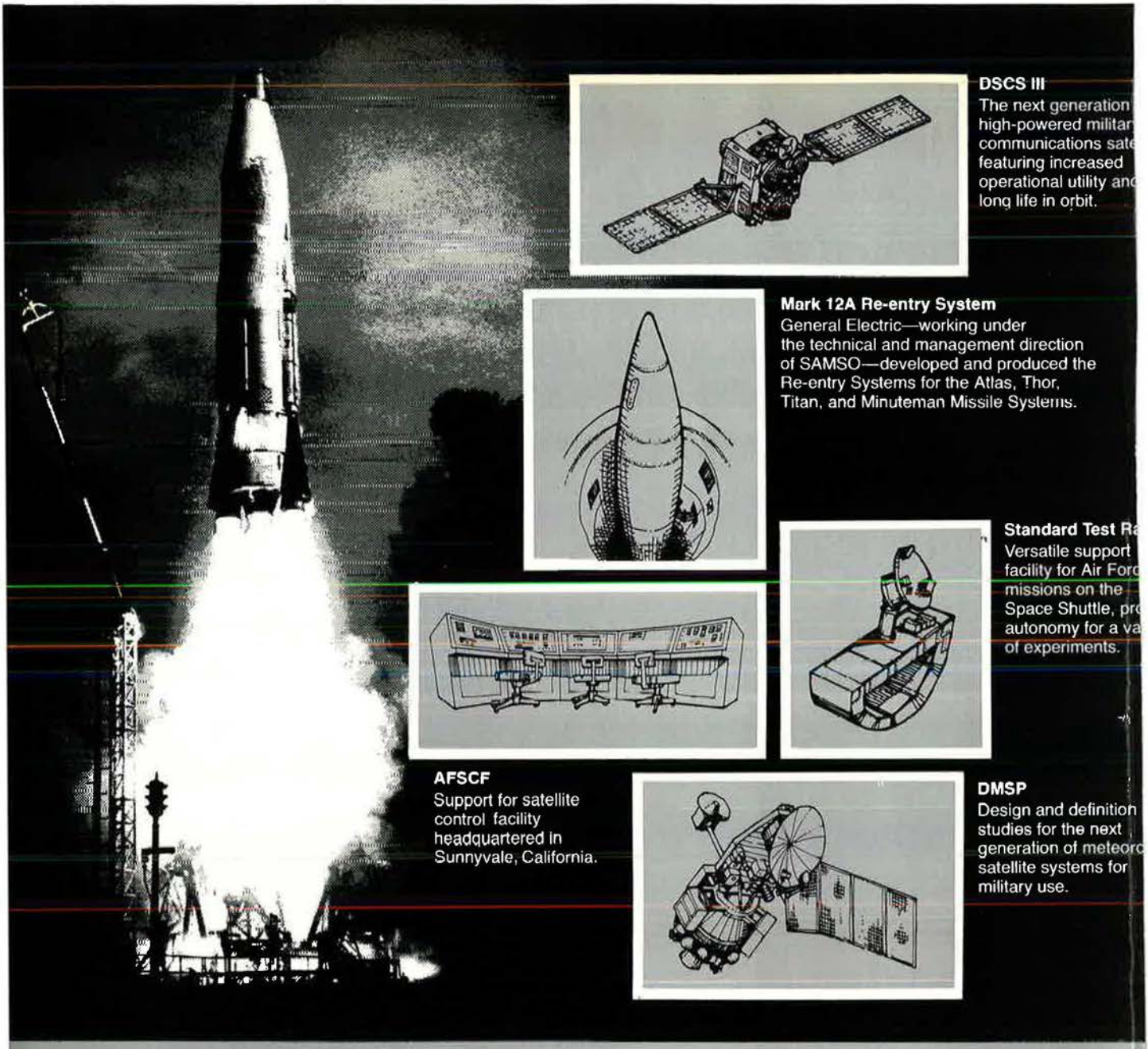
AUGUST 1979/$1

AIR FORCE MAGAZINE

UBLISHED BY THE AIR FORCE ASSOCIATION

SAMSO's Twenty-fifth Anniversary



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The next generation high-powered militar communications sate featuring increased operational utility and long life in orbit.

Mark 12A Re-entry System
General Electric—working under the technical and management direction of SAMSO—developed and produced the Re-entry Systems for the Atlas, Thor, Titan, and Minuteman Missile Systems.

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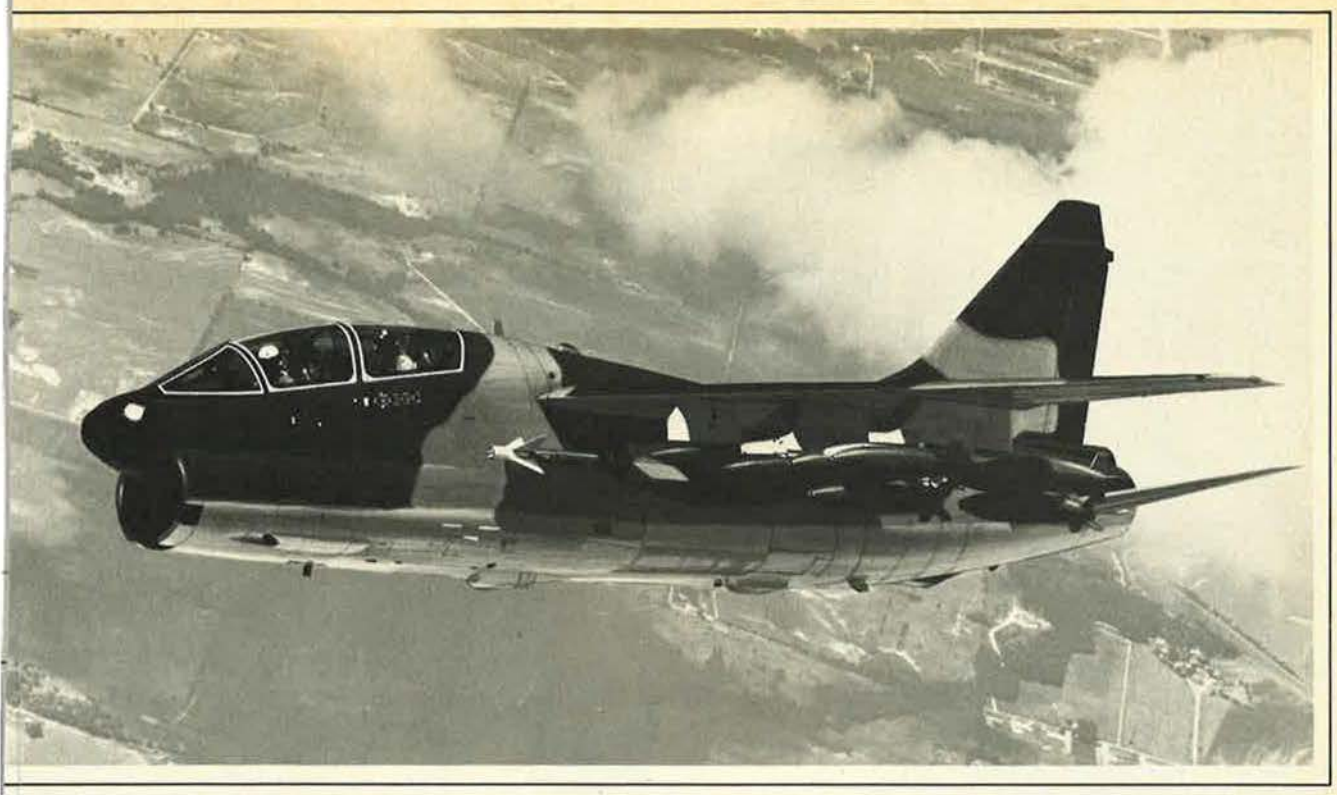
GENERAL ELECTRIC



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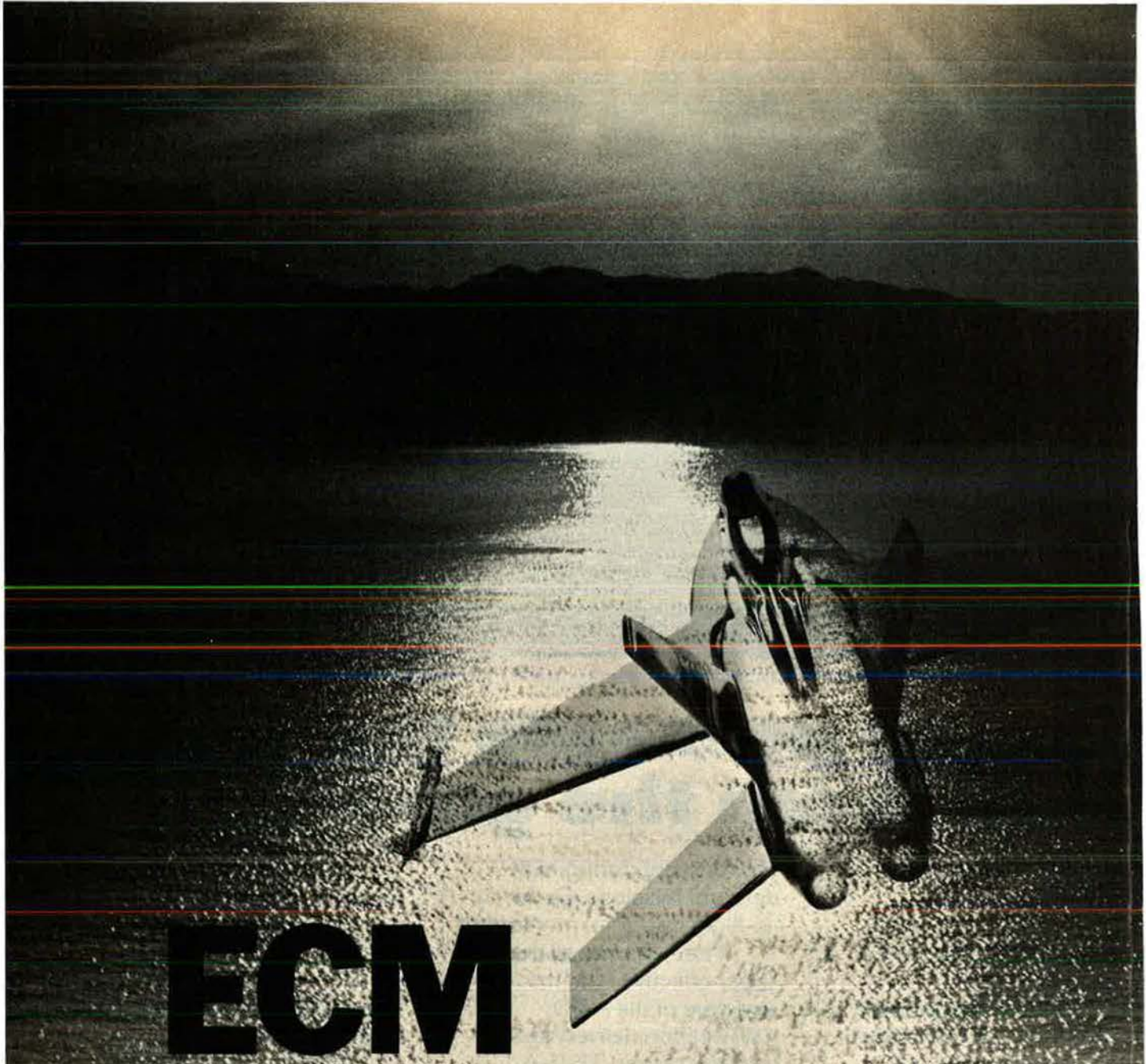

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AIR FORCE MAGAZINE
PUBLISHED BY THE AIR FORCE ASSOCIATION

AUGUST 1979
VOLUME 62, NUMBER 8

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Space hardware, the responsibility of AFSC's Space and Missile Systems Organization, an agency created twenty-five years ago to boost the US into the space age. For reports on SAMSO's origins, its current programs, and its future prospects, see articles beginning on p. 39.

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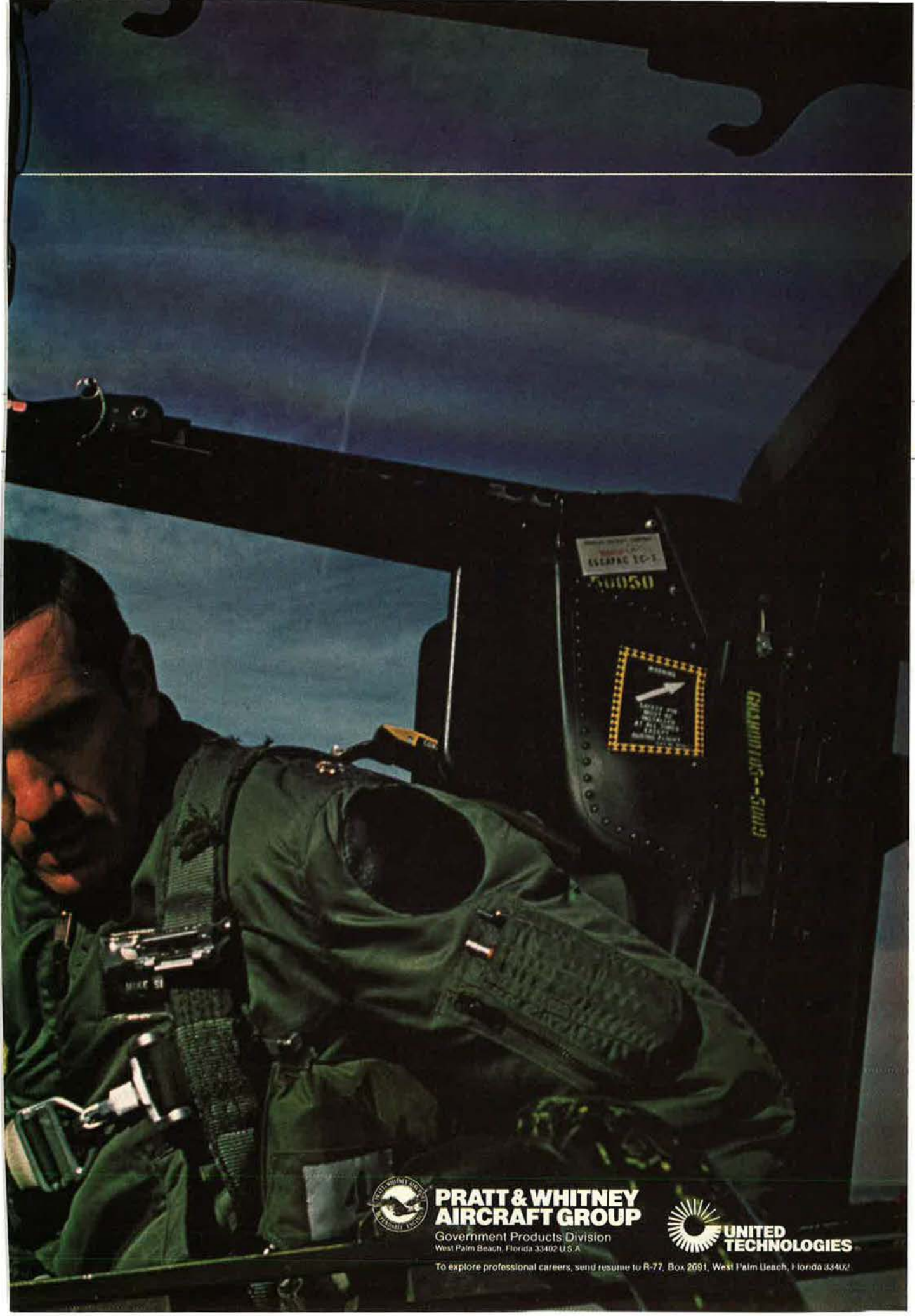
Lt. Col. Mike Sexton
F-15 Pilot
36th Tactical Fighter Wing
United States Air Forces Europe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AN EDITORIAL

The SALT II Treaty

THE long-awaited SALT II Treaty was signed, with the expected fanfare, at Vienna on June 18, 1979. That document has provided regular grist for the pundits and the politicians in the two weeks since President Carter's assertions concerning its merits were offered to a joint session of the Congress.

Thus far, public discussion has tended to highlight the more obvious, easily digestible statistical terms of the treaty—numbers of strategic systems on each side, throw-weights and warhead-delivery capabilities, arms reduction goals, and so on.

Those who have read the text will not wonder at the relative dearth of detailed interpretation that to date has reached the public. The treaty is long and extremely complex, a document comprised of nineteen articles (most supplemented by supposedly clarifying Agreed Statements and Common Understandings), a Protocol, a Memorandum of Understanding, and a supplemental Soviet statement on the Backfire bomber.

On first reading, it would appear that the detailed definitions and understandings incorporated in the treaty should fill the kind of gaps that caused so much trouble with SALT I, and prevent differing interpretations of terms on the part of the signatories. But it is less clear, on more careful study, whether some of the interpretive language is, in fact, intended to clarify or to obfuscate.

As in any negotiated agreement, neither side got everything it wanted; each acceded to some of the other's demands. Even at this early stage of treaty analysis, it is clear that some Soviet concessions are more apparent than real. One such "concession" is their agreement to not produce or deploy the trouble-plagued SS-16 ICBM—a decision comparable to the Ford Motor Company's abandonment of the Edsel.

On the other hand, Soviet reversal of its earlier insistence that the range of air-launched cruise missiles be limited to 2,500 kilometers is a genuine concession.

Not surprisingly, the US negotiators have made more—and more substantive—concessions than their Soviet counterparts. A few of the potentially costly US stipulations are noted by Senior Editor Edgar Ulsamer in his column, "In Focus," on page 18. Beyond these obviously disadvantageous items, there are a number of ambiguities that need to be resolved. One example: Article IV [5] (c) states that "each Party undertakes not to develop, test or deploy systems for rapid reload of ICBM launchers." Does that mean the Soviets will give up their cold-launch technique that pops missiles out of their silos by compressed air, thus leaving an undamag silo that can be reloaded in a matter of hours? We dou that will be the Soviet interpretation.

We agree with President Carter that the treaty must judged on its own merits. The criterion of judgment– not the process of judging—is simple: Does the trea advance the security interests of this country and inte national stability in general, as Mr. Carter said it does? not, then it should be amended to meet that criterion.

We do not take seriously President Brezhnev's ar Mr. Gromyko's threats of dire consequences if the U Senate seeks to amend the treaty. In the first place, Ar cle XIX states: "This treaty shall be subject to ratificatio in accordance with the constitutional procedures each Party." The Soviet leaders are well aware that a U President is empowered by the Constitution to mak treaties only "by and with the advice and consent of th Senate." Further, Article XVIII states that "each Par may propose amendments to the treaty." Still further, w refuse to believe that the Soviets will abandon the SAL process that so far has paid them such handsome div dends.

We plan to publish in the September issue of thi magazine a more detailed analysis of the treaty's pluse and minuses and to offer our judgment as to whether meets the criterion cited above.

An ancillary but almost equally important question t consider is whether the Administration will, as Presider Carter has inferred, exercise the options availabl under SALT II "to build the forces we need to maintai the strategic balance." The shifting sands of this Ad ministration's policies make this question virtually un answerable. Failure to take advantage of comparabl options in SALT I has been a principal contributor to th existing strategic imbalance in favor of the USSR.

We urge that the forthcoming debate on ratification b kept above the level of partisan politics, of emotiona reaction, or of stubborn adherence to previousl staked-out positions, whether for or against. SALT II too important a matter to be judged rashly.

We also hope that no one will succumb to the spe cious argument that flaws in this treaty can be mende by a SALT III. Few of the earlier misjudgments, ove sights, and needless concessions associated wit SALT I appear to have been set right by SALT II as it no stands. There is little reason for optimism that we wou fare better in a third round.

—JOHN L. FRISBEE, EDITO

WE JUST LOWERED THE COST.

For a detailed account of Boeing's work on its ALCM AGM-86B, read on.

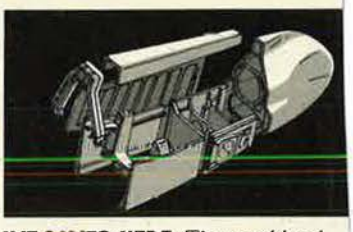
NEW MATH FO

Boeing's business is airplanes. The B-52, the 747 and lots of points in between. Boeing's business is missiles. SRAM is a name that quickly comes to mind.

Our business is also innovation — creative engineering that lowers cost of production and labor while maintaining product reliability.

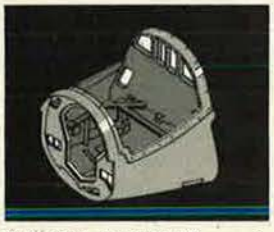
The air launched cruise missile, ALCM, is a real case in point.

When our first design was released, we we



WE SAVED HERE. The machined parts of the aft body structural deta have been replaced with less expen sive forgings and/or castings.

WE SAVED HERE. Replacing the welded tank with four cast segments resulted in half of the total cost reduction. This eliminated 28 separate machined aluminum alloy sections.

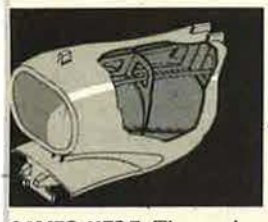


WE SAVED HERE. We made the inertial navigation element bay a casting instead of a built-up section, eliminating 118 rivets.

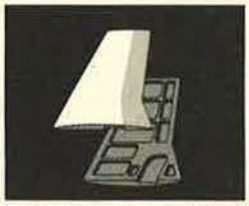
OEING ALCM.

sting out a project that was a third higher than s today. With the concurrence and encourage-ent of the Department of Defense, we found w ways to fabricate, assemble, use new aterials and cut overall labor costs on every missile. Without changing the critical performance characteristics one bit.

Each step of the major savings is outlined here. We think it makes especially good reading.

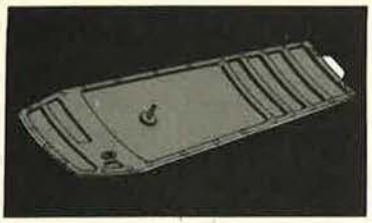


SAVED HERE. The engine t has been changed to a ing instead of a t-up part elimi-ng 184 rivets.



WE SAVED HERE. The composite fin was previously constructed by "hogging" out plates and bonding them together, then machining the end product. Now it is made of molded graphite composite.

WE SAVED HERE. We've replaced aluminum elevons with compression molded graphite-epoxy elevons. Result: reduced machining and forming.



WE SAVED HERE. Now we're making the payload bay covers from castings instead of the original sheet metal.

BOEING

Airmail

Increasing in Strength

I have long been an admirer of General Milton and have read with great interest and edification what he has written. It is in that great spirit that I would like to take issue with "Volunteer Forces and Superpower Status" in AIR FORCE Magazine for May 1979.

General Milton said: "The Reserve Forces, no longer benefiting from the threat of the draft, are fast dwindling away." The fact is that the Air Force Reserve, Air National Guard, Marine Corps Reserve, and Coast Guard Reserve are up to strength. The Naval Reserve is slightly below strength, but is now increasing. The Army Selected Reserve strength is about 130,000 below the strength we would like. However, the two Army components—the Army National Guard and Army Reserve—are increasing in strength. The Army National Guard has increased in the first three months of 1979.

The actions we started during 1978 now are starting to pay off, and we are getting good increases in strength. We look for more increases as the full effects of our bonus program, our convenient initial training options, and our shorter initial enlistments (three or four years instead of six) start to attract volunteers. We are also taking action to preclude some of the unprogrammed losses we have experienced in the past. We are of the opinion that Army Selected Reserve strength has bottomed out and will continue to increase.

He said: ". . . the individual Ready Reserve, which numbered 1,600,000 a few years ago, is now down to 364,000, and dropping." The fact is that the Army's enlisted IRR increased forty percent in 1978, from 100,000 to 140,000. IRR strength is increasing, and we have taken several steps to assure that the increase continues until our objectives are met. It is relevant to compare IRR strength with our requirements rather than with previous strengths. The 1,600,000 personnel in the IRR a few years ago were excess to our needs, unorganized, and not a usable asset. The Air Force, Navy, and Marine Corps have sufficient pretrained personnel (IRR or retired) to meet their mobilization needs. We know that Army IRR strength is less than we need at present, and we plan to increase it in the next five to seven years. In the meantime, we plan to make extensive use of other forms of pretrained manpower—retirees, Standby Reservists, and veterans—to meet Army mobilization manpower objectives.

He also said: "There is very little, in short, behind the volunteer regular forces. . . ." The fact is that there are 1,200,000 Ready Reservists out there, 800,000 of whom drill monthly and all of whom are ready, willing, and able to augment the active forces in time of need. That, in my judgment, is more than "very little."

The Reserve components are much better than most people believe, but they still are not good enough. But improvement can only come by assessing and analyzing the facts as they are. We need all the help we can get from our good friends like General Milton. . . .

Harold W. Chase
Deputy Assistant Secretary
of Defense (Reserve Affairs)
Washington, D. C.

• *For a look at Air Reserve Forces, see "Air Reserve Forces Face Increasing Difficulties," by Bonner Day, beginning on p. 82.*—THE EDITORS

Right On Focus

"In Focus . . ." remains unmatched for its concise reporting and wealth of information. It's still the best monthly column in the business.

Charles M. Kupperman
Defense Analyst
Washington, D. C.

No Poker Game This

Clare Boothe Luce's April issue article, "How to Deal With the Russians: The Basics of Negotiations," points out a great many deficiencies in the US system of negotiations that have certainly been well substantiated by the experiences to date. I do not agree that international negotiations are quite the poker game that Mrs. Luce describes, because in the International Agreement, as was fairly well demonstrated in the Cuban crisis, with a positive policy and substantial backup it is not necessary to be overly concerned with whether or n the other side is bluffing.

Unfortunately, at this time we not have a positive national securi policy, and the force backup in inte nationally perceived terms is rapidly disappearing that Mrs. Luce most dire predicted consequenc are virtually a certainty to become a tual fact.

Benedict Cohn
Beverly Hills, Cal

Built-In Self-Destruct

The article "Soviet Strategic Vu nerabilities," by Dr. Colin S. Gray, the March Soviet Aerospace Almana deserves a rousing "Bravo!" It is r freshing to read an article by one wh could affect US doctrine that d not concentrate on the US/Sovi throw-weight ratio. I, for one, agre with Dr. Gray that the US should pu more effort into ". . . encourag[in [the USSR] to destroy itself froi within."

I have been an AFA member for m entire career (eleven years) an would relish reading more article that address alternatives in US doc trine besides building bigger mis siles/faster planes/etc. The AFA did again and will always get my bid a the best professional organizatio around!

Capt. Richard Patterson
NATO AEW&C Program Manage ment Agency
Brussels, Belgium

In Business to Fight and Win

Every time I see a letter in your page such as that from Lt. Col. Donald F Baucom of Keesler AFB (May '7 "Airmail"), it warms my heart. It's nic to know that there are still individual in the Air Force who are not taken i by the cheap sloganeering and "im age" campaigns that have severel distorted the meaning of military se vice to the nation. . . .

Baucom errs in calling "Peace I Our Profession" a lofty phrase; it i really the sleaziest sort of Madiso Avenue drivel that is laughed at, an has been since its inception. I was i the command that saddled itself wit this idiocy at the time. . . .

In a way, it's a statement of polic and policy has no business in un mottoes. Our business is fightin whatever the civilian leadership this nation does with the results of o having fought is our interest only pa sively. When the RAF had a Bomb Command, they had a motto that le no doubt as to their objective: "Stri Hard, Strike Sure."

Part of the general malaise is posly our dogged resistance to the t that there *is* a pecking order in litary service; there are fighters, ere are horse-holders, and there are ose who sweep up behind. I'm rry, ladies and gentlemen, but any crew type who has to take it to the emy is higher up on the ladder than s support contemporary; any aintenance line chief is higher up in e military scheme of things than his nking buddy from CBPO. It costs thing to acknowledge the truth of s; on the other hand, it debases the rrior when we carry the equality of e uniform to untrue extremes. We had jobs to do. All were necessary. me were more important and ngerous to life and limb than ners. . . .

A more subtle part of this general shy-washiness in the Air Force is, I ink, in our large noncombatant rce. Of course, every service has its ajority of people whose jobs will ad them to combat with an enemy ly by pure accident; but the other rvices at least make an effort at ingrating their people into the ultiate mission: nobody aboard ship in e Navy is exempt from a duty on the attle Bill; every Marine, even paperufflers and computer jockeys, kes up the rifle annually and is reinded on the range why there are ossed rifles under Corps chevrons. But what, pray tell, do we do in the ir Force? Legions of Air Force eople can't tell one airplane from nother—or probably one missile om another—and couldn't care less. ou won't get a sense of mission, or a ense of contributing to a mission, in ie eight-to-five down-at-the-office mosphere of the average base beind the flight line.

In my last assignment—the last ne, that is, where I seriously contribted to the Air Force mission—I arted a system of getting behindie-line types, one at a time, aboard ur birds. Not just for a joy ride; they ould meet the crew at ops, see what ey did there, then get an idea of the admaster's life. Being in the trashauling business made it relatively isy, but a version of it could apply to ny organization. The point is that it as appreciated; as one young tworiper told me one day, "I didn't think nybody *cared* if we knew what went n." It can work anywhere; just don't some headquarters type get hold it and make a *Program* out of . . .

Sometimes I think we've merely ten the worst of the old Army, circa 1947, and painted it blue. Then again, I read letters like Baucom's, and others you have published about the grosser inanities of the contemporary Air Force (you remember, of course, that the current OER system was vigorously attacked in your pages), and I take heart. With luck, some of these writers will rise somewhere near the top, and the sloganeers and imagemakers will fade away, leaving the Air Force with only one face. If we are reputable and honest with ourselves, the public, and the nation's leadership, what concern for "image" need there be? . . .

Let me leave this overlong monologue via a favorite quotation (from "Ethics of the Military Profession," by Maj. Robert C. Carroll, Inf., USA, in *Air University Review,* Nov.–Dec. '74): " . . . by focusing on our image, we lose sight of our soul. . . . If we succumb to the international neurosis of overconcern for our exterior image, we will in fact prostitute our integrity to embellish that image."

Col. R. J. Powers, USAF (Ret.)
Shreveport, La.

I wish to express my most sincere congratulations to you for publishing the letter from Lt. Col. Donald R. Baucom. He has clearly expressed the *raison d'être* of our nation's armed forces . . . to be prepared to fight our nation's wars. Any other mission definition is nothing but a euphemism and underlines our "false morality" approach to war.

False morality is nothing more than an excessive preoccupation with moral aspects. In war, it could be said, our false morality stems from a guilt complex that is a result of our constant repentence over the atomic bombings of WW II or the recent trauma of Vietnam.

False morality has no place in war. War in itself is an immoral act. Why then should we try to whitewash an immoral act? Is it not far more moral in war to finish it as rapidly as possible by employing all the means at our disposal? Only in this way, *i.e.*, by mitigating the suffering of war brought about by long protracted conflicts, can we insert the parameter of "morality" into war.

Viewed in this light, the atomic bombings of Hiroshima and Nagasaki were moral acts because not only did they shorten the war, but, by bringing the war to a rapid end, also saved the lives of millions of persons who would otherwise have died as a result of lengthening the hostilities.

False morality has no place in war from another aspect—patriotism. It would serve us all well to memorize and practice the statement made by Stephen Decatur, " . . . our country, may she be always in the right; but our country right or wrong." I would like to see Jane Fonda actively involved condemning the killing in Southeast Asia or the wanton murders in Iran.

In order to bring about victory and thus morally shorten wars, we must stress the military factors over the moral factors. Let us not forget that victory is a corollary of the will to win and that peace is a by-product of victory. The idea of false morality stems from a lack of understanding of the true nature of war. War comes about when there is a breakdown in diplomacy. The end of diplomacy is peace through negotiation, whereas the end of war is peace through victory. Let us not confuse the ends of one with the other. . . .

False morality brings about a fear of our own power and brings about the idea that power by itself is dangerous. Witness, for example, such statements as "Peace Is Our Profession" or "Aerospace Power for Peace." Nothing could be further from the truth or more damaging to our will to win. We are being trained for war, or, as Colonel Baucom says it, "to fight our nation's wars."

Instead of looking at the moral arguments for and against war we should fix firmly in our mind that if war comes (God forbid), our professional training for war will be brought to bear, and we must fight in the most resolute manner because (1) we have the best way of life yet learned by mankind and we intend to preserve it, (2) several million Pavlovian disciples have sworn to bury us and to be buried you must first die, and (3) because we have the intelligence, the dignity, and the will to fight whenever degeneration or mass retrogression threatens humanity.

Lt. Col. Hector Andres Negroni
APO New York

Down Memory Lane

I just read "D-Day: June 6, 1944," by Gen. Laurence S. Kuter, USAF (Ret.), in the June issue. I would like to correct one portion of General Kuter's article, since I believe that a second lieutenant pilot who shoots down four enemy aircraft in thirty seconds on his first combat mission should be properly identified. The pilot was 2d Lt. Dale Spencer and not Lieutenant Carnes, as identified.

SCIENCE/SCOPE

The 500th AN/APG-63 radar for the F-15 Eagle has been delivered by Hughes as more and more of the U.S. Air Force fighters join active service in the United States and abroad. Air Force bases in the U.S. that now boast the aircraft are Langley in Virginia, Luke in Arizona (a training wing), Holloman in New Mexico, and Eglin in Florida. Eagles also are stationed at Bitburg in West Germany and Camp New Amsterdam in The Netherlands. The production rate of radar systems approaches 150 per year.

The Federal Republic of Germany will soon have a new automated air defense system for southern Germany. The system, called GEADGE for German Air Defense Ground Environment, will replace a radar network installed in the early 1960s. It will employ advanced data-processing techniques to track, identify, and evaluate airborne targets, and to direct intercept missions more efficiently. Hughes will manage the system's design and installation. German and other NATO industries are expected to participate. Similar Hughes systems have been developed for NATO, Spain, Switzerland, and Japan.

An advanced long-range surveillance radar will improve the ability of U.S. Navy ships to defend against supersonic cruise missiles and other airborne threats. The radar, called the AN/SPS-52C, eliminates manual tracking by providing automatic detection and by tying into a new tracking system. The tracking system correlates data from the SPS-52C and two other radars to display targets on a console. Different modes allow the radar to monitor targets that appear suddenly over the horizon and approach at high angles, long ranges, or rapid speeds. Another mode filters out clutter like land masses and rain storms to display only moving objects. Hughes delivers the first production system in 1981.

Eight successes in the last nine firings have concluded development tests of the U.S. Roland air defense system and set the stage for the start of production. Two missiles were aimed at high-g maneuvering drone targets, four were fired at drones with radar or infrared countermeasures operating (one failed due to a random malfunction), and three were guided along a predetermined trajectory. Some missiles had been cooled below freezing to simulate operation in cold environments. The all-weather, short-range U.S. Roland is the first major European-designed weapon system selected for production in the U.S. and deployment with the U.S. Army. Hughes and Boeing Aerospace Company are contractors. They are jointly licensed to produce Roland by Euromissile, a joint venture of Messerschmitt-Boelkow-Blohm of West Germany and SNI Aerospatiale of France.

In honor of their Pioneer Venus mission success, Hughes and NASA's Ames Research Center have received the Nelson P. Jackson Aerospace Award from the National Space Club. The award is made annually to the firm most responsible during the preceding year for outstanding contributions to the space, missile, and aircraft fields. Hughes designed and built the five spacecraft that penetrated the Venusian atmosphere last December, as well as the vehicle that was placed in orbit around the planet and continues to send information to Earth. Ames manages the project. Hughes previously won the award in 1968 for its Surveyor moon landers.

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HUGHES

HUGHES AIRCRAFT COMPANY
CULVER CITY, CALIFORNIA 90230

Airmail

Col. Hal Bowman commanded the 1st Bomb Group, located at enethrope, not Molesworth. The stinctive accomplishment of eutenant Spencer occurred when e 401st was returning from a mis-on to Soran, Germany, on May 29, 44. I was assigned to the 315th mb Squadron of the 401st Bomb oup and personally witnessed the at. I also attended the party given for eutenant Spencer at which Gener-; Kuter and Williams were present. General Kuter . . . will recall that eutenant Spencer received more an the bottle of Napoleon brandy, nich left him in a state of shock. In-dentally, Lieutenant Spencer be-ame an ace.

General Kuter's article brought ack vivid memories of D-Day and the nsuing period.

Lt. Col. Frank T. Hughes, USAF (Ret.)
Madera, Calif.

Colonel Hughes is right in correct-g my unedited and unverified notes. am sure those notes reflect the spirit nd the atmosphere created by 2d Lt. ale Spencer's skill and gallantry. My ppreciation to Colonel Hughes and y apology to Spencer.—Laurence S. uter.

People-Oriented Air Force

n your June issue there appeared a tter by Lt. Col. Robert O. Boardman, lassachusetts ANG. In it he stressed ne ever-present need for the Air orce to assign more junior (pilot) of-cers to staff-oriented duties to better cquaint them with administrative unctions and to exercise responsible dgment and authority. Throughout is letter, Colonel Boardman makes ositive statements about the career pportunities available to a young nior officer. However, every sen-nce is permeated with the words or ne understanding that the *only* junior fficers he is talking about are pilots. ot only does he fail to establish simi-r guideline proposals for all junior fficers, but he actually goes on to ake it look as though these young en face tough uphill battles when it mes to OER criteria.

Not only do other junior officers ce the same tough competitive ining, moves to new bases, making new friends, and the excitement of ing, but they, too, settle down to a routine of uneventful flying and busy-work type of additional duties. Then, too, it is the commander (a pilot himself in ninety-five percent of the cases) who saves the junior officer (pilot) in his seemingly downtrodden plight. Navigators, EWOs, WSOs, Radar Navs, and Bomb Navs all face even tougher hardships because—though they, too, are rated officers—they are considered second-class citizens by the pilot force. They have little chance of hoping for a favorable OER, but are promised it will reflect progression. They can merely dream of command positions (it seems the only navigators who become commanders do so at undergraduate navigator training). Then they also face the less-liked additional duties after being raked over by aircraft commanders and the like.

It is probably a good thing Colonel Boardman is in the ANG, for if he were an active-duty commander, he would have very difficult challenges to overcome, especially if he insisted on being pilot-oriented. Rather, the point to be made is that the Air Force purportedly is "people-oriented." If that is true, then many other junior officers like myself would like to see this slogan implemented, not just stated. Unless the pilot force realizes the concept of teamwork, we will have to look elsewhere from which to draw our future pilots. Single-seat air jockeys are out in today's highly sophisticated technological military profile. Nostalgic memories of training are great, but they have little effect upon the challenges facing today's crew member!

Intelligent, aggressive officers (rated and nonrated) stand out amongst their peers and are mature enough to recognize the challenges, excitement, responsibility, and personal development that does exist. If the Air Force wants a job professional and career-oriented officer (not just pilot), then it had better take quick, responsive measures that give young officers the challenging opportunity to be supervisors and judges of authority they deserve by virtue of their officer creed.

And, lastly, if others say that a young second lieutenant like myself is unaware of all the factors, I counter with the fact that I am a career-oriented individual, for I am a prior enlisted (staff sergeant) man who fought for a degree and a commission and a more challenging job—as a navigator—and now I am fighting for more.

Lt. Alan C. Kifer
Mather AFB, Calif.

An Idea That Didn't Stick

Your "Aerospace World" column (May '79) tells of current optimism among Wright-Patterson AFB engineers about PABST (Primary Adhesively Bonded Structure Technology), a concept of using "superglue" to bond large aircraft sections like wings and fuselages. If this adhesive technique proves successful, it could increase substantially payloads while reducing the cost of maintenance.

I am reminded of a recent interview with Professor Kurt H. Weil, Professor-Emeritus of Aerodynamics at the Stevens Institute of Technology. Professor Weil, brought safely out of prewar Nazi Germany by American friends, had worked for Junkers Aircraft. In 1939, he was brought down to Washington and introduced to General "Hap" Arnold, then Chief of the Army Air Corps.

Weil proposed a scheme to save scarce aluminum by using a plastic glue he had helped develop at Junkers that had proved effective in the construction of plywood aircraft. He argued that American manufacturers could safely substitute plywood for aluminum sections in the construction of trainers, needed in the thousands by a rapidly expanding Air Corps.

However, Arnold, always on the lookout for new and better ways to do his job (*e.g.*, his keen interest in missile technology long before most of his contemporaries) took a dim view of Weil's proposal. Doubtlessly, his decision was colored with visions of several narrow escapes he had over the years in flimsy aircraft. The interview ended in rancor as the General regarded plywood in aircraft a step back in technology and aircraft safety.

Arnold was spared a later accounting of his decision by America's vaunted production genius. By 1943–44, enough aluminum was being stamped out to provide airframes for nearly 300,000 military aircraft, an incredible production record for a six-year period that is likely never to be equaled.

Murray Green
Silver Spring, Md.

The Joy of Flight

In your June 1979 issue, there are two letters in the "Airmail" section that address Ed Gates's article, "Putting Up-Or-Out in Perspective." Both letters accurately state the problem; both say what I've been saying all along: The up-or-out system is *wrong*. It's wrong because it is based on a

Airmail

false hypothesis—namely, that every person in an organization like the Air Force needs to rise to the top; that if a person is not advanced, he becomes nonproductive and ends up as a liability to the organization rather than an asset.

Sure, there is the temptation to rest on one's laurels and draw a paycheck for minimal work. If an organization is successful, however, it has developed a means of eliminating this type of individual that is very effective, and does not degrade morale in the least. The organization also recognizes the fact that a person might be performing a task that to him is very satisfactory, and that he is productive because he enjoys the work itself, and not because he is laying the groundwork for future promotion.

This is the primary reason for the pilot exodus. Most pilots enjoy flying; I flew for fourteen years, the last nine of which were as a fighter pilot. The sheer joy of flight was enough to keep me in the Air Force for the rest of my life. I couldn't duplicate my flying experience outside the military, and felt pride in the fact that I was serving my country and that my job was important. To put it in Mr. Cordella's words, I found "job satisfaction near the hardware level." I wanted to stay in the cockpit; after all, I joined the Air Force to fly airplanes—and nothing else. Unfortunately, under the present policy, my career didn't have much of a chance.

Many younger pilots see me, or people like me, and wonder if their treatment will be the same. They see the chance to stay in a cockpit much higher on the outside, flying for an airline, and maybe performing weekend duty with the Air Guard or Reserve.

A separate "Pilot Corps" has been proposed along with many other suggestions for stopping the loss of pilots. I don't know which is the best; I do know that the Air Force has to recognize the fact that flying is an end in itself, and not a means to another end.

It's very sad, but if I were to give a young Air Force pilot advice on how to stay in aviation, I'd have to say, "Get out of the Air Force."

James P. Qualey, Jr.
Colorado Springs, Colo.

138th Aero Squadron's Farewell

We were one of the small number of squadrons to reach the Zone of Advance, and the last Air Service Squadron to leave Germany after the First World War. Our coming reunion [*see "Unit Reunions," p. 17*] will probably be our last one, and I expect it to be a fond farewell among our members who are fortunate enough to attend.

I am the Editor of our "Squadron Bulletin," a quarterly letter that I have done since the 138th Aero Squadron, 5th Pursuit Group, Association was formed in 1950. We have held our annual reunions in any city where we had a man to represent us and to make all arrangements for hotels, etc. . . . Out of the 440 men who were in our Squadron at some time or other, we had a total of 175 known addresses, with knowledge of about 100 deaths—the remainder were listed as AWOLs. Our present list of members is only forty-one, of whom twelve men were present at our last reunion.

Our Squadron was in all three Armies of the American Expeditionary Forces, and never got to distinguish ourselves in any way! We were formed into a Squadron at Kelly Field, Tex., trained in American planes at Fort Sill and Post Field, then sent to Montrose, Scotland, for training in British planes along with the British. From there we were sent to France, where we were joined by pilots trained in American planes who could not fly our Sopwith Camels. So by the time we got French planes, the war was over. From February 1919 until July 1919, we were in Germany flying patrols to see that the Germans were not trying to muster an army after the Armistice.

Finally, our planes were sold to the Kosciusko Squadron, which, with the help of a large number of American pilots who still wanted to get in some flying, was fighting the Bolsheviks in Poland. . . .

Joseph P. Lafond
Woodburn, Ore.

Fortress Without a Roof

I am writing a new book for 1982 publication about the aerial destruction of Fortress Europe during World War II. The title, *Fortress Without a Roof,* is taken from a statement by President Roosevelt that "Hitler built a fortress around Europe, but he forgot to put a roof on it."

The book will cover all aspects of the air war, including operations by the Royal Air Force and those of the Eighth, Ninth, Twelfth, and Fifteenth Air Forces. I'm anxious to contact former members of these air forces to obtain their reminiscences. Men and women in all organizational units a invited to assist me in research. T book will deal with operations on t ground as well as in the air. Most w come will be comments by those w worked to prepare for the missions operations, maintenance, intel gence, etc. The latter are always t most difficult to get. Comments ne not be lengthy, and each person w provides usable material will be me tioned in the book. Anecdotes a humor are especially needed, as w as details of combat experiences.

Former members who are i terested should write briefly descri ing what they have to offer, and I sh detail precisely what is needed a cording to that person's backgrou and experience.

I am the author of four books military aviation. My newest is *Poi of No Return: The Story of the Twe tieth Air Force,* which will serve as model for the new book.

Wilbur H. Morrison
2036 E. Alvarado St.
Fallbrook, Calif. 920
Phone: (714) 728-9777

371st FG Jug Pilots

I would appreciate it if any form P-47 Thunderbolt pilots who flew wi the 371st Fighter Group would co tact me.

Edward J. DiMarzo
1511 NE 11th St.
Homestead, Fla. 330
Phone: (305) 247-4178

A Real Attention-Getter

The state of Missouri has authorize personalized license plates for auto I've selected "19-Bomb" for my o outfit, the 19th Bomb Group, WW II.

If other Air Force people use th idea, such as 80-Bomb, 38-FTR, etc it would be good PR for the AF—and have been able to get reacquainte with some of my WW II buddies.

Dean H. Anhol
Springfield, M

Aircraft Serial Numbers

I have been working for years to co pile a complete list of serial numbe assigned to US aircraft. Some seri blocks and other information, lik designation block numbers an modifications, are very hard to fin and it occurred to me that some rea ers might be willing to help.

Any information on aircraft a missile serial numbers assigned sin Fiscal Year 1958 is needed. Many these serial blocks are known, but would be too difficult to be specific to my needs in such a short spa

re. Of particular need is any and all formation on serial number assignments to guided missiles and entry vehicles from the 1950s on, en to little-known ones. For a time, least, certain missiles were assigned in this separate category with GM- or R- prefix.

Such information would appear to of great value in the study of US ilitary history.

Keep up the good work in your agazine. It is one of the few really liable news sources on national and ternational affairs, as well as one of e best military air magazines.

Garth Pelton
260 Ranch Rd.
Reedsport, Ore. 97467

roshima Photos

would like to contact any members the 24th Bomb Squadron, 6th omb Group, stationed on Tinian uring World War II who flew photocon missions over Hiroshima imediately following the atom bombg of that city.

Lt. Col. Frank P. Srebro, USAF (Ret.)
897 Scott Rd.
Dickson City, Pa. 18519

95ers, Please Report In

he 295th AFROTC Cadet Group at ne University of Louisville is curently working on an alumni project. We are requesting Detachment 295 raduates who have not been conacted by our alumni committee to end in the following information: ame, rank (if still in the military), address, year of commissioning, and the chool attended within the University f Louisville. Our alumni committee is ooking forward to corresponding ith you.

AFROTC Det. 295 Alumni Committee
% SSgt. Dennis Harper
University of Louisville
Louisville, Ky. 40208

Electronics Researcher

lelp is needed for researching airorne electronics from pre-WW II to resent, including research and delopment, manufacturing, operaonal use, and technical data on all ypes of airborne electronics.

Robert Loffredo
6004 S. W. 2d St.
Des Moines, Iowa 50315

CC Alumnus

any of us wondered what happened the 3,000,000 men who served in e Civilian Conservation Corps from 1933 to 1942. So . . . last summer, some 500 former members of the CCC, from thirty-nine states, met at the VFW Hall in West Sacramento, Calif., and organized the National Association of Civilian Conservation Corps Alumni (NACCCA). Anyone who served in the CCC, in any capacity, is eligible to join NACCCA. For details, please write me.

Jack Vincent
1709 Michigan
West Sacramento, Calif. 95691

Bomb Groups in North Essex

I am attempting to research some of the bomb groups that served in North Essex during World War II, and would like to contact former members in an effort to obtain something about the personnel, the missions, and the aircraft.

The groups in question are the 381st Bomb Group (Ridgewell), the 323d Bomb Group (Earle Colne), and the 410th Bomb Group (L) (Gosfield).

David R. Osborne
The Halstead and District Local History Society
47 Dooley Road, Halstead
Essex, England

Aviation/Medicine Career

I am interested in corresponding with anyone who has successfully combined a career in aviation and medicine, whether it be in the civilian or military arena.

M. E. Poll
25400 Rockside Rd., Apt. 624
Bedford Heights, Ohio 44146

Shot Down Over North China

I would like to contact any crew member of the B-29 bomber *My Assam Dragon,* which was shot down over North China on September 8, 1944, and whose crew members walked 1,500 miles across North China to safety.

George A. Hanlon
920 Irvine Ave., Apt. B-301
Newport Beach, Calif. 92663

History of Commissary Service

The Air Force Commissary Service is trying to trace its history and is asking for help in locating photos and small items from the past used in commissary operations.

Commissaries have been a valuable part of military life since 1866, when they traveled to lonely frontier posts in the American west. Today's Air Force commissaries are found at every major base or station around the world and continue to provide essential services to military people.

Photos and selected historical items will be displayed in the AFCOMS Headquarters and appropriate credit will be given to the donors.

Please send any contributions to:

HQ AFCOMS/CE
Attn: Mr. Frank D. Derby
Kelly AFB, Tex. 78241

7th Fighter Command

I am writing a narrative history of the 7th Fighter Command, World War II. This history will include the 15th, 21st, and 318th Fighter Groups, and the 6th, 548th, and 549th Night Fighter Squadrons. I would appreciate hearing from any former members with information, anecdotes, awards, group or squadron crests, photos, etc. All material furnished will be copied and returned in a secure fashion.

John W. Lambert
1275 Knollwood Lane
Mendota Heights, Minn. 55118

Good-Will Flights

I am collecting information on the two Good-Will Mission flights: Langley Field to Buenos Aires on February 15, 1938, and Miami to Bogotá on August 5, 1938. I would like to contact any aircrew who participated in either of these two flights.

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

Charles A. Rimmer

Would anyone having information on Charles A. Rimmer, a pilot who served with the 1st Special Service Forces, last seen in January 1944 at Monte Cassino, please contact me.

Col. Dan Gallagher
1221 South Frederick St.
Arlington, Va. 22204

20th Fighter Group

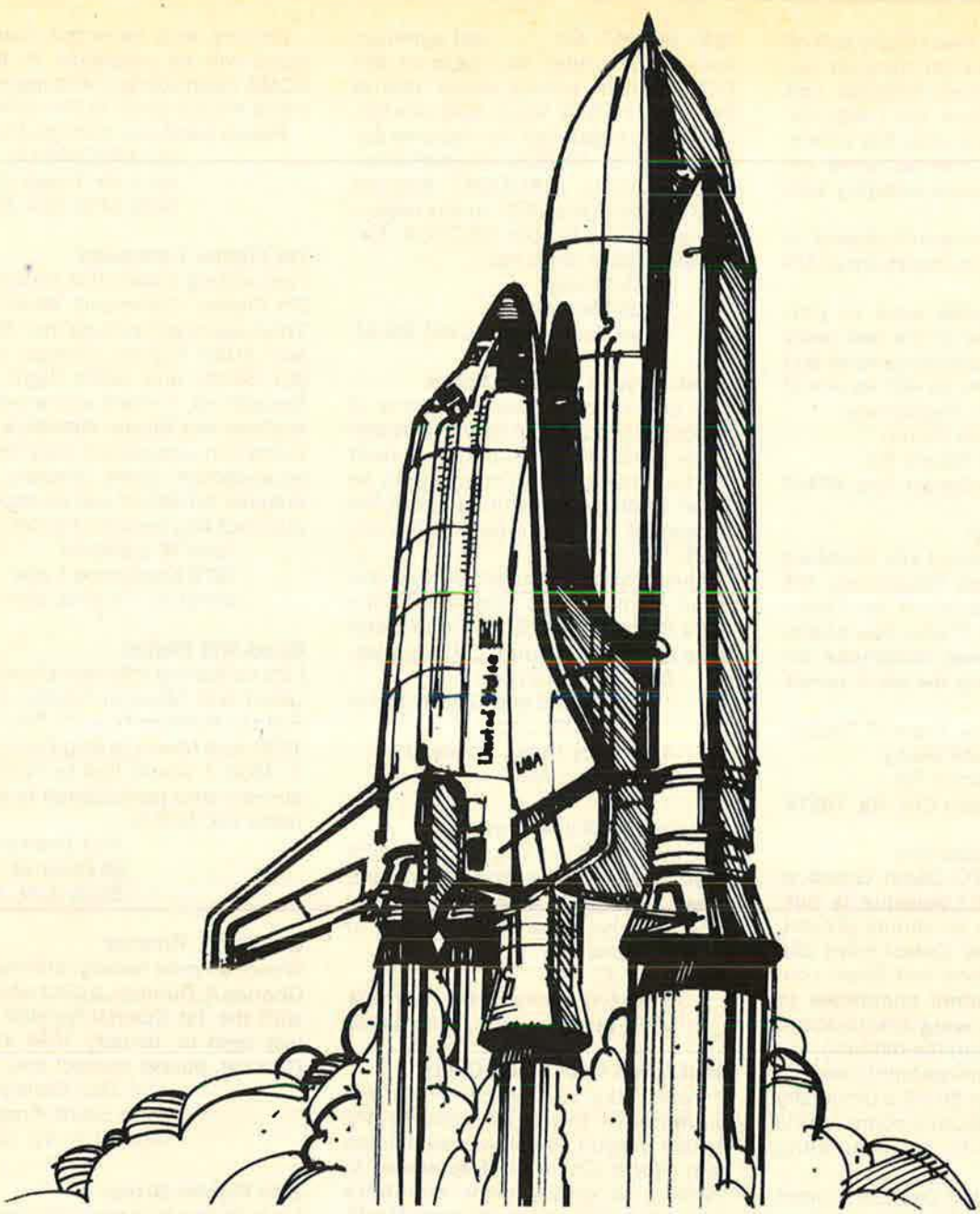
I would like to hear from anyone associated with the 20th Fighter Group, 55th, 77th, and 79th Squadrons, Eighth Air Force, during our stay at Kings Cliffe Station 367, England, during WW II.

The purpose of this is to complete a current address list for a future reunion and gather material for a future article.

Jack Ilfrey
127 Lewis St.
San Antonio, Tex. 78212

US Military in Russia

I plan to write a book concerning America's military presence inside Russia during the World War I period of 1918–21. Would anyone who has knowledge of these activities from



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irmail

her personal experience or the ex-rience of a relative or friend please ntact me.

Lt. Col. Peter Lorenzo, Jr., USAF (Ret.)
P. O. Box 31
El Dorado Hills, Calif. 95630

emories of Stevenage

m currently collecting details of the rious wartime organizations that re active in Stevenage, Herts, En-and, during the 1939–45 period. I uld, therefore, be very pleased to ar from any readers who were ationed in the area and can re-ember Stevenage at that time.

A particular feature of the town in ose days was the Old Castle Inn, a nteen used by service personnel cluding many Americans. I also ave photographs taken at a football atch between an American team nd a team of local lads.

I would welcome any correspon-ence on the subject and will ac-nowledge all letters received.

J. D. Amess
418, Grace Way
Stevenage, Hertfordshire, England

taff Sergeant Marton

am trying to obtain some informa-on about my uncle, SSgt. John lfred Marton, who was killed in Italy anuary 27, 1944. He was a crew ember of *Skim-A-Long*, a B-26 Marauder of the 42d Bomb Wing, 17th omb Group, Twelfth Air Force, ased in Italy or North Africa.

It is believed that one crew member ho missed the flight that day due to lness may still be alive.

I would appreciate any help toward nding that crew member or anyone ho may have known my uncle or ight have a picture of the aircraft.

MSgt. Gerald A. Marton
124 North Glencoe
Wichita Falls, Tex. 76302

lose Art and Emblems

Vanted—negatives or photos of nose rt on aircraft of WW II, also group nd squadron jacket emblems. Will-ng to trade for cloth group and quadron patches, mine for yours. lso nose art on aircraft.

John Sutoy
1975 Huntington Turnpike
Trumbull, Conn. 06611

atch Collectors' Corner

n avid collector of military patches of all types, I have begun collecting patches of USAFE units. If anyone is interested in selling, trading, or giving away any patches, please contact me.

Robert Cerjan
HHC 10th Engr. Bn.
APO New York 09701

UNIT REUNIONS

Air Rescue
October 5–7, Bahia Hotel, San Diego, Calif. Past and present members of ARRS and rescuees invited. **Contact:** Ed LaDou, 10535 Canyon Lake Dr., San Diego, Calif. 92131. Phone: (714) 566-8873.

Air Weather Service
Northern California AWS annual banquet, October 6, NAS-Moffett Field. All ex/ret/recon/res AWS officers welcome. **Contact:** Milt Sipple, 2589 Dumbarton, San Jose, Calif. 95124. Phone: (408) 267-2555.

