civil Relief Act in protecting the military community.

Air Force JAGs also help members charged with criminal offenses abroad. And they handle claims for persons suffering property losses from fire, theft, transfer, etc. This is big business. In FY '76 alone, 63,544 personal claims were completed by USAF JAGs. They resulted in payments of \$17.9 million.

also exemplifies the "take care of its own" philosophy. It is an Air Force fixture that helps wives and children cope with life's vicissitudes during emergencies and when husbands are overseas. The FS volunteers provide families who are temporarily husbandless and fatherless with emergency transportation, child care, advice, and help. They may even cut the grass.

Base FS Centers are stocked with kitchen utensils, high chairs, and other essentials for families on the move. And the volunteers, normally wives who have been around the service for awhile, brief newcomers on local services and benefits.

Also peculiar to Air Force life are little "extras" dealing with transportation. One recent change authorizes

government transportation of a member's family to a designated site abroad—not just to a Stateside spot—when the member is sent to a restricted overseas area and unique circumstances exist. Travel options for Air Force "dormitory" children in Europe, who attend a DoD-operated high school away from their home base, have also been liberalized. And that "final move" for retiring members, their families, and household goods may now be delayed beyond the normal one-year limit. Space-A travel on military aircraft continues, though waits are often lengthy.

Education and Counseling

Air Force also provides educational benefits that most participants rate as a plus: undergraduate and graduate degree programs; tuition assistance under which Uncle Sam pays up to three-quarters of course tuition; and the Community College of the Air Force. CCAF participants combine credits for off-duty courses and USAF technical training to win associate degrees—and a head start toward bigger things in or out of uniform.

Then there is the Retired Activities Program, under which Air Force fields queries from its 400,000-plus retired members, and keeps them posted on pay, allotments, and other topics of interest. It encourages their participation in base projects. Retirees enjoy club membership, shopping, golf, and all other base privileges. Unlike private firms that, except for mailing retirement checks, generally ignore their pensioners, Air Force maintains an interest and stays in close touch with its retirees.

Another important USAF group receives a different kind of assistance, under Project Concern. These are wives with drinking problems. Through special counseling, distribution of literature, meetings with medics, and treatment if needed, Concern helps family members cope. It enjoys considerable high-level support.

For young members transferring to new bases—particularly those completing technical training—there is INTRO, which stands for Individualized Newcomer Treatment and Orientation. Under INTRO, when a person about to PCS asks for a

sponsor at the new site, wheels turn, leading promptly to welcoming letters, information about living conditions, an individual to meet him—even in the early morning hours, Air Force says—and other aid in getting the new assignee comfortably settled. Hq. USAF has nudged commanders recently to assure that this program is operating properly.

Air Force chaplains, medical officers, and JAGs carry out separate projects that also fit into the "take-care-of-its-own" theme. Chapel retreats, the Chief Chaplain's office reports, are popular at numerous bases. Some are for older persons who ponder the problems of retirement. Others are for young people burdened with financial or matrimonial woes. A project called Single Airmen Ministries flourishes at some locations, such as Mountain Home AFB, Idaho, where a program of "spiritual and physical renewal" through such things as cross-country skiing and back packing have drawn kudos.

Perhaps the chaplains' best-known "care" effort is called MAST (Married Airmen Sharing Together). Married first termers and their wives get together, meet new people, "replace isolation with social activity," discuss mutual problems, learn new skills, and smooth the transition from civilian to military life, the chaplains report.

Air Force medics operate other special people projects not normally found in civilian life, such as providing a "health benefits adviser" at each medical treatment facility. He helps sort out the various benefits available to different people, then shows how "health coverage gaps" can be closed. This service is especially helpful to retirees with access to "a mix" of medical benefits.

Air Force medics, through their Child Advocacy Program, try to smoke out—and then halt—child abuse within the Air Force community. And they are proud of their well-oiled machinery for evacuating special cases by air for humanitarian reasons, such as airlifting burn patients to the Army Burn Center in San Antonio. Also sponsored by the medical people is a tooth-decay prevention program for USAF children.

All in all, it's a hefty package that clearly spells out, "We Care." ■

Belated Benefits for AAF's Women Pilots

BY JAMES A. McDONNELL, JR., MILITARY RELATIONS EDITOR

Appearing before the Congressional Committee, the ranking General of the United States Air Arm urged the Congress to move immediately to provide for the appointment of female pilots and aviation cadets in the Air Force. He was looking, he said, for as many as two thousand to twenty-five hundred.

A NEW Air Force policy? No. The General was Henry H. Arnold, Commanding General of the Army Air Forces, and the date was March 1944.

General Arnold was not requesting a new program, but rather incorporation into the AAF of an extremely successful one that had begun in September 1942—the Women's Airforce Service Pilots, or WASP.

By 1944, WASPs were ferrying combat and support aircraft from factories to using outfits throughout the US. They were flying weather and target-towing missions where they were shot at, and one, indeed, was shot down. General Arnold also was considering using them as Training Command flight instructors.

But while the WASPs were serving the AAF, they were not serving in the AAF. That was why General Arnold appeared on the Hill that day in 1944. The WASPs were, in fact, processed, drilled, trained, and in most other ways treated like male pilots. Mrs. Elaine Harmon, a former WASP now living in Maryland, recalls that they were assigned by orders to military units, subject to the same directives and regulations as military people (except for military law), and wore the Air Forces uniform with insignia. But, as she points

out, "we were still civil servants," and—shades of ERA—they were paid \$50 a month less than their male civilian pilot counterparts.

Beyond that, the WASPs were not entitled to military benefits. Mrs. Harmon cited a poignant incident where a WASP copilot and a male pilot were killed in a crash. The WASP's survivors were eligible for none of the death benefits that the pilot's family received. The woman pilot's family even had to pay for her funeral.

Defeat and Deactivation

There is no doubt that militarization of the WASP was always in the minds of its planners. The women military pilot program began with formation of an experimental squadron of experienced women flyers who were trained to do ferry work in the Air Transport Command. In the urgent climate of World War II, it was "get 'em on the job as soon as possible and take care of the details later."

On August 5, 1943, the trainees and the Women's Auxiliary Ferrying Squadron (WAFS) were merged into one WASP organization, directed by Jacqueline Cochran. A study chartered by General Arnold at the time of the merger recommended that the WASPs remain on civil service status for only a ninety-day observation period.

In all, 1,830 women were accepted for pilot training and 1,074 graduated—but always as federal civil service employees.

Most of the WASPs were assigned to domestic ferrying duty. One was awarded the Air Medal for delivering a P-51, two P-47s, and a C-47 in

five days, covering more than 8,000 miles in the process.

Gen. William H. Tunner, of World War II and Berlin airlift fame, recalls in his book, *Over the Hump*, that many male ferry pilots were having accidents in the P-39. To change the image of the aircraft that had come to be known as the "Flying Coffin," General Tunner assigned some WASPs the job of ferrying P-39s. They did it with a perfect flight record. There were no more complaints from the male pilots.

The bill that General Arnold supported in 1944 provided that women pilots appointed under the legislation would be commissioned in the Army Air Forces and entitled to the same rights, privileges, and benefits as any other Reserve officer. It was considered on the House floor on June 21, 1944, but defeated by nineteen votes. There was, in fact, little objection to commissioning women pilots. The major opposition was from members who wanted to add amendments concerning admitting male civilian pilots to the AAF.

An identical bill had been introduced in the Senate, but after the House vote, the Senate bill wasn't reported out of committee. During the House debate, it had been recommended that the women be provided hospitalization and life insurance. No action was taken on that score, either.

After defeat of the House bill, recruitment and training of women pilots stopped. The program was inactivated on December 20, 1944, leaving the WASPs with no veterans' benefits.

"Don't Let Them Down Again"

More than thirty years later, in the Ninety-fourth Congress, a bill to provide veterans' benefits to former WASPs was sponsored in the Senate by Barry Goldwater and in the House by Patsy Mink and Omar Burleson. It died with the Ninety-fourth.

Now once again, Senator Goldwater has introduced a bill, which AFA strongly supports, to provide long-overdue recognition to the WASPs. In introducing the bill this January, Senator Goldwater said:

One of my greatest disappointments in the last Congress was the failure of the 94th Congress

to enact legislation recognizing the contributions of the Women's Airforce Service Pilots . . . I am today reintroducing legislation on behalf of the WASPs. The bill would provide veterans pension, disability compensation, hospital and medical care, and other GI benefits to them. . . . The very reason the group was organized from the outset was for militarization; the group proved their military capabilities to the satisfaction of the [Army Air Forces]. . . . There is no sound nor reasonable basis on which a bill giving recognition to the WASP for their service to their country can be turned down.

Senator Goldwater cited the distinguished record of the WASPs, pointing out that they flew more than 60,000,000 miles during World War II. "I was privileged to have served in the 2d Ferrying Group, stationed at New Castle, Del., when they were there," he said. "I made many flights with them, and it convinced me that their ability as pilots was equal and, in some instances, superior to men."

Thirty-eight WASPs died on duty or during training. It is, of course, too late for them. Of the more than 1,000 program participants, others, of course, have died in the intervening years and the location of many is unknown. One who is known is Air Force Lt. Col. Joan Olmsted, an intelligence officer with the Air Force Intelligence Service at Ft. Belvoir, Va. One of a small number who subsequently joined the Air Force, and the last one still on active duty, she feels strongly that the bill is a necessary redress of past wrongs. While its provisions would have no significant effect on her life, she told AIR FORCE, "So much is owed to those women who were really our all-volunteer force, and this bill would at last recognize what they did."

