AUGUST 1974 / $1

AIR FORCE

PUBLISHED BY THE AIR FORCE ASSOCIATION

MAGAZINE

or

Atlas

Titan II

Minuteman

Titan IIIC

Air Force in Space

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VOUGHT
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AIR FORCE MAGAZINE
PUBLISHED BY THE AIR FORCE ASSOCIATION

AUGUST 1974
VOLUME 57, NUMBER 8

This Month

ABOUT THE COVER

This year, the US Air Force celebrates its twentieth anniversary in space. These twenty eventful years are documented in the special section beginning on page 34 of this issue and are represented by the five missiles shown on the cover. They are, from left, the Thor, Atlas, Titan II, Minuteman, and Titan IIIC.

Departments

AIR FORCE Magazine (including SPACE DIGEST) is published monthly by the Air Force Association, Suite 400, 1750 Pennsylvania Ave., N.W., Washington, D.C. 20006. **Phone:** (202) 298-9123. Second-class postage paid at Washington, D.C. **Membership rate:** $10 per year (includes $9 for one-year subscription); $24 for three-year membership (includes $21 for subscription). **Subscription rate:** $10 per year; $2 additional for foreign postage. Single copy $1. Special issues (Spring and Fall Almanac issues and "Military Balance" issue) $2 each. **Change of address** requires four weeks' notice. Please include mailing label. Publisher assumes no responsibility for unsolicited material. Trademark registered by Air Force Association.

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"Time is the most valuable thing a man can spend."

Theophrastus.

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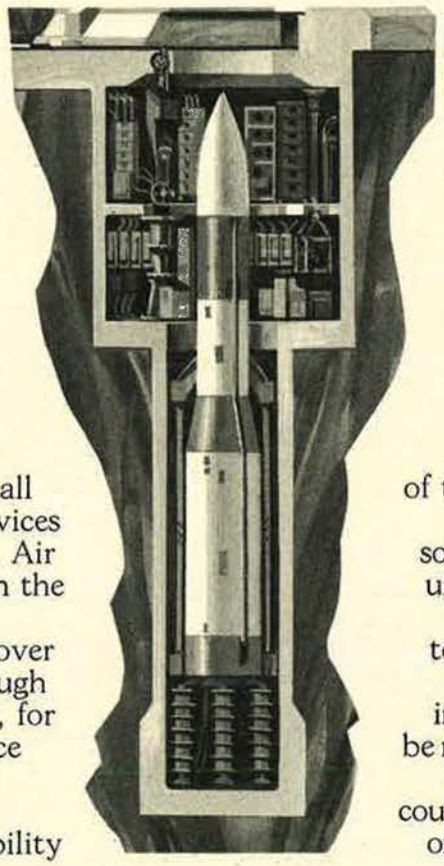

Boeing continues to deliver all Minuteman missiles, training devices and other equipment to the U.S. Air Force on schedule. And underrun the cost target.

We've achieved this record over the years despite some pretty tough odds. At Warren Air Force Base, for example, we're working on a force modernization program. Older missiles are being replaced by Minuteman III and the survivability of the total system is being increased.

But the winters of Wyoming have sometimes been brutal. It's not been uncommon for the Boeing-Air Force team to work in blizzards, with temperatures 40 degrees below zero.

From time to time, additional improvements in Minuteman might be necessary, in order to meet changing strategic conditions. If so, you can count on Boeing being on time, every time.

BOEING

RETHINKING NUCLEAR STRATEGY

A SPECIAL REPORT

Is it time for a fundamental change in US nuclear strategy? A number of defense analysts, including some who are close to the Administration, say that it is.

As they see it, the United States continues to be locked into a strategy of mutual assured destruction (MAD), under which the US and the USSR deter each other from a nuclear strike by holding populations in hostage. That concept, they say, was enshrined by the Anti-Ballistic Missile Treaty, an outcome of the 1972 SALT I negotiations, which limited each country to two ABM sites. The number now is to be reduced to one on each side, leaving civilian populations exposed to nuclear destruction. The USSR has some advantage in this respect, because of its far more extensive civil defense programs.

The SALT I interim agreement on offensive missiles, the second major part of the 1972 negotiations, allowed the USSR 564 more land-based missiles and 240 more submarine-launched missiles than the US, as a way of compensating for greater US missile accuracy and the fact that part of the US Minuteman force carries three multiple independently targetable reentry vehicle (MIRV) warheads. It is unlikely, however, that either side could launch a disarming first strike against the other's missile silos and bomber bases. That probably will remain true even if the Soviets equip their new and larger missiles with MIRVs. The problem of timing a large-scale attack so that one detonating warhead does not destroy others aimed at targets in the same general area appears to be almost insurmountable. (*See discussion of fratricidal effects in "Warhead Design and Nuclear Strategy," June '74 issue.*)

As the Soviets deploy, and undoubtedly MIRV, their new missiles, it is conceivable that they could attempt a limited attack on US strategic forces or interests in order to influence US policies or actions. Since 1970, the President has called for options to respond to such an attack, short of a massive counterblow against urban-area targets. One such option is being provided by aiming more US missiles at Soviet missile silos, improving the accuracy and warhead yield of the Minuteman missiles, and through R&D on advanced missiles. The purpose of these programs is to deter a *limited* strategic strike, not to create a first-strike counterforce capability, as Secretary of Defense James R. Schlesinger has explained.

Under our present philosophy of target selection (a mix of military and civilian targets), the proponents of a revised nuclear strategy see the function of strategic forces, as now constituted, limited almost entirely to deterrence of all-out or limited nuclear attack. This, they believe, will be increasingly true if we equip our missiles with higher yield warheads, thus making it more and more difficult to attack targets close to populated areas without causing massive civilian casualties, through nuclear fallout as well as direct effects. Thus, we will continue to be constrained from using strategic nuclear forces in a coercive role except in the face of an immediate threat to national survival.

This puts the United States—a *status quo* power—at a disadvantage when confronted by an aggressive, expansionist nation like the USSR. As long as our targeting philosophy constrains the US from using strategic forces except where national survival is clearly at stake, the US must protect its far-flung external interests with general-purpose forces. Here, the USSR outnumbers the US by at least a million troops, very likely by closer to two million. Beyond that, the Yom Kippur War demonstrated that Soviet general-purpose forces are equipped with first-class hardware. Experts who have examined Soviet equipment captured in that war estimate that a US defense budget of about $150 billion would be needed to outfit US troops with the quantity *and quality* of equipment now in the Soviet general-purpose inventory.

The Yom Kippur War also pointed up the fact that the US can count on the support of most of her allies only when and where the interests of all happen to coincide.

One strategist illustrates the dilemma in which the US could find itself by a scenario that appears increasingly credible in the light of recent Soviet maneuvers in the Middle East.

Suppose that, after assessing the capabilities of US strategic and general-purpose forces and their basing posture, the USSR were to seize control of Middle East oil? The objective: to bring the industrialized European nations and Japan to heel, to destroy the U

alliance system, and to isolate this country. What alternatives would the US have?

First, a conventional (nonnuclear) confrontation with the USSR in an area relatively close to Russia, but where we have no bases, long lines of communication, and questionable control of the sea lanes. Given those circumstances, the conventional war option would be singularly unattractive.

Second, using tactical nuclear weapons to offset operational disadvantages outlined above. But the USSR probably has as large an inventory of tactical nuclear weapons as we. US disadvantages could be compounded by using tac nukes.

Third, a strategic nuclear strike against major military targets in the USSR. That option would not be credible for reasons discussed above.

Fourth, acceptance of Soviet domination of the Middle East, with all its adverse implications for the US.

Given these circumstances, it is probable that the US would have to select the first alternative at tremendous cost in lives and money and with the outcome very much in doubt.

What is needed to forestall such a contingency, the advocates of strategic change believe, is strategic forces that could dissuade the Soviets from an aggressive course by posing a credible threat to the *institutions and mechanisms* through which Soviet leaders *control* the USSR. Institutions and control mechanisms—not people—should be held hostage. In most, perhaps all, cases, targets would be nonmilitary, and the means and methods of attack would create minimal (but still extensive) civilian casualties and urban damage.

To implement such a strategy, missiles with accuracy approaching zero CEP, some equipped with very low yield warheads, would be required. *(See p. 68 for a discussion of technically attainable ICBM accuracies.)*

The revolutionary aspect of the proposed strategy lies not in the missile, which is technically feasible, but in target selection. Advocates of such a strategy believe that a detailed economic and political study of the USSR will reveal a relatively small number of targets which, if taken out, would impose a penalty on the USSR that would be out of proportion to any gain the Soviets could expect from their threatened or actual aggression. Conceivably, the penalty could range upward to include complete loss of control of the Soviet system.

This kind of strategy would provide a far more credible nuclear coercive capability than we now have. It also would offer promise of war termination at a much lower level of damage than could be expected under our present combination of target selection and warhead yields.

We would need to make a more sophisticated econometric and political analysis of the Soviet system than has thus far been undertaken in order to identify the proper targets. They might include, for example, electric power distribution centers, steel mills, and hydroelectric dams that also furnish the irrigation needed for a minimum level of agricultural production. With a very low-yield warhead and the pinpoint accuracy envisioned by the strategists, and technically possible, a steel mill in an urban area could be destroyed with minimum collateral damage. To convince Soviet leaders that a threatened attack was not to be directed at the civilian population, the Kremlin could be told what areas should be evacuated.

What would be the Soviet response? The strategists do not believe it would be a massive counterblow against US strategic forces or urban targets, since we would retain the Triad with its assured destruction capability. A Soviet response, therefore, would probably be against comparable US targets—if Soviet technology and analytical methods could provide the necessary accuracy and target identification. Hence, a US econometric study of our own country also should be carried forward to determine what targets could immobilize the nation, and to identify means of reducing their vulnerability.

The proposed strategy is predicated on the undisputed US lead in precision guidance and command and control systems and on the far greater redundancy and flexibility of the US economy and communications and distribution systems. It is a damage-limiting, coercive strategy that would be superimposed on a mutual assured destruction base, maintained by the existing Triad of strategic systems.

Proponents of the strategy believe that a net assessment of the losses each side would suffer under this strategy should convince Soviet leaders that their cost would be greater than any potential gain from aggression, and that they would come out of an exchange in far worse condition than the US. Under some targeting plans they would even stand a high chance of losing the Soviet empire through uprisings in the satellite states and among dissident ethnic groups within the USSR. Loss of control of Soviet resources also would open the door to possible Chinese military action, of which the Soviets appear to have an obsessive fear.

There is no evidence that any senior official of the government has endorsed the strategy outlined here. There are indications, however, that serious thought is being given to the need for a coercive capability and to damage limitation—the objectives of the strategy. Damage limitation now is viewed in a broader context than during the McNamara era when the term was applied largely to means of reducing damage to this country.

The proposed strategy represents an attempt to interface strategic weaponry and tactics with techniques of econometric and political analysis that are sophisticated to an unprecedented degree. If advocates of the strategy are correct in their evaluation of its potential, it could provide a credible and usable coercive capability against a still-aggressive Soviet Union.

That capability is rapidly vanishing today. It is not likely to be regained without far-reaching changes in our concepts of nuclear strategy. The strategy described here is a novel option which deserves, at the least, careful study. ■

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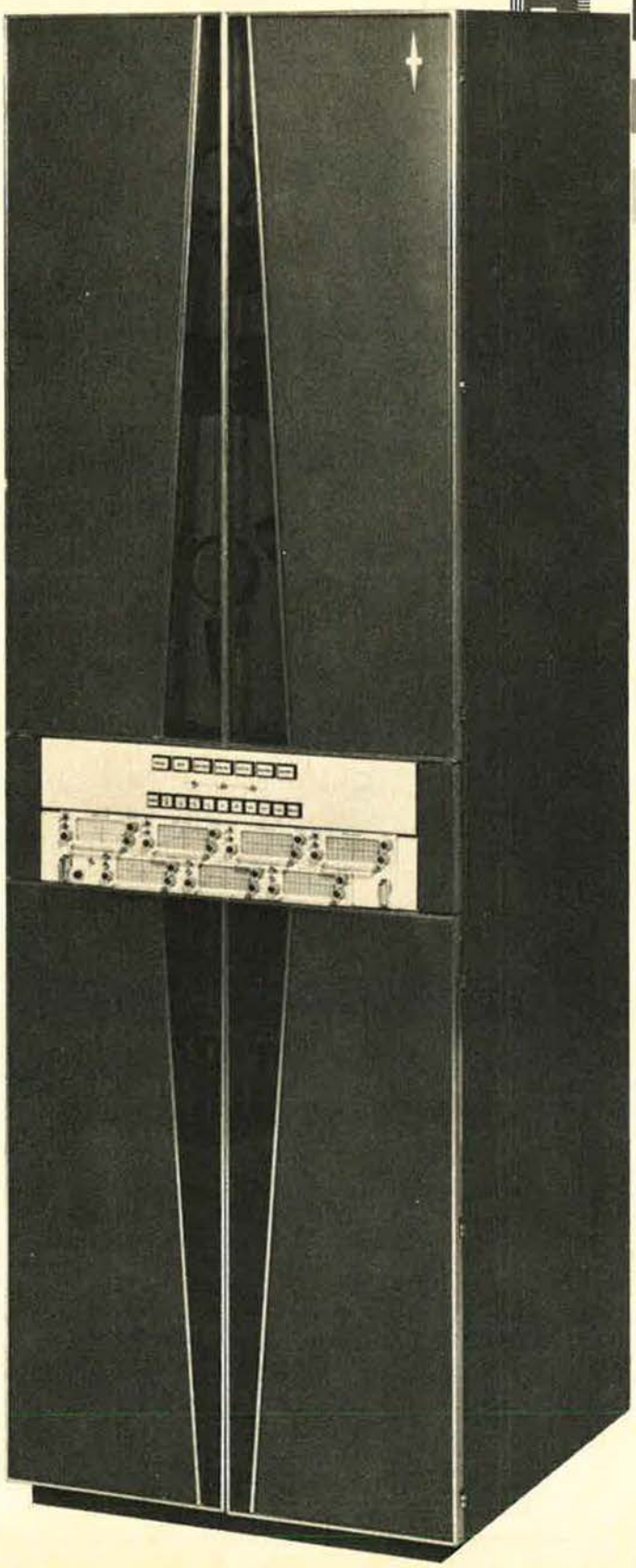

20 years...and counting.

Congratulations. We're proud to have been a part of the Air Force's first 20 years in space and look forward to many more.

Rockwell International

Airmail

Letter to the Author

Dear Mr. Wolk: Please accept my congratulations for your fine article in the June issue of AIR FORCE Magazine: "Prelude to D-Day: The Bomber Offensive." I have some appreciation of the difficulty involved in compressing the great quantity of information available into a digest of six pages. You have done so with magnificent skill and have succeeded in portraying the salient events and developments in their proper respective relationships. The result is both admirable and significant.

I have two comments to offer, neither of which is intended to be critical.

First, you note that "instructors at the Air Corps Tactical School at Maxwell Field, Ala., formulated the concept of high-altitude, daylight precision bombing without fighter escort. This became the American strategic bombing doctrine."

This is quite true, but it does not describe the really significant features of American strategic bombing doctrine. It refers to tactical method, not strategic purpose. The American strategic bombing doctrine as evolved at Maxwell had as its focus the selection of specific targets on the ground whose destruction would cause collapse of the industrial structure and of the support systems that sustained the enemy state, both in its war-making capability and in its capacity to support the social structure. The destruction was to be carried out by precision bombing. The absence of fighter escort made performance more difficult, and indeed problematical, but it was a vital feature of the method of operation, not the fundamental concept.

I belabor the point only because so many people associate the American strategic bombing strategy with the fighter escort aspect of operations, and are prone to weigh the validity of the concept in terms of "unescorted bomber penetration." The B-29 operation in the Pacific was successfully carried out without fighter escort, and their initial purpose was practically identical with that in Europe. Fighter escort may or may not be essential to tactical success; selective targeting was the essence of strategic bombing doctrine.

Second, I would like to mention the generally accepted position of the invasion in regard to air strategy in particular and combined strategy in general. There is a general consensus that the purpose of the strategic air campaign was the assurance of success in the Normandy invasion. (Let me hasten to say that you do not make this point.) Actually, in the view of the air strategists and, I believe, in the view of General Marshall as well, this was not so. To be sure, if General Spaatz had not made the crucial decision to launch Big Week in February (a decision surely as difficult as that other great decision, by General Eisenhower, in June), there would have been no invasion in the summer of 1944. And this would have had immense impact upon the political heads of state. But the war would have gone on, and the strategic air war would have increased enormously in its intensity, and its effectiveness. Invasion in the fall might have been much easier. In the following spring it might not have met opposition. Speculation, of course. Events as they transpired led to magnificent military success. I would only contend that the air support of the invasion of Normandy in June was not the crux of strategic air warfare in Europe, and that strategic air purpose had a much more important ultimate objective.

D-Day is soldiers' day, and rightly so. It was the soldier who paid the price on the beaches of Normandy. Airpower made a tremendous contribution on that day, but its role will probably continue to diminish in popular recognition. (General Eaker notes that Allied air forces operating out of England for two years before D-Day, destroying the Luftwaffe and making the invasion possible, suffered many more casualties than the ground forces lost on all the invasion beaches.)

Two other days should vie for recognition in the annals of air warfare in Europe: February 23, when General Spaatz made the crucial decision that led to Big Week against German airpower; and May 12, when, overcoming at last the opposition that had bound him, he launched the massive air attacks on German synthetic oil that ultimately emasculated the German war machine.

Both of these target systems were in high priority in all the basic American strategic air war plans. One made the invasion possible. The other led to defeat of Hitler's Third Reich. . . .

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

Missing EB-57

Gentlemen: I enjoyed the May '74 annual Air Force Almanac. Although the Almanac included a fairly comprehensive compilation of the aircraft in the active Air Force inventory, I am compelled to advise you of a disappointing omission in your "Gallery of USAF Weapons." Absent was the EB-57, Martin's version of the English Electric Canberra.

As one of 400 officers and men in a squadron operating a fleet of twenty-four EB-57s, I was greatly disturbed by the omission. The pill was particularly bitter to swallow because 1974 was the second consecutive year in which you neglected to include the EB-57 in the Almanac.

It seems incredible that you would include in the Almanac the EB-66 and the C-123, both virtually obsolete aircraft, yet the EB-57, an aircraft flying thousands of operational missions in 1973, was excluded.

Possibly your staff was ignorant of the existence of the 4677th Defense Systems Evaluation Squadron (ADC)—an unforgivable offense for a group dedicated to reporting on US airpower. . . .

Capt. Michael H. Oleksuk
Information Officer
4677th DSES (ADC)
Malmstrom AFB, Mont.

• *Sorry about that. Some arbi-*

Airmail

trary decisions had to be made in tailoring the size of the Gallery to the amount of space available. The EB-57 will be restored to a place of honor in the next Gallery.—THE EDITORS

Different View of Journal

Gentlemen: I read Lloyd Norman's book review of *Viet Journal,* by James Jones, in the June issue. Fortunately, I had already read *Viet Journal.*

Frankly, I found Norman's review irritating. His blunt criticism sounded like Saigon-expert sour grapes. *Viet Journal,* for me, had the ring of truth. After tons of anti-Saigon/antimilitary material coming out of Indochina for all those years, I could dig Jones's favorable and refreshing 1973 look at the in-country US Army (MACV) and the South Viets.

An important part of the book were the chapters about the Battle of Hué in 1968. I mean when the NVA went house-to-house (with clipboard lists) and murdered 2,800 civilians by automatic gunfire, by clubbing them, and by burying many of them alive. James Jones interviewed some of the survivors in Hué and came up with a blockbuster (no wonder the South Viets hate Hanoi). And Norman didn't say a damn thing about Hué in his book review!

John F. Kennedy—in a thoughtful moment—once asked, "Who really *is* objective?"

Thomas B. Givens
Renton, Wash.

Early Model Headset

Gentlemen: Assistance is requested in an effort to acquire a helmet type radio receiver headset (helmet is not needed) issued prior to and during WW II.

The specific headset assembly consists of a rubber dual earphone connector, with a *flat* break-away plug midway between the plug-in cord and the helmet headset. They were intended for ease in break-away during bailouts, and for the convenience of having a cord in the aircraft radio plug receptacle that merely required being connected to the helmet headset plug.

The complete unit was lightweight and fitted into the sewn-on earphone leather pockets.

A later unit came in a massive combination rubber adapter, had a round cord connector, and a fabric-covered wire assembly. These are more or less readily available and not what is needed. . . .

My reason for this request is that I have an old biplane fighter aircraft that is being rebuilt and is nearly ready to fly. The later types of headsets do not fill the bill as well as the old unit would. I have to admit that the specific plane never had radio equipment in it during the time it was an operational fighter, either for Germany or when we got them as part of war reparations. The plane is a Fokker D-VII, 5574/18, and has an assigned FAA side number N-1918-S. It will be flying this year and be available to any federal functions for flight exhibitions, on any official holidays commemorating our service activities, and that of personnel of our services.

Would greatly appreciate any assistance. . . .

Stanley L. Morel
Fokker Verein
812 East Park Row
Arlington, Tex. 76010

94th Bomb Group

Gentlemen: I have monitored the "Unit Reunion" section for many years but do not recall any notice for a reunion of the 94th Bomb Group, Eighth Air Force, based at Bury St. Edmonds, England, during World War II. Would appreciate comments from any former members of this outfit.

Also, is there a copy of the group history available?

Baxter H. Pond
606 N. Larchmont Blvd.
Los Angeles, Calif. 90004

UNIT REUNIONS

USAF IWS

The USAF Interceptor Weapons School is planning the 1st annual reunion and 20th Anniversary Celebration September 20–22, in Panama City, Fla. If you were ever permanently assigned to IWS as a staff member, please contact

EyeWash Reunion Committee
235 Kimbrel Ave.
Panama City, Fla. 32401

7th Air Commando Sqdn.

A reunion is planned for former members of the Sembach 7th Air Commando Squadron (1964–1968), at Fort Walton Beach, Fla., October 11–13. For further information write

A. A. Tillman
Rt. 4, Box 372
DeFuniak Springs, Fla. 32433

92d Bomb Group

The 92d Bomb Group and its supporting units based at Bovingdon, Alconbury, and Podington during WW II are having their annual reunion in Denver, Colo., October 16–20, at the Capital Plaza Inn (formerly the Downtowner). Those interested please contact

Eugene Wiley
1514 California
Denver, Colo. 80202
or
Sheldon W. Kirsner
2603 Cathedral Dr.
St. Louis, Mo. 63129

391st Bomb Group

The 1st reunion of the 391st Bomb Group will be held in Colorado Springs, Colo., October 5–6. Attendees should reserve early. Contact

The Hangar; Raintree Inn
Mr. Buchanan
314 W. Bijou St.
Colorado Springs, Colo. 80905
Phone: (303) 471-8680

Former members who have *not* been contacted may also reserve. These are requested to get on the 391st reunion mailing list by writing

Mike Myklethun
1893 E. Minton Dr.
Tempe, Ariz. 85282
or
James P. Reeves
2623 Skyline Dr.
College Park, Ga. 30337

463d Service Sqdn.

The 463d Service Squadron, 309th Service Group, will hold a reunion October 11–13, in Anaheim, Calif. Please get in touch with

Edward A. Ellis
321 Clearfield Ave.
Norristown, Pa. 19401

475th Fighter Group

"Satan's Angels," the 475th Fighter Group, will be holding its 5th reunion since WW II, in Dayton, Ohio, September 27–29. Former members of the 431st Fighter Sqdn. "Hades," the 432d FS "Clover," the 433d FS "Possum," as well as Group Headquarters personnel and ground crews should contact

Jack Purdy
3026 Ridgeway Rd.
Kettering, Ohio 45419

509th Bomb Wing

The 509th Bomb Wing will hold a reunion September 6–8, 1974, at the Wentworth-By-The-Sea Hotel in Portsmouth, N. H. For further information contact

Col. Virgil R. Epperson, USAF (Ret.)
5 Timber Court
Seabrook, N. H. 03874
Phone: (603) 474-2239

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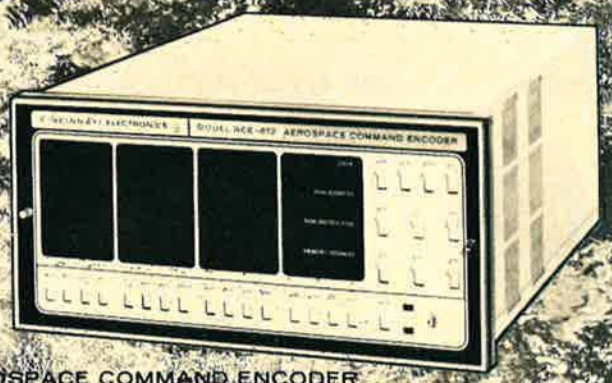

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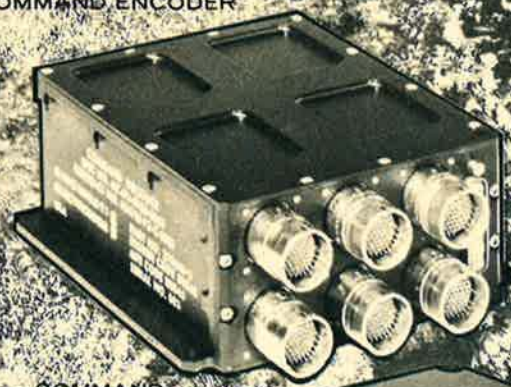

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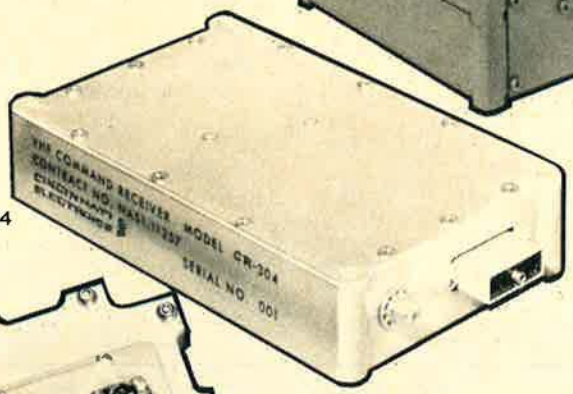

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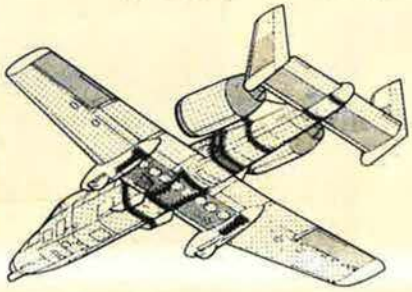
A-10 STATUS REPORT:

SURVIVABILITY, REPAIRABILITY- KEY TO CLOSE AIR SUPPORT

LEVELS OF COMBAT DAMAGE REPAIR REQUIRED:



- No Repair Required.
- Minimum Temporary Repair—not more than ½ day duration.
- Maximum Temporary Repair—not more than 1 day duration.
- Major Structural Repair—lay up for more than 1 day duration.

The A-10 was designed for a specific task—to provide close air support for friendly ground troops. To perform this task, the A-10 must operate in a lethal environment. It must get in close enough to the battle situation to enable its pilot to visually identify targets, distinguish friend from foe, and strike with pinpoint accuracy.

Since the A-10 must be able to take hits, its design was "hardened" for survivability. The pilot is protected by a "bathtub" of titanium armor which is capable of withstanding 23-mm projectiles. A triple redundant control system permits manual control if both hydraulic power systems are lost, and the A-10 can complete its tactical mission flying by cable. Spacially separated engines prevent sympathetic failure. Self-sealing, fire suppressive fuel tanks have survived 23-mm hits in actual tests. The A-10's survivability is greater than that of any other combat aircraft.

Yet, while survivability is essential to bringing back the plane and the pilot, an A-10 grounded for repairs is not doing its job. The A-10's *repairability* adds to its combat effectiveness. This is possible because the basic structure is simple and approximately 95% of the airframe is fabricated of aluminum. Longerons are straight. Fuselage configuration aft of the nose section is single curvature construction. Parts are interchangeable left and right.

This simplicity of configuration translates into rapid repair of combat damage, because fewer parts need to be stocked and fabricating of replacement parts or patches can be made at austere bases.

The chart above illustrates the A-10's exceptional ability to sustain combat damage and get back into action quickly. It illustrates the exceptional repairability of the A-10 aircraft. The ▭ areas are non-structural fairings, housings and access doors which can be left unrepaired temporarily if the battle situation requires it. In the structural areas the ▭ markings are the thinner gage skins, stringers, ribs and formers which are lightly loaded and the ▭ markings are the prime load carrying members which would require a more substantial fix. The ■ markings represent the large, machined frame and rib forgings which would require some degree of tooling to perform the repair.

The close air support mission calls for a plane both repairable and survivable. The lethal A-10 is that plane. And it will be the lowest cost front line fighter in the USAF.

FAIRCHILD
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Airpower in the News

By Claude Witze
SENIOR EDITOR, AIR FORCE MAGAZINE

Détente, Too, Can Be a Weapon

Washington, D. C., July 8

Somehow, it is difficult to escape the impression that it took several days for us to realize that Russia, paying lip service to détente, used it as a weapon again in the Moscow summit talks.

The initial announcements appeared in the newspapers of July 4, just as the firecrackers were being set off. Americans were told that President Nixon and Soviet leader Leonid Brezhnev had agreed to restrict underground nuclear testing and limit each nation to a single antiballistic missile installation (ABM site). There was no agreement reached on the deployment of MIRV warheads on intercontinental missiles.

The ban on testing came as no surprise. Brezhnev had announced more than a month earlier that Russia would accept that. The ABM understanding could have been written by the US Congress. In 1972, the SALT I pact gave each nation the right to build two ABM systems. We have one protecting Minuteman sites in North Dakota, and Congress has turned down a proposal to have another to defend Washington, D. C. The Russians have their ABM system protecting Moscow, which must be where they want it. The 1974 agreement, however, gives each nation the right to change its mind and move the ABM apparatus if it wants to.

As Henry Kissinger, the Secretary of State, has said, the MIRV problem is more complicated. He said the technical problems are too difficult to resolve. Then, in an unfortunate observation, the Secretary said, "Both sides have to convince their military establishments of the benefits of restraint, and that does not come easily to either side."

What is unfortunate is the implication that our own Joint Chiefs of Staff are adamant; that the Pentagon's generals and admirals impeded an understanding. Defense Secretary James R. Schlesinger felt a requirement to deny this, and he hastened to insist that "we have firm civilian control in this country." He refused comment on the suggestion that it may be the Russian military hierarchy that refuses to concede and that Mr. Kissinger had used the term "both sides" to be diplomatic.

The issue for the Pentagon's uniformed leaders was made clear, almost at the same time, by Adm. Thomas H. Moorer, who was retiring as Chairman of the JCS, to be replaced by Gen. George S. Brown of USAF. The Admiral ended his military career with the observation that "military men like the Constitution the way it is." He added:

"I don't know why this issue continues to be raised. One day I read that the Joint Chiefs are weak and never consulted, and another day that they are controlling the country and are seeking to frustrate the policies of the Commander in Chief. Both of these allegations are nonsense in its purest form."

It took a few days for the real message from Moscow to sink in. One reason may be that Congress had started its Independence Day schedule, and there were no profundities from Capitol Hill. President Nixon, stopping at Loring AFB in Maine on his way home, said, "the process of peace is going steadily forward."

That was enough to bring the skeptics out of the woodwork. They came up with the concept that it is the Russians who will not compromise on the MIRV warhead question. Moscow is ready to start deployment and has no intention of slowing down its drive for strategic superiority.

Within hours, both the New York *Times* and the Washington *Post* were weeping about the blow suffered by détente. Both papers tried hard to tie the Moscow failure to Mr. Nixon's troubles at home. The *Times* could not nail it down; the newspaper said "it is not clear" that the President would not make concessions to Russia in order to protect conservative support at home. The *Post* felt differently. It suspects "considerations of political survival influenced [Mr. Nixon's] determination of the requirements of national security."

There also was recognition of the fact that the cause of détente was not served well by Soviet activity in the Middle East and Vietnam. Congress, still smarting from accusations that it is subservient to the Pentagon and its generals, was not criticized this time. The anticipation is that there will be fewer, not more, challenges to military decisions as reflected in budget requests. There was even the suggestion, in one *Post* story, that the extent of JCS pressure on the President has been exaggerated, and that our military decisions suffer from so much public scrutiny, not permissible under Russia's totalitarian government. Dawn brings light.

—Wide World Photos

President Nixon with Leonid Brezhnev at the Soviet leader's dacha on the Black Sea during Mr. Nixon's recent visit to Russia.

Airpower in the News

What was the role of détente? The Russians used it to keep negotiations under way—they will go on until Moscow has the strategic power it wants—and give them time to find out how deep the waters run through Watergate. Soviet officials insist that the summit talks in Moscow were a success. And they were, from Moscow's viewpoint. They are years behind the US in missile technology and deployment, but catching up fast. And catch up they will. Détente is a weapon they are using to make this possible.

The suggestion that our own military leaders had a hand, of some kind, in the acknowledged failures at Moscow is both false and pernicious. Only yesterday, Sen. William Fulbright (D-Ark.), appearing on NBC's "Meet the Press," delivered the opinion that the American military are a principal obstacle to arms agreements, that President Nixon's political plight is being exploited more by the hawks at home than by the Russians, and, finally, that Congress does not accurately reflect the opinions and desires of the American people.

The Defense Department now has to overcome this cry as the critics try to exploit it. The voters in Arkansas already have contributed to the cause. They are removing Mr. Fulbright from the Senate as soon as they can.

The Cost of Defense Living

The Fiscal 1975 military procurement authorization bill is in conference, following its passage by the Senate on June 11. The vote was eighty-four to six. The House version, as reported here last month, was voted, 358 to thirty-seven.

In billions of dollars, these are the figures the conferees must resolve:

	Administration Request	*House Bill*	*Senate Bill*
Procurement	$13.8	$13.6	$12.9
RDT&E	$ 9.3	$ 9.0	$ 8.9
TOTAL	$23.1	$22.6	$21.8

Thus, the Senate version provides an authorization cut of $1.3 billion, or only about 5.5 percent. It is a defeat for the Pentagon's critics and a sign that Congress, even before the Russians displayed their attitude toward détente at Moscow, knew the score. It was laid out for them by John Stennis (D-Miss.), who is the Chairman of the Senate Armed Services Committee:

"I am sure all of us in the Senate look to the day when current negotiations will have been successful and we can materially cut our defense forces in the secure knowledge that those who threaten us will cut their forces also," Mr. Stennis declared at the outset of the debate. Almost with one ear cocked to the Kremlin, he added: "For the present, however, I think we must agree that the time has not come for cutting defense outlays on that basis."

The Senate debate lasted eight days, and there was no threat to proposals for new or improved weaponry. Whereas there were efforts earlier in the House to halt such projects as USAF's B-1 bomber, none of these challenges developed in the Senate.

Probably the most important effort made on the floor came from Sen. Thomas J. McIntyre of New Hampshire, who is Chairman of the Armed Services Subcommittee on Research and Development. He tried to amend the authorization bill to block a request for $77 million to increase the accuracy and yield of our ICBMs. The McIntyre idea already had been rejected by the Armed Services Committee, but the Senator persisted in the debate, nearly three hours of which was held in secret session. Apparently the secrets did not help the McIntyre cause, because he lost, forty-nine to thirty-seven.

Mr. McIntyre was apprehensive about counterforce:

"This is a situation where we get into the hair-trigger period of international tension and the prospect of thinking that we have the power to knock out his silos and destroy his counterforce so that there will not be a prelaunch, but he will take no chances and fire first," the Senator said.

"The counterforce proposals put forward by the Pentagon this year are a drastic and dangerous change in long-established policies, and I believe it would be particularly unwise, given the present state of SALT negotiations, to enact such changes."

Senator Stennis saw a different threat:

"Since this matter was last before the Senate," the Chairman said, "the Soviets have moved forward considerably, greatly one might say, in this field of weaponry. So this is a new day and certainly a different day."

He was supported, at one point, by Sen. Robert Taft, Jr. (R-Ohio), who quoted AIR FORCE Magazine on Russia's new missile capabilities, and the development of the Backfire bomber, along with the required tankers to keep it aloft.

Mr. Taft also cited reports that the Soviet Defense Minister, Marshal Andrei Grechko, is arguing in the Kremlin for a "qualitative leap" in Soviet arms development. The Senator from Ohio commented:

"We cannot permit Marshal Grechko to argue to the Central Committee that the United States will not respond to this arms program. We must make it clear that we will respond, that the choice is either arms control or an arms race—not a one-sided buildup of Soviet power.

"The development of increased accuracy for our missile warheads is a critical part of the message we must send to Moscow."

A second major argument arose over an amendment offered by Sen. Henry M. Jackson (D-Wash.). He proposed that the Secretary of Defense be given authority to veto the sale of goods and technology to unfriendly foreign nations, if the deals would significantly enhance their military capability.

Proponents of increased trade with Russia succeeded in watering this one down a bit, but it was passed on a voice vote. Mr. Jackson contended it is the quality of our weapons that gives us deterrent power and we must protect our technological superiority. He contended that the Commerce Department, which controls most export licenses, is not competent to assess the military implications of what it is doing.

The Senator from Washington pointed out that Russia has asked Boeing, Lockheed, and McDonnell Douglas to build a monster aircraft manufacturing complex in Russia, a more advanced setup than anything we have in the United States. Mr. Jackson said the military implications are clear. The Middle East has been a proving ground for Soviet airlift as well as

SCIENCE/SCOPE

A fiber optic data link carrying aircraft flight control signals from cockpit to controls was successfully flight tested for the first time by the U.S. Air Force recently. The test was part of a program to evaluate various electromagnetic-integration-resistant transmission media for carrying multiplexed signals in a fly-by-wire flight control system. Of particular concern was the potentially catastrophic effect of lightning and other forms of electromagnetic interference on the conventional twisted-pair-wire bus now used to carry primary flight control signals. The two-way multi-port fiber optic data bus was integrated with F-DADS (fault-tolerant digital airborne data system) equipment. Both were developed by Hughes.

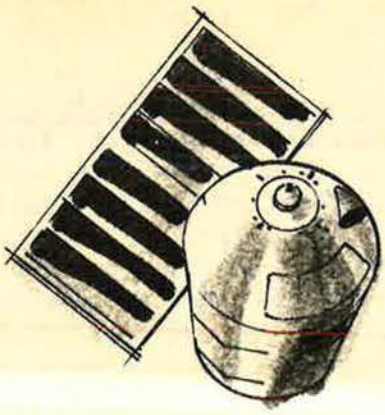
101 TOW anti-tank missile systems for U.S. Army HueyCobra helicopters are now being built by Hughes under contract to Textron's Bell Helicopter Co. The TOW helicopter system consists of a telescopic gyro-stabilized sight, guidance and control equipment, cockpit displays and controls for gunner and pilot, and four two-round missile launchers. It enables the crew to launch wire-guided TOW at standoff ranges against tanks, trucks, and ground installations with bull's-eye accuracy.