AIRSHO '79
Confederate Air Force "Show of Shows," October 4–7, Harlingen Field, Tex. Precision flying, aerobatics, CAF 1st Airborne Paratroopers, CAF Ghost Squadron's re-creation of WW II air battles, and guest performers. **Contact:** Robert L. Griffin, CAF Hq., P. O. Box CAF, Harlingen, Tex. 78550. Phone: (512) 425-1057.

Ranch Hands
Ranch Hand Vietnam Association's 13th annual reunion, October 12–14, Hurlburt Field, Fla. **Contact:** Maj. Jack Spey, USAF (Ret.), 850 Tarpon Dr., Fort Walton Beach, Fla. 32548. Phone: (904) 243-5696.

8th Air Force
5th annual reunion, October 25–28, Phoenix, Ariz. Those interested send stamped, self-addressed envelope. **Contact:** Elmer Fessler, 8th AF Clearinghouse, 3911 NW 173d Terrace, Opa-Locka, Fla. 33055.

Class 41-B
Southeast Training Command. Anyone interested in reunion to be held October 5–6, at Randolph AFB, Tex. **Contact:** Col. Dane W. Harlan, USAF (Ret.), 16403 Ledge Point, San Antonio, Tex. 78232.

Class 61-D
USAF Pilot Training, October 4–7, Boston, Mass. Every member, not only graduates, sought for this 4th reunion. **Contact:** Maj. David L. Roberts, USAFR, 1055 N. Shore Drive, Roswell, Calif. 30076. Phone: (404) 992-9516, AUTOVON 925-2883.

75th Air Service Group, 315th Bomb Wing (Guam)
2d reunion, October 6–7, Hot Springs, Ark. **Contact:** Fred B. Blagg, 117 Kenwood Pl., Hot Springs, Ark. 71901. Phone: (501) 623-7034.

94th Bomb Group
October 12–14, Orlando, Fla. **Contact:** W. S. Winneshiek, 159 Antigua Dr., Cocoa Beach, Fla. 32931.

F-102 Pilots
Tentative plans for reunion, November '79, Sheppard AFB, Tex., in conjunction with dedication of a pedestal-mounted F-102. **Contact:** Col. John M. Franklin, 4300 Shady Lane, Wichita Falls, Tex. 76309. Phone: (817) 692-6081.

VB/VPB-106
WW II Liberator/Privateer squadrons combined, September 20–23, Colorado Springs, Colo. **Contact:** CDR Gordon K. Ebbe, USN (Ret.), 2211 Wynkoop Dr., Colorado Springs, Colo. 80909. Phone: (303) 596-3087.

138th Aero Sqdn., 5th Pursuit Group
The last weekend of September, Ramada Inn, Lawton, Okla. [*see letter, p. 14*]. **Contact:** Joseph P. Lafond, 321 Charles St. Woodburn, Ore. 97071.

305th Bomb Group, 8th AF
364th, 365th, 366th, 422d Squadrons and attached units, 413d Air Service Group, 983d MP Co., stationed at Chelveston, England, WW II; October 4–7, Phoenix, Ariz. **Contact:** Abe Millar, Box 757, Sanger, Tex. 76266.

306th Bomb Group
Stationed at Thurleigh, England, WW II. Reunion October 19–21, Colorado Springs, Colo. **Contact:** Joe Marciano, 1214 Auburn Dr., Colorado Springs, Colo. 80909.

313th Fighter Sqdn., 50th Fighter Gp.
1st reunion. Proposed date, 1st week in October, at Myrtle Beach, S. C. **Contact:** Lt. Col. Hugh M. (Tommy) Farr, USAF (Ret.), Box 365, Pawley's Island, S. C. 29585. Phone: (803) 237-4761.

340th Bomb Wing (1953–64)
September 20–22, Sheraton Airport Hotel, Orlando, Fla. **Contact:** John Ackerman, 7121 Bamboo St., Miami Lakes, Fla. 33014. Phone: (305) 822-3304.

341st Fighter Squadron, 5th AF
4th reunion, October 12–14, at Port Clinton, Ohio. **Contact:** Albert V. Arnold, 109 Ferris St., Apt. 3, Ypsilanti, Mich. 48197.

351st Bomb Group, 8th AF
508th, 509th, 510th, 511th Bomb Squadrons, stationed at Polebrook, England; 5th annual reunion, in conjunction with the 8th AF reunion, October 25–28, Phoenix, Ariz. **Contact:** Ben Schohan, 398 Catawba Ave., Westerville, Ohio. 43081.

353d Bomb Sqdn., 301st Bomb Gp.
Would like to contact ex-members of above (B-17s, WW II, Africa and Italy) to make plans for reunion. **Contact:** Robert H. Cockreham, 518 South 18, Fort Smith, Ark. 72901.

466th Bomb Group, 8th AF
Minireunion with 8th AF, October 25–28, Phoenix, Ariz. Send stamped, self-addressed envelope. **Contact:** John H. Woolnough, Box 4738, Hollywood, Fla. 33023.

In Focus...

BY EDGAR ULSAMER, SENIOR EDITOR

Washington, D. C., July 3

MX Progress Report

The meandering course of MX politics—perhaps the most erratic and tortuous of any major weapon system in memory—may be taking a turn toward palpable and significant progress. Just prior to the Vienna SALT II summit meeting, senior Defense officials, who surprisingly insisted on anonymity, announced—and the White House subsequently confirmed—that the Administration has decided to build MX in the largest configuration permitted under SALT II (ninety-two-inch diameter) without further delay and that the weapon is to be deployed in a mobile mode.

White House enthusiasm for MX seems to be fueled more by SALT considerations than by other motives. The White House's Deputy Assistant to the President, Joel McCleary, was quoted by the generally pro-Administration Washington *Post* as identifying the MX decision as a political maneuver "wasting billions of dollars to placate" conservative elements in Congress so they would support ratification of SALT II. (Predictably, another White House spokesman, upon publication of the *Post's* report, disassociated the Administration from Mr. McCleary's statement.)

The Air Force, and Pentagon civilian experts, meanwhile, responded to yet another revision of Administration guidelines concerning the MX basing mode. The latest redesign—scheduled to be reviewed by senior Defense Department officials in mid-July with ultimate White House approval hoped for sometime thereafter—resembles the multiple protective structure (MPS) configuration in several basic aspects. USAF—supported by its own and the Defense Department's scientific advisors—consistently has favored MPS as the most cost-effective and sound solution. This concept involves large numbers of hardened vertical shelters in which a much smaller number of missiles is concealed in shell-game fashion.

The "new" basing-mode design allows for two political realities, that of "verifiability" as defined by the Soviet interpretation of SALT II, and the White House's visceral opposition to MPS. USAF's new basing-mode proposal retains some of the fundamental virtues of MPS while eliminating the flaws of a competing basing-mode approach—a form of trench-basing that could have made MX vulnerable to preemptive Soviet SLBM attacks. In case of a breach in security, the Soviet SLBMs—due to their short flight time—could bottle up the actual missile by caving in the trench sections adjacent to it.

The latest approach involves clusters of twenty-six horizontal shelters internetted by surface roads. A truck-like transporter that weighs about 1,000,000 pounds fully loaded slides a 500,000-pound mobile launch vehicle (MLV) into one of the horizontal shelters in a way that prevents Soviet detection of where the missile is actually dropped off.

Two launch concepts are being considered. One involves moving the missile out of the shelter, erecting its integral launcher to a vertical or almost vertical position, and firing. The other approach launches the encapsulated missile from its shelter. A gigantic piston punches a hole through the shelter's roof, the missile is launched at a forty-five-degree angle once the erector/cannister has broken through, and transitions to a vertical climbout. Breaking through the shelter would take about half a minute. Because of MX's sophisticated all-attitude guidance system, the geographic orientation of the shelter is immaterial.

Three or four shelter clusters can be situated in a typical valley in the Southwest. (Only public land would be used.) Individual shelters would be about 8,700 feet apart, to assure that no single Soviet warhead could destroy more than one "aimpoint," and interconnected by a grid of roads. Only the shelter areas would be withdrawn from public use and subjected to "point security," as Minuteman shelters are at present.

The MX ICBM would be brought to a cluster's "chokepoint" by a special railroad. To enhance verifiability, the rail link would be severed at the chokepoint except when a missile is being taken in or being taken o

Missile assembly is separate fr the clusters and linked to them by All shelters can be opened for insp tion by Soviet reconnaissance sate lites through "viewing ports."

The transporter can move along cluster's roadnet at speeds betwee twenty and thirty knots. This is fa enough to move a missile to anoth shelter well within the twenty-five t thirty minutes of tactical warning b tween detection of Soviet ICB launches and arrival of the warhead Possible security compromise therefore, won't obviate the need f Soviet targeting of *all* shelters in a the clusters.

Complete reconfiguration of a clu ter by a "fast shuffle," that is, havin the transporter visit and "mate" wit each of the shelters, could be carrie out sporadically and takes abou twelve hours. Cost of the system i predicted to be about $25 billion i 1978 dollars, or considerably les than the trench concept favored b the White House.

The horizontal shelters would b hardened to an average overpressur resistance of about 600 psi, com pared to about 1,200 psi under MPS The lower hardness level is balance out by greater distance between shel ters.

Key benefits of MPS retained by th latest MX basing proposal, in additio to basic survivability, include the fac that the system minimizes the adverse environmental impact of digging thousands of miles of trench; its in trinsic strategic stability opens the door to drastic, equitable reduction o both sides' ICBM arsenals unde SALT III; and its basic features make i compatible with antiballistic missile "point defense," should the need fo ABM protection arise.

SALT II Loopholes

The SALT II accord signed in the Austrian capital by Presidents Jimmy Carter and Leonid I. Brezhnev or June 18 of this year contained a number of surprises:

Item: The Strategic Air Command will be surprised to learn that its arse nal includes 573 "heavy bombers." A least this is the figure attested to by the US in SALT II's "Statement of Data on the Number of Strategic Offensive Arms as of the Date of the Signature of the Treaty." SAC's real inventory of course, consists of only 316 opera tional (primary assigned) B-52s. Th SALT total includes cannibalized o otherwise unusable B-52s in moth balls as well as the unarmed B-1 tes

ircraft. But by inflating the inventory ith these inoperable bombers, the il- sion is created that the US lead in eavy bombers balances the higher oviet inventory of ballistic missiles.

Item: After repeated claims that ALT II would prohibit encrypting lemetry data of ballistic-missile test ghts, the US bowed to Soviet de- ands and agreed to the following el- otical compromise: " . . . neither arty shall engage in deliberate de- al of telemetric information, such as rough the use of telemetry encryp- on, whenever such denial impedes erification of compliance with the rovisions of the Treaty." The US, of ourse, won't be in a position to know hether or not encrypted information nides" performance changes of bal- stic missiles or other factors relevant SALT or simply pertains to such natters as accuracy improvements. he problem is exacerbated by the act that the US probably would not, nd should not, tell the Soviets which ata channels it relies on to monitor ne performance of Soviet ICBMs. he problem of analysis based on avesdropping on a welter of teleme- ry channels is extremely complex nd the US methods involved repre- ent an important intelligence secret. n cases of suspected Soviet cheat- ng, the US would face a delicate di- emma: The choice is between letting he Soviets in on the US monitoring echniques, which would be required o make a thorough and documented ase, or a vague complaint that the oviets could refute easily and which vould be at best of a formalistic na- ure. In the last analysis, then, it can e argued that the language of the reaty makes the Soviets the sole udge of what they think the US hould be furnished in unencrypted elemetry data.

Item: The treaty limits the US Tri- dent I SLBM, designed to carry eight RVs, to seven warheads. This surpris- ng concession by the US negotiators s likely to lower the planned US trategic arsenal by more than 300 varheads when the deployment of rident I missiles is completed in the nid-'80s. This loss in nuclear fire- ower probably is greater than the umber of warheads carried by the ome 250 older weapons the Soviets ave agreed to give up over the next nree years. The latter reduction is eing described by the advocates of ALT II as one of the most salutory chievements of the accord.

Item: The treaty permits the Soviets increase the silo size of the Soviet nion's largest "light" ICBM, the SS-19, by thirty-two percent. The SS-19 is the weapon system that enabled the Soviets to capitalize on a major SALT I loophole with the result that they increased the size of weapons of this category by fifty percent rather than the maximal fifteen percent the US thought that earlier accord permitted. The implication of an additional thirty-two-percent growth in SS-19 follow-on missiles is staggering, both in terms of throw-weight and lethality.

Item: The Soviet Backfire bomber—basically exempt from SALT II constraints and, unless equipped with long-range air-launched cruise missiles, not even counted as a central strategic launch vehicle—gets an additional free ride. An apparently recently added clause of the treaty allows use of sixteen aircraft as testbeds for long-range cruise missile launchers without counting toward the SALT II limits. The US disadvantage stems from the fact that its proposed carriers of cruise missiles, either the B-52 or a special cruise missile carrier under study, will be counted under SALT II.

Misleading Defense Report?

Rep. Robin Beard (R-Tenn.), a member of the House Armed Services Committee, conducted an analysis of the US/Soviet strategic balance in the 1980s that "differs markedly" from Defense Secretary Harold Brown's 1980 Defense Report to Congress.

Calling the DoD report a "misleading and erroneous view of actual US/Soviet capabilities," Mr. Beard charged that the Administration "dramatically underestimated Soviet strategic capabilities." The greatest weakness in the DoD analysis, Mr. Beard said, is that it pits US and Soviet strategic capabilities against a common target system, specifically, the Soviet target base. To give a realistic picture of the strategic balance, he claimed, any analysis should array Soviet forces against US targets and US forces against Soviet targets.

"By failing to do this," Mr. Beard pointed out, "the DoD analysis fails to present an accurate assessment of the present and emerging US/Soviet strategic balance when measured against what US/Soviet strategic forces would do against each other's targets."

The analysis concludes that Soviet strategic forces surviving an exchange, when matched against the US instead of the Soviet target base, are about seventy percent greater than as measured by the DoD study.

Without the MX missile in a survivable basing mode, the Beard study found, the US actually would be better off not retaliating after a Soviet attack because the US retaliation would increase the Soviet margin of superiority.

The Tennessee Representative said his analysis illustrates that "the US will not maintain a pre-attack equivalence with the Soviet Union in strategic capabilities even if we implement all presently planned US strategic force modernization programs, including the MX. It is no longer debatable whether Soviet capabilities will surpass those of the US. They unquestionably will. The question now is, what is the best way to deal with that reality?"

Since the primary purpose of the US strategic forces is deterrence, Mr. Beard suggested, developing survivable strategic forces that would reduce the incentive for preemptive Soviet attack is preferable to vulnerable forces that might invite attack in a crisis.

DoD's Alternate Engine Program

In concert with the US Navy, the Air Force recently awarded an $80 million contract to GE for prototype development of an alternate fighter engine for both services. The engine program bears the designation F101X. Dr. William J. Perry, Under Secretary of Defense for Research and Engineering, told the Senate Armed Services Committee the new engine is, "in a sense, a marriage between the F101 engine, which was the engine developed for the B-1, and the F404 engine developed for the F-18. . . . It uses the core of the B-1 engine which has had more than 20,000 hours of operation as part of the B-1 program."

Gen. Alton D. Slay, Commander of the Air Force Systems Command, cites two reasons why the Air Force needs the F101X. Both the F-15 and the F-16 use the Pratt & Whitney F100 engine. If a "major problem" were to crop up with that engine in a few years, "we would have to stand down our entire fighter force." Also, as an "acquisition executive, I don't like to be in a sole-source position," the AFSC Commander points out. But with an alternate engine program, even if the F101X is never entered into production, General Slay believes that the government "can get a better deal" from industry.

The F101X program, Dr. Perry testified, was germinated by problems connected with the F100 engine. Re-

InFocus...

ferring to stall stagnation encountered by the F100, he said "an engine with that rate of failure in a single-engine airplane is unacceptable. In a two-engine airplane [the F-15], it is enough of a problem." Dr. Perry informed the Committee that "durability and maintainability problems" of the F-15's F100 engine and of the F-14's TF30 engine have caused "less [aircraft] availability [than anticipated] and [have] reduced operational rates. . . . We are a factor of two or three beyond the goals in terms of man-hours and maintenance required on those airplanes."

Part of the problem, Dr. Perry suggested, stems from the fact that in the past decade performance of fighter engines was boosted by about fifty percent. While both the F100 and the TF30 met these ambitious goals in terms of thrust-to-weight and fuel consumption, "I think that it is fair to say that we have tried to move too far, too fast, and we are now reaping the penalties. . . . "

Steps to alleviate the problem include a comprehensive Component Improvement Program (CIP) for both the F100 and the TF30 engine. Dr. Perry pegged costs of the two CIP programs through 1984 at $600 million for the former engine and at $700 million for the latter. The F100 CIP goal is to have stall stagnation rates no greater than 0.15 failures per thousand engine flight hours as opposed to 2.2 incidents at present, according to Dr. Perry.

The second element of the Defense Department's response to these engine problems is the F101X development program. Dr. Perry told Congress that the program's purpose is to serve as a "hedge against failure of CIP." The F101X developmental engine is to fit both the F-14 and the F-16 and is to be carried forward "through 100 flight hours on both," he testified. Maj. Gen. W. B. Maxon, Director of Development and Programming, Hq. USAF, told the Committee that the new engine has a lower thrust-to-weight ratio than the F100 and is a "heavier . . . , more heavy-duty, more durable kind of engine."

The new engine can fit the F-16 with only slight modification of the engine mounting rail and can be retrofitted to the F-14, but would require "substantial modifications" for F-15 retrofit. Both the F100 CIP and the F101X would be suitable for new fighter aircraft in the mid-1980s.

The third element of the Defense Department's engine improvement program, according to Dr. Perry, is the Advanced Technology Engine, slated to be available for production in the 1990s. Objective of this long-term program is to increase the thrust-to-weight ratio while decreasing fuel consumption, compared to the best engines of today.

Washington Observations

• First casualty of SALT II may be USAF's proposed synthetic aperture radar (SAR) satellite system that could provide unique and important strategic and theater information. The intelligence community, supported by influential Administration elements, is advocating stepped-up spending for another costly satellite system designed to pick up telemetry data from Soviet ballistic flight tests. With the loss of the US listening posts in Iran, a pivotal issue in the continuing debate about verifiability of the SALT II accord—and by extension, a decisive factor in the Senate's vote on the treaty—telemetry interception takes on unprecedented political and intelligence importance. Congressional sources see evidence that the Administration is yielding to CIA pressures to develop the signal intercept system at an accelerated rate while slowing down the SAR program. For the time being, the CIA has to rely on a DoD system for most of its telemetry interception capabilities. DoD, in contrast, wants to see both systems developed as soon as possible.

• Another sensor system of increasing importance to US intelligence is spaceborne infrared detection. A key reason is the Soviet penchant for decoys. A good-sized factory in Czechoslovakia, for instance, is known to be turning out large numbers of "rubber MiGs" that are used to set up phony airfields on Soviet and Warsaw Pact territory and to deceive US optical sensors in other ways. The Soviets also have created a fleet of decoy submarines for the same purpose. But spaceborne IR sensors—and to some extent radar—won't be deceived by such ruses. Also, spaceborne IR sensors can "read" the state of nuclear power reactors of submarines in port—that is, differentiate between a boat with its reactor in a standby mode, and one that is running up its reactor and thus presumably is getting ready to put to sea. Advance information of this type facilitates subsequent shadowing and other surveillance of Soviet submarines.

IR—so far as aircraft are concerned—has an uncanny ability to look back in time. These sensors read heat signatures and, therefore, under certain conditions can "see aircraft on an airfield hours after they have left. This capability is significant from an operational as well as an intelligence point of view.

• Gen. Bernard W. Rogers, the new Supreme Allied Commander Europe (SACEUR) and former US Army Chief of Staff, warns that in case of a major contingency, the Army would run out of essential manpower in less than 120 days. Even in the case of such drastic "fixes" as inactivating later deploying reserve units to flesh out the Immediately Ready Reserve (IRR) the pool of trained combat troops—especially tank crews, infantry, and artillery—would be inadequate to replace casualties, according to General Rogers.

By 1984 or 1985, the SACEUR predicts, the Army's manpower shortfall will be about 250,000—assuming that corrective measures, either under way or planned, work out as hoped. These "improvements"—expected to produce about 230,000 immediately ready reservists—involve such relatively risky measures as funneling into the IRR over the next few years some 50,000 honorably discharged youths who could not meet required training standards, as well as emergency recall of some 80,000 retirees.

The problem, General Rogers points out, is more than an Army problem, "it is the country's problem," with solutions resting mainly in political and economic spheres.

• Soviet officials participating in the SALT II summit meeting in Vienna disclosed that the USSR is developing three heavy bomber models. None of the aircraft has reached the flight-test stage. It is not known whether the Soviets plan to produce the three types in quantity. One design reportedly resembles the B-1, while another one is optimized as a cruise-missile carrier, according to the Soviet sources. US defense specialists are somewhat skeptical about the Russian "news leak." The US has not "seen" any evidence of two of the three bomber designs. Some congressional experts fear that the new bombers may be Kremlin fabrication to create bargaining chips for gaining future US concessions in other areas of arms control.

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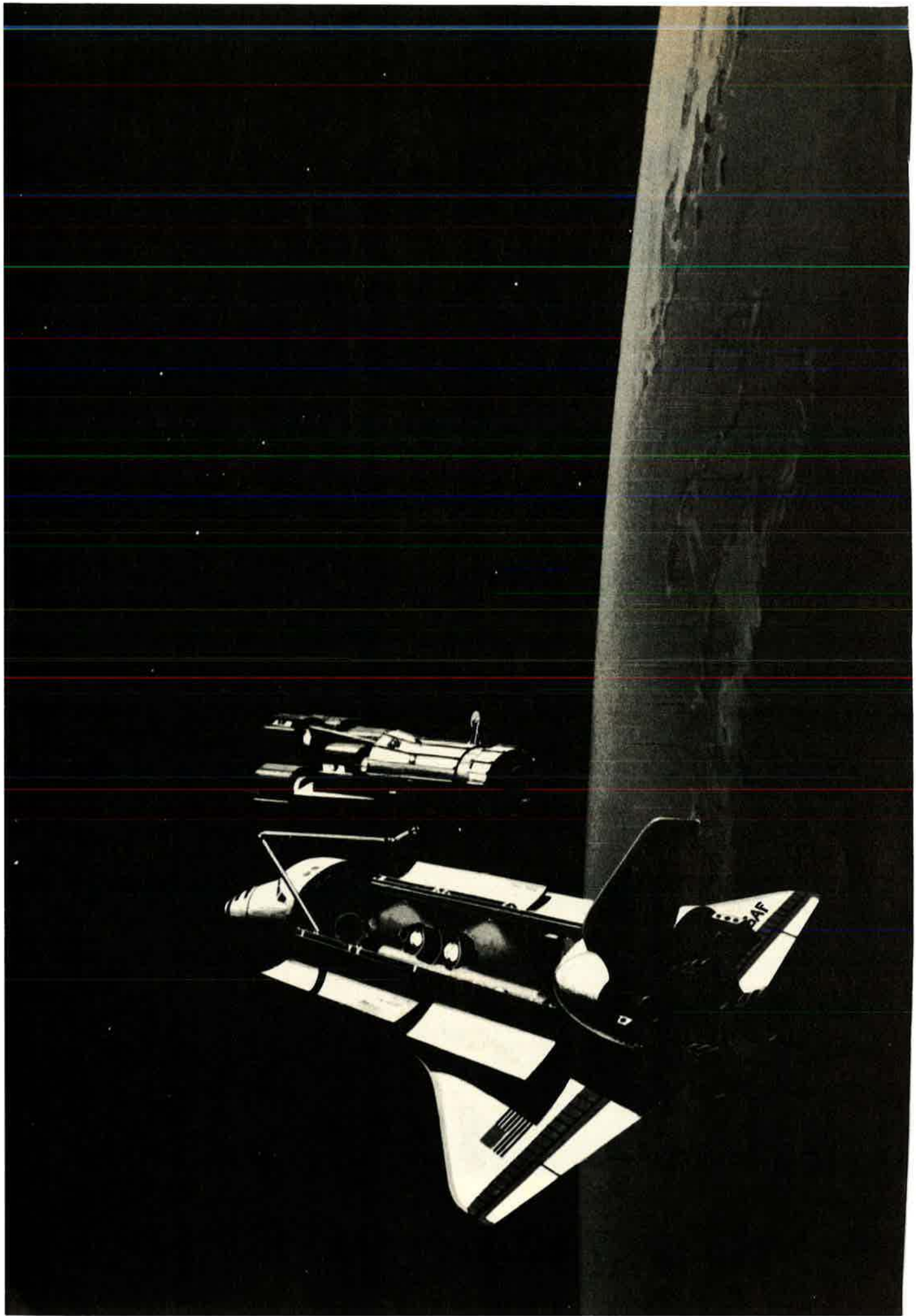

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Aerospace World News, Views & Comments

By William P. Schlitz, ASSISTANT MANAGING EDITOR

Washington, D. C., July 5

★ NASA is planning live television coverage, via domestic satellite, of orbital flight activities during missions aboard the Space Shuttle. The general public could be allowed to tune in on the action, space agency officials said.

During the Shuttle flights, expected to begin in 1980, a closed-circuit TV system will permit astronauts and Mission Control personnel at the Johnson Space Center near Houston to observe satellite ejections and conditions in the Shuttle's cargo bay. Mission Control would also be able to monitor cockpit operations.

Satellite-beamed transmissions are to be received by earth stations in Hawaii, the Johnson Space Center, Edwards AFB, Calif., the Goddard Space Flight Center in Maryland, and a new transmit/receive earth station currently under construction at the Kennedy Space Center in Florida. These will be operated by RCA Americom, a private company involved in various NASA communications activities.

The earth stations in turn will be able to provide high-quality transmissions through NASA's communications net to other space agency facilities and to commercial broadcasters.

★ SAC KC-135 Stratotankers are to begin arriving at RAF Fairford, UK, in September. They'll be the first A Force planes stationed there sinc 1964, when the base was a SAC B- installation.

The move to open RAF Fairford f USAF use stems from a Novemb 1978 decision by the British gover ment. The base first opened January 1944 and in June of that ye paratroopers were airlifted from the for the drop on Normandy.

USAF plans a gradual buildup personnel at the base over the ne few months to a fully operational tot of about 1,150. SAC's 11th Strateg Group under command of Col. Clyd Dunn will direct tanker operatio from the base.

★ Under a joint US/West Germa venture, the Air Force has initiate another step toward development of defense-suppression mini-dron weapon system for deployment b German and US forces in the 1980s.

Two contractors—General Dy namics of Pomona, Calif., and Texa Instruments, Dallas, Tex.—have bee selected to design, develop, an flight-test passive radio frequenc homing sensors for the unmanne Low Cost Expendable Harassmen Vehicle, or "LOCUST."

Also, according to AFSC' Aeronautical Systems Division Wright-Patterson AFB, Ohio, tw

Brothers in arms: These Canadian Forces CF-5 fighters are equipped with pods (note left wingtips) tying them into the Air Combat Maneuvering Instrumentation system. ACMI, built by Cubic Corp.'s Defense Systems Division, allows pilots to engage in mock dogfights while instructors monitor their performance. Canada is considering acquisition of the system.

ontractors will be named before ear's end to design, develop, and st the air vehicle subsequent to a yoff competition. This phase would lso include the integration of sen-ors and associated launch-support quipment.

Because of the international as-ects of the LOCUST proposal, US ompanies planning to submit pro-osals must have a contingency orking agreement with a lead sub-ontractor in West Germany, ASD of-cials said.

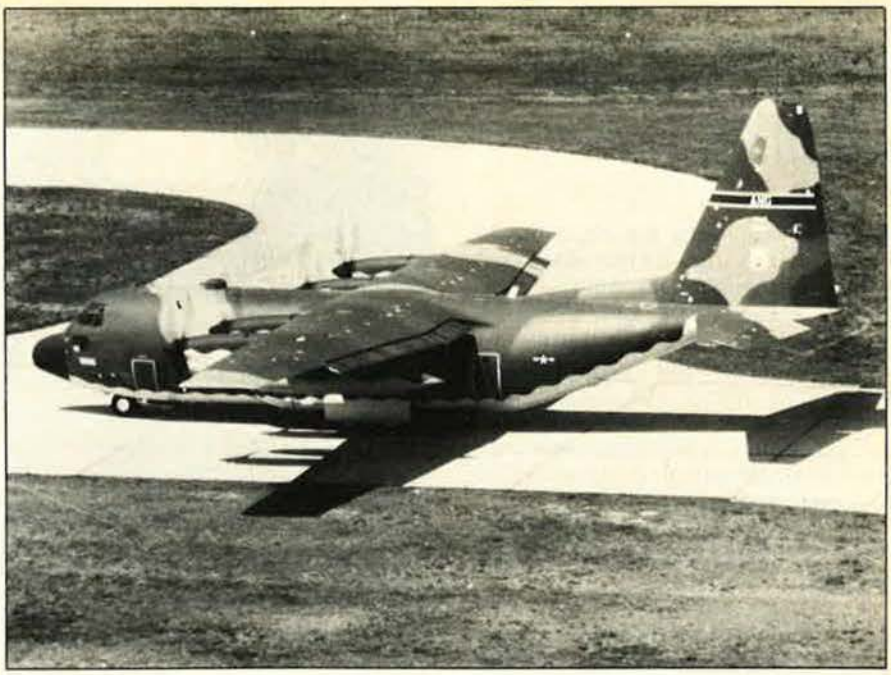
Aircraft deliveries in the news:

• The first operational V/STOL ghter for maritime use—the UK's ea Harrier—was turned over to the oyal Navy in mid-June. The Sea Har-er is a development of the AV-8A arrier in the inventories of the RAF, SMC, and the Spanish Navy. With ritain's last conventional aircraft arrier, *Ark Royal*, having been retired st year, the Royal Navy plans to op-rate Sea Harriers from smaller, less-xpensive ships. Two other Harrier ersions are currently in the works: ne "big-wing" Harrier for the RAF nd the AV-8B for USMC. British erospace and McDonnell Douglas re building the respective Harriers.

• The first UH-60A Black Hawk elicopters were turned over to the JS Army's combat-ready 101st Air-orne Division (Air Assault) at Fort Campbell, Ky., also in mid-June. Subsequently, the first eleven Black Hawks were grounded for a short time ecause of a suspected control-nechanism problem.) The Sikorsky-uilt Black Hawk is a utility tactical ransport designed to carry eleven ully equipped troops plus a crew of hree, with additional missions of nedical evac, resupply, and external ift. The Army plans to deploy 1,107 of he aircraft in the years ahead.

• Equipped with state-of-the-art vionics and electronics, four new ockheed-Georgia Co. C-130H Her-ules were delivered to the Oklahoma ir National Guard in late June, the irst Air Guard unit to receive new ransport aircraft directly from the actory. A total of eight each in the FY 78, FY '79, and FY '80 Defense udgets have been approved by the ongress. *(For a status report on the SAF's Reserve Forces, see p. 82.)*

A joint program for the develop-ent of a new bomb rack for Air Force nd Navy use is now under way. Man-gement of the Multiple Stores Ejec-r Rack (MSER) is the responsibility the Armament Development and Test Center's Munitions System Program Office at Eglin AFB, Fla.



This C-130H prepares to depart the Lockheed-Georgia Co. factory at Marietta for Oklahoma City's Will Rogers Airport, home base of the Oklahoma Air National Guard's 137th Tactical Airlift Wing. That unit became the first to be equipped with factory-new transport aircraft. See adjacent item.

The MSER's high ejection velocity will allow bombs to clear the aircraft's wake quicker and with less disturbance, and improve accuracy by assuring stable vertical ejection throughout the spectrum of aircraft operations, officials said.

MSER will also reduce the time required to rearm aircraft, increase reliability, and reduce maintenance. The new rack will allow a secondary, gravity-release mode at the pilot's discretion, not possible with current bomb racks.

Scheduled for production in 1981, the MSER will initially be installed on USAF's A-10 and F-16 aircraft and will be compatible with the F-15.

Designed to withstand catapult takeoffs and arrested landings, the MSER is to equip Navy's F-18 and USMC's AV-8B Advanced Harrier. The new rack will be capable of releasing munitions at speeds up to 1,000 mph.

★ In June, the world's first at-sea power plant using seawater's thermal differences to produce electricity began operation in Hawaii.

Called Mini-OTEC (for Ocean Thermal Energy Conversion), the fifty-kilowatt plant mounted on a modified barge on the island's west coast will use warm surface water and cold subsurface water to vaporize and condense ammonia in a closed system to power a turbine generator.

The project, funded by the state of Hawaii, Lockheed Missiles & Space Co., and Dillingham Corp., is intended to point the way toward commercial applications and "is an important step toward finding supplemental sources of benign, nonpolluting energy," officials said, stressing that such systems "could play an important role in the energy economy of tropical islands in the foreseeable future."

Engineers believe that if scaled up to, say, 200 megawatts, OTECs could provide the electrical needs of a city of 200,000. Lockheed designed and built Mini-OTEC's power plant, while Dillingham accomplished the barge modification and assembly.

★ The US and the United Kingdom have initiated full-scale development of the JP-233 advanced airfield attack munitions, designed "to put an airfield out of commission and keep it that way for a while."

The program is unique in that it is believed to be the first in which USAF is a partner in developing a major weapon system "with virtually all the work being done in another country." It is also heralded as a premier example of the US commitment to NATO standardization and interoperability of military equipment.

Aerospace World

JP-233 munitions are expected to be in the inventory by the 1980s and will be available for use against such targets as roads and rail nets as well as to suppress operations at enemy airfields. The JP-233 system will be compatible with F-111, British Tornado, and other NATO aircraft.

The program is being managed by a joint Anglo-American program office in London, the American team of which is from USAF's Armament Development and Test Center, Eglin AFB, Fla.

★ When a British Science Research Council satellite was sent into orbit on June 2, it marked the last planned orbiting mission from Wallops Flight Center, Va.

For the Wallops center, it was the forty-first Scout launch and the nineteenth orbiting mission. NASA is expected to continue high-altitude rocket probes for weather and other research at the center, but no other orbiting missions are planned at the Virginia facility.

The British satellite was put into orbit at 7:26 p.m., after a one-week delay attributed to equipment deficiencies and a twenty-six-minute hold for weather.

The Scout, developed and produced by Vought Corp. of Dallas, has been in use over the past two decades for unmanned space probes and orbital missions. The busiest of the space agency's stable of launch vehicles, the Scout has now launched 100 payloads.

Among Scout orbital missions have been twenty-five for NASA, thirty-four for DoD, and twenty-two for other nations, including British, Dutch, French, German, Italian, and European Space Agency satellites. In addition, Scouts have been used for seven high-altitude probes and twelve reentry tests.

Launch sites at Wallops, Vandenberg AFB, Calif., and Ngwana Bay in Kenya have allowed Scout to be used to launch payloads over a wider range of orbital inclinations than any other launch vehicle.

Since development of Scout in 1958, the craft has evolved into a four-stage, solid-propellant vehicle capable of placing 130-pound (59 kg) payloads into 300-mile (483 km) orbits. Scout is also the US's most reliable launch vehicle, with a ninety-five percent success story. It holds the world record for thirty-seven consecutive successful launches.

Maj. Gen. William C. Norris (second from left), Third Air Force Commander, meets with three newly appointed F-111 squadron commanders, from left, Maj. John R. Harris, Lt. Col. Albert S. Dodd III, and Lt. Col. William E. Collins. Colonels Dodd and Collins have become the first Air Force navigators to command tactical fighter squadrons in Europe.

★ Probably the longest continuing scientific investigation in history began with the launch of Pioneer-10 in March 1972. In December 1973, the spacecraft returned the first closeup views of Jupiter, whose gravity was used to put Pioneer-10 on a trajectory to escape the solar system.

But first, Pioneer-10 went on to cross Saturn's orbit in February 1976 and that of Uranus—the seventh planet from the sun—this past July. Next, the craft heads for Neptune and on to the expected limit of its radio communications when it crosses Pluto's orbit in 1987.

Pioneer-10 will thereafter leave solar-influenced space for a possible endless journey into interstellar space.

For its part, Pioneer-11 gave man the first look at Jupiter's polar regions, not visible from earth, in De-

During recent change of command ceremonies at Scott AFB, Ill., from left, Gen. Lew Allen, Jr., USAF Chief of Staff; Gen. William G. Moore, Jr., who retired as Military Airlift Command Commander in Chief; and Gen. Robert E. Huyser, the new Commander in Chief of MAC.

cember 1974. Now on course for Saturn, Pioneer-10's twin will encounter the planet in September, the first spacecraft to do so. Pioneer-11 will send back the first photo images of Saturn's rings.

Then, on a trajectory nearly opposite that of Pioneer-10, it, too, will head into interstellar space.

★ This year, between July 28 and August 4, an estimated 12,000 aircraft and 350,000 people will congregate at Wittman Field in Wisconsin for Oshkosh '79"—"the largest annual aerial event in the world."

During that time Wittman is the scene of more aviation activity than any other airport in the world.

While general aviation predominates at the meet, since a sponsor is the Experimental Aircraft Association it is not surprising that a lot of very original aircraft are on hand.

Scheduled to make demonstration flights this year, and of more than passing interest, is Californian Larry Mauro's *Solar Riser.* The *Riser* has 300 solar cells implanted in the wings, which feed a battery that drives a four-horsepower engine.

Mr. Mauro, president of a company known as Ultralight Flying Machines, has also converted one of his *Easy Riser* aircraft as the first to fly on alcohol. The grain alcohol is produced from a solar still that yields five gallons a day. Alcohol burns cleaner than aviation fuel, doesn't pollute, generates more horsepower, and can be mixed with water.

In case you're wondering, the two planes have already been dubbed *Sunshine* and *Moonshine.*

And this year Cleveland will celebrate the fiftieth anniversary of the National Air Races with a week-long span of aviation activities highlighted by the city's annual National Air Show Labor Day Weekend at Burke Lakefront Airport. This airshow, which attracts more than 200,000 visitors, will feature the International Women's Air Derby, the Great American Balloon Race, and the USAF Thunderbirds, among other events.

★ There are pilots, and then there are *some kind* of pilots. One of those *some kind* of pilots is Lt. Col. John J. Lydon, currently of the 388th Tactical Fighter Wing, Hill AFB, Utah.

Despite an accident as a youngster that caused a hearing impairment, Colonel Lydon joined the Air Force and kept plugging away until he passed his flight physical. It took him three years. In the twenty-plus rated years since, he's logged more than 6,000 accident-free hours in fighters, about twice the average number of hours for that time span. He totaled 350 combat missions in Southeast Asia. Among his decorations, Colonel Lydon has been awarded two Distinguished Flying Crosses and twenty-three Air Medals. Throughout his flying career Colonel Lydon has applied a simple but sound philosophy: "I approach every mission as though it were my first."

★ The International Civil Aviation Organization, a UN agency that administers large-scale technical assistance programs in many developing countries in Africa, Asia, Latin America, and the Mideast, is interested in recently retired Air Force personnel.

Seems ICAO has a continuing need for expert, experienced aviation technical and economic specialists for short- and intermediate-term assignments to those areas.

In the next six months, ICAO plans to hire 170 such specialists having academic degrees or equivalent professional qualifications with a minimum of ten years' practical aviation experience, five of it in the specific specialization. There is no upper age limit if health is unimpaired.

Salaries range from $28,000 to $44,000, plus other benefits including cost-of-living allowances.

Positions range from engineers to air and ground instructors.

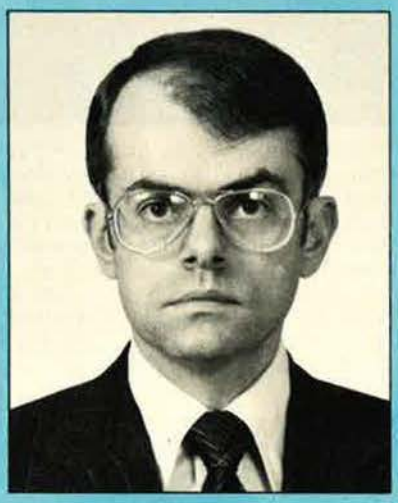
Send résumés and queries to: Technical Assistance Bureau, Recruitment, International Civil Aviation Organization, 1000 Sherbrooke St. West, Montreal, Quebec, Canada H3A 2R2.

★ The eighth annual Bishop Wright Air Industry Awards, named for the father of the famous brothers, were

MAJOR TOWNSEND JOINS MAGAZINE STAFF

Maj. Gene E. Townsend has joined the AIR FORCE Magazine staff as a Contributing Editor under USAF's Education With Industry program. In his last assignment, Maj. Townsend was Chief of the Plans Branch for the Public Affairs Office, United Nations Command/United States Forces, Korea. Graduating from the University of Utah with a B.S. degree in Journalism in 1966, he was commissioned the same year through the university's ROTC program. Major Townsend earned an M.A. in Business Management and Supervision from Central Michigan University in 1977. He recently joined the married ranks, wedding the former Jean Burg of Gambrills, Md. Major Townsend replaces Maj. Charles G. Tucker, who has been assigned to the Air Force Military Personnel Center (Palace INFO) Career Management Staff, Randolph AFB, Tex.

A former information staff officer who served with AIR FORCE Magazine under the EWI program in 1975–76, Robert G. H. Carroll III, was recently named Director of Public Relations for Sikorsky Aircraft Division of United Technologies Corp., Stratford, Conn. Previously Manager of Public Relations, Mr. Carroll will be responsible for overall direction of the division's external and internal communications, including press relations, photographic services, and advertising.



Townsend

Carroll

Aerospace World

presented at recent ceremonies at John F. Kennedy International Airport in New York.

The awards honor outstanding individuals, without regard to race or religion, who have distinguished themselves in the air industry by humanitarian goodwill, courage, and love and concern for their fellow men.

The 1979 recipients:

• **Arthur Godfrey,** the entertainer who is also a veteran pilot. A distingulshed newscaster and old friend who is also a pilot, Chuck Scarsborough, presented the award.

• **Miss Jerrie Cobb,** the first woman to complete NASA's Mercury astronaut test who holds all pilot ratings and has logged 20,000 flying hours. During the last twelve years, Miss Cobb has devoted herself and her airplane to filling the needs of the less fortunate throughout the Amazon basin. Mrs. Doris Renninger, General Manager of NYC's Wings Club and the first licensed helicopter pilot in New York State, presented the award to her old friend.

• **Kimball J. Scribner,** recently retired after a flying career of thirty-six years with Pan Am during which he logged 27,000 flying hours. Captain Scribner is a Trustee of Embry-Riddle Aeronautical University, Chairman of its National Advisory Council, and founder of its Wallace Research Center. Former AFA Board Director Herbert O. Fisher, once a Curtiss-Wright chief test pilot and now a retired airport executive, made the presentation.

• **Mrs. Ida Van Smith,** founder of Flight Clubs, Inc., for Long Island children, who has brought aviation to many minority groups. Chaplain Thomas Flanagan of JFK Airport's Catholic chapel made the presentation.

• **Henry V. Molle,** Vice President of Airline-Aerospace Employees Local 732, who has been active in the airline industry and its labor movement for thirty years. The local's Secretary-Treasurer, William F. Genoese, presented the award.

★ **NEWS NOTES—Northrop Corp.,** Hawthorne, Calif., was awarded an $850.7 million contract for training,

At recent Pentagon ceremonies, Air Force Chief of Staff Gen. Lew Allen, Jr., presents the Cheney Award for heroism to Capt. Christopher C. Soto, of the 562d Tactical Fighter Squadron, 35th TFW, George AFB, Calif. An electronic warfare officer aboard an F-105G fighter, Captain Soto was able to get out quickly when the aircraft crashed on takeoff in April 1978. Realizing that the pilot was trapped in the cockpit, and despite the danger of potential exploding fuel and munitions, he unhesitatingly returned to the aircraft, raised the canopy, and helped the pilot to safety. Captain Soto's quick thinking and disregard for his own safety were responsible for saving the life of the pilot. The award, named for the first American casualty in Italy in World War I, is presented annually to an active or Reserve USAF member.

Jack Withers 1929–1979

Jack Withers, a permanent National Director of the Air Force Association, died on June 20—just three days before his fiftieth birthday—at the Kettering Medical Center in Dayton, Ohio. Surviving are his widow, Kitty, a son, Steve, two daughters—Kathy and Leslie—his mother, Mrs. Helen Belatti of Oklahoma City, and twin sisters—Caron Bartlett of Amarillo, Tex., and Sharon Johnson of Carbondale, Ohio.

A dedicated member of AFA since 1947, Jack was an organizer and the first President of AFA's Robert H. Goddard Chapter at Vandenberg AFB, Calif. He later served as California State AFA President, as an elected National Director, and, after moving to Ohio, as Vice President for AFA's Great Lakes Region.

He was named "Man of the Year" for the California State AFA in 1966, and for Ohio State AFA in 1974.

A member of the Board of Trustees and a Jimmy Doolittle Fellow of the Aerospace Education Foundation (AFA's education affiliate), he was a staunch supporter of that organization and its program of providing Air Force-developed courses to high schools and community colleges.

In keeping with his dedication to the Foundation, his family requested that in lieu of flowers, friends make memorial contributions to the Foundation in Jack's name. Nothing they could have done would have pleased Jack more.

—D. W. S.

maintenance, and supply services in support of **Royal Saudi Air Force F-5 aircraft** over a three-year period.

The restoration and storage area of the **Air Force Museum,** Wright-Patterson AFB, Ohio, is to be **open to public tours** by small groups each Friday. For reservations, call (513) 255-3284 after 10:00 a.m. on the Saturday prior to the tour.

Physician assistants and primary-care nurse practitioners at Cannon AFB, N. M., are **now serving as medical officers of the day** in the hospital emergency room in a TAC test program. Providing routine care, they are backed up by a physician on call during each shift.

A Soviet unmanned spacecraft—**Progress-6**—that had completed a resupply mission to orbiting space station Salyut-6 **burned up on reentry** in early June.

MAC has been named recipient of the Public Relations Society of America's **Silver Anvil award** for its 1978 program publicizing the Command's thirtieth anniversary. The program was conducted by MAC information personnel in the US and Germany and supervised by MAC Director of Information Lt. Col. Louis A. Torraca, Jr. MAC was the only military organization so honored this year.

A computerized battlefield training system featuring 288 moving targets has been developed and installed at Fort Benning, Ga., to provide **simulated combat experience** for Army infantrymen. The system, the work of Sperry Rand Corp.'s Sperry Division and known as the Infantry Remoted Target System (IRETS), is currently undergoing operational and development testing at Benning's Infantry Center.

Died: J. Blaise deSibour, who helped establish AFA's insurance programs, of a stroke in Washington, D. C., in June. He was seventy-three.

Died: Gen. Reinhard Gehlen, the legendary spymaster who was Hitler's expert on the Soviet Union during WW II and then worked for the US and West Germany during the cold war, of cancer at his home near Munich in June. He was seventy-seven. ■

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Lifting off the runway, the U.S. Air Force F-16—one of the world's most advanced fighter aircraft. On its wingtips, the Sidewinder AIM-9L—the free world's most advanced short-range air-to-air missile. Together, they make up a first line airborne defense team. The AIM-9L is already operational on the F-15 and F-14 and is a firm requirement for the Navy/Marine Corps F-18.

As a prime industrial support contractor for Sidewinder AIM-9L, Raytheon is currently in full rate production on the missile's guidance and control section. We are also providing technical assistance to a European consortium—led by the Federal Republic of Germany—that will produce the AIM-9L for use by several NATO nations.

Designed by the Naval Weapons Center, this newest Sidewinder features substantial improvements in maneuverability, guidance, accuracy, and lethality. Its all-aspect IR capability provides for early acquisition and first-launch opportunity against targets in close air-to-air combat. Over 18,000 hours of MTBI and captive flight testing have demonstrated t system's design reliability.

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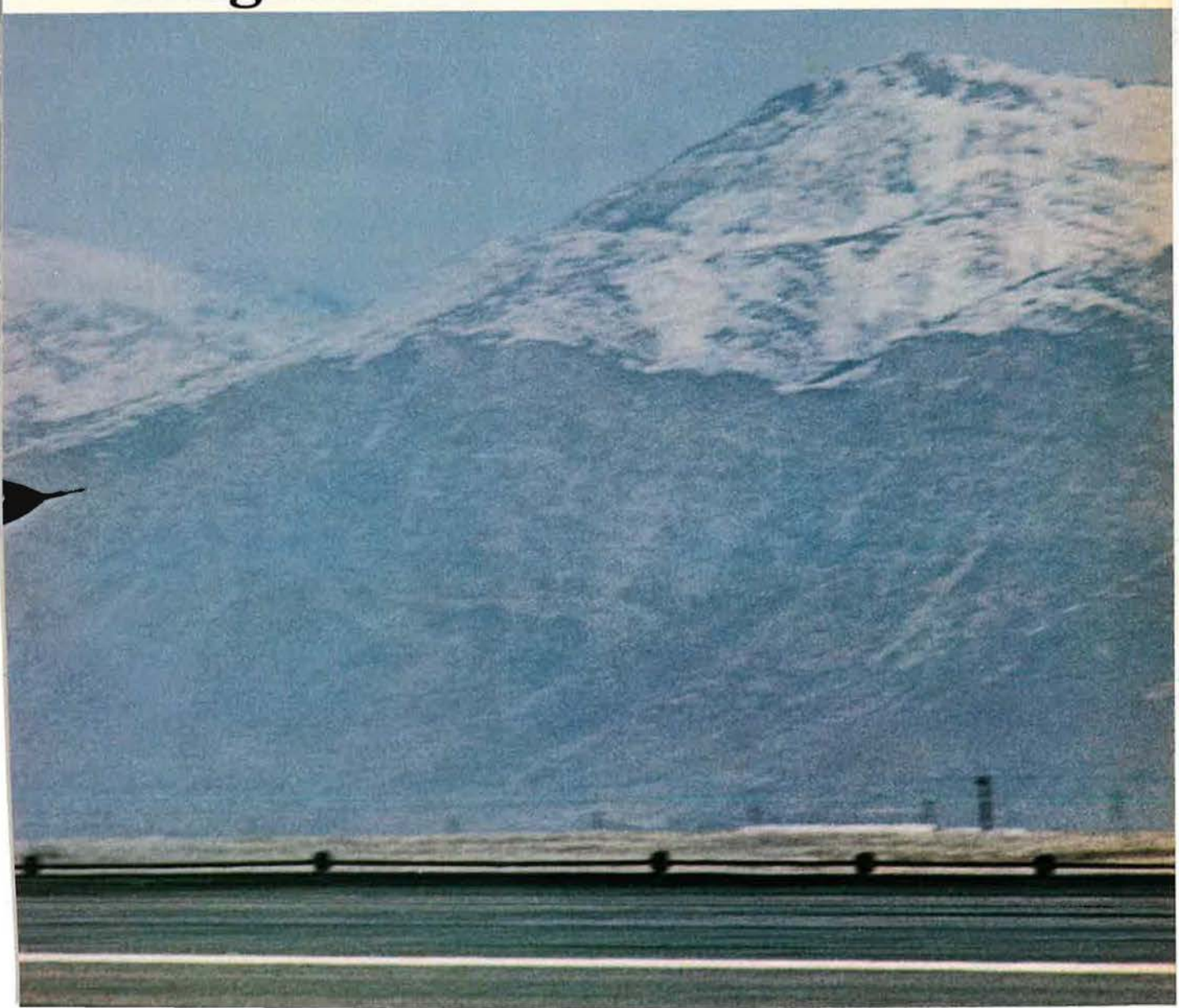

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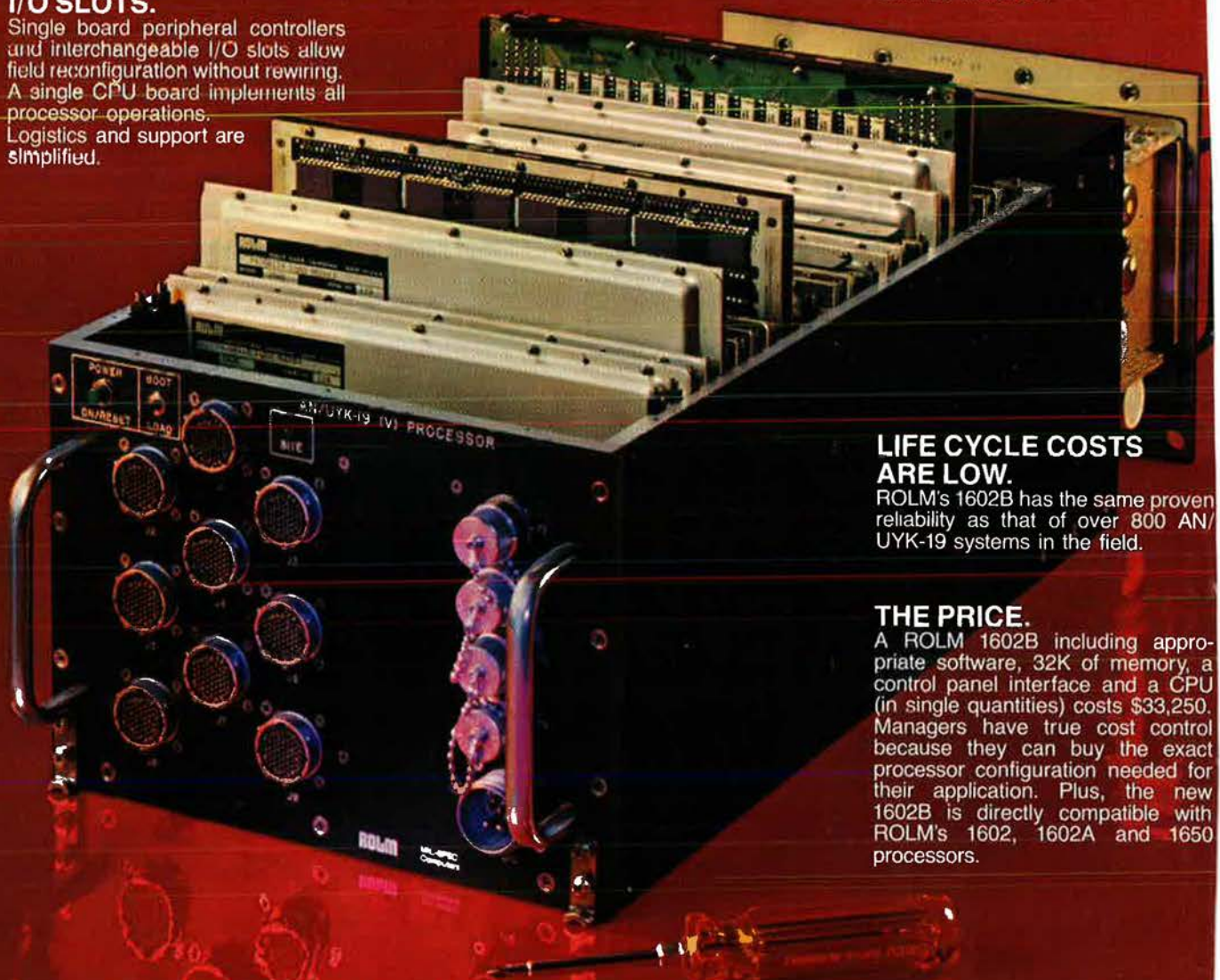

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Capitol Hill

Washington, D. C., June 22

FY '80 Defense Authorizations

By a vote of eighty-nine to seven, the Senate, on June 13, passed its version of the FY '80 Defense Authorization Bill. The bill totaled some $40.1 billion, about $37 million less than the Administration's request. Sen. John C. Stennis (D-Miss.), Chairman of the Senate Armed Services Committee, said that as a result of recommended changes in manpower strengths and policies, a further saving of about $53 million was expected. This would make the bill as passed by the Senate about $90 million below the President's request.

Manpower and Personnel Actions

• **Health Professional Scholarship Program:** The bill, as approved by the Senate, provides for an annual cost-of-living increase for recipients of stipends under the Armed Forces Health Professional Scholarship Program (AFHPSP). It is anticipated that the first cost-of-living adjustment would bring the AFHPSP monthly stipend into line with the National Health Scholarship Program (currently $455 per month). This action would make the AFHPSP competitive in seeking medical personnel.

• **Dependents Overseas:** During consideration of the bill, Chairman Stennis expressed his growing concern about the number of military dependents overseas. He pointed out that while the number of military personnel overseas has decreased by 33,000 over the past ten years, the number of dependents has increased by twice this number.

The Senate upheld the Armed Services Committee recommendations in this matter and agreed to the following: (1) to discontinue payment to junior enlisteds for travel of dependents, household goods, and automobiles; (2) to deny the Army's request for 300 additional civilians in Europe and to reduce by 200 the number of military and by 2,500 the number of civilians involved in overseas dependent community support; (3) to increase by 500 the number of Army personnel to test the effects of an eighteen-month unaccompanied overseas tour; and to direct DoD to reduce the number of overseas dependents by ten percent during FY '80 and by thirty percent by the end of FY '84. *(See also "AFA Believes . . . ," p. 109.)*

Weapon Systems

• **MX:** In other action, the Senate approved the $670 million being sought for full-scale development of the MX missile and basing system. Included in the bill is language requiring that the Secretary of Defense report to both houses of Congress on the final characteristics of the program. This report is due by October 1. For sixty days after submission of the report, no funds may be obligated or expended. During this time, disapproval of the report by either the House or Senate would mean that none of the funds could be obligated or expended during FY '80.