In late February of this year, Senator Goldwater wrote Sen. Alan Cranston (D-Calif.), Chairman of the Senate Veterans' Affairs Committee, reminding the Committee of its promise during the last session to consider the issue again this year. The bill is being cosponsored by two senior members of the Veterans' Affairs Committee, Clifford Hansen (R-Wyo.) and Jennings Randolph (D-W. Va.).



TOP LEFT: WASP Barbara Erickson and Gen. H. H. Arnold review parading WASPs after Erickson was presented the Air Medal. TOP RIGHT: A WASP plots a course for a delivery flight during World War II. ABOVE: A WASP pilot trainee receives instructions prior to her first solo.

Senator Goldwater expects that "hearings will occur in the next couple of months, certainly as one of the first hearings the Committee holds on new bills."

Col. Bruce Arnold, USAF (Ret.), the son of the General who started the women's program back in 1942, has, for years, been a strong supporter of this redress. "These wo-

men," he told AIR FORCE Magazine, "were asked to prove the effectiveness of a new concept when their country needed them. They succeeded beyond the wildest imagining of their supporters.

"Now they need the same kind of support from the country they served. I hope we don't let them down again." ■

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The Bulletin Board

By James A. McDonnell, Jr., MILITARY RELATIONS EDITOR

Revised People Plans Unveiled

Defense Secretary Harold Brown has promised to develop a "revised retirement plan" that will reduce soaring military retirement cost estimates, but also play fair with "people who've been in the military for a substantial time." In discussing President Carter's FY '78 budget alterations, Dr. Brown said he had shelved the Retirement Modernization Act (RMA), the Pentagon's long-standing plan to revamp the retirement program.

Defense's new leader also declared he will save money by closing unnecessary bases, cutting "expenditures on schooling," and scuttling the controversial Uniformed Services University of Health Sciences. And once again he vowed to slash PCS moves.

These and related actions, some down the road a bit, will save personnel money that will be used for "higher combat readiness."

The approximate 6.5 percent military pay raise scheduled for October, originally advanced by the Ford Administration, remains in the Carter FY '78 budget. So do other new proposals reported here last month, such as larger trailer allowances and extension of family separation payments to lower-ranking enlisteds. USAF's personnel strength target for end-FY '78 remains at 572,000 military and 241,000 civilians.

Most of the new Administration's immediate budget cuts are in hardware, but, over the long run, Dr. Brown said he favors putting "a larger fraction" of defense expenditures into "the investment accounts, procurement, and RDT&E." This means reducing the fifty-five percent now going into personnel.

"Over the next year," Secretary Brown said, "I think that we can

zero in on personnel reductions, on a revised retirement plan that does not cause retirement costs—which are at present scheduled to be about \$9 billion in FY 1978—to go up to one estimate of \$30 billion a year by the year 2000, and at the same time avoid unfair treatment of people who've been in the military for a substantial time, [who] came in with the expectation of retirement benefits under the present system, and I think would correctly feel they'd been unfairly treated if changes applied to them."

Service people generally are applauding Dr. Brown's withdrawal of the RMA package, feeling it contains more negative than positive features. But the big question is, What will the replacement plan look like? Apparently, it will apply mainly to people entering service at some future date.

Dr. Brown indicated that Defense officials would review the findings of the Quadrennial Review of Military Compensation on retired pay before a revised retirement system is hammered out. At press time, the QRMC still had not issued a report, although a stack of studies by its staff had been released.

The "schooling" cuts are expected to apply mainly to training classes.

Last of the WOs

Nearly two decades ago, when the Air Force ceased appointing new warrant officers, it had more than 5,000 serving in that status. Now there are only nine, and eight of those are slated to retire by mid-1979. That will leave CWO James H. Long of Dover AFB, Del., as the sole active-duty survivor of that venerable corps. Unless he elects earlier retirement, he'll stay until December 1980.

At one point in the late 1950s, Air Force announced plans to boost WO strength to around 12,000. Interest among NCOs became intense. But that good news was dashed abruptly as appointments were completely halted. The NCO supergrades took over, although the other services continue to maintain active warrant officer programs. Army currently has about 13,000 WOs, Navy around 3,000, and the Marine Corps about 1,300.

In addition to Mr. Long, the remaining Air Force active-duty warrant officers (listed in order of their expected retirement) are George W. Charles, Pope AFB, S. C.; Richard Cartel, Vandenberg AFB, Calif.; Hamilton W. Lufkin, Francis E. Warren AFB, Wyo.; Howard W. Blaise, McClellan AFB, Calif.; Henry L. Amdrate, Andrews AFB, Md.; Louis P. Wright, Nellis AFB, Nev.; John A. Kainz, McClellan AFB, Calif.; and Kenneth L. Conway, Edwards AFB, Calif.

Firms Pay Reservists

More than two-thirds of 238 companies surveyed last year said they paid employees on Reserve-Guard training either full or partial salary, in addition to vacation pay. Most paid the difference between regular salary and drill pay.

The survey conducted by Prentiss-Hall, Inc., looked at the Reserve pay policies of 150 plants, thirty-four offices, forty hospitals, and fourteen banks. About one-third of these did not pay employees on annual Reserve encampments any of their salary, though they did continue regular vacation pay. The remaining companies in the survey had other policies.

The large number paying full salaries or the difference between salary and drill pay has special significance. The Defense Department wants Congress to eliminate the so-called "dual payments"—both drill pay and Civil Service pay—that federal employees who are also Reservists currently receive while training. Instead, they'd receive the difference between salary and military pay. Eliminating the dual pay would save the government an estimated \$30 million annually, Defense estimates.

Other significant Reserve personnel legislation is dormant, according to Will Tankersley, Deputy Assistant Secretary of Defense for

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Reserve Affairs. He told Congress recently that the Pentagon won't ask the lawmakers to (1) lower the Reserve retirement age below sixty; (2) improve Reserve survivor benefits; (3) approve a Reserve benefits bill; or (4) remove the sixty-point limit for inactive-duty training (creditable for retirement purposes), until the exhaustive study of Reserve compensation is completed. As reported in the February "Bulletin Board," that study won't end until next fall. Its fate thereafter is anyone's guess.

Tankersley also said that the Reserve Officer Personnel Modernization Act won't go to Congress until Congress acts on the Defense Officer Personnel Management Act (DOPMA). Action on new recruiting and retention incentives, which many quarters favor as a means to improve Reserve-Guard manning, will wait until results from a Defense-sponsored national survey of present and former Reservists and prospective enlistees are received, Tankersley told Congress.

Meanwhile, Maj. Gen. William Lyon, Chief of the Air Force Reserve, told Congress that "lack of adequate incentives" is partly responsible for the slump in Air Force Reserve personnel strength, now

about 5,000 below the congressional authorization of 53,600.

AFA believes that bonuses and educational benefits for Reserve/Guard enlistees would be two powerful incentives.

Melvin Price Honored

Melvin Price was a thirty-nine-year-old Army corporal when, in 1944, he was elected to the Seventy-ninth Congress. Hearing the news, his commanding officer declared that "anyone elected to Congress deserves another stripe." He promptly promoted him to buck sergeant.

The voters of East St. Louis, Ill., have sent Representative Price back to the House every election since. He became an expert on military affairs, and two years ago was elected Chairman of the Armed Services Committee. On February 16 of this year, fellow legislators, other dignitaries, and friends gathered in the Committee's main meeting room in the Rayburn House Office Building to honor the Chairman at the unveiling of his portrait. It hangs permanently in that room.

Executive Director Jim Straubel; Jack Loosbrock, Deputy Executive Director and Editor of AIR FORCE Magazine; and other AFA officials attended the ceremony.

State ROTC Scholarships

State-financed scholarships for ROTC cadets, in addition to the federal pacts currently authorized,

possibly could strengthen ROTC programs, according to USAF's Maj. Gen. James R. Brickel. He is chief of AFROTC.

General Brickel recently noted that Illinois offers full tuition scholarships to ROTC cadets at state-supported schools. He said the ROTC state-funded programs would also ensure better geographical distribution of scholarship recipients and enhance the states' higher educational systems.

CHAMPUS Reg Slips

That long-awaited Defense Department regulation on CHAMPUS, due in February, didn't make it. Pentagon health authorities delayed publication following complaints from the assistant service secretaries for manpower. They declared that the document language, in some instances, would curb benefits in CHAMPUS, and service people would view them as further erosion of the program.

CHAMPUS officials agreed to change certain sections to meet the objections, and at press time were negotiating over others with service personnel officials. Early approval was expected.

As we reported in last month's "Bulletin Board," Pentagon medical authorities had scheduled the 300-page document for publication early this year. Distribution by April now seems more likely. The big tome will, for the first time in the stormy history of CHAMPUS, provide military members and their families a clear explanation of what ailments and services are covered, to what extent, what is excluded, etc.

More Take Off-Duty Courses

Many more USAF members are taking off-duty study courses and larger numbers are winning degrees. Figures compiled by the Hq. USAF Education Services office show that during FY '76, airmen enrollments in undergraduate courses reached 164,355, up more than 4,000 above the previous year and 17,000 higher than in FY '74. Officer enrollments in undergrad courses totaled 13,328 last year, about the same as the previous year.

In graduate courses, officer enrollments reached nearly 70,000, and the airmen figure was almost 8,800, both up substantially over the previous year.

AFA Executive Director James H. Straubel, left, accepts a Community Service Award on behalf of the Association's affiliate, the Aerospace Education Foundation. The award was presented by Edward Karoly, President of the Washington, D. C., Chapter of the American Society for Training and Development. Cited was the Foundation's work in human resource development by making Air Force course systems available to the nation's civilian educational community.