The F-14 Tomcat's AWG-9 system and Phoenix missile were praised in a recent report of the House Armed Services Committee for having demonstrated capabilities "unprecedented in the annals of aviation." Major accomplishments cited in the report: longest-range fighter detection of fighter-size targets; longest-range fighter-launched air-to-air missile firing; first fighter to demonstrate automatic detection and tracking of multiple targets; and first fighter to demonstrate multiple, near-simultaneous firing of missiles against multiple airborne targets. The AWG-9 weapon control system and the Phoenix missile are built by Hughes for the U.S. Navy.

America's first air-to-air anti-radiation missile, the Brazo, successfully intercepted a jet drone target in its first test firing at Holloman Air Force Base, N.M., recently. It was launched from an F-4D Phantom in a "lookdown" tail attack on a BQM-34 drone. The Brazo is designed to intercept an enemy aircraft by homing on its fire control radar. The U.S. Navy is responsible for developing the Brazo, the U.S. Air Force for flight testing it. Hughes is missile system integrator.

The sharpest photographs ever taken of the Western hemisphere from geostationary orbit are being transmitted every 30 minutes from NASA's first Synchronous Meteorological Satellite (SMS). Resolution of one-half mile is achieved by transmitting 14,600 lines for each image, compared with standard TV's 525. The photos are taken by the VISSR (Visible Infrared Spin-Scan Radiometer) system built by Santa Barbara Research Center, a Hughes subsidiary.

Norway and Turkey have selected the U.S. Army's TOW anti-tank missile for their armed forces, joining Canada, Germany, Luxembourg, Italy, The Netherlands, Denmark, and Iran. The Hughes-built TOW is a wire-guided missile with a maximum range of 3,000 meters. It can be launched from a ground tripod, a variety of vehicles, or helicopters. It has been operative in the U.S. Army for several years and has been used effectively in combat.



MEASURING UP.

Designed to measure scientific phenomena in the space around us, the Earth Limb Measurement Satellite (ELMS) will give the United States Air Force an *extra measure* of value.

In this program structured by the Design-to-Cost philosophy, both Grumman and the Space and Missile Systems Organization (SAMSO) can track costs and performance at every stage of the spacecraft's development.

And after ten months, we're right on target . . . *on schedule* and *on cost.*

ELMS . . .
WORLDS OF DATA AT DOWN-TO-EARTH COST

GRUMMAN AEROSPACE CORPORATION

weaponry, and they came out second best in the air transport contest.

He also cited the importance of computers to modern defense technology and the fact that we have managed to stay at least ten years ahead of them in the science. But, Senator Jackson warned:

"The Soviets are making every effort to close the gap in computer technology in the only way that is possible for them: to get us to give it to them.

"Their efforts have not been without success. Recently one of our largest computer companies signed a protocol of intent with the Soviet Union which calls for the joint development of the next generation of large, high-speed computers.

"In addition, the protocol calls for the American company to create a plant for manufacturing this new computer and for manufacturing the most modern peripheral devices. This plant, in the usual Soviet style, would be one of the largest in the world.

"This venture, if allowed, would not only create, full-blown, a most serious competitor for our overseas computer sales, but it also would, by moving the Soviets ten years into the future, enormously upgrade their military potential across the board."

The Senator said the largest single block in the path of Soviet military technology may be their inability to produce integrated circuits. Integrated circuits were first developed for the Minuteman missile system with R&D funds appropriated for the Air Force. Now it is proposed that an American company set up a factory in Russia and transfer there any knowledge and techniques developed within the next five years. The price to the Russians: $20 million, and most of that on low-cost loans.

Mr. Jackson disclosed in the debate that he has reason to believe the National Security Council has launched a special study to see what can be done to plug the leak of technology with military applications to the USSR. He said the situation verges on a scandal. The Senate's Permanent Subcommittee on Investigations, of which Mr. Jackson is chairman, will hold hearings on the subject as soon as they are authorized.

Another amendment to the Senate bill of concern to the Air Force also was adopted by a voice vote. This amendment prohibits USAF, during Fiscal 1975, from carrying out its planned overland missile tests from operational silos, the proposed Great Patriot project.

While the authorization bill is in conference, and before there is action on appropriations, it should be reported that there is a growing awareness in Washington of the impact of inflation. The Fiscal 1975 budget was drawn up many months ago, with the expectation that prices and wages would go up by about six percent. As every purchaser of asparagus or automobiles knows, the inflation rate is much higher than six percent. In Fiscal 1974 alone, the Pentagon's fuel bill increased from $1.4 billion to $3.6 billion, despite a cut in consumption.

These are the realities that have to be faced. ■

The Wayward Press

Like most of us, even television newscasters have moments of greatness. They have brought us the truth, dramatically, on a number of occasions. The printed media could not possibly match the performance. One instance was the murder of President Kennedy's assassin, Lee Harvey Oswald, by Jack Ruby in a Dallas police station. Another was man's first step on the moon.

On July 2, almost the eve of our American celebration of freedom and independence, there was a third example. Each of the major networks had a broadcast from Moscow cut off the air by Soviet television officials. The broadcasts were about dissent in Russia.

NBC, CBS, and ABC handled the situation with something approaching éclat. They swapped tapes, and each network showed what happened to its own broadcast as well as that of its competitors.

The result was a devastating commentary on the nature of the Soviet system, without editorial observation. There was no need for any.

There are many Americans, some of them old enough to remember Hitler, who still do not understand the nature of totalitarian government. Well, they watched TV on July 2. While they watched, Moscow dissidents were locked up, to be released after President Nixon left the country. Our liberals, most recently shaken by Alexander Solzhenitsyn, should watch more TV news. The kind we got from Moscow, without instant analysis.

* * *

From *Quill*, a magazine published by The Society of Professional Journalists, Sigma Delta Chi, we have learned:

Of 250 editors responding to a survey by the Associated Press Managing Editors Association, two-thirds said they accept trips paid for by special interests, three-fourths said they do not rule out gifts, and ten percent admitted they promise stories in exchange for advertising.

You may recall that the Society of Professional Journalists issued a code of ethics for the profession late last year. It did not approve the conduct of most AP managing editors, if we are to believe the survey.

Also, *Quill* reports that Ralph Otwell, managing editor of the Chicago *Sun-Times* and president of the Society of Professional Journalists, said recently his organization's code "was not engraved on stone tablets and handed down by Moses as he descended Mt. Sinai." Rather, said Mr. Otwell, it was handed down by a committee in Buffalo. That we knew.

* * *

From all over the world, "The Wayward Press" receives newspaper clippings, sent in by readers who spot what they suspect are transgressions by careless or prejudiced reporters. These contributions are useful and appreciated. But we now have a new regulation:

We will not accept clipped articles. The entire page of the newspaper on which the item appears must be forwarded. The reason is that we must be able to confirm the source. In a recent column, a news story was attributed to the wrong newspaper. The newspaper story was incorrect, but our correspondent also blamed the bad reporting on the wrong publication. It won't happen again in this space.

Aerospace World

News, Views & Comments

By William P. Schlitz

ASSISTANT MANAGING EDITOR, AIR FORCE MAGAZINE

WASHINGTON, D. C., JULY 9

Following several years of successive failures in space, the Soviet Union pointed to its apparent triumph in orbiting a space lab in June and putting two men aboard it in July.

The mission came at a time when nine US astronauts were at the Star City space center near Moscow undergoing a three-week training program in preparation for the joint Apollo/Soyuz linkup scheduled for 1975.

CORRECTION

Through an inadvertence, one line of copy was left off the advertisement for Celesco, Training & Simulation Systems Div., on page 57 of the May 1974 issue of this magazine. The line "An Equal Opportunity Employer — M/F" should have appeared at the bottom of the ad page. We regret the omission—THE EDITORS

As usual with the Russians, the lab launch and docking operation were both shrouded in secrecy until each had been completed without mishap. The two spacemen —Col. Pavel Popovich and Lt. Col. Yuri Artyukhin—are to study the earth's surface and atmospheric conditions, perform medical experiments, and test out the lab's systems, among other things.

Orbiting the new spacelab—Salyut 3—and its rendezvous with Soyuz-14 is the first space success for the Soviet Union since three cosmonauts boarded Salyut-1 in June 1971. But that achievement was marred when the three were subsequently killed by a pressure failure during reentry.

☆

In early July, the first educational courses ever taught via space satellite TV began with the transmission of color video instruction through NASA's huge new Applications Technology Satellite-6 (ATS-6). *(For a definitive look at ATS-6, "the largest and most complex application of technology to education ever attempted," see p. 59.)*

The initial program involves more than 600 graduate-level elementary school teachers in eight Appalachian states. The University of Kentucky will give full credit to those completing the two courses scheduled.

ATS-6 went into orbit on May 30 and subsequently passed its systems checkout with flying colors.

Another ATS-6 project begun in July entails the exchange of medical data among VA hospitals that are located in six eastern states.

Besides the many other experiments planned for the communications spacecraft, such as position location and navigation, next year ATS-6 will be moved to a point over East Africa for use by India for the transmission of educational programs to some 5,000 isolated villages.

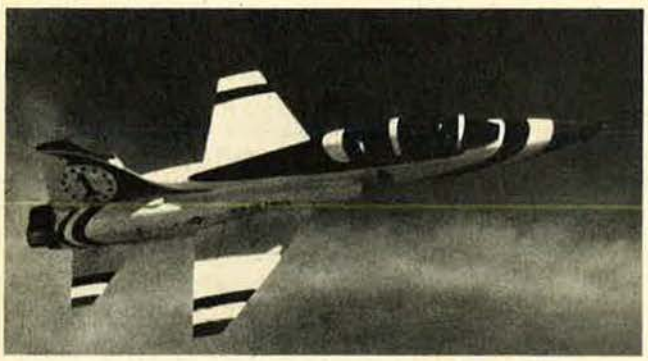
☆

Other space-age technology is also finding civilian medical applications.

UCLA's Laboratory of Nuclear Medicine and Radiation Biology is currently testing a new technique called "brain scanning," which is much more efficient than conventional X ray in discovering such abnormalities as blood clots and tumors.

A key part of the machine that actually does the scanning is a small solid-state cadmium telluride (CdTe) nuclear sensor originally developed for a spacecraft nucleonic fuel-gauging system research program funded by the Air Force Systems Command's Rocket Propulsion Lab at Edwards AFB, Calif.

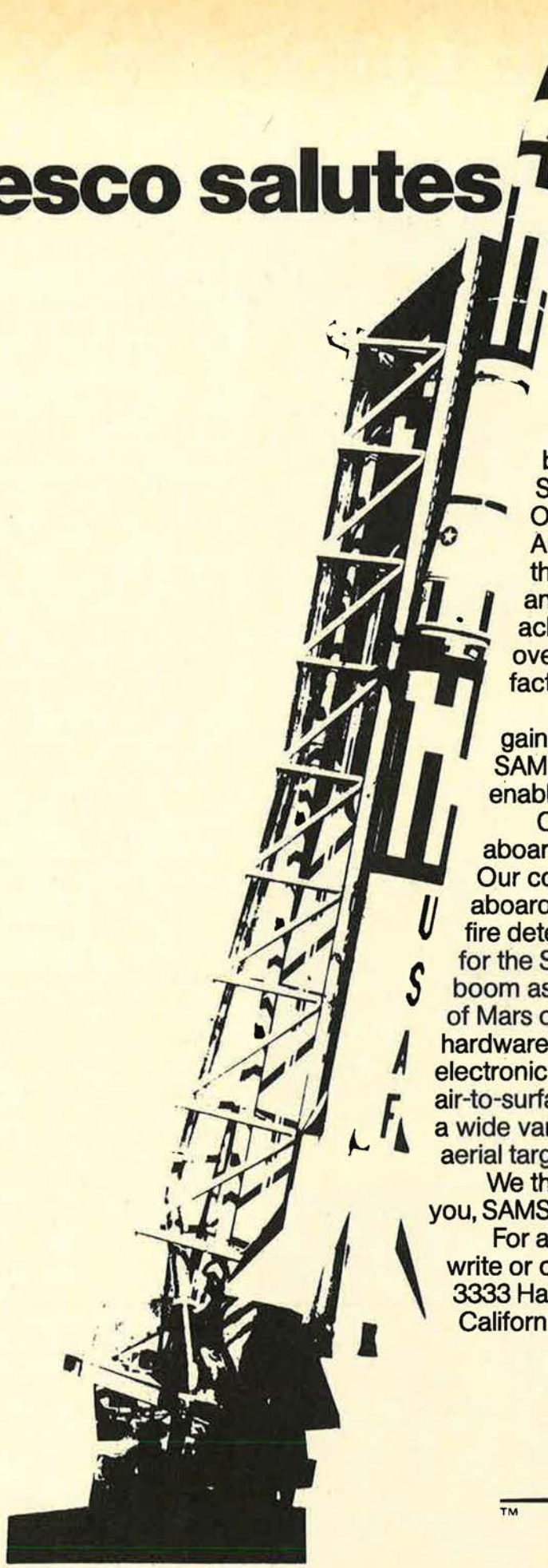
The new X-ray scanner is so sensitive to any change in brain density or mass that not only can it



USAF's aerial demonstration team, the Thunderbirds, will fly forty-one shows at thirty-seven sites this year in a schedule that was to begin in late July. Fuel economies dictated a switch from the F-4 to the T-38 shown here in its Thunderbird decor.

In June, USAF Chief of Staff Gen. David C. Jones—then USAFE Commander in Chief—was awarded Germany's Grand Distinguished Service Cross of the Order of Merit, for service to NATO. Here, a handshake from German Defense Secretary Dr. Siegfried Mann.

Celesco salutes SAMSO.



Celesco grew up on the U.S. Air Force Athena launch vehicle program. As principal contractor for Athena, we have been deeply involved with the Space and Missile Systems Organization over the last decade. And we are unabashedly proud of the extraordinary success Celesco and SAMSO have been able to achieve together – 151 launches over ten years with a success factor of 93 per cent.

The experience and capabilities gained from our long association with SAMSO's ATHENA program have enabled us to serve in other ways.

Celesco transducers have flown aboard Skylab and Apollo spacecraft. Our contamination monitors are aboard Air Force satellites. Our incipient fire detection system has been selected for the Space Shuttle Orbiter. A Celesco boom assembly will sample the surface of Mars on NASA's Viking Lander. Celesco hardware and systems are used for electronic warfare, reconnaissance, and air-to-surface combat. And we produce a wide variety of simulation, scoring, and aerial target systems.

We thank you, Athena. We salute you, SAMSO.

For a copy of our complete brochure, write or call Celesco Industries Inc., 3333 Harbor Boulevard, Costa Mesa, California 92626. Phone 714/546-8030

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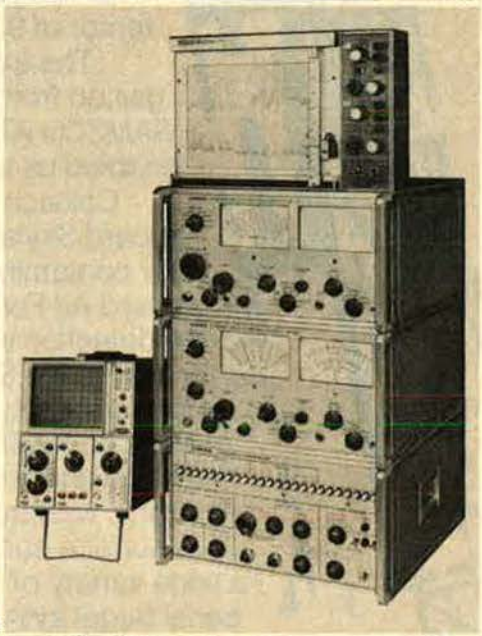
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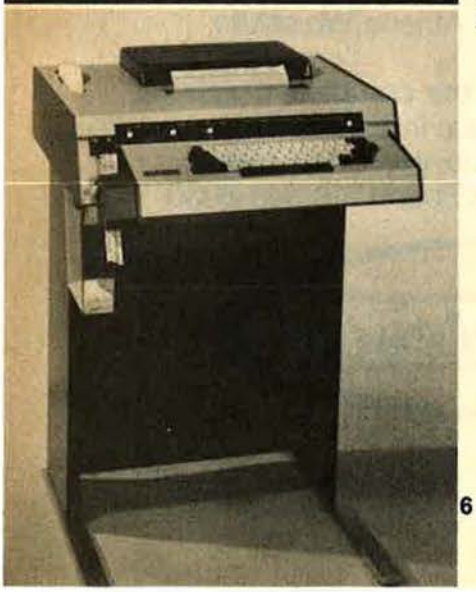
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2. Librascope Systems for Naval Vessels
Librascope pioneered the application of digital computation for naval weapon control systems and is currently supplying these systems for use in submarines, and DLGN class destroyers. It is also involved in sonar detection, large screen laser tactical displays, and multi-function CRT displays.

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5. HRB Singer, Information Sciences
Involved in the techniques of detection, collection and interpretation of electromagnetic radiation. HRB-Singer has also produced infrared and visible light mapping systems.

6. Telecommunications
Other Elements of the Aerospace and Marine Systems Group combine to provide a total telecommunications capability. As prime contractor on the USAF World Wide Technical Control Improvement Program, Singer provides advanced audio-frequency and dc circuit conditioning equipment, primary and secondary circuit patch bays, test equipment and monitoring devices. In addition, a broad line of serial matrix teleprinters and remote batch terminals are produced that satisfy a wide range of applications.

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Aerospace World

detect a growth but accurately locate and define its size, scientists said. The scanner feeds data into a computer that produces a digital "map" from which a three-dimensional picture of the brain can be created.

Also in the medical field, NASA has applied remote medical monitoring techniques, developed originally for spaceflight, to design a new, portable device for low-cost monitoring of patients with high-risk illnesses.

The Vitasign Attendant Monitor, now available commercially, can continuously survey the vital signs of patients in small hospitals, nursing homes, and the like. Previously, such observation could only be found in the intensive-care units of large hospitals.

The four-pound device is designed to operate from existing patient call systems and conventional electrical outlets, NASA said.

☆

The YF-17, Northrop Corp.'s entry in the lightweight fighter prototype competition, made its first flight at Edwards AFB, Calif., on June 9, attaining an altitude of 18,000 feet and a speed of 610 mph.

This was followed two days later by a flight during which the aircraft was pushed through Mach 1 at 30,000 feet, Northrop said. It became the first US-built plane to fly at supersonic speed without afterburners. The YF-17 is designed to hit Mach 2.

In initiating the lightweight tactical fighter prototype program, USAF has stressed high performance at low cost.

For a detailed description of the YF-17, see the October '73 issue. A rundown on its competitor, General Dynamics' YF-16, appeared in the January '74 issue. The production outlook is examined in the June '74 issue.

☆

Iran, which had been considering a buy of fifty McDonnell Douglas F-15 fighters, has decided to purchase an equal number of Grumman F-14s instead.

This will bring to eighty the number of advanced fighters the Middle Eastern nation will purchase from the US at a total estimated cost of about $1.85 billion.

Iran decided on the F-14 Tomcat, originally developed for the US Navy, instead of the Air Force's F-15 Eagle. The Navy aircraft, equipped with its high-performance Phoenix missile, can double as a long-range interceptor. Deliveries will probably start in 1978.

In recent years, Iran has been spending a substantial part of its ballooning oil revenues to modernize its armed forces, and now has one of the most up-to-date military organizations in the Mideast. It regards itself as a stabilizing force in the turbulent Persian Gulf area.

☆

The Air Force has begun a flight-test program at Edwards AFB, Calif., of an F-4 Phantom fitted with a specially designed set of fuselage-mounted canards *(see photo)* expected to substantially increase the aircraft's combat maneuverability.

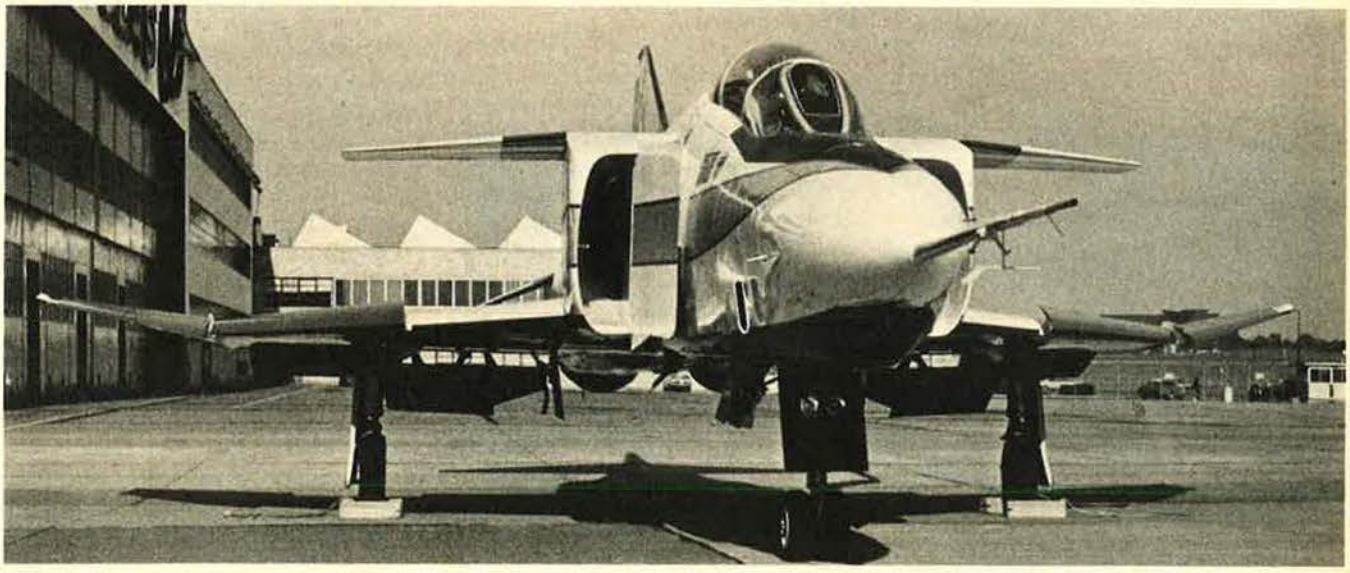
The canards are mounted on the engine inlets, above and just ahead of the wings, and, like all other control surfaces in the modified F-4, are controlled electrically by a fly-by-wire, computer-directed system without mechanical backup. The aircraft is also equipped with leading edge slats on the wings, a feature that has already become standard aboard operational USAF F-4Es.

According to McDonnell Douglas officials, the program is not necessarily aimed at beefing up the performance of F-4s already in the inventory but "could lead to substantial advances in future fighter aircraft technology, such as a twenty percent savings in weight."

☆

The growing rate of inflation, which is tearing the fabric of our economy, has had a particularly devastating effect on the nation's aerospace industry.

This has been reflected in a num-



A McDonnell Douglas F-4 Phantom equipped with inlet-mounted canards is currently undergoing a series of flight tests at Edwards AFB, Calif. The configuration is expected to increase combat capability substantially. Retrofit of other F-4s is not expected (see item above).

Aerospace World

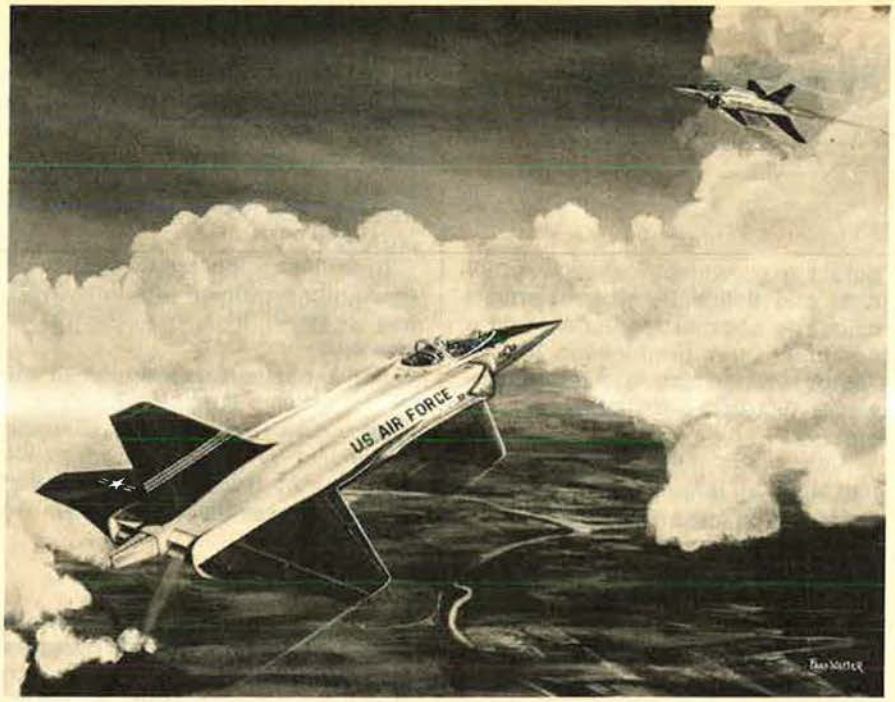
ber of disturbing—even frightening—statistics.

- It costs NASA and DoD about $1,675 to buy what $1,000 could purchase as short a time ago as 1967.
- Between 1958 and 1964, during heavy development activity in aerospace, the Wholesale Price Index grew by one-tenth of a point, from 94.6 to 94.7. In the 1973–74 fiscal year alone the WPI mushroomed 15.6 points.
- In mid-June, steel billet cost fifty percent more than in January.
- Copper sheet is expected to be 120 percent more costly by year's end than in January 1973.

Other figures quoted by industry leaders are equally as depressing, and aerospace firms with fixed-price contracts on long-leadtime products are in a vice, even though stringent steps are being taken to cut costs, industry spokesmen claim. Such inflationary rates are impossible to foresee and build into contracts. Most galling, they say, is when the auto industry, for instance, raises its prices on new cars. The reason given is inflation, but when a new airplane is priced upward, detractors of the aerospace industry point to "cost overruns."

☆

In another experimental program, USAF has contracted with three firms to provide a configuration definition of a demonstrator aircraft crammed with advanced aerospace technology.



Artist's conception of what Fairchild Republic's Advanced Fighter Technology Integration (AFTI) aircraft will look like. Rockwell International and McDonnell Douglas have also received Air Force contracts to determine a configuration definition of the specialized aircraft (see item below).

Under the Advanced Fighter Technology Integration (AFTI) program, the proposed twin-engine aircraft quite possibly could feature:

- A canard on the fuselage below the cockpit;
- A blended wing-body configuration;
- A specially designed cockpit for high acceleration;
- Fly-by-wire control system.

Options also being considered:

- Direct lift control—a way of changing altitude without rotation in pitch.
- Vectored thrust—in which the engines' thrust can be vectored up, down, or laterally.
- Chin fin/rudder—direct side force control permitting lateral movement without rolling or banking the aircraft.

The contract awards—to Fairchild Republic, McDonnell Douglas, and Rockwell International—constitute Phase I of the program, detailing the aircraft, probable performance characteristics, and production methods.

During Phase II, USAF will evaluate each of the three studies and decide yes or no on design and fabrication. If affirmative, a contract could be awarded next summer for construction of two aircraft over a thirty-month period, with flight testing in late 1977.

☆

In mid-June, the Air Force set in motion development of a weapon system that could eventually complement or replace the Short Range Attack Missile. SRAMs are now car-

Believed to be the last survivor of its kind, this A-36 dive-bomber variant of the World War II Mustang was recently presented to the Air Force Museum, Wright-Patterson AFB, Ohio. The A-36 was restored by Minnesota ANG's 148th Fighter Interceptor Group and is fitted with the markings of former unit member Lawrence W. Dye, who flew it in combat during World War II.

How to make a 500-ton rocket stage invisible.

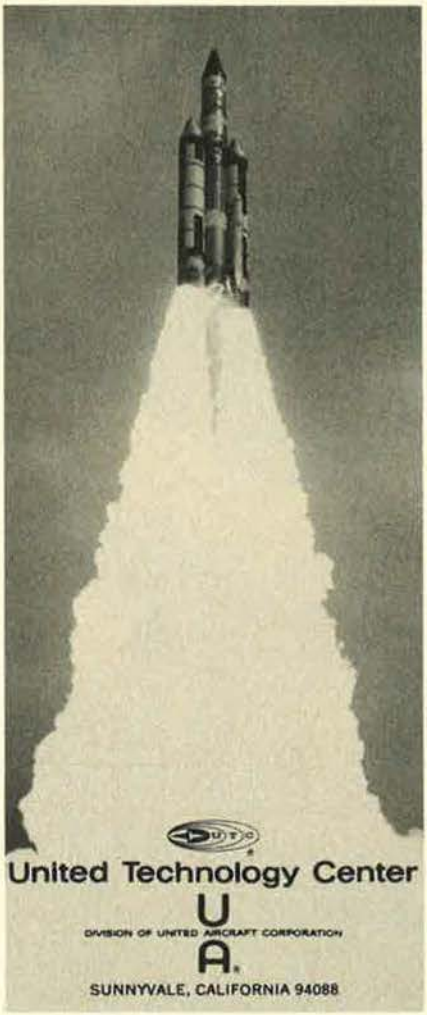
Develop it within budget, deliver it on time, and have it perform flawlessly.

Does that make it invisible? It seems to. When products perform as they should they attract little or no attention.

Like UTC's 120-inch diameter solid rocket motors. Since they boosted the first Titan III-C toward space on June 18, 1965, pairs of these 250-ton motors have performed perfectly in 29 consecutive launches.

The fact that these awesome boosters could be developed, put into production, and integrated into a vehicle as complex as the Titan III on the original tight schedule is significant. To have 58 of them perform with the precision of a handmade item although produced with assembly-line techniques, and transported 3,000 miles by common rail carrier, is even more significant.

Today, UTC's 120-inch solid rockets are the only over-a-million-pound-thrust rockets in on-going production and the list of their uses is growing. Enough 120's have now been ordered to indicate that more than 100 will be flown by 1976 for Air Force and NASA Titan III programs alone.



And in addition to their high reliability and economy, the 120-inch solid motors offer great flexibility. They are simple to use either as strap-ons or in clusters in a simple building block approach. Prime reason for the flexibility in clustered applications is that existing 120-inch motors are a stage in themselves —complete with steering, electronic controls, thrust termination and attach structure. All they require to perform their mission with precision and reliability are good guidance commands.

UTC's invisible 120-inch rockets. They're the basic building blocks for a whole family of low cost, highly reliable space boosters.

Launch it like a rocket ... return it like an airplane.

Automatically.

The shuttle is returning from outer space... unpowered. Land it like an airplane on a conventional runway, automatically, with no option for go-around. Then control it through rollout. *And,* be prepared to do it under IFR conditions. That's Sperry's job.

Sounds tough, but it *can* be done. We've already proven the feasibility of autoland for the shuttle with repeated landings of a NASA CV-990 unpowered from 40,000 feet, with touchdowns right on the runway centerline. Autoland for the shuttle... a reality because Sperry automatic landing experience makes the difference. Sperry Flight Systems of Phoenix, Arizona, a division of Sperry Rand Corporation.

SPERRY
FLIGHT SYSTEMS

Aerospace World

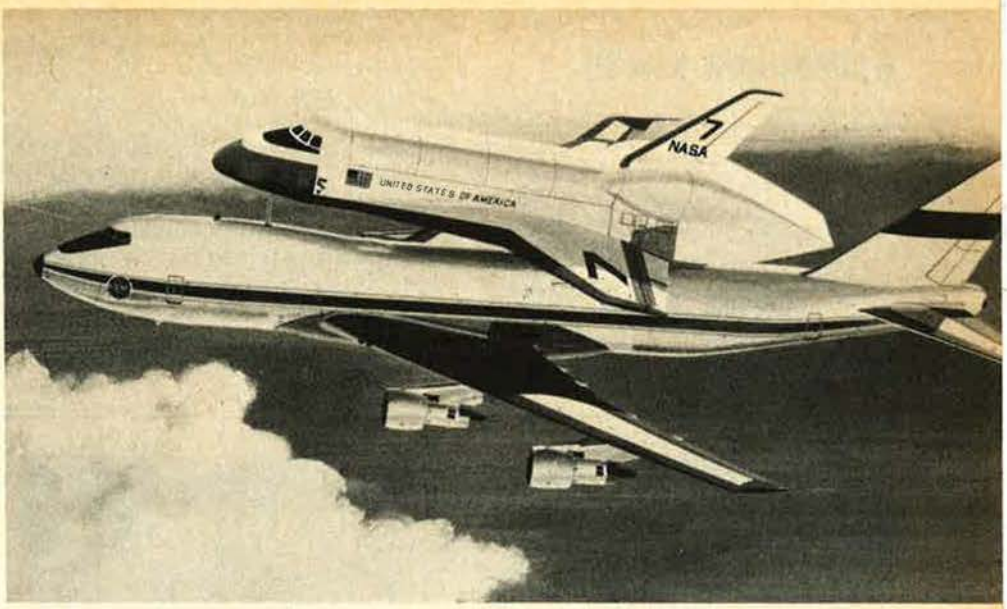
ried aboard SAC B-52s and FB-111s and are also intended for the new B-1 bomber.

Contracts for concept formulation and advanced technology development of ASALM (Advanced Strategic Air-Launched Missile) went to both McDonnell Douglas Corp. and Martin Marietta Corp., which, in effect, would be in competition should the go-ahead be given to develop the missile. ASALM is visualized as a long-range, ramjet, multimission weapon.

The companies will study options in missile systems and technology, as well as possibilities in structures, aerodynamics, and flight control, Air Force officials said.

☆

NASA is buying an American Airlines Boeing 747 to transport the Space Shuttle Orbiter and related hardware across country. The giant aircraft will also be used in approach and landing tests of the reusable Orbiter, to become operational in 1980.



Artist's rendition of NASA's Space Shuttle being transported piggyback aboard a modified Boeing 747. Total weight of the two: a hefty 775,000 pounds (see item).

Earlier, the space agency had planned to install six air-breathing engines on the delta-winged Orbiter to perform flight tests and ferry flights from the West Coast to the launch site at Kennedy Space Center, Fla.

The 747 will cost an estimated $16 million and will be modified to permit piggyback transport of the Orbiter or such other hardware as

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its 153-foot-long liquid-propellant external tank.

Flight profile tests have already begun, with the aircraft modifications slated to get under way next fall. Ground and flight testing are to commence in late 1976. Complete with fittings and Orbiter, the 747 will weigh in at a hefty 775,000 pounds and have a range of 2,320 nautical miles.

On becoming operational in 1980, the Orbiter will launch vertically from the Kennedy Space Center via a large expendable liquid-propellant tank and two recoverable and reusable solid-propellant rocket boosters.

The Orbiter, 123 feet long, could remain in orbit for a week or more, perform reentry, and land at the Kennedy Space Center like a conventional aircraft. An additional launch and landing site is to be built at Vandenberg AFB, Calif.

Former AFA President Maj. Gen. J. B. Montgomery, USAF (Ret.), right, presents $5,000 first prize in Von Kármán Memorial Award Contest to AFSC Aeronautical Systems Division's Charles Tiffany. In the background, witnessing the event, is A. L. Kolom of TRE Corp. General Montgomery is Senior Adviser and a Director of TRE.

☆

In June began a series of test flights of the General Electric CF6-50E high bypass turbofan engine aboard a Boeing 747.

The engine testing is part of the development of the 747 as the Air Force's Advanced Airborne Command Post (AABNCP—USAF designation E-4A; *for details on this and other advanced USAF command and control systems in progress, see p. 60 of the July issue).*

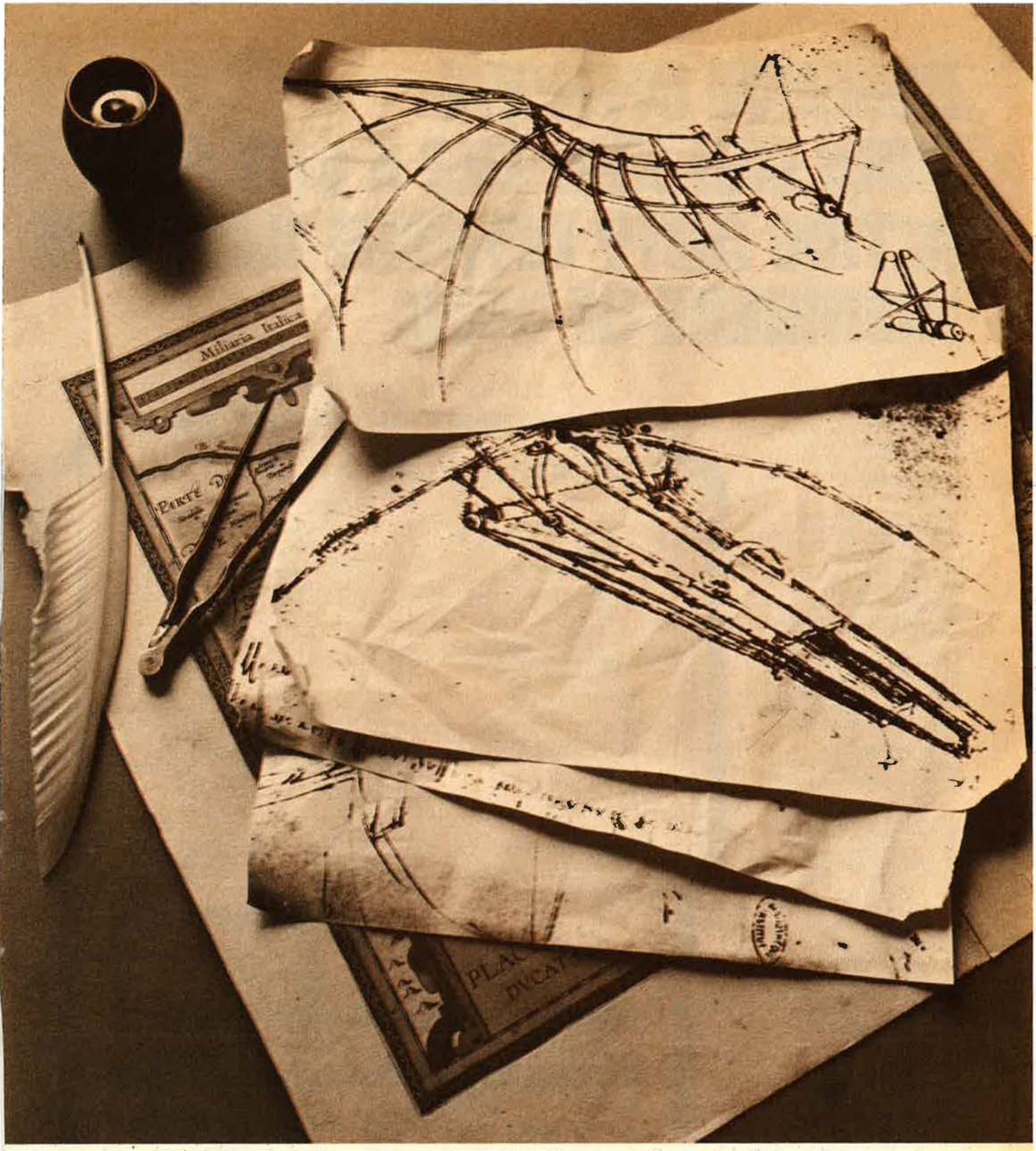
Certification and delivery of the first GE-powered 747 is scheduled for this fall. In all, eighteen CF6-50E engines—said by GE to be the most powerful yet built—will be supplied to the AABNCP program. The engines produce 52,500 pounds of thrust each and are derivatives of the TF39, developed for USAF's mighty C-5A transport.