While the House bill recommends approval of the $670 million requested for full-scale development of MX, the bill as reported by the House Armed Services Committee contains somewhat different language from that approved by the Senate.

The House has directed that the Secretary of Defense proceed with full-scale engineering development of the Multiple Protective Structure (MPS) basing mode concurrently with full-scale engineering development of the MX missile, "unless or until the Secretary of Defense certifies that an alternative basing mode is militarily or technologically superior or more cost-effective than MPS, or the President informs Congress that MPS is not consistent with US national security interests." Differences in the two bills undoubtedly will have to be worked out during conference.

• **AWACS:** In upholding the recommendation of the Senate Armed Services Committee, the Senate voted to approve the $246 million for acquisition of three new E-3A AWACS aircraft. Also included in this amount are funds for refurbishing three RDT&E aircraft. This will bring to twenty-eight the number of US AWACS aircraft.

In other action, however, the Senate denied advance procurement funding for additional AWACS aircraft on the basis that these aircraft were not necessary in view of NATO's recent decision to procure eighteen AWACS, as well as eleven British-built Nimrod airborne warning and control aircraft.

• **Strategic Satellite System:** The House Armed Services Committee has recommended a $51.4 million cut in the Air Force Satellite Communications System, specifically the Strategic Satellite System (SSS). In making its recommendation, the HASC said development of an SSS should be deferred until Air Force studies are further advanced and the Army and Navy have been more fully consulted. The committee also expressed its concern that, prior to developing a new satellite, the command control and communications requirements of all services be harmonized and that the new system be survivable.

The Senate reduced the $70.6 million request by only $10 million, but requested DoD to review all strategic communications programs and to develop a plan for a survivable system. If the House recommendations are upheld on the floor, then the issue will have to be resolved in conference.

Zimbabwe/Rhodesia

The Senate's decision to include an amendment to the FY '80 Authorization Bill mandating the end of economic sanctions against Zimbabwe/Rhodesia could once again result in a Presidential veto of the bill.

Supplemental Authorization

The FY '79 Defense Supplemental Authorization bill, which cleared the Senate earlier this month, was approved by the full House on June 21, and is on its way to the President for signature.

The bill, which totals $2.02 billion, is some $17.8 million less than requested.

The Air Force share of the Supplemental—$298.8 million—includes $45 million for aircraft procurement and just over $253 million for research, development, test, and evaluation.

The RDT&E funds include the $190 million requested for developing the MX missile and MPS basing mode, but the $75 million being sought for further study of an airmobile basing system was deleted during conference. ■

Secretaries Mark, Chayes, Hermann Nominated for Top USAF Posts

BY BONNER DAY, SENIOR EDITOR

ON June 21, President Carter announced the nomination of Dr. Hans Mark as Secretary of the Air Force. Dr. Mark had been Under Secretary from July 1977 until the resignation of Air Force Secretary John Stetson in May, when he became Acting Secretary.

The President also nominated Antonia Handler Chayes, the Assistant Secretary of the Air Force for Manpower, Reserve Affairs and Installations, to be Under Secretary; and Robert J. Hermann, Deputy Under Secretary of Defense for Communications, Command, Control and Intelligence, to be Air Force Assistant Secretary for Research, Development and Logistics, replacing Dr. John J. Martin, who recently resigned that post.

These personnel changes in the Air Force Secretariat have not altered the priorities outlined earlier this year in Air Force testimony before Congress. Dr. Mark's emphasis is consistent with the enduring concerns that the Air Force leadership holds about the future. However, he has articulated those concerns in precise and cogent language.

For example, Dr. Mark identified the three major priorities that will dominate Air Force thinking and action in the coming years. The highest priority is the modernization of USAF strategic deterrent forces. Dr. Mark stated, "It is imperative that *new* first-line weapons be developed promptly to replace our aging missile and bomber forces. It is equally important for us to be imaginative in defining what these weapons should be. Our thinking should not be too rigidly attached to notions or concepts that may have been good twenty years ago, but that no longer work today."

Another priority area identified by Dr. Mark is the enhancement of military airlift capabilities. Here he noted that "development and modernization of both tactical and strategic airlift forces are needed if we are to meet our responsibilities around the world." Dr. Mark also spoke of maintaining the traditionally strong connection between military- and civil-aviation technology as a crucial element in the development of more capable airlift forces for the future.

Finally, Dr. Mark listed the expansion of Air Force activities in space as an important priority he would push during his term as Secretary of the Air Force. The Secretary spoke of the "increasing importance of military operations in space strategic reconnaissance" for the monitoring and verification of strategic-arms-limitation agreements and for strategic indications and warning functions. He said the Air Force can play a vital role in these critical national security tasks.

Beyond the major program priorities outlined by Dr. Mark, it is clear that he will place a strong emphasis on military manpower, including compensation programs. The Secretary says he intends to be a "point man" on "pushing for adequate military pay and otherwise ensuring appropriate benefits for our military professionals."

Dr. Mark, who was born in Germany in 1929 and came to this country in 1940, began his professional career as a research physicist at the University of California, first at the Berkeley campus and later at the university's Lawrence Radiation Laboratory.

In 1958, he began a two-year term as assistant professor of physics at MIT, then returned to the Lawrence Radiation Laboratory to head the Experimental Physics Division. From 1964 to 1969, he served as chairman of the Department of Nuclear Engineering and Administrator of the Berkeley Research Reactor.

In 1969, Dr. Mark was named head of the Ames Research Center, where he managed the Center's research and applications work in aeronautics, space science, life science, and space technology. While at the Center, he continued his association with the academic community, first as a lecturer in applied science at the University of California, Davis campus, and later as a consulting professor of engineering at Stanford University.

Dr. Mark also has been a science consultant to a number of governmer organizations and officials, includin the Institute for Defense Analyses, th National Science Foundation, the U Air Force Scientific Advisory Board Vice President Rockefeller, and th Defense Science Board.

His contributions to science include work on the precise determination o the wavelengths of gamma rays, on the development of X-ray astronomy, anc on nuclear instrumentation.

Dr. Mark and his wife, the former Marion G. Thorpe, have two children.

As Under Secretary, Dr. Chayes expects to continue to play a special role in reserve affairs, international relations, personnel matters, and weapons procurement. She also plans to serve, at Dr. Mark's suggestion, as his "alter ego." Says Ms. Chayes: "I plan to cover the waterfront."

Secretary Chayes views military readiness as the top Air Force priority. "My job is to help convince Congress what the readiness requirements are," she said in a recent interview.

Dr. Chayes says she hopes "to take whatever role is needed" to get a new intercontinental ballistic missile approved by Congress. She also thinks "it is important that we continue the research and development of manned bomber programs as we have planned in the President's budget."

Dr. Chayes was appointed Air Force Assistant Secretary for Manpower, Research Affairs and Installations in July 1977. She was born on July 21, 1929, in New York City. A graduate of Radcliffe College with a BA in government, she earned *magna cum laude* and Phi Beta Kappa honors. She attended the Yale Law School from 1949 to 1951 and ir 1953 finished her legal education a George Washington University.

Dr. Chayes served as a member o President Kennedy's White House staf in 1961, and in 1962 was named a di rector of the President's Committee or the Status of Women.

After a one-year term as a Phillip Foundation Fellow in academic ad ministration in 1963, she was a socia science advisor for the National Inst

ute of Mental Health. In 1966, she was appointed Director of Education and Urban Development for the Action for Boston Community Development Agency.

From 1968 to 1972, Dr. Chayes was an associate professor and Dean at Jackson College of Tufts University. She was law clerk for Judge Charles E. Wyzanski, 1972–73, and a partner in the Boston law firm of Csaplar and Bok prior to her appointment as an Air Force assistant secretary.

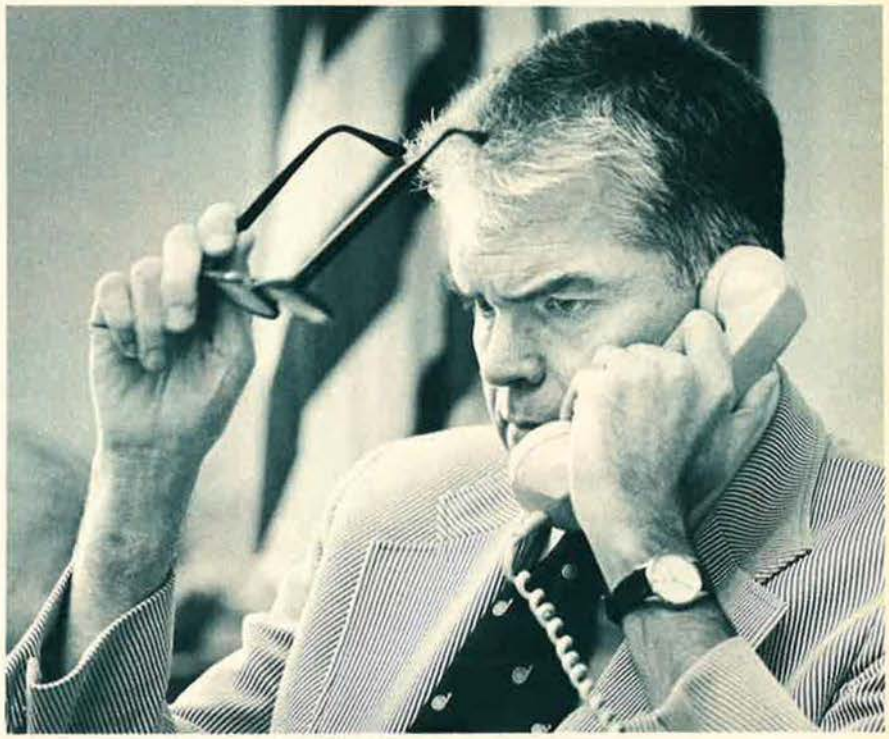
Secretary Chayes and her husband, Dr. Abram Chayes, a professor of law at Harvard University, have five children.

Dr. Hermann, as Air Force Assistant Secretary for Research, Development and Logistics, will be working closely with Secretary Mark in supervising the nation's intelligence satellite program, of which the Air Force is the executive agency.

Born in Sheldahl, Iowa, on April 6, 1933, Dr. Hermann received a BS degree from Iowa State University in 1954. He served in the US Air Force from July 1955 to June 1957 and was assigned duties as an electrical engineer at the National Security Agency. Following military service, he returned to Iowa State University, where he taught in the Electrical Engineering Department while earning a doctorate in engineering.

In 1962, Dr. Hermann returned to the National Security Agency as a member of the NSA fellowship program. By 1965, he had become chief of the Office of Systems Engineering. In 1969, he was appointed Deputy Assistant Director, NSA, for Science and Technology. In 1973, Dr. Hermann was named deputy director of NSA Research and Engineering. The following year he was appointed special assistant to the NSA Director to study signal intelligence. In 1975, he became special assistant for strategic warning and combat information systems to Gen. Alexander Haig, Supreme Commander of Allied Forces in Europe.

Dr. Hermann is married to the former Darlene Lowman. They have two children. ■



Dr. Hans Mark (top) has been nominated for Air Force Secretary, Dr. Antonia Handler Chayes (left), for Under Secretary, and Dr. Robert J. Hermann, for Assistant Secretary for Research, Development and Logistics.

Real-time airborne data processing...

With an IBM system on the E-3A Sentry, the big picture gets a sharper focus.

IBM

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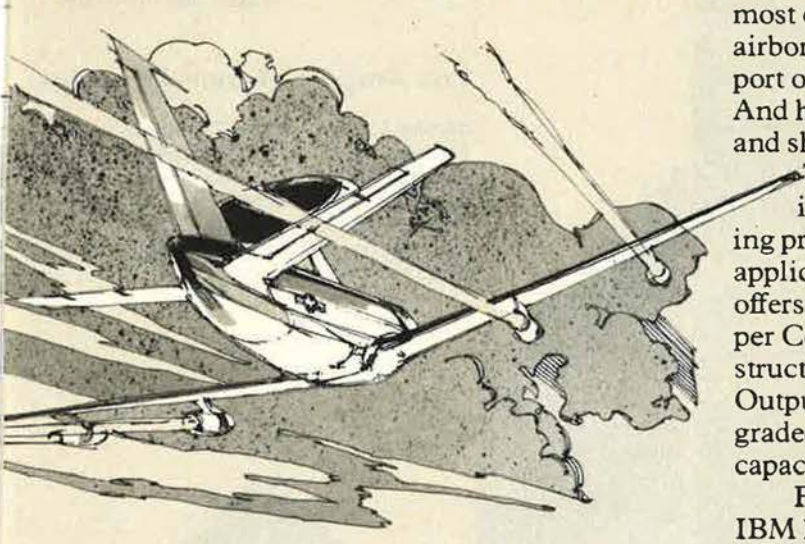

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SAMSO'S 25TH ANNIVERSARY

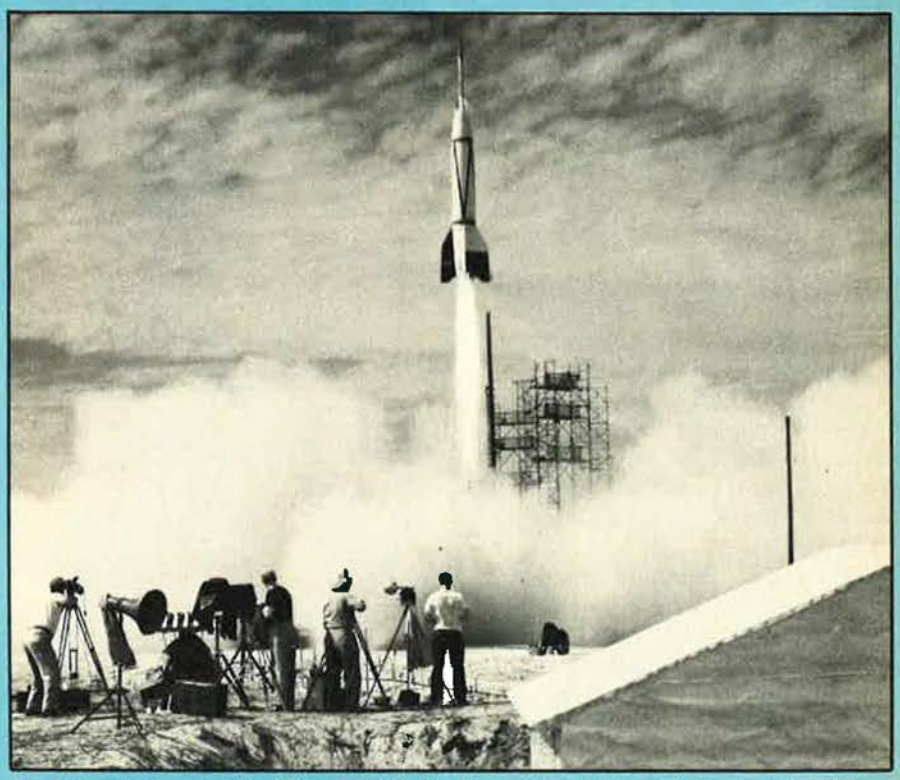
SAMSO will continue to have major responsibility for applying the new technologies described here to creating survivable strategic forces and to furthering deterrent operations in space. These new technologies could make missile defense feasible and render nuclear submarines vulnerable; hence strategy and doctrine must be consistent with technological capabilities.

SAMSO and the Future Strategic Deterrent

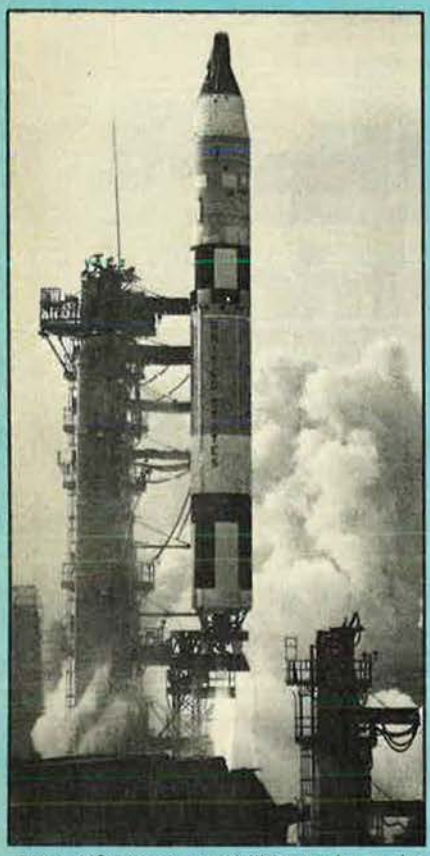
BY THE HON. HANS MARK
ACTING SECRETARY OF THE AIR FORCE

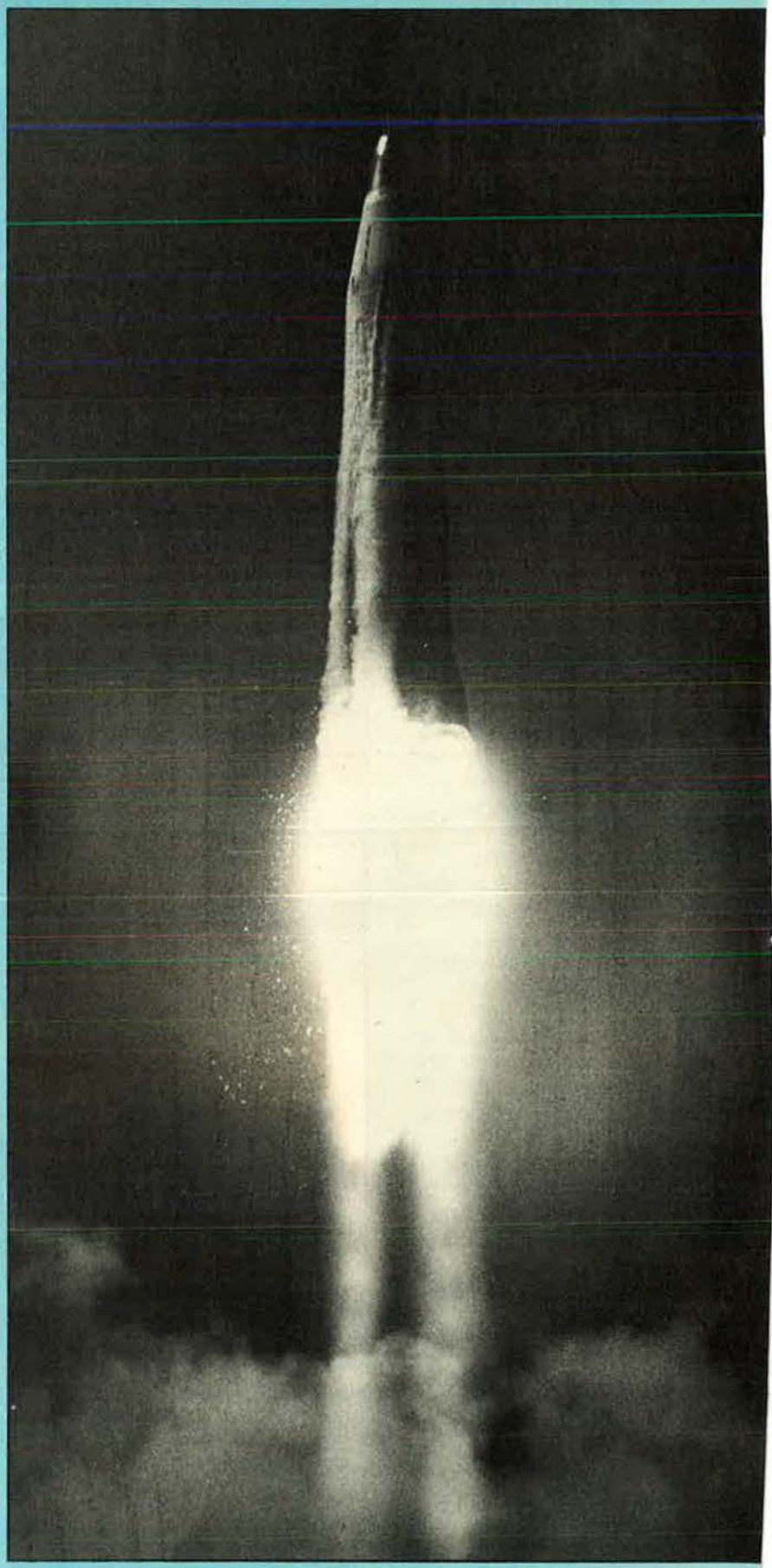
IT IS most appropriate on the twenty-fifth anniversary of the Space and Missile Systems Organization to discuss what has been SAMSO's major mission for a quarter of a century: the creation of our nation's strategic deterrent. What we call strategic deterrence today is an almost unique phenomenon in human history. For the first time, two nations are in a position to hold each other's population hostage and thus, paradoxically, to maintain relative stability in the world. The two most destructive wars in history were fought during the first half of this century. We are now well past the midpoint of the second half of the century, and there is some reason to hope that we will not see another world war before the century comes to a close. There is little doubt that the existence of the strategic deterrent is the cause of this circumstance.

The situation we see today grew out of scientific research performed prior to World War II and technology developments that were carried out during the conflict itself. In nuclear science, the pioneering work of Rutherford, Bohr, Fermi, Chadwick, and, of course, Strassmann and Hahn eventually led to the Manhattan Project and to the development of nuclear explosives. Likewise in the field of rocket propulsion, the scientific experiments and theoretical speculations of Goddard, Tsiolkovsky, and Oberth foresaw the possibility of producing large



The first rocket—a modified German V-2—fired from Cape Canaveral, Fla., in July 1950, was the primitive beginning that led to US ballistic missile forces that could deliver nuclear warheads over intercontinental distances.





Right, US launch capabilities took a major surge with development of the Atlas ICBM in the late 1950s. Later came the Titan II booster, above, that led to manned flights.

rockets that could deliver payloads at long range, and thus eventually deliver warheads at intercontinental distances and even put artificial satellites into orbit. These ideas were first put into practice by Wernher von Braun and his associates, who produced the V-2 rockets for the Germans during World War II.

It was a combination of these two things that led John von Neumann at the end of the second World War to begin talking about an "intercontinental artillery" of awesome power that might somehow stabilize the world after the war in spite of the obvious political tensions that existed between the United States and the Sovict

The US's first strategic missiles also became launch vehicles, like this Thor, for orbiting satellites.

Union. The essential idea was to use the newly available technologies to create a force with such terrible destructive power that its employment was unthinkable. Whether it is really unthinkable remains to be seen, but as a practical matter the idea has worked for over three decades. It is this enterprise, the development of a stable strategic deterrent, that has been SAMSO's central preoccupation for twenty-five years. The relative stability of the world today is continuing testimony to SAMSO's success in discharging its portion of this mission.

In addition to the creation of our land-based strategic missiles, the people at SAMSO did something else that may, in the long term, be even more important. The large rockets that became our first generation of strategic missiles also became the launch vehicles that, to this day, put the vast majority of our satellite payloads, both military and civilian, into earth orbit. The Atlas, the Titan, the Thor, all of these are products, in one way or another, of SAMSO. This is indeed a remarkable achievement. There are very few human institutions that have had the overall impact this one has. That the situation I have described prevails today is a great credit to early leaders such as Bennie Schriever, Si Ramo, Dean Wooldridge, Rube Mettler, Jim Fletcher, Ivan Getting, and many others who founded SAMSO and who gave it direction.

The Arms-Control Factor

There are other factors that also affect our strategic position. One of the most important is the drive toward arms control and the permanent negotiations we are conducting with the Soviet Union to limit the deployment and now even the development of new strategic weapon systems. Strategic arms negotiations started with a "moratorium" on the testing of nuclear weapons, instituted by President Eisenhower in 1959. For several years there was a "gentleman's agreement" that neither the Soviet Union nor the United States would conduct nuclear explosions in the atmosphere. The Soviets broke this "agreement" in 1961 with a massive series of weapons tests. We responded, in kind, and I vividly remember the day-and-night efforts it required for us to mount our 1962 test series. In 1963, the United States and the Soviet Union signed a formal agreement to cease testing nuclear weapons in the atmosphere.

During the last fifteen years, while we have deployed a large strategic deterrent force and at the same time begun the trend toward negotiating limits on strategic arms, the Soviet Union has deployed new strategic weapons at a much more rapid rate than the United States. We also conducted the lengthy negotiations that ultimately led to the first Strategic Arms Limitation Treaty signed by President Nixon in 1972 and to the second treaty just concluded by President Carter. This has led to the condition President Nixon described first in 1972 as the "essential equivalence" of Soviet and American strategic forces. It is this situation that still characterizes the relationship between ourselves and the Soviet Union and which President Carter is attempting to maintain by negotiating the second Strategic Arms Limitation Treaty and initiating new strategic weapon systems such as MX and cruise missiles.

The provisions of these treaties provide the framework within which our strategic deterrent forces must be developed. The treaties also require verification and this, coupled with the very high priority for intelligence information about Soviet strategic forces in general, has stimulated the development of a new technology around very sophisticated "national technical means" for verification. Included is, of course, photography from earth-orbiting satellites.

New Technology and Strategic Deterrence

There have been other new technical developments in this period that may also have a strong bearing on the future of the strategic deterrent. For example, continuing progress in the miniaturization of electronic devices may make it possible to produce very accurate guidance systems so that an antiballistic missile system could be built. This capability strengthens our confidence that we can take appropriate ac-

tion should the Soviets decide to abrogate either of the SALT treaties and, consequently, provides a strong disincentive to Soviet abrogation or Soviet cheating. It is quite conceivable that an antiballistic missile system, using new technology, could be deployed in such a manner that it would not destabilize the strategic situation. This has clearly become a possibility that is much closer to reality today than it was in 1972 when the SALT I treaty was signed. Such a possibility offers the US a tremendous advantage in dealing with the Soviets today and provides hope for future progress in SALT III.

Another new technical field, which has come into prominence since the first arms-control agreement, is the development of high-energy lasers and the possibility that these might play a role in countering offensive weapon systems. Although this possibility is much less likely for a number of technical reasons than is the creation of a new antiballistic missile system based on new electronics, it is still something that must be considered in the longer term. The work being done in this area will continue at a level that will prevent technical surprises for the US and ensure that we have a technology base to draw on if it is ever required.

We must also prepare for the day when ballistic missile-carrying submarines may no longer be able to hide under the surface of the sea. It is probable that eventually there will be ways of finding submarines so that they no longer will be the invulnerable launch platforms for ballistic missiles that they are today. Such is the nature of technology. SAMSO's role in this important area will help the US stay at the forefront of technology and will ensure that there are no technological surprises that reduce the deterrent value of our forces.

The Major Challenge—Survivability

The process of technological evolution I have just described has, of course, been going on all along. It is, in fact, at the root of the major challenge facing our strategic deterrent force today, namely the incipient vulnerability of our Minuteman force. The increasing accuracy and explosive yield of Soviet warheads will soon make it possible for them to target our Minuteman silos and to destroy our land-based intercontinental ballistic missile force on the ground. In response to this threat, we will deploy the MX missile system that has just been approved by President Carter. The MX system will have a delivery vehicle almost three times larger than Minuteman III (190,000 pounds gross weight, compared to 75,000 pounds gross weight for the Minuteman), and it will carry ten warheads instead of three (as is the case of Minuteman III). The missile will be very accurate and, most important, it will be based in a way that will make it survivable even if the Soviets should strike first.

Several ideas for achieving survivability have been proposed and all have in common the property that the missile is moved in some way or other between various launch points. There will be many more launch points than missiles, and since the Soviets will not know in which launch point the missile resides, they would have to waste so many of their forces by shooting at empty aim points that the attack would be self-defeating. Since a launch position is much cheaper than the missile and its reentry vehicles, the economic ratio created by such a system is in our favor. The development of the MX system and its deployment in the next decade will mean that the survivable land-based deterrent of our intercontinental ballistic missile force can be retained as part of the strategic deterrent.

It is important to remember, though, that the survivability of any system is not a permanent condition. When the Minuteman system was built in the early 1960s, it was survivable. Submarines carrying nuclear ballistic missiles are survivable today, but new antisubmarine warfare techniques may eventually change this condition. It may even turn out that the technologies of surveillance are easier to develop and field than a survivable strategic

One basing option for the next generation of US ICBM strategic missiles. Here, punching out of a protective covering of concrete and earth during a recent test.

Dr. Hans Mark, who had served as Under Secretary of the Air Force since July 1977, became Acting Secretary when former Secretary John Stetson resigned in May. On June 21, President Carter nominated Dr. Mark as Secretary of the Air Force. Senate confirmation hearings were in progress at press time. For biographical information on Dr. Mark, see p. 34.

system. Although this is not the case today, it is clear that it could happen in the longer term and that we must prepare for it now.

Furthermore, the surveillance technologies that are likely to create the condition I have described may very well also provide the solution to the dilemma. We must be ready. We must be flexible. We must continually examine the strategic doctrine on which our current deterrent rests. Technology is dynamic by definition. We must be sure our strategy and doctrine are also dynamic and consistent with our own technological capability as well as the capability of our adversaries. The technical ability to monitor arms-control agreements is a cornerstone of both SALT I and SALT II. Continued advances in our ability to monitor, coupled with advances in our ability to detect an attack in time to respond, as well as advances in survivable weapon systems will ensure the security of the United States.

At the present time, our strategic deterrent force can absorb a massive Soviet first strike and still be able to inflict unacceptable damage on the Soviet Union. One can argue, as Secretary Brown has, that the Soviets cannot be sure that we would wait until their missiles get here before we respond. There is a severely limited time available to make such a decision. The fact is that our warning and surveillance sensors are presently not good enough to allow us to be comfortable about adopting this doctrine, because of the many uncertainties involved. We need to have a much better surveillance system and a much more reliable communications system in order to give the national command authorities flexibility to formulate alternate strategies and doctrines.

Deterrent Operations in Space

The technological methods to improve our surveillance and warning systems are definitely on the horizon. What will be required is a great expansion of our ability to conduct operations in space, both in near earth orbit and in orbits further away from the top of the earth's atmosphere. Fortunately, in a few years the United States will field the new Space Shuttle vehicle that will change completely the way we operate in space. The Shuttle will increase the payload weight that we can put in earth orbit per flight by roughly an order of magnitude over the average that we now put in orbit using expendable launch vehicles. Since our ability to do things in space is somehow proportional to the payload weight, there is no doubt that this fact alone will be exceedingly important. Perhaps even more important is the fact that people could accompany every orbital flight. The presence of human judgment in orbital operations is bound to make a crucial difference in what we will be able to achieve.

In view of the potential that the Shuttle and its associated technology present, there is a good chance that the improvement in surveillance and communications systems will have a large impact on future arms-control verification capability and, consequently, on the way we keep our strategic systems survivable. It is for this reason that we need to keep making the necessary investment in sensing devices, both those on the ground and those based in space. At the same time, our advances in space technology could lead to highly reliable technical data and intelligence information that would support continued arms-limitation agreements. There will be more negotiations on strategic arms limitations with the Soviet Union. As these negotiations progress, more attention will surely be paid to the national technical means of verification, including the satellites we use for monitoring and verifying arms-control agreements.

In all of these things, whether one adopts a pessimistic or an optimistic view, operations in space will be the central feature of our strategic posture. It is most important to recognize this point. Furthermore, the Air Force, as the Executive Agent of the Department of Defense for space operations, must begin now to develop the kind of organization that can deal with some of the challenges I have outlined.

There is no doubt in my mind that SAMSO will have the major responsibility to implement some of the ideas and policies that are now being forged. There is, therefore, every reason to believe that the next twenty-five years will be even more exciting and productive than the twenty-five years that have just passed. ■

SAMSO'S 25TH ANNIVERSARY

In the twenty-five years since the Air Force established an agency that was to become AFSC's Space and Missile Systems Organization (SAMSO), that organization has been responsible for developments in military technology that have changed the nature of military affairs to a degree unprecedented in any previous quarter century.

SAMSO: A Look Back

A SPECIAL REPORT

THE organization now known as SAMSO has a complex genealogy. Its remote ancestor was the Western Development Division of the Air Research and Development Command (now Air Force Systems Command), established in Inglewood, Calif., in July 1954. It was renamed the Air Force Ballistic Missile Division in July 1957. Four years later it was split in half to form the Ballistic Systems Division and the Space Systems Division. *(See p. 50.)* The Ballistic Systems Division moved to Norton AFB, Calif., while the Space Systems Division remained in Inglewood for three years and then moved to El Segundo, Calif. In 1967, the two Divisions were merged into one organization, and SAMSO—the Space and Missile Systems Organization—was created, with headquarters in El Segundo.

In the course of the past twenty-five years, the achievements of SAMSO and its predecessors have changed forever the nature of military technology, national strategy, and international relations. Those achievements have been in two areas—ballistic missiles and space systems.

Ballistic Missiles

The Air Force ballistic missile program had its origins in studies and projects initiated by the Army Air Forces immediately after World War II. These efforts aimed at mating the German V-2 ballistic missile and the atomic bomb—a union that, if realized, would completely revolutionize weaponry and strategic warfare as it then existed. Technical problems held the program back at first, but the situation was changed drastically by the thermonuclear breakthrough of the early 1950s, which made it possible to manufacture high-yield nuclear weapons small enough and light enough to be carried as warheads aboard ballistic missiles.

While these developments were taking place in the US, the Soviet Union was making significant progress in developing thermonuclear weapons and ballistic missiles of its own. In view of this potential threat, the US government decided to accelerate its missile-development efforts, and the Western Development Division was established to carry out that task.

Initially, the Division was responsible for developing just one missile—the Atlas, which was being designed and built by the Consolidated Vultee Aircraft Corp. (Convair). The Atlas was an intercontinental ballistic missile with liquid-fuel engines and a stage-and-a-half configuration. Within a year, the Division had also become responsible for de-

The Western Development Division, earliest progenitor of SAMSO, was established in July 1954 under the direction of then Brig. Gen. Bernard A. Schriever and headquartered in "The Little Red Schoolhouse" at Inglewood, Calif.

The early years of missile development had their share of failures, like this Titan test missile that blew up on the launch pad at Cape Canaveral.

veloping an alternate, or backup, missile called the Titan, a more advanced, two-stage missile to be built by the Martin Co. as a hedge against failure or delay in the Atlas program. By the end of 1955, the Division was given the additional task of developing an intermediate-range ballistic missile, the Thor, and was also charged with rapidly achieving initial operational capability with the three missile systems. In barely eighteen months, the mission of the Division had undergone an enormous expansion.

The Division largely replaced the conventional pattern of sequential development with concurrent development. Development, production, testing, and initial operational capability actions were undertaken simultaneously within the framework of a single overall plan. Although the concept of concurrency was not entirely new, the Division applied it on a scale never before used in military development programs.

Progress in ballistic missile systems was slowed in 1956–57, when the Eisenhower Administration made large cuts in defense spending in an effort to balance the budget. However, on October 4, 1957, the Soviet Union used an ICBM to launch Sputnik, the first man-made satellite. Sputnik's impact was immediate and dramatic. The US missile program was given renewed impetus, restrictions were lifted, earlier program priorities were reinstated, and funding was vastly increased.

On April 19, 1957, even before Sputnik, the Air Force Ballistic Missile Division had successfully launched a Thor missile from Cape Canaveral, Fla. On December 17, 1957, the first successful Atlas launch was made, also from Cape Canaveral. Thor deployment was completed in 1960, while deployment of the Atlas was finished in 1962. The Titan made its first successful flight in 1959 and was deployed in 1962. All three first-generation missiles were in place and ready for operation.

In the late 1950s, the Ballistic Missile Division had begun developing two second-generation missiles—the Titan II and the Minuteman. Like the original Titan I, Titan II was a two-stage, liquid-fuel missile. Unlike its predecessor, however, it used storable propellants and an all-inertial guidance system, and it could be launched from hardened underground silos. These improvements gave the Titan II quicker reaction time, greater survivability, and improved performance. The first Titan II unit achieved operational status in June 1963 and the last in December of the same year.

The Minuteman was the first US intercontinental ballistic missile to use solid rather than liquid fuel, which gave it greater simplicity and economy. The first Minuteman flight-test missile was launched in February 1961, and the first group of Minuteman

In December 1957, the Atlas, USAF's pioneer ICBM, was first launched successfully. Operational deployment of the Atlas was completed less than two years later.

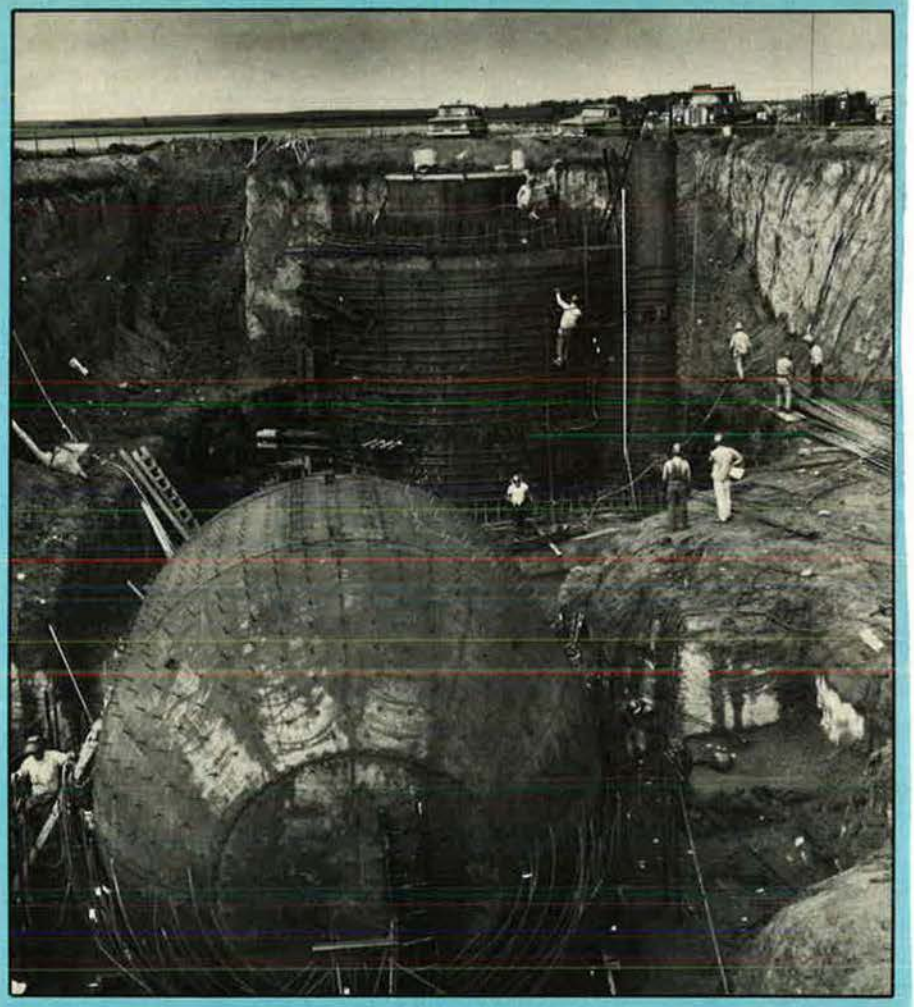
missiles was turned over to the Strategic Air Command at the end of 1962.

By the end of 1965, Minuteman missiles had been deployed at four bases in the north-central United States, and the older, less efficient, and less economical Atlas and Titan I missiles had been retired from the active inventory. The Minuteman, along with the Titan II, became the mainstay of the nation's strategic missile force. Together with SAC's manned bombers and the Navy's Polaris/Poseidon missile-launching submarines, these missiles formed the triad of strategic forces that were maintained on day-to-day alert to deter any hostile nuclear attack on the US or its allies.

The original Minuteman was replaced by the more advanced Minuteman II and Minuteman III. The Minuteman II incorporated a new, larger second stage, improved

guidance, greater range and payload, and greater resistance to the effects of nuclear blasts. The Minuteman III, for its part, possessed an improved third stage, employed more penetration aids to counter antiballistic missile defense systems, and was equipped with up to three independently targetable warheads. By the end of 1975, 450 Minuteman IIs and 550 Minuteman IIIs were in place and ready for operation at six bases in the north-central United States.

Under the terms of the 1972 Strategic Arms Limitation Agreement between the United States and the Soviet Union, this country was barred from increasing the number of strategic missiles in its operational inventory. To maintain its strategic position vis-à-vis the Soviet Union, the US had to improve the quality of its missiles. An advanced development program was started in late 1973 to define the technology and design concepts for a new strategic missile called Missile X, or MX, and to study basing concepts, including airmobile and ground-mobile modes. The feasibility of airmobility was demonstrated on October 24, 1974, when a Minuteman I was dropped by parachute from a C-5A aircraft, and the first stage was fired for thirty seconds.



Designing and constructing the hardened facilities for 1,054 ICBMs was one of the greatest engineering feats of history. In the foreground of this Minuteman site is the equipment building, with the missile silo in the background.

Space Systems

Military satellite projects were added to the mission of the Western Development Division in the mid-1950s. During the 1960s and 1970s, they came to play an increasingly important role in the activities of the Division's successors. Satellites were developed to serve a number of purposes, among them nuclear surveillance, weather reporting, navigation, and communication.

Nuclear surveillance was carried out by six pairs of Vela satellites

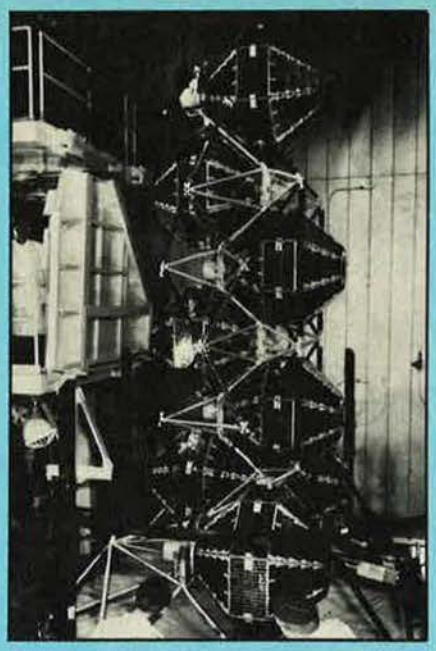
placed into orbit between October 1963 and April 1970. These satellites were used primarily to monitor the 1963 Nuclear Test Ban Treaty, but they also provided important scientific data on solar flares and on other radiation that could affect man's safety in space.

The Space Systems Division and the Air Weather Service began developing and deploying weather satellites for the Defense Meteorological Satellite Program during the 1960s. Two weather satellites are normally in polar orbits about 450 miles above the earth. The system has allowed much more accurate global weather forecasting and has given up-to-the-minute weather data for operational planning. The satellites also are an economical and effective means for detecting and tracking tropical storms, especially in the western Pacific. Data received from the satellites is provided to the entire Department of Defense and is now available on a regular basis to the National Oceanic and Atmospheric Administration as well.

The Global Positioning System is currently being developed to provide navigation and positioning information. When fully operational, it will provide precise, three-dimensional position and velocity information accurate to within thirty feet, and will furnish a precise timing reference within a millionth of a second any place on earth. It will have a wide variety of military and possibly civilian applications and will perform many functions now handled by existing navigation systems.

The space segment of the system will consist of twenty-four satellites in three subsynchronous rings of eight satellites each. Four satellites were launched in 1978, and receivers to be used with them were successfully tested. The system is scheduled to be fully operational in 1984.

Various satellite systems have been developed for communication purposes. The first was the Initial Defense Satellite Communications System, begun in 1962. The system was to consist of a large



These eight satellites for the Initial Defense Satellite Communications System were put in orbit in a single launch.

number of small, 100-pound satellites launched in clusters, to provide communication service to the Defense Department until a more sophisticated system could be developed. The last eleven satellites of the twenty-six-satellite system were inserted into orbit on July 1, 1967, and June 13, 1968.

While this initial system was being deployed, other experimental communication satellites were placed in orbit to test advanced concepts and technology. Lincoln Experimental Satellites, LES-5 and -6, orbited on July 1, 1967, and September 26, 1968, were solid-state, ultra-high-frequency communication satellites. The 1,600-pound Tactical Communications Satellite, placed in orbit in February 1969, tested satellite communications over long distances. It was also designed to test the feasibility of communications with small, mobile, tactical communications equipment that could be used by ground, naval, and air forces. On July 1, 1970, an initial operational capability for tactical communications was established, using the Tactical Communications Satellite and LES-6.

In March 1969, TRW Systems Group was awarded a contract to build an advanced communications system incorporating the technology proven on all these experimental satellites. Once developed, the new Defense Satellite Communications System, Phase II, would replace the Initial Defense Satellite Communications System. By January 1979, the full constellation of four satellites was in place and in operation.

In 1973, planning began for the Defense Satellite Communications System, Phase III. The satellites of this system will carry multiple-beam antennas to provide flexible coverage and resist jamming. A contract for full-scale development of the satellites was awarded to General Electric in 1977.

SAMSO has also managed acquisition of the space portion of the Navy's Fleet Satellite Communications System. When completed, the four-satellite system will support the high-priority communications requirements of both the Navy and the Air Force. The satellites for the system are being built by TRW Systems Group, and the first satellite was successfully launched in February 1978.

SAMSO has also developed the Air Force Satellite Communications System (AFSATCOM) for command and control of USAF's strategic forces. Communications channels for the AFSATCOM system are orbited on Fleet Satellite Communications System and

Satellite Data System spacecraft. In the future, the AFSATCOM network will be composed of dedicated satellites in high-altitude orbits.

SAMSO also has managed development programs that have provided the United Kingdom and the North Atlantic Treaty Organization with synchronous communications satellite systems. The first of two British Skynet I satellites was placed in orbit on November 2, 1969. In 1970, SAMSO and the United Kingdom began developing a more advanced Skynet II satellite system. A malfunction in the launch vehicle caused the loss of the first Skynet II satellite. The second Skynet II satellite, launched successfully on November 22, 1974, was turned over to the United Kingdom on January 19, 1975.

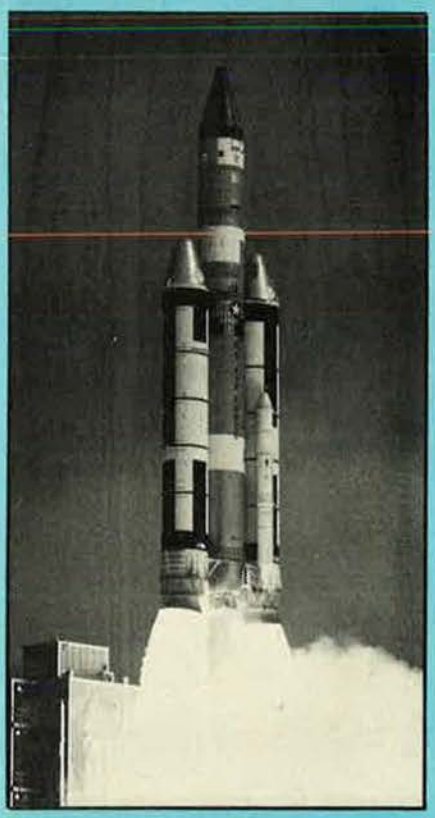
Development of the NATO satellites began in April 1968, with the initial series of satellites known as NATO II. One NATO II satellite was placed in orbit on March 20, 1970, and another on February 2, 1971. The Skynet and NATO satellites, built by Ford Aerospace and Communications Corp., are compatible with each other and with the Defense Satellite Communications System. Three more advanced NATO III satellites were launched successfully between 1976 and 1978.

Launch Vehicles

The earliest launch vehicles used by the Air Force were Thor and Atlas missiles modified to serve as space boosters. The Thor gave rise to the series known as Standard Launch Vehicle 2, and the Atlas provided several varieties of Standard Launch Vehicle 3. Upper stages such as the Agena, the Burner II, and the Stage Vehicle System were developed for use with these vehicles. Together with their associated upper stages, Thor and Atlas launch vehicles have been the backbone of the US space program, used by both the Air Force and the National Aeronautics and Space Administration.

Development of the Titan III, an extremely powerful booster, was begun in late 1961, and the first research and development vehicle was flown on September 1, 1964. This vehicle, a Titan IIIA, consisted of a modified Titan II core topped by an upper stage called the Transtage. A new configuration, the Titan IIIC, with two strap-on solid-rocket motors that generated around one million pounds of thrust each, was successfully launched from Cape Canaveral on June 18, 1965. The family has expanded to include the Titan IIIB/Agena D, the Titan IIID, and the Titan IIIE/Centaur, which has been used by NASA for space projects such as the Viking missions to Mars.

All these unmanned, expendable vehicles will eventually be replaced by a manned, reusable launch vehicle called the Space Shuttle. NASA is developing the Shuttle, but SAMSO is responsible for ensuring that it will meet Defense Department requirements. SAMSO also is responsible for developing an upper stage for the Shuttle and for building launch and landing facilities for it at Vandenberg AFB, Calif.



The highly reliable Titan IIIC launch vehicle with 2,500,000 pounds of thrust was developed under direction of SAMSO. It was first launched in June 1965.

Space and Missile Test Center

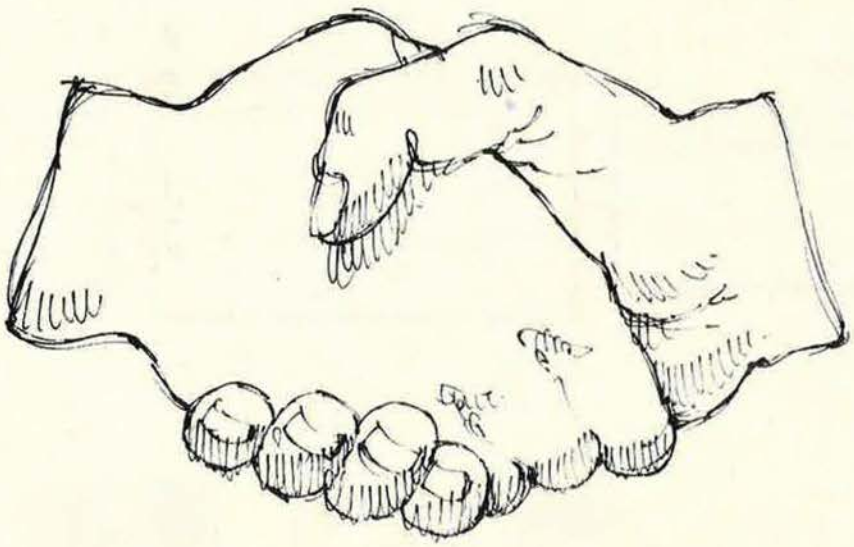
The Shuttle facilities at Vandenberg will be operated by one of SAMSO's subordinate organizations, the Space and Missile Test Center (SAMTEC). SAMTEC, created and assigned to SAMSO on April 1, 1970, maintains and operates the Western Test Range, with launch sites at Vandenberg AFB, and the Eastern Test Range, with launch sites at Cape Canaveral. From Vandenberg and the Cape, SAMTEC puts satellites into orbit and tests ballistic missiles and reentry vehicles for SAMSO.

Air Force Satellite Control Facility

SAMSO's other major subordinate organization is the Air Force Satellite Control Facility (AFSCF) headquartered at Sunnyvale AFS, Calif. This organization, created on July 1, 1965, is responsible for monitoring and controlling military satellites once they are in orbit. The nerve center for the operation is the Satellite Test Center, located at Sunnyvale, Calif. The Test Center is augmented by a global network of tracking stations that stretches from Greenland to the Seychelles Islands in the Indian Ocean. With the aid of SAMTEC and the AFSCF, SAMSO is able to develop and produce space systems and put them into operation. ■

SAMSO
1954-1979

We at Sylvania of GTE salute you on your successful quarter century of technical leadership



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Communication Systems Division

C. G. Fiester, *Vice President*
Western Division

H. E. Patterson, *Vice President*
Eastern Division

SAMSO'S 25th ANNIVERSARY

SAMSO: A Family Tree

1954-57

Western Development Division

Maj. Gen. B. A. Schriever
July 1, 1954 June 1, 1957

1957-61

Ballistic Missile Division

Maj. Gen. B. A. Schriever
June 1, 1957 April 24, 1959

Maj. Gen. Osmond J. Ritland
April 25, 1959 March 31, 1961

1961-62

AFSC Deputy Commander for Aerospace Systems

Lt. Gen. Howell M. Estes, Jr.
April 1, 1961 October 10, 1962


Schriever


Ritland


Estes


Funk


Cooper


Gerrity


Davis


Sands


McCoy

1961–67

Space Systems Division

Maj. Gen. Osmond J. Ritland
April 1, 1961 May 13, 1962

Lt. Gen. Howell M. Estes, Jr.
May 14, 1962 October 20, 1962

Maj. Gen. Ben I. Funk
October 30, 1962 . August 31, 1966

Maj. Gen. Paul T. Cooper
September 1, 1966 June 30, 1967

1961–67

Ballistic Systems Division

Maj. Gen. Thomas P. Gerrity
April 1, 1961 June 30, 1962

Maj. Gen. Waymond A. Davis
July 1, 1962 July 18, 1964

Maj. Gen. Harry J. Sands, Jr.
July 20, 1964 June 30, 1966

Maj. Gen. John L. McCoy
July 20, 1966 June 30, 1967

1967–To Date

Space and Missile Systems Organization

Lt. Gen. John W. O'Neill
July 1, 1967 August 30, 1969

Lt. Gen. Samuel C. Phillips
September 1, 1969 August 24, 1972

Lt. Gen. Kenneth W. Schultz
August 25, 1972 August 31, 1975

Lt. Gen. Thomas W. Morgan
September 1, 1975 April 30, 1978

Lt. Gen. Richard C. Henry
May 1, 1978 (to date)


O'Neill


Phillips


Schultz


Morgan


Henry

SAMSO'S 25TH ANNIVERSARY

The effectiveness of military space systems in the years ahead is likely to increase dramatically with the advent of "autonomous" spacecraft, massive on-board data processing, and a reliable, economical, two-way space transport system.

SAMSO: A Look Ahead

BY LT. GEN. RICHARD C. HENRY, USAF
COMMANDER, SPACE AND MISSILE SYSTEMS ORGANIZATION

TWENTY-FIVE years ago this summer, the progenitor of the Air Force's Space and Missile Systems Organization (SAMSO) was born. It was then that the acronym ICBM entered our vocabulary in deadly earnest, shortly followed by the word satellite, defined as a man-made object orbiting the earth.

Reflecting on the events that have transpired in the ballistic missile and space world over the past quarter century, we cannot but be awed. The sheer rate of change and change itself have had significant impact on our military posture and the way we conduct our affairs today.

The nation has moved through four generations of ballistic missiles: Thor, Atlas, Titan, and Minuteman. The ICBM became the second leg of the triad and the most reliable major weapon system that we have produced.

We have moved from the first words out of space, spoken by President Eisenhower as a Christmas message in December 1958, to today's routine communications relayed around the world in both the private and military sectors, using way points stationed in space. We have moved from the spectacular achievement of landing a man on the moon to the routine of a manned laboratory orbiting overhead.

In the scientific sector, we have moved from the first tentative analyses of the space environment near earth to a truly astounding accumulation of knowledge about the planets and other cosmic bodies in our solar system.

The heritage of these undertakings had its genesis in the early part of the century, starting with the special theory of relativity, moving on to modern quantum theory in the 1920s, experimental nuclear physics and Goddard's rocket work in the thirties, solid-state electronics in the forties, digital computation and lasers in the fifties, and miniaturized integrated circuitry in the sixties and seventies.

Navstar GPS signals received on these twenty-seven-pound backpacks enable soldiers to guide artillery accurately.

These developments led to an ICBM force fielded in Montana, Wyoming, North and South Dakota, Missouri, Arkansas, and Arizona—a force that has been in place and stable since 1965 except for facility and communications improvements.

The same developments expanded military capabilities in space. Today, we are making significant investments in space systems that support field commanders in moving military information ranging from priority message traffic to navigation signals and weather pictures. The result is improved efficiency and order-of-magnitude improvements in the command and control of military forces.

As we contemplate the next quarter century, our thoughts are dominated by the fervent hope that the nuclear holocaust lying dormant beneath the inner reaches of Siberia and the great plains of this

nation will never engulf mankind. The strategic concept of deterrence through strength and national will has accomplished its purpose so far. The essential question is whether the nation will have the moral fortitude and resolve to continue as it has in the past. Most likely there will be another generation of the ICBM dedicated to preserving deterrence through strength and to the ability to survive an attack and strike back.

Keys to the Future

Planning for the future must set aside debate on the political tides and center on the options that are the stock in trade of those concerned with research, development, and acquisition.

There are four words that carry the central thrust of SAMSO's next quarter century. They are precision, information, autonomy, and man.