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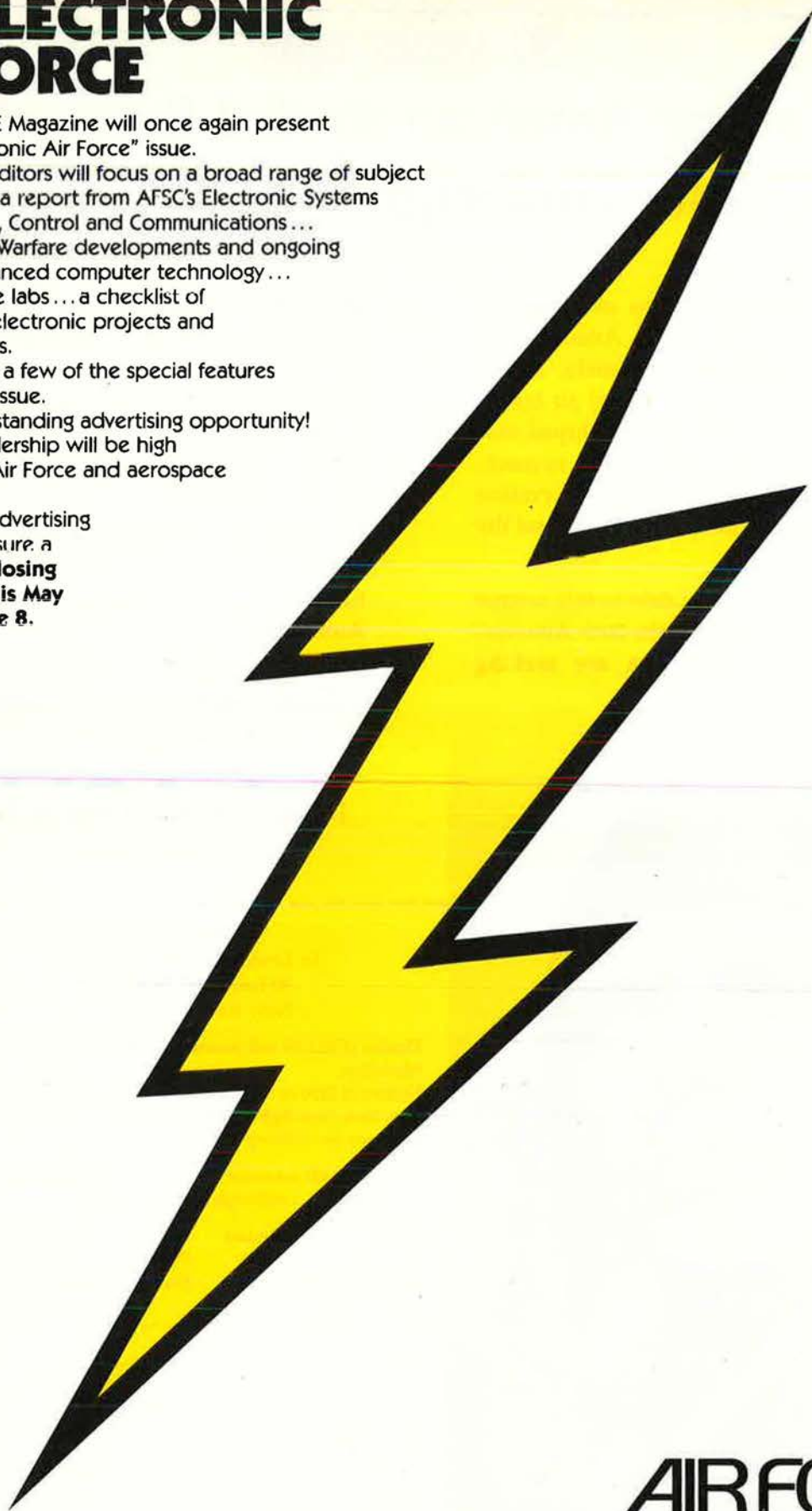
In July, AIR FORCE Magazine will once again present its annual "Electronic Air Force" issue.

This year the editors will focus on a broad range of subject matter, including a report from AFSC's Electronic Systems Div, ... Command, Control and Communications ... latest Electronic Warfare developments and ongoing programs ... advanced computer technology ... what's new in the labs ... a checklist of major Air Force electronic projects and prime contractors.

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AIR FORCE
PUBLISHED BY THE AIR FORCE ASSOCIATION **MAGAZINE**

The Bulletin Board

This study helps account for the baccalaureate degrees won last year by 561 officers and 1,709 airmen, and the master's degrees acquired by 3,247 officers and 270 airmen. Twenty-seven officers won their doctorates last year through the Education Services Program. In all categories, the degree totals topped those for the previous years.

Another 299 officers and 6,239 airmen received two-year college degrees in FY '76.

USAF Education Services officials, happy with these record-breaking statistics, look on their program as improving the attractiveness of the Air Force, and as a means of helping members "grow professionally and personally." They also cite the study projects as evidence that members need not shed their uniforms to continue their education.

Air Force pays seventy-five percent of the tuition for off-duty courses, though many elect to use their GI Bill entitlements. But the latter program will soon begin to phase out, and newcomers to the service won't enjoy GI coverage. Accordingly, officials say, pressures will soon build on the services to provide considerably more tuition assistance money (see last month's "Speaking of People").

Recently revised AF Pamphlet



Gen. Paul K. Carlton, Commander of the Military Airlift Command, retired from the service as of April 1, after a career that spanned thirty-six years.

213-2, Educational Opportunities on Air Force Bases, lists all off-duty courses and sponsoring colleges for each installation.

Bills, Bills, Bills

Members of the Ninety-fifth Congress have poured hundreds of new bills affecting military people into the hopper. They deal with bonuses, military unions, Academy appointments, survivor benefits, and a host of related issues. Scores of these bills would affect the military retirement program in some way. It's another indication of the great concern about retirement costs throughout the government.

Most of the bills, of course, aren't going anywhere. But one that is moving extends enlistment and reenlistment bonus authority until September 30, 1978. Otherwise, they would expire June 30, 1977. The extension has already passed the House.

Also on the move is a bill to reduce the Social Security offset in the Survivor Benefits Program when a widow reaches sixty-two, from 100 to fifty percent—when benefits are attributable to the deceased spouse's military service. Under various other conditions the offset would be eliminated. The measure contains other survivor improvements, including a cost-of-living increase for those covered by the old Retired Servicemen's Family Protection Plan. House Armed Services Committee action was pending on the changes at press time. AFA testified in support of a similar measure during the last session of Congress.

A bill to let the service academies

select their own students was introduced by Rep. Robert J. Cornell (D-Wis.) and fourteen others. They say their plan would take the politics out of appointments.

Following are examples of new bills affecting military retirement, and their sponsors:

- Reduce Reserve retirement eligibility from age sixty to fifty. Sen. Strom Thurmond (R-S. C.) and Rep. G. V. Montgomery (D-Miss.).

- Remove snags to collection of extra retirement pay for heroism by certain retired enlisted recallers. Rep. Sam Stratton (D-N. Y.).

- Provide recomputation of retired pay to 1972 rates. Sen. Spark M. Matsunaga (D-Hawaii). (Other recomp bills abound.)

Top Stars' Pay Upped

Those recent pay raises for high-level government officials went to about 150 military officers of star rank. The big pay package, which Congress let take effect without voting on it, boosted the lawmakers' salaries by \$12,900, to \$57,900 annually.

Other government executives received hikes of from \$29 to \$7,900 a year; the new ceiling is \$47,500. Included are GS supergraders (16s through 18s), their equivalents in other government pay systems such as the Foreign Service and the VA, and certain long-service GS-15s. Also included are military O-10s—they got raises of \$658.20 monthly to bring them to the \$47,500 annual level—and O-9s. The latter got an extra \$350.40 a month if they had more than twenty-six years of service, or \$106.80 with less service.

Carter Urges VA Benefits Hike

President Carter's budget alterations provide cost-of-living increases worth about \$900 million next fiscal year for both veterans drawing disability compensation and old-age pensions. Compensation hikes would be effective October 1, pension boosts next January. Both are expected to amount to nearly five percent, and will follow increases from last year. Veterans with service-connected disabilities receive VA compensation, while the pensions go to elderly low-income vets with nonservice-connected ailments.

The VA budget revision also eliminates the previous Administration's



Planning an Air Force career is Mary Kathryn Jesmouth, the first woman to receive a four-year AFROTC scholarship to the University of Alabama. Majoring in industrial engineering, she hails from Gulf Breeze, Fla.

The Bulletin Board

plan to reduce from ten to eight years the length of time a person could use the GI Bill following discharge from service.

Meanwhile, the high number of young Viet-era veterans without jobs continues as a major concern to AFA and other organizations. Labor Department statistics show that, at the end of last year, some 175,000 (18.3 percent) of those veterans in the twenty- to twenty-four-year age group were unemployed. Among minority groups, the jobless rate was 22.1 percent. AFA urges members who are employers to strongly consider hiring Vietnam veterans when vacancies occur in their organizations.

In a related move, the Veterans of Foreign Wars scored the Labor Department for its poor veterans hiring record. VFW's Executive Director Cooper T. Holt noted that

Labor hired only 3.5 percent veterans out of its total hirings during a recent period, despite an earlier promise that it would launch an "in-depth review of the employment of veterans." What's bad, Holt said, is that Labor is supposed to promote "maximum employment of disabled and Vietnam-era veterans."