Of the E-4As, two will have the GE engine installed initially and two will be retrofitted with it. The program calls for an eventual fleet of seven E-4As.

☆

US Navy is developing a system that will allow it to pinpoint the position of a downed aircraft within minutes.

Core of the GRAN—for Global Rescue Alarm Net—is the Navy's system of fixed-orbit communications satellites and eight ground



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Avco's track record also includes development of the Apollo heat shield; fire and thermal protection materials for advanced missiles, aircraft and ordnance; Boron-reinforced composites for aircraft structural applications; electronic warfare programs; and the design and automated production of arming and fuzing components for both conventional and advanced ordnance.

And don't think we're sitting back contentedly with Mona Lisa smiles. Today, Avco Systems Division continues to apply its systems engineering, aerophysics, electronics, and materials technology to major aerospace programs. It's just part of our policy of being ahead of the times.

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stations now abuilding worldwide.

Navy technicians have designed a miniature five-watt transmitter to be carried aboard aircraft. A pilot in trouble would simply activate the transmitter, which would bounce a signal off a satellite and into a computer at a ground station. The computer does the rest.

GRAN would also respond to signals from standard ELTs (Emergency Locater Transmitters), officials said. (GRAN may have such future applications in the civilian community as locating lost hunters, accident victims, and downed civilian aircraft.)

☆

Testing the navigation system of the Air Force's upcoming new B-1 bomber began in June at Holloman AFB, N. M.

The test program will last about seven months and involve thirty flights of the equipment aboard C-141 aircraft. Some operations will be conducted out of Eielson AFB, Alaska.

USAF views the navigation test program as a major milestone in the B-1's development, required before flight tests of the aircraft's integrated avionics package take place, now scheduled for spring of 1976.

The B-1's navigation gear consists of a Litton inertial measurement unit; a Singer/Kearfott avionics control unit, and doppler radar; a Honeywell radar altimeter; and Raymond Engineering's data entry unit, controls and displays, interface electronics, and special test equipment.

☆

US Air Force Recruiting Service reports that it met or exceeded its enlistment goals for FY '74 in all regular programs. This occurred in the first full fiscal year of the all-volunteer environment—a year that marked the twentieth anniversary of the Recruiting Service.

Some 73,700 persons—8,000 of them women—without prior military service signed up in FY '74. Another 1,828 college graduates—358 women—enlisted for officer training.

The only recruiting shortfall, according to the Service, was in the area of health professionals, but twenty-three special medical recruiting teams have been fielded, and implementation of the new doctor bonus bill should help to fill these ranks, USAF officials said.

☆

NEWS NOTES—Air Force recruiters have a new slogan: **"Look Up. Be Looked Up To. Air Force."** Young people's change in attitudes brought about the switch from "Find Yourself in the Air Force."

Two young USAF officers have been named 1974–75 White House Fellows: **Maj. John J. Borling,** 35th Tactical Fighter Wing, George AFB, Calif., and **Maj. Leslie G. Denend,** a doctoral candidate at Stanford.

The famed "Triple Nickel"—**555th Tac Fighter Squadron**—will be first to be equipped with the **F-15 Eagle.** The unit will move to Luke AFB., Ariz., for training in the new air-superiority fighter.

The **F-15** hit the 2,000-flight mark in mid-June, twenty-three months after the aircraft's maiden flight.

Aeronautical engineer **Dr. Rich-**

Aerospace World

ard T. Whitcomb has received a $25,000 award from NASA for his invention of the **supercritical wing,** an airfoil that increases subsonic speed and range without increased power or fuel consumption.

In June, an Anglo-French **Concorde** supersonic jetliner flew roundtrip from Boston to Paris in just over **six hours**—6,874 miles.

Dr. Noel W. Hinners has been appointed Associate Administrator for Space Science at NASA, succeeding **Dr. John E. Naugle,** who has assumed the position of Deputy Associate Administrator. Hinners had been Director of Lunar Programs in the Office of Space Science.

In mid-June, a federal judge decided that the Air Force and Naval Academies **need not enroll women.** His ruling was based on the academies' training of men for combat, a role denied women under law. The decision may be reversed on appeal.

Gen. Carl A. "Tooey" Spaatz, first USAF Chief of Staff and commander of the US strategic bombing forces in World War II, died July 14 at Walter Reed Army Hospital, Washington, D. C., at the age of eighty-three. An extensive report on his long and distinguished career will appear in our September issue.

Effective June 14, 1974, **Fred Musi** of the Air Force Association Staff became **Assistant Executive Director/Comptroller,** rather than Comptroller. "The new title more accurately reflects the scope of Mr. Musi's authority and responsibilities in the financial planning and management of the Association's affairs," said AFA Executive Director James H. Straubel in announcing the change.

USAF received its **1,000th solid-propellant rocket motor** for its **SRAM** weapon system from Lockheed Propulsion Co., Beaumont, Calif., in June.

The USAF's part of jointly used military/civilian **Laurence G. Hanscom Field,** Mass., will now be known as **Hanscom AFB,** reflecting the increased importance of the facility to Air Force activities.

Died: In June in Beverly Hills, Calif., **Corliss C. Moseley,** a World War I fighter pilot and speed flyer who later became an aircraft industry executive. During World War II, schools he established trained many pilots and mechanics. Later, he became a noted race horse breeder and cattle breeder. An AFA Charter and Life Member, Mr. Moseley died at the age of seventy-nine. ■

There is no generation gap.

The United States Air Force Minuteman continues to bridge the generation gap to freedom with the help of Aerojet Solid Propulsion technology.

The Minuteman, from 1776 to present, has been symbolic of America's first line of defense.

Aerojet Solid Propulsion Company is proud to be part of the Twentieth Century Minuteman. Through delivery of 3,000 motors, Aerojet has aided the Minuteman in protecting American ideals for more than a decade.

Recently awarded the M-X Advanced ICBM Upper Stage Propulsion study program, Aerojet Solid Propulsion continues to be dedicated to advancing technology for the defense of America. The Minuteman ... yesterday, today and tomorrow ... the bridge to freedom for generations of Americans.

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TWENTY YEARS IN SPACE

In 1954, the United States Air Force added a new, vast dimension—that of space—to its mission and in so doing revolutionized not only warfare but technology and human aspirations. The Commander of the Air Force organization that led America's move into space assesses the meaning of this historic event and previews the importance of space technology in the years ahead . . .

USAF'S CONQUEST OF SPACE

BY LT. GEN. KENNETH W. SCHULTZ
COMMANDER, SAMSO

ON THE surface, 1954 seemed a year likely to generate little historic impact. The war in Korea was over and Americans were settling down to a life-style in which the automatic transmission was the new "gimmick" to have in a car, and a first-class stamp cost three cents. An Englishman named Roger Bannister ran the first under-four-minute mile, and the Pulitzer Prize for biography went to Charles Lindbergh for his *Spirit of St. Louis.* President Eisenhower signed a bill providing for the establishment of an Air Force Academy. The first production model of the North American F-100 came off the line. The Air Force awarded a contract for study and development of a new supersonic bomber, the B-58.

Then, in the course of three tests in the Pacific, the hydrogen bomb advanced from experiment to practical reality.

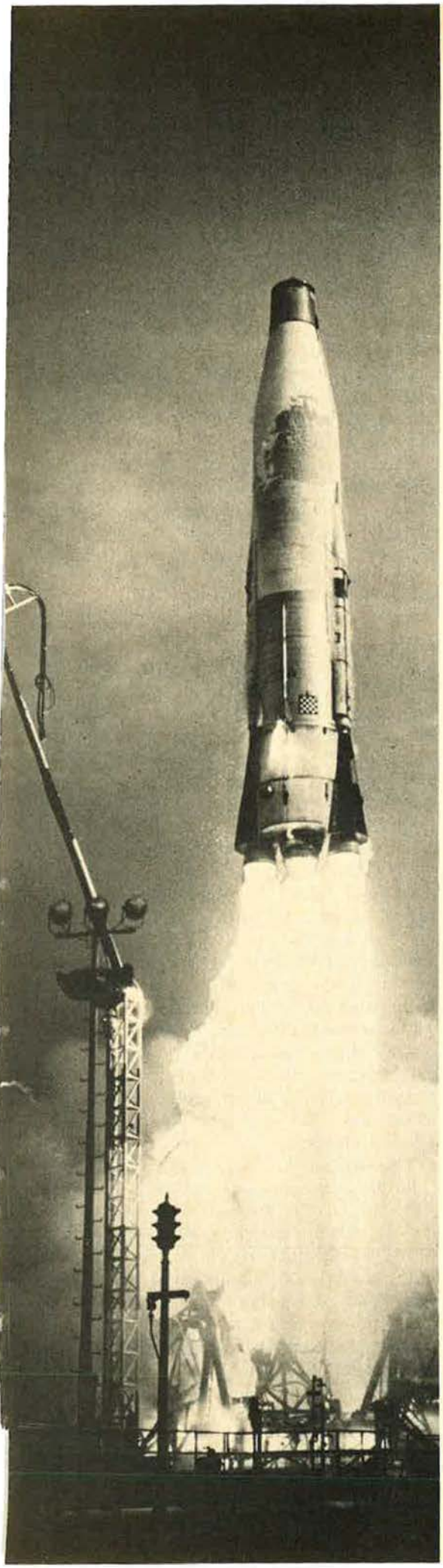
In a sense, the Pacific tests were the "Open Sesame" to the space age. They proved the feasibility of an effective warhead small and light enough to be delivered by a ballistic missile of the power then within our grasp. That proof came at a time when the Soviets were known to be pressing development of long-range ballistic missiles that could give them an enormous strategic advantage over this country. And a concerned American people and Congress were solidly behind the government's determination to retain the strategic superiority that had so far deterred the eruption of the cold war into World War III.

The Beginning

On July 1, 1954, the Western Development Division of the Air Force Air Research and Development Command was established in an abandoned schoolhouse in Inglewood, Calif. Its top-priority mission: to develop in the shortest time possible a United States long-range ballistic weapon system.

There have been a number of organizational and name changes since that time, but the basic mission has remained that of providing the United States with the best ballistic missile strategic capability that evolving technology would provide. As the missiles made possible the first actual moves into space, that mission expanded to include the exploration and development of the total potential of space for strengthening the country's defense.

Today, this initial epicenter of the United States' space effort is named the Space and Missile Systems Organization (SAMSO) of the Air Force Systems Command. Its mission, in broadly simplified terms, has six major facets. SAMSO is responsible for planning, developing, and deploying the US land-based intercontinental ballistic missile force. It manages research and development of military space systems. It develops space launch systems and launches space payloads for military and other government agencies. It operates worldwide facilities for tracking and command and control of United States satellites and those of its allies. In its ABRES program, it conducts triservice development, test, and evaluation of all Department of Defense advanced ballistic reentry systems. And it carries out continuing and extensive programs for identifying and developing



technologies needed for missile and space programs of the future.

In the twenty years since the Western Development Division was created, Americans have walked on the moon; probed the nature of Mars, Jupiter, Venus, and Mercury; and lived and worked in space for a total of almost 22,000 man-hours, or two and a half years. We have orbited a growing galaxy of satellites to provide communications in war and peace; navigation through the treacherous ice of the Arctic; warnings of killer storms, nuclear detonations, or enemy attack; surveys of natural resources, pollution, plant diseases and pests, forest fires, urban blight, and scores of other terrestrial concerns and conditions that can be grasped in full only from the observation platform of a satellite orbiting thousands of miles in space.

As the primary missile and space projects have advanced, they have left a rich wake of peripheral benefits for the whole civil sector, benefits already beginning to have a major impact on the living and working patterns of our society. The space program has generated new products; new industrial and business techniques, tools, management methods; a host of health and safety innovations; new approaches to transportation, housing, the control of crime, and development and management of massive municipal projects. The nation's energy administrators, reviewing satellite findings on new sources of fuels, and the man determining his income tax on a minicomputer are both using tools given them by the space program.

Challenges, Blowups, and Successes

The twenty years between the schoolhouse and such spinoffs, between the order establishing WDD and space successes like VELA, the Initial Defense Satellite Communication System, Mariner-10, or Skylab have not been all triumphs. Despite proved United States world leadership in aviation, the country did not have, in 1954, matured industrial resources for missile research, development, and production. Some rare pioneers had stubbornly kept the

An early Atlas ICBM lifts off its launch pad at Cape Canaveral, establishing its capability as a ballistic missile as well as a reliable space booster.

The small four-stage Scout missile, one of the most cost-effective launchers, is still being used by NASA.

breath of life in ballistic-missile research through the lean post-World War II and Korean War years. But, in general, research and industrial resources for the mission had to be brought into being, nurtured, and welded into a nationwide team with energies focused on the high-priority objective.

The Air Force itself lacked sufficient in-house experience or management methodology to integrate and orchestrate so unprecedented, enormous, and highly compressed a research-and-development effort. From the Guided Missile Research Division of Ramo Wooldridge it created a kind of alter ego, a nonprofit pooling of civilian talent to act as intermediary and interpreter between the Air Force and contractors, and to provide systems engineering and technical direction for the program. It was necessary, in short, to create both the research and industrial capabilities and the management methods for directing and controlling them.

The early years had their full share of educative hardware failures, too. Old hands still remember some of the standard jokes to fend off the mood of defeat: "What was that you guys launched yesterday—the missile or the gantry?" "How is a ballistic missile like having your brother-in-law in your business? It won't work, and you can't fire it." We looked at the captured German World War II films of V-2s blowing up on the pads at Peenemünde and were reminded that they, too, had their failures.

But the tide did begin to turn. In September 1957, after only two years' development time, the Thor intermediate-range ballistic missile passed its first completely successful test flight. By the end of that same year, the Atlas long-range missile also took that first hurdle successfully. In early 1959, the Titan I was first flight tested. In the summer and fall, the first Thor operational squadron was transferred to the Royal Air Force in the United Kingdom, and the first operational Atlas complex was turned over to the Strategic Air Command.

The Big Dig—Site Activation

Concurrent with development of the missiles and related system hardware, the enormous job of constructing launch sites was begun. In retrospect, the true dimensions of that project seem even more awesome than they did at the time the Air Force/Corps of Engineers/industry partnership tackled the job.

The earliest sites were "soft" ones above ground, but later models of the Atlas, Titan, and, finally, Minuteman systems were hardened —buried under twenty-five to thirty-five feet of reinforced concrete and earth. The sites on which the individual squadrons and launch complexes were spaced out were enormous. Total area of the bases was about 125,000 square miles, almost as large as the combined areas of the states of Washington, Alaska, and Hawaii. Work sites were remote, requiring the importation of large numbers of construction workers, more than 3,000 at a site at peak construction. Climatic conditions ranged from the ice and snows of Northwestern winters to the deserts of the Southwest.

The work, both site construction and interface of the complex silo equipments, was without precedent, requiring the development of new approaches, techniques, and skills. And the missiles themselves were evolving constantly under urgent force feeding of the state of the art, making necessary constant modifications of the ground environments.

One harried construction contractor, testifying about program difficulties before a congressional committee, characterized the job as building whole underground cities and filling them with advanced, integrated equipments that had to function with the precision of a Swiss watch.

The electrical output of diesel generators for a Titan I site was, indeed, sufficient to supply a city of 40,000 people. The nearly 4,000 miles of electrical circuitry in an Atlas control center was enough to provide a telephone exchange for a city the size of Cheyenne, Wyo. The first Minuteman bases in Montana required about 120,000 cubic yards of concrete—a load that would fill some 5,300 railway freight cars. *Time* Magazine reported that "the missile base construction programs make the pyramids look like a Tinker Toy exercise."

Early in 1961, the Minuteman, first solid-fueled, "instant response" missile, was a phenomenal success in its initial flight test. In December, the first operational missiles, rushed to completion, were turned over to SAC at Malmstrom AFB, Mont. The first complete wing was activated the following February.

The Minuteman system, progressing from one improved version to another, has since become the mainstay of our strategic missile force, which also still includes fifty-four updated Titan II missiles.

The Atlas and Titan I systems were retired from the active weapons inventory in the mid-'60s, the Atlas to continue its role as a space booster. We are currently modifying the bases for the 1,000 Minuteman force, shaping it to an integrated mix of Minuteman II and III systems. This Minuteman force, our submarine-launched missile elements, and long-range bomber units constitute the United States Triad of strategic defense.

The Space Program Evolves

While the missile side of the mission pushed forward rapidly with the advancing state of the

Then Maj. Gen. B. A. Schriever, later Commander of AFSC, presided at the dedication of the Air Research and Development Command's Western Development Division on July 10, 1956. General Schriever is flanked by Brig. Gen. Ben I. Funk, left, and Dr. Simon Ramo, right.

art, missile adaptations used as launch vehicles were shaping a national space program. In January 1958, Explorer I, launched by a Jupiter missile, was the first US space system to achieve orbit. The program will also be remembered for its discovery of the Van Allen radiation belts. In general, however, the last years of the 1950s were a time of discouraging failures in space. By 1959, the Thor, with an Agena or Able upper stage, had already become the workhorse of our space-launch program, but results still gave little indication of the high reliability the missile was to achieve as a space booster in the '60s.

By 1960, we had begun at last to break even. In that year, sixteen launches out of a total of twenty-nine were successful. Among them were Thor launches of the first successfully orbited meteorological satellite, TIROS-1; the first navigation satellite, TRANSIT-1B; and COURIER, the first active-repeater communications satellite.

The Atlas also made the transition to space booster and contributed to the slowly but steadily climbing percentage of successes. Among its early noteworthy payloads were the first of the Mariner space probes, and the early VELA series development to monitor the Nuclear Test Ban Treaty.

In 1961, President John F. Kennedy announced the national space goal of putting a man on the moon and returning him safely to earth before the end of the decade. The Atlas was chosen as launch vehicle for the first step in the man-in-space endeavor—the Mercury program. In February of the next year, an Atlas-D launched the Mercury-6 in which John Glenn, the first American to circle the globe in space, orbited for nearly five hours.

The more powerful Titan II, specially "man rated," was selected to orbit the two-man Gemini series of spaceflights, begun in 1965. It was still doing a flawless job in that program when development work began on the Titan III, the first Air Force missile to be developed specifically as a space-launch system, and the largest and most powerful of present Air Force boosters. In one launch, the Titan III, with a 25,000-pound-payload capability and an extremely sophisticated upper stage, can put as many as eight different payloads into separate and distinct orbits. We have used it to launch a large number of communications and nuclear detonation detection satellites, among other experimental payloads from a whole spectrum of government agencies.

For the final three-man thrust at the moon, NASA developed the giant Saturn, with a total thrust of more than nine million pounds. And, in July 1969, well before President Kennedy's deadline, the astronauts of Apollo-11 became the first men to set foot on the moon.

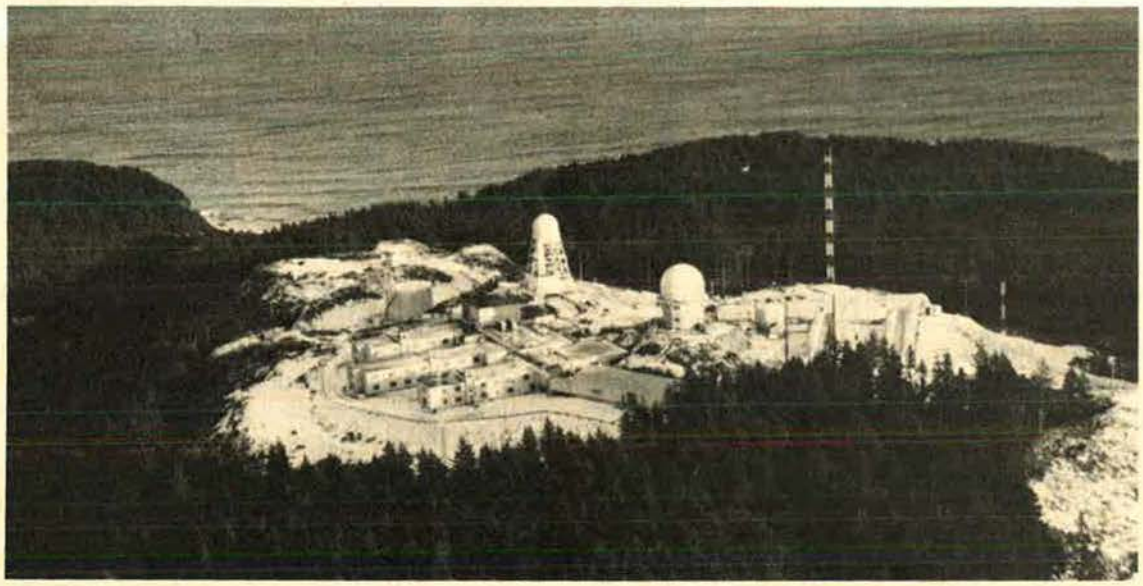
In this twentieth anniversary year, it is difficult to realize that there were years—much of the decade of the '60s—in which we had to prove that space could be useful to us, prove it in the face of the skepticism of others and our own inexperience. Today, space is more or less taken for granted as a viable dimension of our world.

Justice Oliver Wendell Holmes once said, "Man's mind, stretched to a new idea, never goes back to its original dimensions." Surely none of us who saw the awe-inspiring vision, relayed back for the first time by Apollo-8, of our world whirling half a million miles away, incredibly beautiful in the immensity of space, can ever go back to quite the prespace perspective.

And space itself will never be the same. Since 1957, man has orbited a total of some 1,570 spacecraft. Slightly fewer than half of those were US efforts. Six hundred and fifty-seven were still in orbit at the beginning of 1974, fifty-three percent of them belonging to the United States, thirty-nine percent to the Soviet Union, and the remaining eight percent to other nations or international groups such as Australia, Canada, France, Germany, Japan, NATO, INTELSAT, or the European Space Research Organization (ESRO).

Head of the Apollo lunar landing program was a military man—Maj. Gen. Samuel C. Phillips, on loan from the Air Force. Close cooperation has continued in present development work on the Space Shuttle, the reusable space launch system being designed to meet both military and civilian requirements.

Though the Air Force did at one time have responsibility for the Manned Orbiting Laboratory, a precursor of the NASA Skylab program, our principal emphasis today—except for the Shuttle—is on unmanned military space systems.



SAMSO's Remote Tracking Station, Kodiak, Alaska, is a part of the Air Force Satellite Control Facility that provides on-orbit control and evaluation of Department of Defense space vehicles. Other stations are located in New Hampshire, California, Hawaii, Guam, and in the Indian Ocean.

The Military/Civilian Space Duo

The US is unique among space-conscious nations in its dual program—the careful distinction made between military and civilian space developments. The National Aeronautics and Space Administration (NASA) was created by Presidential act in 1958. It absorbed the National Advisory Committee on Aeronautics (NACA), originally established in 1915, and was charged with responsibility for the civilian space program, which could by then be seen as an inevitable outgrowth of military space developments already well under way.

Sharp definition of separate roles for military and civilian space efforts has not always been easy. In actual fact, the two programs have worked in close and economical cooperation, sharing specially qualified manpower, advancements in technology, and the ever-broadening expertise that has come with experience. That cooperation was extremely close and functional in the Mercury and Gemini programs, in which NASA's manned space vehicles were launched by Air Force boosters and crews.

All but one of the fifteen astronauts who participated were members of the armed forces.

Secretary of the Air Force John L. McLucas recently summed up the military space mission in this way: "Under the Space Treaty, the US has agreed not to place weapons of mass destruction in outer space or in orbit around the earth. Rather, we are using the medium of space to increase our alertness to danger and to assist in maintaining an effective deterrent posture. Our space activities are the result of continuing reviews of our national defense needs and the medium where they can best be satisfied, be it land, sea, air, or space. . . . Through the use of space systems we can give our defense forces improved communications, more accurate navigational assistance, better weather information, and more reliable, earlier warning of attack."

One of our earliest and most prolific uses of space has been for military communications. Our first global system, composed of twenty-six satellites, was originally orbited as a research effort, but proved so successful that it was converted to an operational system in 1967. It gave us good service during the war in Southeast Asia, and about half of the satellites are still working. In 1971, we launched two follow-on systems with which we encountered problems, but performance of the second pair of

Phase II satellites, launched early this year, indicates that the difficulties have been corrected. A final launch of the remaining two satellites in this system is scheduled for fall of 1974. We are also into the second generation of similar military communication systems for NATO and the United Kingdom.

We have had less operational experience with tactical satellite communications designed for use with small, mobile ground terminals. But our first, TACSAT I, the largest communications satellite yet launched by the United States, did relay operational communications for all three military services for seventeen months after it became operational. This was considerably beyond its expected lifetime.

We have developed and tested several satellites and a number of receivers for aircraft, ships, trucks, jeeps, and a man-pack to be carried by a three-man team. The first of the fully operational tactical systems scheduled for deployment is the Fleet Satellite Communications System that will provide improved control for Navy ships. The same satellites will provide communications capability for the worldwide Air Force communications system for command and control of Air Force strategic forces.

Weather, Warning, and Navigation

Another military use being made of space is to gather data for analysis and forecasting vital information to defense operations. This has been the concern of our Defense Meteorological Satellite program. For more than a year now this information has been made available to the US public and to other nations through the National Oceanic and Atmospheric Administration and its National Weather Service facilities in Maryland. The system consists of an integrated combination of satellite infrared and visual sensors, communications, and ground processing facilities. The two types of sensors provide resolutions as fine as one-third of a nautical mile. The system is a valuable forecasting tool, especially useful because it can give us data on areas of the world where conventional weather observations are not available.

Our ground processing system has been designed to provide data to the user within minutes after it is collected in space. The system can convert pictorial images to a digital format that can be computer-processed, and we have developed mobile, air-transportable vans that permit data readout on the spot by military commanders anywhere in the world. Japan and the European community are planning geostationary meteorological satellites to continuously monitor weather conditions over their areas.

Early warning of missile attack and detection of nuclear explosions are other major missions for satellites that, from synchronous altitude of 20,000 statute miles, command an overview of almost an entire hemisphere. First elements of one of our earliest operational systems, the VELA, were orbited in 1963 to monitor the Nuclear Test Ban Treaty. Today, we have several systems devoted to the early warning mission, including different types of ground radars as well as space sensors.

We have developed satellites that can detect and track intercontinental ballistic missiles and submarine-launched ballistic missiles almost from the moment they are fired. In addition, these warning satellites have the capability to detect nuclear explosions above the ground. In the near future, the current VELA systems will be replaced by the even more sophisticated capabilities now being developed. The creation of the satellite surveillance system has greatly improved the US's overall warning network.

Space-based systems also offer important potential advantages in navigation. For defense applications we need a system that can accurately and almost instantaneously provide data on position, course, and speed any place in the world for a variety of users, and with the simplest possible user equipment.

For a number of years, SAMSO has been studying such a system. The most recent proposal to develop the Global Positioning System has been approved, and Phase I contractual actions are now under way. This Global Positioning System will consist of twenty-four satellites in three different orbital planes. It will provide accuracy in the tens of feet in position and altitude to meet the needs of all users. And it can be available to any civilian users who purchase receiving equipment. The initial satellite launch will be in 1977 to facilitate the development of user equipment for all services. Additional elements will be in place by 1981, and the system will be fully operational by 1984.

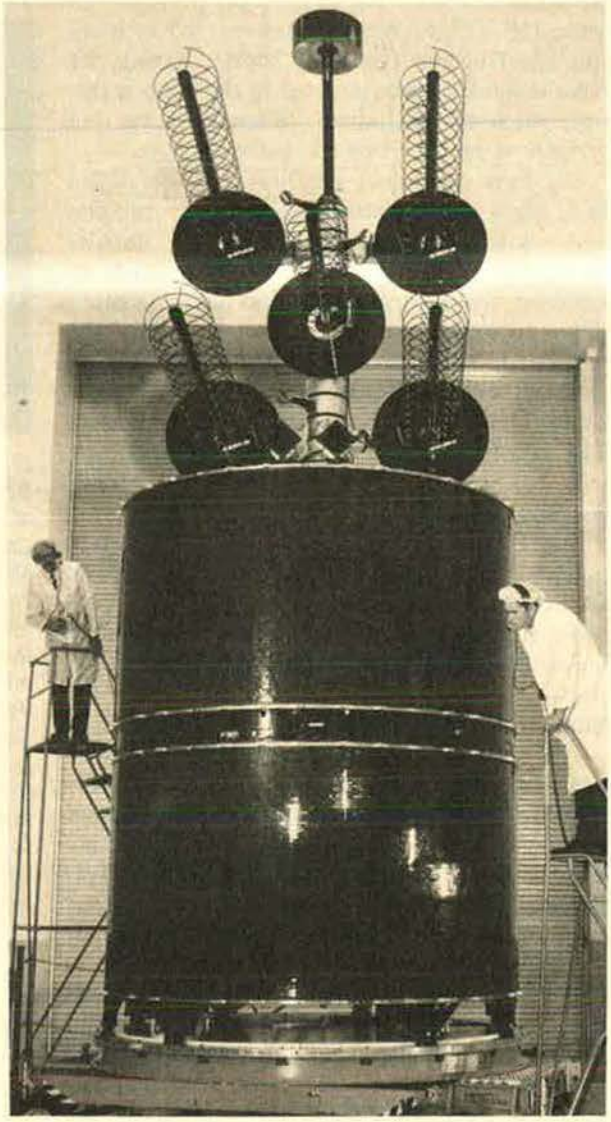
In very broad terms, these are our principal areas of emphasis in military space activity today.

Civilian Space Programs

On the civilian side of our national space program, NASA is still analyzing and applying the wealth of data accumulated in the now completed manned space programs, Apollo and Skylab. It also has many other important programs providing a great variety of scientific data and practical benefits to the country, and indeed the world. Such interplanetary exploration programs as Pioneer and Mariner are continuing. From these space probes and the

Lt. Gen. Kenneth W. Schultz took command of the Air Force Systems Command's Space and Missile System Organization on August 1, 1972. A veteran of more than thirty years of military service, most devoted to research and development, General Schultz served as Director of the Minuteman ICBM program for four years prior to assuming his present assignment.

manned ventures, we now have newly revealing photographs and other data concerning five celestial bodies—the moon, Mars, Mercury, Venus, and Jupiter—to compare with our own in attempting to understand the origins and nature of our own planet.



TACSAT I, the largest military communications satellite yet developed by the Air Force, is shown in the plant of its builder, Hughes Aircraft Co., at El Segundo, Calif. Engineers are making final alignment test of the 1,600-pound spacecraft prior to delivery to USAF.

NASA also has many technology application and scientific programs involving satellites in earth orbit. In ten years, their civilian communications satellite applications have progressed so rapidly that satellites now handle more international telephone traffic than undersea cables, and the cost of a transatlantic call has been cut about forty percent in the last three years.

The NASA Earth Resources Technology Satellite (ERTS-1), orbited in 1972, has become a kind of universal space tool for many nations in addition to our own. ERTS can map 100 million square miles of the earth's surface each week and passes over and photographs approximately the same 115-mile strip at the same time of day twenty times a year. Its photographs can be purchased by anyone, for prices ranging from $1.25 to $27, depending on the size and nature of the reproduction requested.

Among the almost infinite variety of ERTS projects are development of an agricultural map of the United States; studies of smog, earthquake faults, and crop pests in California; a study of ecological changes taking place on the east coast of the United States; snow surveys to assess the risk of spring flooding in Norway; a study of land use and soil erosion in Guatemala; identification of oil, gas, and mineral resources in Alaska; and detection of potential locust breeding sites in southwest Saudi Arabia.

A second Earth Resources Technology Satellite will be orbited in 1975.

Breakthrough in Space Economics—The Space Shuttle

As the second decade of America's space effort draws to a close, a new catalyst is in the making that could prove a major factor in shaping our national space effort for decades to come. The Space Transportation System, or Space Shuttle, a program for which NASA has primary responsibility, but in which the Air Force is actively participating, promises to be a most significant breakthrough in the economics of space. Essentially a reusable booster, the Space Shuttle can dramatically reduce the cost of putting space payloads into orbit.

The Shuttle will consist of two stages—a booster for launch from earth, and an airplane-like manned, reusable orbiter for flight into orbit, where it will conduct space missions. The Shuttle will be launched vertically. The orbiter will separate from its booster and go into orbit under its own power. When it finishes its mission, the pilots will fire its rockets to slow it down, fly it through the atmosphere, and land it like an airplane on a jet-sized airstrip. The delta-winged manned orbiter will be about the size of a DC-9 airplane, with a fifteen- by sixty-foot cargo compartment. The orbiter will be able to carry a combined passenger and cargo weight of 65,000 pounds.

Delivery and placement in earth orbit of payloads by means of propulsion stages, or "space tugs," will allow placement of satellites into very high earth orbits, such as geosynchronous orbit at an altitude of 20,000 nautical miles.

The Space Shuttle will be able to put into orbit most unmanned space systems for communications, weather, navigation, earth observation, and other applications. It will have the capability to retrieve payloads from orbit for reuse, or to service and repair such systems in space. At present, a malfunctioning unmanned system that cannot be realigned by remote command is lost because we do not have the capability either to recover it undamaged for depot maintenance or to repair it in space. The Shuttle could also be used for periodic resupply of manned orbiting space platforms of the future and for space rescue in cases of emergency.

As presently projected, the Space Shuttle should become operational by the end of the 1970s. The program already foreshadows a new era in space. For some years now our space activities and progress have been limited less by the state of the art—as in the early days—than by the high cost of space operations. More than fifty percent of the cost of an operational space system is the launch cost. A single launch of the Titan III costs approximately $20 million. Its ability to launch multiple payloads does give us maximum return for that investment, but that still amounts to a restrictively high price per payload. Present planning calls for the Shuttle, once operational, to replace virtually all of the current Department of Defense launch vehicles.

In addition to the savings that the Shuttle can give us in continuing present mission applications, it may well be that in a new economic climate whole new missions for space systems, manned and unmanned, will become feasible.

A Look Ahead—Military Trends

The space program in its first twenty years has very significantly altered our national defenses and many aspects of this country's economy and our daily lives. The Space Shuttle is only the most concrete of many indications that still greater changes can be anticipated in the next two decades.

At SAMSO, our Deputy for Development Plans is charged with advance scouting of both the missile and space future. Studies now under way and projected give us guideposts to future military developments that can be expected.

One important area of investigation, for instance, is the survivability of military space systems. As these systems become increasingly important in the performance of such essential military missions as communications, navigation, weather monitoring, and warning of enemy attack, their survivability increases in importance. Survivability and systems defense are central themes in the evolution of future military space programs.

One study is being made of possible augmentation of the existent SPADATS (Space Detection and Tracking System) so that it can perform timely detection, tracking, and warning of the presence of space vehicles. Studies and technology development programs are under way to assess the feasibility of using either ground- or space-based sensor systems to provide such warning. Satellite-borne electro-optical sensors are especially attractive for this purpose because they can be combined with the communications benefits of space vehicles and are not hampered by the weather conditions that affect terrestrial sites. A satellite attack-warning and surveillance system could also double as a very important and useful scientific resource. It could, for example, perform detailed cataloging of all earth-orbital particles large enough to be a hazard to space navigation, and so serve as a precursor to a space traffic control system.

In the space communications system area, there are now under development or production the Navy's Fleet Satellite Communications System (FLTSATCOM) that will provide communications to and from naval forces at sea, and the Air Force Satellite Communication System (AFSATCOM). The latter, a system rather than a satellite itself, will use the communications capability of the FLTSATCOM satellites for coverage at lower latitudes and the Satellite Data System (SDS) satellites for transpolar coverage. With the combination of these two capabilities, the Air Force will be able to communicate with its strategic forces anywhere in the world. We are also working on the Survivable Satellite Communications Program (SURVSATCOM) to provide worldwide command and control communications that can survive all phases of general war.

Increasing numbers and types of future satellite users will also make necessary greater capacity and increased flexibility of satellite communications. A number of new technology developments are being investigated to achieve these objectives. Among them are solid-state amplifiers, high-efficiency, ten-watt and forty-watt traveling Wave Tube Amplifiers, and multiple-beam antennas. The forty-watt amplifier will have twice the efficiency of those currently in use and will increase communications capability without increasing prime power requirements. The multiple-beam antenna provides great flexibility for tactical use.

Advances in both early warning and communications satellite technology will greatly improve our attack assessment capability. We will have fast, precise information concerning not only what the enemy is throwing at us, but also how effectively our own defenses are responding.

Finally, the whole area of sensor technology, so vital to our meteorological satellites, among others, is advancing so rapidly that we foresee

The largest US ICBM, the Titan II liquid-fueled missile, remains a key element of this nation's deterrence, with fifty-four Titans currently in the inventory. Titan's contributions to the space program as a launch vehicle started with the Gemini flights in 1965. Titan III can launch payloads weighing about 25,000 pounds.

Building a Titan ballistic missile complex, such as the one shown here, entailed massive construction and earthmoving efforts. Different from Minuteman systems, the Titan silo and launch control center are collocated.

a steady increase in the use of satellite meteorological data for mission support and command decisions.

The Civilian Space Potential

All these developments will have their extensions, applications, and adaptations in the civilian space program. The whole field of sensor technology, for instance, is of tremendous importance to the scientific satellite programs, to civilian weather programs, and to such earth survey and monitoring systems as the Earth Resources Technology Satellites.

Future progress in the civilian applications of space would seem, indeed, to be limited only by our faith, imagination, and willingness to invest in consistent, progressive research and development.

The possibilities of manufacturing in space, beyond the limitations of gravity and atmospheric pollution, have already entered the realm of serious consideration and experiment. The twenty-two-experiment materials science and space processing program undertaken by the Skylab astronauts has proved so promising that consideration is being given to continuing it in the Apollo-Soyuz test project and later by the Space Shuttle. Larger and more perfect crystals for semiconductor use, perfect ball bearings, new fusions and combinations of materials are a few of the possibilities already being investigated.