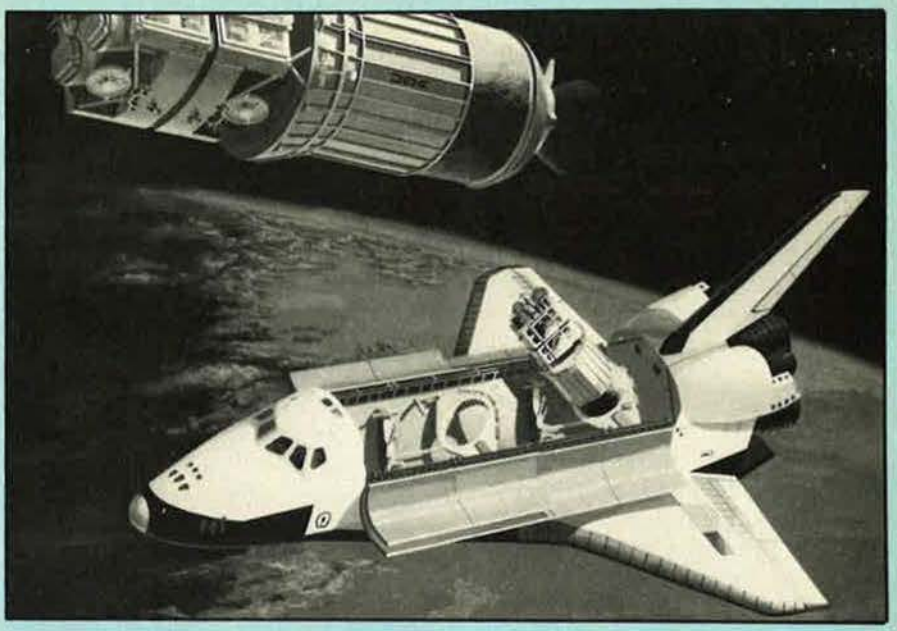
Let us discuss each of them and then speculate on their combined significance.

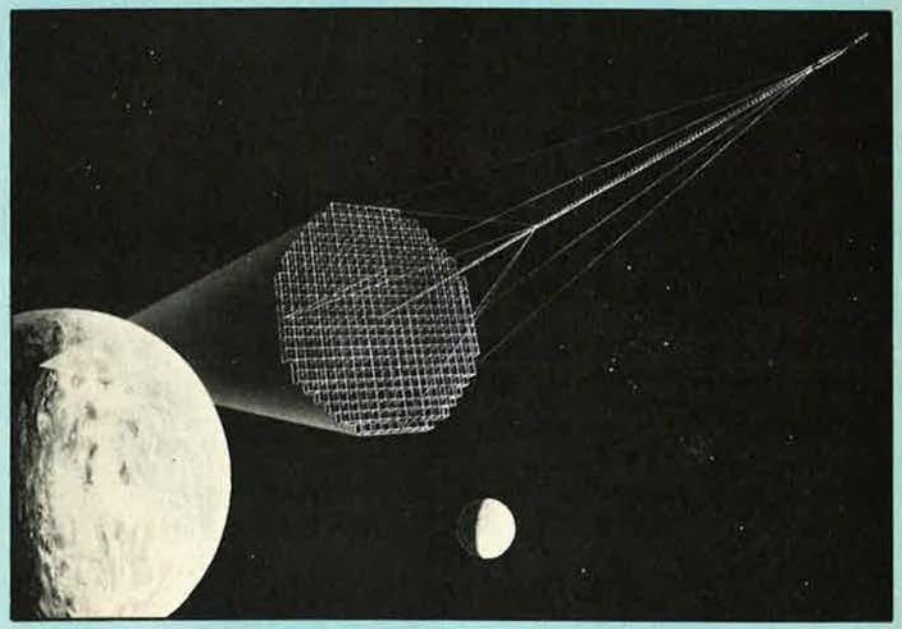
The level of *precision* with which we move about the earth has shown remarkable change during the past generation. Twenty-five years ago, we considered it good intercontinental navigation to make landfall within ten nautical miles of our intended point.

When the ICBM was conceived, an accuracy of five nautical miles was considered an achievement.

Today we talk in terms of hundreds of feet and tenths of a mile.

Given the trend of active developments, we can expect routine navigation on land, sea, air, and in space to improve by another order of magnitude. In other words, we will move through the medium of our choice with an accuracy measured in tens of feet or hundredths of a mile.





Artist's concepts depict deployment of two IUS vehicles and their payloads from the Shuttle (upper photo), and a huge spaceborne antenna that provides long-haul communications on a global scale (lower photo).

It is difficult to comprehend what this means. Certainly it will revolutionize the transportation industry. With equal certainty, it will revolutionize tactical and strategic doctrine.

The concept of a ballistic missile moving hundreds or thousands of miles and striking with the precision of an artillery round will force us to rethink traditional artillery doctrine.

The sheer simplicity of precision navigation at sea, in the air, and in space will allow both the concentration and the dispersal of military forces and equipment to a degree not now possible.

We have already demonstrated precision by orbital rendezvous with distant planets. We will learn the routine of manned and unmanned spacecraft orbital rendezvous at synchronous equatorial altitude and beyond. We know how to do it. It is now a matter of moving from the extraordinary to the routine.

The second key word is *information*. Man's capacity to transmit and receive information has grown by leaps and bounds during the past decade. His ability to digest information has not kept pace.

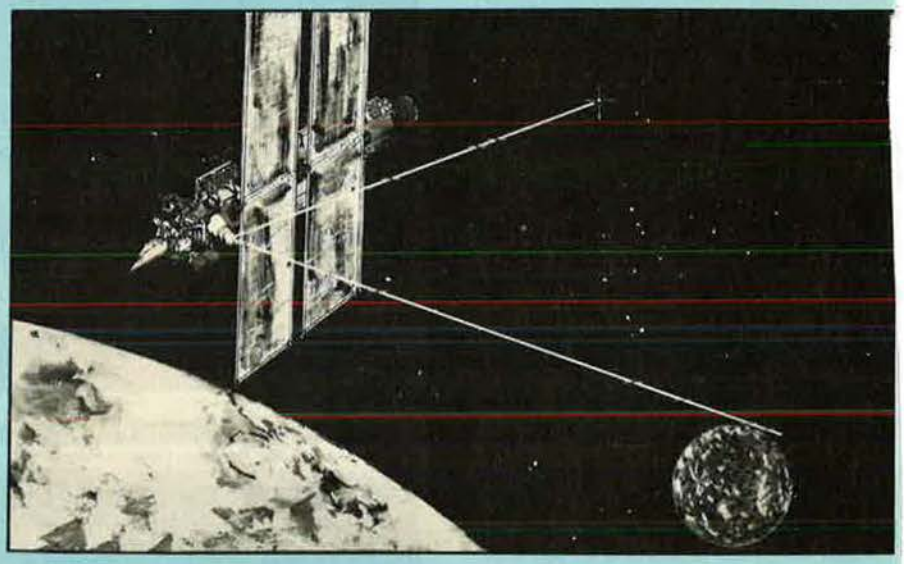
The rate of change in capacity will certainly continue—upward. It is in the area of handling and distributing information that the R&D options for the future are the most exciting.

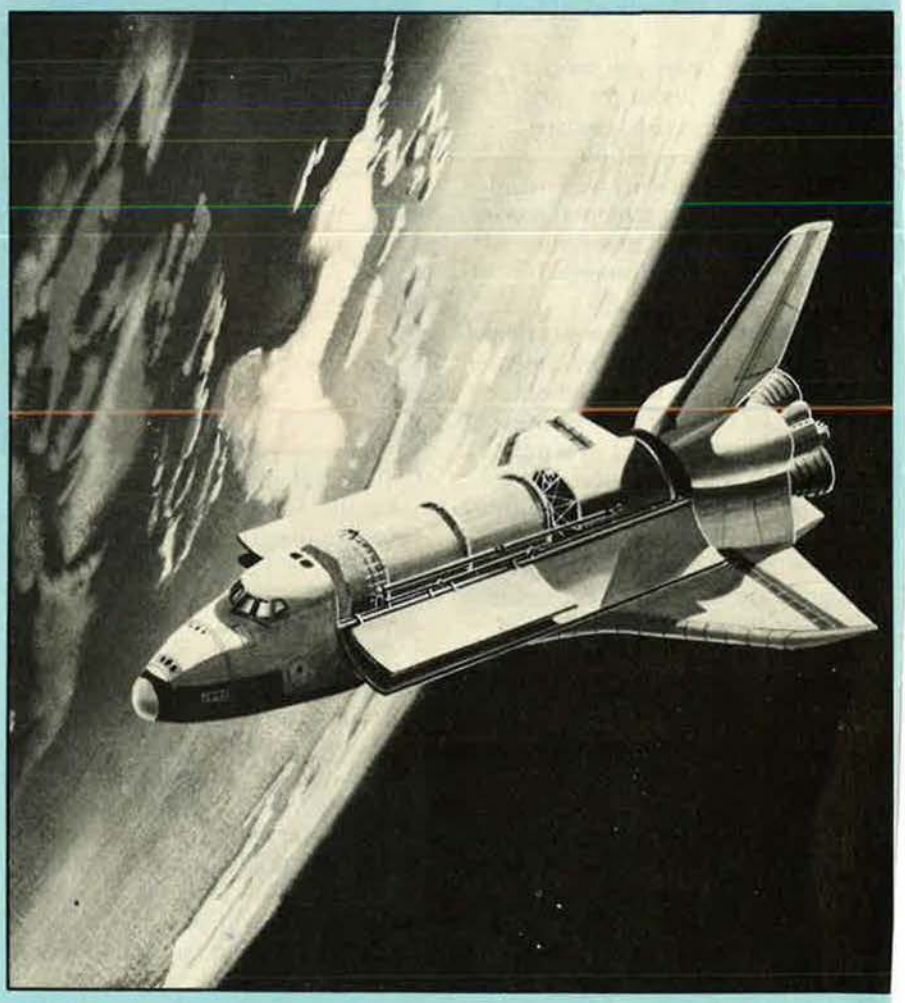
Today we have difficulty distributing, collating, processing, and sorting the vast amounts of information fed to us by the systems we have created.

This will pass, and as we learn to digest information at origin or en route, we will be better able to concentrate on what is important, both when it is important and where it is important.

Today we are taking major steps to overhaul military command and control systems. The E-4B Airborne Command Post, packed with processing machinery and alternative communications systems, will have passed into obsolescence by the turn of the century. By then we will have learned to derive the simple from the complex and, through the architecture now in definition, tighten further the reins of command.

We accept the telephone, the datafax, and the copy machine as ways of life today. In the next quarter century we may be able to use digital transmission circuitry with the same level of privacy that we have with the sealed envelope today. Once we have learned how to routinely protect our privacy in electronic transmission, we can move from the bulky file cabinet of





Space sextants (upper photo) could provide vital satellites with independence from ground tracking. Key to economic space exploitation will be the Shuttle, shown (lower photo) in the process of deploying a 350-foot-wide antenna.

Lt. Gen. Richard C. Henry is a 1945 graduate of the US Military Academy. He has served with both SAC and TAC, and flew 207 F-4 combat missions in Southeast Asia. Since the mid-1950s, he has had several assignments in the ballistic missile and space fields, including duty at AFSC's Ballistic Missile Division, Chief of NASA's Apollo Navigation/Guidance and Lunar Module Development Programs, Manager of the Gemini Program, and Vice Commander of SAMSO. General Henry was named Commander of SAMSO in April 1978. He is a graduate of the National War College and has master's degrees in aeronautical engineering and instrumentation engineering from the University of Michigan.

today to the digital memory circuitry of tomorrow.

To SAMSO this means that satellites will become smarter and smarter. They will be able to heal themselves when subsystems fail. They will be able to carry onboard the logic necessary to fulfill their mission down to their last gasp of electronic life.

This leads to the next key word, *autonomy*. Today our spacecraft have cumbersome electronic umbilical cords linked to Mother Earth. With the precision navigation and computation techniques now being developed, we can see the time when TT&C—telemetry, tracking, and control—will leave our vocabulary. Satellites that are truly autonomous will allow military planners and commanders to use the place called space in ways we cannot anticipate today.

SAMSO's worldwide tracking and control network should not see the turn of the century. As important as this network now is to the continued health and on-orbit operation of our satellites, it is just as important that our designers begin working it out of a mission. Hand in hand with increasing precision and additional information-handling techniques, many of our satellites then would have the self-sufficiency, without continuing health and welfare monitoring, to do their job of supporting their ground terminals.

Finally, there is *man*. For twenty years the military role of man in a place called space has not been clear. His role is not yet obvious, but as inevitably as nations will depend on space to conduct business, just as inevitably nations will depend on space systems to better defend their borders.

With that increased dependency on space systems must come operational reliability—and flexibility. The time will come when the expense of life support for man in space will be outweighed by the economic and military advantages of his being there. It would appear that military man's time in space will come before the twentieth century closes.

SAMSO's Role in National Strategy

What drives this projection? The hovering characteristic of a satellite in synchronous orbit 22,000 miles over the equator. This is the optimal position for our warning and communications satellites—the orbit from which we will continue to meet global military information needs. It is the "mountaintop" in space. Considering the progress of the recent past, it is reasonable to anticipate that a manned space station hovering over the equator—monitoring, maintaining, switching circuitry, and controlling signals—will be a mainstay of our strategic defense. As satellites are given multiple tasks and become more complex and expensive, the use of man to extend their life and give them on-the-spot operational flexibility appears likely.

The use of larger structures, assembled on orbit to provide stronger signals and focusing of surveillance, can supplant the airborne command posts of today, thus providing a stationary listening post and control center, heretofore only achieved from mountaintops.

The expression "a place called space" signifies that space is, in fact, a place and not a mission. The Air Force mission in space is here on earth. Whatever the nature of the satellite placed in orbit, it is dedicated to one fundamental purpose—to improve the lot of the American fighting man, be he on land, at sea, or in the air, through, first, preventing war; if that fails, providing warning; and, finally, furnishing the means for committing and controlling our military forces.

If the above discussion sounds controversial and "far out," consider the changes in SAMSO's activities over the past twenty-five years.

SAMSO will remain at the heart of our evolving national strategy. The organization now has a character and a sense of destiny that will continue in the years ahead. Its structure will change as all organizations change. But it is now embarked on two quests. The first is to remove the "R&D mystique" from space and bring the use of space systems into the daily routine of the nation's operational military forces. The second is to provide the next generation of ICBMs the standards of excellence that have been established by those that have gone before. With the achievement of these objectives, effective deterrence of nuclear war can continue. ■

The diversity and scope of SAMSO's mission are mirrored by the multitude of programs under its aegis, extending from Space Shuttle integration to new generations of self-sufficient, long-lived satellites.

SAMSO: A Status Report

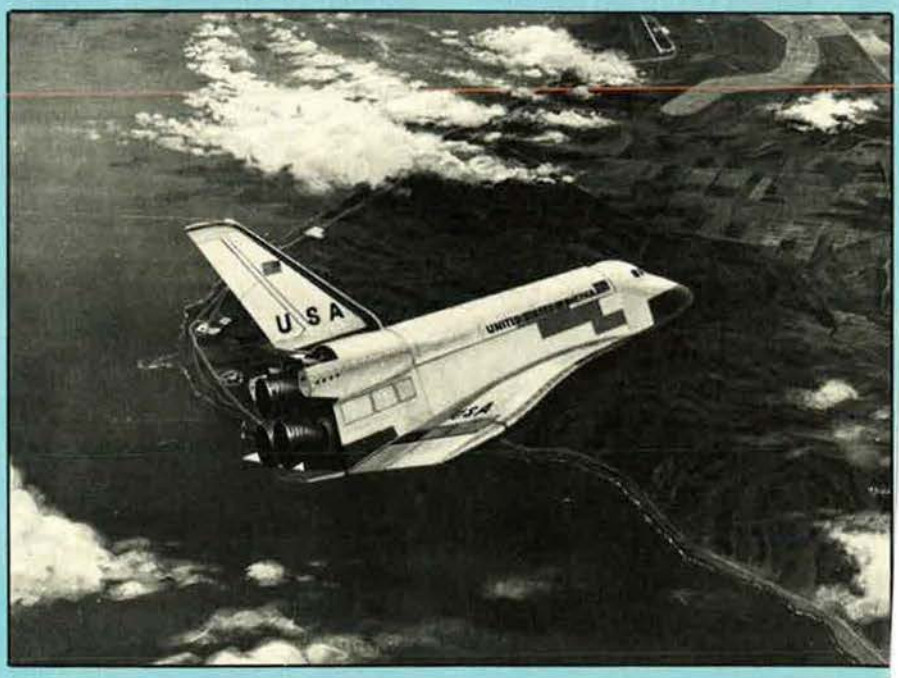
BY EDGAR ULSAMER, SENIOR EDITOR

THE Space and Missile Systems Organization (SAMSO), which is USAF's and the Defense Department's principal developer and operator of space systems, stands on the threshold of possibly greater challenge and potential than when it was founded—unceremoniously and hurriedly—twenty-five years ago.

The goal then—imperative and staggering—was to provide this nation with strategic deterrence by means of ballistic missiles equivalent to or greater in capability than those of any adversary. SAMSO is about to cross a new threshold with the survivably based MX ICBM program that extends the viability of the land-based ballistic missile, and hence of the strategic triad, into the next century. The fundamental decision to enter a "mobile" MX into full-scale engineering development, and to do so without compromising the weapon through commonality with sea-based ballistic missiles, has just been made. But at this writing, the question about basing mode details is yet to be resolved by the Administration, Congress, and USAF.

SAMSO Commander Lt. Gen. Richard C. Henry views the decision to enter MX into full-scale development as an affirmation of this nation's proven policy of "deterrence through strength." Another affirmation, in his view, is SAMSO's space interceptor, or ASAT, program. In concert with related work in space surveillance, spacecraft survivability, and command and control, ASAT can provide the option to make an attack on sovereign US space assets as counterproductive—from the aggressor's view—as would be an attack on the strategic triad after MX comes into the operational inventory, General Henry said.

SAMSO's ASAT program—confined for the time being to research and development—is an insurance policy against unilateral Soviet advantage derived from the USSR's arsenal of operational space interceptor weapons. *(See "Defense Technology: Moving into Space," p. 46, June '79 issue.)* The US ASAT program is all the more important because of the Soviet Union's decision to furnish its space interceptors with orbital rendezvous capability. The US approach, initially at least, would be confined to aircraft-launched homing missiles that intercept targets at low orbital altitudes by direct ascent. The difference is fundamental and portentous. The



Artist's conception depicts a Shuttle Orbiter coming in for a landing at Vandenberg AFB. Shuttle operations will be conducted at Vandenberg and at Kennedy Space Center.

rendezvous technique potentially could make a mockery of the principle that space should remain a sanctuary from warfare.

The Soviet ASAT weapon already has been tested to altitudes of about 600 miles, but through technological growth could reach targets in far higher orbits. The US position that national sovereignty extends into space to each nation's military and civilian spacecraft, therefore, could become fragile if not academic. Space interceptors can shatter the notion of a space sanctuary as easily as high-flying Soviet SAMs exploded the US stratagem of high-altitude U-2 overflight some fifteen years ago. Space sovereignty, it can be argued, begins at altitudes beyond the reach of the other side's space interceptors if there is no "deterrence through strength," meaning the ability of one's own ASAT to mete out a *quid pro quo*. Without a countervailing US ASAT capability, then, even this country's National Technical Means of Verification could become Soviet targets under certain conditions.

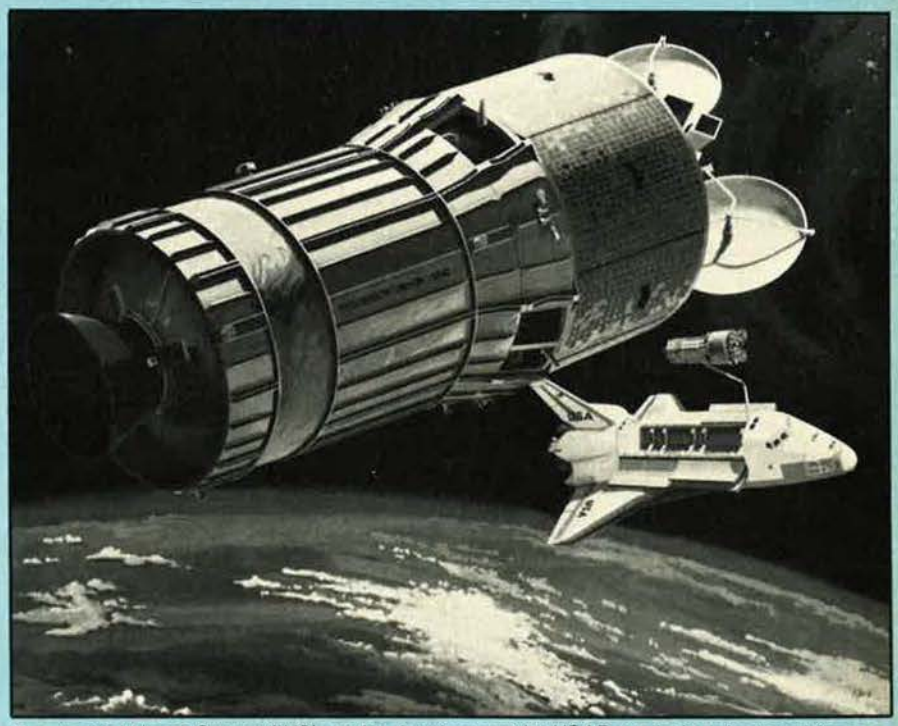
Other SAMSO "Thresholds"

US military space capabilities, General Henry predicted, will gain broadly and significantly from a series of technological thresholds that are about to be crossed. These include the Space Shuttle, a "reliable" new launch system that can be expected to do away with the "agonizing uncertainty" of delivering payloads into space and to pave the way toward placing "military man" into orbit. "One idea that I expect will mature in the next twenty-five years will be a program to put a manned space station into geosynchronous orbit," General Henry said.

The benefits of manned operations in geostationary orbit—22,300 miles above the earth—are major and unique. "It's the only elevated spot in the universe short of a mountaintop where we can put an object, or man, to stay in position indefinitely. A commander in an airborne command post has to fly orbits, expends fuel, and can stay up for only a limited period. The same conditions apply also to spaceborne command posts operating below geosynchronous altitudes, including sun-synchronous orbits. Under such circumstances, the commander's visitation time will be short. Also, unless we put up many command posts in different spots along low orbital paths, we will have to accept the fact that single spacecraft will be in a useful location for only brief periods. On the other hand, if we can place one long-lived manned spacecraft in a geosynchronous position, perhaps over the equator south of Mexico, and another one [in an antipodal] location south of India, we achieve in effect global coverage on an enduring basis," according to General Henry.

The range of capabilities needed to place manned spacecraft into geostationary orbit, the SAMSO Commander cautioned, is not yet in hand. Required are a "maturing" of the Space Shuttle and development of orbital transfer vehicles that can take personnel from the Shuttle's low orbits to geosynchronous altitude as well as the assembly of large structures at this high altitude to serve as space command centers.

Another SAMSO threshold with a dramatic potential, General Henry feels, is a new generation of satellites that use fault-tolerant computer technologies, space sextants, and comprehensive onboard data-processing to function in an "autonomous," and, hence, far more reliable and efficient manner than satellites that depend on constant control from the ground. The fault-tolerant computer, under development by



Two Inertial Upper Stages (IUS), under development by USAF, are being deployed from an Orbiter to deliver payloads to high-altitude orbits or into planetary trajectories.

SAMSO for some time, "will enable us to build spacecraft that heal themselves" through advanced techniques of fault diagnosis and correction. Lastly, by processing more information onboard, "autonomous" satellites will be able to filter out the vast amounts of raw sensor data that at present are being telemetered to ground-based computers. The less that data has to be transmitted to the ground, the greater the opportunity to "protect" limited amounts of vital information that has to be "downlinked." Also, autonomy of spacecraft operation translates directly into higher survivability of the system since ground stations remain the most vulnerable nodes.

Paralleling the trend toward autonomous spacecraft is a subtle but important change in how space systems are perceived by defense planners, General Henry suggested: "We have tended to treat them as components. I argue that we should see space systems in the context of force structure, akin to the net of bases that we are maintaining around the world." The increasing longevity and survivability of highly capable satellite systems buttress the analogy of a force structure in space.

While the potential for hostile action against space systems—either through physical destruction or through interference, jamming, or electronic takeover—is broad, so is the range of options for countermeasures to boost their survivability to a degree far greater than is possible with ground-based systems. "Space," General Henry points out, "is big. It's possible to put spacecraft at altitudes far above geosynchronous orbit, to hide them—that is, turn them on only when needed—or to proliferate them." Even if the Soviets were to develop a direct-ascent ASAT that could reach up to high altitudes without orbital transfer, the time and thrust needed to get there probably rule out surprise attack and create the option for evasive maneuvering.

It is possible also—although not considered essential for the time being—to maintain standby satellites on the ground to rapidly replace systems lost to hostile action. General Henry points out that standby satellites could be placed on Titan II launch vehicles that in turn are deployed in silos to provide quick-reaction capabilities as well as some launch-vehicle survivability. He added, however, that "we have not yet found a mission that requires such an arrangement. For the time being, we plan to fight a war, if one should occur, with what we have on orbit. With sufficient on-orbit spares, we probably will be able to maintain a level of capability satisfactory for wartime needs."

SAMSO and the Space Shuttle

According to Dr. William J. Perry, Under Secretary of Defense for Research and Engineering, the Space Transportation System, or Space Shuttle—compared to the present generation of space launchers—will offer DoD users "increased reliability; increased payload weight and volume capacity; and the capability to recover and refurbish spacecraft for reuse, to conduct on-orbit testing and repair . . . and to assemble large structures in space. Coupled with lower projected launch costs, these unique features promise increased flexibility and economies for our military space operations." The Defense Department bluntly classifies the NASA-developed Space Shuttle as "an integral part of our future military space operations" and DoD is its priority user.

SAMSO acts as the Defense Department's executive agent on the Shuttle program and has direct responsibility—in concert with NASA—for developing important Shuttle-related subsystems and facilities.

The Air Force, through SAMSO, is developing the Space Transportation System's so-called Inertial Upper Stage (IUS), a solid-fuel orbital transfer vehicle that can take Space Shuttle payloads from low earth orbits to high energy orbits, such as geosynchronous altitudes, or place them in interplanetary trajectories. Present forecasts envision a requirement through 1991 of at least sixty-three of these expendable vehicles that will serve both the Defense Department and NASA.

First flight of the IUS is scheduled for late 1980 on a Titan 34D launch vehicle. The first Shuttle/IUS flight is planned for early 1981. (The first manned orbital flight of the Shuttle probably will take place early in 1980, with initial operational capability at Kennedy Space Center to be attained a year later.)

When launched from the Shuttle, the IUS can deliver a 5,000-pound payload to geosynchronous orbit; when operated in conjunction with Titan 34D, the IUS payload is reduced to 4,000 pounds. The current phase of the IUS program—expected to cost about $300 million—involves the development and flight qualification of nine flight vehicles as well as the acquisition and system integration of associated support equipment. Four of these vehicles are to be used aboard the Shuttle, another four in conjunction with Titan 34D, and one special model of the IUS, funded by NASA, will be used for planetary flight.

SAMSO also is developing the Space Shuttle facilities at Vandenberg AFB, Calif. IOC of the Vandenberg Shuttle complex (VAFB) is slated for late in 1983. NASA is responsible for the Shuttle launch

and landing facility at the Kennedy Space Center (KSC).

The Vandenberg facility is needed for high-inclination (relative to the equator) launches involving sun-synchronous, polar, or near-polar orbits that can't be carried out from KSC without unacceptable performance losses and overflight of populated land areas during launch. The Kennedy Space Center site, by contrast, is better suited for Shuttle flights involving due-east launches. Launches of this type take advantage of the earth's rotation and thus maximize the Shuttle's orbital delivery capacity (65,000 pounds in due-east vs. about 30,000 pounds in high-inclination launches).

NASA determined recently that "thrust augmentation," meaning additional liftoff power, is needed to meet the Shuttle's desired orbital delivery capabilities for high-inclination launches. NASA, therefore, is modifying the Shuttle's configuration for operation from VAFB by adding a single strap-on solid motor to each of the Shuttle's two main solid rocket boosters. With this additional power, the Shuttle's maximum orbital payload from VAFB increases to about 45,000 pounds. The Shuttle normally consists of the Orbiter—a stub-winged, piloted vehicle that is part spacecraft and part aircraft—as well as two solid-fuel motors that are refurbishable and an expendable fuel tank. Only the Orbiter "flies" into space and back; the two rocket motors separate from the assembly 120 seconds into the flight of the system and drop into the ocean for eventual recovery. The huge fuel tank is dropped off from space and burns up upon reentry into the atmosphere.

The unforeseen requirement to add two strap-on motors to the system necessitates redesign of the VAFB launch pad and of the launch mount that supports the Shuttle on the pad. Extra thrust is needed first for Shuttle flights supporting NASA's Space Lab (a scientific space station) program during FY '84. For operational as well as cost reasons, SAMSO and the Defense Department decided to revise the design of the VAFB facility now rather than retrofit later on. Congressional approval of the revision has not yet been obtained, however.

The Vandenberg Shuttle complex will start operations at an initial rate of six launches per year. This tempo grows to twenty evenly spaced launches annually by mid-1985 and will be predicated on the use of two Orbiters and one launch pad. The Defense Department now envisions a total of 113 Shuttle flights in support of national security objectives between FY '79 and FY '91, sixty-four from KSC and forty-nine from VAFB. By the mid-1980s all DoD space launches will be carried out by the Shuttle. Titan III—whose production line is scheduled to close down completely by FY '83—will be phased out, even in a backup role.

SAMSO also is in charge of modifying the Shuttle flight control facilities at NASA's Johnson Space Center in Houston, Tex., to permit secure operation of classified DoD missions. Over the long term—beyond the mid-1980s—a dedicated DoD Shuttle flight-control facility will be required, Dr. Perry told Congress. Such a backup capability, he said, "would avoid total dependence on the single mission control facility at [the Johnson Space Center], . . . improve our capabilities for certain missions in the late 1980s, [and] enhance the survivability of our space systems."

Through FY '80, the Defense Department has allocated more than $1 billion to the Space Shuttle program. For the time being, there are no plans to provide the Shuttle with a defense capability or to use the system in any form of space combat. The underlying reason is the Shuttle's intrinsic vulnerability. While the Orbiter can perform maneuvers in space, the laws of physics governing orbital inertia make it practically impossible for the Shuttle to evade nuclear or conventionally armed interceptors or even inert matter placed into a "counter orbit." The velocities associated with counter orbits are so high that even a load of BBs would probably prove lethal to the Orbiter.

Recent claims by Soviet officials engaged in arms-control talks with US negotiators that the Shuttle threatens Russian spacecraft with a "kidnapping" potential ring hollow in light of the Orbiter's vulnerability. Moving the Shuttle in on a satellite—even a US spacecraft—whose thrusters are operating is extremely risky. Since it is easy and inexpensive to mine or in other ways "boobytrap" spacecraft, Soviet "fears" of the Shuttle's "kidnapping" capability are probably feigned and meant to gain negotiating advantages.

The Defense Department's and SAMSO's principal concern about the Shuttle program hinges on the acquisition schedule of the four Orbiters authorized so far and retention of the option to acquire another vehicle "should increases in projected traffic, loss of an Orbiter, or turnaround times longer than now projected require such a decision," according to Dr. Perry. Each Orbiter is expected to fly about 100 missions with a turnaround time of about two weeks.

The Navstar Global Positioning System

In June of this year, the Defense System Acquisition Review Council (DSARC II) authorized full-scale development of the Navstar Global Positioning System (GPS), a network of twenty-four satellites

The Navstar Global Positioning System, under development by SAMSO, will consist of twenty-four satellites to provide worldwide navigation/positioning information.

likely to change warfare on land, at sea, and in the air.

As its name implies, GPS is a space-based positioning and navigation system concerned with the mundane yet vital function of telling its users where they are and where they are going. GPS does its job with unprecedented precision by pinpointing the location of its users within ten meters in three dimensions and, if they are mobile, by gauging their velocity within 0.1 meters per second. This information will be used for command, control, and coordination of military operations of any kind: accurate fire support, all-weather day and night weapon delivery, tactical missile guidance, aerial rendezvous/refueling, photomapping, geodetic surveys, and search and rescue.

When Navstar GPS achieves full operational capability in 1987, the system will be operated by the Strategic Air Command, and will be available with varying degrees of precision to all the military services, the Coast Guard, the Defense Mapping Agency, NATO forces, NASA's Space Shuttle, and such civilian users as the Federal Aviation Administration. Approximately 25,000 sets of GPS user equipment will be operated by the services when the system is fully deployed.

The system's twenty-four satellites will be arrayed in three orbital planes with a fifty-five degree inclination to the equator. Deployed at an altitude of 10,900 nautical miles, this network of satellites will provide constant global coverage. The subsynchronous circular orbits take the satellites around the earth and over their ground control stations twice daily. Mean distance between individual satellites is always greater than 1,500 nautical miles to assure that an enemy can't destroy more than one satellite with one nuclear-armed interceptor. An enemy would have to put out of commission at least six of the satellites in order to erode the system's three-dimensional performance capability.

Each satellite continuously beams navigation/positioning information to earth. User sets on the ground, in the air, or at sea automatically select four satellites in a suitable position, lock on to their signals, and compute the user's position and velocity. The terminals are passive and thus won't betray the user. The satellites will be tracked, controlled, and monitored by a master control center. A "heartland" site is needed to make "uplink" jamming or other interference difficult. Both the up- and downlinks are encrypted to prevent electronic takeover by an adversary.

The Navstar satellite signal is highly jam resistant through advanced protective techniques. Also, an adversary would need enormously powerful ground jammers to jam out six satellites at a time in order to degrade performance in a significant way.

Temporary jamming of user equipment on an individual basis is possible but probably not worth the price of admission. If the user is an aircraft, its antenna will be on top while the jammer usually will be on the ground. In such a case the aircraft will act as a buffer. In addition, the aircraft could be provided with an antenna "nulling" capability to blank out jammers.

Finally, GPS was not meant to replace inertial navigation systems of aircraft. In fact, the two systems complement each other well. GPS provides accurate position updates one or two miles away from weapons-release point, and the inertial navigation system furnishes jamming immunity. Jamming ground-based user equipment is intrinsically difficult because the terrain absorbs the bulk of the jamming energy.

Navstar GPS terminal equipment is being developed for three classes of users: single-channel equipment for static or slow-moving army elements, such as tanks, APCs, trucks, jeeps, and foot soldiers; two-channel units for Army helicopters as well as ships, from LCUs to fast frigates, that provide continuous tracking and compensate for rolling motion; and four- or five-channel aircraft equipment usable by all forms of combat aircraft.

During Phase I of the Navstar GPS Program (culminating in DSARC II), more than 650 field tests of user equipment were carried out in conjunction with three and four prototype satellites as well as a ground-based, pseudo-satellite "inverted" GPS test configuration. The system is being developed in three distinct phases: concept validation, full-scale development, and full acquisition.

Navstar GPS signals, if transmitted without scrambling or other

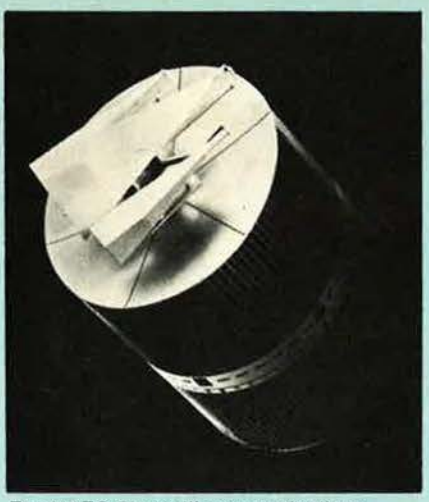
encoding, could be picked up by an adversary. A special data code, called "selective availability," therefore, has been incorporated into the system. Users who don't have the frequently changing code will receive navigation positioning information in a degraded form. SAMSO is working with the system's potential civilian users to arrive at a level of "degraded accuracy" that, while useful to civil aviation and similar interests, won't profit hostile military forces in a significant way.

Launch of the Navstar GPS prototype and replenishment spacecraft from Vandenberg AFB on Altas-F boosters will continue until 1983. That year the first operational satellites will be launched from KSC by the Space Shuttle and IUS. Two satellites will be transported to low-earth orbit aboard the Shuttle. The IUS then transfers the satellites to their permanent subgeosynchronous orbits. Lifetime of individual satellites will be about six years, with performance loss of the spacecraft's solar panels the limiting factor.

Key contractors of the multibillion dollar program are: **Satellite**—Rockwell International's Space Systems Division; **Phase I User and Control Segments**—General Dynamics' Electronics Division, along with Magnavox Advanced Products Division; **Phase I Alternate User Equipment**—Texas Instruments.

SAMSO's Communications Satellites

While a number of classified intelligence and early warning functions have been vital to national security, space, from the military as well as the commercial point of view, has proved to be most fertile in the field of communications.



The NATO Phase III communications satellite system consists of three geosynchronous spacecraft, one active and two on orbital standby, to provide secure communications in Europe.

The NATO III Communications Satellite System is one of SAMSO's major communications programs. It provides the space segment of the NATO Integrated Communications Systems. Funded completely by the alliance, this program consists of three satellites in geosynchronous orbit above the Atlantic Ocean. The system's space segment provides rapid and secure communications among NATO forces through a network of ground and shipboard stations operated by various member nations. Two of the system's three satellites, NATO III B and C, are kept in a "storage mode"; that is, only the satellites' "housekeeping" functions are active, but they can be "called up" for service rapidly. The NATO system is interoperable with the US Defense Satellite Communications System (DSCS). Prime contractor for Phase III is Ford Aerospace and Communications Corp.

DSCS is a worldwide satellite communications program whose space segment is managed by SAMSO for the Defense Communications Agency. Purpose of the system, now transitioning from Phase II to III, is to provide secure wideband (high-data rate) jam-resistant communications in support of worldwide military command control and crisis management. The system serves the National Command Authorities (NCA), the World Wide Military Command Control System (WWMCCS), the Diplomatic Telecommunications Service, the Defense Communications System, the White House Communications Agency, and other agencies and selected allies. DSCS got under way with launch of the first of twenty-six small Phase I satellites in June 1966.

At present, the system consists of four active Phase II satellites and two on-orbit spares. These satellites are equipped with a propulsion system for orbital repositioning. DSCS II's two dish-shaped antennas are steerable from the ground and thus can concentrate their electronic beams on specific ground areas to link up with small, portable ground stations.

The first DSCS III satellite is scheduled for launch next summer, along with one DSCS II replenishment satellite. The first DSCS IIIs will be treated as demonstration vehicles to test the new design in a "fly-before-buy" manner.

DSCS III's multibeam antennas make it possible to shape and distribute the transmitted energy in response to specific needs. The spacecraft's two transmitting antennas each will have nineteen beams. The system's sixty-one beam-receiving antennas can generate antenna "nulls" to counteract jamming.

Orbit life of the DSCS III satellites is expected to be about ten years. The spacecraft is hardened against nuclear effects to levels specified by the Joint Chiefs of Staff. Additional DSCS II satellites are being deployed until production go-ahead on Phase III satel-

lites is granted. Titan III serves as launch vehicle at this time, but operational DSCS IIIs will be delivered to geosynchronous orbit by the Shuttle and IUS. TRW Systems Group manufactures DSCS IIs, and GE's Space Division the DSCS IIIs.

SAMSO is in charge of acquiring the satellites of the Naval Electronics Systems Command-managed Fleet Satellite Communications (FLTSATCOM) system that provides high-priority communications for both the Navy and the Air Force.

FLTSATCOM consists of two on-orbit satellites, each of which contains twenty-three communications channels in the ultra-high and super high-frequency bands. Ten channels are used exclusively by the Navy for communications among forces on land, at sea, and in the air. Twelve channels are allocated to USAF as part of its AFSATCOM system, and a single channel is reserved for the NCA. Atlas/Centaur serves as FLTSATCOM's launch vehicle. TRW's Defense and Space Systems Group is prime contractor.

The Air Force Satellite Communications (AFSATCOM) system provides reliable two-way command control and communications for nuclear-capable forces anywhere in the world. The system's space segment consists of communications transponders on different types of DoD satellites. AFSC's Electronic Systems Division (ESD) is responsible for the airborne and ground terminals of the system. *(See "The Growing, Changing Role of C³I," p. 36, July '79 issue.)* SAMSO serves as the lead division in managing design, procurement, and integration of AFSATCOM, and is responsible for the system's space segment. AFSATCOM achieved IOC this spring with deployment of the full space segment, of terminals on a B-52 squadron and on four airborne command posts, and of a master control station at Offutt AFB, Neb.

The Fleet Satellite Communications system's space component is being acquired by SAMSO. The system serves USAF as well as the Navy.

In response to increasing Soviet jamming capabilities and the ASAT threat, a Defense System Acquisition Review Council (DSARC) acknowledged last January the need for a more survivable AFSATCOM follow-on, the Strategic Satellite System, or SSS. This program is scheduled to move into source selection late this year, but opposition by the House Armed Services Committee casts a pall over its future.

Principal feature of SSS is that it will operate at 110,000-mile altitude, the highest stable orbit this side of the moon. By combining extensive maneuvering capability with extremely high orbital altitude, SSS is considered invulnerable to most foreseeable threats. SSS attains high jam resistance through new technologies first tested on the MIT-Lincoln Laboratory's LES 8/9 experimental satellites. Rather than "null" jamming, this technique relies on spacecraft computers to "process out" jamming.

A long-term SAMSO goal for advanced communications satellites involves laser communications between spacecraft that take advantage of the high data rate inherent in laser communications as well as of their high jam resistance.

The Defense Meteorological Satellite Systems Program

SAMSO's Defense Meteorological Satellite Systems Program (DMSP) presently consists of four satellites in sun-synchronous, 450 nautical-mile-altitude, near-polar orbits. Each satellite can cover the entire globe in about twelve hours to provide real-time weather information and related data to military users as well as to the Commerce Department's Oceanic and Atmospheric Administration.

A fifth "spare" satellite will soon become available for standby launch on forty-five days' notice. Defense weather data is furnished in real time to Air Weather Service and Navy ground and shipborne terminals around the globe or can be stored on-board for later transmission to special readout sites in the United States.

Launch vehicle for DMSP spacecraft is the aging LV-2F Thor booster, but the next generation of advanced DMSP satellites, known as "Block Six," will be placed in orbit by the Space Shuttle. Major contractors of DMSP are RCA Astro Electronics Division; Westinghouse Electronics Corp.; Barnes Engineering; Aerojet Electrosystems Co.; and the Electronics Systems Division of Harris Corp.

SAMSO's ABRES Program

SAMSO's Advanced Ballistic Reentry Systems (ABRES) program deals with the complex and diverse disciplines associated with advanced reentry technology in behalf of USAF as well as other DoD elements. The range of ABRES concerns extends from sophisticated nose-tip designs and materials to decoys and maneuvering reentry vehicles (RVs).

In a fundamental sense, ABRES focuses on efforts to minimize the

inaccuracies in the reentry of ballistic-missile warheads and to increase their survival potential against interceptors. Any change in the shape and weight of an RV affects its accuracy. But erosion, and thus blunting of an RV's nosetip, even under ideal clear and calm weather conditions, is unavoidable because of kinetic heating. The problem gets worse if the RV is exposed to rain, snow, or other forms of moisture. Because water is incompressible, an RV diving through rain at high hypersonic speeds will experience significant blunting of its shape. Moreover, since the exact weather conditions in the target area are not known at the time of the missile's launch, the degree of blunting to be encountered is unpredictable.

Techniques for ameliorating the erosion problem caused by heating include active cooling, such as transpiration cooling, and the use of new erosion-resistant materials, such as carbon/carbon composites.

Another way to keep the reentry vehicle as close to its predicted course as possible is by preventing asymmetric erosion. By keeping the erosion even, the warhead experiences only a range error; if erosion occurs unevenly and alters the shape of the RV, the weapon also will experience a "veering error" that drives the warhead off course. The challenge, therefore, is to induce the rapidly spinning RV to erode asymmetric surfaces faster than symmetric surfaces and, hence, to restore itself to a condition of uniform blunting.

The ABRES program has dealt with these challenges by such methods as flight-testing various nose-tip designs simultaneously to compare their erosion resistance and shape resistance under identical weather conditions. A related ABRES concern is to assure that erosion of the antenna window is in step with the erosion level elsewhere.

Precise fuzing is an important ABRES initiative. Since a warhead that detonates too soon or too late clearly is inefficient, the RV's fuzing is crucially important. This is doubly true because ICBMs flying a minimum energy trajectory (a flight path that equates to the greatest possible distance) arrive at a shallow angle, thus exacerbating the slant-range error problem.

Two specific, major ABRES programs are in progress. The Advanced Ballistic RV, or ABRV, program packs a host of recent technological advances into a new RV that could serve as the follow-on to the MK 12A warhead. The latter is about to be retrofitted to Minuteman III ICBMs and is a candidate for MX. Several ABRV variants are being explored, including a design that would provide a warhead yield greater than MK 12A's 335 kilotons. Several test flights of ABRVs are taking place this year.

Important emphasis is shifting to survivability considerations of another kind: Under the SALT I ABM (antiballistic missile) Treaty, the deployment of weapons to counter ballistic missiles is limited but not ruled out categorically. ABRES has under way a number of initiatives to provide options for coping with Soviet ballistic missile defense systems.

The AMaRV, or Advanced Maneuvering RV, is a technology program that could become the basis for a completely new RV for both ICBMs and SLBMs. RV maneuvering can be induced in one of two general ways. The Navy's MK 500 RV maneuvers by dint of a special design feature that changes the angle of attack, thereby causing the warhead to fly off course. But as the RV rotates, the veering error is evened out and leads to a "barrel-roll" trajectory that makes interception by ballistic missile defense (BMD) interceptors more difficult.

The AMaRV design that ABRES pursues uses infinitely variable controls to determine reentry paths. For the time being, the RV's control surfaces will be activated on a preprogrammed basis, but there are long-term options to update the RV's guidance by such means as Navstar GPS, pulse Doppler map matching, and range-only correlation. Eventually, it may even be possible for a "smart" AMaRV to detect an approaching interceptor and to maneuver out of harm's way.

To round out a reentry system to support both candidates, the development of decoys and their deployment systems is under way. Decoy techniques range from traditional chaff-dispensing methods to more sophisticated technologies employing simulation decoys or electronics.

Maneuvering can serve to evade conventional BMD interceptors or to counter possible future laser weapons by making steering and target tracking more difficult, as well as to improve the RV's accuracy. Precision terminal guidance in the sense of the present generation of "smart" tactical weapons, however, is harder to come by for RVs. Not only must their terminal sensors react far more rapidly than subsonic tactical weapons, but they must pierce the plasma—a state of ionization around the warhead caused by reentry heating that tends to cause severe communications blackouts. The need, therefore, is for high power levels that force sensor signals through the plasma down to the ground and then readmit them to the sensor to provide terminal guidance.

Judging by SAMSO's stupendous progress over the past twenty-five years, it would seem safe to predict that its scientists, engineers, managers, and other experts will meet this and myriad other challenges over the next quarter century. ■

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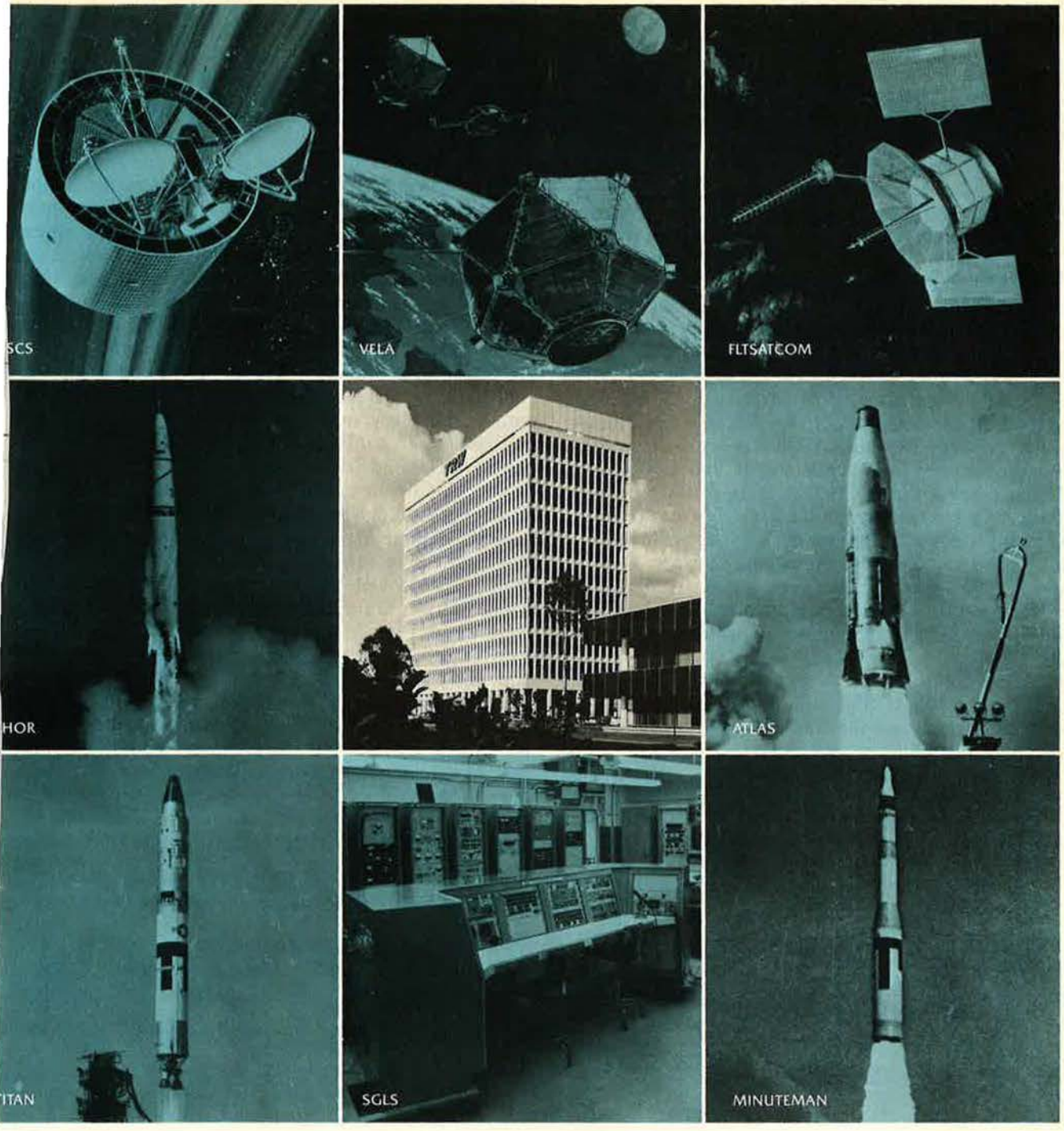

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Every major argument against the MX can be shown logically to be false, or is trivial when set against the benefits to international security inherent in the system.

THE MX ICBM: Why We Need It

BY COLIN S. GRAY

On June 8, 1979, it was announced from the White House that the President had decided to authorize full-scale development of the MX ICBM. There remains some uncertainty over the basing mode, though, increasingly, it seems very likely that it will be some variant of the intermittently hardened trench (with the trenches to be dug in Nevada and Utah). The case for MX development and deployment was put persuasively and accurately by Mr. Carter when, in a news conference on May 29, 1979, he said "[t]he most destabilizing thing that we could have in our strategic relationship with the Soviets would be acknowledged inferiority or a vulnerable strategic deployment of missiles." Quite so. It is unfortunate that Mr. Carter did not feel as strongly as this in 1977 or 1978, but still, better late than never.

The June 8 decision is to be applauded, but it should not be assumed that that decision is irreversible. Very obviously the decision reflects Mr. Carter's (accurate) reading of the domestic politics of the upcoming SALT II ratification debate. The Administration's willingness to trim its deepest strategic doctrinal beliefs in aid of Senate ratification is not in dispute. What is in dispute is whether or not the Administration understands, and endorses, the strategic case for the MX ICBM. If the pro-MX decision of June 1979 has been taken for the wrong reasons (*i.e.*, essentially in order to appease SALT skeptics in the Senate), there is a very substantial risk that Mr. Carter's interest in MX may not long survive the SALT ratification debate. Readers may recall that in 1977 Mr. Carter canceled the B-1 at the point where prototypes were actually flying.

It is very important for the American public to understand that the MX ICBM, with its $30 billion (over ten years!) price tag, is not the equivalent of a welfare check for US defense industry. We need this weapon system for the most basic and serious of security reasons. The MX ICBM is essential for US security, for the security of forward-placed friends and allies, *and* for the prospects of the SALT process. The Arms Control and Disarmament Agency (ACDA) should be ecstatically happy with the President's pro-MX decision. Of course, it is not, but that is a subject deferred for comment later on in this article.

The MX Debate

There are several layers of debate concerning the future of the US ICBM force. First, there is the basic question: Should the United States retain an ICBM force at all? There are no Iron Laws of Strategy that assert that a strategic force posture should have three major components, nor that one of those components should comprise an ICBM deployment. However, it is well recognized that there is merit in diversity and that, from choice, one would rather not simplify the tasks of Soviet target-planning staffs. Aside from the attack complication for the Soviets posed by the existence of a US ICBM force, that force, if survivable, has some unique characteristics that our defense community finds very attractive. These include ease of real-time communications, readiness, accuracy, reliability, and flexibility. Also, there is a rather basic feeling that it cannot be healthy for Western security for the United States to be coerced, in peacetime, out of its ICBM deployment.

Second, although most commentators are able to agree upon the desirability of retaining a *survivable* ICBM deployment, there remains the question of which ICBM should be deployed. The New York *Times*, for example, in an editorial of June 13, 1979, favors survivable ICBMs, but not survivable MX ICBMs. The MX ICBM, of ninety-two-inch diameter, with close to 8,000 pounds of payload, and probably bearing ten 350-kt. Mk. 12A MIRVs, is guilty, in the New York *Times* assessment, because it will pose a threat to Soviet silo-housed ICBMs. The question of the size of the missile raises very directly the issue of deterrence philosophy and employment policy. Many of those people who oppose the large MX missile, but who favor redeploying Minuteman III far more survivably, essentially have an "after-the-fact-punishment

philosophy" of nuclear retaliation which they deem (a) to be adequate for all plausible deterrent requirements, and (b) to be nonprovocative in arms-competitive terms.

The Soviet Adversary

The time is long past when, as a bold experiment in unilateral arms control (which we hoped would be reciprocated by duly educated Soviets), we should halt or delay weapon programs on the alleged grounds that they would be provocative in Soviet eyes. The principal mission of MX, in time of war, would be to take out, in a suitably definitive manner, Soviet hard targets (silos, C^3 nodes, storage sites for nuclear weapons perhaps). In Soviet perspective, one might fairly call this program provocative: That is exactly what it is intended to be. MX is not designed to kill Soviet citizens or to blow down factory buildings; it is designed to wage war against the more blast-resistant important elements of the Soviet military and political structure. Given the fact that the Soviet Union has a militarily intelligent war-waging focus in its strategic doctrine, one should anticipate the Soviets greeting a serious US MX program with considerable dismay.

Readers should recall just why it is that the United States has been driven, very belatedly, to decide to deploy a high-payload (for the US) land-movable ICBM. Strong critics of MX are fond of charging the US with "starting another round in the nuclear weapons race." There can be no excuse for such a dishonest formulation. The US is being driven to change the basing mode of its ICBM force simply because the Soviet Union, in its richly varied fourth-generation ICBM deployment (the SS-17 through -19 with their several alternative warhead packages [four in the case of the SS-18])—duly licensed by SALT—is placing our silo-housed ICBMs under sentence of prelaunch death. As of today, given the Soviet ICBM test accuracies observed and deduced, and given the rate of modernization, by late 1980 or early 1981, less than one-third of the Soviet ICBM force should be able to destroy ninety percent or better of our ICBM force in its silos. In this context, to claim that the decision to deploy MX would start another round in the nuclear weapons race is analogous to blaming the Poles for firing back in self-defense when they were invaded in 1939.

The Soviets have told us, quite unambiguously though indirectly, what their views are on strategic stability. Those views are expressed most clearly through program *actions*. The Soviets have acquired a very major hard-target kill capability, are beginning to deploy an answer to the US ALCM threat (which will mature through the mid-1980s) in the SA-10, and have under way a very large civil-defense program. The serious Soviet military literature says virtually nothing, directly, about "stability." Like SALT, it is not a planning factor of great importance. But that literature, classified and unclassified, offers a portrait of Soviet military style and intention that is fully consistent with program deeds. At some risk of appearing to be simplistic, the Soviets believe that wars can happen, and that it would be the duty of the Soviet defense establishment to seek to win them. "Winning" requires the defeat of the enemy's armed forces and the limitation of damage to the Soviet homeland.

A major—probably *the* major—function of MX deployment will be to deny Soviet defense planners plausible theories of victory, or of escalation dominance. The United States should not endorse one-way-street concepts of stability. Given that the Soviets are threatening US ICBMs, there is no reason why that threat should not be reciprocated with interest. Moreover, as is developed below, the United States can threaten the Soviet ICBM force while avoiding most of the alleged instability problems that are supposed to follow.

MX: The Reasons Why

Every major argument that has been leveled at MX is either (logically) demonstrably false, or is trivial when set against the benefits to international security of the system. Too many pro-MX papers and articles have been defensive in tone—thereby according undue respect to the position of arms-control ideologues. Before stating the base-case for MX, two caveats need to be registered. First, it is the right system, but the lead-time for the program is distressing. We need an initial operating capability in 1982, not 1986. Second, although MX is essential for an adequate strategic posture, it alone is not the complete answer to our strategic problems. It needs to be matched to an employment policy far more intelligent than that extant, and, on the home front, it has to be backed by a modernized air defense system and by a dedicated nonmarginal civil-defense program.