Draft Savings Held Minor

A return to the draft, replacing the All-Volunteer Force, would save about \$500 million annually, less than one-half of one percent of the Defense budget. These savings would come from recruiting, advertising, and enlisted bonuses, according to Pentagon officials in the wake of growing concern by AVF doubters over the services' recruiting difficulties.

The Senate Armed Services manpower subcommittee has announced hearings about the matter. The Chairman of the parent Committee, Sen. John Stennis (D-Miss.), has already called for the draft's return.

The Pentagon doesn't think it necessary. Keener recruiting, better retention, more servicewomen,

and more civilians are the principal ways the Defense Department believes it can cope with the manpower problem.

Pro-draft forces have suggested that large savings would accompany reinstatement of a draft. According to the Pentagon, however, other than the cuts cited above, the only way to save big with a draft is to slash draftees' pay to the minimum wage level. That would save about \$2 billion annually, according to John F. Ahearne, the Principal Deputy Assistant Secretary of Defense.

Short Bursts

The Air Force Uniform Board has reaffirmed the long-standing "no-umbrella policy" for men. "Adequate protective clothing is already authorized and available," it says, and "flight-line personnel cannot effectively use an umbrella." So strongly does the Board feel about the matter that it may not allow Air Force women to use the things. Headquarters has asked commands for their views on extending the "no-umbrella" policy to the ladies.

Ed Gates . . . Speaking of People

Recruiting Climate Turns Cloudy

When a military service continually recruits large numbers of quality people, it receives many more dividends than the obvious one of improving effectiveness.

So it was with the Air Force during FY '74 through FY '76, the first three years of the all-volunteer force (AVF). During that period, USAF recruiters, after careful screening, signed up more than 200,000 nonprior-service enlisted members. More than ninety percent of them were high school graduates, and about half scored above average on the military's enlistment qualification test.

Because of this coup—it was the envy of all the other services—Air Force technical training failure rates dropped from 8.9 percent to five percent. Administrative discharges, other exits, and discipline rates all plunged, while the overall rate of enlistee separations during their first year in service declined thirty percent. The court-martial rate fell to the lowest in Air Force history.

All this translated into improved unit effectiveness, reduced turnover, more attention to the major mission, greater productivity, and substantial savings in people and dollars. It also created an atmosphere in which the membership generally could take pride; a truly quality force, such as USAF attained during those three years, is a morale-builder for all who wear the uniform.

The problem now, more than halfway into the AVF's fourth year, is to maintain that high quality. But the fact is that Air Force is in trouble, and its leaders are deeply concerned.

The recruiting picture, as AIR FORCE Magazine has re-

ported, began to deteriorate some months ago. More recently Maj. Gen. Bennie L. Davis spelled out the seriousness of the situation during a presentation to a House Armed Service subcommittee. The Hq. USAF Director of Personnel Plan was seeking support for increased FY '78 recruiting funds.

General Davis, who formerly headed the USAF Recruiting Service, painted a discouraging picture that contains the most serious implications for the near future.

Instead of the favorable recruiting climate of the first three AVF years, the current fiscal year has found the percentage of high school graduates enlisted in the Air Force dropping to eighty-seven percent. This is down from ninety-two percent in FY '74, General Davis reported. He added that non-high school grads are one and one-half times more likely than graduates to be discharged before completing their initial enlistment.

Worse, General Davis told the lawmakers, is the plunge in the number and types of youths waiting for USAF entry. He explained that recruiters work against a "bank of specific skill requirements nine months in the future." These needs are tied directly to training courses and projected active-duty vacancies. Recruiters, therefore, focus on youths qualified for available skill requirements, and the technical training pipeline is geared accordingly.

Normally, in the salad days of recruiting, Air Force fills requirements for a specific month well before that month. No more, General Davis said, for example, that "last year we entered January with 100 percent of January's skill require-

The *Fuji Flyer*, published at Yokota AB, Japan, copped two first places in the 1977 base newspaper contest. It won the graphic arts event and the division for funded newspapers with more than eight pages. Several ATC base papers also won honors in the contest. These and other winners are competing in the Defense-wide newspaper contest.

Approximately 656 USAF officers are enrolling in AFIT programs this fiscal year, including fifty-four who are going for doctorates. The entries continue the annual decline in AFIT enrollments that began some years ago, and officials say the drop off will continue next year. Officers wanting to win an AFIT berth should check AFM 50-5, Vol. I, for application details.

Why spend money—it amounts to millions annually—to apprehend military deserters when most of them are ultimately discharged as unqualified? The question is posed by the General Accounting Office.

Retired and other former USAF information officers were pleased to have recently received a roster listing their names and addresses.

With more than 600 on the list, it helps them keep in touch.

Senior Staff Changes

CHANGES: M/G Timothy I. Ahern, from Dir., Oper. Rqmts., DCS/R&D, Hq. USAF, Washington, D. C., to Asst. DCS/R&D, Hq. USAF, Washington, D. C. . . . **Col. (B/G selectee) Theodore D. Broadwater**, from Dep. Dir., Log. Plans & Progs., DCS/S&L, Hq. USAF, Washington, D. C., to V/C, San Antonio ALC, AFLC, Kelly AFB, Tex. . . . **Col. (B/G selectee) John R. Budner**, from Dep. Dir. for Force Dev., DCS/P&O, Hq. USAF, Washington, D. C., to Dep. Dir., NMCC (#1), J-3, JCS, Washington, D. C. . . . **Col. (B/G selectee) Edward L. Ellis**, from Cmdr., 46th ADW, ADCOM, Peterson AFB, Colo., to Cmdr., 23d NORAD Rgn. and 23d AD, ADCOM, Duluth IAP, Minn.

Col. (B/G selectee) Paul H. Hodges, from Cmdr., 10th TRW, USAF, RAF Alconbury, UK, to Cmdr., 601st TCW, USAF, Sembach AB, Germany . . . **M/G Charles F. G. Kuyk, Jr.**, from Dep. Dir. for Strat. Forces, DCS/R&D, Hq. USAF,

Washington, D. C., to Dir. Ops. Rqmts., DCS/R&D, Hq. USAF, Washington, D. C. . . . **B/G Joseph R. Lowry**, from Staff Judge Advocate, Hq. MAC, Scott AFB, Ill., to SJA, Hq. AFLC, Wright-Patterson AFB, Ohio . . . **Col. (B/G selectee) William H. L. Mullins**, from Chief, House Liaison Ofc., Legislative Liaison, OSAF, Washington, D. C., to Dep. Dir., Legislative Liaison, OSAF, Washington, D. C., replacing B/G Robert B. Tanguy.

B/G George K. Patterson, from Dep. for Aeronautical Equip., ASD, AFSC, Wright-Patterson AFB, Ohio, to Cmdr., Def. Elect. Supply Center, Dayton, Ohio . . . **Col. (B/G selectee) Kenneth L. Peek, Jr.**, from Cmdr., 5th BMW, SAC, Minot AFB, N. D., to Dir., Comd. & Control, Hq. SAC, Offutt AFB, Neb. . . . **Col. (B/G selectee) Robert D. Russ**, from Cmdr., 4th TFW, TAC, Seymour Johnson AFB, N. C., to Asst. DCS/Plans, Hq. TAC, Langley AFB, Va. . . . **B/G Robert B. Tanguy**, from Dep. Dir., Legislative Liaison, OSAF, Washington, D. C., to Dep. CINC, US Southern Comd., and Cmdr., USAF Southern AD, TAC, Howard AFB, Canal Zone. ■

ents filled, but this year we started the month with ten percent or about 600 of our requirements vacant."

And only forty percent of the March 1977 requirements had been "banked" by January, far behind the mark attained at the same point the previous year. "We are entering each month with a smaller portion of our requirements filled," a situation General Davis described as critical because it cuts heavily into the time a recruiter can work with prospects, investigate them, and sign up the most promising.

"Ultimately, if the trend is not reversed, it will mean a fundamental breakdown in the way we do business. We will not be able to assure a smooth flow of qualified enlistees to the training pipeline," he warned.

This, in turn, will lead to specific skill needs going unfilled and to gaps in the pipeline. A lopsided number of the unfilled requirements each month is in hard-to-recruit skills such as munitions maintenance, weapons mechanic, and security specialist.

"Potential shortfalls in skills such as munitions maintenance are serious because they affect the combat capability of the Air Force," General Davis told the legislators. One hopes they were listening.

Various reasons—such as insufficient incentives and fewer youths coming of military age each year—have been given to explain why all the services have experienced recruiting woes. General Davis provided some other reasons. While USAF recruiting quotas have remained high, the number of recruiters was cut a couple of years ago. Advertising dollars were reduced sharply. All this ties in with a recent nationwide survey conducted by the Defense Department showing that during 1976 awareness of USAF opportunities among young persons dropped by thirty percent, and the "propensity for enlistment" dropped for all the services.

"Telling it like it is" to prospects, which General Davis said is SOP with USAF recruiters, ultimately reduces complaints, attrition, and disciplinary problems. But it also dis-

courages many acceptable newcomers or, as he put it, "represents a trade-off in the salability of our enlistment package and increases recruiting difficulty."

This "emphasis on candor" and the fact that "we are recruiting under the toughest criteria the Air Force has ever imposed" restrict the size of the qualified market. Yet this is "totally justified" to meet the service's quality goals.

The former recruiting chief outlined the many new steps being taken to meet the recruiting crisis, such as urging USAF members to provide recruiters with names of likely prospects. General Davis called the response to this move "overwhelmingly favorable," though he said it was too early to tell whether it has been successful.