The Spacelab, a cooperative venture of NASA and the European Space Research Organization (ERSO), is planned for orbit by the Space Shuttle in early 1980. It, too, should produce new findings concerning potential industrial and scientific applications of space.

With the advent of the Space Shuttle, space travel for many, rather than only the few specially trained and equipped astronauts, will become feasible. The Shuttle's easy and routine access to space will make it possible for scientists and engineers to go into orbit and check on their space experiments. Any normally healthy individual will be able to withstand the mild forces of acceleration and deceleration when the Shuttle is launched and reenters the atmosphere, and passengers can travel in its pressurized interior in normal clothing.

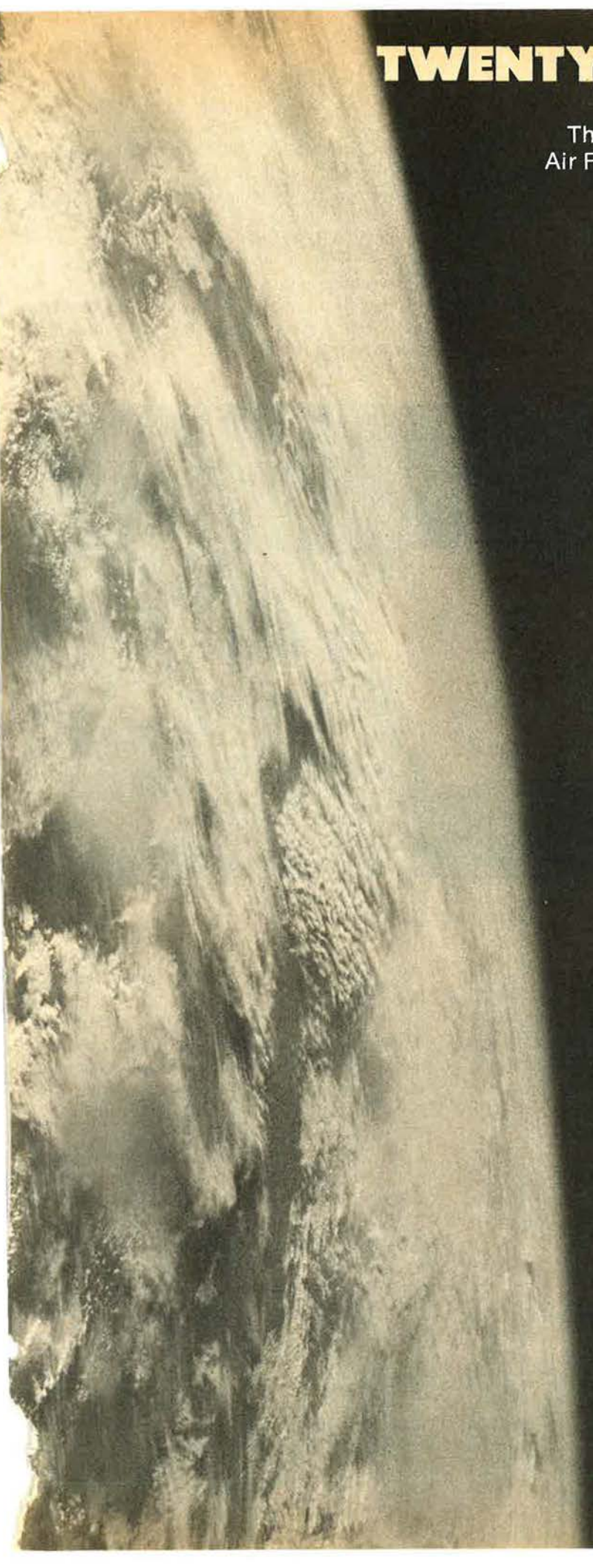
It seems safe to predict, with the trailblazing possible with the Shuttle, that before the end of this century—perhaps long before it—people will be flying suborbitally in space, much as we fly today in jet aircraft. And they may be doing it with less pollution of the atmosphere, less noise, and less consumption of the dwindling conventional energy resources of our globe.

In the future also are the countless extensions and amplifications of terrestrial benefits already beginning to reach us from satellite applications—vastly improved capabilities for exploring and conserving the world's natural resources; new knowledge of the nature of our world and universe and of the impact of our environment on human activities; new opportunities for education, and the dissemination of knowledge on health and safety; even perhaps new understanding of our neighbors in the community of nations, and of the necessity and value of peace in a world that we now have seen in a new perspective, small and precious in the infinity of space.

In 1962, speaking of the space program at Rice University in Texas, President Kennedy said, "We set sail on this new sea because there is new knowledge to be gained, and new rights to be won, and they must be won and used for the progress of all people."

That has been the credo of the space program in its first twenty years. It has been an article of faith since the early failures and the slow buildup of a new deterrent power for peace. We have adhered to that credo through Apollo, in which all mankind participated by proxy, to the communications and weather satellites that bring today's world events and tomorrow's weather into our living rooms, and to the busy space travels of ERTS—mapping a continent, tracking a marked deer in Montana, pinpointing pollution at sea.

These twenty years have been only a first step into that enormous new dimension. Even the most conservative speculation as to what the next fifty—or even twenty—years will bring truly staggers the imagination. ■



TWENTY YEARS IN SPACE

The Space Age created a new mission for the Air Force—warning of any attack on this nation through space. As the potential threat has grown in size, variety, and sophistication, ADC's warning net continues to evolve, to guarantee that there will be . . .

NO HIDING PLACE IN SPACE

BY MAJ. GEN. OTIS C. MOORE, USAF

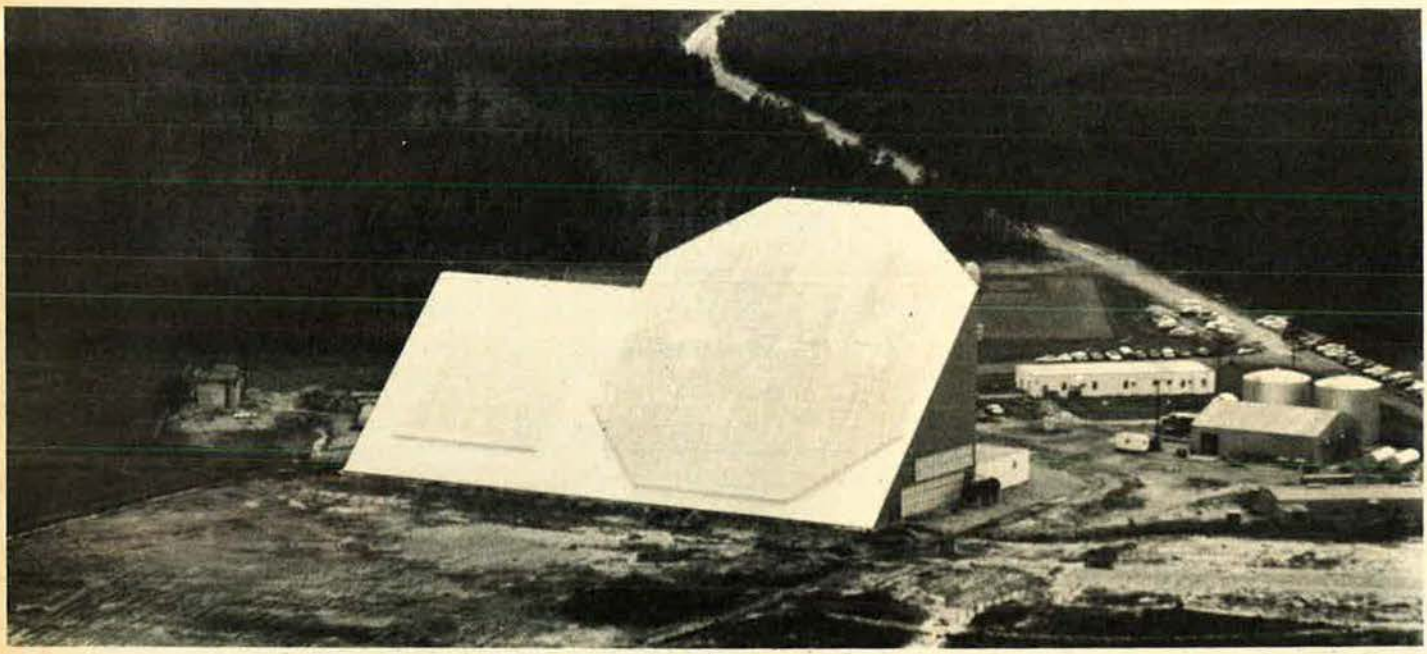
IN OCTOBER 1957, the Soviet Union ushered in the Space Age by putting the 184-pound Sputnik I into orbit. This was hailed as a great technological breakthrough with ominous overtones for strategic planners in the United States. Military planners had theretofore sought to build a strong force of bombers for offense, and interceptors and short-range missiles for defense. Clearly, the Soviets were offering the West a new challenge.

A rocket booster that could put a payload in orbit could as well deliver that payload to any desired target on earth. Furthermore, a missile attack could be launched undetected from deep within the Soviet landmass, overfly radar coverage intended for defense against bombers, and fall with complete surprise upon US cities and military installations, only minutes after launch.

The United States had a two-fold challenge

to meet. First, American strategic planners would have to develop a survivable strategic offense, more effective than any foreseeable enemy threat. Second, and perhaps equally important, the United States would have to create a warning and surveillance system able to detect and assess a possible attack from the air or from space in time to set the strategic offense in motion, if required.

In answer to the first challenge, the United States has developed the strategic Triad, a mixed force of manned bombers, land-based missiles, and missile-carrying submarines. In answer to the second challenge, we have developed a variety of detection and surveillance systems, both earthbound and space-based. Although, theoretically, warning is not necessary for the assured destruction of USSR targets in the event of a mass raid on our forces, it unquestionably adds to our confidence in being able to deliver; hence our warning capability adds to the deterrent value of strategic offense. Thus, strategic offense plus warning yields a combination I shall call "Triad Plus One."



The ten-story-high AN/FPS-85 phased-array radar at Eglin AFB, Fla., was designed for the SPACETRACK mission. It can track many space objects simultaneously.

Triad Plus One

Current strategic concepts postulate no scenario in which the United States would initiate a preemptive nuclear strike upon another country. Hopefully, our Triad Plus One likewise deters any potential aggressor from initiating an attack upon us; however, we must do all possible to assure the survival of our forces in the event deterrence fails. This places a severe burden on strategic forces. They must be designed to ride out a first strike and still be able to retaliate with enough strength to ensure unacceptable losses to the enemy.

The Triad, by employing a mixed force, compounds enemy offensive and defensive problems. Hardening missile sites and dispersing missiles, bombers, and submarines make coordination of a devastating surprise attack difficult and unlikely. An effective warning system further reduces the possibility of an enemy surprise attack.

Warning also contributes to the survivability of the Triad, particularly to strategic bomber forces. It assures that bombers and fighter-bombers are airborne prior to initial impact of an enemy weapon. For these reasons, an effective warning system is vital to the security of the United States. This warning system has been evolving since the late 1950s and today is operated for Aerospace Defense Command by the Fourteenth Aerospace Force.

The warning network consists of several individual systems deployed worldwide. It includes the radar of the Ballistic Missile Early Warning System (BMEWS), the Sea-Launched Ballistic Missile Detection and Warning system (SLBM), the Over-the-Horizon Radars (OTHR), and, recently, a satellite-based detection system. A command and control system, located deep within Cheyenne Mountain, Colo., in a site hardened against nuclear attack, collects and displays the data furnished by this network. To understand this system is to understand the vital role of warning in maintaining

national security. To appreciate the size of this task, one must realize that providing an effective system requires that every man-made object launched into space must be detected as quickly as possible after liftoff. It must then be identified as to its purpose, cataloged, and tracked until its orbit decays into the earth's atmosphere and the object is destroyed or deorbited and recovered.

In addition to this warning network, and a very important supplement, is the NORAD Space Detection and Tracking System—SPADATS for short. The components that form SPADATS are: ADC's SPACETRACK system, operated by the Fourteenth Aerospace Force; the US Naval Space Surveillance system, made up of a line of radio transmitters and receivers strung across the United States; and the Canadian Forces Air Defense Command Satellite Tracking Unit, which operates a telescopic camera used to photograph satellites.

Each day SPACETRACK's worldwide web of cameras and radars turns out some 18,000 satellite observations of the 3,000-plus satellites now in space.

Since the Soviets' Sputnik I was launched, more than 7,000 man-made objects have been cataloged. Those no longer in space are logged as "decayed"—that is, they have been recovered, burned upon atmospheric reentry, or have impacted on earth or other celestial bodies.

Besides keeping track of them during launch and orbit, they are followed when they come down. The Terminal Impact Prediction (TIP) program has two very important functions. One is to assist the warning radars by giving them trajectory information on all reentering satellites. Without this knowledge, one of the returning space pieces could trigger a false alarm in the missile attack warning network. Another reason for tracking a returning satellite stems from the 1967 United Nations space treaty that makes each country responsible for any damages caused by its returning satellites.

First Came BMEWS

The systems that make up the US warning network have evolved over a period of almost a quarter century. BMEWS, the Ballistic Missile Early Warning System, had its origin in the work of researchers in the early 1950s. Existing tracking radars in those days were limited to a range of several hundred miles. In the late 1950s, RCA was awarded a contract to develop a long-range radar that could detect Soviet missile launches.

In the early 1950s, the Continental Electronics Co. had developed a high-power, final radar output tube, called a Klystron, that produced a radiated output power of 1.25 million watts. By staging several such Klystrons, RCA was able to boost the output power to five million watts, extending the range to some 3,000 miles. That range was adequate for missile warning. The first BMEWS site using this technology was constructed at Thule Air Base, Greenland.

The location at Thule was selected because it is on the probable flight path of a Soviet-launched ICBM. Building the installation was a major engineering feat. Arctic winds reached 150 miles per hour, and temperatures dropped to forty degrees below zero. In spite of these conditions, contractors built four antennas, each one larger than a football field. Construction required three years, and the site became operational in October 1960.

The Thule site is only one of three sites whose radar eyes blanket the northern attack routes to the North American continent. Two more sites were constructed at Clear Air Force Station, Alaska, and at Fylingdales Moor, England.

Each of the three sites is equipped with a computer. When the radar detects a launch, the on-site computer calculates the trajectory parameters and assesses the probability that the launch constitutes a threat. A single launch, for example, might indicate a satellite launch or test shot and would have a low threat value, whereas near-simultaneous multiple launches would have a high threat value.

BMEWS interest in a Soviet launch does not end when it is discovered to be nonhostile. When the launch happens to be an earth-satellite vehicle (ESV), BMEWS trackers routinely provide to the Space Defense Center in Cheyenne Mountain observations of those satellites that orbit within their radar coverage.

The Network Grows

Soviet emphasis on submarine-launched ballistic missiles (SLBMs) from 1968 onward forced the United States to create a system to monitor its coastal approaches. There are eight radar sites in the SLBM Detection and Warning system, located on the Atlantic, Pacific, and Gulf coasts. These radars are capable of both surveillance and tracking. When any of the surveillance radars detects a threat, it automatically becomes a computer-directed tracking radar.

The present eight radars with a range of several hundred miles were intended to be only an interim system. Future plans include replacing these eight sites with two phased-array radars, one each on the East and West coasts.

To detect submarine missiles launched beyond the range of ground-based detection radars, a satellite-based warning system is in

Prior to his present assignment as Director of Operations, Hq. USAF, Maj. Gen. Otis C. Moore had served for nearly two years as Commander, Fourteenth Aerospace Force, Ent AFB, Colo. A 1948 graduate of the US Military Academy, General Moore, who is dual-rated as pilot and navigator, has served in several SAC bombardment units and as Chief of the Space Branch at SAC Headquarters. Following tours as an Air Staff planner and as Executive Officer to the Air Force Chief of Staff, General Moore was Chief of Staff, Seventh Air Force, in Vietnam during 1971–72. He is a graduate of the National War College and holds a master's degree from the University of Omaha.

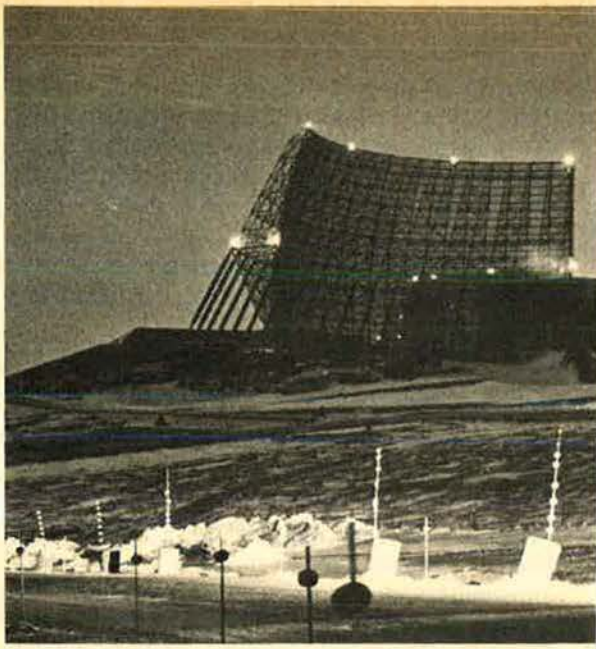
synchronous orbit. Using an infrared (IR) sensor, this advanced satellite system detects the hot plume of an SLBM by measuring the contrast between the plume and the cool ocean background. Although this system has proved highly reliable, it does possess inherent limitations. Sun shining off the clouds can sometimes look like the IR signature of a missile. Certain geographic areas are not included in the coverage. Unlike the phased-array radar, satellites do not provide highly accurate impact-point prediction data. Despite its limitations, the launch warning provided is nearly instantaneous and the system works.

Expansion of Soviet capabilities in the 1960s reduced the effectiveness of the BMEWS and SPACETRACK systems. BMEWS protected the northern attack routes to North America while SPACETRACK accounted for orbiting objects. But there were areas from which the Soviets could launch missiles without detection until long after the launch. To cover greater areas of the Soviet landmass and to detect south-launched, potential fractional orbital bombardment missiles, an over-the-horizon radar (OTHR) system went into operation in March 1968.

Over-the-horizon radar is something of a misnomer, since it is not really a radar at all. This system consists of a series of transmitters and receivers located throughout the Pacific and Europe. A powerful, high-frequency radio transmitter bounces a continuous signal off the ionosphere, an outer layer of the earth's atmosphere which reflects radio waves. The signal bounces repeatedly back and forth between the ionosphere and surface of the earth before being received at a station several thousand miles away. When an extended-range missile penetrates the ionosphere, as all must do during rocket burn, it disturbs the radio signal. The OTHR receiving station will detect this disturbance and hence can provide warning that an event has occurred.

The Missile Warning and SPACETRACK networks perform separate and distinct missions; yet both function together. For example, when the Missile Warning network detects a foreign rocket launch, the SPACETRACK network is alerted. SPACETRACK sensors then detect and track the object in space, be it a reentry vehicle on a ballistic trajectory or an earth satellite vehicle in orbit around the earth. In turn, when it appears that an earth-orbiting object is about to decay and reenter the earth's atmosphere, the SPACETRACK network alerts the Ballistic Missile Warning network to guard against a possible false alarm caused by the reentering object.

Sputnik I was launched on October 4, 1957. The same day, it was photographed by a Baker-Nunn camera operated by the Smithsonian



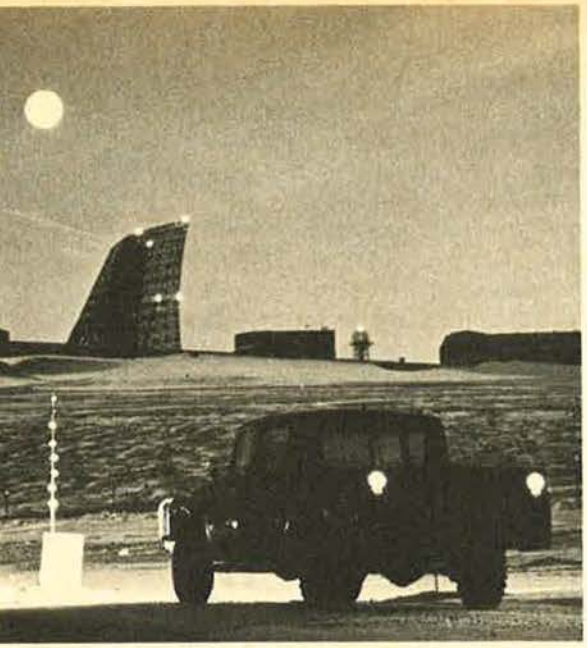
The first major element of the space-oriented warning net was the Ballistic Missile Early Warning System (BMEWS). This BMEWS site at Thule AB, Greenland, nearly 700 miles north of the Arctic Circle, became operational in October 1960.

Astrophysical Observatory. This camera, a modified Schmidt twenty-inch telescope that photographs stellar objects using an attached fifty-five-mm camera, is the senior member of the satellite tracking family, and it still has an active role today. Great sensitivity and high accuracy characterize Baker-Nunn observations. This camera could detect a sun-illuminated basketball-size object 25,000 miles away. At a range of a thousand miles, the camera can determine the position of a satellite within fifty feet.

The Baker-Nunn camera determines a satellite's position by comparing a known stellar background, in which the stars appear as points, to the satellite's track, which appears as a streak. Unfortunately, this fine instrument has several important limitations that reduce its effectiveness as a satellite tracker. The requirement for a star background restricts the camera to night operations and clear weather. Furthermore, technicians need several hours to process and analyze the film. Thus, any observations and orbit confirmations are delayed. Nevertheless, four Baker-Nunns, located in Italy, New Zealand, on Sand Island in the Pacific, and in California, serve the SPACETRACK system on a full-time basis.

SPACETRACK Sensors

The sensors of the SPACETRACK system have been developed and improved over the past fifteen years. These sensors consist of long-range tracking radars whose observations are supplemented with the high-accuracy observation from the Baker-Nunn cameras. The worldwide system tracks and maintains a current



Aerospace Defense Command's Baker-Nunn space cameras are so accurate that, at a range of 1,000 miles, they can determine the position of a satellite within fifty feet.

catalog of almost every man-made object orbiting the earth. These sensors follow an object throughout its life span from time of launch until it penetrates the earth's atmosphere and is recovered or burns.

The identification of each object in space (known as Space Object Identification) is made through analyzing the characteristic signature of its radar picture. Each object in space is different; hence, a method of reconstructing the shape and size of an object was feasible and designed for use as early as the Sputnik II launch. Recently, during the launch of Skylab I, it was suspected that the panels of the orbital workshop had failed to deploy as planned. The radar signature was analyzed to determine the shape of the Skylab. Through analysis of the radar signature, it was determined that a solar panel had in fact failed to deploy. This work contributed to the eventual success of Skylab I astronauts in making repairs.

One particular SPACETRACK radar, the AN/FPS-85 at Eglin AFB, Fla., merits special mention. This sensor is a phased-array radar, the first of a new generation of radars destined to play an ever-increasing role in space surveillance and warning systems. The AN/FPS-85 was designed specifically for space surveillance. It has no moving antennas, but rather consists of two fixed electronic arrays embedded in large concrete slabs set at an angle of forty-five degrees to the horizon.

One electronic array consists of 5,184 transmitter modules. The other array is a hexagonally shaped plane consisting of 4,660 modules that receive the radar signal bounced back from an orbiting satellite. The transmitted beam is aimed and steered electronically by setting the desired phase of the signal with the transmitter modules. Since there is no heavy dish antenna to swing, the beam can sweep its entire area of coverage in a matter of milliseconds. This unique capability permits the AN/FPS-85 to track a very large number of objects simultaneously, feeding orbital data to on-site computers. Because of the radar's location in Florida, most of the space objects in the catalog pass within its coverage every day. The AN/FPS-85 is the workhorse of SPACETRACK.

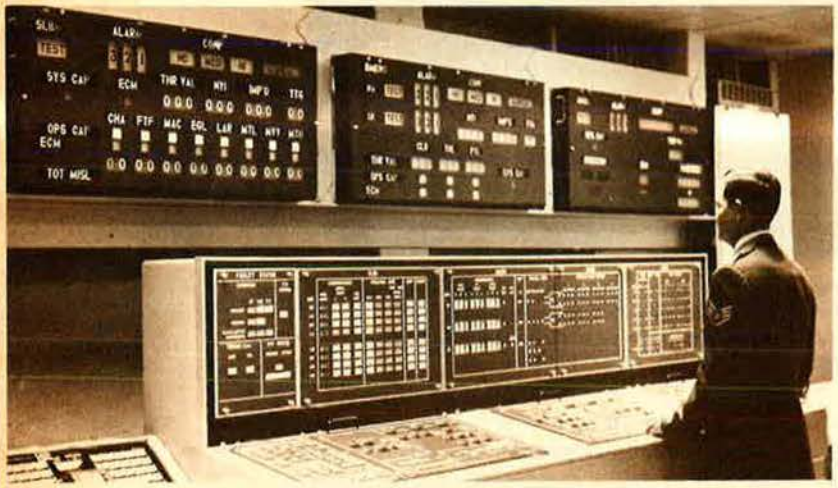
The phased-array design of the tremendously successful AN/FPS-85 has paved the way for the SPACETRACK of the future. As older systems become obsolete and are withdrawn from service, newer systems based on phased-array radars will be put into operation.

Command and Control

BMEWS, SLBM, satellites, OTHR, SPACETRACK have all been linked to complex detection and surveillance systems that produce data on man-made objects in space. Every payload object must be tracked, for, should one of them prove hostile, the United States must act instantly to defend itself. Daily observations on some 3,000 objects must be received and assessed somewhere so that any threat value may be determined and all objects may be cataloged. There is such a place, deep in Rocky Mountain granite, southwest of Colorado Springs: the NORAD Cheyenne Mountain Complex, or NCMC. In the event of war, the Commander in Chief of the North American Air Defense Command will direct the defense of the North American continent from the NCMC.

The structure within Cheyenne Mountain rests on two-foot-diameter coil springs to mini-

mize damage in case of nuclear blast. A tunnel leads from the outside of the mountain to two twenty-five-ton blast doors that give access to the interior. In the event of a nuclear attack, the blast doors would be closed to seal the NCMC into a completely self-contained unit. The complex can support itself with no outside aid for more than a month.



The Missile Warning Center, located in NORAD's Cheyenne Mountain Complex, displays data on all foreign missile launches within seconds after actual liftoff.

Several different organizations share the buildings inside the NCMC. The nerve center of satellite track operations is the Space Defense Center operated by the 1st Aerospace Control Squadron. This command post for the global satellite tracking network receives observations continuously. These observations are processed by computer, orbital elements are determined, and updates are sent to sites as required so that tracking efforts may continue. The Space Defense Center also maintains the computerized catalog of each satellite, and analysts assign each new space object a catalog number. Logs are also maintained on objects that have decayed, on space debris, and on deep space probes.

More than 7,000 man-made objects have been cataloged since Sputnik I. Occasionally, an object will break apart. Then analysts must detect, track, identify, and catalog not one, but scores of objects.

Also located in Cheyenne Mountain is the Missile Warning Center. This center receives data from sensors that detect all foreign launches. Its primary mission is to provide warning through the National Military Command Post to our Triad forces.

Recently, increased attention has been given to using sensor data during a raid to make an assessment of the enemy's attack. A program known as Attack Assessment provides data on probable impact points within the United States. The purpose of this program, which is operational on a limited basis, is to provide real-time information on intended target areas after a raid is detected. This information can be used by the National Command authorities to determine our country's response. Since the system is rudimentary today, more research and development is required for a complete attack assessment capability.

New Challenges

Missile Warning and SPACETRACK are Air Force missions of continuing importance. Today our capability is greater than ever before. Yet today is no time to rest on past accomplishments. The current Strategic Arms Limitation (SALT) agreements permit the USSR superiority over the United States in numbers of intercontinental missile launchers (1,618 to 1,054) and in SLBMs (950 to 710), while the United States enjoys an advantage in strategic bombers and the number of warheads carried by its ICBMs and SLBMs in multiple independently targetable reentry vehicles (MIRVs).

The Soviet Union has now developed MIRV systems of its own. If the Soviets put MIRV into operation, their advantage in numbers of missiles would be increased, and our advantage in technology decreased.

The USSR is the only nation to have tested a Fractional Orbital Bombardment System (FOBS). This weapon can be launched to appear as a satellite which usually carries a low threat value. However, after achieving low-altitude orbit, the payload can be abruptly deorbited and directed against a terrestrial target. This drastically reduces warning time.

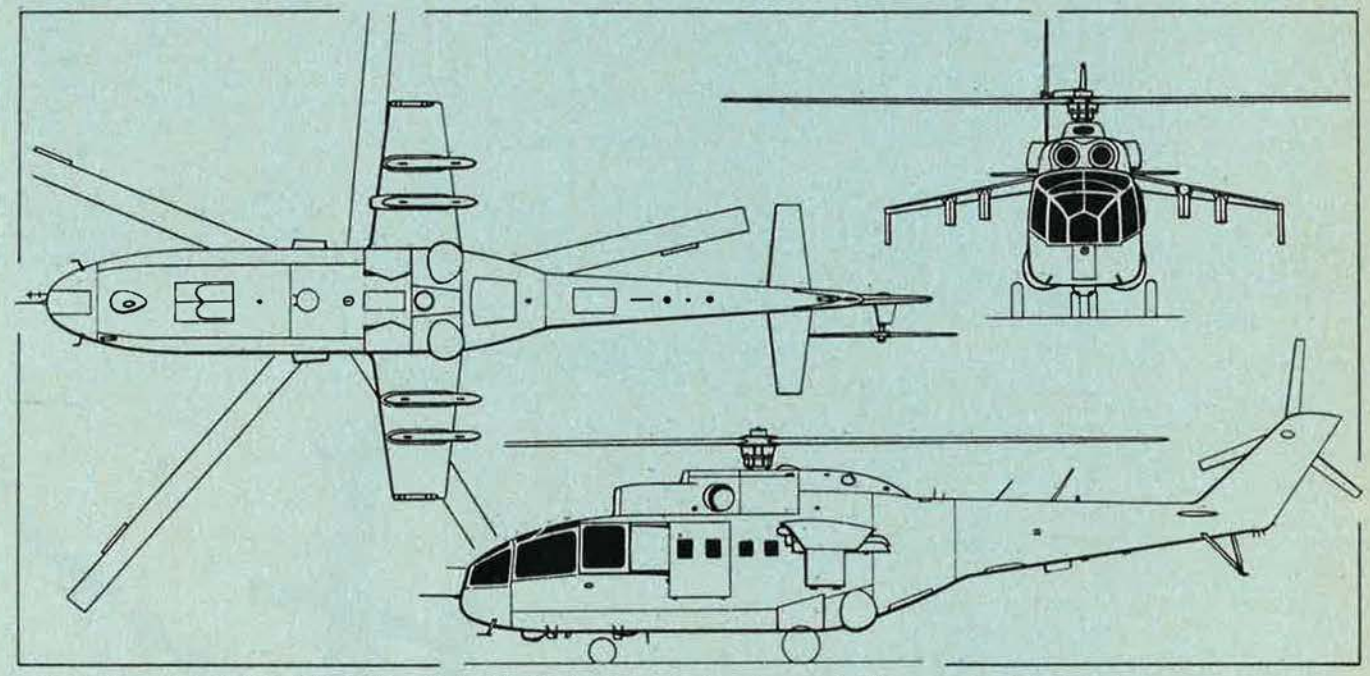
New challenges will continue to be a feature of the space surveillance mission. To ensure adequate protection, not only for strategic offensive forces, but for the American people, aerospace defense planners must keep pace with the changing threat patterns. Tight budgets impose additional problems. Hardware and software costs are becoming greater. An operational phased-array radar system, for example, will cost about $50 million.

Public awareness of both the threat and the need for space defense is essential if we are to keep the warning mission strong. Americans must realize that this nation's ability to launch a devastating second strike against a potential aggressor is the prime factor that keeps the cost of war too high for any adversary to risk.

Without warning, deterrent forces are more vulnerable. It is the Triad Plus One that provides the guarantee of peace in the free world. Warning is the guardian of Triad. ■

JANE'S

ALL THE WORLD'S AIRCRAFT SUPPLEMENT



Mil Mi-24 assault helicopter ("Hind-A" version). This drawing does not show the canted tail rotor pylon (Pilot Press)

MIL
MIKHAIL L. MIL DESIGN BUREAU, USSR

MIL Mi-24
NATO code name: "Hind"

This assault helicopter was known to exist for some two years before photographs became available to the technical press in early 1974. Two versions were shown in these photographs and are identified by the following NATO code names:

"Hind-A". The auxiliary wings of this version have considerable anhedral and each carry three weapon stations. The two inboard stations on each side are used normally as attachments for large rocket pods. The wingtip stations take the form of deep rectangular pylons, each carrying two missile rails, for air-to-surface adaptations of a standard Soviet anti-tank weapon. A 12.7 mm machine-gun is flexibly mounted beneath a flat panel of bullet-proof glass in the nose.

"Hind-B". Generally similar to "Hind-A", except that the auxiliary wings have no anhedral or dihedral, and carry only the two inboard weapon stations on each side. This suggests that, paradoxically, "Hind-B" may have preceded "Hind-A" in development.

The general appearance of the Mi-24 is shown in the accompanying illustrations. It is of conventional all-metal pod-and-boom design, with the comparatively low profile associated with gunship helicopters. In addition to the crew, on side-by-side seats, it is estimated that eight or ten assault troops can be accommodated in the main cabin. Access to the flight deck is via a large rearward-sliding blistered transparent panel which forms the aft flight deck window on the port side. At the front of the passenger cabin on each side is a large door, divided horizontally into two sections which are hinged to open upward and downward respectively.

The tapered auxiliary wings are set at an incidence of about 20°. There is a variable-incidence horizontal stabiliser at the base of the sweptback and canted fin that serves also as a pylon to carry the tail anti-torque rotor.

"Hind-A" version of the Mil Mi-24 with wingtip launchers for anti-tank missiles

The tricycle landing gear is retractable, and comprises a twin-wheel nose unit and single-wheel main units. The latter retract rearward and inward into the aft end of the fuselage pod, turning through 90° to stow almost vertically, discwise to the longitudinal axis of the fuselage, under prominent blister fairings. A tubular tripod skid assembly protects the tail rotor in a tail-down take-off or landing.

It has been suggested that the Mi-24 utilises the power plant and rotor system of the Mi-8; but only the three-blade tail rotor appears to be common to the two designs. Using its assumed diameter to scale other dimensions of the Mi-24, it becomes clear that both the turboshaft engines and the five-blade main rotor are smaller in size than their counterparts on the Mi-8, although the main rotor blades have a comparatively wide chord. The engines are mounted conventionally, side by side above the cabin, with their output shafts driving rearward to the main rotor shaft through a combining gearbox.

The Mi-24 is operational, with two units of approximate squadron strength reportedly based in East Germany in the early months of 1974.

DIMENSIONS, EXTERNAL (estimated):

Diameter of main rotor	55 ft 9 in (17.00 m)
Diameter of tail rotor	12 ft 9½ in (3.90 m)
Length overall	55 ft 9 in (17.00 m)
Height overall	14 ft 0 in (4.25 m)

SUKHOI

GENERAL DESIGNER IN CHARGE OF BUREAU: Pavel Osipovich Sukhoi, USSR

Changes in the reported designations of certain combat aircraft of Sukhoi design, and conflicting statements concerning types in operational service—notably during the 1973 Yom Kippur War between Israel and Arab states—have caused considerable confusion. The following brief notes on current Sukhoi types are based on the latest and most reliable officially-released information:

Sukhoi Su-7B (NATO code name "Fitter-A"). This is the standard fixed-wing ground attack fighter which has been in service with the Soviet Air Force for more than a decade and is operational also with the air forces of Cuba, Czechoslovakia, Egypt, East Germany, Hungary, India, Poland, Syria, and North Vietnam. Described, with its tandem two-seat training variant (NATO "Moujik"), on page 486 of 1973–74 *Jane's*.

Sukhoi Su-9 (NATO code name "Fishpot-B"). Initial operational version of this single-seat delta-wing all-weather fighter. Examples which took part in the Aviation Day display at Tushino in 1961 were each armed with four of the Soviet Air Force's then-standard radar-homing air-to-air missiles (NATO code name "Alkali") on underwing mountings. Still operational in large numbers in Soviet Air Force.

Sukhoi Su-11 (NATO code name "Fishpot-C"). Development of Su-9, with lengthened nose of less-tapered form, enlarged centrebody, two slim duct fairings along the top of the centre-fuselage, as on Su-7B, and armament of two "Anab" missiles under wings, one with radar homing head and one with infra-red homing head. Described under Su-9 entry on pages 486-7 of the 1973–74 *Jane's*. The tandem two-seat training version has the NATO code name "Maiden".

Sukhoi Su-15 (NATO code name "Flagon"). Believed until recently to be designated Su-11, this single-seat twin-jet all-weather interceptor is in service with the Soviet Air Force in two forms. The first is that described as "Flagon-A" on pages 487–8 of the 1973–74 *Jane's*. The other has extended-span wings of compound sweep, as illustrated on "Flagon-B" (page 488), but does *not* have the latter's vertically-mounted lift-jet engines.

Sukhoi Su-17 (NATO code name "Fitter-B"). The initial version of this variable-geometry development of the Su-7B, described and illustrated on pages 486–7 of the 1973–74 *Jane's*, is said to be designated Su-17 in the Soviet Union. Contrary to expectation, it is in service in considerable numbers, together with the Su-20.

Sukhoi Su-20. Identified as an improved version of "Fitter-B" with improved ground attack capability. A variable-geometry "Fitter" shown in a photograph released recently through *Tass* is believed to represent an intermediate stage between the Su-17 and Su-20, with additional weapon stations under the fixed wing centre-section on each side, a dorsal spine fairing between the cockpit canopy and the fin, and other changes. The dorsal fairing is thought to contain additional fuel tankage to improve further the originally-poor endurance of the Su-7 series, particularly with afterburning in use.

This version of the Mi-24, with only four weapon attachments on its auxiliary wings, has the NATO code name "Hind-B"

Improved "Fitter-B" variable-geometry fighter-bomber, with additional underwing weapon attachments and dorsal spine fairing containing fuel tankage (Tass)

NATO code name "Fencer". Little is known about this new variable-geometry attack aircraft. It has been described by Admiral Thomas H. Moorer, Chairman of the US Joint Chiefs of Staff, as "the first modern Soviet fighter to be developed specifically as a fighter-bomber for the ground attack mission". Of likely Sukhoi origin, it is expected to be in the same class as the USAF's F-111.