The US defense community will debate almost anything except strategy. Conservatives and liberals alike are guilty of talking about weapon systems when they should be discussing strategy. If they can settle upon a sensible strategy, the hardware implications tend to be reasonably obvious. So, what is the case for MX? In summary form, the MX ICBM:

- Should deter the Soviets from pressing further down the hard-target counterforce path. Suitably deployed, and with the possible back-up of preferential terminal ballistic missile defense (BMD), the Soviets could not profitably target MX.
- Should pose the Soviets an impossible arms compet-

"The time is long past when . . . we should halt or delay weapon programs on the alleged grounds that they would be provocative in Soviet eyes."

Colin S. Gray is a member of the professional staff of the Hudson Institute, Croton-on-Hudson, N. Y. He holds a doctorate in International Politics from Oxford University, and in 1973–74 was a Ford Fellow at the Department of War Studies, University of London. Prior to joining the Hudson Institute staff, Dr. Gray was an Assistant Director of the International Institute for Strategic Studies in London. He has been a frequent contributor to this magazine, is the author of several books on defense affairs, and has written extensively on strategy and arms control for European and US journals.

itive task (*i.e.*, they could not counter it directly, militarily), hence the Soviets might, for the first time, have a genuine, and very pressing, incentive to attempt to negotiate a large draw-down in strategic offensive force launcher numbers through the SALT process.

- Should serve as a massive firebreak against any Soviet incentive to seize the initiative in a military breakout from a local crisis. With their well-known war-waging doctrine, Soviet defense planners would be given an appropriate headache by a US ICBM force that they could not attack in any expectation of securing a favorable cost-exchange ratio (of payload expended for payload destroyed).
- Should permit an American President to exercise sub-SIOP level central nuclear strikes, confident in the knowledge that he would not be inviting a massive Soviet countermilitary reply. Limited options of many varieties are only prudent and possible if the US has a survivable MX deployment. At the present time, any US resort to limited strike options would be an invitation to the Soviets to respond with a devastating, though still constrained, countermilitary reply.
- Should make an enormous difference to the US ability to wage and survive a central war. It is not obvious that intra-war deterrence is a concept acknowledged in the Soviet Union. US deployment of the MX ICBM should increase quite dramatically the prospect of Soviet cooperation for early war termination.

Stability and SALT

Apart from saving the US government the embarrassment of being compelled by Soviet offensive-force improvements to have to resort to a dyad of SLBMs and manned bombers/cruise missile carriers, the MX ICBM, deployed survivably, is innocent on all instability charges. Contemplating this US program, the Soviets have the following policy options: They can oppose it directly, and attempt to build enough warheads to saturate the system, but this will not work if the US chooses, sensibly, to marry trench or multiple protective structure (MPS) housing to preferential ballistic missile defense; they can elect to live with a US system that poses a theoretical first-strike threat to their ICBM force (one should not be too sympathetic with the Soviets vis-à-vis the survivability of their ICBMs—after all, they do have nearly 950 SLBMs and they are being given a free ride for Backfire deployment under the terms of SALT II); they can seek to invest in a more survivable ICBM basing mode for themselves; or they may prefer to close off the hard-target counterforce race through SALT.

The strength of the trench (or MPS) movable MX deployment program is that US security is served by the program, regardless of the Soviet choice of response. Some commentators, foolishly, have argued that the MX program makes sense *only* within the framework of SALT II. In other words, the basing mode will be survivable only if the Soviets can be held to the payload fractionation sub-limits that have been agreed. (There is some fuzziness concerning the details and their interpretation, but it is the US understanding that the Soviets, until December 31, 1985, are held to a ten-MIRV deployment on the SS-18, six MIRVs on the SS-19, and four MIRVs on the SS-17. As with much of the more important details of SALT II, these fractionation sub-limits are *not* verifiable. One mod of the SS-18 has been tested simulating a fourteen-MIRV menu. We cannot verify whether SS-18s are deployed with ten or fourteen warheads.) It is very likely that the payload fractionation sub-limits for SALT II were negotiable precisely because they are irrelevant. For the very limited duration of SALT II (until December 31, 1985), there will be *no* MX deployment, and SALT II-licensed modernization will permit the Soviets to deploy nearly 6,000 high-yield MIRV warheads on their fourth-generation ICBMs (and there are only 1,054 US ICBM silos, plus, at most, a couple of hundred other hard targets).

The principal lesson of the SALT process to date is that each side is rewarded in the negotiations as is appropriate to its unilateral effort. SALT reflects the real world; it does not change it. The United States has a problem in 1979: either it modernizes its strategic forces with some urgency, or it slips into a position of strategic inferiority, meaning that in the event of acute crisis, or war itself, we lose and they win. This problem should come as no surprise. The Soviets have been improving the quality of their strategic forces in a fairly steady, nondramatic way. For how long does the United States think it can allow the Soviet Union to outspend it on strategic forces on the order of three-to-one, and yet somehow evade serious security problems?

It is ridiculous to argue that we need SALT in order to contain the potential threat to our ICBM deployment. With a current MX initial operational capability of 1986, no one knows what, if any, SALT constraints will apply that are relevant to the security of that deployment. Moreover, it should never be forgotten that the Soviets, in the determination of their SALT negotiating positions, are not moved by abstract (Western) concepts of stability. SALT is a tactical concern for the Soviets, as it should be for us, also. If the Soviets should ever agree to a SALT régime that would really cut quite heavily into their freedom of program action vis-à-vis investment in war-waging muscle, the motive would have to be that they discerned an inferior alternative. To be precise, they would judge that the dominant alternative to a SALT régime which they did not much like would be a United States at least moderately alarmed and moving into semimobilization with respect to investment in strategic systems.

The Case Against MX

The path to hell, so we are told, is paved with good intentions. MX is anathema to many people because it will threaten that nearly seventy-five percent of Soviet offensive force payload that is locked up in their ICBM deployment. What are the dangers that they discern? The

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Sperry Update 8

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

Specialized Sperry equipment aids Project Galileo.

Sperry involvement in the space program continues with the award of contracts for two systems to be used in the Project Galileo spacecraft, which is expected to orbit Jupiter in mid-1985.

Innovative, high reliability systems from Sperry will link main sections of the craft electrically and will also perform precision pointing and control of the science experiment platform.

Under a contract from Jet Propulsion Laboratory (JPL), Sperry's unique Spin Bearing Assembly, with a Sperry-patented roll-ring, will complete an electrical circuit between the spinning and non-spinning sections of the orbiter.

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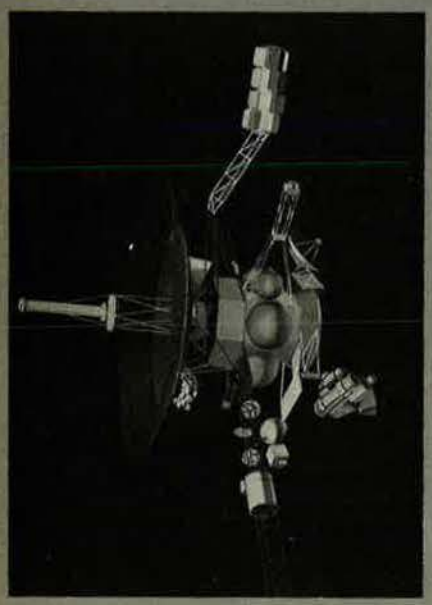
Also to be provided under JPL contract is a Sperry Standard Articulation System (SAS-A), a fully integrated mechanical and electrical system which will provide extremely accurate pointing of the spacecraft's science scan platform.



Sperry provides digital flight control for 737s.

Shown here is equipment included in Sperry's SP-177 digital flight control system, which will replace the analog system formerly used in the Boeing 737 airliners.

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The aircraft will also be equipped with air data computers and cockpit displays.

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following constitutes a fair sample of the claimed prospective evils:

- In a moment of acute crisis, the Soviet Union would launch its ICBM force for fear of losing it to a US first (MX) strike.
- The Soviets will respond to the "provocation" (!) of MX by "going mobile/movable" with their ICBM force—and the US could not verify ICBM numbers in such a deployment mode.
- MX is a "war-fighter's" weapon and will fuel the illusion that nuclear wars can be waged and survived (if not necessarily won).

These are not straw targets; these arguments have very real political significance and require direct refutation.

First, the "crisis instability" case against MX is, by definition, false, because MX is to be based "survivably." (If it is not, this author would not endorse it.) If we grant, as we should, the survivability of the MX basing mode, against what target set does the USSR launch its vulnerable ICBM force? Does anybody believe that the Soviet Union would escalate into, or in, a central nuclear war, leaving the US ICBM force untouched? There are some issues of degree here. No matter which basing mode we select for MX, with or without synergistic preferential BMD assistance, the Soviets could draw down that force, but only at a truly prohibitive price in payload expended. In short, *survivable* MX ICBM deployment is the key to victory-denial for the Soviets. The "crisis instability" claim vis-à-vis MX appeals only to those people who share the insane vision of nuclear war as a terminal society-destroying event. Soviet military strategy, as best we can determine, is dedicated to the *defeat*, not to the punishment, of the enemy. *(See* Soviet Strategy for Nuclear War, *by Joseph D. Douglass, Jr., and Amoretta M. Hoeber. Hoover Institution Press, Stanford University, Stanford, Calif., 1979.)*

"The 'crisis instability' claim vis-à-vis MX appeals only to those people who share the insane vision of nuclear war as a terminal society-destroying event."

Second, it is indeed entirely possible that the Soviets might respond to our MX deployment with a countervailing land-movable/mobile ICBM deployment of their own. (It is possible that the Soviets already have deployed a mobile ICBM, the SS-16. This mobile ICBM was tested very successfully, but has not been deployed in any *acknowledged* way as yet. Unlike a trench-movable MX, the SS-16—as with its ugly smaller sister, the SS-20 IRBM—is a truly *mobile* system.) If the Soviets should decide upon a mobile ICBM basing mode, they would have to devote many rubles to concrete (instead of weapons)—which threatens us not at all—and the size of their missiles would probably have to decrease. As for the claim that the United States could not verify Soviet ICBM deployment vis-à-vis a mobile basing mode, several comments are appropriate: (1) We cannot verify Soviet ICBM production and stockpiling today. Several hundred Soviet ICBMs could be readied for firing, overnight, from soft sites; (2) Although Soviet ICBM production is shrouded in some considerable mystery, the Soviets could not possibly stuff a trench or MPS system with additional missiles on short notice. Soviet defense industry is working close to capacity already. Those commentators who suggest that the Soviets could secretly deploy real ICBMs to fill many of the holes or places in a trench or MPS system need to display more convincing detail concerning Soviet industrial mobilization potential than they have thus far.

Third, MX is not in disgrace for being a war-fighter's weapon. No arms controller known to this author can guarantee that, at some point, the United States will not have to fight a war with the Soviet Union. Neither MX, nor any other weapon system, will serve to persuade reasonable men that nuclear war can be conducted lightly. MX cannot guarantee success to American arms, but it should ensure failure for the Soviet Union. Critics of MX should not be allowed to forget that the "war-fighting" case for MX is, really, supportive of pre-, and early intra-war deterrence. The Soviets are most unlikely to enter into, or choose to expand, a war that they believe they cannot win.

A Brighter Future

It would be difficult to exaggerate the importance of the MX ICBM, but it is less difficult to exaggerate just what MX may accomplish for US and US-allied security. As specified earlier, MX has to be married to a vastly improved US strategic nuclear employment policy (*see my article "Soviet Strategic Vulnerabilities,"* AIR FORCE *Magazine, March '79*), and to a serious set of programs for the physical defense of North America. We may unravel the Soviet political-military machine through the rigorous prompt employment of MX, but if the cost is 100,000,000 dead Americans, ours will be a Pyrrhic victory.

Whatever the doubts we may harbor concerning his motivation, the President's pro-MX decision of June 8, 1979, is to be welcomed. The Soviets are now on notice that the substantially unilateral hard-target counterforce party will be over (though not soon enough). Proponents of MX should not be apologetic over the silo-killing potential of the system—that is a principal source of strength. The prospects for SALT III were enhanced greatly by the President's decision in favor of MX. ■

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With the recent assignment of A-10s to US Air Forces in Europe, the Air Force has completed its "triad" of tactical airpower in the NATO area. This is how the wing will train, and if necessary fight, in the European theater.

A-10 Close Support Operations in Europe

BY BRIG. GEN. RUDOLPH F. WACKER, USAF
COMMANDER, 81ST TACTICAL FIGHTER WING

THE latest addition to Air Force tactical airpower in the NATO area is the Fairchild A-10, operated by the 81st Tactical Fighter Wing here at RAF Bentwaters-Woodbridge in the UK. The wing, which had been equipped with F-4s for a good many years, got its first A-10 in January of this year and is scheduled to receive the last of its new birds during the first quarter of FY '81.

Tactical airpower, here as elsewhere, has three classic missions: interdiction, air superiority, and close air support. In the old days, the F-4 did all of these things. Then we got the F-111 to pick up a lot of the interdiction. Last year, the F-15s joined US Air Forces in Europe as air-superiority specialists. The A-10 completes the triad as we pick up the close-air-support specialty. F-4s are still going to "swing" in whatever direction is needed to give us a mass capability in any of these areas, and later the F-16 will fill the swing role.

The biggest threat to our soldiers here in the NATO area is armor, and the A-10 is uniquely designed and equipped to operate at the Forward Line of Troops. It can work either within the tactical air control system, or outside of it, in very close coordination with ground forces.

Our concept for performing this mission is new. We will operate at forward sites and maintain our aircraft in the rear. We'll have 108 A-10s at RAF Bentwaters-Woodbridge in six squadrons. They'll perform most of their tactical work within the Federal Republic of Germany from forward operating locations (FOLs) like the one at Sembach. Up to eight aircraft at each location will work for the Army on a daily, mission-by-mission basis.

We will operate in the Allied Tactical Air Force (ATAF) tasking system. We'll be flying some low-level missions and doing low-altitude tactical navigation at our gun-

nery ranges. We've already talked with American division commanders, and expect to coordinate with our NATO ground force commanders soon. There is a high demand for A-10 support.

The Forward Locations

We will deploy to forward operating locations as flights. Each flight commander will be in charge while his unit is at the forward location; however, he will work under the direction and command of the FOL commander who functions as a mini-wing commander. The FOLs will be manned by about fifty permanent people, including four officers: a commander, an operations officer, a maintenance officer, and an administrative officer. The remainder will be crew chiefs who will be augmented by supply and transportation people. Aircrew personal equipment and life-support people and munitions load crews will be deployed with the flying personnel.

Personnel will be rotated to the forward locations for three-week periods of TDY. Those around in the early sixties remember the "tac rote" program, where rotating units left the CONUS for two or three months at a time and often would end up being on "temporary" duty for more than half of each year. I'm concerned about the potential for this now. With six squadrons and the manning factors now projected, the pilots will be TDY twenty-eight percent of the time. Exercises, static displays, and demonstrations will add to the TDY load.

Basically, the logistics of the maintenance mission at the FOL is to remove, replace, and make quick fixes. For major maintenance, aircraft will be flown to England, or a repair team from Bentwaters will take in any needed parts and equipment. The concept is designed to keep our logistics base at RAF Bentwaters out of proximity to a potential war zone. What we will deploy to the FOLs is a lean, mean, and compact fighting unit that has a minimum of logistics support.

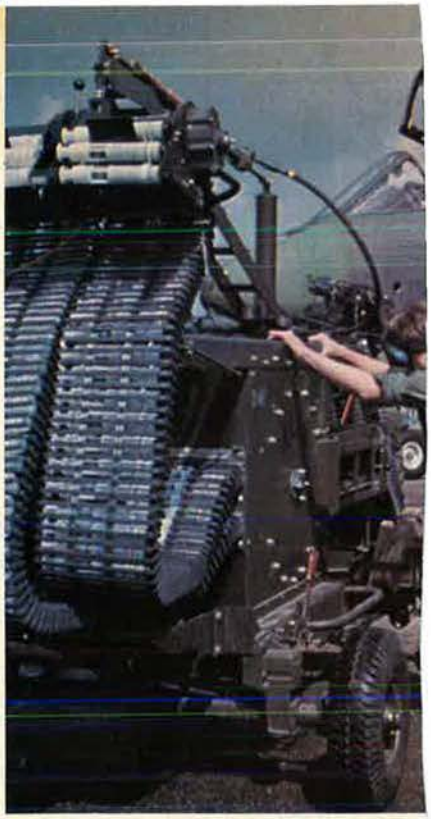
The first of the four peacetime FOLs has been activated at Sembach AB, Germany—Detachment 1 of the 81st Tactical Fighter Wing. Three other FOLs are being planned at Leipheim, Alhorn, and Norvenich, all German Air Force (GAF) bases. During contingencies, two additional GAF FOLs would be opened for our last two squadrons.

The basic reliability and simplicity of the A-10 opens other new possibilities for deployment. USAFE is presently studying the possibility of operating the A-10s during wartime from dispersed operating locations such as stretches of the Autobahn. Based on the Tactical Air Command's tests at Bicycle Lake Army Air Field (an unimproved dry lake bed in Southern California) and the Red Flag exercises in Nevada, the A-10 should be able to operate routinely from austere sites such as we're thinking about in a dispersed operations program.

The Aircraft

The A-10 doesn't have a batch of electronics to keep in commission. It's a simple airframe with plenty of reliability. What little electronics there is, like the head-up display, is advanced and reliable. The need to give us some navigational assistance at low levels is well recognized and, in the near future, an inertial navigational system (INS) will be added. The 81st TFW is scheduled to get the first of these new systems in a few months. Eventually all A-10s will get an INS retrofit. Until that mod comes along, we will continue to "train like we'll fight," learning the terrain, roads, and other characteristics of our operational area. I'm very pleased that so many of the 81st pilots already feel comfortable within 100 miles of our first FOL without a map—and they've only been operating there for a few weeks.

The aircraft has fantastic survivability built in. All electronic or hydraulic systems can be run from either engine, or from an auxiliary power unit. If the redundant hydraulics were lost, the aircraft still flies with cables between the stick and control surfaces. There's also armor around the pilot and fire-re-



The A-10 (right) is the first USAF aircraft designed specifically for close air support. Our experience in Vietnam and the presence of a huge Soviet armored force in Europe spurred production of the plane. An A-10 receives ammunition for its 30-mm gun from the Automatic Loading System (above left) and Maverick missiles (above right).


USAF
K46

tardant foam in the fuel tanks. Any fuel tank can be isolated if damaged. All of this combines to make it a very survivable system.

The 30-mm GAU-8 is the basic weapon of the A-10. The airplane and the mission are built around it. All of the aircraft capabilities and advantages come together when the pilot puts a tank in the gunsights and squeezes off a few rounds. If it's done right, there's one less tank for the ground guys to worry about, but the gun gives us another advantage. Because of its lethality and the A-10's low speed, the pilot can find, track, and kill a tank without overflying it. That's a real advantage for any pilot in a high-threat environment. In a fast mover, you can't identify your target and get set up in one pass—you're simply moving too fast. But the A-10 is just like a kid throwing rocks at a rattlesnake—you stay out of his reach and throw those 30-mm rocks until he's no longer a threat.

I would say that our gun is going to become more and more impressive as an antitank weapon in the European area. Its power and flexibility could make it the most effective new weapon in the theater.

The A-10 is capable of carrying all the conventional ordnance, including the "smart" weapons, in the Air Force inventory with the exception of air-to-air and antiradiation missiles.

The A-10 flies with typical fan engine-type fuel conservation. The pilots who have flown afterburner airplanes most of their careers have a difficult time getting used to the lack of a power "kick." A-10 pilots just have to plan ahead better. Nevertheless, it is the most honest airplane I've ever flown. It's simple to operate and very comfortable. The aircraft is responsive in every axis. When it's in full stall, it will roll easily and the nose will point wherever you want it at almost any speed.

It operates nicely off short runways, where standard takeoff distance is around 2,000 feet. It lands in less than 2,000 feet. It's an air-to-air refueler's dream. The pilot drives up to the back of the tanker and inserts the boom between his toes. I suspect if a good boomer would hold the boom still, the A-10 pilot could refuel himself and the boomer wouldn't have to do anything—it's that stable.

Pilots flying the A-10 are unanimously optimistic about the A-10's survivability—even in the European threat environment. We all hear from our supersonic brothers that unless we fly fast enough to keep our hair on fire, we won't survive. (No matter that at high speeds an armored target is difficult to detect and identify, much less attack with a reasonable probability of success.) Remember that we don't need (or intend) to overfly our target array while we kill it. Our engines don't smoke or make a lot of noise to give away our position, and aside from the very remote possibility of actually being blown out of our low-altitude environment by a large missile warhead, the aircraft is designed to absorb hits, keep on fighting, and then get the pilot home.

I have to admit to an early concern about my pilots' attitudes in converting to a big, slow, ugly airplane and a single mission. I can assure you that my fears were unfounded. Next time you come across a pilot wearing an 81st Blue Dragon patch, ask him about his airplane and his job.

Tactics

The A-10s, flying from the FOLs, will have numerous options open to the pilots because of the aircraft's airborne endurance and its capability to operate from austere locations. For example, with four

Brig. Gen. Rudolph F. Wacker has commanded the 81st Tactical Fighter Wing at RAF Bentwaters, UK, since May 1977. Much of his career has been in fighter units, including a combat tour in F-4s during the Vietnam War. He also has served in the Air Staff as action officer for Southeast Asia interdiction operations and as Chief of Tactics in the Directorate of Operations. In the early 1960s, he was a military training instructor at the Air Force Academy. Prior to his present assignment, General Wacker was at the Tactical Air Warfare Center, Eglin AFB, Fla.

AGM-65 Maverick missiles and a fully loaded 30-mm gun, the airplane could fly 150 miles, stay over the target area for two hours, and return with twenty minutes of fuel remaining.

The average mission-ready pilot, operating in a target-rich environment, should be able to handle about fifteen attacks (not reattacks) of which twelve or thirteen should result in kills.

With the same load, the aircraft also could go 100 miles, strike a smaller target array immediately, and land at a dispersal location such as an Autobahn—some twenty-five miles from the target area and only five minutes away by air. The pilot then could go on ground alert with the internally mounted aircraft power unit turned on to maintain communications, and be ready for quick response to requests for additional air support. In that scenario, it is likely he could return to the same target area several times before returning to the FOL or main operating base for refueling and rearming.

The air-to-air threat is constantly reevaluated as A-10 tactics are developed. At the altitudes we expect to fly, enemy interceptors pose almost a negligible threat. The A-10 is extremely difficult to detect and even tougher to track for air-to-air gunnery. Interestingly, a careless interceptor pilot quickly changes from the hunter to the hunted and generally will find himself outmaneuvered by the A-10 and always outgunned.

Training

I can't say enough about the quality of the people in this program. They're just outstanding. This applies to the A-10 cadre Tactical Air Command provided for maintenance and also to the aircrews. We're getting roughly equal percentages of experienced USAFE people, first assignment instructor pilots from Air Training Command, and experienced TAC people. The remainder are from Undergraduate Pilot Training. They're all good people and a welcome addition to the wing.

The training program at Davis-Monthan AFB in Arizona is multiphase. There's a conversion course that F-4 pilots go through—those from mission-ready units in USAFE. There's a more extensive transition and training course for pilots from other sources. It's all programmed so that an entire squadron, composed of different experience levels, comes out the graduation end of the checkout program mission-ready.

We wanted to transition from F-4s to A-10s with a minimum loss of capability, and I think the fact that we maintained the capability with F-4s to cover our NATO commitments from the end of January through April, and at the same time brought our squadrons of A-10s on the line, is really important. This hasn't been done before, but the Davis-Monthan program will let us do it.

We will train as we will fight, but that doesn't mean spending all our training hours in the treetops. We don't spend that kind of time in a high-threat area. My view is that we will fly only so low as required by the threat and mission.

We must know our operating areas, we must read maps and contours. We can't fly an altimeter. We must have calibrated eyeballs. That takes practice. I believe it's going to be a very easy airplane to operate, but less easy to deploy well because situational awareness at low level will be essential to success and survival. Constant training at low level, careful understanding of the dynamics of the airplane, and a mature approach to the mission are our objectives.

The keys to safety are good training programs and a mature professional attitude among the people. That's true of any organization or any aircraft. I don't anticipate any safety problems as we take over a larger and larger part of an absolutely vital mission for which the A-10 was designed—close air support. ■

A-10s in the UK (left) will deploy to FOLs in Germany. A guard (above) watches over an A-10 at Sembach.

BMT: Something Old, Something New

Each year, 75,000 young men and women are introduced to Air Force life at the Basic Military Training Center, Lackland AFB, Tex. Despite changes in facilities, curriculum, and methods, the traditional spirit of basic training continues to dominate the six-week program.

BY MAJ. CHARLES G. TUCKER, USAF, CONTRIBUTING EDITOR
Photos By MSgt. Hal Markuson, USAF

At 4:59 a.m., the west corner of Lackland Air Force Base is wrapped in a shroud of darkness. The stillness of the early morning is broken only by the murmur of an occasional cool Texas breeze.

A minute later, as if by the closing of a switch, "all hell breaks loose," as one young airman describes it. The darkened dormitories along Truemper Street explode into the brightness of Times Square as waves of light flood the dormitories and shatter the peaceful sleep of 8,000 young men and women undergoing Basic Military Training (BMT). Military Training Instructors (TIs), in their classic manner, rouse the sleepy troops with "good news": Another training day has arrived, and PC (physical conditioning) starts in fifteen minutes. The TIs' shouting is overpowered only by a taped bugle call of reveille blasting unmercifully from speakers throughout the dormitories.

Havoc reigns. Trainees hit the floor, the same thought rushing through each freshly shorn head: Avoid the certain castigation reserved by the TI for any trainee late to formation. A broken shoelace or missing sock can spell a crisis at this crucial moment.

BMT—1979

For these first few minutes, Air Force Basic Military Training is exactly as 3,000,000 alumni remember it. Only one change is readily apparent: the setting. Most of the old, "temporary" Korean-era wooden mobilization barracks are gone. The eleven basic military training squadrons are housed in modern, air-conditioned concrete dormitories like those lining Truemper Street. Each three-story dormitory can house a thousand trainees, and contains squadron staff offices, and often a dining hall and a small dispensary. The ground floor has been left open for drill, PC, and outdoor activities in bad weather or before the sun comes up.

The BMT center at Lackland hosts about 75,000 young men and women each year. Most report that the six weeks of intensive training is a rewarding experience. Except for the male trainees' first haircut and the 5:00 a.m. wakeup routine, almost all of the stereotypes of basic training reinforced by Jack Webb's movie, "The DI," or TV's "Tribes," have been laid to rest.

Because the Air Force needs self-disciplined young airmen, not combat foot soldiers, there's been a shift of emphasis from the more rudimentary "soldiering" skills to those needed by a mature, responsible airman who can successfully complete specialized training and become a useful, productive member of the Air Force.

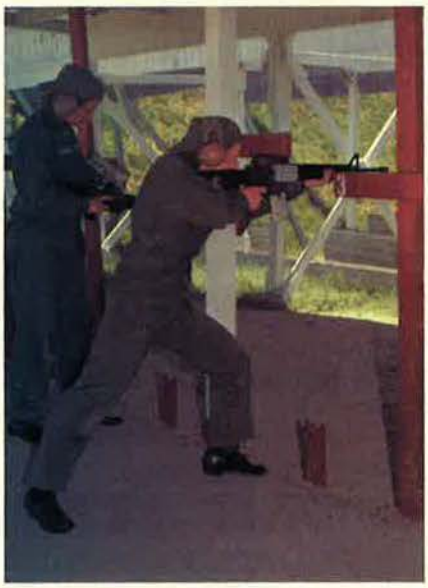
The mission of Basic Military Training, simply stated, is to prepare regular, Reserve, and Air National Guard recruits to serve in the Air Force. The mission is accomplished in 360 hours of classroom instruction, drills, processing lines, and a confidence course that adds up to thirty action-filled training days. As one BMT squadron commander remarked, "The course is just rough enough to tax their minds and bodies, and just lax enough to allow them to ask 'why?' and get an answer."

Men and women undergo identical training, are assigned to separate flights in the same squadron, live in different wings of the same dormitories, and compete, for the most part, for the same Air Force jobs. Their TIs, who are male and female USAF NCOs, handle both male and female flights. By mixing men and women into coed squadrons of 900-plus trainees, it is easier to manage the large numbers of airmen on base than when women were in separate squadrons. Consolidated squadrons have meant better utilization of the thousand-person dormitories. Officials say the consolidated squadrons also are more effective in orienting the trainees to the Air Force environment where men and women train and work side by side. These factors will be even more important later this summer when the trainee population on Lackland is expected to swell to more than 11,000.

Physical Skills

A new physical conditioning program calls for exercise and running every day at 5:15 a.m., except those days when field training or details are scheduled. The PC program consists of limbering exercises followed by ones designed to tone up the whole body. Many of the traditional exercises such as push-ups,

Trainees undergo confidence-building exercises (left) and small-arms instruction (lower left) as part of BMT. Modern air-conditioned dorms (below) have replaced the wooden barracks of yesteryear.



sit-ups, and deep knee bends have been replaced at the recommendation of Air Force physicians who found that they caused a high incidence of spinal injuries when improperly performed.

Course officials say the newer, less-strenuous exercises have not resulted in a decline of the trainees' physical fitness. The net effect has been a sharp reduction in training time lost to sprains and pulled muscles.

For the first two weeks, exercises are followed by a timed, hopping routine resembling jumping rope. The hopping is used to prepare trainees for running which begins in the third week. Starting out at three-quarters of a mile, trainees progressively build up to a mile and a half by the sixth week. They are then tested against a standard of

sixteen and a half minutes to run a mile and a half.

An ancillary of the PC program is weight control. Trainees are weighed when they arrive at Lackland and must be within USAF weight standards before they are graduated. Those who are overweight or within ten pounds of the maximum for their age and height are counseled by a dietician. They are reweighed each week, and any who fail to show adequate progress in shedding extra pounds are placed on a stringent, supervised diet. If, by the end of BMT, a trainee is still overweight, he is assigned to a flight of newer trainees so he will have additional time to bring his weight within the standards.

Field Training

The military training courses, although relatively unchanged from the '50s and '60s, have kept pace with modern teaching methods. Modern audiovisual teaching methods and self-paced programmed learning textbooks are used to augment classroom instruction, followed by practice, practice, and more practice.

Small-arms training teaches weapons handling and use. Since few airmen regularly use a weapon in their Air Force jobs, this is the only time many of them will receive small-arms instruction during their USAF careers. Men and women fire identical courses for qualification, and are awarded the Small-Arms Marksmanship Ribbon if they score high enough.

Standard USAF 5.56-mm M-16 rifles, fitted with .22-caliber adapters, are used in the training. The adapters have meant a substantial savings in the cost of small-arms training. The smaller .22 rounds cost two cents each, compared to fifteen cents for a standard M-16 round. Range instructors told AIR FORCE Magazine that the cheaper round has not adversely affected the quality of instruction or the trainees' score. They say the number of trainees with experience handling firearms before entering the Air Force is decreasing noticeably, and the .22 round, which is quieter and has less recoil, is better adapted to the young, inexperienced shooters.

Work details are still an integral part of the course. Dining halls on Lackland have been contractor-operated since 1974, but this has not meant an end to KP (Kitchen Police), or "Mess Attendant," as it is now called. Trainees are not allowed to prepare or serve food in the dining halls; however, they unload delivery trucks, operate dishwashers, restock dish and silverware dispensers, and scrub floors.

In the Classroom

Classroom instruction provides training in a variety of courses relevant to the trainees' future assignments and their personal lives.

Military Law covers the Uniform Code of Military Justice, types of discharges, and courts-martial. It is teamed with a course titled Rights, Freedoms, and Responsibilities that discusses citizenship, the Code of Conduct, and the Law of Armed Conflict. There is the traditional instruction in Air Force Customs and Courtesies. Seven hours of instruction on Personal Affairs focuses on pay and allowances, leaves and passes, and referral agencies on base that may be of assistance in unique situations.

Early in the BMT program, trainees are instructed in the USAF's Equal Opportunity and Treatment Policies and Procedures. This is a course on human relations and the importance of communication in relating to other Air Force members.

A three-hour Air Force Career Advancement Course covers the USAF enlisted force organization, USAF training programs, educational opportunities, career progression, and the Air Force policies concerning assignment of its enlisted force.

Another three hours are devoted to Air Force History and Organization, the echelons of command within the USAF, the US Total Force Policy, and the organization and responsibilities of the major commands.

There are introductions to Air Force communications security, drug and alcohol abuse, and first aid. Self-paced textbooks are used to teach environmental protection and protection against chemical warfare.

The course on personal financial management has been expanded in response to reports from the field that one of the problems most frequently experienced by young airmen is poor management of their pay. Most trainees had jobs before they enlisted, but many do not know how to manage a checking account. The course also covers financial planning and various savings programs available to service members.

All trainees complete a course on personal hygiene, sex education, and birth control. A course on rape prevention was originally developed for women trainees, but now is given to the men also. A film titled "How to Say 'No' to a Rapist and Survive" is shown to all trainees. A seminar for women explores the nature of that threat and

A Typical Training Day at BMT

0500–0615	Reveille/Physical Conditioning/Showers
0615–0730	Breakfast
0730–0830	Dorm Preparation for Inspection
0830–1130	Academic Classes or Processing
1130–1230	Lunch
1230–1630	Academic Classes Drill Practice Inspection (Personal) Retreat
1630–1730	Dinner
1730–1830	Mail Call/Briefings
1830–2100	Dorm Preparation/ Study Time Personal Hygiene
2100–0500	Lights Out

discusses myths about rape that are commonly held by our society. The seminar for men is geared toward responsibilities and consequences.

Officials report there is a list of subjects field commanders say need to be taught at BMT. As time to teach new subjects becomes available, they are added. It would be impossible to teach all the proposed subjects, however, without extending the course beyond six weeks, an alternative that is unlikely in light of current budget restrictions.

Despite the changes in facilities and curricula, the traditional spirit of basic training remains unchanged. The course continues to be the spit-and-polish operation that has characterized it since it moved to Lackland from Harlingen AFB, Tex., in 1946. One recent graduate told AIR FORCE Magazine, "It was just as effective in preparing me for my first assignment as my dad said it was for his first."

For most of the young people arriving at Lackland (an average of 350 each duty day), the first few days still qualify as a crisis point in their lives. A recently implemented "buddy system" has helped new recruits deal with the trauma of facing this new environment by sharing problems with another who is in the same situation.

Changes in the Trainees

The number of women continues to increase. The percentage of female nonprior-service enlistees has increased from 5.1 in Fiscal Year 1972 to a programmed 19.5 in Fiscal Year 1979. Presently, about one-third of the trainees recruited to serve in the Air Force Reserve and Air National Guard after basic training are women.

It is not unusual to see trainees wearing one or two stripes on their uniforms upon graduation. Trainees enlisting for six years are advanced to E-3, while four-year enlistees in critical specialties are advanced to the grade of E-2 when they finish. Also, since February 1979, former Civil Air Patrol and Junior ROTC cadets have been offered similar accelerated promotions to E-2 and E-3, depending on their length of participation, as an enlistment incentive.

At Lackland, former cadets are also given the opportunity to bypass basic training by demonstrating proficiency at passing inspections, marching, and completing examinations on classroom academic subjects. Only a few trainees elect the bypass option, and very few of them are successful. As the TIs point out, neither high school ROTC nor CAP is intended to be a substitute for Air Force Basic Training.

Trainees' motives for enlisting are interesting. In an informal AIR FORCE Magazine poll, the opportunity to learn technical skills and to participate in educational programs were the two reasons most frequently given for enlisting. (Lackland officials report that more than ninety percent of the trainees go on to specialized courses after they complete basic training.) The opportunity for travel frequently was cited by women. Of approximately 125 trainees interviewed, two said patriotic service was their primary reason for enlisting; however, most mentioned it as a secondary motivation.

Men and women said that while money was not a primary factor in their decision, the security of guaranteed employment was a positive persuader. Most said collateral benefits such as medical care, commissary shopping, and base-exchange discounts offset the decrease in pay they took when they left civilian jobs.

A significant number of men were married and have more than one child. Most of the married women said their spouses are members of the Air Force, and cited the attractiveness of USAF's liberal join-spouse assignment policy. Many trainees have completed at least one year of college. Almost all former college students said they plan to continue their education on a part-time basis while on active duty.

Men and women reported a predominantly antimilitary sentiment among their peers, yet said the same friends who chided them for enlisting admitted that military service offers educational and training opportunities not widely available in the civilian job market.

The trainees polled gave recruiters high marks for their honesty and thoroughness in presenting the opportunities of an Air Force career.

Effective Training

Asked what they liked the most and the least about basic training, trainees in their first week at Lackland responded, "The food" and, "My TI," respectively. When the same question was asked of trainees about to graduate, the responses were the same, but the order was reversed.

The total turnabout in perspectives, typified by responses to that question, might summarize the effectiveness of basic training today. BMT explores the future in terms of an Air Force career that's full of responsibility, rewards, and pleasant experiences available to anyone who wants to make the effort.

Perhaps the value of the course is reflected in the comments of one trainee who spoke with AIR FORCE Magazine just before boarding a bus that would take her to Keesler AFB, Miss., for three months of specialized training: "In the six weeks I've been here at Lackland, I've grown up. My TI has taught me to believe in my abilities and to trust others. No one had taught me those things before. Today I'm leaving Lackland with a far better idea of where my life is headed than I've ever had before. It's an experience and a satisfaction I've never known. I wish my friends could know it also."

As she spoke, a blue bus arrived from the San Antonio airport. Out of the bus filed a small part of the trainees arriving at Lackland that day.

Nearby, a master sergeant wearing the blue campaign hat that identified him as a TI, yelled, "Welcome to the Air Force and Lackland Air Force Base. We've got a great time in store for you, and you're gonna love it here!"

The expressions of uncertainty and apprehension on the faces of the new arrivals made an interesting contrast to the confidence and anticipation displayed by the Keesler-bound graduates. One can reasonably surmise that in six weeks you could return to that same bus stop and watch as today's new arrivals depart Lackland, having completed basic training. Their message might be the same as millions who preceded them: "We learned a lot more here than the basics of military service." ■

Continued success of the Air Reserve Forces is threatened by budget constraints, population trends, other stresses. The future of the Air National Guard and Air Force Reserve may well depend upon support of aggressive recruiting and continuation of the reserve components' technician program

Air Reserve Forces Face Increasing Difficulties

BY BONNER DAY, SENIOR EDITOR

THOUGH one of the military success stories of the past decade has been the Reserve Forces of the Air Force, new pressures threaten to make the future less promising.

The success of the Air National Guard and the Air Force Reserve came at a time when the armed forces in general have suffered reverses. During a period when the armed forces have declined in numbers, the Air Reserve Forces components experienced a small but significant growth.

All the services have reported increasing difficulties in recruiting, and shortages in essential skills for the active-duty forces. AWOL and desertion rates have risen to record highs in the Army and Navy. The All-Volunteer Force concept is increasingly under attack, and support in Congress for a return to the military draft is on the increase. As for the armed forces reserves, Congress has been reminded time and again in recent years that they are in trouble. USAF Gen. David C. Jones, Chairman of the Joint Chiefs of Staff, issued this warning in his first annual report to Congress:

"While heavy reliance is placed on the reserve components, their readiness continues to be hampered by significant deficiencies. Personnel shortages are the most serious."

The heart of the problem is a decreasing number of young people who are willing and able to serve in the armed forces.

In the face of this trend, the successful record and performance of the Air Reserve Forces is even more remarkable.

The Air Force Reserve was the nation's only reserve component to exceed its end strength goal, 53,000, in 1978. It plans to increase to an average strength of 57,353 in FY '80. Significantly, today's force is more than 6,000 larger than the 46,998 reported a decade ago, when the draft was in effect.

Similarly, the Air National Guard achieved an end strength of 91,674 in FY '78, and is expected to increase that figure slightly in FY '79 to 92,900 as it moves toward an eventual goal of 99,000. This force is not as large as Air Guard leaders would like, but it will support ninety-two percent of the projected wartime requirements of the Air Guard. By comparison, Air Guard strength a decade ago was 85,000.

The Air Reserve Forces units thus have survived the uneasy 1973–76 transition period when the military draft, a historically strong incentive for Reserve and Guard enlistments, had ceased. And, more important to Air Force planners, the two reserve components have shown they can grow in a peacetime environment.

Maj. Gen. John T. Guice, Director of the Air National Guard, reported his units in the past year have achieved the highest rate of combat readiness in the Guard's history, with ninety-seven percent of the major units rated by the Air Force as combat ready. The Air Force Reserve held its largest mobilization exercise ever last year, involving 20,000 Reservists, and has scheduled an even more sophisticated exercise for this summer.

Recruiting has not been easy. Army Maj. Gen. LaVern E. Weber, Chief of the National Guard Bureau at the Pentagon, says the Air National Guard will meet its programmed strength levels, but "only by an inordinate allocation of time and effort."

Maj. Gen. Richard Bodycombe, Chief of the Air Force Reserve, is more optimistic. He says he does not anticipate any difficulty in reaching the FY '79 average manning level. He expressed concern, however, over whether the Reserve will be able to continue to attract enlistments in several critical skills.

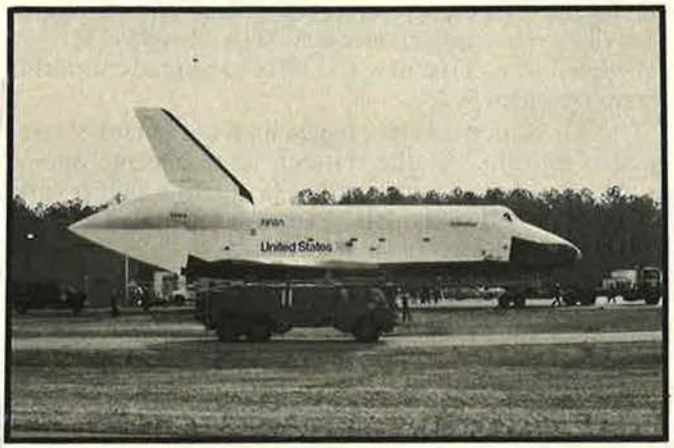
Reasons for Success

In the years ahead, even greater pressures are expected on the Air Reserve Forces. These include a shrinking population of military-age Americans, greater competition from other active and reserve military forces, and an increasing burden of missions and training exercises. Reserve leaders are already reacting to the new pressures, but the effect on strength and morale of units remains an unknown in the US military equation.

The success of the Air Reserve Forces so far, unique within the Defense Department, has been a practical laboratory on leadership and personnel policies.

The variety of reasons offered by Defense and Air Force officials for this success can be summed up as superior personnel policies. The special character of the Air Force, with its emphasis on aerospace technology, an attractive career field with interesting and high-paying civilian-related jobs, has been a factor. But more than any other service, say Defense personnel experts, the Air Force has been quick to spot new personnel trends, adept at taking advantage of new congressional legislation and Administration policies, and innovative in dealing with manpower problems.

One of the big boosts for the Air Reserve Forces was the congressional legislation known as the Reserve Bill of Rights. As administered by the Air Force, the 1968 law permitted the assignment of reserve rather than regular officers in key reserve positions. The Air Force Reserve command was established August 1, 1968, as a result of the law. Reserve units quickly began assuming new missions and setting operational records. Says General Bodycombe, who is a reservist brought on active duty: "It is important for reservists to know they are being led by reservists."



Fire protection coverage is provided by an Air Guard fire-fighting unit while the Space Shuttle is being moved.

The Air Reserve Forces also have been aggressive in supporting the "Total Force" concept. The result has been that Reserve and Guard units are treated the same as active-duty units and are given similar operational and training missions. Increasingly, they are also being given first-line aircraft, rather than rejects of the regular forces.

During the past year, eleven of the Air Guard's thirteen strategic refueling units provided a tanker on continuous alert in support of the Strategic Air Command. The Guard and the Reserve have assumed a full-time C-130 tactical airlift support mission in the Panama Canal Zone. Eleven Air Guard interceptor units maintain aircraft on continuous alert, helping to protect the continental US and Hawaii against air attack. In November 1978, Reserve C-141, aeromedical evacuation, aerial port, and maintenance crews assisted in the airlift of the bodies of Americans killed in the Jonestown, Guyana, massacre.

Aircrews and medical personnel from the Air Force Reserve helped in the evacuation of Americans from Jonestown, Guyana.

Reserve officers say the use of reserve units for active-duty missions has played a major part in building unit morale and encouraging enlistments and reenlistments.

Another factor cited are the duties of part-time airmen. Says General Bodycombe: "Air reservists often are assigned work that is related to their civilian occupations or is interesting as a part-time hobby. It is the low-paying and hard-labor jobs that we have difficulty in filling." It is the opinion of Air Force leaders that the Air Force has fewer numbers of the less-attractive jobs than the other services.

A fourth boost to Guard and Reserve units has been the technician program, in which qualified civilians are hired in full-time career reserve jobs. During the week, they provide day-to-day management and administrative continuity. During reserve training periods, they work as military members of the reserve unit.

Attack on Technicians

The Air Guard has more than 22,000 technicians. Eighteen percent of the Air Force Reserve, about 6,900, are technicians.

General Bodycombe says the technician program is one of the main reasons the Reserve Forces have been so successful. But this program is under attack. Congress has directed a test of Air Force and Army technician billets to see whether they can be converted successfully to full-time active-duty military positions for savings in personnel costs. For the Air Force Reserve, the test involves sixty-eight technicians in FY '79 and 161 positions in FY '80. For the Air National Guard, the test involves

Air Force Reserve crews flew relief supplies by C-130 from the Canal Zone to assist Honduras hurricane victims.

526 positions in FY '79 and 390 more positions by September 30, 1980.

The test so far shows the Reserve Forces having difficulty getting quality full-time reservists at the rank and pay currently authorized. Some technicians already have resigned in anticipation that the technician program will be phased out entirely.

Air Reserve leaders say the technician conversion program threatens the continued success of their units. One officer monitoring the program recently told AIR FORCE Magazine: "This conversion program was designed to address Army problems; the Air Force, which has a successful reserve program, should be exempted."

Maj. Gen. William Lyon, who until his recent retirement was head of the Air Force Reserve, has been one of several vocal supporters of the technician program. In a March farewell appearance, he told Congress that the test would be followed by a complete phase-out of technician positions: "They're going to militarize those technicians, and I'm here today to tell you that when you do that with the Air Force Reserve, you run the risk of degrading that readiness over the years." He asked Congress to "take whatever action you can, whatever is appropriate, to exclude the Air Force Reserve from that program."

Supporters of the technician program say this force provides stability and continuity that would be lost if the jobs were militarized.

The biggest factor in the success of the Air Reserve Forces has been the reservists themselves. These are men and women who must pass tough standards of intelligence and training and must be willing to give up a large part of their lives to serve in a reserve unit.

"It takes a person with a lot of dedication and ability to juggle a full-time job and hold down a reserve position," says Col. Frank B. Myska, head of the Air Force Reserve Operations and Plans Division.

In the typical reserve unit, the officers and men are older and more experienced than an equivalent unit in the active forces. In head-to-head competition, the reserve unit often outperforms the active-duty unit.

As individuals, reservists constantly are called upon to make hard choices between their families, careers, and recreation, and their loyalty to a reserve unit. Those willing to make the sacrifice provide the unit with high morale and efficient performance.

In the Air National Guard last year, as an example, fourteen states maintained a 100 percent manning level, eleven had ninety-six percent of their authorized strength, and the rest had ninety percent or more of their permitted strengths, according to Col. Robert E. Stevens, head of the Air National Guard Personnel Division.

New Aircraft to Reserves

The policy of giving reserve units new planes rather than castoffs of the regular forces has affected morale positively.

The Air Force Reserve converted the 915th Tactical Fighter Group at Homestead AFB, Fla., to F-4 fighter-bombers on March 15, some nine months ahead of schedule. This gives the Reserve eight fighter units, including three F-105s and four A-37s, of a planned force of twelve units. Important for morale purposes, say Reserve leaders, is the opportunity given the Reserve to share fighter missions with the Guard.

All three of the squadrons involved in the Reserve KC-135 conversion attained combat-ready status far in advance of programmed dates. The first unit reached combat-ready status in just three months, the second unit in five months, and the third unit in three and a half months.

The first KC-10 aircraft, part of the Air Force's initial buy of the new aerial tanker force, will be assigned to the Strategic Air Command and based at Barksdale AFB, La., but will be flown and maintained by both SAC personnel and members of the collocated Reserve Associate Air Refueling unit. The Reserve also has one C-9, thirteen C-141, and four C-5 Associate Airlift units collocated with Military Airlift Command transport wings in the unique ten-year-old Reserve Associate program.

The Reserve also plans to announce soon its schedule to convert units to the F-16 and A-10. Long-range plans call for the Reserve to convert additional units to fighter and close-air-support aircraft. The Reserve also is scheduled to receive new C-130Hs to upgrade its airlift forces *(see also p. 25)*.

The Air National Guard began its KC-135 tanker conversion in 1975. As the thirteen units became operational, they began participating in rotating tanker task force operations in the UK. They are scheduled soon to begin operations in Guam and Alaska.

New A-7 aircraft permit the Air Guard to keep four aircraft on station full-time in the Canal Zone, providing close-air-support missions in joint training exercises with the US Army.

This summer, two Air Guard squadrons are scheduled to be converted to A-10 aircraft and the new-production C-130H will be added to the Air Guard inventory. The Guard plans to retire all F-100 tactical fighters by October.

The new aircraft, along with other reserve programs, however, are not considered sufficient to maintain the success the Air Reserve Forces experienced during the past decade.

Reserve leaders are particularly concerned about reenlistments, as retaining an experienced reservist saves the cost of training a new enlistee. But the Air Guard has

experienced a steady decline in its retention rates since 976.

Recruiting Bonuses

To help improve reserve recruiting, Congress last year provided bonuses and educational benefits for the first time to reservists. The Defense Department has asked that the recruiting devices be extended in FY '80. The bonus is for $1,500; half is paid when the enlistee completes service schooling, and the remainder is paid over the six-year enlistment period. Reenlistment bonuses are $1,800 for six years and $900 for three years. Bonuses are paid only for skills that are experiencing shortages. At present, the Guard pays bonuses to enlistees for thirty-two specialties and to those reenlisting for fifty-eight specialties.

Air Guard 2d Lt. Marilyn Koon, assigned to a KC-135 unit, graduated with the first class of Air Force women pilots.

In the educational option program, the Air Force agrees to pay half of an enlistee's educational expenses, up to $500 a year for four years.

The Air Guard reports that in the first four months in which the new recruiting incentives were offered, eighty signed up for the bonus program and one asked for the educational assistance option. Recruiters complained that restrictions left them with too little time to use the incentives sufficiently during the first fiscal year of the two programs.

The Air Force also has asked for a larger number of reserve recruiters in recent years. The Reserve has budgeted 284 recruiters for FY '80, or eighty-four more than in FY '79. The Air Guard went from 340 recruiters in FY '78 to 401 in FY '79.

Still, recruiters report difficulty in obtaining sufficient numbers of aircraft maintenance, munitions and weapons maintenance, and food-service people. The Air National Guard is spending too much time and effort on recruiting that "could and should be devoted to maintenance and training for combat readiness," says General Weber.

Adding to the problems of reserve leaders has been the expanded use of reserve units for active military missions. Each year the Guard and Reserve are asked to do more, until a growing number of commanders say that the Reserve Forces have reached a point of diminishing returns.

"If the reserves are asked to do much more than they are doing now, there is a serious danger that performance will suffer, morale will drop, or both," says one reserve officer.

Plans calling for an increase in Guard and Reserve strength in coming years may relieve some of the pressure. But reserve officers warn that the individual reservist can be asked to do only so much before his responsibilities to his civilian job and family suffer.

"We have reached the saturation point already," says one top Air Force Reserve officer. He cited as an example the case of one reserve officer, a high school teacher, who was spending fifty days a summer on reserve activities.

One Guard officer comments: "We are squeezing every bit of work we can out of reserve units, but the long-range effect is detrimental to the reserves as they continue to lose members through resignations and declining reenlistment rates."

Growth in Reserves

The Air Force Reserve in 1969 consisted of 370 planes and 47,000 people. This year the Reserve, with more than 450 aircraft supported by 54,000 people, flew 76,000,000 passenger-miles and airlifted 5,600,000 ton-miles of cargo.

The Air Guard in 1969 had 1,438 aircraft and 85,000 people. This year the Guard, with 1,522 aircraft and 92,500 people, provided one-quarter of the Air Force tactical fighter capability and seventeen percent of the strategic refueling aircraft.

Today the Guard is responsible for sixty percent of the Air Force air defense interceptors, half of the tactical reconnaissance aircraft, and a third of the tactical airlift. The Reserve provides seventy percent of the US hurricane reconnaissance missions, flies the only Air Force aerial spray missions—used to control insects—and provides fifty percent of the Air Force gunships and thirty percent of the service's special-operations helicopters. Altogether, the Reserve Forces furnish about half of the Air Force's aircrews.

Can the Reserve Forces continue their current pace in the Total Force concept? Reserve officers say much depends upon the funding of recruiting incentives and the future of the technician program. If sufficient support for these two programs is provided, say reserve officers, the Guard and Reserve not only will be able to carry out its present share of Air Force missions, but in the decade ahead can take over an increasing part of the burden. ■

The author argues that the US may no longer be capable of waging attrition warfare and should consider maneuver strategies—the classic strategies of inferior forces.

The American Style of Warfare and the Military Balance

BY EDWARD N. LUTTWAK

NATIONAL styles differ in war, as they do in the pursuits of peace. Embodied in the tactical orientation of military forces and revealed by their structures, these national styles reflect not only the material and human attributes of societies but also their collective self-image. That is why the attempt to transplant a national style of warfare into the armed forces of another nation, with a different pattern of strengths, weaknesses, and social relations, usually fails. One recalls vividly the failure of Egypt to practice Soviet-style armored warfare in 1967, and equally her success with her own tactics, at least during the first days of the 1973 war.

To each his own, therefore. But even so, a fatal dissonance can arise: National styles of warfare, embedded as they are in culture and society, may retain their domestic authority even while being overtaken by changes in the external military environment. Particularly dangerous are those changes which are subtle and cumulative rather than overt and dramatic. The latter may awaken attention and stimulate a rethinking of military methods and structures which may yet save the situation. But when change is slow and not manifest, routines are apt to go on as before, until the sudden and catastrophic discovery of inferiority in war itself.

Attrition vs. Maneuver

There is now a real danger that the American style of warfare is being overtaken by precisely this kind of change in the external military environment. Even while the Soviet Union is closing the quality gap in one dimension of military strength after another, and even while the United States's overall military resources are declining relative to those of the Soviet Union, she holds on to the belief in her own material superiority. To be sure, the official spokesmen of the services constantly remind us of the growing Soviet advantage in the numbers and the steady improvement in the quality of Soviet weapons, and yet the *operational* implications of these facts have not been absorbed. The American national style of warfare remains unchanged: It still presumes a net superiority in material, for it is a style based on the methods of attrition rather than maneuver.

We all know what attrition is. It is war in the administrative manner, of Eisenhower rather than Patton, in which the important command decisions are in fact logistic decisions. The enemy is treated as a mere inventory of targets, and warfare is a matter of mustering superior resources to destroy his forces by sheer firepower and weight of materiel.

Maneuver, by contrast, is not a familiar practice in recent American military operational form. In fact, in the language of the US Army, maneuver is frequently confused with mere movement, or at least offensive movement. Maneuver may well call for movement, but it is very much more than that. It can be applied not only in ground combat but in all warfare, and indeed in all things military, even research and development. Maneuver describes "relational" action—that is, action guided by a close study of the enemy and *his* way of doing things—where the purpose is to muster some localized or specialized strength against the identified points of weakness of an enemy that may have superiority overall.

Maneuver thus depends much more on Intelligence (and intellect) than attrition warfare, which can almost be a matter of mere procedure. It also entails a higher degree of risk. But while the side that has materiel superiority can choose freely between attrition or maneuver, the side whose resources are inferior overall can only prevail by successful maneuver. If an inferior force remains tied by tradition and attitude to low-risk or low-payoff attrition methods, it must be defeated. In the cumulative destruction of the forces ranged against one another which characterizes an attrition contest, the inferior force will inevitably be exhausted first.

American Concepts Out of Date

It is not surprising that maneuver warfare is so unfamiliar to American military men—in whose self-image materiel superiority still looms large—while it is almost instinctive to those who see themselves as inferior in resources, be they from Vietnam or Israel.

It is by now obvious that the US Army, Navy, and Air Force would no longer enjoy an automatic superiority in materiel if confronted by the forces of the Soviet Union, and yet their structure and their methods still implicitly

reflect the presumption of a net advantage in resources.