He also reported that Air Force is adding 293 airmen to its recruiting force this year and sending top-flight first-term airmen to their hometowns for short periods to support local recruiting efforts.

The year ahead will be particularly tough because quotas have been raised for nonprior-service, prior service, and OTS recruits. Even with the additional manpower, the Recruiting Service "will be required to achieve the highest production level per recruiter in our all-volunteer history," if quality and quantity goals are to be met, the Personnel Plans chief testified.

Expressed in constant FY '76 dollars, the FY '78 cost per Air Force enlistment is projected to be one-third below what it was the first year of the AVF and only two percent more than in FY '77.

The \$67.6 million USAF is seeking for the crucial campaign, \$8.7 million above this year's recruiting budget, is "absolutely essential" for meeting our goals, General Davis declared. Congress seems likely to heed the request and approve the increase.

Even so, there is no assurance that the adverse recruiting trend will be reversed. It's little wonder that the leadership is worried. ■

Airman's Bookshelf

Raiding Son Tay

The Raid, by Benjamin Schemmer. Harper & Row, New York, N. Y., 1976. 326 pages with appendices and index. \$10.95.

Benjamin Schemmer's *The Raid* is the best account so far of the attempted rescue of American POWs from the North Vietnamese prison camp at Son Tay. The author has made a significant contribution to the full story of this extraordinary mission. He traces it from its origin through the oppressive, bureaucratic maze of the Pentagon and related intelligence communities, to its preparation, execution, and alleged or actual impact on the war and the POWs.

The substance of Mr. Schemmer's narrative is accurate. He generally places events and personalities in their proper perspective and chronological order. His enthusiasm for the topic, however, has caused him to slip into the pitfalls of many journalists. Some of the details of *The Raid* suffer from embellishment, sensationalism, and incomplete research. The result, as one might expect, is a very readable, if not historically complete, rendition of the Son Tay rescue attempt.

As an example of the liberties Mr. Schemmer has taken, one need only consider his explanation for the untimely move of the prisoners from Son Tay to a different camp. Only the Vietnamese can categorically answer this question. The author, however, suggests that the move was the result of a top-secret US weather-modification program known as "Operation Popeye." He devotes considerable space to the thesis that the flooding caused by seeding clouds with silver and lead iodide crystals forced the Vietnamese to move the POWs from the Son Tay camp to a safer area, thus

inadvertently foiling the would-be rescuers.

This is an intriguing prospect, and certainly makes good copy. Unfortunately, as Mr. Schemmer would have learned had he interviewed more of the Son Tay inmates, flooding was not a problem at the camp during the spring and summer of 1970. In fact, the evidence seems to indicate that the move of the POWs to a new camp was generated by nothing more than a belated effort on the part of the Vietnamese to improve their living conditions. This is not nearly as exciting as weather modification, but perhaps a bit closer to the truth.

The full story of the Son Tay rescue effort is impressive. It requires no enrichment or ornamentation. To be sure, certain aspects of the story must be deleted for security reasons, and one appreciates Mr. Schemmer's treatment of classified material. But even the unclassified portions of the mission, as anyone can confirm by reading the now declassified after-action report, require no embellishment. They stand by themselves as "stranger than fiction." It is unfortunate that Mr. Schemmer could not resist the temptation to improve upon them.

The greatest contribution of *The Raid* concerns the questions Mr. Schemmer raises about the stifling bureaucracy and duplication of effort in certain government agencies. From *The Raid* one gains an illuminating, if distressing, perspective of the Washington scene. One is encouraged that certain individuals were able to rise above it and function effectively despite its crushing encumbrances. Such was the case with the key planners of Son Tay, who knew the vital channels and contacts, and were able to effect action. Mr. Schemmer's account in this area seems quite good. No doubt, through his service in the

Department of Defense and position as editor of *Armed Forces Journal*, he understands Washington infighting, and he does an excellent job of presenting it to the uninitiated.

But the definitive story of the Son Tay raid is yet to be written. Mr. Schemmer's research, extensive as it may have been, did not include input from such key figures as Maj. Gen. Leroy J. Manor, the overall mission commander, or Lt. Gen. James R. Allen, who ordered the initial feasibility study. These individuals, and others who played a vital if unheralded role in the mission, would have significant insights and contributions to the story. For now, *The Raid* will have to suffice. It delineates most of the main actors and events in a dazzling adventure.

—Reviewed by Lt. Col. Jon A. Reynolds, USAF, Department of History, USAF Academy. (Colonel Reynolds was a prisoner at Son Tay.)

CIA Evolution

Secrets, Spies and Scholars, by Ray S. Cline. Acropolis Books Ltd., Washington, D. C., 1976. 294 pages. \$10.

Not just another book about the CIA, this is a brief but comprehensive history of the agency's evolution, punctuated by observations from the experience of Dr. Ray Cline, a professional intelligence officer. Cline began his career in "the drudgery of signals analysis" and later served as an overseas station chief and as Deputy Director for Intelligence.

Widely experienced in both the covert and overt sides of intelligence, he decries the hold that clandestine work has on the imagination of both the public and officialdom. This cloak-and-dagger emphasis has led to pressures toward extensive covert projects over which the agency was unable to maintain either secrecy or control. Well-publicized failures have overshadowed the small-scale, selective, and largely successful activities that provided a "quiet supplement to diplomacy."

Intelligence collection will always be expensive because it must be extensive, Cline implies. To get a nugget of information for effective policymaking, much "ore-bearing compound" must be sifted. Perhaps

ninety-five percent of the effort will be wasted. Once gathered, bits and pieces of information must be analyzed by trained minds and scholarly estimates must be prepared. Reports will gather dust if there is no system for bringing them to the timely attention of officials who must act on the information.

A closing chapter on reorganizing the CIA underscores the author's point that the United States cannot afford to be without such an agency to provide its leaders with current information and well-researched estimates of foreign intentions. Among his suggestions are cabinet rank for the CIA Director; a new, purely analytical and estimative intelligence agency to be established by law; a small professional staff housed in the White House, under the Director, to control clandestine collection operations; and a better system of congressional oversight. Cline believes that reorganization along these lines could even enable CIA to open much of its store of information to public use by scholars and journalists.

—Reviewed by Marjorie Ulsamer, Deputy Director of Publications, HUD.

Speer—Twenty Years in Spandau

Spandau. The Secret Diaries, by Albert Speer. Macmillan Publishing Co., Inc., New York, N. Y., 1976. 463 pages with index. \$13.95.

Albert Speer was convicted of war crimes in 1946 at Nuremberg and spent twenty years in prison for his role in Hitler's Third Reich. Written mostly on toilet paper, with pages frequently hidden in his shoes until they could be smuggled out, his secret diaries are captivating.

Speer worked for Hitler for ten years, until early 1942, as the Führer's personal architect. Within two years after becoming munitions minister in 1942, he almost tripled production of armed vehicles, quadrupled that of large guns, and more than doubled aircraft production. Writing about the years immediately preceding his supervision of armaments production, he reflects on "squandered opportunities; chances for victory that slipped away because of incompetence, arrogance, and egotism. . . ." Yet, "In final

analysis modern wars are decided by superior technological capacity, and we didn't have that."

Speer won a measure of respect at Nuremberg when he alone among those on trial confessed general responsibility for wartime crimes. The following twenty years were a travail of monotony, extended depression, and boredom. But Speer met these conditions with ingenuity and perseverance. When he was released from Spandau in 1966, his family had more than 20,000 pages of his writings. He had also hiked around the Spandau courtyard a distance equivalent to a walking tour around the world. Alone, he had laid out flower beds in the huge courtyard, built brick terraces, and created a system of paths. He looked down on fellow prisoners who failed to set goals for themselves.

But invariably he returns in his diaries to Hitler: ". . . quite often it seemed to me that he stood high above all the people I knew, probably even above my father, whom I truly revered. . . . The complicated feelings of being bound to him remain to this day. . . . Going over it all in Spandau, I have gradually understood completely that the man I served was not a well-meaning tribune of the masses, not the re-builder of German grandeur, and also not the failed conqueror of a vast European empire, but a pathological hater."

A copy of *The Army Air Forces in World War II*, by Craven and Cate, was smuggled to Speer. He wrote that the book missed the point in its emphasis on the destruction of Germany's industrial potential. In reality, he says, the importance of the air attacks was that they opened a second front long before the invasion of Europe. ". . . no one has yet seen that this was the greatest lost battle on the German side. The losses from the retreats in Russia or from the surrender of Stalingrad were considerably less." (See also the dialogue between Speer and former 8th AF Commander Lt. Gen. Ira Eaker, on p. 53 of this issue.)

Caught in the gravitational pull of the megalomaniac's magnetism, Speer spun in Hitler's orbit until the end. His diaries are a valuable contribution to the knowledge of Nazi Germany and the personalities of the imprisoned top Nazis when stripped of power.

—Reviewed by Jim Taylor, Senior Editor.

New Books in Brief

A New Command, by Gordon Harris. Why did Maj. Gen. John B. Medaris, the US Army's top missile expert, become Father Bruce Medaris, an Episcopal priest? In his Army days he was known as a blunt, tough, outspoken man who possessed rare talents and who counted as a personal success the launch of America's first satellite. Here is his remarkable story. Photos. Logos International, Plainfield, N. J., 1976. 313 pages. \$3.50.