LOCKHEED

LOCKHEED-CALIFORNIA COMPANY; Address: Burbank, California 91503, USA

LOCKHEED YF-12 and SR-71

Procurement of this aircraft was authorised after consideration of competitive designs from Boeing, General Dynamics, Lockheed, and North American, and detail design of the Lockheed submission began in 1959. Known then by the designation A-11, its original purpose was almost certainly to supersede the Lockheed U-2 for long-range high-altitude surveillance missions. Like the U-2, it was designed by a small team led by C. L. Johnson, Lockheed's Vice-President for Advanced Development Projects, in the ADP building at Burbank known as the "Skunk Works". For its construction, a new titanium alloy known as Beta B-120 was evolved specially by Lockheed and the Titanium Metals Corporation, and 93% by weight of the A-11's structure is built of this alloy, which has a tensile strength of up to 200,000 lb/sq in (14,060 kg/cm²).

Existence of the A-11 was not revealed officially until 29 February 1964, when President Lyndon Johnson stated at a news conference that it had already been tested in sustained flight at speeds of more than 1,735 knots (2,000 mph; 3,220 km/h) and at heights in excess of 70,000 ft (21,350 m) at Edwards Air Force Base, California.

The following versions of the aircraft have been built:

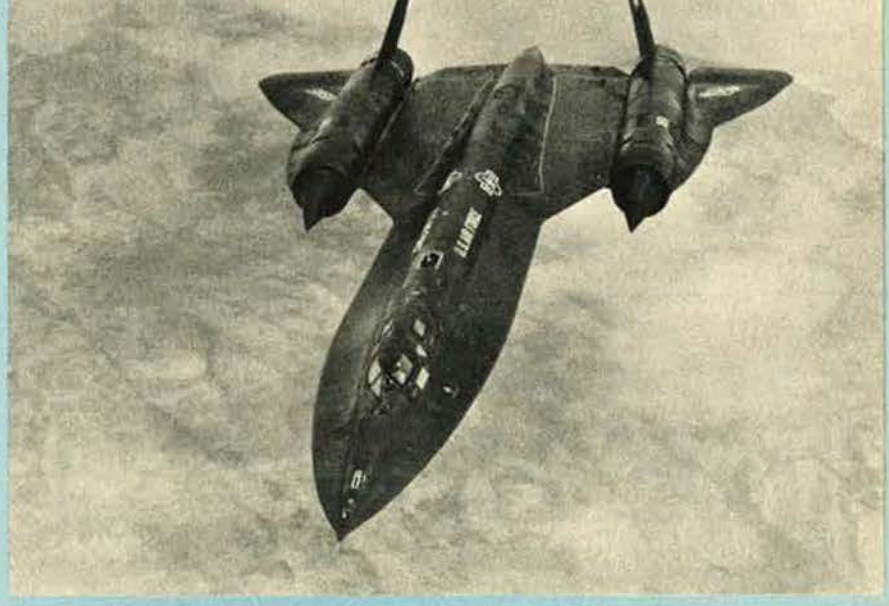
YF-12A. The first three A-11 aircraft (60-6934 to 60-6936), ordered on a USAF contract in FY 1960, were redesignated YF-12A in 1964, during which year they were evaluated as experimental all-weather fighters in the USAF's IMI (Improved Manned Interceptor) programme. First flight took place at Watertown Strip, in the Nevada desert, on 26 April 1962.

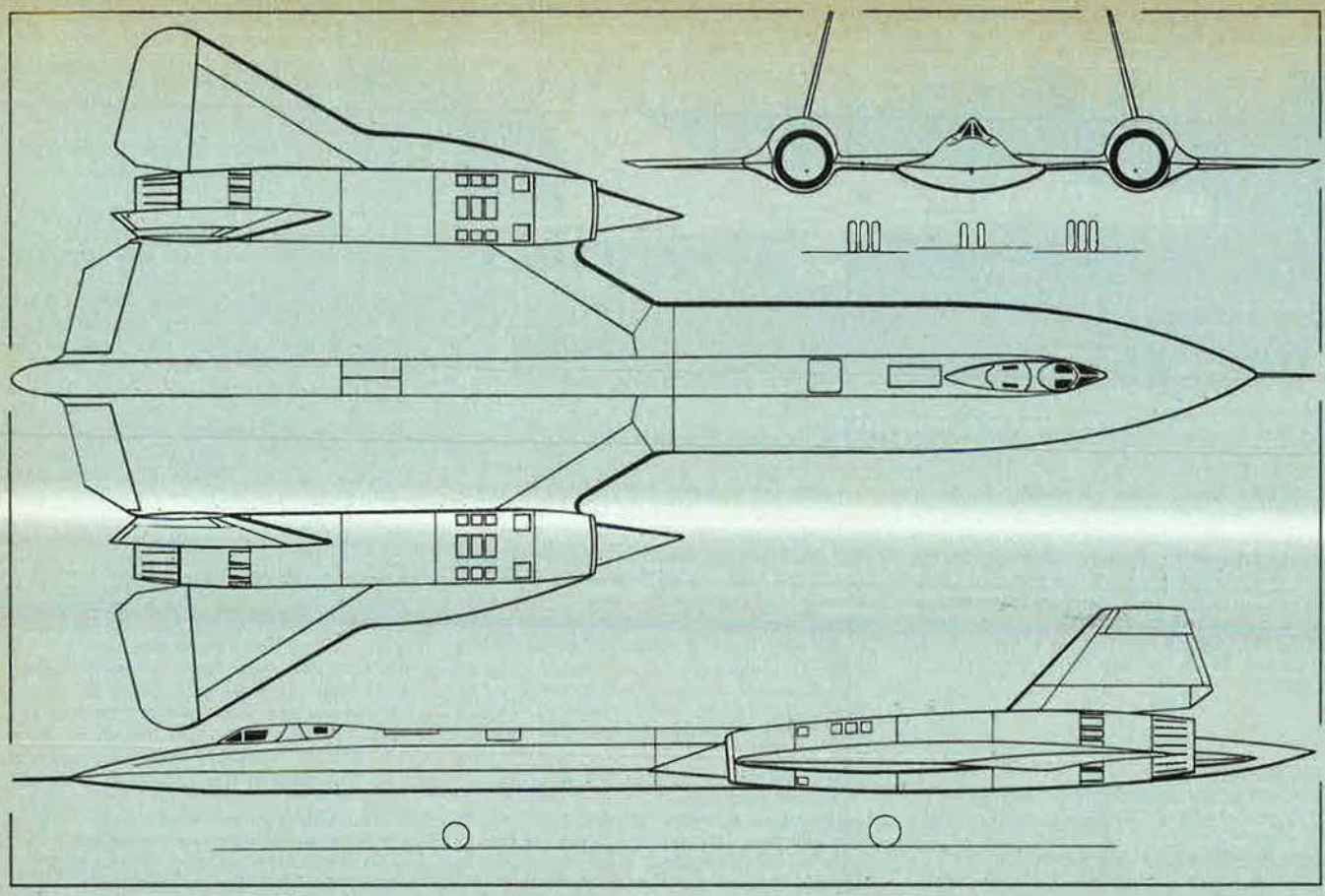
The YF-12A was displayed publicly for the first time at Edwards AFB on 30 September 1964, and from this base on 1 May 1965 the first and second YF-12As, flown by USAF pilots, set up three world records and six international class records. Col Robert L. Stephens and Lt Col Daniel Andre achieved 1,797.718 knots (2,070.102 mph; 3,331.507 km/h) over a 15/25 km course at unlimited altitude, and a sustained height of 80,257.91 ft (24,462.596 m) in horizontal flight. Maj Walter F. Daniel and Maj Noel T. Warner averaged 1,426.851 knots (1,643.042 mph; 2,644.220 km/h) over a 500 km closed circuit. Maj Daniel and Capt James P. Cooney averaged 1,466.666 knots (1,688.890 mph; 2,718.006 km/h) over a 1,000 km closed circuit, with a 2,000 kg payload, an absolute world record, and qualifying also for records without payload and with a 1,000 kg payload. The 500 km and 1,000 km closed-circuit records were later beaten by the Soviet MiG-25.

A brief description of the YF-12A has appeared in previous editions of *Jane's*. It was nicknamed "Blackbird" from the special high-heat-emissive black paint in which the aircraft were finished. Major flight evaluation for the interceptor role ended in 1966, but the second and third YF-12As were allocated in late 1969 to the joint USAF/NASA AST (Advanced Supersonic Technology) programme. This programme, spread over several years, is intended to seek data on altitude-hold at supersonic speeds; boundary layer noise and skin friction; base drag of future hypersonic wing designs; heat transfer under high speed conditions; propulsion system interactions involving effects of engine intake performance; and other performance and handling characteristics. Preliminary parameters in the programme included cruising at altitudes between 80,000 and 120,000 ft (24,400 and 36,575 m) and speeds of between Mach 3 and Mach 4. Aerospace Defense Command of the USAF was responsible for the first phase (operational combat research), which began flight test in 1970 and terminated at the end of 1971; during this phase, on 24 June 1971, aircraft 60-6936 was lost in a crash. The second phase, which began in mid-1972, is controlled by NASA, which allocated a sum of $10 million to finance the programme until the end of 1974. The place of the crashed YF-12A was taken in this phase of the programme by aircraft 60-6937, the sole YF-12C. An alternating schedule keeps one aircraft on flight status most of the time, while the other undergoes installation and checkout of test systems and instrumentation; an average of three flights per month is made, each of two to three hours' duration. The areas occupied originally in the YF-12A by the missiles and fire control radar are taken up in the AST aircraft by research instruments. These include infrared TV scanners in the port-side wing/body chine, to monitor temperature at the inlet on that side and along the wing leading-edge inboard of the inlet. Other sensors are for monitoring inlet unstart problems at high Mach numbers, and to indicate possible ways of improving inlet tolerance without creating unstart conditions. (A supersonic inlet is temperamental; if the airflow is disturbed from the exact design condition, the internal shock may be expelled, with gross breakdown of flow and sudden collapse of engine thrust, in what is termed an inlet unstart.) In one experiment, completed in the Autumn of 1973, one aircraft was partly disassembled and put through tests to distinguish between aerodynamic and thermal loads on the airframe.

YF-12C. Designation of the fourth aircraft (60-6937), ordered on the same contract as the three A-11/YF-12As and completed as the prototype for the SR-71 version. Subsequently allocated to the USAF/

Lockheed SR-71A strategic reconnaissance aircraft (two Pratt & Whitney JT11D-20B afterburning turbojets)





Lockheed SR-71A, the fastest aircraft yet put into service by any air force in the world (Pilot Press)

NASA Advanced Supersonic Technology programme, as described under the YF-12A heading.

SR-71A. Strategic photographic and electronic reconnaissance aircraft, developed from the YF-12A via the YF-12C prototype. Development began in February 1963, and the first production SR-71A (61-7950) made its first flight at Edwards AFB on 22 December 1964. Existence first revealed by President Johnson, on 24 July 1964.

As in the YF-12C, the SR-71A fuselage is slightly longer than that of the YF-12A, the wing/body chine fairings extend fully forward to meet at the extreme nose, and there are no ventral fins. The SR-71A is substantially heavier than the YF-12A, carries considerably more fuel, and has a longer range. Evaluation by Strategic Air Command began in 1965, and deliveries of production SR-71As, for working up, were made to the 9th (formerly the 4200th) Strategic Reconnaissance Wing at Beale AFB, California, beginning in January 1966. Subsequent operations have reportedly included surveillance of the Suez Canal region in 1970 and, by aircraft detached to Kadena AB, Okinawa, of the Chinese mainland prior to 1971. The SR-71A and the Teledyne Ryan AQM-34L RPV were the only USAF reconnaissance aircraft permitted to overfly North Vietnam after the cessation of bombing on 15 January 1973. The SR-71s, although painted dark blue overall, are also referred to unofficially as "Blackbirds". One aircraft was operated in the Middle East during and after the Yom Kippur War.

The initial SR-71A/SR-71B order, placed in FY 1961, is believed to have been for 21 aircraft (61-7950 to 61-7970). An option for six more was taken up in the Spring of 1966, and published photographs have revealed serial numbers up to 61-7980, suggesting that at least 10 more beyond the initial order may have been built. Because of budget constraints, a large percentage of the SR-71 fleet is in storage, but the number of aircraft on active status was increased slightly in late 1973. In service, the YF-12/SR-71 series of aircraft have performed several thousand supersonic flights, of which some 40% have been at Mach 3.0 or above.

SR-71B. Original tandem two-seat operational training version of the SR-71A, with second cockpit elevated aft of front (pilot's) cockpit. Fixed ventral tail-fins under nacelles reintroduced. Two aircraft known (61-7951 and '56), the first of which was delivered to the SAC's 9th (formerly 4200th) Strategic Reconnaissance Wing at Beale AFB, California, on 7 January 1966; one aircraft was subsequently lost in a crash.

SR-71C. Revised training version, modified from an SR-71A after the loss of one SR-71B in an accident.

The following description applies primarily to the SR-71A, but is generally applicable to all YF-12 and SR-71 models except where a specific version is indicated:

TYPE (SR-71A): Two-seat strategic reconnaissance aircraft.

WINGS: Cantilever low/mid-wing monoplane, of basically delta planform with rounded tips. Wings have a bi-convex section, a thickness/chord ratio of 3.2%, and a small negative angle of incidence. Leading-edges have 60° sweepback, trailing-edges 10° forward taper. Multi-spar fail-safe structure, predominantly of Lockheed/TMC B-120 series titanium alloy and incorporating engine nacelle ring carry-through structure. Upper and lower skins are bonded to spars, and have pre-formed chordwise corrugations to aid the airflow in conditions of prolonged thermal soaking. Entire wing structure is designed to withstand sustained skin temperatures of up to about 260°C, and locally up to about 427°C. The leading-edges inboard of the engine nacelles are extended forward along the fuselage sides in blended wing/body chine fairings which act as a fixed canard surface to reduce trim drag, improve directional stability and provide additional lifting area. On the YF-12C and SR-71 models these chines extend to, and meet at, the extreme nose; on the YF-12A they are cut back to aft of the nose radome, approximately in line with the front cockpit. The leading-edges outboard of the nacelles have marked conical camber, and there is a smaller chine fairing along the outboard side of each nacelle. The outer wings, and the outer half of each nacelle, hinge upward to provide access to the engines. Hydraulically-actuated plain elevons on trailing-edge, inboard and outboard of engine nacelles, each with 12° travel up or down and a triangular cutout adjacent to the nacelle; these are operated in unison or differentially for control and trim in both pitch and roll. No slats, flaps, spoilers, tabs, or other movable control surfaces.

FUSELAGE: Pressurised fail-safe structure, predominantly of B-120 series titanium alloy, designed to withstand sustained skin temperatures of up to about 260°C, and locally up to about 315°C. Nose, forward of cockpits, is tilted upward 2° to reduce trim drag; the YF-12A has a larger nose than the SR-71A, with a plastics radome. The SR-71 models have an extended tailcone, compared with the YF-12A, to improve boat-tail drag.

TAIL UNIT: Cantilever fail-safe structure, predominantly of B-120 series titanium alloy, designed to withstand sustained skin temperatures of up to about 315°C. No horizontal surfaces, control in pitch being effected by use of the elevons. On top of each engine nacelle is a fixed stub-fin

surmounted by a slab-type all-moving fin, these being inclined inward 15° from the vertical to reduce roll effect during deployment. The movable fins have up to 20° travel to left or right, are actuated hydraulically, and can be operated separately or in unison as required. In addition the YF-12A has a fixed underfin beneath each nacelle, inclined outward at 15°, to offset its larger nose radome and shorter wing/body chines; these fins are fitted also to the SR-71B. In its original form the YF-12A also had a centreline ventral fin beneath the rear fuselage, which folded upward to port through 90° for ground clearance when the landing gear was extended. The ventral fins were fitted originally to offset a loss of stability at high speed, resulting from the increased nose cross-section of the YF-12A; the centreline underfin is not fitted to the YF-12s currently flying.

LANDING GEAR: Retractable tricycle type. Three-wheel main units retract inward into wing/body chine fairings; twin-wheel steerable nose unit retracts forward into fuselage. Oleo-pneumatic shock-absorbers. Taxying light on each oleo leg; landing light on nosewheel leg.

AIR INTAKES: Each engine is fed by an axisymmetric circular air inlet with an electro-hydraulically actuated translating central spike. At low Mach numbers the spike is locked fully forward, where it diverts or spills excess airflow ahead of the inlet and provides a minimum, fairly large, throat area at the inlet lip. At 30,000 ft (9,145 m) altitude the spike is unlocked, and starts to translate aft at Mach 1.6. The inlet should have self-started by this time, although this can be delayed until as late as Mach 2.1. As the spike retracts, the throat moves aft to the station of the cowl shock trap bleed, where cowl boundary layer is bled off (to stabilise the internal shock, and also to cool the engine and nozzle) through 33 fixed solid-wall axial ducts. Centrebody (spike) boundary layer is bled off inward through a porous section of centrebody, and expelled overboard via the centrebody support struts. Rearward translation of the spike closes down throat area by 54%, compared with the Mach 1.0 setting, but increases the area of the captured stream tube by 112%. Engine operation is also critically dependent upon the forward by-pass doors, which are a series of large apertures in a broad band in the outer cowl wall just downstream of the throat. Rotation of this band progressively uncovers matching apertures in the duct itself, allowing airflow to escape overboard through louvres. The doors are open on the ground, but rotate to the fully-closed position upon retraction of the landing gear. At speeds above Mach 1.4 the by-pass may modulate as required to maintain a scheduled pressure ratio between selected pitot and static pressures. The complete inlet system is controlled by Hamilton Standard fail-safe powered systems, with manual emergency operation, with computer control according to sensed flight Mach number, angle of attack, angle of sideslip, and normal acceleration, thus providing an automatic restart cycle to recover from inlet unstarts. Variation in forward by-pass can exert an enormous influence on aircraft drag, especially noticeable as pronounced yaw if one by-pass modulates while the other remains shut. When operating perfectly, the inlet system generates a pressure ratio of more than 40 : 1 at the cruising Mach number. At low speeds the inlet generates little forward thrust; at Mach 2.2 it generates only 13% of the total propulsive thrust, whereas at about Mach 3.2 it generates 54%, compared with only 17.6% for the engine at that Mach number. An inlet shock stabiliser system, developed by NASA's Lewis Research Center, was being tested on the YF-12 in 1974. This system is based on a pressure valve which monitors the movement of the shock wave in the inlet and corrects it automatically by moving the inlet spike or inlet dump doors. A new turbine inlet gas temperature (TIGT) sensor has also been developed for evaluation in the YF-12.

POWER PLANT: All versions of the YF-12 and SR-71 are powered by two Pratt & Whitney JT11D-20B (J58) by-pass turbojets (also described correctly as turboramjet engines), each rated at approx 23,000 lb (10,430 kg) st dry and 32,500 lb (14,740 kg) st at sea level with afterburning. Each engine has a very high capacity by-pass duct system which pipes fourth-stage air to the afterburner to cool the jet pipe and increase the compressor stall margin. The engine discharges through an ejector nozzle, which is part of the airframe and is of purely aerodynamic design. The primary nozzle is a ring of blow-in doors which provide tertiary air to fill in the ejector at Mach numbers below 1.1. This tertiary air is provided by suck-in doors around the nacelle, augmented by the cowl (shock trap) bleed and aft by-pass bleed. The main ejector is supported downstream on streamline struts and a ring of Rene 41 alloy, on which are hinged free-floating trailing-edge flaps of Hastelloy X alloy. These open up progressively between Mach 0.9 and Mach 2.4 to provide a divergent shroud around the primary nozzle and the secondary stream. At low Mach numbers the ejector adds nothing to engine thrust; at Mach 2.2 it provides 14% of the total propulsive thrust, and at about Mach 3.2 it provides 28.4%. The power plant also incorporates suck-in doors to provide tertiary flow and secondary by-pass doors around the plane of the engine inlet face. The nacelle structure is designed to withstand sustained skin temperatures of up to about 593°C. The fuel used is a special low vapour pressure hydrocarbon known as JP-7. Insulated integral tanks, five occupying the entire upper part of the fuselage and others in the inner portion of each wing, have a total capacity of more than 80,000 lb (36,290 kg) of fuel. This fuel is used as the main heat-sink for the whole aircraft, and is thus heated until at delivery to the engine its temperature is 320°C. Final fuel injection to the engines is made at 130 lb/sq in (9.14 kg/cm²). An automatic fuel feed system maintains CG adjustment as the tanks are depleted; for thermodynamic reasons, due to the high ratio of surface area to volume, the wing tanks are used first, *i.e.*, in climb. A nitrogen atmosphere is used to pressurise and inert the tanks. All versions of the aircraft have a receptacle on top of the fuselage, aft of the rear cockpit, for in-flight refuelling from KC-135 tanker aircraft.

ACCOMMODATION (SR-71A): Crew of two (pilot and reconnaissance systems officer) on ejection seats in separate tandem cockpits, each under a clamshell canopy which is hinged at the rear and opens upward. Canopies are opaque except for a rectangular window in each side. Front cockpit has a knife-edge windscreen formed by two triangular quarter-lights. Crew members wear Gemini-type *g* suits, and both cockpits are fully pressurised, heated, and air-conditioned. Crew escape system is operable from speeds of more than Mach 3.0 at 100,000 ft (30,500 m) down to zero speed at ground level. Duties of the RSO include those of a co-pilot, flight engineer, and navigator, and the aircraft can be flown from the rear cockpit if re-

The SR-71B/C tandem two-seat training versions of the SR-71 were built with an elevated rear cockpit

quired. This cockpit is elevated in a pronounced "step" in the SR-71B and C, in which versions it is occupied by the instructor.

SYSTEMS: Cockpit air-conditioning by heat exchanger system, using engine bleed air pre-cooled in the fuel system. Two independent hydraulic systems for actuation of landing gear, elevons, all-moving fins and, with electrical servo assist, the air inlet spikes. In the event of a control system malfunction the inlet spikes can be controlled manually, provided that hydraulic pressure is available and that the spike linear voltage differential transducer (LVDT) is functioning. If the spike LVDT fails, the spikes can be moved fully forward by means of a solenoid.

ELECTRONICS AND EQUIPMENT: Astro-inertial navigational system, providing automatic star tracking even in daylight. Honeywell air data computer and automatic flight control system (AFCS). The latter comprises a three-axis stability augmentation system (SAS), autopilot, and Mach trim system, and is designed primarily to provide optimum handling qualities during take-off and landing, in-flight refuelling, subsonic cruise between 25,000 and 50,000 ft (7,625 and 15,250 m), and Mach 3 cruise above 60,000 ft (18,300 m). The SAS incorporates triple redundant sensors, electronics and gain-scheduling, and is engaged in the yaw and pitch modes at all times to counteract inlet unstarting. A Hamilton Standard control system governs automatically the variable inlets, fuel supply, and variable-area nozzles. The pitch axis has two dual-tandem series servos, each driving one inboard elevon; the roll axis has dual redundancy, and a separate channel to drive each inboard elevon; and the yaw axis has four series servos, two for each fin. Triple display indicator (TDI) gives a digital readout of Mach number, altitude, and knots equivalent airspeed (KEAS), and is used for transition to, and cruising at, supersonic speed. Conventional flight director system, modified to present angle of attack information during cruise on the glideslope portion of the attitude display indicator (ADI). Instrumentation duplicated in the rear (RSO's) cockpit includes basic flight instruments, fuel monitoring systems, annunciator warning panels, systems instruments and most communications instruments. Operational equipment in the SR-71A is classified, but includes provision for a wide variety of advanced observation equipment ranging from simple battlefield surveillance systems to multiple-sensor high-performance systems for interdiction reconnaissance, and strategic systems capable of specialised surveying of 60,000 sq miles (155,400 km²) in one hour from an altitude of 80,000 ft (24,400 m). Photographic, infra-red, and electronic sensors are housed in the forward portions of the wing/body chine fairings.

ARMAMENT: All SR-71 models are unarmed. Details of armament formerly fitted to YF-12A were given in the 1972–73 *Jane's*.

DIMENSIONS, EXTERNAL (SR-71A):
- Wing span 55 ft 7 in (16.95 m)
- Length overall 107 ft 5 in (32.74 m)
- Height overall 18 ft 6 in (5.64 m)
- Wheel track (c/l of shock struts) approx 17 ft 0 in (5.18 m)
- Wheelbase approx 34 ft 0 in (10.36 m)

AREA (SR-71A):
- Wings, nominal 1,800 sq ft (167.23 m²)

WEIGHTS (SR-71A, approx):
- Weight empty 60,000 lb (27,215 kg)
- Fuel load more than 80,000 lb (36,290 kg)
- Max T-O weight 170,000 lb (77,110 kg)

PERFORMANCE (SR-71A, approx):
- Max level speed at 78,740 ft (24,000 m) more than 1,735 knots (2,000 mph; 3,220 km/h) (more than Mach 3.0)
- Max level speed at 30,000 ft (9,145 m) more than 1,146 knots (1,320 mph; 2,125 km/h) (more than Mach 2.0)
- Typical unstick speed 200 knots (230 mph; 370 km/h)
- Typical subsonic climb speed 400 knots (460 mph; 741 km/h)
- Typical approach speed 180 knots (207 mph; 334 km/h)
- Typical touchdown speed 150 knots (173 mph; 278 km/h)
- Operational ceiling above 80,000 ft (24,400 m)
- Air turning radius at 1,735 knots (2,000 mph; 3,220 km/h) 78–104 nm (90–120 miles; 145–193 km)
- Fuel consumption 80,000 US gallons (6,661 Imp gallons; 30,282 litres)/hr
- Max lift/drag ratio, trimmed: below Mach 1.0 approx 11.5; at Mach 3.0 and above 6.5
- T-O run at 140,000 lb (63,505 kg) AUW 5,400 ft (1,646 m)
- T-O to 50 ft (15 m) at 140,000 lb (63,505 kg) AUW 9,000 ft (2,745 m)
- Landing from 50 ft (15 m) at 60,000 lb (27,215 kg) 6,000 ft (1,830 m)
- Landing run at 60,000 lb (27,215 kg) 3,600 ft (1,097 m)
- Typical operational radius 1,040 nm (1,200 miles; 1,930 km)
- Range at Mach 3.0 at 78,740 ft (24,000 m), without refuelling 2,589 nm (2,982 miles; 4,800 km)
- Max endurance at Mach 3.0 at 78,740 ft (24,000 m), without refuelling 1 hr 30 min

BEECHCRAFT

BEECH AIRCRAFT CORPORATION; Head Office and Main Works: Wichita, Kansas 67201, USA

BEECHCRAFT TURBO MENTOR
US Navy designation: YT-34C

In March 1953 the USAF selected the Beechcraft Model 45 as its new primary trainer and, under the designation T-34A Mentor, a total of 450 were eventually acquired. Power plant consisted of a 225 hp Continental O-470-13 six-cylinder horizontally-opposed aircooled engine.

Just over a year after the Air Force adopted the Beech Model 45 as its primary trainer, the US Navy reached a similar decision, and a total of 423 T-34B Mentors were built for that service.

Experience in both the USAF and USN showed the Mentor to be a rugged and reliable aircraft, and in 1973 Beech received a USN R&D contract to modify two T-34Bs to see whether the type could be upgraded for a continuing training role. This involved the installation of a turboprop

Beechcraft YT-34C Turbo Mentor, an experimental conversion of the T-34B Mentor trainer with a 715 shp United Aircraft of Canada PT6A-25 turboprop engine

Beechcraft YT-34C Turbo Mentor, the gross weight of which is 1,000 lb (454 kg) more than that of the original Mentor, is continuing its test programme this Summer

engine and the latest avionics equipment, the primary object being to let student pilots have experience of operating turbine-powered aircraft from the beginning of their flight training.

The power plant selected was the 715 shp United Aircraft of Canada PT6A-25 turboprop, which has a torque limiter in this application to restrict engine output to 400 shp. This will not only ensure long engine life, but will also provide constant performance over a wide range of temperature and altitude.

Design of the modifications to update the aircraft began in March 1973, and work on two T-34Bs started in May of the same year. Designated YT-34C, the first of these aircraft flew for the first time on 21 September 1973, and the test programme was continuing in the early Summer of 1974.

By comparison with the original Mentor, the new YT-34C has a 1,000 lb (454 kg) increase in gross weight, which has meant that structural modifications have also had to be made to strengthen the fuselage and tail unit. Additional strength for other assemblies and components has been achieved largely by adopting off-the-shelf parts from other Beech aircraft.

TYPE: Two-seat turbine-powered primary training aircraft.

WINGS: Cantilever low-wing monoplane. Wing section NACA 23016.5 (modified) at root, NACA 23012 at tip. Dihedral 7°. Incidence 4° at root, 1° at tip. No sweepback at quarter-chord. Conventional box beam structure of light alloy. Ailerons of light alloy construction. Single-slotted trailing-edge flaps of light alloy. Manually operated trim/servo tab in port aileron.

FUSELAGE: Semi-monocoque light alloy structure.

TAIL UNIT: Cantilever structure of light alloy. Fixed-incidence tailplane. Manually operated trim tabs in elevator and rudder.

LANDING GEAR: Electrically-retractable tricycle type. Main units retract inward, nosewheel aft. Beech oleo-pneumatic shock struts. Single wheel on each unit. Main wheels and tyres size 6.50-8. Nosewheel and tyre size 5.00-5. Goodyear multiple-disc hydraulic brakes.

POWER PLANT: One 715 shp United Aircraft of Canada PT6A-25 turboprop engine, torque limited to 400 shp, driving a Hartzell three-blade metal constant-speed fully-feathering propeller. Two bladder-type fuel cells in each wing, with a combined usable capacity of 142 US gallons (537.5 litres). Oil capacity 3.5 US gallons (13.2 litres).

ACCOMMODATION: Pilot and pupil in tandem beneath rearward-sliding cockpit canopy. Cockpit ventilated, and heated by engine bleed air.

SYSTEMS: Hydraulic system for brakes only. Pneumatic system for emergency opening of cockpit canopy. Diluter demand gaseous oxygen system, pressure 1,500 lb/sq in (105.4 kg/cm²). Electrical power supplied by 200A starter/generator. Air-conditioning system planned for production aircraft but not installed in prototypes.

ELECTRONICS AND EQUIPMENT: Dual controls and blind-flying instrumentation standard. Engine intake de-iced by bleed air. Electrically-heated pitot and angle of attack indicator. UHF com, Omni, DME, LF/DF and transponder. Intercom. Fluxgate compass system.

ARMAMENT: An armament system similar to that of the Model PD 249 "Pave Coin" Bonanza, detailed in the 1973–74 *Jane's*, could be provided.

DIMENSIONS, EXTERNAL:

Wing span	33 ft 6 in (10.21 m)
Wing chord at root	8 ft 4½ in (2.55 m)
Wing chord at tip	3 ft 5¼ in (1.05 m)
Wing aspect ratio	6.22
Length overall	28 ft 8½ in (8.75 m)
Height overall	9 ft 10 in (3.00 m)
Tailplane span	12 ft 2 in (3.71 m)
Wheel track	9 ft 6½ in (2.91 m)
Wheelbase	7 ft 11 in (2.41 m)
Propeller diameter	7 ft 6 in (2.29 m)
Propeller ground clearance	1 ft 5¾ in (0.45 m)

DIMENSIONS, INTERNAL:

Cabin: Length	9 ft 0 in (2.74 m)
Max width	2 ft 10 in (0.86 m)
Max height	4 ft 0 in (1.22 m)

AREAS:

Wings, gross	179.9 sq ft (16.71 m²)
Ailerons (total)	11.4 sq ft (1.06 m²)
Trailing-edge flaps (total)	21.3 sq ft (1.98 m²)
Fin	14.1 sq ft (1.31 m²)
Rudder, including tab	8.16 sq ft (0.76 m²)
Tailplane	31.8 sq ft (2.95 m²)
Elevators, including tab	16.2 sq ft (1.50 m²)

WEIGHTS AND LOADING:

Weight empty	2,630 lb (1,193 kg)
Max T-O and landing weight	4,000 lb (1,814 kg)
Max wing loading	22.2 lb/sq ft (108.3 kg/m²)

PERFORMANCE (preliminary results at max T-O weight):

Max never-exceed speed	250 knots (288 mph; 463.5 km/h)
Max level speed at 17,500 ft (5,335 m)	223 knots (257 mph; 414 km/h)
Max cruising speed at 17,500 ft (5,335 m)	223 knots (257 mph; 414 km/h)
Stalling speed, without flaps	55 knots (63.3 mph; 102 km/h)
Max rate of climb at S/L	1,696 ft (517 m)/min
Service ceiling	over 30,000 ft (9,145 m)

AGUSTA

COSTRUZIONI AERONAUTICHE GIOVANNI AGUSTA SpA; Head Office and Works: Casella Postale 193, 21017 Cascina Costa, Gallarate, Italy

In addition to versions of the Bell Model 47, Agusta is currently producing under licence in Italy the Bell Iroquois Models UH-1B and UH-1D/H, as the Agusta-Bell 204B and 205 respectively, the twin-engined Model 212, and the light turbine-powered Model 206 JetRanger helicopter series. Plans

are being made to produce also the Long Ranger stretched version of the Model 206. Under license from Sikorsky, production of SH-3D helicopters began in 1967, and production of the HH-3F (S-61R) started in 1974. Agusta is also engaged, together with Meridionali, SIAI-Marchetti, and other Italian companies, in quantity production under licence of the Boeing Vertol CH-47C Chinook helicopter. Under development, with production deliveries to begin in 1975, is the Agusta-designed A 109 Hirundo (Swallow) twin-engined general-purpose helicopter.

For specialised naval missions, Agusta has developed from the standard Bell Model 212 a version known as the AB 212ASW.

AGUSTA-BELL 212ASW

The Agusta-Bell 212ASW helicopter has been developed as a medium-sized twin-engined naval helicopter equipped for anti-submarine search and attack missions, and attack missions against surface vessels. It is also suitable for search and rescue and utility roles. It is an extensively modified version of the standard Agusta-Bell 212 (see current edition of *Jane's*), utilising naval operational experience gained with the AB 204AS, and because of its similarity in size to the 204AS can also operate from small ship decks. A prototype has been successfully evaluated, and the AB 212ASW is now being produced and delivered to meet orders from the Italian Navy (28) and from foreign operators.

Apart from some local strengthening, and the provision of deck-mooring equipment, the airframe structure remains essentially similar to that of the commercial Model 212 and military UH-1N, described under the Bell entry in the US section of the current edition. Main differences from the Agusta-Bell 212 are as follows:

TYPE: Twin-engined anti-submarine and anti-surface-vessel helicopter.

POWER PLANT: One United Aircraft of Canada PT6T-6 Turbo Twin Pac engine, derated to 1,290 shp for T-O and a max continuous rating of 1,130 shp. Fuel capacity 215 US gallons (179 Imp gallons; 813 litres). Provision for one internal or two external auxiliary fuel tanks. Engine installation has special protection against salt water corrosion.

ACCOMMODATION: Crew of three or four.

SYSTEMS: Standard duplicated hydraulic systems for flight controls, as in AB 212. Either hydraulic system is capable of operating the automatic flight control system. Third, self-contained system for operation of sonar, rescue hoist, and other utilities. Electrical system capacity increased to cater for higher power demand; the two standard generators are integrated with a 20kVA alternator.

ELECTRONICS AND EQUIPMENT: Complete instrumentation for day and night sea operation in all weathers. Avionics installed are EAS ERM 710 UHF transceiver, Collins SSB/DSB 718 U-5 HF transceiver, and Agusta AG-03-M intercom, for communications; Marconi-Elliott AD-370B ADF, Hoffman AN/ARN-91 TACAN, and Collins AN/ARA-50 homing UHF, for navigation assistance; Aeritalia (Honeywell) AN/APN-171 radar altimeter, Canadian Marconi AN/APN-172(V)2 Doppler radar, Canadian Marconi CMA-708/ASW navigation computer, and automatic flight control system with General Electric SR-3 gyro platform, Agusta ASE-531A automatic stabilisation equipment, and Agusta AATH-547A automatic approach to hover, for automatic navigation; Siemens AN/APX-77 IFF/SIF transponder; MEL ARI-5955 search radar and Motorola SST-119X radar transponder; and Bendix AN/AQS-13B sonar for ASW search.

Agusta-Bell 212ASW twin-engined anti-submarine and anti-surface-vessel helicopter

ARMAMENT AND OPERATIONAL EQUIPMENT: Weapon system may consist of two Mk 44 or Mk 46 homing torpedoes, depth charges, or two air-to-surface missiles. Provisions for auxiliary installations such as a 595 lb (270 kg) capacity rescue hoist, 5,000 lb (2,270 kg) capacity cargo sling, inflatable emergency pontoons, internal and external auxiliary fuel tanks, according to mission.

ASW MISSION: The basic sensor system employed for the ASW search and attack mission is the AN/AQS-13B variable-depth sonar, which has a max operating depth of 450 ft (137 m). The automatic navigation system permits the positioning of the helicopter over any desired "dip" point of a complex search pattern. The position of the helicopter, computed by the automatic navigation system, is integrated with sonar target information in the radar tactical display, where both the surface and the underwater tactical situations can be continuously monitored. Additional navigation and tactical information is provided by accurate UHF direction-finding equipment, from an A/A mode-capable TACAN and from a radar transponder. The automatic flight control system (AFCS) integrates the basic automatic stabilisation equipment with signal output from the radar altimeter, the Doppler radar, sonar cable angle signals, and outputs from the dry cable transducer. The effectiveness of this system results in hands-off flight from cruise condition to sonar hover in all weathers and under rough sea conditions. A specially designed cockpit display shows the pilots all flight parameters for each phase of the ASW operation. The attack mission is carried out with two Mk 44 or Mk 46 homing torpedoes, or with depth charges.

AWW MISSION: For this mission the AB 212ASW carries a high-performance long-range search radar, with a very efficient scanner design and installation, possessing high discrimination in rough sea conditions. Provisions have also been made to permit incorporation of future radar systems developments. The automatic navigation system and the search radar are integrated to permit a continuously updated picture of the tactical situation. Provisions are also incorporated for the installation of the most advanced ECM systems. The surface attack is performed with air-to-surface wire-guided missiles. In operation, the co-pilot aims and "flies" the missiles to the target through a gyro-stabilised sight system of the XM-58 type.