The US Army, for example, has recently promulgated a new manual of tactical doctrine for a major conflict in Europe (FM 100-5). This is a doctrine of pure attrition: Soviet forces are expected to attack in deep columns of armor, and the Army means to oppose them by positioning armor and infantry battalions in their path—some pushed forward to act as a "covering force," but the bulk concentrated on the main line of resistance. Advancing Soviet armor is to be defeated by sheer firepower, in sequence: First air attacks well forward of the battle line, then artillery (with precision munitions), then the guns and antitank missiles of the yielding "covering force" in a shoot/fallback/shoot sequence, then the main forces with their own guns, missiles, and small arms. Single battalions are to leapfrog one another in a slow withdrawal, to reload with ammunition so that they can resume the orderly administration of firepower. Catch phrases associated with the new doctrine have an industrial sound: "force-generation," "target servicing," etc. The invading enemy is treated as a mass of individual targets to be destroyed one by one, with the strength of the defense in firepower being ranged against hard armor. No attempt is made to seek out and exploit weaknesses in the *modus operandi* of the enemy or in his array of forces. No thought is given to the possibility of attacking the long flanks that columns of armor must necessarily have. The Army's new doctrine thus continues to presume a net superiority in firepower: US forces are to "mow down" Soviet armor as British imperial infantry once dealt with the Zulu *impis*. The British won, though they were outnumbered as the US Army would be today, but unfortunately the Soviet forces are not Zulus and they will not be outgunned.

A Maneuver Defense for NATO

A maneuver defense for the North Atlantic Treaty Organization (NATO) would be quite another thing. Far from seeking to muster strength against strength in a frontal clash of firepower vs. armor, it would rely on attacks against the weak points of the Soviet array. For example, Soviet divisions draw their resupply from convoys of trucks following in their wake, 1,800 trucks for each tank division and 2,200 for each "motorized rifle" division. Behind each hard wedge of armor there is the soft column of unprotected and road-bound trucks. A maneuver alternative to the Army's new doctrine might deploy all-armored and highly agile strike forces which would sidestep the oncoming thrust of Soviet armor columns, penetrate through the spaces between the columns, and then advance deeply enough into the enemy's rear so that they could then turn to attack the "soft" traffic of artillery, combat-support and service units, and supply columns following in the wake of the Soviet armor.

While American tanks and combat carriers would be formed into these strike forces, the infantry (which is already well equipped with antitank missiles) would be placed in the path of the Soviet advance to form resilient and amorphous defense zones. The aim would be to slow down and *embed* the enemy armor spearheads rather than to destroy them in costly combat. In the meantime, the strike forces would be on their way, to advance in parallel to the advancing enemy columns before turning to wade into them.

While American battle tanks could no doubt do much better against trucks and artillery carriages than in tank-to-tank combat, the operational goal—as in all genuine maneuver—would not be so much to destroy enemy resources as to dislocate the enemy's scheme of operations. Instead of being faced with an entirely predictable frontal resistance (which they are well organized to defeat), Soviet commanders would be confronted by confused entanglements and sudden emergencies in their own vulnerable rear, as the elusive strike forces attack road-bound traffic, only to disappear (when attacked in turn) to come back and attack again somewhere else along the columns. Soviet armor spearheads would in some cases run out of supplies while fighting it out in the resilient defense zones; above all, the stream of reinforcement echelons (on which the Soviet method depends) would be drawn away to confront the strike forces in the rear, instead of being fed into the penetrating advance to keep up its momentum.

This is not by any means a fully analyzed idea, and it is, of course, at the extreme end of the risk/payoff spectrum, but it does illustrate the general principles of maneuver warfare as they apply to all combat—land, sea, or air.

First, one's own high-quality forces must not be expended against those of the enemy; instead, they are to find and attack the weak points in the enemy's array of forces. In the meantime, the enemy's main effort is to be contained (though it cannot be defeated) by a specialized defense, organized from the lower-cost forces.

Second, the key to victory in maneuver is force disruption rather than destruction. Of course, there will be some attrition, but its purpose must be to dislocate the enemy's system of war, rather than to reduce his forces in piecemeal combat. The goal is to force the enemy to abandon his program, rather than just to reduce the forces he has to implement that program.

Finally, maneuver warfare cannot be fought by stan-

Dr. Edward N. Luttwak is a research professor at Georgetown University and Senior Fellow in Strategic Studies at the University's Center for Strategic and International Studies, Washington, D. C. He is the author of several books and many articles on current military affairs. *This article, reprinted from the March/April 1979 issue of* Survival *with permission of the International Institute for Strategic Studies, London, England, was originally presented to the National Security Seminar of the Lehrman Institute. The author wishes to express his indebtedness to Steven L. Canby for key ideas in the article.*

dard, general-purpose forces shaped by traditional preferences and bureaucratic priorities. Instead, one must deploy forces especially tailored to cope with a specific enemy—that is, forces which are configured to exploit his particular weaknesses, rather than to maximize all-around capabilities. One allows the enemy to dictate one's force structure and tactics; the "organizational initiative" is conceded in order to seize the operational advantage.

Examples of Maneuver Defense

An outlined airpower example illustrates the generality of these rules. Soviet battlefield air-defense systems are now much more formidable in Europe than they were in Arab hands in October 1973, when Israel lost almost a quarter of her air force in three days. To do its work, which is to help in the *land* battle, the US Air Force (USAF) plans to defeat the array of Soviet antiaircraft guns and missiles by attrition and sheer weight of materiel: special "defense-suppression" aircraft are deployed to attack Soviet radars directly, while other special aircraft are to neutralize Soviet radars with electronic countermeasures. In addition, each line aircraft is to carry self-protection electronic devices. In the first few days of a NATO war, when airpower would be needed most to give time for the ground forces to deploy, the USAF would, in fact, be busy protecting its own ability to operate at all.

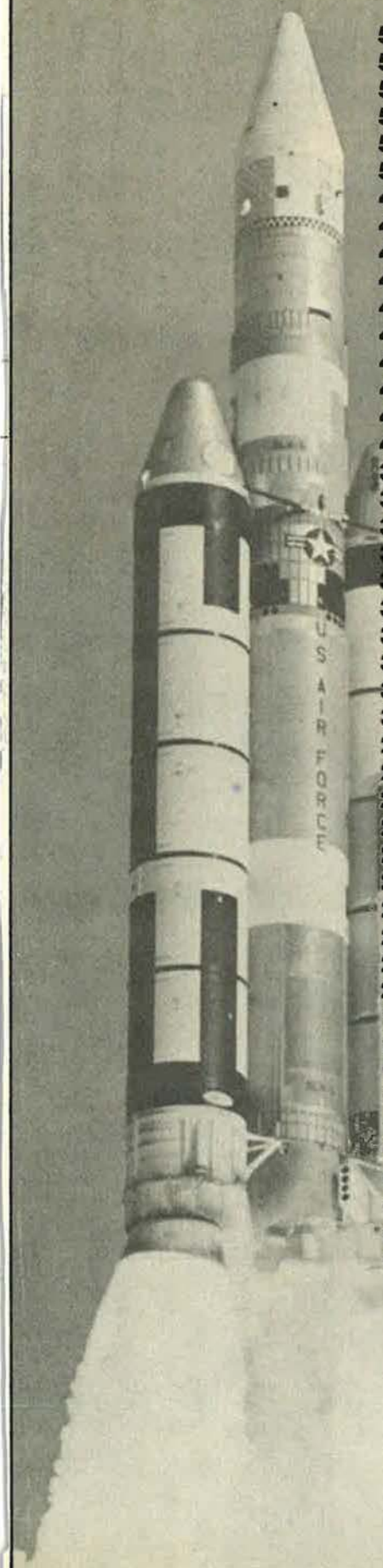
It is interesting to note that others have reacted differently. The Royal Air Force (RAF) simply cannot afford to fight it out with Soviet air defenses; its plan is to *evade* rather than defeat them. The RAF has decided to use its aircraft in the immediate rear of the battlefield, to attack Soviet reinforcement echelons rather than the first wave of Soviet forces on the battlefield itself—where defenses are thickest. As some RAF officers see it, the American insistence on taking on the Soviet Union where she is strongest may result in an air force which will be "taking in its own washing" instead of earning its keep. The RAF approach is "relational" maneuver; that of the USAF a form of attrition.

In the case of naval forces, a counterexample can be cited from the opposite side. When Stalin decided to build an oceanic navy as part of the armament program that began in earnest very soon after V-E Day, his plan reportedly called for a *nonrelational* "balanced fleet" on the Anglo-American pattern, with destroyers, cruisers, and aircraft carriers, as well as submarines—the indispensable weapons of the weaker fleet. Had Stalin's successors continued on this path, the Soviet navy would have been a much inferior imitation of the American and bound to be outclassed in every encounter. But after Stalin's death his naval plans were scrapped and the Soviet Union adopted a relational "maneuver" approach; she built her own navy specifically to exploit the weaknesses of the US Navy, instead of trying to imitate its structure. As a result, the American surface navy of carrier task forces is now confronted by an array of Soviet anticarrier forces, based on the use of antiship missiles carried in submarines, naval aircraft, and surface warships. The Soviet navy, which this relational scheme has produced, cannot do many of the things that the US Navy does so well, but it does have a fair chance of winning a naval war, at least in some circumstances. A nonrelational Soviet navy, built to realize the typical naval ideal of a "balanced fleet," would by contrast have guaranteed absolute and total inferiority at sea for the Soviet Union.

The Implications of Inferiority

Now that the United States has chosen to place herself in a position of military inferiority to the Soviet Union by reverting to the pattern of underspending of the interwar years, the nonrelational procedure, with its low-risk/high-cost attrition solutions to every threat, is becoming increasingly obsolete. In one area of defense after another there is no third alternative between higher-risk maneuver methods and a guaranteed defeat. In part, the persistence of an obsolete style of warfare is due to an understandable cultural lag: The services are in the position of those remaining ill-informed American tourists who, in Germany or Japan, still offer *sotto voce* to pay their hotel bills in dollars—and expect a discount. But aside from cultural lag there is another source of irrationality, and ironically it is the product of the striving to substitute logic and calculation for military instincts and bureaucratic goals. Many of the "systems-analysis" techniques introduced by [former Secretary of Defense Robert S.] McNamara and revived by the present civilian defense chiefs are based on mathematical models that treat warfare as a cumulative exchange of firepower; they are, in fact, pure attrition models in most cases. Even though the historical record of war shows quite conclusively that superior firepower is often associated with defeat, and that winners more often than not were actually inferior in firepower, these mathematical models continue to be devastatingly influential because they capture all that is conveniently measurable about warfare. Thus, bookkeepers may fancy themselves strategists.

Unfortunately, these models miss the essence of warfare, which has little to do with the orderly administration of superior firepower on a passive set of targets. To their great discredit, the uniformed military have chosen to play the bureaucratic game, and now have their own models, suitably rigged. Instead of resisting the pressure to conform, and devoting their intellect to the study of war as it really was in history, and as it may be again on the battlefield, the military waste their talents on studies and models that are based on premises that are false, and which they *know* to be false. Hence, the blind lead, and those who could see follow in order to defeat the mathematics of the civilian "systems analysts" with their own, ever more elaborate computer models. Unfortunately, the tactics of bureaucratic conflict in the Pentagon are of no use on the battlefield. ■



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7 January 18, 1967
6 November 3, 1966
5 August 26, 1966
4 June 16, 1966
3 December 21, 1965
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Focus on the Soviet Military

The Armed Forces of the USSR, by Harriet Fast Scott and William F. Scott. Westview Press, Boulder, Colo., 1979. 439 pages. $24.

Colonel and Mrs. Scott are unique: They have represented the Air Force in two tours of duty in the USSR, they have garnered an impressive array of academic credentials, and now they have produced the first real textbook on the Soviet military.

Those who teach Soviet affairs and who appreciate the significant role of military power in Soviet domestic and foreign policies have long been aware that there is no adequate text on the Soviet military. Professional analysts of Soviet military affairs are often faced with a surfeit of information, but a lack of relevant, well-organized data that explains how the military actually operates in the Soviet system. *The Armed Forces of the USSR* fills the needs of students and teachers, and is a boon to the analyst of Soviet affairs. Much of its information is available elsewhere, but nowhere else is it assembled and compiled into such a usable, readable package.

The Scotts begin with a cogent history of the Red Army. The first two chapters are devoted to giving the reader a quick review of the sixty-one-year military history of the Soviet Union. From 1917 through World War II there is a straightforward treatment of the turbulent history in which the current Soviet military establishment took shape. Then the book shifts gears. Postwar history is presented through a discussion of the evolution of Soviet military doctrine and strategy. This approach is successful; the book always seems relevant and never fails to be interesting. The historical detail that is presented is not merely history for history's sake, and the treatment of Soviet doctrinal evolution summarizes a whole field of study in thirty pages.

It should be noted that the book presents a distinct point of view on Soviet military doctrine. The Scotts divide the evolution of postwar Soviet military doctrine, as do Soviet military spokesmen, into three stages. The postwar Stalinist stage ended with the Generalissimo's death in 1953. The second stage lasted through the 1950s, and the final, and current, stage began with a landmark speech by Nikita Khrushchev in January 1960. The implication is that continuity is more prevalent than change in the last eighteen years of Soviet military doctrine.

Two important modifications to Soviet doctrine are discussed. The possibility of nonnuclear conflict and the need to be capable of "combat actions under nuclear as well as nonnuclear conditions" has been recognized in Soviet writings since the mid-sixties. In the seventies, Soviet spokesmen have dealt with the need for capabilities to project Soviet military power and presence. But the Scotts do not believe that these modifications alter the essence of doctrinal tenets laid down before Brezhnev:

> Soviet military doctrine, as announced by Khrushchev in January 1960, has been modified in the intervening years, but its fundamentals remain the same—the nuclear rocket weapon will be the decisive factor in any world war. Once the Soviet strategic nuclear forces reached parity with the United States and could neutralize American nuclear forces, Soviet military leaders considered the possibilities of waging nonnuclear war *under a nuclear umbrella*. Following this, the next step was to consider the projection of military power and presence.

The organization of the Soviet military establishment, and the personalities who occupy the key positions, are the focus of the middle of the book. The institutions of the Soviet High Command, the Council of Defense, the Main Military Council, and the General Staff are treated as clearly as one will find in the open literature. This is supplemented by comprehensive and interesting biographical sketches on the most important personages in the Soviet High Command. There is a brief description of each of the military services with most of the historical and biographical information that most students of Soviet military affairs would need to know. All of the ancillary military and quasi-military organizations are covered as well.

Chapters on the relationship between the Party and the Armed Forces and on the "Soviet Military-Industrial Complex and Defense Costs" launch the final part of the book. This segment includes a wealth of information on military education and training. In fact, chapters ten and eleven, which cover enlisted and officer professional development, are clearly the best available on their subjects in contemporary literature.

In the final chapter, the Scotts weigh the US-Soviet balance in several ways. They do not pull punches. Regarding Soviet military thinkers in comparison to US officers:

> Soviet strategists are perhaps without contemporary equal in providing theoretical insights into the nature of war and its specific aspects. It would be difficult to find any book written in the past two decades by an officer in the United States armed forces that matches the level of Marshal Sokolovskiy's *Military Strategy*, General Reznichenko's *Tactics*, or Colonel Sidorenko's *The Offensive*.

Regarding potential national leadership in the event of war, Colonel and Mrs. Scott give the US low marks:

> In the event of an international crisis that might lead to military action, the Soviet leadership would be composed of men with years of experience in their positions. In contrast, the top political leadership in Washington changes every four to eight years. . . . Even toward the end of a four-year tour in the White House, the president and most of his staff are amateurs when compared to their counterparts in the Kremlin.

As the foregoing suggests, there is much to learn from Colonel and Mrs. Scott. Their book should be read by both military officers and academics. Any US military officer interested in

Airman's Bookshelf

the affairs of our major potential adversary should make the book part of his professional library.

—Reviewed by Cmdr. Steve Kime, USN, Director of Soviet Studies, National Defense University, Fort Lesley J. McNair, Washington, D. C.

Fighting the Missile Gap

Strategic Options for the Early Eighties: What Can Be Done?, edited by William R. Van Cleave and W. Scott Thompson. National Strategy Information Center, New York, N. Y., 1979. 200 pages. $5.95.

This slender but provocative volume, the product of papers and comments presented at a symposium, is a feast of ideas, not all of which are digestible. The conference participants were motivated by the view that the US will be "compelled" in the early 1980s to "pass through a 'time valley' of maximum military peril." This country, they believe, needs to "buy time" with "quick fixes" of its strategic nuclear forces to carry it safely through this dangerous period.

The authors argue that the US has blown a commanding lead in nearly every category of strategic warfighting and will be well behind the USSR by the early 1980s. The participants suggest numerous solutions to the strategic problem that they believe are operable within 1,000 days or less. The quick fixes are required because the normal ten-year gestation period of weapon systems will produce weapons too late, given the frightening trends. The conferees agree that were they offered a choice between an operable quick fix in 1,000 days and a better system in double that period, they would choose the former.

The bane of such compendiums is their unevenness. There are well-presented discussions on the multiple aim point (MAP) solution to ICBM vulnerabilities, and articulate arguments on the difficulties with the launch-on-warning (LOW) concept. On the latter, the participants believe that LOW is no quick fix to ICBM vulnerabilities because it is not credible. LOW depends upon continuous, flawless, instantaneous operation of the national chain of command. LOW also asks unanswerable questions: Launch on what? Launch against what? The possibility of warning error is too great to make LOW valid, they argue, and the targets the missiles are to strike create dilemmas.

Will missiles be launched in a spasm against empty silos? Will missiles be sent against Soviet cities while our metropolises are held hostage to a larger Soviet second strike? Does the US wish to escalate to holocaust with no thought of negotiation? Paul Nitze, the symposium's most distinguished strategist, summed up the views of the group by stating that LOW is an attempt to maintain deterrence through words.

Another section of the book deals with the uses the Soviets might make of their growing military might. Many of the participants believe that the USSR is spending fifteen or more percent of its GNP on the military in order to help that country solve its burgeoning economic problems.

The conferees warn that the Soviets could regain all they have spent in arms since World War II by seizing the Persian Gulf. They would then be able to postpone indefinitely their economic slowdown and gain crucial leverage over US allies in Europe and Asia. The symposium members want the US to eliminate its strategic deficiencies before the Soviet Union employs its might to blackmail the US into inaction.

Despite its valuable segments, the book has serious problems when it deals with the interface between quick fixes and solutions that have utility for the long term. The editors of the volume say they do not want stop-gap activities to rule out more solid solutions, but that longer-term measures are difficult in an era of budget stringency. What prevents the constant seeking after interminable quick fixes to shore up the country, as the Soviets continue to go us one better? Even the symposium's leadership and the book's editors are inconsistent on this score.

In one place the book says that the recommended quick fixes are no more than inexpensive, temporary expedients, but this is contradicted by an assertion that the suggested solutions are neither cheap nor temporary fixes. The core difficulty comes from a disregard of objectives.

The assertion is that there are only three "valid" questions: How seriously adverse are the trends? What problems do we face? What needs to be done quickly? Without clear goals that are understood and agreed upon by all, however, solutions proliferate like dandelions in a wet spring, and weeding proves impossible because the central question, what do we want to accomplish, is unasked, and therefore, unanswerable.

—Reviewed by Lt. Col. Alan Gropman, Hq. USAF.

My Lai: A Failure in Leadership

The My Lai Inquiry, by Lt. Gen. W. R. Peers, USA (Ret.). W. W. Norton & Co., New York, N. Y., 1979. 306 pages. $12.95.

If truth is the first casualty in a war human decency often is a close second. Massacres, atrocities, brutalities, rapes, and lootings have occurred through the history of warfare.

We like to believe that American troops are more humane and more law-abiding than other warriors. American history books record numerous instances of American compassion, generosity, and humane treatment, but rarely the war crimes.

War crimes, however, are not entirely absent from US military history. We have not read or heard much about them because they have been submerged under the avalanche of war news reporting of major battles, the heroics of our troops, and the successes of our wartime leaders.

The My Lai massacre was revealed first in a March 29, 1969, letter by Ron Ridenhour, a soldier home from the Vietnam War. He wrote to the Army and Congress that "something rather dark and bloody" was committed by troops of the Americal Division at "Pinkville" (My Lai).

Ridenhour, who deserves a special Pulitzer Prize for his reporting the My Lai allegations, was ignored for a while. But his letter finally reached public print and stirred the Army to conduct an inquiry.

Eight months later, General "Ray" Peers, a thirty-six-year professional soldier, was named by the Army to direct the investigation of the cover-up of the My Lai massacre of March 16, 1968. General Peers retired in 1973, shortly after completing his investigation. Now, ten years after his inquiry, he is still choked with moral outrage over what he is convinced was a deliberate effort by some twenty-five or more Army officers and enlisted men, from generals to sergeants, to hide the truth that more

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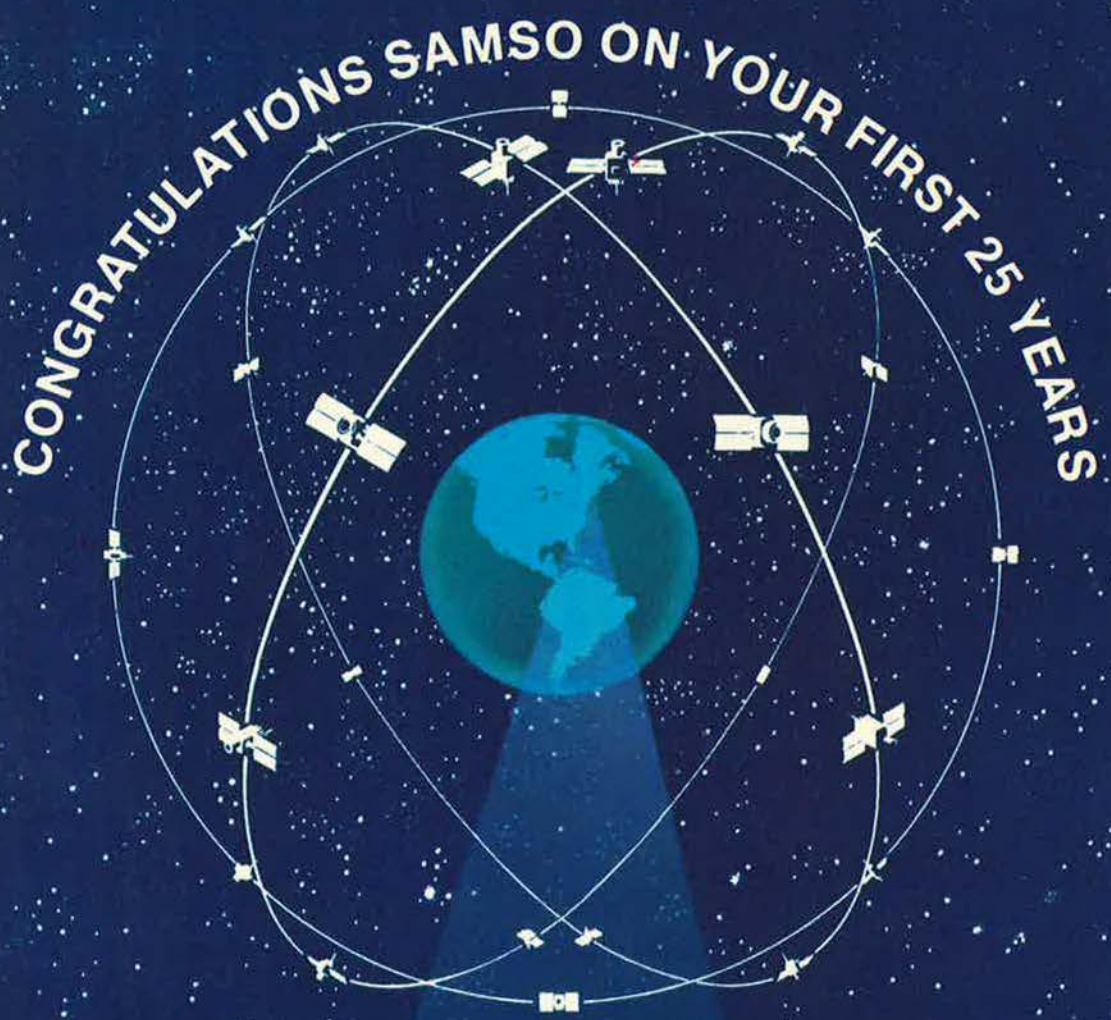

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than 400 Vietnamese women, children, and old men were murdered without provocation at My Lai.

Peers rejects the schoolboy or gangland code against tattling or squealing on your buddies. He insists the Army personnel involved in the cover-up should have blown the whistle on the massacre, ordered a prompt and thorough investigation of rumors of the murder of civilians in My Lai, and reported promptly the allegations of possible war crimes or other military violations at My Lai.

Peers believes there was a serious failure of leadership at My Lai all the way up the chain of command. He feels these senior Army officers should have detected that "something was seriously wrong" when they received early reports that about 128 Viet Cong had been killed but only three weapons captured—an unusually low weapons toll for so many enemy troops killed.

Peers writes that he found "most difficult to understand" the dismissal of charges against many of the accused officers. He says he told General Westmoreland later that "it was a travesty of justice and would establish a precedent that would be difficult for the Army to live down."

After his inquiry panel heard more than 400 witnesses in fourteen weeks, from November 27, 1969, to mid-March 1970, and gathered 20,000 pages of testimony, Peers and his panel of military and civilian experts were convinced there had been a cover-up of the My Lai massacre.

The avowed purpose of the My Lai operation was to trap a Viet Cong battalion, but the intelligence was wrong. The battalion had vanished and there was no hostile resistance. Only women, children, and old men were left behind. The intelligence briefing before the assault said that most of the women and children would be gone to market in another town by 7:00 a.m., before the attack was to start. The Peers inquiry disclosed that somehow the troops thought their job was to wipe out My Lai hamlet—the people, dogs, livestock, and buildings.

Peers blames the My Lai massacre in part upon defective leadership, loose enforcement of the rules on handling civilians, lack of experience because of the rapid turnover of troops, and the psychological factor of fear of Viet Cong booby traps.

But Peers says, "the most disturbing factor we encountered was the low regard in which some of the men held the Vietnamese, especially rural or farming people."

Peers denounces the view of some people that Lt. William Calley is some kind of a hero. He said the "notoriety and publicity given Calley are all wrong." He sees Calley as lucky to have escaped a death sentence.

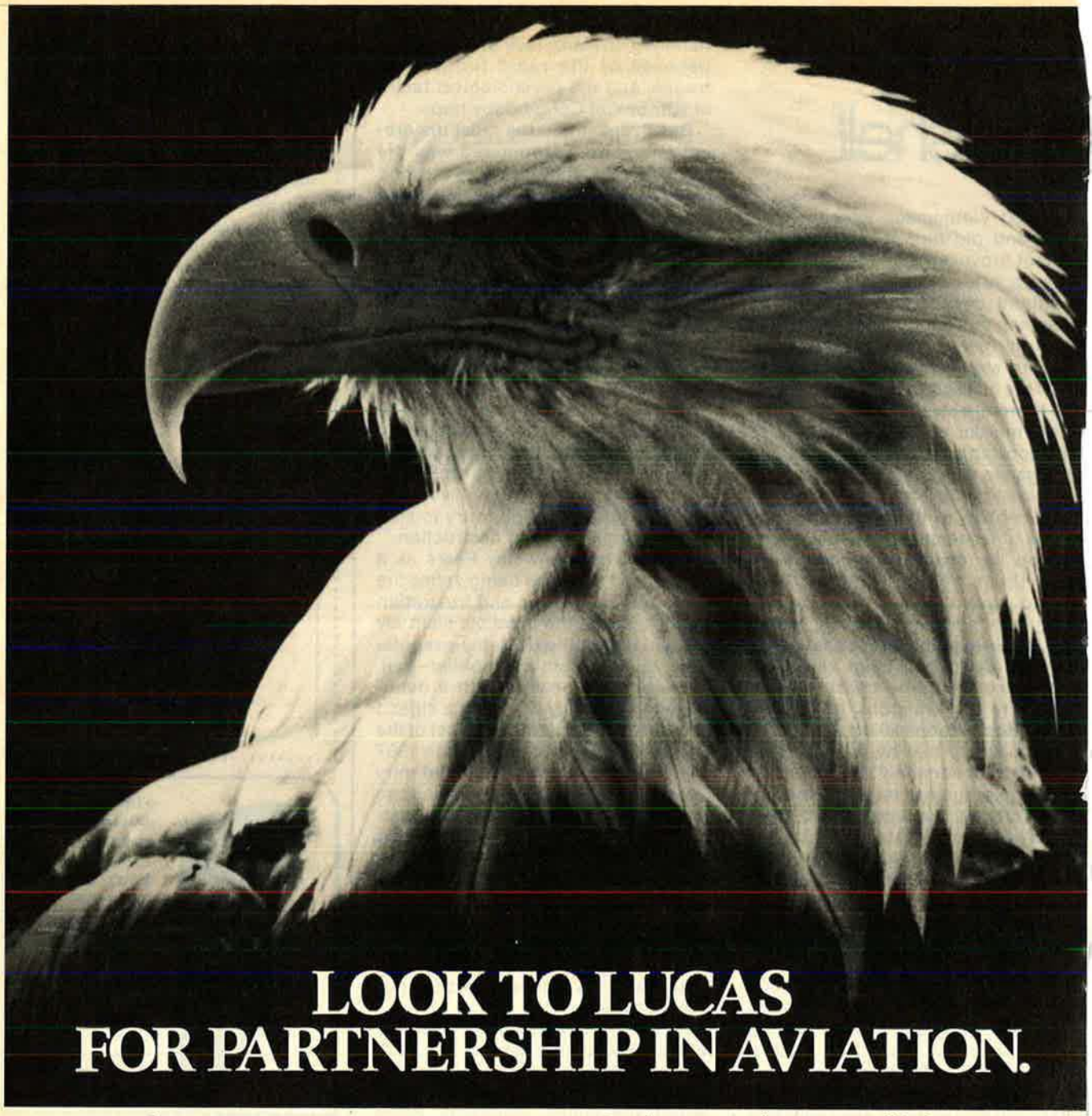
If there was any hero at My Lai, Peers says, it was Warrant Officer Hugh C. Thompson, the helicopter pilot, who tried to stop the slaughter at My Lai and risked his life to shelter civilians from further harm. Peers says Thompson "was the only American who cared enough to try to stop the wanton killing and destruction."

Those who know Ray Peers as a soldier and a human being sense the profound indignation and frustration he feels about the indelible stain My Lai had left on the US Army's reputation. He is a soldier's soldier—tall, arrow-straight posture with a determined jaw usually clamping a cigar. I saw him in the swirling red dust of the Central Highlands of Vietnam in 1967 when he commanded the 4th Infantry Division. His pugilist's nose gives him the image of a tough fighter—perhaps a remnant from his guerrilla fighting days in World War II. His quick smile and clipped-off laconic sentences over the noise of his helicopter as he checked on troops in the field reinforced the impression that his experience in three wars was reflected in his firm but human-sensitive leadership.

In a memorandum to General Westmoreland on March 18, 1970, Peers wrote of the need for improved battlefield leadership, particularly in moral and ethical standards. Peers later took some consolation from an Army paper based upon his recommendations, which noted that some Army commanders forgot about duty, honor, and country and sought career advancement through a system they believed "rewarded selfishness, incompetence, and dishonesty." The paper urged renewed emphasis upon Army ethics and morality.

Peers concludes that the chance of another "gruesome tragedy" like My Lai is "quite remote." But it could conceivably happen again.

—Reviewed by Lloyd Norman, retired Newsweek *correspondent.*



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AUGUST 1979

Mikoyan MiG-27 ground attack aircraft of the Soviet Air Force in landing configuration (*Flug Revue*)

MiG
MIKOYAN DESIGN BUREAU, USSR

MIKOYAN MiG-23

NATO reporting names: Flogger-A, B, C, E, F, and G

The prototype of this variable-geometry air combat fighter was first displayed in public during the 1967 Aviation Day flypast at Domodedovo Airport, Moscow. Initial deliveries of pre-series aircraft to the Soviet Air Force were made in 1970, but deployment of the MiG-23 in large numbers did not begin until 1973. Two Soviet fighter regiments, with a total of about 75 aircraft, were based in East Germany in 1973/74, and deliveries to the Soviet Air Force of all versions of the MiG-23 and the related MiG-27 were estimated to total over 1,500 aircraft by the Spring of 1979. Others had been supplied to the Czechoslovak Air Force. Export versions, with a lower equipment standard, are operated by the Algerian, Cuban, Egyptian, Iraqi, Libyan, and Syrian Air Forces.

There appear to be at least six versions of the MiG-23 of which details can be published:

MiG-23 (Flogger-A). Prototype shown at Domodedovo on 9 July 1967. Illustrated in 1973–74 and preceding editions of *Jane's*. It is now known that one or two development squadrons of 'Flogger-As' entered service with the Soviet Air Force. Experience with these dictated almost total redesign of the major production versions which followed.

MiG-23S (Flogger-B). Single-seat air combat fighter which is rapidly displacing the MiG-21 as the primary air-to-air tactical aircraft of the Soviet Air Forces, deployed in both forward areas and the interior of the USSR. Design changes compared with prototype include movement further rearward of all tail surfaces except ventral fin, giving much increased gap between wing and tailplane; a much larger dorsal fin; and the introduction of fixed inboard wing leading-edges. The *US Military Posture* statement for FY 1979 described 'Flogger-B' as 'the first Soviet aircraft with a demonstrated ability to track and engage targets flying below its own altitude'.

MiG-23U (Flogger-C). Tandem two-seat version suitable for both operational training and combat

Armed usually with air-to-air missiles, this MiG-23S ('Flogger-B') of the Soviet Air Force carries two underbelly rocket pods (*Flug Revue*)

use. Individual canopy over each seat. Rear seat slightly higher than forward seat, with retractable periscopic sight for occupant. Dorsal fairing of increased depth aft of rear canopy. Otherwise identical to early MiG-23S (with R-27 engine). In service with Soviet Air Force and air forces of other countries, including Czechoslovakia and Egypt.

MiG-23S (Flogger-E). Export version of 'Flogger-B'. Generally similar to Soviet Air Force version, but equipped to a lower standard. Smaller radar (NATO 'Jay Bird': search range 15 nm; 29 km; 18 miles, tracking range 10 nm; 19 km; 12 miles) in shorter nose radome. No undernose laser rangefinder or Doppler navigation equipment.

MiG-23- (Flogger-F). Export counterpart of Soviet Air Force's MiG-27 ('Flogger-D') ground attack/interdictor version. Has the nose shape, cockpit external armour plate, and larger, low-pressure tyres of MiG-27, but retains the power plant, variable-geometry intakes, and GSh-23 twin-barrel gun of the MiG-23 interceptor. Operated by Czechoslovak and Egyptian Air Forces.

MiG-23S (Flogger-G). First identified when six aircraft from the air base of Kubinka made goodwill visits to Finland and France in the Summer of 1978. Although basically similar to 'Flogger-B', these aircraft had a much smaller dorsal fin. Absence of operational equipment, such as underwing pylons and laser rangefinder, may suggest that only a few aircraft have been modified to this standard for improved aerobatic capability as a display team.

Early production aircraft were powered by a Tumansky R-27 turbofan engine, rated at 68.6 kN (15,430 lb st) dry and 100 kN (22,485 lb st) with afterburning. This power plant continues in use in the two-seat MiG-23U, but the current MiG-23S and MiG-27 have a Tumansky R-29B turbojet. The following description refers specifically to the current single-seat MiG-23S as supplied to the Soviet Air Force:

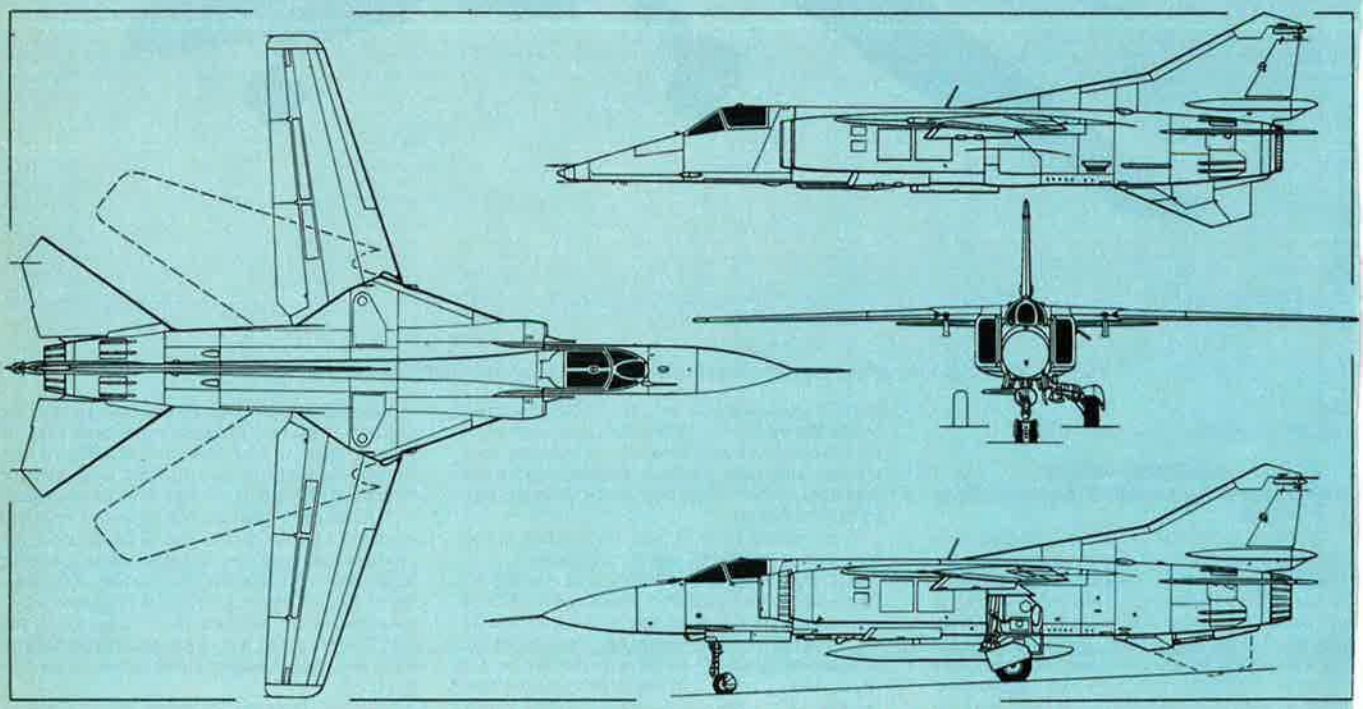
TYPE: Single-seat variable-geometry air combat fighter.

WINGS: Cantilever shoulder wing. Sweepback of main panels variable in flight or on the ground by manual control, reportedly at 16°, 45°, or 72°. Full-span trailing-edge single-slotted flaps, each in three sections, permitting independent actuation of outboard sections when wings are fully swept. Top-surface spoilers/lift dumpers forward of flaps, for differential operation in conjunction with horizontal tail surfaces, and for collective operation for improved runway adherence and braking after touchdown. Leading-edge flap on outboard two-thirds of each main (variable-geometry) panel.

FUSELAGE: Conventional semi-monocoque structure of basically circular section; flattened on each side of cockpit, forward of lateral air intake trunks which blend into circular shape of rear fuselage. Large flat boundary layer splitter plate forms inboard face of each intake. Two small rectangular 'blow-in' air intakes in each trunk, under inboard wing leading-edge. Perforations under rear fuselage, aft of main wheel bays, are pressure-relief vents. Two door-type airbrakes mounted on each side of rear fuselage.

TAIL UNIT: All-moving horizontal surfaces, swept back at approximately 57° on leading-edge, operate both differentially and symmetrically to provide aileron and elevator function respectively. Conventional fin, swept back at approximately 65° on leading-edge, with inset rudder. Large dorsal fin. No tabs. Large ventral fin in two portions. Lower portion is hinged to fold to starboard when landing gear is extended, to increase ground clearance.

LANDING GEAR: Retractable tricycle type, with single wheel on each main unit and steerable



Mikoyan MiG-23S ('Flogger-B') with additional side view (top) of MiG-27 ('Flogger-D') (*Pilot Press*)

twin-wheel nose unit. Main units retract inward into rear of air intake trunks. Main fairings to enclose these units are attached to legs. Small inboard fairing for each wheel bay hinged to fuselage belly. Nose unit, fitted with small mudguard, retracts rearward. Brake parachute housed in cylindrical fairing at base of rudder.

POWER PLANT: One Tumansky R-29B turbojet engine, rated at 78.5 kN (17,635 lb st) dry and 112.8 kN (25,350 lb st) with max afterburning. Max internal fuel capacity 5,750 litres (1,265 Imp gallons). Variable-geometry air intakes and variable nozzle. Provision for carrying external fuel tank, capacity 800 litres (176 Imp gallons) on underfuselage centreline pylon.

ACCOMMODATION: Single seat in air-conditioned cockpit, under small rearward-hinged canopy.

AVIONICS AND EQUIPMENT: Radar dish (NATO 'High Lark': search range 46 nm: 85 km: 53 miles, tracking range 29 nm: 54 km: 34 miles) behind dielectric nosecone. Small cylindrical fairings forward of starboard underwing pylon and above rudder are believed to contain ECM equipment. Undernose laser rangefinder and Doppler equipment standard on Soviet Air Force version. Retractable landing light under nose, aft of radome.

ARMAMENT: One 23 mm GSh-23 twin-barrel gun in fuselage belly pack, with large flash eliminator around muzzles. One pylon under centre-fuselage, one under each engine air intake duct, and one under each fixed inboard wing panel, for air-to-air missiles (NATO 'Apex' and 'Aphid') or other external stores.

DIMENSIONS (estimated):

Wing span:	
fully spread	14.25 m (46 ft 9 in)
fully swept	8.17 m (26 ft 9½ in)
Length overall	16.80 m (55 ft 1½ in)

WEIGHT (estimated):

T-O weight	12,700–15,000 kg (28,000–33,050 lb)

PERFORMANCE (estimated):

Max level speed at height with external stores	Mach 2.3
Max level speed at S/L	Mach 1.1
Service ceiling	18,600 m (61,000 ft)
T-O and landing run	900 m (2,950 ft)
Combat radius	520 nm (960 km; 600 miles)

MIKOYAN MiG-27
NATO reporting name: Flogger-D

Although the single-seat ground attack aircraft known to NATO as 'Flogger-D' has many airframe features in common with the MiG-23, it differs in important respects and is designated MiG-27. Use of fixed air intakes and a fixed nozzle is consistent with the primary requirement of high subsonic speed at low altitude.

The forward portion of the fuselage is completely redesigned by comparison with the MiG-23. Instead of an ogival radome, 'Flogger-D' has a nose that is sharply tapered in side elevation, with a small sloping window covering a laser rangefinder and marked target seeker, and additional armour on the flat sides of the cockpit. A six-barrel 23 mm Gatling-type underbelly gun replaces the GSh-23 of the interceptor, and there are five pylons for external stores, including tactical nuclear weapons and, probably, the air-to-surface missile known to NATO as 'Kerry'. There is provision for carrying an external fuel tank for ferry flights under each outer wing, which must be kept in the fully-forward position when the tank is in place. Equipment includes an ECM antenna located above the port glove pylon.

The somewhat similar aircraft known to NATO as 'Flogger-F' is a member of the MiG-23 series, with variable-geometry intakes and a GSh-23 twin-barrel gun, although having the nose shape and larger, low-pressure tyres of 'Flogger-D'. It represents the export counterpart of 'Flogger-D', with lower standards of equipment and performance, and is described under the MiG-23 entry.

The following data are estimated for the MiG-27 operated by the Soviet Air Force:

DIMENSIONS, EXTERNAL:

Similar to MiG-23, plus:	
Wing aspect ratio (spread)	7.45
Tailplane span	5.75 m (18 ft 10¼ in)

Westland's new WG 30 twin-turboshaft general-purpose helicopter, first flown on 10 April and intended as a Puma replacement

AREAS:

Wings, gross (spread)	27.26 m² (293.4 sq ft)
Horizontal tail surfaces	6.88 m² (74.06 sq ft)

WEIGHTS:

Max weapon load	3,000 kg (6,610 lb)
Max T-O weight	20,100 kg (44,310 lb)

PERFORMANCE (estimated):

Max level speed at height	Mach 1.75
Max level speed at S/L	Mach 0.95
T-O to 15 m (50 ft) at AUW of 15,700 kg (34,600 lb)	800 m (2,625 ft)
Max ferry range with three 800 litre (176 Imp gallon) external tanks	1,350 nm (2,500 km; 1,550 miles)

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WESTLAND WG 30

Westland Helicopters first undertook studies leading to this enlarged, twin-engined development of the Lynx helicopter as a private venture in early 1976. Detail design of the bigger fuselage began about a year later, and the construction of two prototypes was authorised in January 1978. The first of these, registered G-BGHF, was rolled out on 23 March 1979 and made its first flight on 10 April 1979, a week ahead of schedule. By the end of May it had accumulated 30 h of flying in 30 flights. The second prototype made its public debut at the Paris Air Show in June 1979.

Main differences from the Lynx are the new and more spacious fuselage: fully retractable landing gear: increased-diameter main and (on the production version) tail rotor; a noise and vibration reducing 'raft' mounting for the twin engines and main rotor head: increased fuel capacity: new automatic flight control system: and simplified electrical system. Payload/range capability is increased, and the WG 30 is capable of nap-of-the-earth flight. More than 85% of the proven dynamic system of the Lynx is retained.

Initially, the WG 30 is planned to meet British and foreign military needs for a tactical transport, battlefield support, and aeromedical helicopter. It is, however, also being developed for the civil market, for such roles as passenger and/or cargo transport, executive and VIP use, offshore oil support, and Arctic operation. Military approvals and full Category A civil certification are expected to be obtained during 1980, and deliveries to begin towards the end of 1981.

TYPE: Twin-turboshaft general-purpose military and civil helicopter.

ROTOR SYSTEM: Four-blade semi-rigid main rotor and four-blade tail rotor. Main rotor blades, which can be folded for stowage, are of constant chord and cambered section; each has a stainless steel spar and a bonded GRP rear skin. Forged titanium hingeless main rotor head. Main rotor system, engines, and main rotor gearbox are mounted on a structural 'raft' which reduces rotor-induced vibration, improving passenger comfort, and improves structural and systems reliability. This raft comprises two fore-and-aft steel beams and three cross-beams, the latter (from front to rear) being of machined light alloy, fabricated light alloy, and steel. The raft 'floats' on four Lord elastomeric suspension blocks which, in turn, are mounted on two pairs of fore-and-aft beams bolted on to the main lift frames. First prototype has a standard Lynx tail rotor, later aircraft will have a rotor of slightly larger diameter, with composite blades, which will rotate in the opposite direction and will be quieter.

ROTOR DRIVE: Engines drive directly into standard Lynx conformal main gearbox, thence by driveshafts to intermediate and tail rotor gearboxes.

FUSELAGE AND TAIL UNIT: Main cabin, which is of basically rectangular cross-section, is a conventional semi-monocoque structure of light alloy frames and stringers, with stringer spacing constant throughout the air-frame. Roof panels, fuel tank surrounds, and bulkheads are of aluminium honeycomb, floor panels of Ciba-Geigy Fibrelam glassfibre reinforced plastics.

LANDING GEAR: Hydraulically retractable tricycle type, with oleo-pneumatic shock-absorber on each unit. Fairey Hydraulics main units each have a single Goodyear wheel and tyre of the size fitted to the Westland Sea King; they retract into fairings on the fuselage sides at the rear of the cabin, the wheels remaining partly exposed when retracted. Fairey nose unit, which is castoring, is fully retractable rearwards, and is fitted with twin Goodyear wheels and tyres.

POWER PLANT: Two Rolls-Royce Gem 41-1 turboshaft engines mounted side by side above cabin, each rated at 835 kW (1,120 shp) max contingency, 790 kW (1,060 shp) intermediate contingency, 746 kW (1,000 shp) for T-O, and 671 kW (900 shp) max continuous. Engine intakes as for

Lynx, without heater mats. Fuel in two FPT tanks, each of 499 kg (1,100 lb) capacity, one under front seats and one under rear seats in cabin. Intertechnique booster pumps, with provision for crossfeed to either engine.

ACCOMMODATION: Crew of two on flight deck, with provision for one-pilot operation. (Full double- and single-pilot IFR certification to be obtained.) Large wraparound flight deck windows provide excellent field of view for crew. Windscreen washers and wipers on both front transparencies. Main cabin can accommodate, in military version, 14 troops with full equipment, 17 troops without kit, or a maximum of 22 troops in high-density configuration; or, as cargo, ammunition, anti-tank missile launch teams, fuel, and supplies for battlefield support. Aeromedical version can accommodate six stretchers plus eight sitting casualties/medical attendants. Civil passenger version can provide three/four-abreast seating for up to 17 persons in airline standards of comfort. This version, too, has a high-density layout, in which up to 21 passengers can be accommodated in two rearward-facing rows of four, two forward-facing rows of three, one forward-facing row of four, and one inward-facing row (on the starboard side) of three persons. Various other civil layouts include executive/VIP transport (six/eight seats, toilet, and galley unit), offshore oil support, all-cargo and mixed passenger/cargo. Large rearward-sliding door on each side of cabin. Four large square cabin windows each side, including one in each door. Step each side to facilitate access to flight deck. Baggage space in port side of rear fuselage, aft of cabin, with external access door. Stowages for safety equipment, liferafts and lifejackets, and aircraft flotation gear, for overwater operation.

SYSTEMS: Two independent hydraulic systems (each 141 bars; 2,050 lb/sq in), as in Lynx; No. 1 system actuates landing gear. Electrical compartment in starboard side of rear fuselage, aft of cabin. DC system as in Lynx (28V from two 6kW engine-driven starter/generators, alternator, and battery); AC power provided by two 500V static inverters, but alternators are available at customer's option. Louis Newmark duplex automatic flight control system for all three axes, with computer-based control and duplex heading hold. Spring 'feel' units of Lynx replaced by SFENA units (one each for pitch and roll). Other flying controls essentially similar to Lynx, but rods connecting hand and foot controls to operating jacks are of the type fitted to Wessex and Sea King. Duplicated three-axis automatic stabilisation equipment. Air-conditioning system optional.

AVIONICS AND EQUIPMENT: Anti-collision radar in nosecone. Nose compartment aft of this for avionics and radio. Standard aircraft is VFR equipped, but IFR package (to include VOR/ILS, DME, and ADF) is under development. Communications and security systems to customer's requirements.

DIMENSIONS, EXTERNAL:

Diameter of main rotor	13.31 m (43 ft 8 in)
Diameter of tail rotor:	
first prototype	2.21 m (7 ft 3 in)
production	2.44 m (8 ft 0 in)
Length overall, rotors turning	15.90 m (52 ft 2 in)
Length overall, main rotor blades folded	14.33 m (47 ft 0 in)
Width overall, main rotor blades folded	3.30 m (10 ft 10 in)
Height overall, rotors turning	4.39 m (14 ft 5 in)
Height overall (minimum)	4.04 m (13 ft 3 in)
Cabin doors (each):	
Height	1.37 m (4 ft 6 in)
Width	1.22 m (4 ft 0 in)
Height to sill	0.58 m (1 ft 10¾ in)

DIMENSIONS, INTERNAL:

Cabin, excl flight deck:	
Length	4.42 m (14 ft 6 in)
Width	1.98 m (6 ft 6 in)
Height	1.68 m (5 ft 6 in)
Volume	13.03 m³ (460 cu ft)
Baggage compartment volume (rear)	1.05 m³ (37 cu ft)

AREAS:

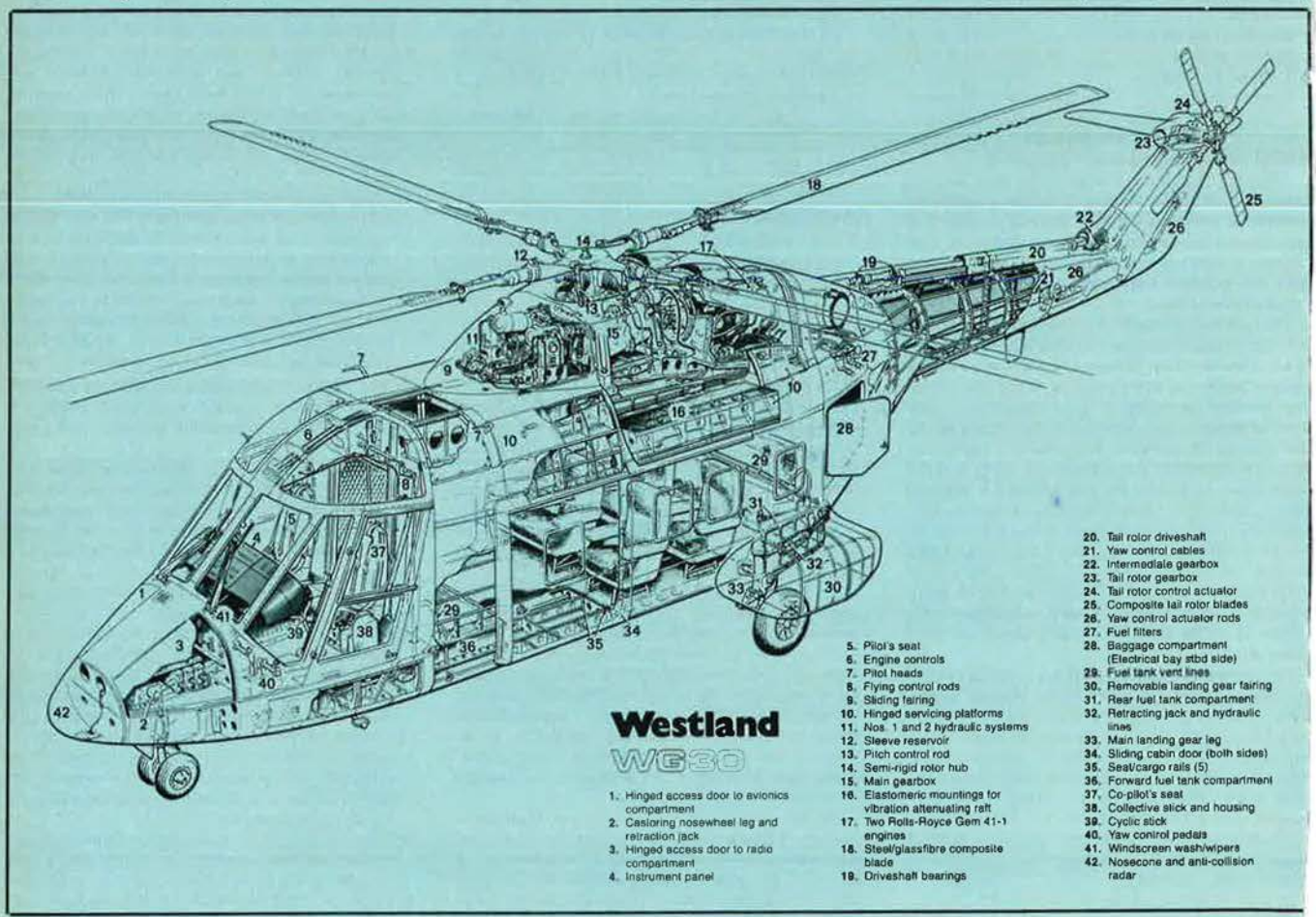
Main rotor disc	139.14 m² (1,497.7 sq ft)
Tail rotor disc:	
first prototype	3.80 m² (40.9 sq ft)
production	4.68 m² (50.4 sq ft)

WEIGHTS AND LOADING:

Manufacturer's bare weight, with basic minimum equipment	2,914 kg (6,424 lb)
Max fuel load	998 kg (2,200 lb)
Typical operating weights (tactical troop transport):	
1 crew, VFR equipped	3,120 kg (6,878 lb)
2 crew, IFR equipped	3,311 kg (7,300 lb)
Max weight for hovering OGE at max T-O weight, ISA	5,035 kg (11,100 lb)
Max T-O weight	5,330 kg (11,750 lb)
Max cabin floor loading	976 kg/m² (200 lb/sq ft)

PERFORMANCE (estimated, at max T-O weight except where indicated):

Max level speed at 915 m (3,000 ft), AUW of 4,762 kg (10,500 lb)	145 knots (268 km/h; 167 mph)
Max level and cruising speed at S/L:	
ISA	135 knots (250 km/h; 155 mph)
ISA + 20°C	125 knots (232 km/h; 144 mph)
Max level speed at S/L, one engine out	110 knots (204 km/h; 126 mph)
Min level speed at S/L, one engine out	30 knots (56 km/h; 35 mph)
Hovering ceiling IGE	2,135 m (7,000 ft)
Hovering ceiling OGE	1,525 m (5,000 ft)
Radius of action (offshore oil support, IFR), 45 min hold, 227 kg (500 lb) fuel reserves	135 nm (250 km; 155 miles)
Range with 1,815 kg (4,000 lb) payload:	
carried internally	75 nm (140 km; 85 miles)
carried externally	45 nm (85 km; 50 miles)
Max ferry range (S/L, ISA)	nearly 400 nm (740 km; 460 miles)



Cutaway drawing of the Westland WG 30 in its 17/21-passenger transport configuration

The WG 30 uses many already proven dynamic components of the successful Westland Lynx

DASSAULT-BREGUET

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

DASSAULT SUPER MIRAGE 4000

When the French Air Force abandoned development of the ACF (Avion de Combat Futur) programme, in favour of the less-costly single-engined Mirage 2000, M Marcel Dassault commented that no country should be without a twin-engined combat aircraft. He announced in December 1975 that Dassault-Breguet would develop at its own expense a twin-turbofan counterpart of the Mirage 2000, intended primarily for interception and low-altitude penetration attacks on targets a considerable distance from its base. Potential export customers were assured that the new aircraft would offer overall performance superior to that of any aircraft in its class known to be in production or under development.