The Balloon Book, by Paul Fillingham. Ballooning is one of today's fastest growing sky sports. If you have ever thought of taking it up, this is your book. Details on selecting equipment, taking lessons, obtaining a license, and buying a balloon, plus technical data on how to launch, navigate, and land are some of the topics covered. Photos, drawings, charts, bibliography, index, and appendix. David McKay Co., Inc., New York, N. Y., 1977. 226 pages. \$14.95.

Convoy, by Martin Middlebrook. In the winter of 1942-43, the Germans came close to cutting the convoy link between North America and Britain. In this powerful narrative, the author describes the ships, aircraft, equipment, and tactics of the rival forces; the men caught up in the struggle; and the resulting convoy battle whose outcome would determine the course of World War II. Photos, appendices, bibliography, index. William Morrow & Co., New York, N. Y., 1977. 377 pages. \$12.50.

Doenitz at Nuremberg: A Reappraisal, edited by H. K. Thompson, Jr., and Henry Strutz. Previously unpublished views of the Nuremberg trials by 400 leading personalities in the military, law, arts, diplomacy, philosophy, history, and religion are recorded in this volume. Most of the contributors were active in World War II, many serving in commands or occupying positions in the highest echelons. Amber Publishing Co., New York, N. Y., 1976. 198 pages. \$10.

The Dynamics of Détente, by Arthur Macy Cox. The author gives his opinions on how and why we should reach more fundamental arms control and disarmament agreements with the Russians than

What Every Good Physicist Knows About Radar But Has Never Told You.

The laws of physics dictate certain characteristics for radar — characteristics that seem shrouded in mystery for most laymen, but which establish performance limitations profoundly important to mission planners. The laws of physics are written in all languages and what you are about to read is no secret to radar experts, whatever their country.

Most of us visualize fighter radar as a pencil-like beam projected ahead of an aircraft. But engineer/physicists know that this beam is cone-shaped. Its diameter is in part determined by the size of the radar's antenna. For fighters, there is a point beyond which the laws of physics prevent further narrowing of the beam because the antenna size is dictated by the diameter of the forward fuselage.

Beam width can determine whether a radar sees two aircraft as two targets... or just one. The wider the beam, the more aircraft that can "hide" in the cone and appear on a fighter radar scope as a single blip. Narrow is better.

So how important is that to a fighter pilot?

At close range, not very. But at longer ranges the cone becomes quite large.

For instance, at 70 miles, targets must be at least 3½ miles from one another before today's state-of-the-art radar "sees" two targets. That's right. Within the three mile diameter of that cone, an enemy force can crowd a horde of airplanes and still produce only a single blip on the screen.

At 25 miles, multiple targets can hide in a one mile diameter piece of sky and still appear as one.

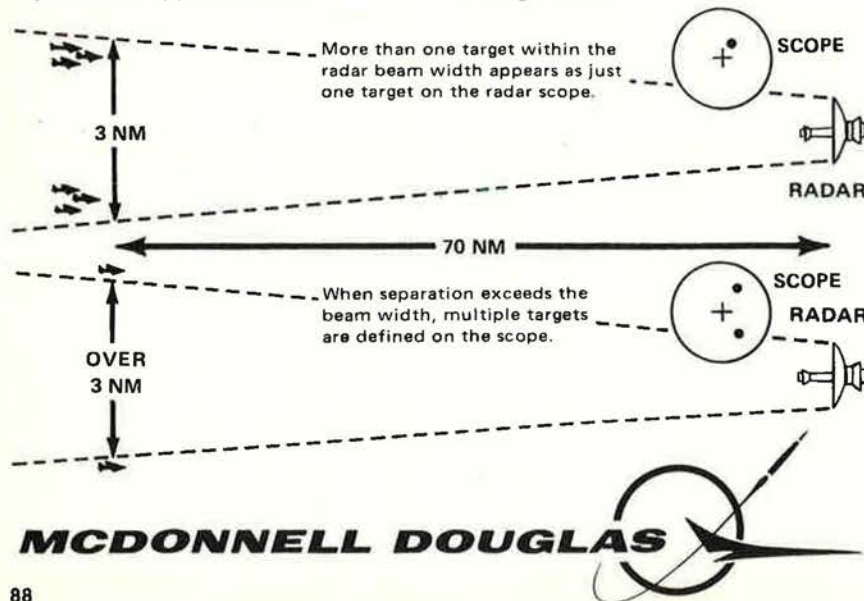
What multiple blips mean to the fighter pilot is that either he's facing vastly superior numbers or that the multiple targets are knowingly ignoring the advantages of this physical phenomenon.

Not likely. But radars designed to track multiple targets at long range must depend upon this unlikely prospect if they are to offer advantages over single-target-tracking radar.

This doesn't mean multiple targets are unassailable in their "cone of protection." F-15 Eagle pilots have proved thoroughly capable of engaging superior numbers at considerable range. The F-15 radar has demonstrated a detection range of over 100 miles. With the Eagle's great speed and fast Sparrow missiles, Eagle pilots attack multiple targets using a "look-shoot-look-shoot" technique, picking off targets in tight formation in "turkey-shoot" succession.

The Eagle pilot fires. If the blip remains after the missile reaches the target, he fires on the second target. And so on.

Naturally, if an aircraft were slower and carried slower missiles, "shoot-look-shoot" wouldn't work as well. But this is the Eagle. It doesn't have to ignore the laws of physics. It fights right through them.



Airman's Bookshelf

we have achieved so far. He analyzes current US and Soviet defense postures, the politics and economics of détente, and the current US strategic concept, which he finds outdated because of unsound reasoning and superficial rhetoric. The final chapter presents recommendations on a new concept that the author says would provide a framework for negotiating agreements with the Soviets. Notes, index. W. W. Norton & Co., New York, N. Y., 1976. 256 pages. \$8.95.

Eurocommunism and the Atlantic Alliance, by James Dougherty and Diane K. Pfaltzgraff. The authors, focusing on Italy and France, examine Eurocommunism and its implications for the Atlantic Alliance, European unity, and Eastern Europe. They assess the impact of Eurocommunism on democracy in the two countries and the contention that Western European Communist parties have become autonomous of the Soviet Union. The concluding chapter sets forth several options for US policymakers in response to the challenge of Eurocommunism. Institute for Foreign Policy Analysis, Inc., Cambridge, Mass., 1977. 66 pages. \$3.

Lonely Eagles, by Robert Rose. Nine years after World War II, the Supreme Court challenged the "separate-but-equal" philosophy of segregation. During the war, however, it was the rule. Not until a 1939 congressional act did the Army Air Corps provide training units for blacks. Segregated in separate units, blacks faced a multitude of problems caused by discrimination. In this history of America's black air force in World War II, the author reveals problems and successes and an excellent war record that received too little recognition. Photos. Aviation Book Co., Glendale, Calif., 1977. 160 pages. \$4.50.

On Eagles' Wings, by Ezer Weizman. The former Commander of the Israeli Air Force and head of the General Staff of the Israeli Defense

Forces recounts his youth, his career in the Air Force, and his climb to become its commander. His autobiography also reveals much about the birth and growth of the Israeli Air Force and how it became one of the most respected and renowned combat forces in the world. Index. Macmillan Publishing Co., Inc., New York, N. Y., 1976. 302 pages. \$8.95.

The Overseas Targets: War Report of the OSS, Vol. II, by Kermit Roosevelt. Revealed for the first time in this recently declassified history of the Office of Strategic Services in World War II are hundreds of dramatic accounts of OSS activities in the European and Far Eastern Theaters. OSS infiltration, sabotage, clandestine communications, espionage, and secret support of resistance groups in occupied countries are discussed. Walker & Co., New York, N. Y., 1976. 460 pages. \$12.95.

Pioneers of Aviation, compiled by D. D. Hatfield. Familiar faces in aviation history such as Amelia Earhart, Glenn Curtiss, and the Wright brothers are featured along with lesser-known figures in this photography. Highlights of each person's life are covered in photos arranged to simulate a personal photo album. Northrop University Press, Inglewood, Calif., 1976. 204 pages. \$4.50 paperback. \$7.50 hardcover.

State of the Nation's Air Transportation System, edited by Robert Hudock. Here are the proceedings of a two-day symposium sponsored by the National Academy of Engineering last June to analyze the state of the nation's air transportation system. Panelists focused on the status of new technologies, productivity, finances, economics, and the impact of regulation. This volume includes keynote presentations, panel discussions, and a statement of issues. Available from National Academy of Sciences, 2102 Constitution Ave., N. W., Washington, D. C. 20418, 1976. 72 pages. \$5.50.

Warships of the World: Major Classes, by Bernard Ireland. Warship design in the last twenty years has been dictated by two major developments—the guided missile and the nuclear submarine. They have determined weaponry and electronics and, in turn, defined

ship design. The author deals with surface warships exceeding 5,000 tons, arranged by country. Specifications for each class are given and compared. Photos, index. Charles Scribner's Sons, New York, N. Y., 1977. 128 pages. \$7.95.

These recently published Adelphi Papers will interest students of military/political affairs. *Defending the Central Front: The Balance of*

Forces, by Robert Lucas Fischer, 45 pages; *The Arab-Israeli Dispute: Great Power Behaviour* by Lawrence L. Whetten, 45 pages; *The Alliance and Europe: Part VI, The European Programme Group*, by D. C. R. Heyhoe, 27 pages. Copies may be ordered from The International Institute for Strategic Studies, 18 Adam St., London WC2N 6AL, England. \$1.50 each postpaid.