DIMENSIONS, EXTERNAL: As AB 212, except:

Max width:
- with torpedoes 12 ft 11½ in (3.95 m)
- with missiles 13 ft 8¼ in (4.17 m)

WEIGHTS (A: ASW mission with Mk 44 torpedoes; B: AWW mission with AS.12 missiles; C: search and rescue mission; all at S/L, ISA):

Weight empty, equipped:
- A, B, C 7,484 lb (3,395 kg)

Crew of three:
- A, B, C 529 lb (240 kg)

Mission equipment:
- A (two Mk 44 torpedoes) 846 lb (384 kg)
- B (AS.12 installation and XM-58 sight) 491 lb (223 kg)
- C (rescue hoist) 88 lb (40 kg)

Full fuel (normal tanks):
- A, B, C 1,764 lb (800 kg)

Auxiliary internal tank:
- A, B 55 lb (25 kg)

Auxiliary external tanks:
- C 70 lb (32 kg)

Auxiliary fuel:
- A, B 518 lb (235 kg)
- C 785 lb (356 kg)

Max mission T-O weight:
- A 11,196 lb (5,079 kg)
- B 10,841 lb (4,918 kg)
- C 10,720 lb (4,863 kg)

PERFORMANCE (at max T-O weight, ISA):

Max level speed at S/L
- 106 knots (122 mph; 196 km/h)

Max cruising speed with armament
- 100 knots (115 mph; 185 km/h)

Max rate of climb at S/L:
- A 1,519 ft (463 m)/min
- B 1,197 ft (365 m)/min

Rate of climb at S/L, one engine out:
- A 423 ft (129 m)/min
- B 348 ft (106 m)/min

Hovering ceiling in ground effect:
- A 12,500 ft (3,810 m)

Hovering ceiling out of ground effect:
- A 4,000 ft (1,220 m)

Search endurance (A) with 50% at 90 knots (103.5 mph; 167 km/h) cruise and 50% hovering out of ground effect, 10% reserve fuel 3 hr 0 min

Search range (B) with 10% reserve fuel 323 nm (372 miles; 598 km)

Endurance (B), no reserves 3 hr 45 min

Endurance (C) at 90 knots (103.5 mph; 167 km/h) search speed 4 hr 15 min

Max range with auxiliary tanks, 100 knots (115 mph; 185 km/h) cruise at S/L, 15% reserves 360 nm (414 miles; 667 km)

Max endurance with auxiliary tanks, no reserves 5 hr 0 min

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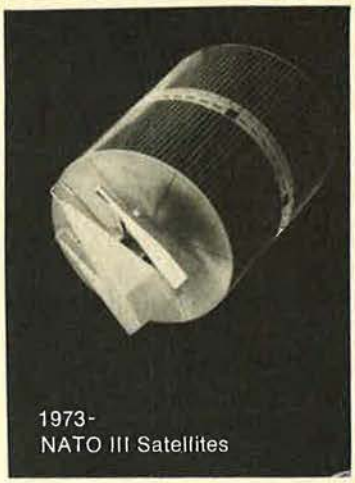

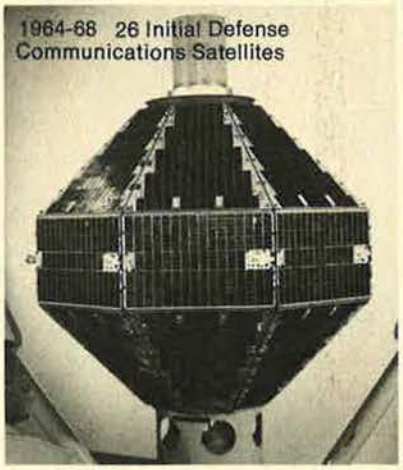

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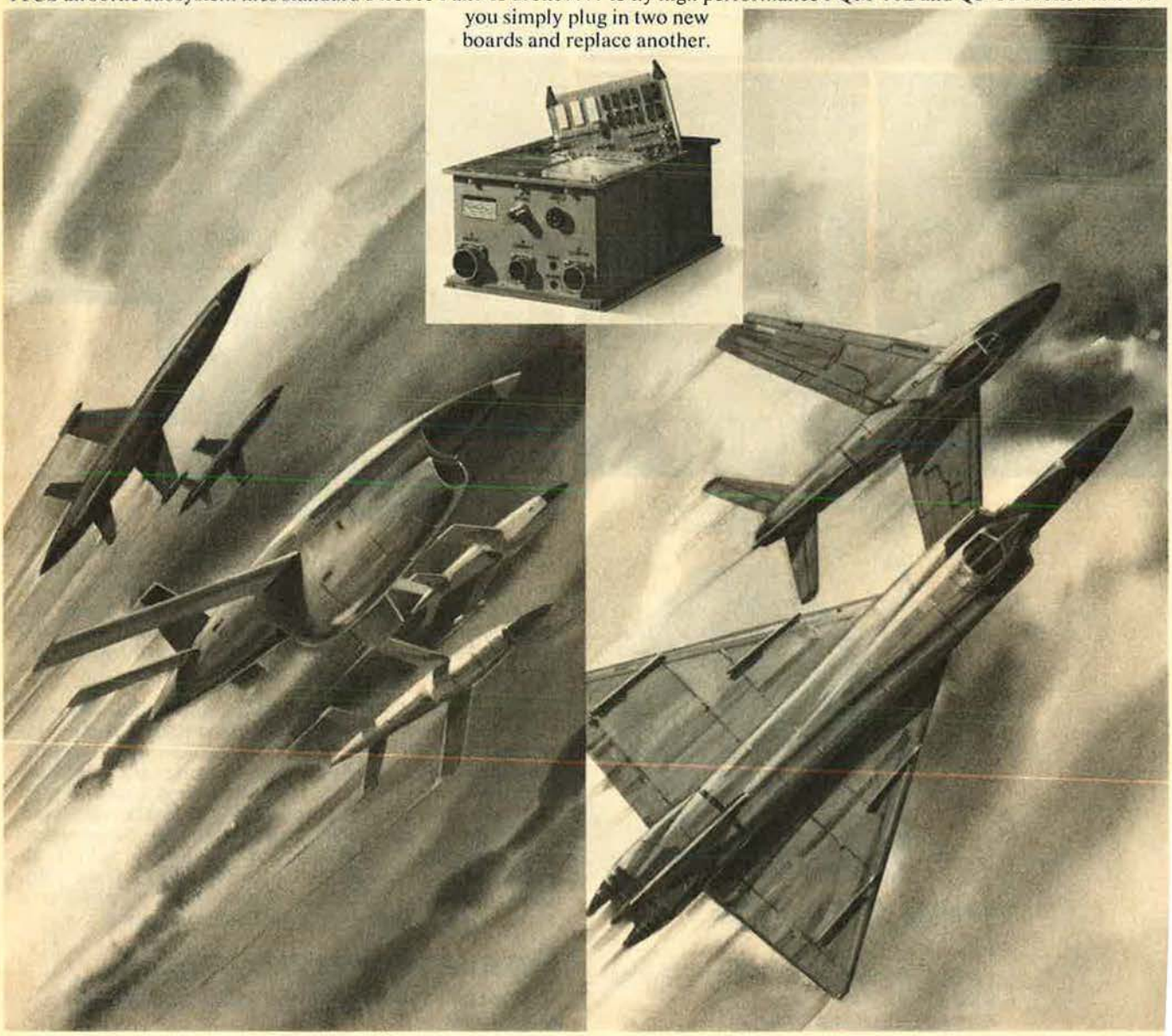

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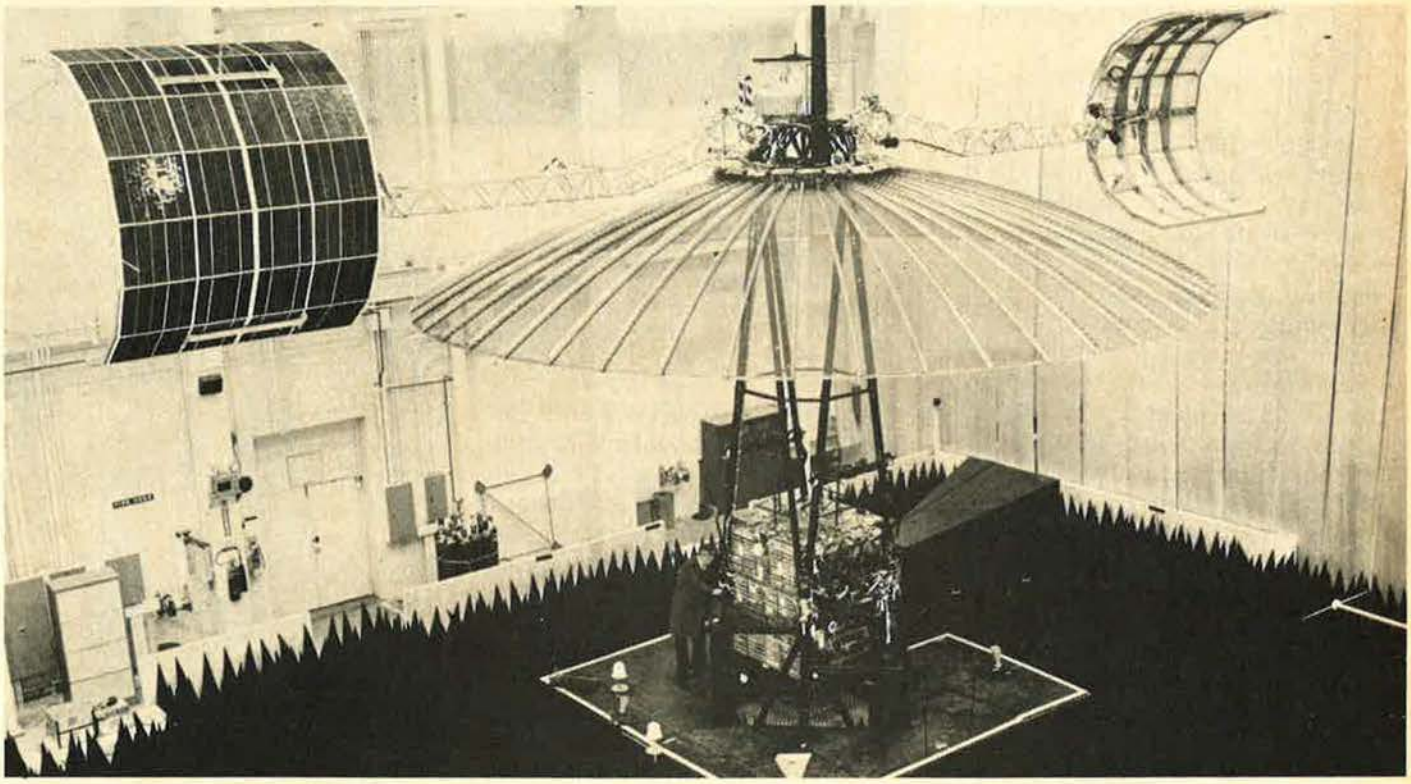
ATS-6

NASA'S HUGE TRANSMITTER IN THE SKY

BY EDGAR ULSAMER
SENIOR EDITOR, AIR FORCE MAGAZINE



The large and versatile ATS-6 applications technology satellite during final checkout at Fairchild Industries' facility.

ON MAY 30, 1974, at 0900 hours sharp, SAMSO's 6555th Aerospace Test Group fired a Titan IIIC launch vehicle from Complex 40 of the Eastern Test Range in Florida. About fourteen hours later, the huge booster flawlessly positioned its $185 million payload in a synchronous, or stationary, orbit 22,300 statute miles above the Galapagos Islands. Earlier, an Air Force C-5 had delivered that payload—NASA's huge Applications Technology Satellite (ATS-6)—from the Washington, D. C., area, where the spacecraft was designed and built by Fairchild Industries, to Cape Canaveral.

History may well treat this event as the moment when the US investment in space started to pay regular dividends directly to the taxpayer—dividends beyond the payoffs in national security and prestige. ATS-6 exploits twenty years of Air Force and NASA space technology to achieve pervasive practical impact on the lives of individuals here on earth. From its synchronous perch, which gives it a precisely fixed, stationary position relative to the earth, ATS-6 is in communications view of almost half the globe, including all of the continental United States.

By rebroadcasting and augmenting TV and radio transmissions, the new spacecraft will serve millions of people in a variety of novel educational, medical, and basic communications roles. Various government agencies at the state and federal level as well as the Corporation for Public Broad-

casting and the government of India will provide programs for the twenty different technological demonstrations and scientific experiments to be carried out by ATS-6.

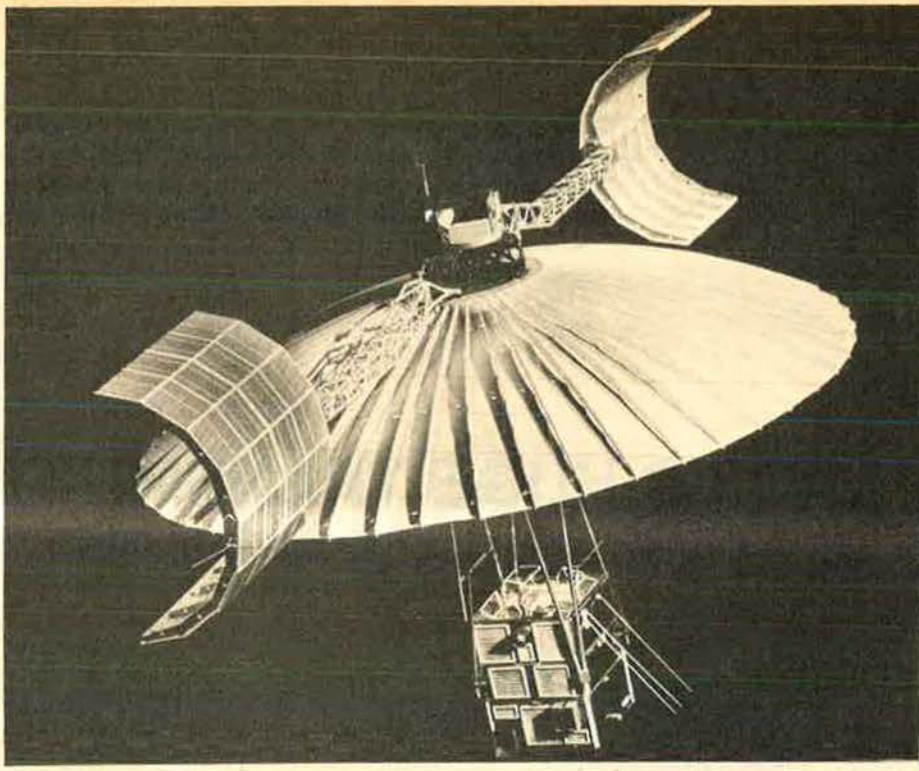
According to the US Department of Health, Education and Welfare, ATS-6 represents, among other things, "the largest and most complex application of technology to education ever attempted." HEW Secretary Caspar Weinberger told reporters that ATS-6, which is the world's first broadcast (as opposed to communications) satellite, will make possible vital educational functions for the people of Alaska, the Rocky Mountain region, and Appalachia. These functions include teacher training, career counseling of high school students, adult education, and training of medical students.

At the same time, ATS-6 is expected to improve the quality of health care for Americans in remote locations, and later for the people of India. It will make possible such novel means as telediagnosis and teleconsultation to and from remote medical facilities and the rapid transmission of a patient's medical record for emergency diagnosis and treatment. As a direct participant in the ATS-6 program, the US Veterans Administration will use the system to link its hospitals in remote locations with larger medical centers by using the satellite for the simultaneous, low-cost, long-distance audio and video transmission of such clinical information as electrocardiograms, tracings, and X rays, as well as for general consultations.

Other major functions to be performed by the new spacecraft include air and ship navigation and traffic control, communications with other satellites to reduce their dependence on ground stations, and meteorological as well as agricultural observations.

World's Most Powerful

The new satellite differs from previous communications satellites in a fundamental fashion: It is powerful enough to beam video and audio information to thousands of simple ground receivers, some costing as little as $600. ATS-6 radiates about 200,000 watts of effective radio-energy, compared to about 6,400 watts produced by INTELSAT IV, the most capable communications satellite currently in operation. The present family of communications satellites requires complex and costly ground terminals that rebroadcast satellite transmissions on the ground. ATS-6, by contrast, requires no intermediary system and transmits its signals directly to the user.



Above: Built by Fairchild Industries for NASA's Goddard Space Flight Center, ATS-6 can communicate with many simple and inexpensive ground terminals. Right: Heart of the new satellite is its Earth Viewing Module that includes high-powered transmitters and antenna feeds.

The new spacecraft derives this unique capability from its high-powered receiver system which, with its large directive parabolic antenna, can relay simultaneously a large number of color TV and other signals to an essentially unlimited number of inexpensive terminals on the ground, in the air, and at sea.

Fairchild Industries' Vice President Dr. Wernher von Braun predicted that this capability "could turn out to be the most important advance since movable type as a means for reaching people now separated by vast geographic, economical, and cultural barriers." NASA officials point out that ATS-6 is basically a full-size ground transmitter put into space.

The new spacecraft's vital statistics bear out this description: ATS-6 weighs about 3,090 pounds and is twenty-six feet high and fifty-two feet wide. Its reflector antenna has a diameter of about thirty feet and, in a technological sense, is one of the most critical and advanced elements of the new spacecraft.

A key function of the parabolic reflector is the simultaneous transmission of color TV and audio signals to precisely defined geographic areas of the earth. During the first year of ATS-6's operation, these areas will include Appalachia, the Rocky Mountain states, and the states of Washington and Alaska. The spacecraft does this by bouncing off its reflector the high-powered rebroadcast signals generated by its two transmitters. These signals form a pair of diverging beams that produce two giant "footprints" on earth, covering an area about 1,000 miles long and 300 miles wide.

The reflector, folded during launch, looks like an opened umbrella in its deployed state. It consists of a support and forty-eight aluminum ribs that are covered by copper-coated dacron to provide the needed reflectivity.

Mounted on top of the parabolic antenna are the solar panels—two semicylindrical structures covering an area of 218 square feet and incorporating 21,600 solar cells. The output of the two panels is 470 watts of power. The spacecraft keeps the panels on a constant east-west exposure so that one of them is always facing the sun to ensure a constant power supply. The electrical power generated by the panels is channeled to two large nickel-cadmium batteries, which act as a reservoir during periods when the spacecraft's power consumption exceeds the output of the solar panels.

Mounted on a platform on top of the solar panels is the Environmental Measurement Experiments package, which contains scientific instruments to gauge cosmic rays and other radiation, including electrons, protons, and alpha particles as well as the earth's magnetic field. These upper elements of the spacecraft are connected to its 2,000-pound core, called the Earth Viewing Module or EVM, by a tubular truss made of tough, lightweight reinforced plastic. The EVM consists of several elements, including the on-board communications system, which NASA terms the "most complex ever developed for spacecraft application."

At the heart of the unit is a versatile transmitting and receiving subsystem that consists of six receivers and nine transmitters, capable of operating in about twenty frequencies ranging over a wide sector of the radio spectrum. The communications system can function in the manner of a switchboard by converting signals from one bandwidth to another.

Another important component of EVM is the mechanism for attitude control and spacecraft positioning. The brain behind the controls is a pair of digital computers, backed up by an analog emergency system, that are linked to sensors of various types. The computers are preprogrammed, but can take instructions from the ground when necessary. Information from space and ground-based sensors is processed by the computers and used to control the speed of the spacecraft's three momentum wheels, which furnish stability in terms of roll, pitch, and yaw.

Backing up the momentum wheels is a series of small thrusters that will be used whenever the spacecraft is to be moved east or west along the earth's equator. The three-axis pointing capability, according to NASA spokesmen, is sufficiently accurate to "lock on any set of coordinates on earth within about thirty-five miles." This precise pointing capability is crucial to a range of ATS-6 missions, including the tracking of aircraft, surface ships, and low-orbit satellites and manned spacecraft.

According to NASA's Deputy Associate Administrator for Applications, Leonard Jaffe, ATS-6's ultra-precise position keeping in synchronous orbit, coupled with the ability to track accurately, may eventually do away with the large number of ground stations currently needed to receive data from spacecraft passing overhead. Spacecraft now have to store data from their sensors on tape recorders until they come within range of a ground station and then "dump" that information. The elimination of both ground stations and tape recorders on board the satellites —a cumbersome and "not terribly reliable" arrangement—is seen as a vast and far-reaching improvement of future satellite networks.

NASA is investigating such a network, known as the Tracking and Data Relay Satellite System (T&DRSS). According to present plans, that system would employ two synchronous orbit satellites to relay command, tracking, and telemetry data between the ground and a number of spacecraft in low earth orbit. ATS-6 will test the feasibility of this concept through tracking and data

THE PRINCIPAL CONTRACTORS TO NASA FOR ATS-6

Fairchild Industries, Germantown, Md.—Prime contractor for development, integration, and test of the ATS-6 spacecraft.

Philco-Ford, Western Development Laboratories Division, Palo Alto, Calif.—Development of the communications module.

IBM, Gaithersburg, Md.—Design and development of the telemetry and command system.

Honeywell Aerospace Division, St. Petersburg, Fla.—Development of the attitude control system.

Lockheed Missile Space Center, Sunnyvale, Calif.—Development of the nine-meter (thirty-foot) parabolic reflector.

Rocket Research Corp., Redmond, Wash.—Development of the spacecraft propulsion system.

Hercules, Magna, Utah—Development of the parabolic reflector support truss.

relay experiments with other NASA spacecraft, two of which are to be launched later this year. They are the Nimbus-F meteorological research spacecraft and the GEOS-C geodetic research satellite. The first operational mission of this type assigned to ATS-6 will involve tracking and data relay from the Apollo and Soyuz spacecraft as they orbit the earth in a ten-day, joint US-USSR space docking experiment in mid-July of 1975.

Because of the location of the Soviet launch site, the orbits of the two spacecraft will be inclined in a way that places them outside of the range of many US ground stations. ATS-6 will more than make up for the lack of ground coverage by permitting steady coverage of the two spacecraft during fifty percent of their orbits. As a result, it will be possible to transmit large quantities of biomedical and other data and to increase the amount of live TV from the flight.

Air Traffic Control

In concert with the Federal Aviation Administration, the Maritime Administration, the US Coast Guard, the Canadian Ministry of Transport, and the European Space Research Organization (ESRO), NASA is using ATS-6 to conduct extensive performance tests of communications and position-location techniques involving ships at sea and aircraft flying over the Atlantic. Operating in conjunction with an older satellite, ATS-5, the new ATS-6 provides tracking and communications facilities along a corridor across the North Atlantic that absorbs the heaviest traffic loads.

Four jet aircraft and five ships, provided by the US, Canada, and ESRO, will participate in these tests. Known as Program Pace, these experiments are meant to provide safer and more economical transatlantic air traffic by reducing the present spacing and timing constraints that result in costly and time-consuming routing patterns. At present, transatlantic flights are assigned 120-mile-wide corridors and individual aircraft are spaced at least fifteen minutes apart. ATS-6 will explore the potential of reducing these separation requirements to thirty-mile-wide

A Titan IIIC, USAF's most powerful booster, lifted ATS-6 into orbit.

traffic lanes and five-minute spacing of individual aircraft.

(This technique resembles the more complex and sophisticated approach to be taken by the twenty-four-satellite NAVSTAR Global Positioning System, which is being developed by the Air Force on behalf of the Department of Defense. NAVSTAR GPS, on which the Air Force just let an initial $42.8 million contract to Rockwell International, is to provide three-dimensional navigation position accuracies of about thirty feet for up to 27,000 users by the end of this decade. It also can be used for blind bombing and midcourse guidance of terminally guided missiles.)

The underlying principle of NASA's ATS-5 and ATS-6 effort involves trilateration from three ground stations to each spacecraft.

The Indian Connection

One of the key functions of the new broadcast satellite is to bring public TV, on a test basis, to large areas of the United States that, because of remoteness and peculiar terrain features, cannot be served economically at present. According to the President of the Corporation for Public Broadcasting, Henry Loomis, to reach the "last ten percent of the people [in the US with TV coverage] would cost as much as reaching the first ninety percent." While he pointed out that ATS-6 will not be able to broadcast to all remote regions of the United States, he predicted that it will be possible to narrow the gap by reaching "maybe twenty percent" of the population who do not now receive TV broadcasts.

Possibly the most dramatic demonstration of the new spacecraft's unique capabilities is to start next summer when the satellite is to be moved for one year to a new location above the East African country of Kenya in order to focus its broadcast beams on the Indian subcontinent. Known as the SITE, or Satellite Instructional Television Experiment, this effort will involve the rebroadcasting by ATS-6 of instructional television programs in a pattern that can be seen all over India. These broadcasts, designed to improve occupational skills, increase food production, assist in teacher training and family planning, and improve health and hygiene, will be prepared by the Indian government. Signals will be received by low-cost community receivers in some 5,000 Indian villages.

Indian officials told AIR FORCE Magazine that the basic ground system used by the SITE program will cost about $600 and will consist of a simple ten-foot-diameter antenna of chicken wire mesh, a converter, and a TV receiver. In addition, the spacecraft will also transmit to ground-based networks serving urban areas.

Utilization of the spacecraft after completion of the Indian demonstration effort has not been determined except that ATS-6 will be returned to a position where it can serve the US. The spacecraft's useful lifespan, determined by the propellant supply required for its station-keeping, is estimated at five years by NASA program officials.

The total cost of the program, counting the spacecraft, the Titan IIIC launch vehicle, and the specialized ground equipment developed by NASA and the individual user agencies, is about $250 million. This would seem a reasonable price for what HEW Secretary Weinberger called the ATS-6's task of "bringing space-age technology down to earth and using it in our daily lives." ■

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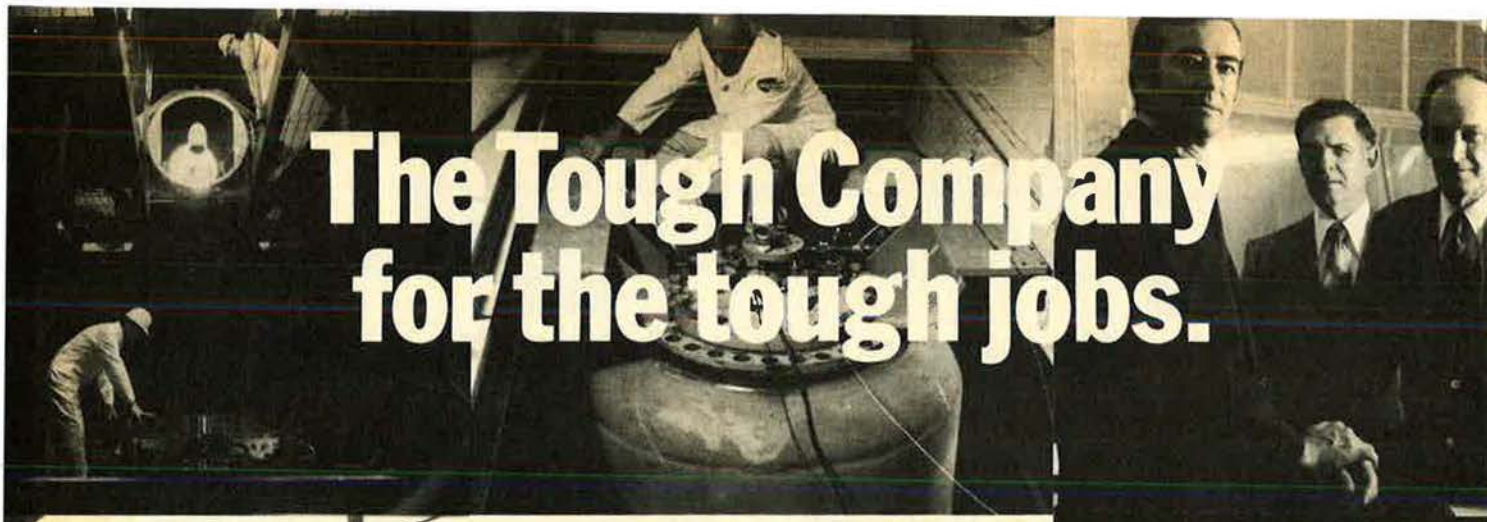

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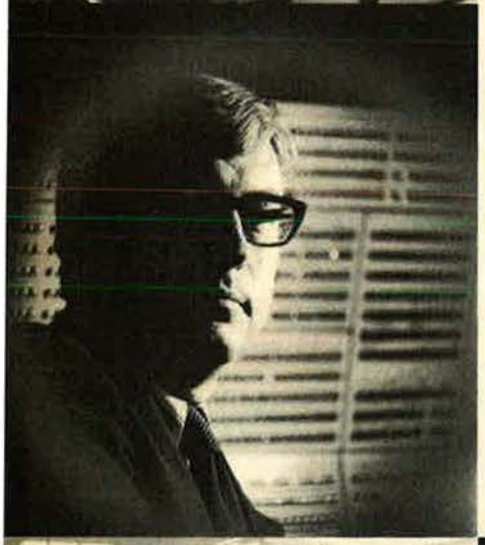

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The AFA Symposium on Strategic Weapons Development, held this spring at Vandenberg AFB, Calif., dispelled the fiction that "our land-based missile force is vulnerable and obsolete," and stressed the need for an upgraded national warning system and for better communications . . .

Our ICBM Force—The Vulnerability Myth

BY EDGAR ULSAMER
SENIOR EDITOR, AIR FORCE MAGAZINE

"WE know the technical difficulties [caused by the fratricidal effect] of developing an ICBM force that could have a simultaneous laydown capability and, more importantly, we know that the Soviet military planners could never have high confidence that their forces could really do significant damage to our ICBM force even if they could attain the necessary force and timing capabilities.

"A Soviet attack against our land-based missile force requires them to use systems that have extended flight times, thus alerting our bomber force and letting them get airborne. Alternatively, a Soviet attack against our bombers by SLBMs gives us warning for our ICBMs with the attendant likelihood of escape. With these two force elements, there is no way that the Soviet military could rationally expect to

A Minuteman III roars from Vandenberg AFB, Calif., as a fitting finale of AFA's Strategic Weapons Symposium.

AFSC Commander Gen. Samuel C. Phillips considers full-scale development of an attack assessment system one of the most pressing strategic requirements.

SAMSO Commander Lt. Gen. Kenneth W. Schultz recommends the development of a new, flexibly based, long-range ICBM prototype capable of extreme accuracy.

achieve any viable strategic advantage, no matter what the scenario."

This reasoning was set forth by Gen. Samuel C. Phillips, Commander of the Air Force Systems Command, in dispelling the "myth that our land-based missile force is vulnerable and obsolete," at AFA's Symposium on Strategic Weapons Development at Vandenberg AFB, Calif., May 1–2, 1974.

Lt. Gen. Kenneth W. Schultz, Commander of AFSC's Space and Missile Systems Organization (SAMSO), pointed out that "the possibility that any existing enemy force could accurately target and knock out all, or even any overwhelmingly major portion of our 1,000 Minuteman force is still so remote as to be negligible." Originally, Minuteman was organized in flights of ten, with each flight assigned its own specially hardened launch control facility, he said, but "then the Soviets developed twenty-five-megaton warheads, which gave them the capability to knock out our 100 hardened launch control facilities. Our next step . . . was to put the launch control capability into the air where an enemy couldn't target it. That's where it is today, and the on-going Command Data Buffer Program will permit retargeting of Minuteman III from any of five interconnected launch control facilities within each squadron in a fraction of the time previously required."

In short, General Schultz stressed, "the enemy has lost the capability to knock out our land-based missile power, even with 100 precisely directed, simultaneous [and] massive hits." He added that because of these factors the outgoing Air Force Chief of Staff, Gen. George S. Brown, was able to report to the Congress that "eighty-five to ninety percent of the Minuteman force would survive a nuclear attack," and that Minuteman III provides weapons on alert at lower operating cost than any other Triad element.

Concerning the recent accenting of a flexible targeting policy, General Phillips told the AFA Symposium that, although the United States emphasized a strategy of assured destruction during the past two decades, "during the vast majority of that time we had, in fact, forces capable of destroying the military forces of the Soviet Union. It is also significant to add that such an assured destruction objective has never been stated as a primary role in Soviet strategic objectives; the destruction of the opposing military forces has always been their No. 1 objective."

Significant improvements in the flexibility and efficacy of the existing strategic forces, the AFSC Commander emphasized, can be attained through an attack assessment system. The increasing sophistication of launch platforms and penetration aids creates difficulties in identifying the nature of an attack in progress. The overriding requirement, he said, is to improve the software associated with US warning system computers so that information from satellites, radar networks, and other sensors positioned around the globe can be correlated, analyzed, and coherently displayed to decision-makers. "Instead of showing disparate data from dissimilar gathering points, the correlated analysis will tell us immediately whether the attack is real, what kind of an attack it is, where it is coming from, and where it is headed."

While fiscal constraints have slowed down AFSC's attack assessment program, General Phillips said, "the immediate aim is to improve the information, assessment, and displays of SAC and NORAD and the National Military Command Center, primarily through changes in the software. Later on it may be necessary to consider developing new satellites, new radars, new computers, and other equipment."

Another urgent and vital requirement is in the area of improved space communications, General Phillips said, in order to provide "immediate access to missile and bomber forces." Such a capability is needed to control the bomber forces after launch, "thus allowing us to take advantage of any changes in enemy posture, target availability, or diplomatic exchanges. Space communications links, in combination with other communications systems, ensure that the national command authorities will be continually apprised of military situations and have a force immediately responsive" to their orders.

A "synergistic" gain can be realized by combining improved command and control systems with attack assessment by eliminating the need

for redundant targeting within the Triad of strategic weapons. For example, General Phillips explained, "the utility and flexibility of the manned bomber force can be maximized by not having to attack targets destroyed in the prior ICBM attack." Stressing that the Triad must be continued and improved, he urged that "at the very least, we must develop system options and put them on the shelf where they could quickly be put into production if strategic arms-limitations discussions fail."

Minuteman Meets New Strategic Needs

"Besides making a viable contribution to the spectrum of deterrence, our ICBM force has the capability to inflict, at all times and under all foreseeable conditions, a significant degree of damage upon any single aggressor, or combination of aggressors, even after absorbing a surprise attack," according to Lt. Gen. W. F. Pitts, Commander of SAC's Fifteenth Air Force, who provided the Symposium with a status report on USAF's ICBMs.

Current improvements of the Minuteman force, General Pitts said, assure that the system's effectiveness "keeps pace with the demands of extended strategies. This is particularly true where it is necessary to minimize collateral damage."

In describing Minuteman III's follow-on warhead, designated the Mark 12A, General Pitts said that the new reentry vehicle uses "advances in hardware and electronic design to allow substantial miniaturizing of the arming and fuzing components [thereby making it possible to enlarge the warhead package] to the extent that the yield can be increased substantially" from the older Mark 12. Since the new warhead is identical in weight and volume to the older one, it is possible to "maintain the current Mark 12 data base, thus reducing the cost involved with testing a new reentry vehicle."

Stressing that accuracy is a key factor in safeguarding Minuteman's credibility, he disclosed that the Air Staff recently initiated a Guidance Improvement Program to "develop improved accuracy for the present Minuteman III guidance system and to improve rapid retargeting techniques and capabilities." He added that the Air Force is examining hardware and software changes of the present guidance system.

The Command Data Buffer, which permits rapid, remote retargeting of ICBMs and is now operational at Francis E. Warren AFB, Wyo., helps to assure the "credibility of Minuteman well into the 1980s," according to General Pitts. This retargeting mechanism, he added, meets not only the new national requirement for flexible targeting but also makes it possible to reprogram the Minuteman III force after an enemy attack.

Lt. Gen. W. F. Pitts, Commander of SAC's Fifteenth Air Force, stressed that Minuteman's credibility is assured "into the 1980s" and meets flexible targeting requirements.

Rear Adm. H. E. Lyon, the US Navy's Project Manager for the Trident System told the AFA Symposium that Trident is highly survivable against all foreseeabl threats.

In-place survivability is a prime requirement of USAF's ICBMs, which must be able to withstand an enemy's first strike, General Pitts pointed out. The resultant requirements are stringent. "Besides receiving blast and shock effects through ground motion, a surviving launch facility will have debris deposited over the launcher/closer. Regarding the in-flight situation, the accelerating booster must penetrate sizable dust particles strewn in the atmosphere by previous nuclear detonations. Friction from these particles could erode the forward section of the missile. Sporadic shock effects and electromagnetic energy also could affect the missile during the boost phase," he explained.

In order to prevent excessive debris from falling into the launch tube and striking the missile, the Air Force has strengthened the mechanism for opening the launcher/closer and installed an ingenious debris collection system, which, incidentally, is also effective against snow and ice.

The Upgraded Silo Program, General Pitts said, is designed to make the silo's missile suspension system and shock-mounted flooring as survivable as the structure itself. Other measures protect Minuteman against the electromagnetic energies generated by nuclear bursts. In unprotected systems, General Pitts said, electromagnetic pulse (EMP) can cause component burn-out, computer memory loss, and spurious signal in logic circuits. The Air Force counters these problems in two ways, he said:

"The amount of current entering the silo is limited by electrically sealing the launch facility. Also, we shut down critical circuits within the facility and the missile for a matter of milliseconds until the pulse has passed. When reactivated, there is no adverse effect to the componets or logic circuits and, most important, no degradation in accuracy."

The Sea-Based Deterrence

Rear Adm. H. E. Lyon, the US Navy's Project Manager for the Trident System, briefed the AFA Symposium on the sea-based strategic system. During the past fifteen years, the Polaris/Poseidon fleet completed more than one thousand deterrent patrols "with the crews having spent almost two million hours under way" in forty-one submarines. The Trident system, currently under development as a replacement of Polaris/Poseidon, is predicated on three criteria, he said:

- It must be highly survivable in a sophisticated ASW environment;
- It must be a cost-effective replacement of the present systems;

SAMSO Commander Proposes Advanced ICBM Prototype

In a widely noted Symposium presentation, Lt. Gen. Kenneth W. Schultz, Commander of AFSC's Space and Missile Systems Organization (SAMSO), urged that the US start at once to develop a new, versatile, and long-range ICBM prototype. The estimated cost would be about $200 million over the next four or five years. The SAMSO Commander said he was making this proposal on a personal basis but "with some knowledge" of DoD and Air Force leaders. SAMSO has since been asked to "definitize our general description of what such a prototype should look like," General Schultz told AIR FORCE Magazine in a subsequent interview.

The Air Force is now working on an advanced ICBM known as the M-X program, but this effort is limited to "subcomponent and subsystem technology demonstration." [*See "M-X: The Missile System for the Year 2000," March 1973, and "Upgrading USAF's ICBMs for the Counterforce Role," February 1974.*]

Principal features of an advanced ICBM should be extreme accuracy—possibly down to zero CEP—"flexible options for trade offs between throw weight and range," and greater throw weight than Minuteman. Some of the missiles must be capable of air-launch to assure that a portion of the force is invulnerable to surprise attack, according to SAMSO's analysis.

The Air Force wants the prototype to have the payload flexibility of its strategic bombers, so the missile can carry a single warhead, or be MIRVed in different configurations with different penetration aids, or carry variable quantities of different RVs, according to General Schultz. Such an arrangement would keep a potential aggressor from knowing what types of warheads and penetration aids are installed on the US ICBMs at a given moment. As a result, the attacker's planning would be complicated and the deterrence value of the missile force increased, the SAMSO Commander said. He conceded that it would be reasonable to assume that the new missile could carry as many as ten warheads and still have a hard-target kill capability.