A mockup of the new type, now designated Super Mirage 4000 (originally Super Mirage Delta), was unveiled in December 1977. The prototype achieved a speed of Mach 1.2 during its first flight on 9 March 1979, Mach 1.6 on its second flight three days later, and Mach 2.2 during its sixth flight on 11 April, when an initial spin analysis was also made and it was flown at angles of attack up to 25°.

Its general configuration is shown in the accompanying illustrations. Dimensions, weights, performance, and details of armament are generally classified; but installation of two engines of the type fitted in the single-jet Mirage 2000 will give the Super Mirage 4000 a power:weight ratio well above 1:1 in an interceptor role. It was said to have taken off at a loaded weight of about 20,000 kg (44,000 lb) for early flight tests.

The Super Mirage 4000 has computer-derived aerodynamics, with a rearward CG made possible by a fly-by-wire active control system. Other features include foreplanes, a blister-type cockpit canopy giving a 360° field of view, a very large nose radome, and extensive use of boron and carbon fibre composites for structures such as the fin, rudder, elevons, fuselage access panels, and foreplanes.

The following details should be regarded as provisional:

TYPE: Single-seat multi-role combat aircraft (two-seat version under study).

WINGS: Cantilever mid-wing monoplane of delta planform, with computer-derived aerodynamics. Large-radius root fairings. Full-span automatic leading-edge flaps operate in conjunction with two-section elevons which form entire trailing-edge of each wing, to provide variable camber in combat and during landing approach. Fly-by-wire active control system for elevons and flaps. No tabs.

FUSELAGE: Conventional semi-monocoque structure, 'waisted' in accordance with area rule. Door-type airbrake in each intake trunk above wing-root leading-edge.

TAIL UNIT AND FOREPLANES: Cantilever fin and inset rudder; latter actuated by fly-by-wire control system. Fin is made of carbon composite and contains fuel tankage. No tab. Variable-incidence swept canard foreplane near lip of each engine air intake duct.

LANDING GEAR: Retractable tricycle type, of Messier-Hispano-Bugatti design, with single wheel on each main unit and twin nosewheels. Hydraulic retraction, nosewheels forward, main units inward. Oleo-pneumatic shock-absorbers. Electro-hydraulic nosewheel steering. Aluminium alloy main wheels, with tubeless tyres and steel disc brakes on prototype; graphite composite brakes planned on production aircraft.

Dassault Super Mirage 4000 multi-role combat aircraft

This view shows well the canard surfaces of the new twin-jet Dassault Super Mirage 4000

POWER PLANT: Two SNECMA M53-2 turbofan engines side-by-side in rear fuselage of prototype, each rated at 83.4 kN (18,740 lb st) with afterburning. Production Super Mirage 4000 is intended to have later M53s, each rated at 95 kN (21,400 lb st) with afterburning. Movable half-cone centrebody in each air intake. Provision for a large jettisonable fuel tank under each wing. Fuel tankage in fin helps to give total capacity about three times as great as that of the Mirage 2000.

ACCOMMODATION: Pilot only, on Martin-Baker Mk 10 zero-zero ejection seat, under sideways-opening (to starboard) transparent canopy; 360° field of view.

SYSTEMS: Messier-Hispano-Bugatti hydraulic system, pressure 280 bars (4,000 lb/sq in), powered by four advanced pumps and using lightweight titanium pipelines. Two Auxilec electrical generators. Turboméca Palouste gas turbine APU, in compartment aft of pilot's seat, for engine starting.

AVIONICS AND EQUIPMENT: Provision for radar of 90 cm (35.4 in) diameter in nose, to provide search range of up to 65–70 nm (120–130 km; 75–80 miles). Digital autopilot, multi-mode displays, SAGEM inertial navigation system, Crouzet Type 80 air data computer, Thomson-CSF VE.120 head-up display and digital automated weapon delivery system.

ARMAMENT: Provision for two 30 mm DEFA guns in bottom of air intake trunks and a rail under each outer wing for a Matra 550 Magic air-to-air missile, plus a wide range of air-to-air and air-to-surface weapons.

DIMENSIONS, EXTERNAL:

Wheel track	4.36 m (14 ft 3½ in)
Wheelbase	6.90 m (22 ft 7½ in)

FAIRCHILD REPUBLIC

FAIRCHILD REPUBLIC COMPANY (A Divisio of Fairchild Industries Inc); Divisional Office an Works: Farmingdale, Long Island, New Yor 11735, USA

FAIRCHILD REPUBLIC NIGHT/ADVERSE WEATHER A-10

In the 1978–79 *Jane's*, brief details were given of a two-seat attack version of the A-10A Thunderbolt II. More specifically, this is regarded now as a night/adverse weather (N/AW) attack aircraft, with secondary use as a trainer retaining operational capability. Funded jointly by Fairchild and the US Department of Defense, a prototype has been built for evaluation purposes, and was transported to Edwards AFB, California, during April 1979, where the first flight was made on 4 May. The initial flight was to be followed by a company test programme extending to the end of September 1979. If, as a result of these and subsequent USAF tests and evaluation, it is decided to procure the N/AW A-10 in quantity, it has been suggested that they could be deployed effectively on a one-to-one basis alongside in-service A-10As. Alternatively, if considered expedient, it will be possible to retrofit single-seat A-10As to N/AW A-10 standard.

This potentially important version of the A-10 will carry, in addition to the pilot, a weapons system officer (WSO) in the aft cockpit, who will be responsible for ECM, navigation, and target or threa acquisition and designation. This will enable the pilot to concentrate on control of the aircraft, with a far higher likelihood of success in attacking targets under conditions of darkness or adverse weather.

Generally similar to the single-seat A-10A, the N/AW version differs by having a second (aft) cockpit with raised seat to provide the WSO with virtually the same over-the-nose view as the pilot. His cockpit duplicates that of the pilot, except that it has a cathode ray tube (CRT) in lieu of the head-up display, no flight controls, and is not provided with titanium armour. Other changes include forward extensions of the port and starboard landing gear housings to accommodate radar and FLIR respectively, and lengthened twin fins to increase their effective area, thus maintaining the same di

Fairchild Republic Night/Adverse Weather A-10, a two-seat version of USAF's Thunderbolt II

ectional stability factor as the single-seat A-10A. n the construction of the N/AW A-10, Fairchild has ntroduced welded/bonded fuselage panels, and graphite composite tailplane leading-edges for test purposes.

To provide the two-seat A-10 with its essential night/adverse weather capability, there are changes in the avionics equipment. New equipment includes a modified version of the Westinghouse WX-50 multimode radar, which will be used as a ground moving target indicator, for ground mapping, terrain following/avoidance, and threat detection; a modified version of the Texas Instruments AAR-42 FLIR; Ferranti Type 105 laser rangefinder; Litton INS; Honeywell radar altimeter; a changed Kaiser HUD for the pilot and Hartmann CRT for the WSO; and General Electric low-light-level TV. This last feature has been included for comparison with FLIR. The N/AW A-10 will retain also the Martin Marietta AN/AAS-35 Pave Penny laser target designation pod which is standard equipment of in-service A-10As.

A description of the A-10A Thunderbolt II can be found in the 1978–79 *Jane's*. It applies also to the N/AW A-10, except as described above. Available specification and performance figures are as follows:

DIMENSIONS, EXTERNAL: As for A-10A except:

Height overall	4.98 m (16 ft 4 in)

WEIGHTS (estimated):

Operating weight empty	11,908 kg (26,253 lb)
Mission T-O weight, with fuel	4,853 kg (10,700 lb) 20,032 kg (44,162 lb)

PERFORMANCE (estimated at mission T-O weight):

T-O run	860 m (2,820 ft)
Landing run	372 m (1,220 ft)
Mission radius	250 nm (463 km; 288 miles)

BOEING VERTOL

BOEING VERTOL COMPANY: Offices and Works: PO Box 16858, Philadelphia, Pennsylvania 19142, USA

BOEING VERTOL MODEL 234 COMMERCIAL CHINOOK

Announced in the late Summer of 1978, this development of the military CH-47 Chinook has been evolved for use as a commercial passenger transport, as a cargo carrier, and for specialised tasks such as servicing offshore oil and natural gas rigs, remote resources exploration and extraction, logging, and construction work.

The airframe of the Model 234 is based on that of the latest military Chinook, but has many new features. These include the use of wide-chord glassfibre rotor blades, instead of the usual metal blades; redesign of the fuselage-side fairings in two different forms; a lengthened nose to accommodate the weather radar antenna; and movement further forward of the front landing gear units.

Two basic versions of the commercial Model 234 are offered:

Long-range model. Identified by continuous fuselage-side fairings, approximately twice as large as those of the military Chinook and containing large fuel tanks. Equipped to airline standards as a passenger, passenger/freight 'combi' or all-cargo transport.

Utility model. Fuselage-side fuel tanks replaced by two drum-shape internal tanks, mounted longitudinally side-by-side at the front of the cabin. Fuselage-side fairings removed, leaving only an individual streamlined blister around each landing gear mounting. As well as reducing weight, this enhances the helicopter's lifting capability by reducing the airframe surface area on which the rotor downwash impinges.

Conversion from one configuration of the Model 234 to another is estimated to take eight hours, and requires four persons to handle the fuel tanks of the utility model and the ramp baggage bins of the passenger-carrying helicopter. Initial cost of the glassfibre blades is significantly greater than that of metal blades, but manufacturing time is reduced by 5% and in-service maintenance costs by 71%. Mean time between blade removal is estimated at 3,200 h. The three blades of any one rotor are interchangeable, but blades cannot be interchanged from one hub to another. Current engine TBO is 1,800 h.

Artist's concept of the long-range configuration of the Boeing Vertol Commercial Chinook, able to carry 44 passengers

Initial order for the Model 234 was placed by British Airways Helicopters, which ordered three in 1978, with an option on three more, primarily for North Sea oil rig support operations. Other early customers were Columbia Helicopters and Erikson Air Crane, both based in Oregon, USA. Assembly of the first aircraft began in mid-1979. First flight is scheduled for mid-1980, with full certification in early 1981.

TYPE: Twin-turbine commercial transport helicopter.

ROTOR SYSTEM: Two three-bladed rotors in tandem, turning in opposite directions and driven through interconnecting shafts which enable both rotors to be driven by either engine. Wide-chord glassfibre blades, with VR7 section over inboard 85% of span, and VR8 section on outer 15% of span; thickness/chord ratio 12% and 8% respectively. Overall blade twist 12°. Each blade comprises a laminated glassfibre skin over a glassfibre D spar, forming the front half of the section, and with the rear half filled with Nomex honeycomb. An aluminium screen inserted in the skin provides lightning protection, discharging strikes via the titanium leading-edge. Outboard 25% of leading-edge capped with replaceable nickel section. Blade balancing by tracking weights in tips. Two blades of each rotor can be folded manually. Hubs fully articulated, with pitch, flapping, and drag hinges. All bearings submerged completely in oil. Auxiliary transmission lubrication system enables flight to be completed after total loss of oil in primary system. Blades embody electrical de-icing blankets, permitting addition of a de-icing kit if required. Rotor rpm 225.

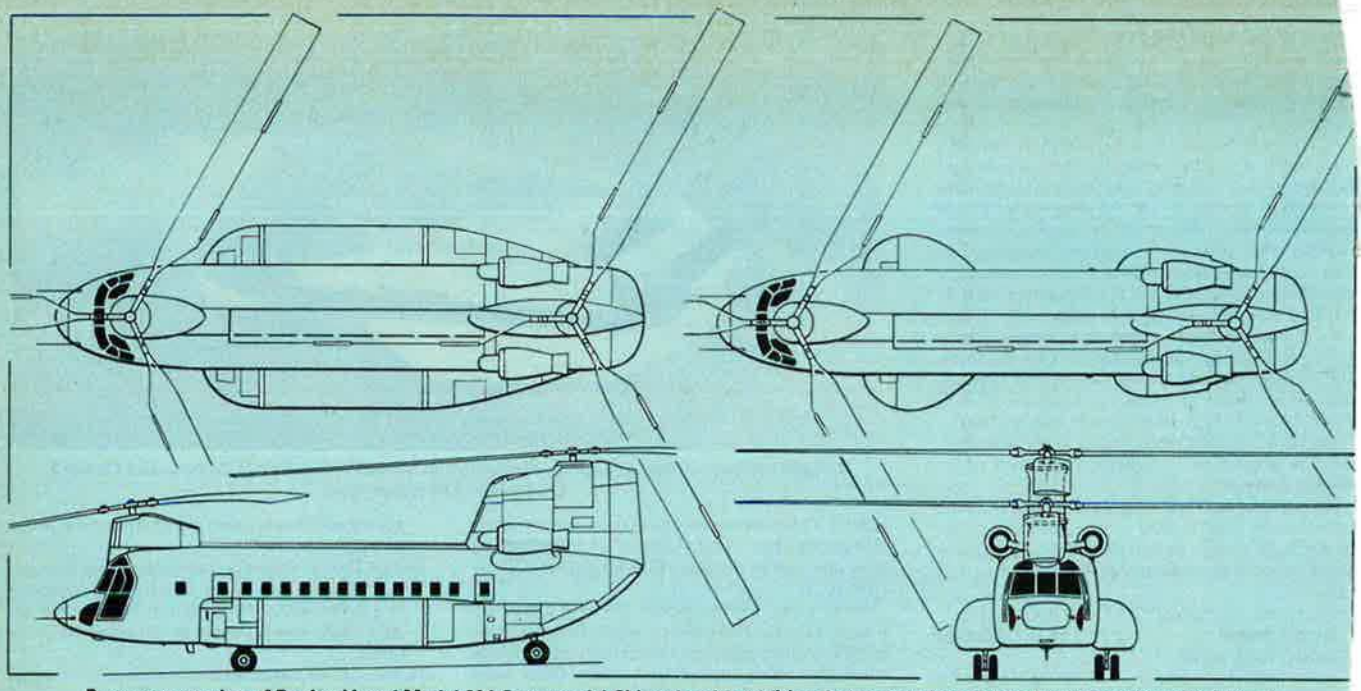
ROTOR DRIVE: Power is transmitted from each engine through individual overrunning clutches, into the combiner transmission, thereby providing a single power output to the interconnecting shafts.

FUSELAGE: All-metal semi-monocoque structure of basically square section. Loading ramp forms undersurface of upswept rear fuselage. External fuel pods of long-range model made of advanced composites, including glassfibre, graphite/epoxy and Nomex nylon honeycomb. These fairing pods provide flotation capability adequate to meet British airworthiness requirements applicable to a Sea State Seven (9.15 m; 30 ft waves. Wave length-to-height ratio 15) without added flotation gear.

LANDING GEAR: Non-retractable quadricycle type, with twin wheels on each forward unit and single wheels on each rear unit. Oleo-pneumatic shock-absorbers on all units. Rear units fully castoring and steerable. Equipped with hydraulic disc brakes.

POWER PLANT: Two Avco Lycoming AL 5512 turboshaft engines, pod-mounted on each side of rear rotor pylon. Each engine has max T-O rating of 3,039 kW (4,075 shp), max continuous rating of 2,237 kW (3,000 shp), and 30 min contingency rating of 3,246 kW (4,353 shp). Transmission rated at 5,592 kW (7,500 shp) at 225 rotor rpm, and 3,430 kW (4,600 shp) for single-engine operation. Long-range model has two fuel tanks, one in each fuselage-side fairing, with total capacity of 7,911 litres (2,090 US gallons). Utility model has two drum-shape internal tanks, with total capacity of 2,271 litres (600 US gallons). Single-point pressure refuelling.

The cabin of the Model 234 Commercial Chinook, shown here in a display mockup, has window size and spacing identical to those of the Boeing 727



Passenger version of Boeing Vertol Model 234 Commercial Chinook, with additional plan view (top right) of cargo version (*Pilot Press*)

ACCOMMODATION: Two pilots on flight deck, with dual controls. Passenger cabin of long-range model seats up to 44 persons four-abreast, with centre aisle. Each seat has overhead bin and underseat stowage for carry-on baggage; larger items are stowed over the rear ramp in the main baggage compartment. Galley, with cabin attendant's seat, and toilet standard, between flight deck and cabin. Typical 'combi' configuration accommodates 18 passengers forward and 7,250 kg (16,000 lb) of freight, loaded via rear ramp. All passenger facilities can be removed for freight-only service. Passenger door at front of cabin on starboard side. Crew door on each side of flight deck. Cabin floor supported by dynamically tuned fittings to reduce vibration. Hydraulically powered cargo ramp can be stopped at any intermediate position to match the level of the loading vehicle being used. Single central cargo hook is standard on utility model for carrying external loads of up to 12,700 kg (28,000 lb). Optional dual tandem hooks for precision operations and for load stability in high-speed flight; or three tandem hooks for delivering multiple loads.

SYSTEMS: Heating and ventilation systems maintain comfortable flight deck/cabin temperature in ambient temperatures down to −32°C. Duplicated flying control, hydraulic, and electrical systems. Solar T62T-2B APU, rated at 71 kW (95 shp), drives auxiliary gearbox on rear transmission to start engines and provide power for two flying control system hydraulic pumps and two alternators. All critical systems heated to inhibit ice buildup.

AVIONICS AND EQUIPMENT: Duplicated full blind-flying instrumentation, weather radar, and dual four-axis automatic flight control system with built-in test equipment provide all-weather capability. Optional equipment includes passenger interior furnishings for the utility model, 'Combi' interior, downward-shining cargo load light, cargo winch of 5,440 kg (12,000 lb) capacity operable via floor hatch or loading ramp, rescue hoist of 272 kg (600 lb) capacity, a power-down rear loading ramp to drive the ramp below water when required, a water dam to prevent water entering the cabin when the ramp is down, glassfibre wheel-skis, an ice detector probe, and ditching equipment that includes two liferafts, each with an overload capacity of 36 persons. Standard items include integral work platforms, and a maintenance panel that allows 26 separate checks to be carried out from a single ground-level position.

DIMENSIONS, EXTERNAL:

Rotor diameter (each)	18.29 m (60 ft 0 in)
Rotor blade chord (constant)	81.3 cm (2 ft 8 in)
Length overall, rotors turning	30.18 m (99 ft 0 in)
Length of fuselage	15.87 m (52 ft 1 in)
Height overall	5.67 m (18 ft 7 in)
Width over fuselage-side fairings	4.78 m (15 ft 8 in)

DIMENSIONS, INTERNAL:

Passenger cabin:	
Length	9.19 m (30 ft 2 in)
Max width	2.51 m (8 ft 3 in)
Max height	1.98 m (6 ft 6 in)
Baggage compartment, volume	4.42 m³ (156 cu ft)
Utility model, cargo hold volume	41.03 m³ (1,449 cu ft)

WEIGHTS (estimated: L, long-range model; U, utility model):

Weight empty:	
L	11,090 kg (24,449 lb)
U	9,219 kg (20,323 lb)
Fuel load:	
L	6,361 kg (14,024 lb)
U	1,826 kg (4,026 lb)
Max payload:	
L	10,229 kg (22,551 lb)
U, internal	11,843 kg (26,109 lb)
U, external	12,700 kg (28,000 lb)
Max T-O weight:	
L and U, internal load	21,318 kg (47,000 lb)
U, external load	23,133 kg (51,000 lb)

PERFORMANCE (estimated: L, long-range model; U, utility model):

Max level speed:	
L, U	165 knots (305 km/h; 190 mph)
Max cruising speed at 610 m (2,000 ft):	
L, U, internal load, at 10,900 kg (24,000 lb) AUW	160 knots (296 km/h; 184 mph)
L, U, internal load, at 21,318 kg (47,000 lb) AUW	142 knots (263 km/h; 163 mph)
Cruising speed for optimum range, at 610 m (2,000 ft):	
L, U, internal load, at 18,150 kg (40,000 lb) AUW	137 knots (253 km/h; 157 mph)
L, U, internal load, at 21,318 kg (47,000 lb) AUW	135 knots (250 km/h; 155 mph)
Max rate of climb at S/L:	
L, U, internal load	410 m (1,350 ft)/min
Service ceiling: L, U, internal load	4,570 m (15,000 ft)
Hovering ceiling OGE:	
L, max passenger load	1,370 m (4,500 ft)
U, max external load	305 m (1,000 ft)
Range, with 45 min IFR reserves:	
L, with 44 passengers	545 nm (1,010 km; 627 miles)
L, with max fuel	740 nm (1,371 km; 852 miles)
U, with max internal load	180 nm (333 km; 207 miles)
U, with max external load	135 nm (250 km; 155 miles)
Max endurance:	
L	5 h 30 min
U, internal load	1 h 24 min

Artist's impression of the Boeing Vertol Model 234 for British Airways

Industrial Associates of the Air Force Association

"Partners in Aerospace Power"

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Colt Industries, Inc.
Computer Sciences Corp.
Conrac Corp.
Control Data Corp.
Cubic Corp.
Decca Navigator System, Inc.
Decisions and Designs, Inc.
Dynalectron Corp.
E-A Industrial Corp.
Eastman Kodak Co.
ECI Div., E-Systems, Inc.
E. I. Du Pont de Nemours & Co.
Emerson Electric Co.
E-Systems, Inc.
Ex-Cell-O Corp.—Aerospace
Fairchild Camera & Instrument Corp.
Fairchild Industries, Inc.
Federal Electric Corp., ITT
Firestone Tire & Rubber Co.
Ford Aerospace & Communications Corp.
GAF Corp.
Garrett Corp.
General Dynamics Corp.
General Dynamics, Electronics Div.
General Dynamics, Fort Worth Div.
General Electric Co.
GE Aircraft Engine Group
General Motors Corp.
GMC, Delco Electronics Div.
GMC, Detroit Diesel Allison Div.
GMC, Harrison Radiator Div.
Goodyear Aerospace Corp.
Gould Inc., Government Systems Group
Grumman Corp.
GTE Sylvania, Inc.
Harris Corp.
Hayes International Corp.
Hazeltine Corp.
Hi-Shear Corp.
Honeywell, Inc.
Howell Instruments, Inc.
Hudson Tool & Die Co., Inc.
Hughes Aircraft Co.
Hughes Helicopters
Hydraulic Research Textron
IBM Corp.—Federal Systems Div.
International Harvester Co.
Interstate Electronics Corp.
Israel Aircraft Industries, Ltd.
Itek Corp., Optical Systems Div.
ITT Defense Communications Group
ITT Telecommunications and Electronics Group—North America
Kelsey-Hayes Co.
Kentron International, Inc.
Lear Siegler, Inc.
Leigh Instruments, Ltd.
Lewis Engineering Co., The
Libbey-Owens-Ford Co.
Litton Aero Products Div.
Litton Industries
Litton Industries Guidance & Control Systems Div.
Lockheed Corp.
Lockheed Aircraft Service Co.
Lockheed California Co.
Lockheed Electronics Co.
Lockheed Georgia Co.
Lockheed Missiles & Space Co.
Logicon, Inc.
Loral Corp.
Magnavox Government & Industrial Electronics Co.
Marquardt Co., The
Martin Marietta Aerospace
Martin Marietta, Denver Div.
Martin Marietta, Orlando Div.
McDonnell Douglas Corp.
Menasco Manufacturing Co., Div. of Colt Industries, Inc.
Military Publishers, Inc.
MITRE Corp.
Moog, Inc.
Motorola Government Electronics Div.
Northrop Corp.
OEA, Inc.
O. Miller Associates
Pan American World Airways, Inc.
PRC Information Sciences Co.
Products Research & Chemical Corp.
Rand Corp.
Raytheon Co.
RCA, Government Systems Div.
Redifon Flight Simulation Ltd.
Rockwell International
Rockwell Int'l, Electronics Systems Group
Rockwell Int'l, North American Aerospace Operations
Rohr Industries, Inc.
Rolls-Royce, Inc.
Rosemount Inc.
Sanders Associates, Inc.
Satellite Business Systems
Science Applications, Inc.
Singer Co.
Sperry Rand Corp.
Sundstrand Corp.
Sverdrup & Parcel & Associates, Inc.
System Development Corp.
Talley Industries, Inc.
Teledyne, Inc.
Teledyne Brown Engineering
Teledyne CAE
Texas Instruments Inc.
Thiokol Corp.
Tracor, Inc.
TRW Defense & Space Systems Group
United Technologies Corp.
UTC, Chemical Systems Div.
UTC, Hamilton Standard Div.
UTC, Norden Div.
UTC, Pratt & Whitney Aircraft Group
UTC, Research Center
UTC, Sikorsky Aircraft Div.
Vought Corp.
Western Electric Co., Inc.
Western Gear Corp.
Western Union Telegraph Co., Government Systems Div.
Westinghouse Electric Corp.
World Airways, Inc.
Wyman-Gordon Co.
Xerox Corp.

Fewer flight demonstrations but more exhibitors, more and better technical exhibits, and more people at Le Bourget marked this year's . . .

Paris Air Show

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

THIS year the Paris Air Show—or, in the more elegant French way, *Le Salon de l'Aéronautique*—was the thirty-third of these biennial events and the biggest ever. There were more exhibits, more exhibitors, and most certainly more people milling around the historic old airpatch of Le Bourget. And if, as the Paris newspapers proudly informed us, French aviation brought in $6 billion in sales last year, the Paris hotels and restaurants must have come close to that figure during the week of *Le Salon*.

Paris, helped in no small way by our shrinking dollar, has become a place where $150 hotel rooms and $50 dinners are simply facts of life. It is a long reach from the days when sleazy little men sidled up to Americans in the Place Vendôme and offered black-market premiums for dollars. The trick now is to get someone to take them.

Be that as it may, however, the air show would disappear as an international spectacle without the Americans. The Germans are coming up in the aviation world, the Italians have a few things to offer, as do the British and the Canadians. The French, as we have seen, are doing fine. Nevertheless, if the United States aviation industry ever decided to stay home, Paris would become just another air show, and not a very interesting one at that.

This year, for a variety of reasons, there were fewer United States aerial demonstrations than usual. Cost was one of the reasons, and bureaucratic difficulties with Washington another, but mainly the demonstrations were down because there is not much new to demonstrate. It is now four years since the dramatic air show confrontation between the Dassault F1 and the General Dynamics F-16, both then in contention for the NATO buy of the century. The F-16 won, of course, and this year it began coming off the lines in Belgium and Holland. The demonstration F-16 in this year's show was, in fact, a Belgian product, and a two-seater version at that. The F-16 has reached the advanced stage of taking VIPs for rides in between aerobatic shows for the crowd.

Our only other fighter flying this year was the F-15 Eagle, impressive as always but no longer new. The only new fighters were French—the Mirage 2000 and the Super Mirage 4000. The 4000, a big delta-wing, two-engine airplane, made its first flight in March of this year, a tribute to the remarkable and unequaled ability of Marcel Dassault Aviation to bring airplanes from conception to flight in what has become for us an impossibly short time.

The Super Mirage is an impressive airplane, both in size and apparent performance. It has the look of an interceptor, although there was no information available at Le Bourget on its capabilities for that or any other mission. Still, the Soviet Backfire is being viewed with increasing alarm in Western Europe. The French, who continue to maintain their fierce, if not entirely rational, independence from NATO's coordinated air defense arrangements, may see the need for a new high-performance interceptor. Or maybe Dassault first turned out another airplane, as he has before, with no assured market in view.

The Tornado, that improbably successful joint venture of the Germans, British, and Italians, put on a daily show. Like our own swingwing designs, the Tornado is expensive, but the various air forces concerned are enthusiastic about its performance. In a further move toward allied unity, the RAF will conduct Tornado training for all three air forces. Just watching the demonstration flight, admittedly not the most reliable way to judge an airplane, I got the impression of a very flexible, high-flying, high-performance machine. No air combat fighter, perhaps, but a very useful all-around tactical bird.

The Soviets were at Le Bourget, of course. They always come, but the crash of their SST, the Concordski, during the 1973 show, seems to have discouraged them from flight demonstrations.

That same accident also put Le Bourget, increasingly a victim of Parisian urban sprawl, in a certain amount of future risk as a site for the air show. Demonstration flights must now stick rigidly to their briefed routines. The slightest infraction sees a pilot ordered to land. Since it is hard to imagine a Paris Air Show anywhere but at Le Bourget, we can only cheer the French on in their safety campaign.

The main attractions at this show for the professional aviation world are not found in the sky, however, but in the technical exhibits and even more, probably, in this rare chance to talk with one another. The exhibits this year were the best ever. There seems to be a never-ending breakthrough in all the bits and pieces—flight controls, optics, survival gear, navigation computers, and hundreds of other things that make the combat airplanes of the free world so reassuringly capable.

Sadly, there seems to be one vital element in the weapon systems complex that is lagging behind. Not even, in fact, in the same generation, for air-to-air munitions have not kept pace. The fire-control systems are beginning to have all sorts of magic capabilities. The airplanes with engines of hitherto-undreamed-of power can do almost anything a pilot can think of and physically tolerate. It is in the bullet department that there needs to be some improvement. ■

The International Institute
for Strategic Studies'

Military Balance 1979/80

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The Bulletin Board

By James A. McDonnell, Jr., MILITARY RELATIONS EDITOR

Severance Pay Still Snafued

If all interested parties support a meritorious issue, it should win speedy approval. Right? Wrong, at least in the case of enlisted severance pay. It's been waiting in the wings for decades, even though it would do two important things: (1) give enlisted people severance equity with officers, and (2) encourage service management, heretofore reluctant to fire unproductive people because there is no exit money, to get rid of some deadwood.

But Congress has looked the other way because the Pentagon insists that severance pay must be a part of its new military retirement package. The package, pending for over a year, was only recently submitted to Congress. It could lie dormant there another couple of years—with still no enlisted severance pay on the books.

Hoping to end this nonsense, Rep. Bob Wilson (R-Calif.) has introduced H.R. 4359. It would simply provide the long-delayed severance money without further ado. At least the bill should provide a forum for debate on this issue. Other important new military personnel bills include:

- **H.R. 4256** (Melvin Price, D-Ill., and Bob Wilson) would allow the Air Force and Navy to assign women members to vessels and aircraft engaged in combat missions. This is an Administration proposal.
- **H.R. 4238** (Lester J. Wolff, D-N. Y.) would (1) extend to Civil Air Patrol cadets, eighteen years and older, compensation available to CAP senior members in event of disability or death, and (2) boost the level of compensation available to both.
- **S. 1340** (Abraham Ribicoff, D-Conn.) would end the linkage between military pay and federal civilian pay, allowing major reforms in civilian employees' compensation rules. It could also lead to larger raises for the military than for civil servants in the years ahead. This is an Administration proposal.
- **H.R. 4367** (Robin Beard, R-Tenn.) would deny veterans' benefits to service members who do not complete their initial period of obligated service on active duty. It's aimed at persons who don't meet minimum behavior o performance standards.
- **S. 1296** (Henry M. Jackson, D-Wash., and Charles McC. Mathias, R-Md.) would authorize additional medical and dental care for members of the Reserve Forces. Approval will make Reserve-Guard service "significantly more attractive to potential recruits and present enlistees," Senator Jackson told the Senate.

The Air Force recently swore in Maj. Mildred L. Raichle, a lieutenant colonel selectee, as its first full-time woman military judge. Maj. Gen. Walter D. Reed, USAF's Judge Advocate General, administered the oath. Judge Raichle, an Indiana University law school graduate with thirteen years' USAF service, is now dispensing justice at bases in the Southeastern US. She and USAF's twenty-six other judges preside over trials involving military criminal matters.

Care Improvements Seen

"We're going to get well before too long," according to Maj. Gen. Garth B. Dettinger, USAF's Deputy Surgeon General. He was referring to expected increases in active-duty physicians and restoration of specialty care, which—because of severe specialist shortages—is not now available at many Air Force facilities.

These good tidings won't materialize overnight. But within a couple of years, he said, the Air Force should start accumulating hundreds of medical officer graduates each year from the military medical scholarship program begun in 1973 and from the new armed forces medical school. It takes about eight years to produce a fully trained physician, he explained.

Meantime, however, the persistent shortage of obstetricians has forced the Air Force to temporarily close OB services at four more bases—Fairchild, Wash.; Nellis, Nev.; Robins, Ga.; and Tyndall, Fla. The recent loss of fifteen obstetricians triggered the move, though officials said the four sites will continue to provide outpatient gynecological services. Restoration of full OB services is expected in two years.

Dr. Dettinger, in remarks to AFA's Junior Officer Advisory and Enlisted Councils, forecast restoration of various other medical specialty services in the early 1980s when the scholarship pipeline hopefully starts gushing. He made clear, however, that substantially increased physician compensation is essential. Congress is in the process of considering several doctor pay boosts.

Councils Meet, Map Plans

Members of AFA's Junior Officer Advisory and Enlisted Councils at a June 7–8 meeting in the nation's capital received high-level briefings on military personnel issues, reviewed recommendations they will give AFA leaders at the convention in September, and began work on their annual special project. This year, the special project will underscore the "good things"—various rewards

satisfactions, intangible benefits, etc.—associated with life in the Air Force.

Thirty junior officers and enlisted members from throughout the USAF participated in the two-day AFA-sponsored event at the Twin Bridges Marriott Hotel, just a stone's throw from the Pentagon.

In his keynote address to the group, Maj. Gen. William R. Usher, the Hq. USAF Director of Personnel Plans (and the JOAC advisor), reported that Air Force leadership is highly concerned about military pay levels, is working hard to improve them, and is insisting on a "fair shake." He also spotlighted the theme that affiliation with the Air Force is a profession, or calling, rather than just a job.

The two Councils were welcomed by AFA President Gerald V. Hasler and briefed on current military legislation by Col. Carl R. Abrams, Chief of USAF's Legislative Division; on the medical care situation by Maj. Gen. Garth B. Dettinger, the USAF Deputy Surgeon General; and on the Pentagon's plans to overhaul the military retirement system by Col. Leon Hirsh, the Defense Department's Director of Compensation. CMSAF Robert Gaylor, the Advisor to the Enlisted Council, also briefed that group.

Rep. David E. Bonior (D-Mich.), in the principal luncheon address, called on the government to expand its support for Vietnam-era veterans who have employment, medical, and other problems.

Viet-Era Readjustment Act OK'd, Hailed

Congress has passed and the President has signed into law a bill greatly expanding readjustment counseling and related mental-health service for Vietnam-era veterans. Special counseling for their families is also provided.

Capitol Hill sponsors call the new program "landmark" legislation. It's designed to reach out and help veterans of that war who have psychological, alcohol, or drug problems.

Many Viet-era veterans have been reluctant to seek assistance directly from VA facilities, so the new program will find the government contracting with private physicians and counselors to provide the required mental-health services. Meanwhile, the VA will mobilize its 8,000 psychological and social work staff and hire additional specialists in the drive to assist all who need readjustment help. Veterans have two years to request the new counseling services.

The new law also sets up a community-based drug and alcohol treatment program on a test basis. The VA will contract for such treatment for veterans in halfway houses, therapeutic communities, psychiatric residential treatment centers, etc.

The new measure also establishes a test program of preventive health-care services for veterans with a fifty-percent-or-greater service-connected disability rating. This and the drug-alcohol treatment test are not limited to Vietnam War vets.

Sen. Alan Cranston (D-Calif.), chairman of the Senate Veterans Affairs Committee, called the readjustment measure "a milestone in a long struggle to help some veterans who, years after the fighting in Vietnam, are still having difficulties adjusting to civilian life."

AFA Believes . . .

Bring Dependents Home from Overseas?

At press time, we note with dismay that the Senate has approved the recommendations of its Armed Services Committee to discontinue travel entitlements for dependents of overseas-bound junior enlisted people. In a related move, it also directs a ten percent reduction of *all* overseas dependents by September 1980 and a further reduction, within the next five years, of thirty percent.

"Bring the dependents home from overseas" has become a rallying cry for both budget-cutters and those who see the dependents as potential hostages to any aggressor.

AFA believes, as set forth in our current Defense Manpower Issues Policy Paper, that "full travel benefits for junior enlisted families" are essential to maintain morale and to boost reenlistments. This includes travel to overseas locations. We have fought for this position for some years.

On the larger issue of overseas dependents in general, we would point out that by law, *all* military members are entitled to the same basic PCS travel and transportation allowances. It has been DoD funding constraints that have denied this entitlement for overseas moves to enlisted people below E-4 with less than two years of service. In FY '79, we were pleased to see Congress okay the funding for all, even though they placed a limit on total numbers of dependents overseas at 350,000. That figure, presumably based on availability of dependent services and thus a reasonably understandable restriction, closely approximated the number of dependents actually overseas at the time. (The Air Force currently has close to 100,000 dependents in NATO countries, where about seventy percent of USAF's overseas-assigned personnel are concentrated. Most of the others are in Japan/Okinawa, the Philippines, and South Korea.)

But the currently proposed restrictions, which will force the services into using more short, unaccompanied tours, defy logic. Air Force studies have determined that such tours are disastrous for morale and retention and significantly detract from readiness. Even the President's Defense Manpower Commission Report stressed that such tours:

- Drive up family separation allowance costs;
- Force members in critical skills to rotate back to short tour areas more frequently;
- Drive down the reenlistment rate, boost already-critical recruiting goals, add to training costs; and
- Decrease force readiness because of increased turbulence and lowered morale.

Finally, keeping dependents out of overseas areas only results in noncommand-sponsored dependents traveling overseas at their own expense.

The larger implications of this are apparent. Take, as an example, the European area where combat readiness is heavily dependent on familiarity with local operating conditions and inter-allied procedures. If USAF billets in the NATO area have to be manned by people on short, unaccompanied tours and by TDY units, combat readiness inevitably will suffer. Also, with pilot loss rates already at their highest point in history, and both first-term and career reenlistments declining, this seems a strange time to aggravate retention by increasing family separation, the number-one career irritant.

Finally—and perhaps most important—any unilateral move by the US to reduce the number of dependents overseas could be interpreted by our NATO allies—who, after all, live there—as a lack of commitment by this country.

AFA believes that travel entitlements should be restored for junior enlisted members. Further, the only limitation on numbers of other dependents overseas should be the availability of acceptable support facilities. We trust that congressional debate on this issue will recognize that any other action is false economy and could lead to a distinct weakening of our deterrent capability.

—JAMES A. McDONNELL, JR.

The Bulletin Board

Retire to Central America?

Five Central American countries—Costa Rica, El Salvador, Panama, Guatemala, and Nicaragua—have enacted special laws to attract US military retirees as permanent residents, Hq. USAF is telling its retired members.

"Sunshine and cheaper living" are cited as the major lures. Other enticements, the Air Force reports, include duty-free importation of household goods, tax exemptions, and retention of US citizenship. The Washington, D. C., embassies of the countries will provide "all the facts," the Hq. USAF memo in the latest retired bulletin says.

The impact of the revolution in Nicaragua on Americans searching for retirement havens was not mentioned.

New Recruiting Moves Launched

In still another move to attract recruits, the Air Force has expanded its base-choice program to include numerous overseas locations. Youths qualified for enlistment in such hard-to-fill skills as security, law enforcement, aircraft electrical systems, fuels, and fire protection can, after completing basic and specialty training, elect to pull duty in Germany, Japan, Spain, and several other countries.

Earlier this year *(see March '79 "Bulletin Board")*, the Air Force started offering an additional stripe or two on enlistment to AFJROTC graduates, new six-year enlistees, and certain youths enlisting to fill critical skills. These steps have helped recruiting somewhat, but at the end of May, Air Force nonprior-service enlistments still were about 1,500 short for the year, Hq. USAF authorities said.

In another recruiting development, USAF's Information Director, Brig. Gen. H. J. Dalton, Jr., has told IO shops Air Force-wide to pitch in and assist—to meet with local recruiters; gin up more Air Force Recruiter Assistance Program (AFRAP) lead referral cards via off-base speakers, commanders' letters-to-parents programs, etc.; use base tours, open houses, etc., to carry the recruiting message outward; and make full use of bands, drill teams, and the like. Send your news releases to high school newspapers, he also told base IOs.

General Dalton's office in the Pentagon produced the new film, *Special Report: Entitlements,* that is currently being shown throughout the Air Force. Part of the "Air Force Now" internal film series, the thirty-minute film focuses on the traditional service benefits and their monetary value. Chief of Staff Gen. Lew Allen, Jr., appears briefly in the film.

O'sea Schools Transfer Hit

The Defense Department's dependent school system may be transferred to the Department of Education, a new agency the Administration is trying to create in the name of "federal reform."

The DoD schools abroad and some 150 other federal education programs would come under the new Education Department, under a Senate-passed bill being heatedly debated in the House in June. The major exception is the VA education system, which would stay where it is.

But the DoD schools switch has drawn the wrath of many service officials, DoD school authorities, and lawmakers. Rep. William L. Dickinson (R-Ala.) sees the transfer as another threat to military benefits, since with two bureaucracies in the act, the quality of education would suffer. Military children would be the victims.

At one point in the House debate, Rep. John N. Erlenborn (R-Ill.) threatened to offer amendments to

Ed Gates . . . Speaking of People

Can the Military Club Dilemma Be Resolved?

What's wrong with the approximately 720 US officer, NCO, and lower-grader clubs in the fifty states and the 280 abroad? By and large, according to reports, they are in a rather unhealthy state.

Numerous clubs are hurting financially; some are solvent only because they are heavily subsidized by appropriated funds and profits from base package liquor stores. Various quarters, however, believe that package-store profits should be distributed for the benefit of all service personnel, not just those belonging to military clubs.

Poor attendance is a main reason clubs are in trouble. The services need some new approach, or gimmick, or big attraction to get the troops back in the clubs.

In earlier years, the vast majority of officers and NCOs at most service installations supported their clubs; many made them their second homes, going there for lunch, swimming, a quick beer, parties, dances, etc. Some came over-frequently just to play the slot machines.

"See you at the club," military people said about as often as "good night." It signified a feeling of belonging, part of the "way-of-life" attitude the military leadership sees lacking today. With the club the hub of social activities, life in uniform was a bit fuller, many believe. And with the slots humming, club treasuries were amply filled, prices were low, and dues were negligible.

No more. Now, according to a recent probe by the US General Accounting Office (GAO), forty-four of every 100 active-duty Air Force, Army, Navy, and Marine Corps members never go near a club. Of the fifty-six percent who patronize them, many do so infrequently. Income lags, dues rise.

The GAO, which acts as the congressional auditor of federal agency spending, sent sleuths to the headquarters of the services and to several installations, Stateside and abroad, to check on club management, membership policies, etc. GAO also queried several thousand active-duty members for their views.

The probers found that most officers—seventy percent of those in the USAF, sixty percent of those in the Army—feel they are pressured or obligated to join their clubs. Some survey respondents said their effectiveness ratings would be adversely affected if they declined to join. This doesn't exactly encourage participation.

Dues also impact on attitudes toward club joining. Half of all Air Force officers, who pay an average of $11 a month, believe their dues are unreasonable. Many Army and Marine Corps members feel the same, the survey held.

Numerous officers, NCOs, and lower-ranking enlisteds cited poor entertainment as their main reason for not supporting military clubs. Poor food was also mentioned. Attractive drink prices were a major reason given by many members of all the services for joining a military club, followed closely by check-cashing service.

Club income from alcohol sales dropped slightly following the services' efforts, launched a couple of years ago, to deglamorize on-base use of alcohol. Even so, the survey showed that about sixty percent of the military population had not changed either club o

ut the service academies under the Education Department, saying if it could operate the overseas schools better than DoD then it could also operate the academies better. The Ervenborn threat, of course, was designed to scuttle the Department of Education measure entirely, not transfer the academies.

Youth or Experience?

Its obsession with "youth and vigor" denies the US armed forces the increasing technical expertise they need and costs the government unnecessary amounts of money. That's the nub of a new report coauthored by retired Air Force Col. Martin Binkin and published by the Brookings Institution.

Colonel Binkin and his Brookings associate, Irene Kyriakopoulos, note that the military services, with more than half the troops under twenty-four, is indeed youthful, but contrary to generally accepted opinion it is highly inexperienced. Nearly forty percent of all military members today are either trainees, apprentices, or helpers, they claim.

The cost of retaining experienced workers would be less than the cost of replacing them, the authors hold. This is because costs of recruitment and training have soared, lower graders now marry early and thereby create dependent expenses, and junior grade pay has risen faster in recent years than senior members' compensation.

USAF Lt. Col. Robert E. Doty, Jr., was recently named Outstanding Serviceman of the Year by the Honolulu Pacific Federal Executive Board. Doty, an AFA member, was chosen out of 45,000 military personnel in Hawaii for his dedication and contributions to the federal service and community.

By retaining just 14,000 extra trained enlisted members, the report holds, the government would save about $300 million annually. *Youth or Experience? Manning the Modern Military* is the twenty-first in the series of Brookings Studies in Defense Policy, which are designed to increase public understanding of defense policy issues.

Arlington to Remain "Active" Until 2022

Arlington National Cemetery, the nation's foremost resting place for its war dead, is averaging about eleven burials per weekday or some 2,700 a year. Under current eligibility criteria, authorities expect the burial rate to rise sharply in the years ahead as "the threshold years for World War II veterans" approach.

By 2022, the 620-acre burial ground will cease to be "active," according to the Army, which operates the cemetery.

Back in the early 1960s, burials at Arlington soared to 7,000 a year, but this high rate could not continue. In early 1967, with only 6,500 gravesites remaining, the eligibility rules were tightened and more space was acquired. Interments plunged, though two years ago eligibility was eased just a bit. Even so, the majority of the veterans in this country still remain ineligible.

The only eligibles are persons dying on active duty, retirees, veter-

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package-store usage. One of every five members was unaware of the alcohol deglamorization program.

The GAO in its report on club problems went on at great length about poor club management. It claimed that base commanders have too much control and that club managers lack the know-how to operate efficiently.

Furthermore, according to the GAO, the fact that the services receive appropriated funds and package-store profits to support clubs acts as a "disincentive to effective and efficient [club] management." In other words, it charged, the services won't push hard for new economies as long as much of their income is handed them on a silver platter. The GAO insists that big savings can be achieved through club consolidations.

"Consolidating multiple clubs on an installation often presents a viable means to improve service to military personnel while achieving economies of scale. Installation commanders are reluctant to consider the joint use of facilities by various ranks," the GAO stated, because "they perceive a resulting breakdown of military tradition and discipline."

A few clubs have been consolidated, in whole or in part, though the results are not clear. The GAO urged more joint usage. It scolded the Army for not closing its large O-club at Fort Shafter, Hawaii, which is in financial trouble and not used much by the officers, and using the Shafter NCO club for both groups.

Sembach AB, Germany, is another GAO example of officer and NCO clubs in financial difficulty, with authorities unwilling to merge the dining facilities "because of a possible erosion of military discipline."

It seems likely, however, that with costs rising all along the line and with legislators unhappy with package-store profits and appropriated funds largely supporting clubs, more consolidations will be forthcoming. The alternative frequently might be closure.

How do the rank and file feel about a single, all-ranks club? According to the survey, lower-ranking people endorse the idea while higher graders are opposed.

"Enlisted men and officers should use the same club. We are told to work as a team so why not enjoy ourselves as a team?" a typical Air Force junior enlisted member supposedly said.

"I will not participate in any club consolidated to accommodate all ranks. I must be able to relax in an environment totally separate from the people [EM] who work for me," a typical Army officer is supposed to have declared.

So there is no clear consensus on the consolidation issue. But to avoid going that route, it would seem, the services must get more people back in the clubs. On a frequent, regular basis. And a new attraction might also help the cause—the aforementioned one-armed bandits.

Air Force and Army clubs overseas deep-sixed their slot machines years ago following disclosure of the "skimming" scandals at clubs in Southeast Asia. But the Navy and Marine Corps clubs abroad kept their iron men humming, acquiring millions of dollars of support funds in the process.

This hasn't been lost on the present Air Force and Army leadership. Army authorities, in fact, recently approved an early return of slots to their clubs overseas, and Air Force is expected to follow suit very soon. One high-level Air Force source visualizes annual profits of more than $10 million from the Air Force move that would be used not only to prop up club treasuries but also to support other recreational programs.

The next step, some officials agree, would be to restore the slot machines to Stateside clubs, though launching such a drive would stir up a hornet's nest. But the benefits might be worth it. After all, no one else has come up with a workable idea for solving the military club dilemma. ■

The Bulletin Board

ans with disabilities rated thirty percent or higher, Medal of Honor and other high award winners, and certain government officials. A few former politicians with no military service have gotten in under the latter route.

Still, there's a way for honorably discharged vets not in any of the categories above to be interred in Arlington—by cremation in the new columbarium. The first section is scheduled for completion in November. The new structure contains niches for 5,000 urns, which will contain ashes of the dead. When completed, the columbarium will accommodate 50,000 remains.

Cremations, the Army reports, have been increasing gradually; they numbered 407 last year. Officials anticipate 900–1,000 during the columbarium's first full year of operation at Arlington.

Some 4,000,000 visitors come to Arlington Cemetery each year. The Tomb of the Unknowns and President Kennedy's grave are the most frequently visited sites.

An important new interment may occur at Arlington before long—an unknown soldier from the Vietnam War. The remains of three individuals have been undergoing processing in Hawaii, to determine whether or not they are identifiable.

Meantime, the Veterans Administration, which operates the national cemeteries outside of Arlington, has recently opened two new cemeteries and plans to open three others within the next couple of years.

Now in operation after opening late last year are cemeteries at Calverton, Long Island, N. Y., and Riverside, Calif. Those nearing completion are:

- Bourne, Mass., once a part of Otis AFB. A December 1980 opening is planned.
- Indiantown Gap, Pa. Construction should begin next spring, with opening anticipated in February 1982.
- Quantico, Va. This is only thirty miles from Arlington, but since most veterans remain ineligible for Arlington the government wanted another national cemetery in the area. The target date for opening is January 1982.

The only other new national cemetery on the horizon in the near future will be located at Fort Custer, Mich., or at a site called Plum Brook, near Sandusky, Ohio. Final selection is due this fall, though several years will follow before it is open.

The VA is also considering three sites in the south—Fort Mitchell, Ala.; Fort Gillem, Ga.; and Fort Jackson, S. C. One will be chosen, with an announcement due sometime this fall.

Short Bursts

"Hostile fire" pay—that's $65 per month—has been okayed for US military members **stationed in Iran** from December 8, 1978, to February 23, 1979. To collect, persons should report to base finance offices armed with appropriate assignment orders and travel vouchers. The Pentagon reported in June that there were 298 US military, mostly Army, still assigned to Iran at the end of March.

A total of **352 of the 535 members of Congress are veterans,** but only forty-one are ex-Air Force.

Back in 1955 a rated major with twelve years of service drew **$220 per month in flight pay;** that equaled forty-three percent of his basic pay. Today, twenty-four years later, an O-4 with the same service receives **$245 in flight pay,** or fourteen percent of his basic. Quite a deterioration. The fifty percent increase in flight pay USAF is seeking wouldn't do much to halt the pilot exodus, officials concede, but it would show that the service is trying. Unfortunately, the proposal, which also includes authority for paying certain pilots lump-sum bonuses and a fifty-percent increase in enlisted

ight pay, is still "being staffed" among the services.

During 1978, the IG reports, **AWOLs in the Air Force** accounted for 33,000 days lost. That's low and Air Force leaders intend to keep it low. Accordingly, they're leaning on commanders to find out just why persons went AWOL and where they holed up. They want them returned to military custody promptly.

As spring turned into summer, the **draft registration issue** continued to boil on Capitol Hill amid predictions that an explosion is near. Registration of eighteen-year-olds, as endorsed by the House and Senate Armed Services Committees, will touch off a rebellion from our nation's youth," according to Rep. Les Aspin (D-Wis.). He has proposed **"computer registration"** as a cheaper, more effective route for the government to take. Mr. Aspin holds that the IRS can merge the addresses in its records with the birthdate and sex found on Social Security records to produce a usable tape for Selective Service, and avoid "face-to-face" registration and the certain turmoil it would touch off.

Latest Defense Department figures show only 4,694 USAF members participating in the **Veterans' Educational Assistance Program** (VEAP), compared to the following numbers in the other services: Army 40,819, Navy 20,729, and Marine Corps 5,177. VEAP ended the GI Bill for persons entering service after December 31, 1976, establishing in its place a contributory scheme—by the individual and the government—that slowly builds up an educational fund. Army is plugging VEAP strongly in its recruiting ads, but it really isn't a very good individual investment. Air Force officials acknowledge that the tuition aid program is a better deal for Air Force members than VEAP.

Strategic Air Command junior airmen arrive at Hq. SAC, Offutt AFB, Neb., to discuss the role of younger personnel in the command. Part of the new retention program called FIRST VIEW, 240 airmen and spouses have participated to date. Deplaning (top to bottom) are Mrs. Planje, SrA. Dennis L. Planje, and SrA. John M. Meister.

It's official: **Men in the Air Force now can carry umbrellas** while in uniform. But there's a condition: "It must be carried in the left hand so that personnel can properly salute," Headquarters says.

Hq. USAF is advertising **245 AFROTC openings** next summer for captains, majors, and LCs at 141 campuses. Forty-eight billets are for flyers; all the others are for nonrateds. The AFROTC posts are called "career-enhancement" slots. ■

Senior Staff Changes

RETIREMENTS: B/G William H. L. **Mullins;** M/G Robert E. **Sadler.**

CHANGES: M/G Robert W. Bazley, from Dep. IG for Insp. & Safety, and Cmdr., AFISC, Norton AFB, Calif., to Cmdr., Sheppard TTC, ATC, Sheppard AFB, Tex., replacing M/G Charles L. Donnelly, Jr. . . . **B/G Ernest A. Bedke,** from Dep. Cmdr. for Joint Test/Exercises, Readiness Tng. Range Acty., USAFTFWC, TAC, Nellis AFB, Nev., to IG, Hq. TAC, Langley AFB, Va. . . . **M/G Carl H. Cathey, Jr.,** Chief, US Mil. Tng. Msn., Dhahran, Saudi Arabia, to DCS/Requirements, Hq. TAC, Langley AFB, Va. . . . **B/G John T. Chain, Jr.,** from Mil. Asst. to the Secretary of the Air Force, Washington, D. C., to Dep. Dir. of Plans, DCS/OP&R, Hq. USAF, Washington, D. C., replacing M/G Daryle E. Tripp.

M/G Charles L. Donnelly, Jr., from Cmdr., Sheppard TTC, ATC, Sheppard AFB, Tex., to Chief, Mil. Tng. Msn., Dhahran, Saudi Arabia, replacing M/G Carl H. Cathey, Jr. . . . **B/G Allison G. Glover,** from DCS/Engrg. & Svcs., Hq. AFSC, Andrews AFB, Md., to DCS/Engrg. & Svcs., Hq. MAC, Scott AFB, Ill., replacing B/G Paul T. Hartung . . . **B/G Paul T. Hartung,** from DCS/Engrg. & Svcs., Hq. MAC, Scott AFB, Ill., to Dep. Dir., Engrg. & Svcs./Prgm. Mgr., AB Construction, Israel . . . **M/G Robert T. Herres,** Dir., Comd. Control & Comm., DCS/OP&R, Hq. USAF, Washington, D. C., to Cmdr., Hq. AFCS, Scott AFB, Ill., replacing retiring M/G Robert E. Sadler.

B/G Charles B. Jiggetts, from Cmdr., Northern Comm. Area, AFCS, Griffiss AFB, N. Y., to Dir., J-6, Hq. PACOM, Camp Smith, Hawaii, replacing B/G Robert F. McCarthy . . . **B/G William G. MacLaren, Jr.,** from V/C, Hq. AFCS, Scott AFB, Ill., to Dir., Comd. Control & Comm., DCS/OP&R, Hq. USAF, Washington, D. C., replacing M/G Robert T. Herres . . . **B/G Robert F. McCarthy,** from Dir., J-6, Hq. PACOM, Camp Smith, Hawaii, to V/C, Hq. AFCS, Scott AFB, Ill., replacing B/G William G. MacLaren, Jr. . . . **Col. (B/G selectee) Attilio Pedroli,** from Cmdr., 323d FTW, ATC, Mather AFB, Calif., to Cmdr., Def. Indus. Sup. Ctr., DLA, Philadelphia, Pa. . . . **Col. (B/G selectee) Eugene M. Poe, Jr.,** from Chief, Senate Liaison Ofc., Legislative Liaison, OSAF, Washington, D. C., to Dep. Dir., Legislative Liaison, OSAF, Washington, D. C., replacing retiring B/G William H. L. Mullins.

Col. (B/G selectee) Richard W. Pryor, from Cmdr., Southern Comm. Area, AFCS, Oklahoma AFS, Okla., to Cmdr., Northern Comm. Area, AFCS, Griffiss AFB, N. Y., replacing B/G Charles B. Jiggetts . . . **M/G Len C. Russell,** from DCS/Plans, Hq. USAFE, Ramstein AB, Germany, to Dep. IG for Insp. & Safety, and Cmdr., AFISC, Norton AFB, Calif., replacing M/G Robert W. Bazley . . . **M/G Daryle E. Tripp,** from Dep. Dir. of Plans, DCS/OP&R, Hq. USAF, Washington, D. C., to DCS/Plans, Hq. USAFE, Ramstein AB, Germany, replacing M/G Len C. Russell.

SENIOR ENLISTED ADVISOR CHANGE: CMSgt. Emory E. Walker, from Cmdt., Air Training Command NCO Academy, Lackland AFB, Tex., to Senior Enlisted Advisor, Hq. ATC, Randolph AFB, Tex., replacing retiring CMSgt. Brian Bullen. ■

Perspective
Comment & Opinion

Are We Promoting the Right People?