—Reviewed by Robin Whittle



WARNING

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Edited by John W. R. Taylor

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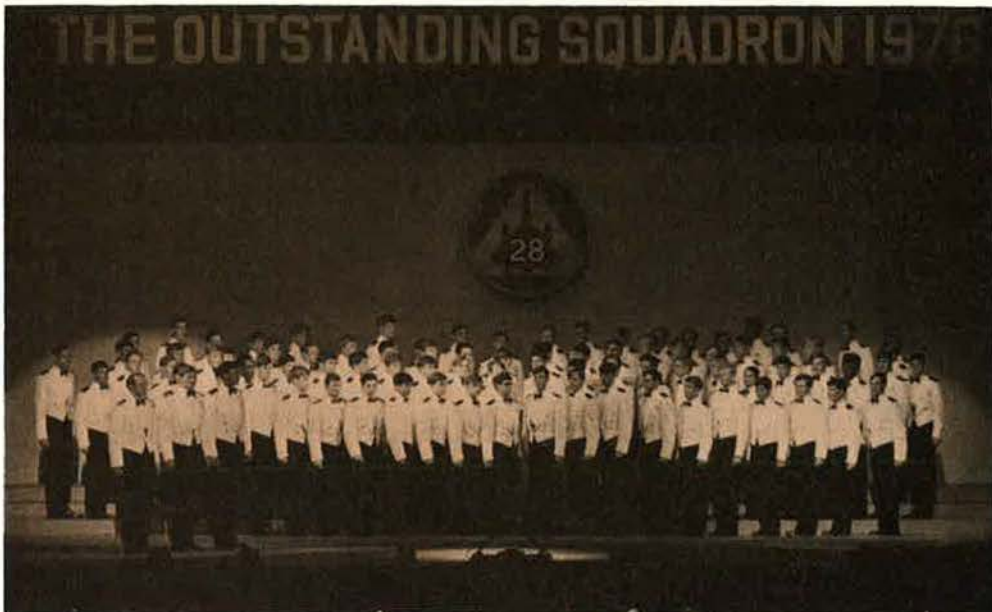
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WISCONSIN (Madison, Milwaukee): **Charles W. Marotske**, 78 S. Verdev Dr., Oak Creek, Wis. 53154 (phone 414-762-4383).

WYOMING (Cheyenne): **T. Watson**, 908 Arapahoe, Cheyenne, Wyo. 82001 (phone 307-638-3344).

May 28 at The Broadmoor, Colorado Springs, Colorado



THE EIGHTEENTH ANNUAL OUTSTANDING SQUADRON DINNER

**Saluting the 1977 Outstanding Squadron at the United States Air Force Academy
Cosponsored by the Air Force Association and its Colorado Springs Chapter**

More than 600 guests—including parents and girl friends of many of the cadets, together with aerospace, AFA, and government leaders from throughout the country—will pay tribute to the Academy Squadron as it receives from AFA the Academy's most outstanding award of the year for excellence in all elements of cadet life, from academic standings and military leadership to drilling and intramural athletics.

Reception 6:15 p.m., Dinner 7:00 p.m., Dancing 10:00 p.m.; the International Center of The Broadmoor.

Dress: Black-tie for civilians, Summer Mess Dress for Military.

Cost: \$30 single, \$50 per couple.

Hotel reservations may be made direct with The Broadmoor, Colorado Springs, Colorado, 80901; telephone (303) 634-7711. European Plan rates: Singles \$47, \$57, \$67; Doubles \$50, \$60, \$70; Parlor suites from \$90 per day. Deadline for hotel reservations: April 26, 1977. Be sure to mention AFA when writing or calling for accommodations.

Golf and tennis tournaments will be conducted at The Broadmoor on Friday, May 27. Please write to AFA for details.

DINNER RESERVATION FORM

Return to: Air Force Association
1750 Pennsylvania Ave., N.W.
Washington, D. C. 20006

Please make the following reservations for me at AFA's 1977 Outstanding Squadron Dinner.

_____ singles @ \$30 \$ _____ couples @ \$50 \$

Enclosed is my check for \$ _____

Please send information on the golf and tennis tournaments.

Name _____

Address _____

City _____ State _____ Zip _____

Telephone (_____) _____

AFA News

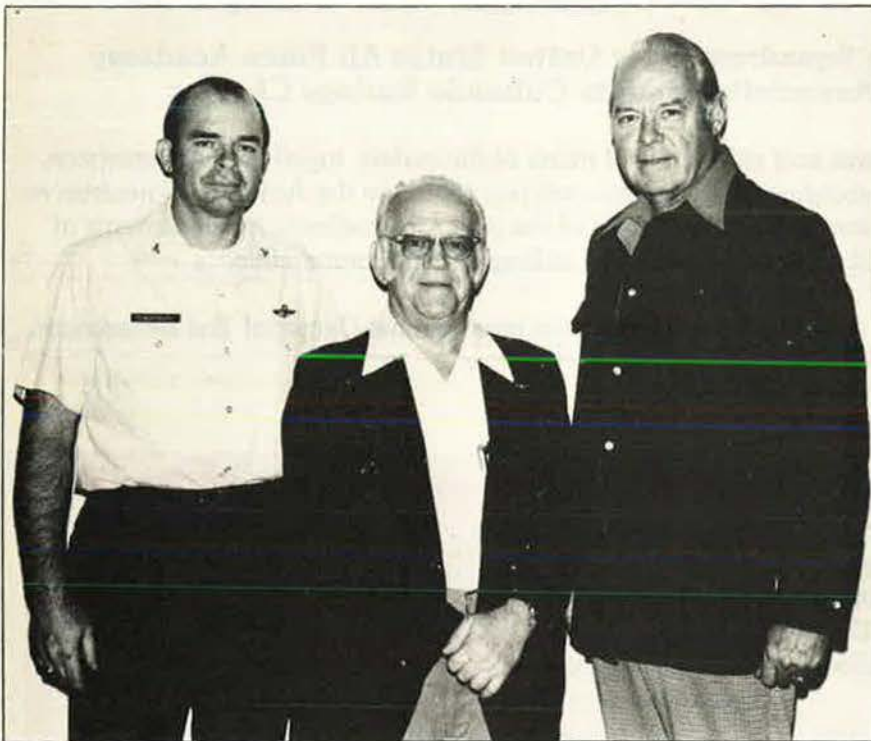
By Don Steele, AFA AFFAIRS EDITOR

Units of the Month

THE BLUE BARONS CHAPTER, COLO., AND THE NATION'S CAPITAL CHAPTER, WASHINGTON, D.C., cited for consistent and effective programming in support of AFA's mission, most recently exemplified in their High School Aerospace Education Symposium and dinner honoring House Appropriations Committee Chairman George H. Mahon, respectively.



Among the ninety distinguished leaders of Congress, the Department of Defense, and AFA who attended the Nation's Capital Chapter's dinner at Washington's City Tavern Club honoring the Chairman of the House Appropriations Committee, Hon. George H. Mahon, center, were, from left, Chapter President James McGarry; Hon. Jack L. Stempler, Assistant Secretary of Defense (Legislative Affairs) Designate; Air Force Chief of Staff Gen. David C. Jones; and AFA National President George M. Douglas.



AFA's Riverside County Chapter, Calif., the Military Affairs Committee of the Riverside Chamber of Commerce, and the Riverside Convention and Tourist Bureau will cosponsor the 1977 National Model Airplane Championships to be held at March AFB, August 6-14. The event, which will be directed by the Academy of Model Aeronautics, aeromodelling division of the National Aeronautic Association, will feature sixty competitive events with at least 1,000 competitors, including many from foreign countries. Shown at a recent planning meeting are, from left, Col. Elmer Funderburk, March AFB Commander; John E. Clemens, President, Academy of Model Aeronautics; and Riverside Chapter President Lt. Gen. William P. Pitts, USAF (Ret.). Entry forms are available from: Academy of Model Aeronautics, 815 15th St., N. W., Washington, D. C. 20005.

COMING EVENTS . . .

Angel Flight/Arnold Air Society National Conclave, Marriott Hotel, New Orleans, La., April 9-12 . . . **Alaska State AFA Convention**, Anchorage, April 15-16 . . . **Massachusetts State AFA Convention**, Chicopee, April 16-17 . . . **Connecticut State AFA Convention**, New Haven, May 7 . . . **New Jersey State AFA Convention**, Golden Eagle Inn, Cape May, May 20-22 . . . **California State AFA Convention**, Newport Beach, May 20-22 . . . **Missouri State AFA Convention**, St. Louis, May 21 . . . **New Hampshire State AFA Convention**, Portsmouth, May 21 . . . **AFA Golf Tournament**, The Broadmoor, Colorado Springs, Colo., May 27 . . . **AFA Board of Directors and Nominating Committee Meetings**, The Broadmoor, Colorado Springs, Colo., May 28 . . . **AFA's Annual Dinner honoring the Outstanding Squadron at the Air Force Academy**, The Broadmoor, Colorado Springs, Colo., May 28 . . . **Colorado State AFA Convention**, Denver, June 3-5 . . . **Pennsylvania State AFA Convention**, George Washington Motor Lodge, Allentown, June 3-5 . . . **Ninth Annual Bob Hope AFA Charity Golf Tournament**, March and Norton AFBs, Calif., June 4-5 . . . **Alabama State AFA Convention**, Airport Holiday Inn, Mobile, June 9-11 . . . **Washington State AFA Convention**, Davenport Hotel, Spokane, June 17-19 . . . **New York State AFA Convention**, Dutch Inn, Long Island, July 15-17 . . . **Texas State AFA Convention**, St. Anthony Hotel, San Antonio, July 30-31 . . . **Academy of Model Aeronautics' 1977 National Model Airplane Championships**, March AFB, Calif. (AFA's Riverside County Chapter is a cosponsor), August 6-14 . . . **AFA's 31st Annual National Convention**, Sheraton-Park Hotel, Washington, D. C., September 18-21 . . . **AFA's Aerospace Development Briefings and Displays**, Sheraton-Park Hotel, Washington, D. C., September 20-22 . . . **Sixth Annual Air Force Ball**, Century Plaza Hotel, Los Angeles, Calif., October 28. ■

chapter and state photo gallery



The Nebraska State AFA and its Ak-Sar-Ben Chapter of Omaha, recently presented \$1,000 checks each to provide additional equipment and services for airmen at Offutt AFB. Shown during presentation of the checks are, from left, Chapter President Bob Runice; Miss Mary Moon, Recreation Center Director at Offutt AFB; State President Lyle Remde; and Col. Richard Y. Newton, Jr., Commander, 3902d Air Base Wing (SAC).