The ICBM prototype must be designed to "go into silos but at the same time give us the option to shoot it from a truck—or other mobile launcher—if that is desirable, or most important, to launch it from an aircraft. Some people favor a modular approach where different missile stages are assembled for differen missions—as we do in the case of space launches—bu we believe that such a tinker-toy approach could caus serious troubles in the field," according to the SAMS Commander.

General Schultz told AIR FORCE Magazine that it i reasonable to assume a halving of present CEPs withi four or five years "without using radically new tech nologies." The Advanced Inertial Reference Spher (AIRS), currently moving toward flight demonstratio as part of SAMSO's year-old M-X program, could pro vide such an accuracy increase by combining th various gyro functions in a single reference sphere "We are also working on advanced computer design and, hopefully, demonstrating a breadboard model o an advanced hardened subsystem based on MO [metal oxide semiconductor] large-scale integrate circuits."

Stating that guidance technology has made grea strides because of SAMSO's Advanced Ballistic Reentr System program, General Schultz disclosed that "in ertial guidance systems that can provide . . . accurat post-boost guidance all the way to the target are no within the state of the art."

A long-term goal of Air Force ICBM guidance wor is zero CEPs. "In a practical sense, the Air Force ha achieved a zero CEP with its air-launched Maveric tactical missile. The challenge now is to adapt thes techniques to an ICBM traveling at 16,000 miles a hour for 5,000 miles or more," he said. Gener Schultz stressed the importance of increasing accurac noting that the standard measure of accuracy, CEP, misleading. CEP does not denote the mean accurac of a missile "100 percent of the time," but the radiu within which half of the missiles will impact and whic the other half will miss. "The better the mean point impact, the more effective the weapon," Gener Schultz pointed out.

In order to hedge against the momentum of Sovi R&D and potential changes in the USSR's targetin philosophy and number of MIRVs, the US must mai tain "at least engineering equivalence" vis-à-vis th Soviets, General Schultz urged. The central requir ment is to provide US strategic forces with the opti

• It must carry a missile that delivers a full payload over much greater ranges than the Polaris/Poseidon systems.

In Trident, Admiral Lyon said, the Navy is, for the first time, developing a new submarine platform and a new strategic weapon system simultaneously. "With the longer range missile available, the Trident system will be based in and operate out of the United States. The location for that base has been selected at the Naval Torpedo Station . . . across Puget Sound from Seattle, Wash.," he said. Construction of the new base is to start this fall.

Development of Trident began in 1971, and its most important element is "perhaps the nuclear propulsion plant designed to allow Trident to operate quieter than any prior class of submarine." Under normal patrol conditions "this reactor has virtually no moving parts," and should enable the submarine to perform continuing patrol operations "between regular shipyard overhauls for about ten years," Admiral Lyon said.

The Trident missile is the Navy's "first three-stage submarine-launched ballistic missile and utilizes much new propulsion technology

of an air-launched ICBM. If missiles traveling at forty knots in the ocean are considered invulnerable, then those moving at more than 500 knots in the vastly greater area of the atmosphere must be "an order of magnitude" less vulnerable, he suggested.

An airborne missile carrier, he maintained, is next to impossible to hit from 5,000 miles away. "It shouldn't be necessary to put the missile-launching aircraft into the air until somebody starts launching ICBMs at it," because a barrage bombing of the airspace through which the carrier could escape would require a prohibitively large number of the aggressor's warheads, according to General Schultz.

At the same time, the full potential of a US air-launched system can only be realized if the missile has intercontinental range. A missile with less range would require the missile carrier to fly considerable distances toward the target before it could launch its weapons. This would lower the reaction time and drive up operating costs.

While Air Force studies of various ICBM basing modes establish the merit of air-launched systems, there is no intention of completely replacing the silo-based missile. "A mix of silo- and mobile-based systems would give the country the greatest return on its investment in strategic weapons, just as it does in the case of Triad. [Minuteman] is still fully viable . . . but we need a new, airborne system compatible with [the existing ICBMs]," he said.

An inherent advantage of prototyping "would be the option to change to a full-scale engineering development if the Soviet threat increases further. During the first year or year and a half, there would be almost no difference between a prototype and a development program, and we could branch off into full development easily and economically. If we were to do nothing for the next two years or so, and then recognize a serious tilt favoring the Soviets, we would run into a welter of problems. We would lose time and money and run into the program manager's nightmare of concurrency, high risk, inadequate understanding of the requirements and the associated trade offs, and so on."

Another positive facet of SAMSO's proposed ICBM prototype program is its "nonprovocative character," according to General Schultz. He pointed out that there is no US commitment to build operational hardware and the Soviets themselves are flight-testing five prototypes at this time."

The M-X program, which General Schultz termed the leading edge of US ICBM technology, could be the springboard of the proposed prototype. In a status report to AFA's Symposium, he explained that M-X should provide the information needed to evaluate silo-based as well as land- or air-mobile options by the late 1970s, if it then should become necessary to build a new system. The M-X program, confined by available funds to demonstration of critical elements of advanced technology systems, primarily emphasizes exploratory work on mobile systems. The M-X program, according to General Schultz, consists of these key elements:

• Building a pre-prototype transporter launcher for land-mobile use and scale-level testing of associated hardened structures.

• Exploration and demonstration of advanced propulsion techniques, including design of new second stages and integration of new rocket cases, nozzles, propellants, and other components.

• Wind-tunnel studies and related research involving, among potential missile carriers, the C-141, C-135, C-5, and wide-bodied commercial jets, conducted in conjunction with AFSC's Aeronautical Systems Division and Arnold Engineering Development Center.

• Concept development and simulation of mobile command and control and security systems, and investigation of appropriate computer software.

• Means of increasing the hardness of fixed silos, such as cannisterization of the missile to increase survivability.

A paramount factor that could affect the US ICBMs in the future would be a MIRV ban, reportedly under serious consideration by US and Soviet negotiators at SALT II. While General Schultz considered the basic issue to be outside SAMSO's purview, he commented that MIRV is a hardware reality so far as the US and the Soviet Union are concerned and that it could be acquired by third countries. As a result, he observed, MIRV technology can't just be buried by fiat. Pointing out that no means exist—short of on-site inspection—for differentiating between MIRVed and single RV launchers when in their silos, he cautioned that even a fully verifiable destruction of existing MIRV inventories could be followed by a covert rebuilding of MIRVed ICBM forces.

Listening with rapt attention to a Symposium presentation are, from left to right, Lt. Gen. W. F. Pitts, Lt. Gen. James T. Stewart, Lt. Gen. Walter P. Leber, USA, Gen. Jack J. Catton, and former Air Force Chief of Staff Gen. Curtis E. LeMay.

developed in recent years at the Air Force Propulsion Laboratory. New weight-saving materials, integrated circuit electronics, and improved reentry body design and materials all assist in making the performance goals [of greater range] possible."

The Trident submarine, according to the Program Manager, is about 100 feet longer than present SSBNs, carries twenty-four rather than sixteen missiles, requires no increase in manning compared to the Poseidon subs, and can remain on station much longer because it requires fewer shipyard overhauls.

The Trident missile will involve two versions, C-3 and C-4, with the C-3 being designed for retrofitting into thirty-one Poseidon-carrying submarines, according to Admiral Lyon. The follow-on C-4 missile is to be available in quantity in the mid-1980s and will "not be constrained" by the requirement of compatibility with older subs.

The Trident system is "expensive," with each of the ten programmed systems costing "about $550 million. However, when built and operating, the Trident system will keep missiles at sea in an alert status for about one-third the cost of acquiring and operating a system similar to our earlier systems. All war-game modeling has shown Trident highly survivable against all . . . threats that we can foresee," Admiral Lyon told the AFA Symposium.

Lt. Gen. Walter P. Leber, the US Army's SAFEGUARD System Manager, reported on the history and status of the SAFEGUARD ABM system. The accord between the US and the USSR signed in Moscow in May 1972 by President Nixon limits both sides to two sites and a total of 100 interceptor missiles. General Leber pointed out that the treaty, which is "in perpetuity" but subject to five-year review cycles, permits research involving land-, space-, air-, and sea-based ABM systems.

The US Army's ABM effort consists of three elements, he said. The SAFEGUARD area defense system, which the US is confining voluntarily to one installation at Grand Forks, N. D., is expected to be operational "within a year. It will be able to defend some of our Minuteman missiles. From the Soviet point of view, it means that it will take somewhat more than 100 RVs to neutralize" the US ABM system, General Leber said.

The Site Defense system, currently in a prototype demonstration state, is "exclusively dedicated to the defense of Minuteman. This second-generation system is scheduled to complete [the current R&D phase] in 1977 and be ready for deployment early in the 1980s. It appears to be capable of handling all foreseeable threats," according to General Leber.

The Advanced Technology effort, the third element of the US Army's ABM program, is exploratory in nature and oriented toward future "breakthroughs," in order to either permit the US to deploy a truly advanced system in the years to come or to understand the meaning of potential ABM breakthroughs by other nations, according to General Leber.

Other speakers at AFA's Symposium on Strategic Weapons Development included Maj. Gen. George J. Keegan, Jr., the Air Force's Assistant Chief of Staff for Intelligence, who discussed the Soviet threat; Maj. Gen. Lee M. Paschall, the Air Force's Director of Command Control and Communications, whose presentation paralleled his article on C^3 that appeared in the July 1974 issue of AIR FORCE Magazine; Maj. Gen. Billy J. Ellis, SAC's Deputy Chief of Staff for Personnel, who highlighted the "people side" of strategic weapons development; and Maj. Gen. John W. Pauly, Commander of SAC's 1st Strategic Aerospace Division, host for the event. General Pauly underscored the importance of Operational Base Launch, the Air Force's proposed launch of operational Minuteman II missiles—without warheads—from their actual silos rather than a special facility. (*See February '74 issue, "The Pentagon Looks at New Strategic Options."*)

The two-day event, opened by AFA President Joe L. Shosid, attracted a capacity attendance of more than 600 industry executives as well as AFA and civic leaders. ■

See first Symposium report in July '74 issue.

Wherever disaster strikes, Hercules can strike back.

When famine hit the nation of Chad in Central Africa, Hercules hit back with 500 tons of food. Since runways were as hard to find as something to eat, Hercules had to land in clearings as short as 2100 feet. Clearings made of dirt and gravel.

Hercules has made a career out of landing where other planes can't and bringing food and medicine to those in need. The Tactical Air Command of the U.S. Air Force has flown hundreds of these Hercules mercy missions.

When earthquakes devastated Nicaragua and Peru, Hercules was in the air within two hours carrying tons of plasma and supplies.

Typhoon Karen seized the island of Guam. Hercules flew in with generators and water purification systems. All of which were unloaded through Hercules' huge rear doors and down its rear loading ramp, without the need of ground-handling equipment.

Hercules has been all over the world helping to save lives. It's brought vaccine to fight epidemics, insecticide to fight locusts, iron lungs to fight polio. It's landed on snow, ice, sand and mud.

That's one of the reasons 34 nations have purchased this rugged airlifter. If disaster does strike, they have Hercules to strike back.

Lockheed - Georgia

A Division of Lockheed Aircraft Corporation
Marietta, Georgia

Interview With Carl Vinson, Former Chairman of the House Armed Services Committee

The View From Milledgeville, Georgia

BY LOUIS R. STOCKSTILL
Photos by Jim Duckworth

"Intelligence, and reflection, and judgment rest in old men, and if there had been none of them, no states could exist at all."

The words are those of Cicero, and we find them marvelously appropriate to introduce the following interview with Carl Vinson, the eldest elder statesman extant in the field of national security. Readers of this magazine will remember the interviewer, Lou Stockstill, best for his article "The Forgotten Americans of the Vietnam War," in our October 1969 issue, which told for the first time of the shameful treatment of American POWs in Southeast Asia and set off a series of reverberations that eventually resulted in the return of those who survived. In his former capacity as editor and congressional correspondent of the Armed Forces Journal, *Stockstill came to know Carl Vinson well, as a news source and as a friend.*

We thought it appropriate that Stockstill go to Milledgeville, Ga., to see how the first and longtime Chairman of the House Armed Services Committee now views the kinds of problems he had been so adept at solving in years past. —The Editors

Q Mr. Chairman, after more than fifty years in the House of Representatives, you have now been in retirement for ten years. Still, I imagine that in your leisure time, you continue to reflect on many of the current issues of national defense.

A Now, Lou, you know that an old man, out of public office for ten years, should be seen very little, if at all, and heard even less.

Q In your case, Mr. Vinson, I doubt that ever will be true. Many of our present leaders and members of our armed forces would consider themselves fortunate if they could benefit from your wisdom and know some of your thoughts about the trends and issues that affect our military posture.

A Well, naturally, I continue to be very interested in matters affecting our armed forces and the security of the United States. But you have to remember that I no longer have any close, personal knowledge of most of these matters. I try to keep informed about what's going on. I read four daily newspapers, I read the New York *Times's* weekly news round-up, and I watch the major national news programs on TV every night. But that's about the extent of my knowledge. If you keep that in mind, I'll try to answer your questions. Now, what is your first question?

Q One of the big questions remaining from the Vietnam War has to do with men who evaded the draft and refused to serve, or who deserted military service and fled to another country. How do you feel about amnesty for these men?

"Sooner or later I think we'll have to go back to the draft."

A I strongly oppose any general amnesty. We should never encourage the idea that military service is something that can be shunned at the whim of the individual. When a man evades the draft or deserts his uniform, it means another young man has to take his place and perhaps fight, or be wounded, or even killed. And it would be unfair to these other young men to allow those who shirked their responsibility to go scot free.

Q Do you favor some provisional amnesty that would give them, so to speak, a second chance? Recently a former Secretary of the Army told a congressional committee that these men all had one thing in common—they were all young and they all made a mistake.

A I heard that testimony, too. Perhaps they were young and made a mistake, but from what I've seen of those being interviewed on TV, few acknowledge or even know they made a mistake. Their attitude is not one to encourage widespread support for amnesty.

I think every case will have to be considered on its merits, and if the man owes a debt to society, he must pay it. Unless we deal firmly with this problem, we will only encourage disrespect for our armed forces and for the millions of young men who have served their country honorably.

Q This might be an appropriate place to discuss the efforts that are being made to man the services with an all-volunteer force. Do you believe this program will be successful?

A No, I do not. From what I gather to be the case even if we get all of the men we need, they won't all be of the caliber we need.

The profession of arms is an honorable profession, and money alone won't fill the ranks. You can't buy patriotism, and you can't buy loyalty. And from what I've been reading lately about the thousands of dollars in bonuses that are being offered for reenlistment and to keep medical officers and other specialists, it seems to me that the costs are getting entirely out of hand.

But even if we can afford the dollar costs, we can't afford the risk of filling the ranks of the armed forces with men who are not fully qualified, men who are not high school graduates, or who are below average in intelligence.

Sooner or later I think we'll have to go back to the draft. And I hope we don't wait until it's too late. I think Congress should reinstate the draft right now.

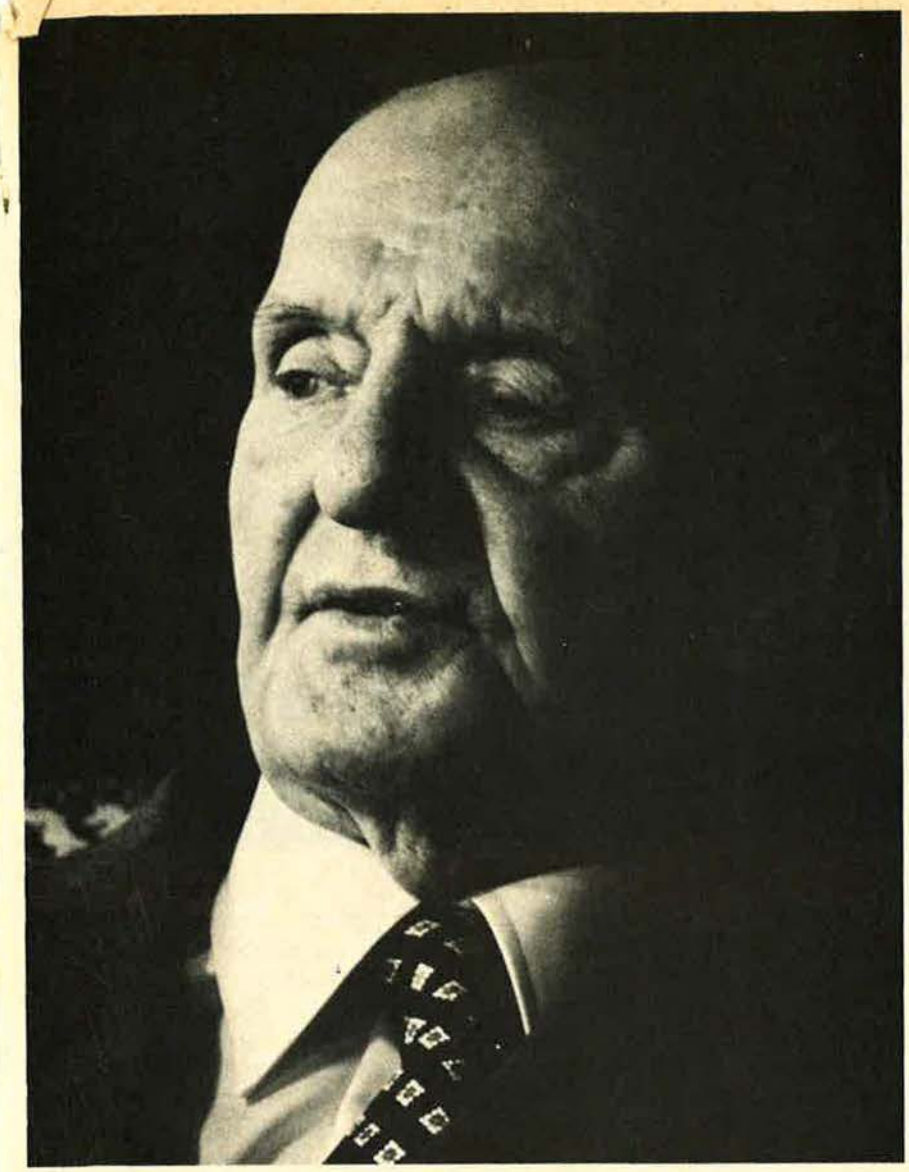
Q The Secretary of Defense has stated that the maximum attributable cost of the volunteer force during Fiscal Year 1975 will be about $3.7 billion; the total military manpower price tag is almost $32 billion, however—or more than one-third of the entire Defense Department budget for the coming fiscal year. What effect do you think these growing manpower costs are having on other Defense Department programs?

A They are bound to have a profound effect. Weapons costs never stop going up, and if you have to set aside billions of dollars for your payroll, then obviously, in a tight-money situation, you'll have less to spend on weapons and other programs.

And, of course, we are facing another tight-money situation. After every war, our defense expenditures have always been tightened up. The same pattern is shaping up again. The actual dollar outlays may be greater, but what we can buy with the money is a lot less.

Q Do you find this alarming?

A Yes, I do. Russia is our major potential adversary, and the Soviet Union's weapons have become more and more sophisticated and she is constantly improving her arsenal. We cannot afford to let Russia overtake us. We have to improve our bomber force, and we must keep our missile superiority, and we must improve our submarine force and constantly modernize and strengthen our Navy so that



we'll continue to be second to none.

Q Do you think the Strategic Arms Limitation effort and the present policy of détente will enable us to reduce our Defense expenditures?

A Well, let me say this. We must strive to use every means at our command to create a more peaceful world. But our leaders can only go to the conference table with confidence as long as we are as strong as or stronger than any potential adversary. Any reductions we might make must be made only when we are absolutely sure that we are not lessening our safeguards.

Q Mr. Chairman, there has been some recent talk in Washington about a possible move within the Defense Department to reorganize the armed forces and perhaps change some of the present roles and missions. Would you encourage a new look at the present structure of the services?

A I don't know of any particular need to look at it, but I don't know all of the background. I do know that the present organization and present roles and missions were hammered out in the Eisenhower Administration, and they are well defined and well understood. There's no harm in reviewing the structure from time to time, of course, but changes should not be made unless they offer strong, justifiable improvements.

If anything needs to be reviewed today, I think it might be the ratio of fighting men to the ratio of support forces. If we need to revitalize the services, we should probably tighten up the support structure.

When we created the Air Force, for example, we created it so we would have a superior force of pilots capable of performing all essential air missions. I think we may have gotten too far away from that concept, and that the Air Force could possibly strengthen its rated-officer structure and pare back in some of the areas that are not directly related to its primary combat missions.

And the same thing holds true for the other services, as well.

Q With respect to Air Force pilots, you probably are aware there have been some drastic changes in the methods of determining eligibility for flight pay, and that this matter is still under study and revision in the Congress. What is your reaction to this? *[The new flight pay bill was signed into law on May 31 and became effective June 1.*
—The Editors]

A Unquestionably, we have to pay pilots a premium. It costs millions to train them, and once they're trained, we have to make every effort to keep them in uniform. I'm not familiar with the changes or proposed changes in flight pay, but I would say this:

If changes are made, they must be designed to increase the attractions of a military career in flying and to improve the pilot retention rate. Any change that won't enhance these two goals won't be worth making.

And, from my experience, I would say that that principle applies across the board to most armed forces manpower needs. It applies particularly in areas of highly specialized training where the government foots the training costs.

Q Mr. Chairman, I know you have been concerned about the effect of the recent energy crisis on our military preparedness, specifically as it related to the petroleum reserves set aside for defense use. Could you comment on this and on any related concerns you have about future energy needs as they apply to the armed forces?

A This is a subject I'm glad to talk about. The fate of these special petroleum reserves has worried me a great deal the last few months.

The Administration wanted to start pumping this oil. They wanted to pump out more than we took out during all of WW II—as much as 200,000 barrels a day, compared with 64,000 barrels a day that we used during the war.

Of course, it's up to Congress to decide this issue. But, personally, I opposed it and will continue to oppose it. And I hope and trust that the Congress will insist on keeping this oil right where it is—in the ground.

These reserves were set aside for defense needs in wartime. If we allow this oil to be used for every kind of emergency, we run a grave risk of eventually having no backup supply in some future time of national danger.

Petroleum shortages, in a situation like the crisis we just weathered, may hamper us and hold us back and cut out Sunday driving, but unless they threaten our national survival, we must hold onto our defense reserves.

It's an old saying, but I'll repeat it, anyway. You can't eat your cake and have it. If we draw on these reserves now, they won't be there when we really need them.

Q Do you foresee any steps we should be taking to improve the long-range energy requirements of the armed forces?

A Well, one thing everyone learned from the recent crisis is that we can no longer afford to depend on foreign nations to fulfill our energy needs. We have to move ahead rapidly in achieving maximum independence. We must make every effort to increase all of our energy resources and output.

"We can no longer afford to depend on foreign nations to fulfill our energy needs."

Personally, I think we should launch a new, all-out effort to capitalize on the pioneering success we had in harnessing the atom. We all know what the Manhattan Project achieved. And I think that a similar effort could produce atomic power for all of our naval vessels and that we could still produce an atomic-powered aircraft engine.

The nation that put the first man on the moon certainly has the ability to solve the problem of repackaging the atom.

One way that we could go about it would be to set up a program that would assure the utilization of all of the magnificent brainpower that is now being drained out of the space program. These scientists and engineers already have demonstrated that they can do the impossible. If we gave them whatever additional experts they might require and reorganized them into a task force charged with finding new answers to our energy needs, I believe they might amaze us, all over again.

But no matter what form the effort takes, we shouldn't delay a minute in getting on top of this problem. Every potential means of improving our energy resources must be thoroughly explored and exploited, not only for the benefit of the military but for the benefit of every citizen of the nation.

Q Two final questions, Mr. Chairman: First, how do you view the performance of the House Committee on Armed Services since your retirement?

A The Committee has done an outstanding job. The membership has changed substantially since I left, but I think that the late Mendel Rivers made a great record as Chairman, and I think Eddie Hébert has demonstrated that he may be the finest Chairman the Committee has ever had.

You know, Eddie was always one of the hardest working, most knowledgeable, and most thorough subcommittee Chairmen who ever served under me. He proved himself long ago when he first headed the Investigating Subcommittee, and he continues to demonstrate superior qualities of leadership.

It has pleased me to see the Committee continue its long-standing policy of nonpartisanship. When it comes to the defense of our country, no issue must ever be decided in a partisan atmosphere.

The ranking Republicans on the Committee, Bill Bray and Les Arends, and the senior Democrats, Mel Price and O. C. Fisher, have always been stalwart believers in this philosophy, and I know they have given Chairman Hébert strong support in maintaining this essential method of examining our defense requirements.

Some of the other members who started out as freshmen congressmen when I was Chairman, who impressed me at the time, and who continue to impress me with the caliber of their endeavors, are still there—Charley Bennett, Sam Stratton, Otis Pike, Bob Wilson, and Dick Ichord. They are all strong men, and as long as the Committee has leaders like them, it will continue to make a fine record.

Some of the outstanding members, like Les Arends, O. C. Fisher and Charley Gubser are retiring at the end of this Congress, but I have faith that their replacements will try to serve the interests of their country, with the same honesty and integrity that these men and the long line of their predecessors have always exhibited.

The Committee has a proud heritage. It is respected and admired. If those who now serve on the Committee, or who join it in the future, want to take pride in their service, they will continue to uphold and build on the Committee's reputation for hard work and no nonsense.

Q Do you have any advice for the newer members of the Committee?

A If I were in a position to advise them, the most important message I could pass along would be this: Never allow geographic concerns, or narrow constituent concerns, or private or political or vested interests, or any such interests to influence your vote on issues of national security. Your main concern, always, must be the welfare of the United States of America. ■

(See the following pages for more about Mr. Vinson.)

Ten minutes later the phone rang. It was Mr. Vinson with a terse command for me . . .

"Get On Out Here"

BY LOU STOCKSTILL

The 300-acre Vinson home, River Ridge Farm, sits astride an unnumbered state highway four miles south of Milledgeville, the old, pre-Civil War capital of Georgia.

The rolling, well-maintained road is bordered with a heavy carpet of red clover, towering pines, and green pastures. As you leave the outskirts of Milledgeville, a signpost identifies the road as Vinson Highway.

But when you reach the farm, there's nothing to indicate that it belongs to one of Georgia's most illustrious sons. A thick privet hedge marches along the road in front of the half-moon driveway curving up to the house. Tall magnolia, nandina, dogwood, and other trees and shrubs enfold and dwarf the spacious white frame residence so that it appears deceptively small and inconspicuous. Most travelers would pass it by without paying it much attention—a fact that suits the man who lives there.

He has always walked apart from the common herd, and guarded his privacy with zeal. Retirement has not changed him. Unlike many former colleagues who have retired or been defeated but continue to haunt the halls of Congress, Carl Vinson has never been back inside the US Capitol since he stepped down as Chairman of the House Committee on Armed Services ten years ago.

Of course, friends from "Washington City" come to Milledgeville. Recent visitors have included Mel Laird and Bryce Harlow, before they left the White House as senior advisers to the President; House Armed Services Committee Chairman F. Edward Hébert; the Secretary of the Navy; the Chief of Naval Operations; former Sen. Margaret Chase Smith; and Rep. and Mrs. Bob Sikes.

He welcomes these visitors and the chance to hear first-hand news about the Congress and official Washington. But in the quiet days when there are no visitors, he keeps busy on the farm and with his office in town and his correspondence, and he is content.

For my first interview with Mr. Vinson, I was late—not by the clock, but by his own personal timetable, which has built-in pitfalls even for the wary.

Before I left Washington, I had talked with him on the telephone. He had reserved a room for me at the Holiday Inn, about two miles on the other side of Milledgeville from the farm. And he had told me to telephone him when I arrived.

From previous experience, I knew this did not mean thirty minutes or an hour after my arrival, but the instant I checked in. So I quickly placed the call.

"All right, Lou," he said, "now you go through town and stop and see Till and then come on out to the farm."

"Till" is a former assistant of Mr. Vinson's who also is retired. He and his family live in Mr. Vinson's former townhouse on Montgomery Street, where Mr. Vinson grew up, just around the corner from Georgia College. It's about a ten-minute drive from the Holiday Inn, and I was there in less than fifteen minutes.

Till and I chatted for another ten minutes, and then the telephone rang. We both smiled in the knowledge of what it foreboded. And we were not wrong. It was Mr. Vinson.

"Where is Lou?" he wanted to know. "Right here," Till said. "Well, tell him to get on out here," Mr. Vinson commanded, "I'm waiting for him."

Those who know Mr. Vinson best are familiar with his idiosyncracies and find them amusingly endearing. I would be treated to others over the next three days. When a man has served in the House of Representatives for more than half a century (longer than anyone in our history) and chaired a major congressional committee for thirty years (also a record), it is difficult not to become a little imperious.

I got on out.

We spent the afternoon reminiscing and talking about current activities of old friends, what they're up to and what the government is up to. And then we drove back into Milledgeville for an early dinner.

Mr. Vinson has never driven a car, has never learned to drive. And he tends to be suspicious of the competence of those who do sit behind the wheel.

As we headed back into Milledgeville, I waited for my first instructions. They were not long in coming.

"Now, Lou," he said, "you're driving too fast. You'd better slow down or you'll get a citation."

I was doing thirty-five in a forty-mph zone, so I slowed down.

During dinner I had no need to outline my planned schedule for the interview that had brought me to Milledgeville. Mr. Vinson, as I had anticipated, already had thought out an agenda:

"Now, we'll go back to the farm after dinner, and watch the evening newscasts, and then we can talk until time to go to bed. And in the morning you can come back out and I'll try to answer some of your questions. And that's the routine we'll follow."

And so it was. We spent mornings on the interview. But in the evening, we watched the TV news programs. And then, until 10:00 or 10:30 each night, we discussed the people and events in the news and then rambled through a great many other topics.

The conversation frequently ranged back in time. Mr. Vinson talked about his family. His grandfather helped survey the state in its infancy. An uncle served in the Georgia legislature before the Civil War. He is particularly proud of two present-day members of the family: a nephew, Army Maj. Gen. Wilbur Vinson, who commands the Southern European Task Force, headquartered in Italy; and a great nephew, Sam Nunn, who represents Georgia in the United States Senate.

Mr. Vinson talked about some of his own campaigns for the Congress.

He recalled the events involved in his first race for the US House of Representatives, sixty years ago. His memory at any age would be remarkable, but at ninety years and six months, it is little short of phenomenal.

Remembering that first campaign in 1914, he talked about a speech he made in August "at noon" on a "wet, gray day." He recalled the first words he spoke and the effect they had on his audience. And he recited the names of all of the counties he carried to win the race, as well as those he lost.

As he talked about his early days in Washington City, he remembered vivid and specific details about the numerous rooming houses, boarding houses, and hotels where he lived as a bachelor (their names, locations, the amount of his rent, and the names of others who lived there). He still remembers the exact price he paid for the modest frame house he bought in Chevy Chase after his marriage in the depression years.

He recalled the automobile trips he and Mrs. Vinson made to Georgia in those years (with "Mary" at the wheel). "There were only two small paved stretches of road the entire distance, and one of them was paved with brick. The trip took four days each way."

Sometimes the memories crowded in thick and fast. They were well larded with humorous anecdotes.

On his first visit to the White House after John F. Kennedy became President: "He told me to sit down and motioned to a rocker. I said, 'Mr. President, I know the Executive and the Legislative are coequal branches of government, but in the old days when I came to see the President I always stood in front of the desk. It's easier to end an interview if only one person is seated.' And President Kennedy laughed and told me, 'Well, in that case you sit and I'll stand.' "

In another discussion, I mentioned to Mr. Vinson that I had never seen him angry. "Well," he said, "anger is an emotion no man can afford."

He remembered a House colleague who had been elevated to the chairmanship of another committee and who came to ask advice about how to keep the committee members in line. "I told him to get a copy of the House Armed Services Committee rules and just follow them to a 'T,' and he wouldn't have any trouble."

But before long, Mr. Vinson said, the colleague was back, bemoaning the fact that his committee members had all but wrested his powers right out of his hands. "Your rules didn't help a bit," he complained.

Mr. Vinson told him, "It wasn't my rules that did it. The trouble is, you got all of your members mad at you. I never let more than four or five of my members get mad at me at any one time."

During the evenings I spent with Mr. Vinson, we both laughed a great deal. He has always had a marvelous sense of humor.

Sometimes as we talked and laughed, from the comfort of the two big, overstuffed rocking chairs on his enclosed back porch, it was difficult for me to remember that I was sitting with a man who was a powerful influence in the nation when I was still a schoolboy; a man who has personally known nine Presidents of the United States; who is the only living member of the historic Aircraft Board, appointed by President Calvin Coolidge, that blueprinted the future of American commercial and military aviation.

I have known Carl Vinson for twenty-four years. Most of the time, I would find myself thinking of him as a contemporary. And I would momentarily forget that this is a man who also knew Billy Mitchell, who argued with Herbert Hoover, who battled with Dwight Eisenhower, and who served as mentor to such fledgling congressmen as Lyndon Johnson and "Scoop" Jackson—a man who was the architect of the two-ocean navy and who played a major role in the development of almost every aspect of America's present-day military might.

But then I would remember. And I would be grateful that AIR FORCE Magazine had given me this opportunity to once again spend some time with a great American who, only incidentally, is an old friend.

He has always walked apart from the common herd.

The approaching expiration of temporary grade relief, force reductions, and legislative inaction on DOPMA are creating for USAF . . .

ANOTHER PROMOTION CRISIS

BY ED GATES
CONTRIBUTING EDITOR, AIR FORCE MAGAZINE

THE Air Force is heading toward another officer promotion crisis.

On September 30, the temporary authority that permits advancements to field grades on a scale somewhat equitable with the other services expires.

At press time, the odds appeared a whisker in favor of an extension by or shortly after that date. But it was far from a sure thing; there is formidable congressional opposition to continued "grade relief" for the Air Force without a substantial accompanying cut in higher grade billets.

And, without an extension, near chaos will prevail.

This makes the seventh time Air Force has been forced to go to Congress for extended officer grade relief. The signs a year ago pointed toward an early end to such nonsense and the accompanying turmoil, for the Pentagon then was developing the Defense Officer Personnel Management Act (DOPMA).

DOPMA aims to simplify and streamline the officer promotion system and related personnel practices and at the same time provide adequate permanent grade ceilings. Officers would, for the first time, enjoy a deserved, authoritative, long-range look at their career advancement opportunities.

But DOPMA's chances of becoming law are uncertain. The large, immediate question is whether Congress will extend grade relief, if not via DOPMA, then by way of Defense's backstop proposal to continue existing temporary grade relief until September 30, 1976. USAF officials, at every opportunity, have warned the lawmakers of the impending turmoil without extension.

If the legislators extend the current temporary authority—in doing so they would ignore the many officer policy reforms in DOPMA—Air Force promotions will continue on the same basis as in the recent past. USAF authorities noted that, contrary to some widely held beliefs, mere extension of the temporary grade ceilings will neither increase nor speed promotions.

"Not Encouraging"

One authority characterized USAF's officer hike outlook, even with temporary extension, as "not encouraging . . . we will be fighting to stay even and not lose ground." He was referring in part to declining officer strength generally and reduced spaces in the higher ranks in particular. These fall-offs have been occurring throughout the past six years, and the end is not in sight.

Thus, the number of officer promotions (subject to grade ceilings) in the fiscal year just beginning will be well below FY '74 hikes which, in turn, were considerably lower than promotions made in FY '73 *(see accompanying table).*

Even so, the temporary grade tables allow USAF some 6,000 more colonels, lieutenant colonels, and majors than permitted by the basic ceilings established in 1954 in the grade limitation statute. Accordingly, if relief is not extended beyond September 30, USAF plans these actions in FY '75:

- Demotion of nearly 1,000 full colonels;
- Demotion of more than 2,000 lieutenant colonels;
- RIF of up to 3,000 majors.

And, of course, there would be no field-grade promotions for at least a year. USAF officers would drop far behind their Army and Navy counterparts in promotion opportunity and in the years of service required for advancement.

Service authorities frequently in the past have sounded warnings of dire consequences. Six times since grade limits were first established two decades ago, the Air Force—because Congress shorted it with insufficient field-grade slots in the beginning—has had to return periodically with requests for relief. The seventh occasion is fast approaching.

Each previous extension should have provided permanent grade tables, not temporary relief for a year or two, USAF has insisted. But Congress hasn't seen it that way. The other services in the meantime, with the more generous initial permanent grade ceilings granted them by Congress in 1954, have enjoyed a high degree of promotion tranquility. (In 1954, Congress felt that the Air Force, then a young service, needed fewer officers above the rank of major since fewer of its officers had

enough time to qualify for promotion to higher grades. That situation changed rapidly with the passage of time.) Not threatened with losing thousands of senior positions overnight, the other services have been able to plan their promotion programs well in advance and clue in their officers accordingly.

Not USAF. Because of the uncertainty over the fate of grade relief on September 30 and beyond, Headquarters USAF at press time lagged in hammering out specific eligibility zones and other criteria for the FY '75 selection programs.

FY '75 Promotion Outlook

Service officials, for instance, have had to delay a crucial decision on whether the next colonels board will consider a new full year group or just the second half of the 1954 lieutenant colonel group. (While there had been no announcement by press time, the odds favored inclusion of a full year group.)

"Air Force regrets not being able to advise officers well in advance of details of the FY '75 promotion program. But with the grade-relief problem up in the air, it can't be helped," Maj. Gen. Ray M. Cole told AIR FORCE Magazine.

General Cole, the Deputy DCS/Personnel, and other USAF officials call the need for DOPMA the "most important personnel issue" confronting the service in FY '75, the government year that began July 1. Failing passage of DOPMA, Air Force must secure the temporary grade relief needed to prevent the chaos that would result from the previously cited field-grade demotions and RIFs by the end of FY '75.

That turmoil would be in addition to the steadily rising number of RIFs Air Force anticipates this year from overall force cuts. Earlier, Headquarters forecast that total officer strength would decline by 3,659 persons throughout FY '75 (from 110,959 to 107,300), and that some 2,200 of the decrease would be involuntary force cuts, or RIFs.

More recent budget cuts, however, indicate that a total of 3,000 to 4,000 officers may have to be RIFed this fiscal year due to force cuts, General Cole indicated.

By mid-June the outlook on the grade-relief issue forecast a rugged verbal battle, particularly in the Senate, with Sen. William Proxmire (D-Wis.) quarterbacking the opposition. Also indicated is the possibility that final action may be delayed beyond the September 30 "deadline," thus adding further confusion to the ultimate outcome.

The first visible movement on grade-relief extension is expected to emerge, perhaps in mid-summer, with hearings by a House Armed Services subcommittee. A subcommittee spokesman said the group plans to "look at" DOPMA, Defense's temporary grade-relief plan, and the DOPMA-related legislative item that would let the services early-retire hundreds of senior officers. All three items are closely connected.

What may emerge from the subcommittee—and subsequent full Committee consideration—is a simple grade-relief extension, although the spokesman wouldn't rule out the group's approval of DOPMA or part of it this year.