By Lt. Col. Raymond R. Fischer, USAF

It's time to take a look at the officer promotion system from a different perspective, one so obvious that perhaps it is being overlooked. Are the needs of the Air Force the primary factor in the selection process, and are the right people being selected to best satisfy these needs? I don't think so.

First off, date of rank is the only factor in determining who will be looked at by a given central promotion board. Normally, an entire year group, regardless of relative qualifications, specialty distribution, or other factor, will enter the "primary zone" as first-time eligibles to compete on a "best-qualified" basis for a limited number of promotions.

The board, in its deliberations, carefully assesses the relative merit of each candidate on the basis of the "whole-man" concept, assigns a numerical rating to each, lines them up from "best to worst," applies a predetermined percentage quota, and, bingo, the "best-qualified" candidates come out the winners. But does the Air Force?

Perhaps, in most cases, those selected are generally more qualified than those who aren't. After all, OERs, level of assignment, experience, PME, academic education, awards, combat time, official photographs, and other general factors were considered. Far and away the most significant—OERs: precontrolled "nine fours," bloodily won controlled reports, post-controlled mostly "top blocks," and bitterly resented closed reports on lieutenant colonels and colonels. Consider the tremendous difficulty of a central board in determining the relative merit of thousands of contenders in the face of changing OER systems and consequent variance in rater perceptions, lack of standardization in kinds and numbers of reports, etc.

As difficult as a board's task may be, it isn't so much what they *do* consider that raises the question of their effectiveness, but rather *what they don't consider*—the relative quality of candidates within the various Air Force specialties, and the specific and relative needs of the Air Force for promotees within each specialty. Would a civilian corporation promote a research chemist to fill a marketing executive position because the chemist had a fractionally better "whole-man" record than any marketing candidate? Of course not. But does it make any better sense for the Air Force to promote officers "in the blind" without a view toward specific, current specialty requirements?

Enter the age-old chestnut: "An officer is an officer, and an officer can do anything." Maybe this idea had some validity when the Air Force had one aircraft and one pilot, but its merit has slipped drastically over years that have seen extraordinarily rapid growth in both numbers and occupational specialties.

It's time we put the old chestnut to bed, and redefined what an officer is, or at least should be in today's Air Force, and then set about promoting him or her accordingly. An officer is an officer; *i.e.*, to some extent a generalist, as well he or she must be to satisfy the myriad corollary demands of their profession. However, an officer is primarily a highly qua ified technical specialist whos hard-gained expertise took many years and many dollars to develop Therefore, let the "new chestnut" be "An officer is a specialist, and a specialist can best perform in his o her specialty." *Example:* A fighte pilot can do *one* thing better thar anyone else—fly fighters! And, con versely, nobody, but nobody, can fl fighters better than a fighter pilot.

Obviously, some specialists will and should, grow beyond the techni cal limits of their specialties. *Exam ple:* Some fighter pilots will learr enough about management, leader ship, and other general aspects of of ficership along the way to become operations officers, fighter squadror commanders, or even the Chief o Staff. However, the run-of-the-mil line of the Air Force specialist among us will, and should, spend th majority of their years more or less di rectly involved in some aspect of thei specialty. The point is, some special ists will, in time, become more quali fied and demonstrate more potential than others within their specialty, and *these* are the officers who should be selected for promotion.

The overall problem of officer promotion may be complex, but it certainly is solvable. What we need first is a radical change in philosophy, then a redesigned officer promotion system to serve our revised thinking. The philosophy I'm suggesting is that we think of an officer as a specialist who should, in all but rare cases, remain in a specialty for an entire career. Then, I'm suggesting we promote these specialists on the basis of the needs of the Air Force, expressed as quotas for each specialty area. To the recently stated idea that we need a professional pilot corps, I say, *Amen!* But, we also need professional corps of supply officers, weapons controllers, missile launch officers, research and development officers, etc., etc.

Here's how the promotion process I'm proposing would work. First, a central board would periodically determine how many vacancies, by

HOW TO SHARE YOUR PERSPECTIVE

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

grade, were available or projected within each specialty area. Then, balancing these vacancies against the real and current needs of the Air Force, they would assign appropriately weighted promotion quotas for each specialty.

Next, selection boards would be convened by specialty. Members would be senior specialists in the career area being considered, drawn from each major using command. These specialists boards would fill assigned quotas from among the best-qualified candidates available for consideration.

The advantages of such a system are obvious. Most important, the Air Force would get exactly what it needs, the best-qualified people in each specialty to fill previously determined, valid requirements. Next, the quality of the officer corps, along with its morale, would inevitably increase, as promotion visibility became clear for the first time, and officers worked vigorously to make themselves competitive in their career areas.

All the sacred cows would be granted continued life. Academic education, PME, awards, combat experience, and the stern but friendly countenance of official photographs would continue to have meaning to specialty boards. But the real beauty of this idea is that those who beheld the photograph would, in all likelihood, have some personal knowledge of the man or woman its image represented, because he or she would be one of their own.

Oh, for the day when we become wise enough to stop comparing the relative merits of an apple and an orange, a jackass and a jack rabbit, and one highly trained specialist with the rest of the totally different highly trained specialists in the United States Air Force.

Colonel Fischer is Deputy Commander of the 601st Tactical Control Group, Kapaun AS, Germany. He received his commission in 1956 through the ROTC program at the University of Rochester. In his career as a Weapons Controller, he has served in a variety of Air Defense and NORAD assignments, and in Korea and Germany. He was instrumental in establishing the TACS school at MacDill AFB, Fla., in 1966, and has written three textbooks in support of it.

AFA N

1979

At its annual meeting in Colorado Springs, Colorado, on May 26, AFA's Nominating Committee, comprised of the National Officers and Directors and the President of each AFA State Organization or his or her designee, chose a slate of four National Officers and twenty-one Directors to be presented to the Delegates at the National Convention in Washington, D. C., on September 17, 1979.

For National President, members of the Nominating Committee nominated Vic Kregel, a native of Irwin, Pa., who now resides in Dallas, Tex. Mr. Kregel is Manager of Public Affairs for the Vought Corporation. He entered the Air Force in 1942 and received an Air Force commission and pilots wings in 1943. In 1944, he completed Navy flight training and received the gold wings of a Naval aviator. He then flew 500 combat hours in the Southwest Pacific. Later, he served for two years as an Exchange Officer with Fighter Command, Royal Air Force. A graduate of several service schools and the University of Maryland, he was a member of the faculty at the Air University as a section commander and lecturer. His last assignment prior to his retirement in 1965 was as Business Manager of Athletics at the United States Air Force Academy in Colorado Springs.

Mr. Kregel now serves AFA as an elected National Director, and as a member of the Aerospace Education Foundation Board of Trustees. He has served as a National Vice President (Southwest Region), a member of the Organizational Advisory Council, and as a State and Chapter President. He is a Life Member of AFA.

Gerald V. Hasler, the incumbent National President, was nominated for Chairman of the Board. Mr. Hasler, of Albany, N. Y., is the President and Chief Executive Officer of an architectural design and remodeling corporation. During World War II, he was a B-25 pilot instructor. Immediately following the war, he was with the United Nations Relief and Rehabilitation Administration as its Director for the French Zone of Occupation and Director of Supply and Transport for Austria with headquarters in Austria. An AFA member since 1963, Mr. Hasler now serves as Chairman of the Executive, Nominating, Awards, and Convention Site Committees; as a member of the Resolutions Committee; as an ex officio member of all Committees and Councils; and as a member of the Aerospace Education Foundation's

Vic Kregel

Gerald V. Hasler

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Board of Trustees. He has served as Board Chairman, an elected National Director, Chairman of the Constitution Committee, National Convention Parliamentarian, an ex officio (nonvoting) member of the Finance Committee, Treasurer of the Aerospace Education Foundation, and a State and Chapter President.

Earl D. Clark, Jr., of Kansas City, Kan., was nominated for the office of National Secretary. Mr. Clark is President of the Collins Construction Company and of the Earl D. Clark Architectural Firm, as well as a bank director. He now serves as a National Vice President (Midwest Region). He has served as an elected National Director, a member of the Finance Committee, a member of the Organizational Advisory Council, and a State and Chapter President. He is an Air Force colonel in the retired Reserve, and a Life Member of AFA.

Jack B. Gross, a prominent Hershey, Pa., civic leader and businessman, was nominated for an unprecedented nineteenth term as National Treasurer. Mr. Gross also serves as Chairman of AFA's Finance Committee; as a member of its Executive, Resolutions, and Convention Site Committees; and as a member of the Aerospace Education Foundation's Board of Trustees. He has served as Chairman of the Board of Directors, an elected National Director, and as a State and Chapter President. He is a retired Air Force colonel and a Life Member of AFA.

Earl D. Clark, Jr.

Jack B. Gross

The following are permanent members of the AFA Board of Directors under the provision of Article IX of AFA's National Constitution: John R. Alison, Joseph E. Assaf, William R. Berkeley, John G. Brosky, Edward P. Curtis, James H. Doolittle, George M. Douglas, Joe Foss, Jack B. Gross, George D. Hardy, Martin H. Harris, Gerald V. Hasler, John P. Henebry, Robert S. Johnson, Sam E. Keith, Jr., Arthur F. Kelly, Thomas G. Lanphier, Jr., Jess Larson, Curtis E. LeMay, Carl J. Long, Nathan H. Mazer, John P. McConnell, J. B. Montgomery, Edward T. Nedder, Martin M. Ostrow, Julian B. Rosenthal, John D. Ryan, Peter J. Schenk, Joe L. Shosid, C. R. Smith, William W. Spruance, Thos. F. Stack, Harold C. Stuart, James M. Trail, Nathan F. Twining, and A. A. West.

The twenty-one men whose pictures appear on the following page are nominees for the eighteen elective Directorships for the coming year. (Names marked with an asterisk are incumbent National Directors.)

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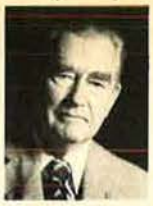
Blankenship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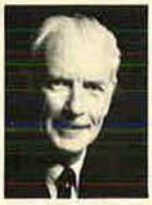
Nettleton


Price


Rapp


Ritchie


Stearn


Taylor


West


Wilkins

NOMINEES FOR AFA'S BOARD OF DIRECTORS

***David L. Blankenship,** Tulsa, Okla.—industry executive. Former Chapter, State President; National Council member. Life Member.

***Daniel F. Callahan,** Nashville, Tenn.—management engineering consultant. Former Chapter, State President; National Council Chairman; National Committee member. Current Aerospace Education Foundation Board of Trustees member. Life Member.

***Robert L. Carr,** Pittsburgh, Pa.—real estate broker. Former Chapter, State President; National Committee member; Vice President (Northeast Region).

***William P. Chandler,** Tucson, Ariz.—insurance broker. Former Chapter, State President; National Council member; Vice President (Far West Region). Life Member.

Hoadley Dean, Rapid City, S. D.—development company president. Former Chapter President. Current Chapter Secretary; National Committee Chairman; Vice President (North Central Region); Aerospace Education Foundation Board of Trustees member. Life Member.

R. L. Devoucoux, Portsmouth, N. H.—stock broker. Former Chapter, State President. Current National Committee member; Vice President (New England Region).

***Richard C. Emrich,** McLean, Va.—financial manager, FAA. Former Chapter, State President; Vice President (Central East Region). Life Member.

E. F. "Sandy" Faust, San Antonio, Tex.—bank executive. Former State President; Vice President (Southwest Region). Current Chapter Officer; National Trustee, Arnold Air Society. Life Member.

Alexander C. Field, Jr., Chicago, Ill.—broadcasting company executive. Former Chapter, State President. Current National Committee member; Vice President (Great Lakes Region); Aerospace Education Foundation Board of Trustees member. Life Member.

***James P. Grazioso,** West New York, N. J.—roofing and sheet metal contractor. Former Chapter, State President; Vice President (Northeast Region); National Council member. Life Member.

***Alexander E. Harris,** Little Rock, Ark.—property management executive. Former Chapter, State President; Vice President (South Central Region); National Committee member. Life Member.

***Roy A. Haug,** Colorado Springs, Colo.—telephone company executive. Former Chapter, State President; Vice President (Rocky Mountain Region); National Council Chairman. Current National Committee member; Aerospace Education Foundation Board of Trustees member. Life Member.

***William V. McBride,** San Antonio, Tex.—retired Air Force general. Former Vice Chief of Staff, United States Air Force. Current National Committee member; Aerospace Education Foundation Board of Trustees member. Life Member.

***J. Gilbert Nettleton, Jr.,** Germantown, Md.—aerospace industry executive. Former Squadron Commander; Chapter President; Chairman, National Air Force Salute; Chairman, Aerospace Education Foundation Board of Trustees. Current National Committee member; Aerospace Education Foundation Board of Trustees member. Life Member.

Jack C. Price, Clearfield, Utah—Air Force civilian executive. Former Chapter, State President; Vice President (Rocky Mountain Region); National Director; National Council Chairman. Current National Secretary; National Committee Chairman; Aerospace Education Foundation Board of Trustees member. Life Member.

***William C. Rapp,** Buffalo, N. Y.—telephone company executive. Former Chapter, State President; National Council member; Vice President (Northeast Region). Current National Committee member. Life Member.

***R. Steve Ritchie,** Golden, Colo.—industry executive. Former National Committee member. Current Under Forty National Director.

***Edward A. Stearn,** San Bernardino, Calif.—aerospace industry executive. Former Chapter President; National Committee member; National Council member; National Advisor. Current State President; Aerospace Education Foundation Board of Trustees member. Life Member.

***L. T. "Zack" Taylor,** Lompoc, Calif.—industry consultant. Former Chapter, State President; National Council member. Life Member.

***Herbert M. West, Jr.,** Tallahassee, Fla.—environmental consultant. Former Chapter, State President; Vice President (Southeast Region); National Council member. Current Aerospace Education Foundation Board of Trustees member.

***Sherman W. Wilkins,** Bellevue, Wash.—aerospace executive. Former Chapter President; National Committee member; Vice President (Northwest Region). Current Aerospace Education Foundation Board of Trustees member. Life Member.

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Production go-ahead on Mark 5 operational vehicles.
First **Mark 11** reentry vehicle flight.
Production go-ahead on Minuteman Mark 11 reentry system.
First flight of **Mark 11/11A Penetration Aids.**

1965-1969.

ABRES programs **(LORV, RVTO, Endo decoy, Exochaff)** resulted in innovative approaches to critical areas of penetrability, accuracy, and multiple targeting.
New and sophisticated **composite** and **3D materials** developed by Avco.
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First **Mark 1/1A Penetration Aids** flight (1968).

1970-1974.

Advancement of reentry system technology during ABRES' Advanced Ballistic Concepts **(ABC)** Program.
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1975-1979.

Three highly successful Technology Development Vehicle **(TDV)** flights conducted.
Development and flight testing of the preprototype MX reentry vehicle on the **ABRV** contract.
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Avco's sophisticated 3D materials applied to advanced rocket nozzles.
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AFA State Contacts

Following each state name, in parentheses, are the names of the localities in which AFA Chapters are located. Information regarding these Chapters, or any place of AFA's activities within the state, may be obtained from the state contact.

ALABAMA (Auburn, Birmingham, Huntsville, Mobile, Montgomery, Selma): **Frank M. Lugo,** 4307 Old Shell Rd., Mobile, Ala. 36608 (phone 205-344-9234).

ALASKA (Anchorage, Fairbanks): **David W. Robinson,** P. O. Box 1120, Anchorage, Alaska 99510 (phone 907-274-3561).

ARIZONA (Phoenix, Tucson): **E. D. Jewett, Jr.,** 7861 N. Tuscany Dr., Tucson, Ariz. 85704 (phone 602-297-1107).

ARKANSAS (Blytheville, Fort Smith, Little Rock): **Gordon W. Smethurst,** RR #2, Box 43D, Cabot, Ark. 72023 (phone 501-374-2245).

CALIFORNIA (Apple Valley, Edwards, Fairfield, Fresno, Hawthorne, Hermosa Beach, Long Beach, Los Angeles, Marysville, Merced, Monterey, Novato, Orange County, Palo Alto, Pasadena, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, San Mateo, Santa Barbara, Santa Monica, Tahoe City, Vandenberg AFB, Van Nuys, Ventura): **Edward A. Stearn,** P. O. Box 5867, San Bernardino, Calif. 92412 (phone 714-889-0696).

COLORADO (Aurora, Boulder, Colorado Springs, Denver, Ft. Collins, Grand Junction, Greeley, Littleton, Pueblo, Waterton): **Stephen L. Brantley,** 1089 S. Buchanan St., Aurora, Colo. 80010 (phone 303-320-7153).

CONNECTICUT (East Hartford, North Haven, Storrs, Stratford, Windsor Locks): **Joseph R. Falcone,** 14 High Ridge Rd., Rockville, Conn. 06066 (phone 203-565-3543).

DELAWARE (Dover, Wilmington): **John E. Strickland,** Rt. 6, Box 408, Dover, Del. 19901 (phone 302-678-6070).

DISTRICT OF COLUMBIA (Washington, D. C.): **George L. J. Dalferes,** 12602 Tartan Ln., Oxon Hill, Md. 20022 (phone 301-897-6620).

FLORIDA (Bartow, Broward, Cape Coral, Ft. Walton Beach, Gainesville, Jacksonville, New Port Richey, Orlando, Panama City, Patrick AFB, Redington Beach, Sarasota, Tallahassee, Tampa): **Jack G. Rose,** 5723 Imperial Key, Tampa, Fla. 33615 (phone 813-855-4046).

GEORGIA (Athens, Atlanta, Rome, Savannah, St. Simons Island, Valdosta, Warner Robins): **William L. Copeland,** 1885 Walthall Dr., NW, Atlanta, Ga. 30318 (phone 404-355-5019).

HAWAII (Honolulu): **William B. Taylor,** 233 Keawe St., #630, Honolulu, Hawaii 96813 (phone 808-524-3535).

IDAHO (Boise, Twin Falls): **Ronald R. Galloway,** Box 45, Boise, Idaho 83707 (phone 208-385-5247).

ILLINOIS (Belleville, Champaign, Chicago, Elmhurst, Peoria): **Kurt Schmidt,** 2009 Vawter St., Urbana, Ill. 61801 (phone 217-367-6633).

INDIANA (Indianapolis, Lafayette, Logansport, Marion, Mentone, South Bend): **Roy P. Whitton,** 916 Oak Blvd., Greenfield, Ind. 46140 (phone 317-636-6406).

IOWA (Des Moines): **Ric Jorgensen,** 4005 Kingman, Des Moines, Iowa 50311 (phone 515-255-7656).

KANSAS (Topeka, Wichita): **Cletus J. Pottebaum,** 6503 E. Murdock, Wichita, Kan. 67206 (phone 316-681-5445).

KENTUCKY (Louisville): **Bill Dotson, Jr.,** 3736 Mamaroneck, Louisville, Ky. 40218.

LOUISIANA (Alexandria, Baton Rouge, Bossier City, Monroe, New Orleans, Shreveport): **Thomas L. Keal,** 404 Galway, Shreveport, La. 71115 (phone 318-868-9688).

MAINE (Limestone): **Alban E. Cyr,** P. O. Box 160, Caribou, Me. 04736 (phone 207-492-4171).

MARYLAND (Andrews AFB, Baltimore): **Robert J. Beatson,** 7813 Locris Ct., Upper Marlboro, Md. 20870 (phone 301-336-5400).

MASSACHUSETTS (Boston, Falmouth, Florence, Hanscom AFB, Lexington, Taunton, Worcester): **Mary Anne Gavin,** 24 Cherrywood Dr., Stoughton, Mass. 02072 (phone 617-223-5630).

MICHIGAN (Battle Creek, Detroit, Kalamazoo, Lansing, Marquette, Mount Clemens, Oscoda, Petoskey, Sault Ste. Marie, Southfield): **Howard C. Strand,** 15515 A Dr., N., Marshall, Mich. 49068 (phone 616-963-1596).

MINNESOTA (Duluth, Minneapolis, St. Paul): **David J. Little,** 1888 Princeton Ave., St. Paul, Minn. 55105 (phone 612-699-3600).

MISSISSIPPI (Biloxi, Columbus, Jackson): **Kenneth M. Holloway,** 13 Hermosa Dr., Ocean Springs, Miss. 39564 (phone 601-857-8382).

MISSOURI (Kansas City, Knob Noster, Springfield, St. Louis): **Stuart E. Popp,** 5605 Hancock, St. Louis, Mo. 63139 (phone 314-263-8409).

MONTANA (Great Falls): **Lucien E. Bourcier,** P. O. Box 685, Great Falls, Mont. 59403 (phone 406-453-1351).

NEBRASKA (Lincoln, Omaha): **Lyle O. Remde,** 4911 S. 25th St., Omaha, Neb. 68107 (phone 402-731-4747).

NEVADA (Las Vegas, Reno): **James L. Murphy,** 2370 Skyline Dr., Reno, Nev. 89509 (phone 702-786-2475).

NEW HAMPSHIRE (Manchester, Pease AFB): **Charles J. Sattan,** 53 Gale Ave., Laconia, N. H. 03246 (phone 603-524-5407).

NEW JERSEY (Andover, Atlantic City, Belleville, Camden, Chatham, Cherry Hill, E. Rutherford, Edison, Forked River, Fort Monmouth, Jersey City, McGuire AFB, Newark, Trenton, Wallington, West Orange): **Leonard Wilf,** 203 Cranford Rd., Cherry Hill, N. J. 08003 (phone 609-429-4245).

NEW MEXICO (Alamogordo, Albuquerque, Clovis): **Joseph H. Turner,** P. O. Box 1946, Clovis, N. M. 88101 (phone 505-762-4557).

NEW YORK (Albany, Bethpage, Binghamton, Buffalo, Catskill, Chautauqua, Griffiss AFB, Hartsdale, Ithaca, Long Island, New York City, Niagara Falls, Patchogue, Plattsburgh, Riverdale, Rochester, Staten Island, Syracuse): **Kenneth C. Thayer,** R. D. #1, Ava, N. Y. 13303 (phone 315-827-4241).

NORTH CAROLINA (Asheville, Charlotte, Fayetteville, Goldsboro, Greensboro, Kitty Hawk, Raleigh): **William M. Bowden,** 509 Greenbriar Dr., Goldsboro, N. C. 27530 (phone 919-735-4716).

NORTH DAKOTA (Concrete, Fargo, Grand Forks, Minot): **Ernest J. Collette, Jr.,** Box 345, Grand Forks, N. D. 58201 (phone 701-775-3944).

OHIO (Akron, Cincinnati, Cleveland, Columbus, Dayton, Newark, Toledo, Youngstown): **Robert J. Puglisi,** 1854 SR 181, Crestline, Ohio 44827 (phone 419-683-2283).

OKLAHOMA (Altus, Enid, Oklahoma City, Tulsa): **William N. Webb,** 404 W. Douglas, Midwest City, Okla. 73110 (phone 405-734-2658).

OREGON (Corvallis, Eugene, Portland): **Clayton Gross,** 3124 SW Doschdale Rd., Portland, Ore. 97201 (phone 503-244-9592).

PENNSYLVANIA (Allentown, Beave Falls, Chester, Dormont, Erie, Harris burg, Homestead, Lewistown Philadelphia, Pittsburgh, State Co lege, Washington, Willow Grove, York **Lamar R. Schwartz,** P. O. Box 7 Fogelsville, Pa. 18051 (phone 21 967-3387).

RHODE ISLAND (Warwick): **Charle H. Collins,** 143d TAG (RIANG), War wick, R. I. 02886 (phone 401-737 2100).

SOUTH CAROLINA (Charleston, Co lumbia, Greenville, Myrtle Beac Sumter): **Edith E. Callilham,** P. O. Bo 959, Charleston, S. C. 29402 (phon 803-577-4400).

SOUTH DAKOTA (Rapid City): **D. I Corning,** Camp Rapid, Rapid City S. D. 57701.

TENNESSEE (Chattanooga, Knox ville, Memphis, Nashville, Tri-Cities Area, Tullahoma): **Jack K. Westbrook** P. O. Box 1801, Knoxville, Tenn. 3790 (phone 615-523-6000).

TEXAS (Abilene, Austin, Big Spring Commerce, Corpus Christi, Dallas, De Rio, Denton, El Paso, Fort Worth, Har lingen, Houston, Kerrville, Laredo Lubbock, San Angelo, San Antonio Waco, Wichita Falls): **Frank Man upelli,** P. O. Box 5250, San Antonio Tex. 78201 (phone 512-349-1111).

UTAH (Brigham City, Clearfield Ogden, Provo, Salt Lake City): **William C. Athas,** 2916 Willow Creek Rd. Sandy, Utah 84070 (phone 801-973 4300).

VERMONT (Burlington): **John Navir** 134th DSES, ANG, Burlington IAP, V 05401 (phone 802-658-0770).

VIRGINIA (Arlington, Danville, Har risonburg, Langley AFB, Lynchburg Norfolk, Petersburg, Richmond Roanoke): **Jon R. Donnelly,** 853 Sutherland Rd., Richmond, Va. 2323 (phone 804-649-6425).

WASHINGTON (Seattle, Spokane Tacoma): **Jack Gamble,** 7010 Tur quoise Dr., SW, Tacoma, Wash. 9849 (phone 206-584-1610).

WEST VIRGINIA (Huntington): **James Hazelrigg,** Rt. 2, Box 32, Barboursville W. Va. 25504 (phone 304-755-2121).

WISCONSIN (Madison, Milwaukee) **Charles W. Marotske,** 7945 S. Verde Dr., Oak Creek, Wis. 53154 (phon 414-762-4383).

WYOMING (Cheyenne): **Lloyd A Flynn,** 1907 Laurel Dr., Cheyenn Wyo. 82001 (phone 307-634-5901).

A New Package . . . At Lower Costs . . . With More Options . . . And Added Events . . .

AFA's 1979 National Convention and Aerospace Development Briefings and Displays

ncluding, For The First Time, The Outstanding Airmen Dinner

September 16-20, Washington, D.C.

Despite inflationary barriers, a new approach to national convention programming will result in the lowest registration fees in many years: $50 advance and $60 regular. In addition, registrants will have more options than ever and, for the first time, will be able to attend the popular Outstanding Airmen Dinner.

All reservation requests for rooms at the Sheraton-Park should be sent to: Reservations Office, Sheraton-Park Hotel, 2660 Woodley Road, N.W., Washington, D.C. 20008. The nearby Shoreham-Americana Hotel's address is: 2500 Calvert St., N.W., Washington, D.C. 20008.

We urge you to make your reservations as soon as possible. To assure acceptance of your reservation request, refer to the AFA National Convention.

Sheraton-Park Hotel and Motor Inn, Washington, D.C.
AFA National Convention & Exposition

September 16-20, 1979

Singles: $42 $45 $65 $70 **Twins:** $54 $57 $80 $85 **Suites:** $130-$190 $210-$260

Plus 8% D.C. Sales Tax & 80 cents Per Room Per Night Occupancy Tax.

If rate category requested is unavailable, room in next open category will be assigned. To enable us to confirm your request. RESERVATIONS MUST BE RECEIVED not later than THREE WEEKS prior to opening date of the convention. Your room will be held until 6:00 p.m. unless guaranteed. Guaranteed reservations must be canceled by 4:00 p.m. on date of arrival or you will be charged for that night.

NAME ______

ADDRESS ______

CITY ______ STATE ______ ZIP CODE ______

Name(s) of other occupants ______

DATE ARRIVING ______ 19____ ARRIVAL HOUR ______

DATE DEPARTING ______ 19____

Check out time 1:00 PM

Advance Registration Form

Air Force Association National Convention and Aerospace Briefings & Displays

September 16-20, 1979 • Sheraton-Park Hotel • Washington, D.C.

Type or Print

Name ______

Title ______

Affiliation ______

Address ______

City, State, Zip ______

Note: Advance registration and/or ticket purchases must be accompanied by check made payable to AFA. Mail to AFA, 1750 Pennsylvania Ave., N.W., Washington, D.C. 20006.

Reserve the following for me:

☐ Advance Registration $______
☐ @ $50 per person (includes credentials and tickets to the following Convention functions; value $60): AF Chief of Staff Luncheon; Annual Anniversary Reception OR Salute to Congress;* AF Secretary's Luncheon

Tickets may also be purchased separately for the following:

☐ Aerospace Ed. Foundation Luncheon @ $15 each $______
☐ Outstanding Airmen Dinner @ $30 each $______
☐ AF Chief of Staff Luncheon @ $20 each $______
☐ Annual Anniversary Reception @ $20 each $______
☐ Salute to Congress* @ $20 each $______
☐ AF Secretary's Luncheon @ $20 each $______
☐ AF 32nd Anniversary Reception & Dinner Dance @ $45 each $______
Total for separate tickets $______
Total amount enclosed $______

Advance Registration Fee before September 7 — $50.00 (After September 7 — $60.00)

*Tickets to Salute to Congress available only to AFA Convention Delegates accompanied by their Congressman.

AFA News

By Don Steele, AFA AFFAIRS EDITOR

Principals at the dedication of the Albert A. Eldridge Hall at the ANG Museum, Otis AFB, Mass., in May, from left, Michael Corcoran, Jr., Museum Board of Directors; Warren Freda, Museum President; Francis A. Doyle, Museum Finance Chairman; CAP Lt. Col. Raymond Nault, Museum Director; Mr. Eldridge, Display and Archives Chairman; David P. Rossiter, Museum Board of Directors; MSgt. Robert J. Driscoll, ANG (Ret.), Museum Treasurer. Mr. Eldridge has been active in AFA since 1947. He has held all elective offices in the Boston Chapter, and was State President in 1950, 1957, and 1958. Since 1957, Mr. Eldridge has been editor of the Massachusetts AFA State newsletter and a member of the AFA State Executive Committee.

—Photo by James Heiderman

At awards ceremonies at the Michigan AFA State Convention at Battle Creek in May, from left, Michigan ANG's Robert Heyart, recipient of the State AFA's Vandenberg Award; Michigan AFA State President Howard C. Strand; Capt. Charlotte Greene, guest dinner speaker and one of the first of USAF's women pilots; and Edward Cartledge, recipient of the State AFA's Airability Trophy.

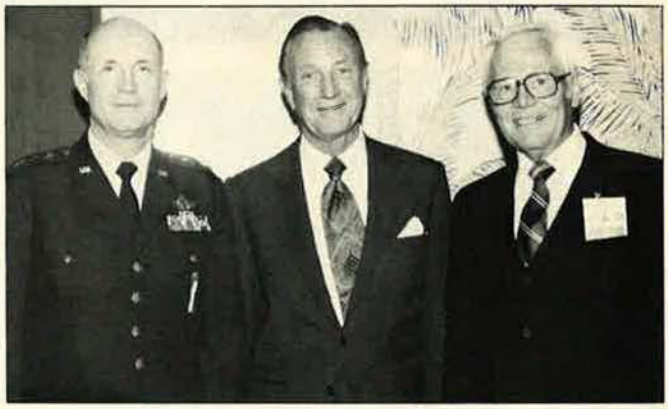
Guest speaker at the Connecticut AFA State Convention in May was TAC Commander Gen. W. L. Creech, Langley AFB, Va. From left, above, Joe Falcone, AFA State President; Harry J. Gray, Iron Gate, N. Y., Chapter member and United Technology Corp. Board Chairman; General Creech; and R. L. Devoucoux, Vice President for AFA's New England Region.

Distinguished guests at the Washington AFA State Convention in Seattle in May, included, from left, AFA State President Frank Troutman; Gen. William G. Moore, Jr., CINC MAC and guest dinner speaker; Peg Reed, Vice President for AFA's Northwest Region; AFA National President Gerald V. Hasler, luncheon speaker; and AFA National Director Sherm Wilkins.

chapter and state photo gallery

TAC Commander Gen. W. L. Creech and retired CMSgt. Bob Harris, Vice President for Administration, AFA's Langley, Va., Chapter, present awards to TSgt. John W. Samples, 33d TFW, Eglin AFB, Fla. The occasion was the Airman Awards Banquet held in May at the Langley AFB NCO Club to honor TAC's outstanding airmen for 1979. Silver bowls were provided for each by the Langley Chapter. Other recipients were SMSgt. Donald E. Bradford, 67th Combat Support Group, Bergstrom AFB, Tex.; MSgt. Thurman V. Chambers, TAC NCO Academy, Bergstrom; TSgt. William S. Eng, 24th Combat Support Group, Howard AFB, Canal Zone; SrA. Richard M. Littleton, USAF Hospital, Holloman AFB, N. M.; and SrA. Willard B. Burnett, 430th TFS, Nellis AFB, Nev.

t. Gen. Thomas P. Stafford, Air Force DCS for Research, Development and cquisition, was guest speaker in Chicago at recent Armed Forces Week joint meeting f AFA, the Armed Forces Communications and Electronics Association, and Northrop orp. officials. In photo, from left, Richard H. Becker, President, AFA hicagoland-O'Hare, Ill., Chapter; General Stafford; Frank Easley, President, AFCEA nicago Chapter; and Lorry Thomas, Northrop Management Club President. More an 300 attended to hear the former astronaut, Commander of the US craft during 75's Apollo/Soyuz linkup.



At the joint meeting of AFA's Chicagoland-O'Hare, Ill., Chapter, the Armed Forces Communications and Electronics Association, and Northrop Corp. officials, from left, guest speaker Lt. Gen. Thomas P. Stafford; Thomas V. Jones, Northrop Chief Executive Officer and Chairman of the Board; and Alexander C. Field, Jr., Vice President for AFA's Great Lakes Region.

Capt. Ronald Sconyers, Aerospace Education Coordinator for AFA's Alamo Chapter of San Antonio, Tex., recently presented AFA's AFJROTC Bronze Medal to Cadet James Medley at the annual awards dinner at the Randolph AFB Officers' Club.

COMING EVENTS

AFA's 33d Annual National Convention, Sheraton-Park Hotel, Washington, D. C., September 16–19 . . . **AFA's Aerospace Development Briefings and Displays,** Sheraton-Park Hotel, Washington, D. C., September 18–20 . . . **Seventh Annual Air Force Ball,** Century Plaza Hotel, Los Angeles, Calif., October 26.

AFA News

Adam Johnston, AFA's Anchorage, Alaska, Chapter President, presents plaque to SrA. Walter P. Koltys, 343d Component Repair Squadron, Elmendorf AFB. Senior Airman Koltys was named Outstanding Airman of the Year 1978 for the Alaskan Air Command. CMSgt. Sara A. Sellers, center, formerly of the 5073d ABS, Shemya AFB, and TSgt. Charles Hudson, Hq. AAC, Elmendorf, also were honored as AAC outstanding airmen. Guest speaker Lt. Gen. Winfield W. Scott, Jr., second from left, assisted in the presentations at the banquet in May held at the Elmendorf AFB Officers' Open Mess.

Gen. Alton D. Slay, AFSC Commander, was the quest speaker in May of AFA's H. H. Arnold Memorial, Tenn., Chapter at the Arnold Engineering Development Center's Officers' Open Mess. In photo, from left, Tom Bigger, Tennessee State AFA President; General Slay; Conrad Rennemann, Jr., Vice President and Deputy General Manager, ARO, Inc., AEDC's operating contractor; Col. Michael Alexander, AEDC Commander; and Alfred Eskew, Arnold Chapter President. General Slay spoke on USAF's need for more engineers and technicians.

Chuck Pinney, Chairman of the California AFA committee in support of the Enlisted Men's Widows and Dependents Home, presents eleven checks to State President Ed Stearn. A goal of $25 per member has been set unanimously by the State Convention, which could raise more than $300,000 toward construction of a new 200-apartment facility adjacent to Eglin AFB, Fla.

AFA's General Robert F. Travis, Calif., Chapter has announced the 1979 recipients of its annual $500 scholarships awarded to outstanding AFJROTC and CAP cadets graduating from local high schools. From left, CAP Cadet David Pavey; AFJROTC Cadet Sheila Zuehlke; and CAP Cadets Gay Vierra and Raymond D. Jones. A first in AFA annals, the Travis JROTC-CAP scholarship program, established in 1977, has been emulated by other AFA Chapters across the country.

photo gallery

At the signing of the "Aerospace Power Week" proclamation in May, from left, Zaven Kaprielian, President of AFA's Laurence G. Hanscom, Mass., Chapter; Mary V. Connors, Past President of the Hanscom Chapter; Mrs. Araxy Kaprielian, Recording Secretary of the Massachusetts AFA State Organization; Eugene H. MacMurray, Jr., Hanscom Chapter Vice President; Massachusetts Gov. Edward J. King; Mrs. Rita MacMurray; Mrs. Mary Anne Gavin, President of Massachusetts AFA State Organization; Richard M. Stone, Hanscom Chapter President; and Robert V. Pace, AFA State Organization Director of Communications. Copies of the proclamation, rolled and tied with ribbon, were at each place setting at the State AFA Convention banquet.

At a recent meeting of AFA's Fort Worth, Tex., Chapter, Bomber and Tanker Crew of the Year Citations were presented to, from left, Capt. Weldon L. Schorp, Jr.; Mrs. Bugbee; 1st Lt. Dale R. Bugbee; Mrs. Porter; Capt. Delewis O. Porter; USAF Chief of Staff Gen. Lew Allen, Jr., guest speaker; Chapter President Bryan L. Murphy, Jr.; Mrs. Day; 1st Lt. Dan A. Day; Sgt. Steven M. Fonseca and guest; Mrs. Dewey; and Capt. Carl W. Dewey.

Clyde Ice, who taught himself to fly sixty years ago and trained more than 2,000 military pilots before and during World War II, was honored by AFA's Rushmore, S. D., Chapter on his ninetieth birthday May 12. The event in Rapid City was held in conjunction with the Annual Military Awards and Recognition Banquet sponsored by the Chapter and the Military Affairs Committee of the Rapid City Chamber of Commerce. In photo, from left, Maj. Gen. D. L. Corning, Rushmore Chapter President and South Dakota Adjutant General; Hoadley Dean, Rushmore Chapter Secretary and Vice President for AFA's North Central Region; Lt. Gen. Richard L. Lawson, Director of Plans and Policy, J-5, JCS, Washington, D. C., and guest speaker; Mr. Ice; and Jim Anderson, chairman of Rapid City Chamber of Commerce's Military Affairs Committee.

20% Dividend Paid for 1978 Reduces Net Cost to All-Time Low

New, Low-Cost Protection for the Hig

HIGH OPTION PLUS

CURRENT BENEFIT TABLES

Insured's Attained Age	STANDARD PREMIUM: $10 per month Basic Benefit*	HIGH OPTION PREMIUM: $15 per month Basic Benefit*	HIGH OPTION PLUS PREMIUM: $20 per month Basic Benefit*
20-29	$85,000	$127,500	$170,000
30-34	65,000	97,500	130,000
35-39	50,000	75,000	100,000
40-44	35,000	52,500	70,000
45-49	20,000	30,000	40,000
50-54	12,500	18,750	25,000
55-59	10,000	15,000	20,000
60-64	7,500	11,250	15,000
65-69	4,000	6,000	8,000
70-74	2,500	3,750	5,000
Aviation Death Benefit*			
Non-war related	$25,000	$37,500	$50,000
War related	$15,000	$22,500	$30,000
Extra Accidental Death Benefit*	$12,500*	$15,000*	$17,500*

*The Extra Accidental Death Benefit is payable in addition to the basic benefit in the event an accidental death occurs within 13 weeks of the accident, except as noted under AVIATION DEATH BENEFIT (below).

*AVIATION DEATH BENEFIT: The coverage provided under the Aviation Death Benefit is paid for death which is caused by an aviation accident in which the insured is serving as pilot or crew member of the aircraft involved. Under this condition, the Aviation Death Benefit is paid in lieu of all other benefits of this coverage. Furthermore the non-war related benefit will be paid in all cases where the death does not result from war or an act of war, whether declared or undeclared.

OTHER IMPORTANT BENEFITS

COVERAGE YOU CAN KEEP. Provided you apply for coverage under age 60 (see "ELIGIBILITY") your insurance may be retained at the same low group rates to age 75.

FULL TIME, WORLD WIDE PROTECTION. The policy contains no war clause, hazardous duty restriction, combat zone waiting period or geographical limitation.

DISABILITY WAIVER OF PREMIUM. If you become totally disabled at any time prior to age 60 for at least a 9-month period, your coverage will be continued in force without further payment of premiums as long as you remain disabled.

FULL CHOICE OF SETTLEMENT OPTIONS. All standard forms of settlement options, as well as special options agreed to by the insured and United of Omaha, are available to insured members.

CONVENIENT PAYMENT PLANS. Premium payments may be made by monthly government allotment (payable to Air Force Association), or direct to AFA in quarterly, annual or semi-annual installments.

DIVIDEND POLICY. AFA's primary policy is to provide maximum coverage at the lowest possible cost. Consistent with this policy, AFA has provided year-end dividends in all but three years (during the Vietnam War) since the program was initiated in 1961, and basic coverage has been increased on six separate occasions.

ADDITIONAL INFORMATION

Effective Date of Your Coverage. All certificates are dated and take effect on the last day of the month in which your application for coverage is approved, and coverage runs concurrently with AFA membership. AFA Military Group Life Insurance is written in conformity with the insurance regulations of the State of Minnesota. The insurance will be provided under the group insurance policy issued by United of Omaha to the First National Bank of Minnesota as trustees of the Air Force Association Group Insurance Trust.

EXCEPTIONS: There are a few logical exceptions to this coverage. They are:

Group Life Insurance: Benefits for suicide or death from injuries intentionally self-inflicted while sane or insane will not be effective until your coverage has been in force for 12 months.

The Accidental Death Benefit and Aviation Death Benefit shall not be effective if death results: (1) From injuries intentionally self-inflicted while sane or insane, or (2) From injuries sustained while committing a felony, or (3) Either directly or indirectly from bodily or mental infirmity, poisoning or asphyxiation from carbon monoxide, or (4) During any period a member's coverage is being continued under the waiver of premium provision, or (5) From an aviation accident, either military or civilian, in which the insured was acting as pilot or crew member of the aircraft involved, except as provided under AVIATION DEATH BENEFIT.

ELIGIBILITY

All active duty and retired* personnel of the Armed Forces of the United States, members of the Ready Reserve* and National Guard*, Armed Forces Academy cadets*, and college or university ROTC cadets* are eligible to apply for this coverage provided they are under age 60 and are now, or become, members of the Air Force Association.

*Because of certain restrictions on the issuance of group insurance coverage, applications for coverage under the group program cannot be accepted from non-active duty personnel residing in either New York or Ohio. Non-active duty members residing in these states, however, may request special application forms from AFA for individual policies which provide coverage quite similar to the group program.

OPTIONAL FAMILY COVERAGE

(may be added to any of the above Plans)
PREMIUM: $2.50 per month

Insured's Attained Age	Life Insurance Coverage for Spouse	Life Insurance Coverage for each Child*
20-39	$10,000	$2,000
40-44	7,500	2,000
45-49	5,000	2,000
50-54	4,000	2,000
55-59	3,000	2,000
60-64	2,500	2,000
65-69	1,500	2,000
70-74	750	2,000

*Between the ages of six months and 21 years, each child is provided $2,000 coverage. Children under 6 months are provided with $250 coverage once they are 15 days old and discharged from hospital.

Please Retain This Medical Bureau Prenotification For Your Records

Information regarding your insurability will be treated as confidential. United Benefit Life Insurance Company may, however, make a brief report thereon to the Medical Information Bureau, a nonprofit membership organization of life insurance companies, which operates an information exchange on behalf of its members. If you apply to another bureau member company for life or health insurance coverage, or a claim for benefits is submitted to such company, the Bureau, upon request, will supply such company with the information in its file.

Upon receipt of a request from you, the Bureau will arrange disclosure of any information it may have in your file. (Medical information will be disclosed only to your attending physician.) If you question the accuracy of information in the Bureau's file, you may contact the Bureau and seek a correction in accordance with the procedures set forth in the federal Fair Credit Reporting Act. The address of the Bureau's information office is P.O. Box 105, Essex Station, Boston, Mass. 02112. Phone (617)426-3660.

United Benefit Life Insurance Company may also release information in its file to other life insurance companies to whom you may apply for life or health insurance, or to whom a claim for benefits may be submitted.

from AFA Military Group Life Insurance

verage Up to $170,000

APPLICATION FOR
AFA MILITARY GROUP LIFE INSURANCE

United of Omaha

Group Policy GLG-2625
United Benefit Life Insurance Company
Home Office Omaha Nebraska

Full name of member _____
Rank Last First Middle

Address _____
Number and Street City State ZIP Code

Date of birth Mo. Day Yr.	Height	Weight	Social Security Number

Please indicate category of eligibility and branch of service.

- ☐ Extended Active Duty
- ☐ Ready Reserve
- ☐ National Guard
- ☐ Retired
- ☐ Armed Forces Academy
- ☐ ROTC Cadet
- ☐ Air Force
- ☐ Other _____ (Branch of service)

Name and relationship of primary beneficiary

Name and relationship of contingent beneficiary

This insurance is available only to AFA members

- ☐ I enclose $13 for annual AFA membership dues (includes subscription ($9) to AIR FORCE Magazine).
- ☐ I am an AFA member.

Please indicate below the Mode of Payment and the Plan you elect:

Plan of Insurance

Mode of Payment	Standard Plan Member Only	Standard Plan Member And Dependents	High Option Plan Member Only	High Option Plan Member And Dependents	High Option PLUS Plan Member Only	High Option PLUS Plan Member And Dependents
Monthly government allotment. I enclose 2 month's premium to cover the necessary period for my allotment (payable to Air Force Association) to be established.	☐ $ 10.00	☐ $ 12.50	☐ $ 15.00	☐ $ 17.50	☐ $ 20.00	☐ $ 22.50
Quarterly. I enclose amount checked.	☐ $ 30.00	☐ $ 37.50	☐ $ 45.00	☐ $ 52.50	☐ $ 60.00	☐ $ 67.50
Semi-Annually. I enclose amount checked.	☐ $ 60.00	☐ $ 75.00	☐ $ 90.00	☐ $105.00	☐ $120.00	☐ $135.00
Annually. I enclose amount checked.	☐ $120.00	☐ $150.00	☐ $180.00	☐ $210.00	☐ $240.00	☐ $270.00

Names of Dependents To Be Insured	Relationship to Member	Dates of Birth Mo. Day Yr.	Height	Weight

Have you or any dependents for whom you are requesting insurance ever had or received advice or treatment for: kidney disease, cancer, diabetes, respiratory disease, epilepsy, arteriosclerosis, high blood pressure, heart disease or disorder, stroke, venereal disease or tuberculosis? Yes ☐ No ☐

Have you or any dependents for whom you are requesting insurance been confined to any hospital, sanatorium, asylum or similar institution in the past 5 years? Yes ☐ No ☐

Have you or any dependents for whom you are requesting insurance received medical attention or surgical advice or treatment in the past 5 years or are now under treatment or using medications for any disease or disorder? Yes ☐ No ☐

If YOU ANSWERED "YES" TO ANY OF THE ABOVE QUESTIONS, EXPLAIN FULLY including date, name, degree of recovery and name and address of doctor. (Use additional sheet of paper if necessary.)

I apply to United Benefit Life Insurance Company for insurance under the group plan issued to the First National Bank of Minneapolis as Trustee of the Air Force Association Group Insurance Trust. Information in this application, a copy of which shall be attached to and made a part of my certificate when issued, is given to obtain the plan requested and is true and complete to the best of my knowledge and belief. I agree that no insurance will be effective until a certificate has been issued and the initial premium paid.

I hereby authorize any licensed physician, medical practitioner, hospital, clinic or other medical or medically related facility, insurance company, the Medical Information Bureau or other organization, institution or person, that has any records or knowledge of me or my health, to give to the United Benefit Life Insurance Company any such information. A photographic copy of this authorization shall be as valid as the original. I hereby acknowledge that I have a copy of the Medical Information Bureau's prenotification information.

Date _____, 19 ____ _____
Member's Signature

8/79
Form 3676GL App

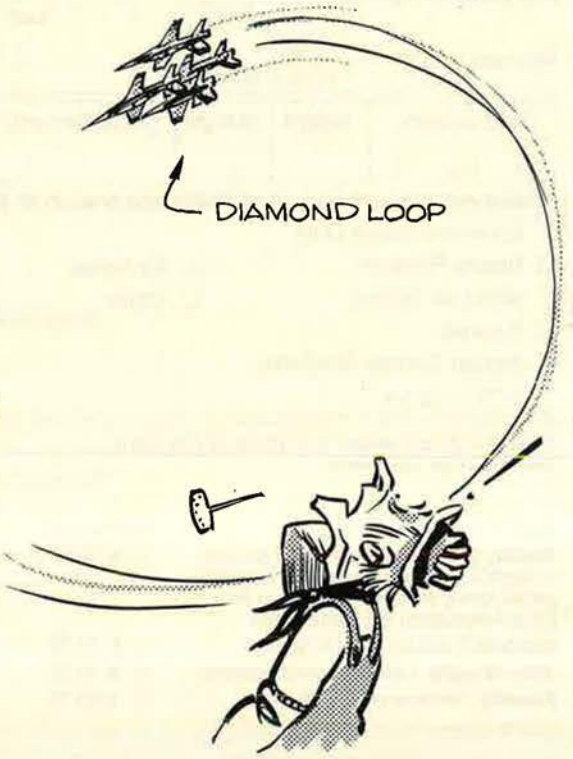
Application must be accompanied by a check or money order. Send remittance to:
Insurance Division, AFA, 1750 Pennsylvania Avenue, NW, Washington, D.C. 20006

Bob Stevens'

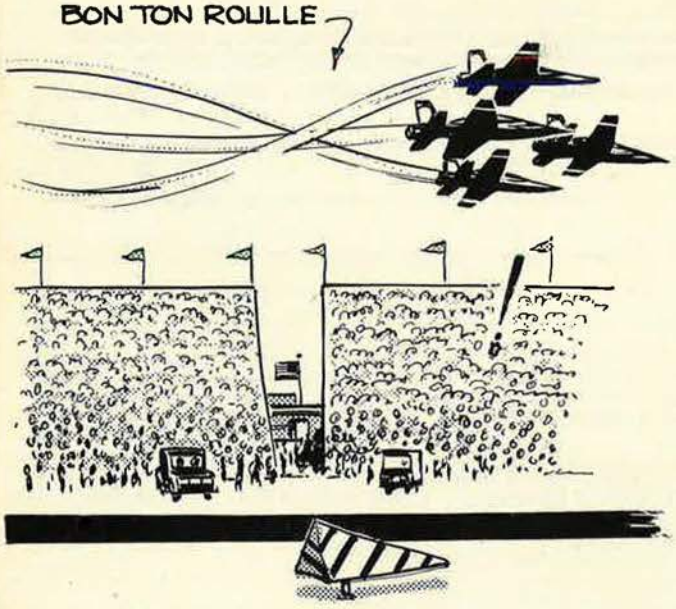
"There I was..."

IT'S TOUGH TO KEEP UP WITH THE QUANTUM LEAPS AVIATION and SPACE HARDWARE ARE MAKING REMEMBER THE OL' FARMER WHO SAW HIS FIRST BARNSTORMER and SAID," I SEE IT, BUT THERE AIN'T NO SUCH THING!"

TAKE OUR SUBJECT, FOR EXAMPLE - HE'S SEEING HIS FIRST DEMONSTRATION BY THE USAF THUNDERBIRDS...

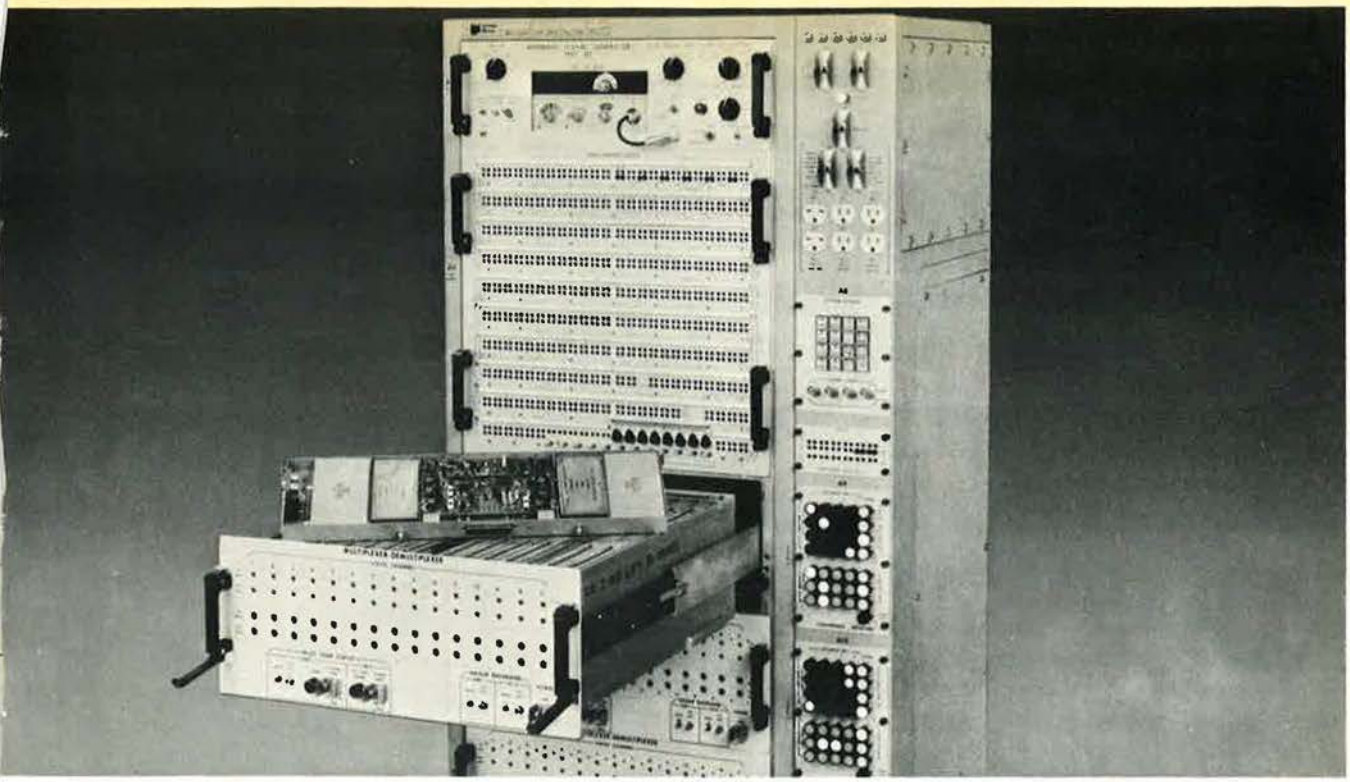


FOR ALL WHO HAVE SEEN THESE LADS PERFORM - YOU KNOW HOW TIGHTLY THEY HANG IN THERE...



UNTIL THAT FINAL "BOMB BURST"

THANKS TO GLEN NOYES, REDLANDS, CA. Bob Stevens



Frequency division multiplexers this sophisticated can come only from a sophisticated military communications systems house.

The new AN/ACC-6(V) frequency division multiplexer, developed by E-Systems ECI Division ınder Air Force contract and already selected by the Air Force for use in the Worldwide Airborne Command Post, is the most sophisticated equipment of its type ever developed. A look at a few of ts features will show you why.

It is expandable from 15 to 90 channels. It's designed to ensure high quality transmission of speech, facsimile, graphics, and data. The functionally modular design helps achieve extraordinary channel availability and an extremely low channel restoral time—less than two minutes. Adaptive interfaces and tech control features are built-in. There's no question that the multiplexer is a state-of-the-art achievement.

Yet, the multiplexer is easily integrated into existing military communications systems. Only company with long, detailed experience in developing both complete communications systems nd individual elements for those systems could produce a multiplexer as sophisticated as the ECI .N/ACC-6(V). That's why it came from ECI.

Our systems accomplishments over the years have ranged from communications systems or airborne command posts to data systems for shipboard missile control and transportable ommunications systems for tactical ground application.

We're constantly broadening our capabilities to develop and produce the most sophisticated ommunications systems and equipment. That's just part of the job when you're as sophisticated a ommunications systems house as we are. For more information on ECI developments such as the ıultiplexer, or on our total systems capability, call or write: E-Systems, Inc., ECI Division, P. O. Box 2248, St. Petersburg, Florida 33733. (813) 381-2000.

E-SYSTEMS
ECI Division

ECI's AN/ACC-6(V) Frequency Division Multiplexer, another element of total communications systems capability at E-Systems.

Dinner flight.

To "feed" hungry fighter squadrons at 30,000 feet (and strategic airlifters as well)—and to serve up cargo to bases around the globe—the U.S. Air Force has selected the DC-10 as its new Advanced Tanker Cargo Aircraft.

Now designated the KC-10, its refueling capability nearly doubles the nonstop range of a fully-loaded C-5 strategic transport. It delivers 200,000 pounds of fuel 2200 statute miles and returns to home base. With its cargo capability, the KC-10 can now support deployment of fighter squadrons and their unit personnel and equipment—a job previously requiring both tanker and cargo planes. Maximum cargo payload is 170,000 pounds over 4370 miles.

Our KC-10 is the latest in a long line of McDonnell Douglas transport aircraft that have helped keep the U.S. Air Force Number One in the world.

KC-10

MCDONNELL DOUGLAS