AFA National President George M. Douglas was the guest speaker at a recent dinner sponsored by AFA's Wichita Falls Chapter, Tex. During the program, Mr. Douglas, right, presented John "Connie" Sparks an AFA Medal of Merit in recognition of his outstanding service to AFA. Mr. Sparks is the Secretary/Treasurer of the Chapter and a staff executive of the Wichita Falls Board of Commerce and Industry.

PHOTO BY JOHN BARWELL



The Fourth Annual Colorado High School Aerospace Education Symposium—held recently at Lowry AFB, and cosponsored by AFA's Blue Barons Chapter, the CAP's Mile High Squadron, and the AFJROTC unit at Hinkley High School—attracted 250 high school students from throughout the Rocky Mountain Region, including CAP and AFJROTC cadets. The theme of the symposium was "Strategic Aerospace Power." The program included a briefing by the Strategic Air Command Briefing Team, a tour of Lowry AFB facilities, and briefings on the functions of the units at the base. Some of the participants are shown inspecting an F-106.

INTERESTED IN JOINING A LOCAL CHAPTER?

For information on AFA Chapters in your area, write:
 Assistant Executive Director/Field Operations
 Air Force Association
 1750 Pennsylvania Ave., N. W.
 Washington, D. C. 20006



During the recent awards banquet sponsored by AFA's Huron Chapter, Mich., Mrs. Ida Foor, a Licensed Practical Nurse at the Wurtsmith AFB Hospital, was named "Civilian of the Year" at the base, and A1C David Franklin, a clerk-typist in the base's Civil Engineering Squadron, was named "Airman of the Year." Shown are, from left, Chapter President Sigvard Swanberg, who presented AFA Certificates of Appreciation and \$50 Savings Bonds to the honorees; Col. Henry W. Boardman, 379th Bomb Wing Commander; Mrs. Foor; Col. William M. Klesert, 379th Combat Support Group (SAC); and Airman Franklin.

AFA News



TIMES PHOTO BY KEN ACLIM

Miss Bessie Hazel, the immediate Past President of AFA's Ark-La-Tex Belle Chapter, and the current Secretary of the Louisiana State AFA, was recently presented the 15th annual Amelia Earhart Service Award by the Zonta Club in Shreveport. The Zonta Club is a service club of executive women with one member from each profession or career field. Miss Hazel recently retired from the Shreveport Times, where she was an executive secretary. In the photo, Miss Hazel, center, receives the award from Mrs. Clydie Mitchell, left, Zonta Club selection committee chairman. Mr. Harold P. Pluimer, guest speaker at the awards banquet, is at right.



The 9014th Air Reserve Information Squadron, based at Chicago's O'Hare International Airport, recently was awarded an Air Force Outstanding Unit Award. Shown at the presentation ceremonies are, from left, Al Fields, Jr., President of AFA's Chicagoland Chapter and Vice President of WGN/Continental Broadcasting Co.; Brig. Gen. James McAdoo, Deputy Chief of the Air Force Reserve; Col. Albert G. Boeck, Jr., Commander, 9014th Air Reserve Information Squadron and a member of the Chicagoland Chapter; and Brig. Gen. H. J. Dalton, Jr., Director of Information, Office of the Secretary of the Air Force.



Col. Mack E. Boone, AFRES, Past President and current Secretary of AFA's Paso del Norte Chapter in El Paso, Tex., has been named the Top Air Force ROTC Liaison Coordinator for the entire western half of the United States. Colonel Boone, right, is shown being congratulated by Col. Cregg P. Nolen, left, Air Force ROTC representative, and Maj. Marvin Cook, center, the Admissions Counselor for Air Force ROTC, who submitted the nomination.



At a recent Tactical Air Command NCO Academy graduation, Bernard Pusin, left, President of AFA's Austin Chapter, Tex., presented Maj. James W. Boyce, Jr., right, Commandant of the Academy at Bergstrom AFB, a chapter check for \$275 to be used to carpet several of the Academy's administrative offices.

photo gallery



The Eighth Annual Bob Hope AFA Charity Golf Tournament, which was held late in 1976 at March and Norton AFBs, raised more than \$6,000 for Air Force-oriented charities. The eight tournaments, all cosponsored by AFA's Riverside County and San Bernardino Area Chapters—the "Bob Hope Chapters"—have raised more than \$46,000 for Air Force-oriented charities. When Comedian Bob Hope, second from right, arrived at March AFB to participate in the tournament, he was met by, from left, the Tournament's General Chairman, John Howard; AFA National Director and Tournament Founder Ed Stearn; and Col. Stan Brown, far right, then Commander of SAC's 22d Bomb Wing at March AFB. Mr. Hope's first radio show broadcast before a military audience took place at March Field on May 7, 1941.



The Armed Forces Caravan Bicentennial Exhibit visited Charlotte, N. C., in late 1976 as part of the city's Bicentennial celebration. AFA's Piedmont Chapter President Dermont Saunders, Chairman of Charlotte's Armed Forces Bicentennial Committee, worked with officials of the caravan during the visit, and AFJROTC cadets in the area toured the exhibits under the sponsorship of the Piedmont Chapter.



The Ark-La-Tex Chapter of Shreveport, La., recently sponsored a banquet at the Barksdale AFB Officers' Club to honor the new Commander of the Eighth Air Force, Lt. Gen. James E. Hill. Distinguished guests included, from left, Maj. Gen. William A. Temple, Vice Commander, Eighth Air Force; General Hill; Rep. Joe D. Waggoner, Jr. (D-La.); and Chapter President Maj. Gen. William E. Eubank, Jr., USAF (Ret.).

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Bob Stevens'

"There I was..."

SOME SADIIST DESIGNED A THROAT MIKE THAT WAS SUPPOSED TO FREE YOUR HANDS (BUT TO KEEP FROM CHOKING, YOU HAD TO LEAVE IT LOOSE & HOLD IT TO TALK ANYWAY).



(P.S. SWEAT "SHORTED 'EM OUT" and LEFT BURN MARKS ON YOUR NECK)

LET'S STROLL DOWN THE MEMORY LANE OF AIRCRAFT MICROPHONES. I WISH WE COULD SAY-LIKE THE CIGARETTE COMMERCIAL-"YOU'VE COME A LONG WAY, BABY"... BUT WE REALLY CAN'T.

BRITISH WWII MODELS WERE IN A FABRIC FLAP WITH THE OXY MASK. THE PROTRUDING EAR-PHONES CAPPED THE PICTURE.

I SAY, YANK, LET'S GIVE 'ER A RUDDY GO!



P-47 T-BOLT ASSN. 16TH ANNUAL REUNION MAY 6-8 ST. MORITZ-ON-THE-PARK N.Y.C.

FINALLY, WE PROGRESSED TO THE LIGHTWEIGHT LIP MIKE- WHICH YOU CAN ALWAYS EAT IN TENSE SITUATIONS -

THEN THERE WERE THE CUMBERSOME HAND-HELD JOBS. GREAT WHEN ALONE, TRYING TO MAKE AN IFR APPROACH, LAP FULL OF MADS, 3 GUYS TALKIN' AT YA, ETC., ETC.

NOTHING, BUT NOTHING, EVER BEAT THE HUMAN VOICE BOX WHEN IN A REAL JAM-

WHICH WAY TO IRELAND?



LINDBERGH IN "SPIRIT OF ST. LOUIS"; N.Y. TO PARIS, 1927.





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Tactical Expendable Drone System. Northrop

TEDS has successfully completed all validation flights for U.S. Air Force. Provides electronic countermeasures support for strike aircraft. 500 knot speed. 400 nautical mile range.

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Aircraft, Electronics, Communications, Construction, Services. Northrop Corporation, Ventura Division, 1515 Rancho Conejo Blvd., Newbury Park, California 91320, U.S.A.

NORTHROP

F-15 unbeatable in eight areas measured by Japan Defense Agency.

- ✓ All Weather Combat Capability.
- ✓ Effectiveness against High Altitude High-Speed Targets.
- ✓ Effectiveness against Low Altitude Targets.
- ✓ Air-to-Air Combat Capability.
- ✓ Electronics Capability.
- ✓ Independent Combat (no ground command) Capability.
- ✓ Safety Training, Reliability, Maintainability, Importation and Logistic Support.
- ✓ Cost Effectiveness.

The conclusion of the Japan Defense Agency, "The F-15 is regarded as the most suitable fighter aircraft for development by the Air Self Defense Force. F-15 is to be the next fighter aircraft type."

For an English translation of the un-abridged text of the Japan Defense Agency report, please write on your letterhead to:
McDonnell Douglas
"F-15 Selection," Box 14526,
St. Louis, MO 63178



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