DOPMA's Prospects

By early June, the Senate Armed Services Committee had no DOPMA or other grade-ceiling extension hearings scheduled. But a committee spokesman indicated that the group, perhaps at the last minute, would report out "an extension of some kind."

There appears to be no chance of the Senate committee acting on DOPMA this year, the spokesman for the unit told AIR FORCE Magazine. Committee Chairman John Stennis (D-Miss.) expressed similar views earlier.

Senator Proxmire, meantime, told the Senate recently that DOPMA is so complex as to be "impossible to completely understand what is being proposed." Mr. Proxmire has directed his harshest barbs at Defense's failure, in the DOPMA package, to reduce (1) the number of officers compared to enlisted members (the "officer-EM ratio"), and (2) star and flag rank billets. Displaying a huge chart on the Senate floor, Mr. Proxmire zeroed in on the ratios of generals to total troop strength.

In 1945, he noted, there was one four- and five-star officer for each 600,000 persons in uniform. In 1952, that ratio had dropped to one per 145,000, and it now stands at one four-star officer for each 56,000 troops. Among other general officers the ratio decline has been less drastic, but still significant, Mr. Proxmire charged.

When and if an Air Force grade-relief extension of two years receives

USAF Officer Promotions

To	Actual FY 1973	FY 1974 (Estimated)	FY 1975 (Estimated)
Star Grades	159	110	135
Colonel	1,619	1,129	949
Lt. Colonel	3,439	2,881	1,214
Major	3,851	3,505	2,598
	9,068	**7,625**	**4,896**
Not Subject to Grade Ceilings			
Captain	6,463	4,474	5,074
1st Lt.	9,433	2,822	7,401
	15,896	**7,296**	**12,475**
Grand Total	**24,964**	**14,921**	**17,371**

The FY 1975 estimates assume that grade relief, which expires September 30, 1974, will be extended. The sharp drop in field-grade advancements reflects declining officer strength overall and substantial cuts in the higher grade authorizations. Among line officers alone, Air Force now has about 800 fewer colonels and 3,220 fewer LCs than it had six years ago. General officer totals are down to 400 from peak strength of 443. Total officer strength, meanwhile, has dropped from 121,500 at the start of FY 1973 to approximately 110,900 now, and is expected to fall below 107,000 a year from now. The sharp plunge in promotions to captain and first lieutenant in FY 1974 mirrors USAF's move last year to stretch out advancements to those grades. It will soon take a full four years of commissioned service to attain the rank of captain.

approval by the House of Representatives, Senator Proxmire plans to fight it, though "he may agree to a one-year extension," an aide to the legislator told AIR FORCE Magazine. The aide added that such a concession would come only after the Senator again takes to the Senate floor to denounce such things as "grade creep" and the officer-EM ratio and "extracts from Defense and the Armed Services Committees a firm commitment to come up with genuine reforms."

Harassing the services on promotions is old hat to the gentleman from Wisconsin. Two years ago, when Air Force's previous temporary grade-relief law was about to expire, the Pentagon urged Congress to approve a permanent extension. The House rejected the permanent idea, but it did okay four more years of temporary relief.

When that measure came up in the Senate, Mr. Proxmire would have none of it. He demanded a simple one-year renewal. After securing a promise from the Pentagon to come up with a massive overhaul of grade ceilings and related officer policy reforms, he eventually agreed to a two-year relief bill. The overhaul reform product—DOPMA—is not at all what he wanted, Mr. Proxmire now claims.

During the hassling on the extension measure in 1972, RIF and demotion talk escalated throughout the Air Force. They were avoided only by an eyelash and with the realization that, without permanent extension, the trauma would reappear in two short years.

Long-Standing Issue

Air Force first secured temporary grade relief—an extra 3,000 majors billets over the original grade ceiling scales—in 1959. That lasted two years, then relief providing 4,000 extra LC spaces was reluctantly granted for two more years. Another two-year relief measure passed in 1963, followed by a one-year extension until the fall of 1966; that program contained 1,100 colonel and 5,500 LC billets above the basic grade ceilings.

In 1966, Air Force was still seeking—but not achieving—permanent grade relief. Instead, Congress approved a temporary extension of six years. It contained continued authority for 1,100 extra colonels and 5,500 more LCs, and added 9,500 additional majors. The latter figure was reduced by 1,500 slots a year, zeroing out in 1971. The two-year extension in 1972, which expires this coming September 30, continued the extra colonel and LC spaces.

Other influential lawmakers also keep calling for Defense to come up with permanent grade ceilings and related officer personnel policy changes acceptable to them. Rep. Otis Pike (D-N. Y.) has been vocal on the grade-creep issue. Senator Stennis also has expressed concern about DOPMA. The powerful chairman of the House Appropriations Committee, Rep. George H. Mahon (D-Tex.), said he voted for the 1972 temporary grade-relief bill with "considerable reluctance."

Mr. Mahon told the House that Defense and the Armed Services committees must come up with legislation "that will provide reasonably equal promotion opportunities for officers in all the military services and address this problem of grade creep."

Rightly or wrongly, Defense and the services are in trouble over the grade-creep issue. Their reluctance to fashion sharp reductions in the proposed permanent grade tables in DOPMA, particularly of generals and colonels, is the crux of the problem.

The basic grade tables contain a sliding-scale arrangement which, in times of general force reductions, reduces high-level billets at a much slower pace than total slots. For example, Air Force currently (until September 30) is authorized 5,654 colonels for a 110,000-member officer force. If that force dwindles to 100,000, colonel slots would drop to 5,295, a loss of only 359. With 90,000 officers altogether, Air Force could have 4,936 colonels.

Your Best Chance for Promotion:
BE A WELL-EDUCATED REGULAR

It's tough to make reasonably high rank in the Air Force. And if an officer is passed over the first time he's considered in the primary zone, his chances nose dive. He's just about out of it. The recent temporary lieutenant colonel selections provide a good example.

Primary zone line officer competitors numbered 4,940. But only 1,688 of them—a mere thirty-four percent—were chosen for promotion. Exactly 1,617 of the selectees came from the 2,606 contenders competing for the first time. That's a sixty-two percent selection figure which, over a period of several years, will rise to the approximately seventy percent overall "opportunity" figure USAF advertises for all majors.

It rises because of (1) the eventual selection of a few officers who were passed over the first time they were considered, and (2) the earlier secondary zone selection of a few members of the same basic year group.

Primary zone selection chances for all grades diminish with each subsequent consideration round. Thus, of the 880 majors considered by the recent LC board for the second time, only fifty-seven were chosen; only nine of the 536 third-time contenders made it; and just five of 917 officers considered four to six times were tapped for promotion.

Other official statistics on the 4,940 primary zone competitors for LC reveal that:

- Regulars overwhelmed non-Regulars. The statistics: Regulars considered, 4,162; selected, 1,662. Non-Regulars considered, 778; selected, twenty-six.
- Nonrated officers edged out rateds. The statistics: Rateds considered, 3,134; selected, 1,055—a thirty-four percent selection rate. Nonrateds considered, 1,806; selected, 633—a thirty-five percent rate.
- Education paid off. Advanced degree holders enjoyed a fifty-two percent selection rate, against thirty-two percent for BA-level officers. A mere fifteen percent of the nondegree holders considered were selected for promotion.

Ed Gates has been a Contributing Editor of AIR FORCE Magazine since his retirement as Editor of Air Force Times *in 1973. In addition to his monthly column on personnel affairs, he is a frequent contributor of feature articles analyzing developments in the personnel field.*

Underlying the formula is the concept that a numerically small total force requires a substantial senior officer structure. This provides a solid base for speedy overall expansion in an emergency.

Senator Proxmire and other critics are unleashing their sharpest harpoons at the star ranks, despite the fact that the services have shaved off numerous star billets since military personnel strength started to tumble in the late 1960s. Air Force is down to 400 general officers from its earlier peak strength of 443. A year from now USAF star billets will drop to 393, according to present plans.

Yet this and comparable reductions in the other services don't satisfy congressional critics who can exercise considerable leverage via the grade-relief expansion issue. The Proxmires, in effect, can tell USAF, "Cut your general officer slots much further or we'll torpedo your entire promotion program" by blocking grade-relief extensions.

It is interesting to note that while USAF is reducing to 393 general officers, its actual star "requirements" are placed at 580.

USAF Policy Changes

Elsewhere on the officer promotion front, Air Force is changing a few policies to conform with certain provisions of DOPMA. Promotion "opportunity" for making major and lieutenant colonel, for example, has been reduced—from captain to major, ninety to eighty percent; from major to LC, seventy-five to seventy percent. (LCs, meanwhile, continue to rate a fifty percent chance of making colonel.)

But the major features of DOPMA —*e.g.*, a single promotion system, reduced tenure guarantees, and an all-Regular officer force after the eleventh year of service—cannot be applied administratively. A new law is needed. Without it, the ridiculously confusing and expensive-to-operate dual promotion system (temporary and permanent promotions) continues in operation.

Among the key features of USAF's present promotion system that won't change should DOPMA become law are (1) secondary zone selections, which give outstanding performers a crack at early advancement, and (2) emphasis on the "whole-man" concept in promotion board evaluations.

Not on the horizon, though the idea appeals to officers seeking more visibility from the promotion system, is a "report-card" arrangement giving persons not chosen for promotion clues as to why they were not.

While next September 30 is the crucial date on which existing temporary grade relief expires, the roof won't fall in the following day if nothing happens. This is because the "accounting date" for squeezing actual officer strength within legal ceilings is June 30, 1975, end of the fiscal year. Theoretically, in the absence of relief extension, Air Force could wait until that latter date to demote and RIF the thousands that would be required. But it wouldn't wait nearly that long.

A detailed contingency plan with timetables for carrying out the massive ousters and demotions exists at Headquarters USAF, though officials are not disclosing details. It is expected, however, that if grade-ceiling relief is not forthcoming by late fall, drastic actions would commence about the end of this calendar year.

Hopefully, cool heads will prevail by September 30 and USAF will receive at least another temporary extension. That course is far better than nothing. Yet, further postponement of permanent grade ceilings by Congress merely resets the stage for another early round of turmoil the following year or two. When will it end? ■

CONSIDER THE SOURCE

Col. Lewis A. Dayton, Air Corps, known by his contemporaries as "The Sheriff," was commander of the Air Base S-2 School at Camp Mabry, Austin, Tex., in 1942–43. "Lewie," as the students and staff affectionately called him, was regular Army, and a command pilot. He was a rough and ready character, but was also a considerate man with a warm heart.

To get in his monthly flying time, Lewie would fly to Tulsa to visit the regional headquarters of the Army Air Forces Technical Training Command. While Lewie was away on one of these trips, Brig. Gen. Junius Jones from TTC Headquarters stopped by on an impromptu visit and took the opportunity to make a cursory inspection. The General found everything to his liking, but ordered one minor change and directed that it be done at once. I told him I would post an order immediately, and did so.

When Lewie returned, he stopped by the school bulletin board and saw the newly posted order. He ripped it off the board, stormed into my office, his face a deep crimson, and blurted out: "Who in the hell's idea is that?"

I replied "General Jones's, Sir." Lewie paused for a moment, looked me in the eye, and said gently, "Damn good idea, ain't it."

—Contributed by Col. Sidney S. Rubenstein, USAF (Ret.)

(AIR FORCE *Magazine will pay $10 for each anecdote accepted for publication.)*

MIA/POW Action Report

By William P. Schlitz

ASSISTANT MANAGING EDITOR, AIR FORCE MAGAZINE

AFA-Financed Scholarships

Later this summer, the board of trustees of Scholarships for Children of American Military Personnel (SCAMP) will decide on the winners of this year's awards. SCAMP is a private, nonprofit education organization in Southern California.

The SCAMP awards are made possible by revenues derived from the Air Force Ball, sponsored by the Air Force Association, an event that will be held for the third consecutive year on October 26 at the Beverly Wilshire Hotel, Beverly Hills, Calif.

Eligible under the SCAMP program are all the children, no matter where they reside, of those who served in any of the military services in Southeast Asia and were either killed in action, missing in action, or prisoner of war. Applicants are to be judged on their scholarship qualifications, need, extracurricular activities, and potential.

The SCAMP trustees, headed by former AFA President and current AFA Board Chairman Martin M. Ostrow, are made up of leaders in a number of fields. They are Richard J. Borda, Senior Vice President, Wells Fargo Bank, and a former Assistant Secretary of the Air Force; Edmond G. Ducommun, Director of Community Relations, Ducommun, Inc., and President, 11th Region, Navy League; Sen. Barry Goldwater (R-Ariz.); John R. Stuelpnagel, Vice President and General Manager, Hughes Helicopters, and Board Chairman of the greater Los Angeles Association of the US Army.

Initially, the scholarships will be for one year, and a maximum of $1,000.

Letters with information concerning the prospective applicants should be sent to Martin M. Ostrow, President, SCAMP, Suite 301, 280 South Beverly Drive, Beverly Hills, Calif. 90212.

The closing date of August 15 for the receipt of applications will enable the recipients to make use of the scholarships in the 1974 fall semester.

USAF Requalifying POW Pilots

The 12th Flying Training Wing, Randolph AFB, Tex., has been hard at it requalifying those of the 242 repatriated Air Force pilots who were Southeast Asia POWs and who are able to return to flight status. The unit requested the assignment.

In a nod to what might have been, the first flight a former POW pilot takes with his instructor is known as the "Champagne Flight," reminiscent of the final SEA mission concluding a tour, that was always capped by the traditional toast in bubbly. This flight acts as a transition from the Vietnam days to the present for men who may have been out of the flying picture for years.

Since May 1973, when the program began, some 135 out of 144 qualified ex-POWs have taken the course. The others have either left the service, taken nonflying jobs, or been medically disqualified.

What with the skies more crowded —and controls more stringent—than ever before, becoming accustomed again to cockpit time has afforded the returned POWs considerable challenge. Most have taken it in stride. To assist, USAF has tailored the requalifying process to the needs of the individual, allowing each to set his own pace.

Ex-POWs in Politics

At least four former American Southeast Asia prisoners of war have opted for the political arena after leaving the service.

Leo Thorsness, a former Air Force lieutenant colonel and Medal of Honor winner who was captured in April 1967 and returned during the major release of SEA POWs early last year, has set his sights on the South Dakota US Senate seat currently occupied by George McGovern. Thorsness recently won the Republican nomination to try for it.

In Maine, former Navy Lt. Mark Gartley, captured in August 1968 and released in September 1972 by the North Vietnamese, won the Democratic nomination in the Second Congressional District to go against Rep. William S. Cohen, presently the Pine Tree State's only Republican in Congress. Gartley is currently a flight officer for Eastern Air Lines.

In Maryland, Bernard L. Talley, Jr., a former Air Force major who was shot down in 1966, will run in the state's Democratic primary in September for the US Senate.

And, in California's Thirty-fourth Congressional District, Orange County, former Navy Lt. David Rehman has won the Republican nomination. Rehman was shot down in 1966 and released last year. ■

Lt. Col. William Breckner, center, Interceptor Weapons School Commander at Tyndall AFB, Fla., is presented a special State AFA award in recognition of his outstanding performance by local Chapter President Bill Truxal. Air Defense Weapons Center Commander Brig. Gen. Carl D. Peterson looks on. Breckner is an ex-POW.

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AFA's 1974 Annual National Convention and Aerospace Briefings and Displays will be held at the Sheraton-Park and Americana Shoreham Hotels September 16-19. All reservation requests for rooms and suites at the Sheraton-Park Hotel should be sent to: Reservations Office, Sheraton-Park Hotel, 2660 Woodley Road, N.W., Washington, D.C. 20008. Reservation requests for the Shoreham Hotel should be sent to: Reservations Office, Americana Shoreham Hotel, 2500 Calvert St., N.W., Washington, D.C. 20008.

Be sure to refer to AFA's Annual National Convention when requesting your reservations. Otherwise, your reservation requests will not be accepted by the Sheraton-Park. AFA's Annual National Convention activities will include luncheons for the Secretary of the Air Force and the Air Force Anniversary Reception and Dinner Dance. The National Convention will also include AFA's Business Sessions, Symposium, and Air Force Reserve and Air National Guard Seminar, and several other invitational events, including the President's Reception, the Annual Outstanding Airmen Dinner, and the Chief Executives' Reception and Buffet Dinner.

We urge you to make your reservations at the Sheraton-Park Hotel or Americana Shoreham Hotel as soon as possible in order to obtain your reservations. Arrivals after 6:00 p.m. require guaranteed payment for the night of arrival. Fill out the Advance Registration form below—today—and mail it to AFA, 1750 Pa. Ave., N.W. Washington, D.C. 20006

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The Bulletin Board

By John O. Gray
MILITARY AFFAIRS EDITOR, AIR FORCE MAGAZINE

Civil Air Patrol Cadet Steven A. Doerner displays CAP's highest cadet honor, the Carl A. Spaatz Award presented him by Vice President Gerald R. Ford (left), in recent ceremonies at the Vice President's office. USAF Vice Chief of Staff Gen. Richard H. Ellis looks on. Cadet Doerner, a member of CAP's Brandywine Squadron, Wilmington, Del., is an A student in ROTC at the University of Delaware.

The Retirement Dilemma

The likelihood of a surge in early retirement requests loomed at mid-year as the Administration and Congress turned their backs, at least temporarily, on "save pay" legislation for service members retiring after October 1, 1974.

Without the measure, all such persons will receive less retired pay than those retiring before that date. The losses range from $7 a month for an E-5 to $200 a month for O-9s and O-10s *(see July '74 "Bulletin Board").*

When the problem arose due to an adverse Comptroller General decision, the Defense Department urged the Office of Management and Budget to endorse a legislative proposal giving post-October 1 retirees at least as much retired pay as earlier retirees. But OMB declined. And Congress on its own has sidetracked a "save pay" plan, though a House Armed Services subcommittee had indicated it might approve it.

Why the government's failure to act on a matter that seemingly has little opposition? Insiders insist that the real reason is that OMB and the House subcommittee both feared that a save pay bill would attract a retired pay recomputation amendment on the House floor. And influential quarters oppose that idea.

Meantime, a number of three- and four-star officers in all the services, who have mandatory retirement dates after October 1, sent in their retirement papers with August and September exit dates. The list includes Lt. Gen. Leo E. Benade, USA, the Deputy Assistant Secretary of Defense, whose office has the primary action on the retired pay "inversion" problem.

Hq. USAF officials were keeping a close watch on the situation. They noted that early returns showed a sharp increase in September 1 colonel exit requests. They also felt that, as word spread of the government's inaction on save pay, a flurry of early departure bids would surface from many ranks.

Air Force authorities noted that a burst of retirements could have some favorable results: RIFs might possibly be reduced and promotions increased, and forced retirements of senior Regular officers (if the "tampering-with-tenure" legislation discussed in the June '74 issue becomes law) reduced.

Another possibility, a high-placed USAF source said, is that some early retirement requests might be rejected. Service members should remember that in nearly all cases, retirement is a privilege, not a right.

Top-Priority Bills

In late June, Defense Secretary James R. Schlesinger wrote lengthy letters to the chairmen of the House and Senate Armed Services Committees urging them to shepherd four Defense-sponsored personnel proposals to enactment this year. Included is USAF's officer grade relief measure needed by September 30, 1974, to ward off disaster *(see p. 80).* The other three would provide authority for (1) packing future pay raises into quarters and subsistence allowances as well as into basic pay; (2) all services to forcibly retire certain senior Regular officers; and (3) Army to RIF young Regular officers. The "three-way" pay measure won House approval on July 1.

Stores Under Fire

The pressure to curtail or eliminate military exchanges and commissaries is increasing. One ominous sign is a new probe of commissary stores by the General Accounting Office, the congressional arm that watchdogs federal spending. Stores in each service are being checked. So are basic operating criteria and even "the reasons why we have commissaries."

Meantime, General Benade, Defense's top military personnel official, said recently that the "very existence" of exchange and com-

missary stores is threatened from "many quarters." Congress has provided much noise, but even high-level civilian Pentagon officials reportedly have their knives sharpened to curtail activities, increase prices, etc.

One apparent step in this direction finds the Navy, at Defense insistence, preparing a legislative proposal to provide for building commissary stores with "surcharge" funds. "This legislation change may result in a higher surcharge percentage rate applied to sales in commissary stores," the Air Force Comptroller's office said.

GAO, in separate investigations, also is looking into liquor sales in the military, and the service academies' operating costs, production, and dropout rates.

Up or Out for Civilians?

Defense Secretary Schlesinger says the lack of an up-or-out program for civilian employees of the military establishment makes it very difficult to conduct efficient reduction-in-force projects. He noted in a recent congressional appearance that "almost all" civilian workers are rated "satisfactory." He called for authority to fire employees when, in the Secretary's discretion, such action is necessary.

USAF Reserve Star Board

Crucial dates upcoming for Air Force Reserve colonels eyeing stars are October 9–10, when a board will identify them for consideration for general officer promotions. A major criterion is completion of a senior service school (a short course won't do). Other requirements are reasonably tough.

ANG Units Retained

The Air Force has rescinded previously announced plans to inactivate five Air National Guard units. The inactivations, which AFA opposed strongly, were announced last February. That action also triggered congressional opposition, and since that time "alternative" plans were reviewed. The outcome finds the five units receiving replacement missions via assignment of A-7, O-2, HC-130, and HH-3 aircraft. The units being retained are the 129th Special Operations Group, Hayward Municipal Airport, Calif.; 163d Fighter Interceptor Group, Ontario International Airport, Calif.; 106th Fighter Interceptor Group, Suffolk Co., Airport, N. Y.; 112th Fighter Interceptor Group, Greater Pittsburgh Airport, Pa.; and the 115th Fighter Interceptor Group, Truax Field, Wis.

Councils Active

AFA's Air Reserve, Air National Guard, and Civilian Personnel Councils, together with the Chairmen of its Airmen, Junior Officer Advisory, Organizational Advisory, and Government Advisory Councils, plus its Special Advisers to the President for Medical, Air Force Senior ROTC, Air Force Junior ROTC, Civil Air Patrol and Retiree Affairs met in Washington, D. C., June 27–28. The Airmen Council and the Executive Committee of the Junior Officer Advisory Council met in Colorado Springs on May 30 and 31. The main order of business for the Colorado meeting was the finalization of the script for their joint project—a slide briefing designed to be given by junior officers and airmen throughout USAF to high school audiences. The script will be tested during AFA's upcoming national convention.

The Washington meeting covered a wide range of current Air Force topics, including an intelligence briefing, a presentation on current recruiting efforts for the active force, the Guard and the Reserve; a presentation on Military Medical Health Care; an updating of activities in the Air National Guard, Air Force Reserve, and Civilian Personnel areas; and a presentation on across-the-board personnel issues by the Office of the Assistant Secretary of Defense (Manpower and Reserve Affairs).

The Councils and Special Advisers drafted several resolutions for consideration by AFA's Resolutions Committee which, if approved by the Committee, will be presented to the delegates in Convention in September.

Medical Care Outlook Bleak

Attacks on military medical programs from within the government have intensified and could lead to complete elimination of in-service care for active-duty dependents and retirees and their dependents in the next couple of years.

That's the view of informed officials in Washington, most of whom

1910 JOHN LANG 1974

John A. Lang, Jr., Chairman of AFA's Civilian Personnel Council, former Administrative Assistant to the Secretary of the Air Force, and a retired Air Force Reserve major general, died on June 27 at Greenville, N. C. At the time of his death, Mr. Lang was Vice Chancellor of East Carolina University.

Born at Carthage, N. C., on November 15, 1910, John Lang was a graduate of the University of North Carolina, from which institution he also held a master's degree. Prior to World War II, he was Assistant to the Director of Education of the Civilian Conservation Corps, and later North Carolina State Administrator of the New Youth Administration.

Mr. Lang served in the Army Air Forces for four years during World War II. He continued his affiliation with the Air Force, rising to the rank of major general in the Air Force Reserve.

After the war, Mr. Lang spent nearly fifteen years on Capitol Hill as Administrative Assistant to Congressmen Charles B. Deane and Robert E. Jones. From July 1961 to February 1964, he was Deputy for Reserve and ROTC Affairs in the Office of the Secretary of the Air Force. In 1964, he was appointed as the Administrative Assistant to the Secretary, a post that he held until his retirement in August 1971. During part of that period, he served concurrently as Acting Special Assistant to the Secretary for Manpower, Personnel, and Reserve Forces.

John Lang will be remembered by his many friends in the Air Force, its Reserve components, and the educational world for his wise counsel, administrative skill, and dedication to the welfare of this country. He was a patriot in the best sense of that word.

Mr. Lang is survived by his widow, Catherine Gibson Lang, of 114 King George Drive, Greenville, N. C.; four children, John A., III, Richard, Laura Catherine, and Martha Elizabeth; and by his parents. The family requested that, in lieu of flowers, memorial donations be made to the Air Force ROTC Scholarship Fund, Maxwell AFB, Ala. 36112.

are highly concerned that nonmilitary authorities in the Defense Department are planning to limit military medical care "primarily to active-duty members."

It appears that the Department of Health, Education and Welfare and the Administration's Office of Management and Budget also have their knives sharpened to attain similar results. A lengthy Defense-OMB medicare study, slated for completion late this year, could trigger sweeping curtailments. The House Appropriations Committee, meantime, has blistered the services for high medicare expenditures and "mismanagement of medical programs." A study by the Committee's staff has recommended sharp cuts in dependent care, including the end of dental care at "remote" stateside installations.

It is understood that Defense officials are planning to water down the payment of the newly authorized $13,500 medical officer bonus, to smaller sums in many cases. Many veteran military doctors would leave service if this occurs, it is predicted. USAF's doctor shortage at midyear stood at about 550. The Defense Department, meanwhile, has trimmed various dependent medical care programs under CHAMPUS. The rules on psychiatric treatment have been tightened. Abolishment of a rule dealing with care before and after hospitalization will require patients to pay larger fees than heretofore. Another change is slated to eliminate what little orthodontic care was still provided.

Mobilization Study

A study has been going on in the Defense Department that would allow the mobilization of up to 50,000 Reservists and Guardsmen to meet contingencies short of a war situation but not require a full call-up. It was not indicated how far along the study had progressed or whether the proposal would become a formal legislative request.

AFRES–ANG People Programs

Recruiting and retention in the Air Force Reserve and Air National Guard were definitely improving as FY '75 began. Within the Defense Department, the attitude of high authorities toward the Reserve Forces had improved greatly since last winter. And the upcoming months are likely to see important new missions assigned to the components.

Key officials made these disclosures at a late June meeting with members of both AFA's Air Reserve and Air National Guard Councils.

While recruiting and retention were on the upswing, authorities said more nonprior service members are needed to "improve the mix" in the components' manpower. This, they said, calls for resurrection of the Reserve/Guard airmen bonus that Defense backed away from last year.

Two new programs have helped improve manning of the Reserve Forces: (1) the recently approved $20,000 worth of inexpensive government life insurance; and (2) the modest expansion of exchange shopping privileges for members of Selected Reserve units. Under regulations being prepared at press time, unit members can shop one day at the exchange for each day of active or inactive duty training performed. It can be done any day, not just on drill days as heretofore. Wives may accompany their husbands at the stores.

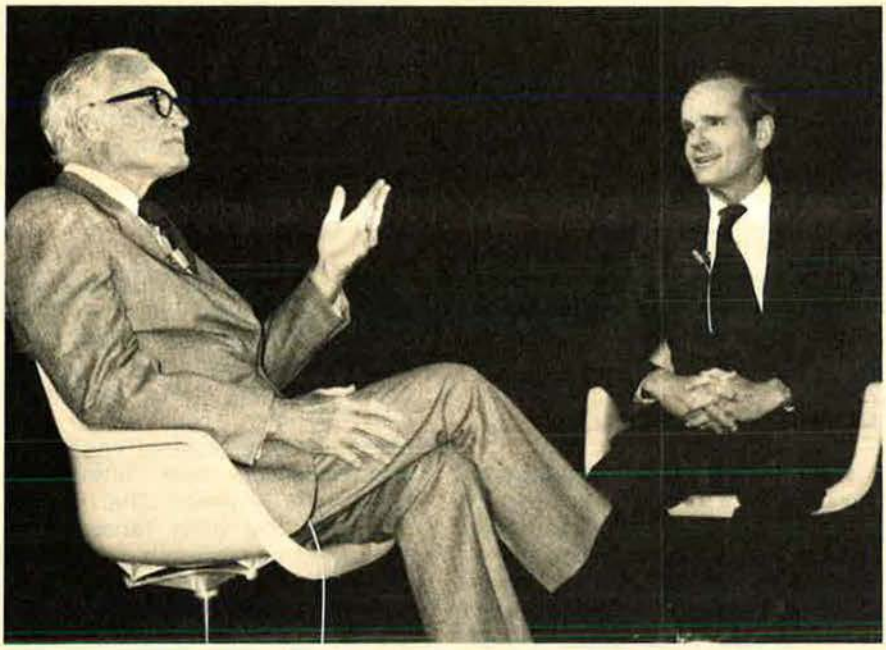
But several other important "people" proposals that AFRES and ANG leaders also want in order to attract top people and strengthen their organizations have been lagging. Their chances of adoption this year appear nil, though with renewed support they might succeed next year. The items include:

1. Government-paid tuition aid. Under a plan USAF has been pushing, Reserve first-termers attending school could receive half the tuition charge for six semester hours. Airmen on subsequent enlistment would receive seventy-five percent.

2. Front-loaded bonus. This would provide a "bonus" of perhaps $1,000, to be paid a few months following enlistment. In effect, it would be an advance in pay that the recipient would repay throughout his hitch.

3. Retiree participation in Reserve units. This is a House-passed bill allowing certain retired enlisted members with critical Reserve-type skills, such as flight engineers, to join Reserve units and draw full retired and drill pays. The Senate Armed Services Committee has held up the measure.

4. Earlier, reduced retirement. Reserve—so-called Title III—retirement does not pay off until age sixty. Thousands of Reservists and



Though normally on opposite sides of the political arena, Sens. Barry M. Goldwater (R-Ariz.), left, and William Proxmire (D-Wis.) joined forces recently to tape a television spot advertisement supporting the need for employer support of the Reserve Forces. Every TV station in the country was scheduled to receive a print of the spot in late July, courtesy of the advertising firm of D'Arcy-MacManus & Masius and the Advertising Council. Interested groups or clubs may secure copies of the film by writing the National Committee for Employer Support of the Guard and Reserve, Arlington, Va. 22202.

many organizations, AFA included, have endorsed legislation to reduce the age limit. The Defense Department at midyear was about ready to send its long-studied proposal to the Office of Management and Budget, a Pentagon official told AIR FORCE Magazine. It would permit retirement at age fifty and up, though on a "sharply reduced annuity," he said.

Special Mention

Congratulations to: SMSgt. George E. Atkinson, who played a major role in the success of Operation Homecoming that repatriated 325 Air Force POWs from SEA, for being named Outstanding Airman of 1974 at the Military Personnel Center, Randolph AFB, Tex. . . . Military Airlift Command aircrews who evacuated POWs to American control, for receiving the coveted Mackay Trophy for 1973. . . . Maj. Robert F. Petry, Jr., and his daughter Margaret, for being cited by the Delaware General Assembly as the first father-daughter team in the Delaware Air National Guard's history. (He commands the 166th Communications Flight; she's a new member of the 166th's Tactical Clinic.) . . . the 9015th Air Reserve Information Squadron, New York City, for outstanding assistance to USAF, the Air Force Reserve, and the local community, resulting in receipt of the Air Force Outstanding Unit Award. . . . Richard J. Foch, Titusville, Fla., a seventeen-year-old junior at Astronaut High School, for being the top overall Air Force winner in the International Science Fair competition held recently at Notre Dame University, South Bend, Ind.—all eleven USAF

Ed Gates . . . Speaking of People

Tampering With Terminal Leave

That recent flap over leave-taking and large terminal leave payments was hardly surprising, considering the personnel money crunch. Accrued leave outlays have grown steadily. The Defense Department says it wants to reduce the terminal pay-offs by encouraging members to use up more of their leave.

The first headlines suggested that Defense was going to crack down hard by curtailing the accumulation and carryover of leave, reducing the leave formula, penalizing members for not taking leave, etc. No sooner had these reports touched off cries from the troops than the Pentagon rushed out a "fact sheet" designed to defuze them.

The fact sheet, which USAF Headquarters bucked to all bases, noted that existing law—not policy—authorizes sixty days accumulation of leave and requires payment for unused portions of it at separation or retirement time. It said that Defense "seeks to increase the opportunity for military personnel to take leave, to encourage them to take leave as it is earned, hopefully to eliminate the loss of leave, and to reduce the high levels of unused leave and the resulting high costs of reimbursements."

There's nothing in that quotation to cause alarm. But leave has become almost an emotional issue; even the faintest suggestion of adverse tampering evokes concern. And, meantime, the General Accounting Office, which is Congress' watchdog on federal spending, has been probing the services' leave practices. This could mean trouble.

Terminal leave outlays are big business. Air Force in FY '74 paid about $147 million to 169,000 departees. All the military services combined shelled out well over $350 million during the year on this item. Thus, it is no surprise that budget cutters are sniffing pay dirt.

Air Force policy, like Defense's, has been for members to "take leave as it accrues." This is more easily said than done; leave is an elusive proposition. Mere orders won't pull it off. Air Force, in fact, tried it with some very firm directives in the early 1960s when then Chief of Staff Gen. Curtis E. LeMay was in charge. Terminal leave outlays were costing USAF in the neighborhood of $70 to $80 million a year.

LeMay called for broader leave-taking. Frequent short periods away from the job would enable members to perform more effectively on return to duty, he held. Commanders were to insist that people use their leave.

The effort was not a big success. Hoarding leave had become a way of life. Each year more people, disenchanted by the then low basic pay scales, looked on terminal leave as one way the services could unofficially supplement their restricted income. Separatees regarded it as a rightful payment to help them transition from military to civilian life, a not unreasonable attitude in view of the government's failure to provide any sort of terminal bonus (other than for RIFed officers) or vesting program.

Contributing to the lack of success of the LeMay order was the fact that some commanders could not or would not sacrifice the man-hours that would be lost under a take-full-leave program. Some units, of course, were spread too thin, so that with full leave-taking their jobs couldn't be done.

Still other quarters maintained that through effective leadership and direction, commanders normally could accomplish the mission without curbing leaves.

Similar conditions and arguments persist today. In fact, with USAF personnel being cut in recent years at a faster pace than its base structure, a good case might be made for personnel being "stretched too thin."

Regardless of the services' basic leave policies, most service members accrue considerable amounts of it. And since the accrual is based on today's sharply increased basic pay rates, it amounts to a tidy farewell bonus, particularly in the higher ranks. Four- and three-star officers usually take home the maximum leave accrual of sixty days: $6,000 each.

USAF colonels average fifty-seven days of accrued leave at retirement time, majors fifty-two days, and captains forty-four. Their lump sum payments range from $1,900 to well over $4,000.

USAF's FY '74 estimate gives the typical departing chief master sergeant (E-9) forty-nine days of accrued leave, amounting to an average $1,832 pay-off. This drops by enlisted grade to nineteen-plus days of accumulated leave and payments of $263 for the average E-3.

Before the government actually tampers with the military leave program, officialdom should not forget that many members must serve in places where leave can't be taken. So they lose some of it. Reducing the sixty-day carry-over proviso should be out of the question.

Then there are the bureaucrats who want to chop the military from thirty to twenty-six days of leave or less annually because Civil Service employees "only" get twenty-six days. But unlike the military, the civil servants don't count Saturdays, Sundays, and legal holidays in their leave period. They can stretch their twenty-six days far beyond a military man's thirty.

At all costs, the service community should fight any attempt to curb accrued leave for members who depart before retirement. Retirees receive lifetime pensions and other benefits. Separatees, whether they have two or eighteen years of service, get nothing for their time in uniform other than their terminal leave. ■

The Bulletin Board

winners received savings bonds from AFA, in addition to Air Force-sponsored awards, and young Foch is being sent, as a result of his selection, to the Nobel Prize ceremonies in Stockholm later this year.

Short Bursts

Navigators are applauding USAF's recent request for legislation that would repeal a 1929 law prohibiting them from commanding flying units . . . And enlisted crew members are pleased with a recent directive to the field assuring most of them 120 days advance notice before being involuntarily removed from flying pay: no advance notice was previously required . . . With more young USAF officer RIFs on the horizon, a recent Supreme Court decision could be bad news; it denies readjustment pay to RIFees with less than five years of service. . . . Headquarters has reminded the field that USAF policy "discourages" news stories about WAF being the first women in particular career fields (like the first lady Air Policeman): emphasize individual WAF achievements, not the "first" gimmick, Air Force says . . . Departing Air Force Academy Superintendent Lt. Gen. A. P. Clark says that since female officers leave USAF "at a greater rate after completion of their service commitment" than male officers, this could be costly if women attended the service academies—Clark is unalterably opposed to making the academies coed . . . Of the 306 officers (all lieutenant colonel selectees) recently chosen to attend the Air War College and other senior service schools, 193 hold advanced degrees, ninety-nine own BA-level degrees, and fourteen are degreeless . . . The Military Personnel Center wants base and command personnel officials to overcome the snafus and make certain that Air Force retirees receive their retirement certificates on time—too many haven't. . . . AFA President Joe L. Shosid, speaking for the entire membership, sent Sen. Vance Hartke (D-Ind.) a warm letter lauding his latest retired pay recomputation amendment (to the FY '75 military procurement bill). . . . Some opposition has arisen to USAF's bid to boost its AFROTC scholarships from the present 6,500 to 9,250 *(see July '74 "Bulletin Board")*, but authorities say the proposal still may be included among next year's DoD legislative proposals. . . . July price hikes in base clothing stores mean customers now pay more for nearly all items, including duffle bags that advanced from $4.20 to $5.09. . . . USAF, via the Inspector General's

Senior Staff Changes

PROMOTIONS: To be **General:** William V. **McBride;** Louis L. **Wilson.** To be **Lieutenant General:** Ray B. **Sitton.**

RETIREMENTS: Gen. Jack J. **Catton;** M/G John B. **Henry,** Jr.; B/G Erwin A. **Hesse;** L/G James D. **Hughes;** Gen. Timothy F. **O'Keefe;** L/G Jay T. **Robbins;** B/G Glenn R. **Sullivan;** M/G Vernon R. **Turner.**

CHANGES: B/G (M/G selectee) Jesse M. Allen, from DCS/Plans, Hq. TAC, Langley AFB, Va., to DCS/Ops and Intelligence, Hq. USAFE, Ramstein AB, Germany, replacing M/G Wilbur L. Creech . . . **B/G John F. Barnes,** from DCS/P, Hq. TAC, Langley AFB, Va., to ACS/J-3 UNC/USFK and Dir., US/ROK Operational Planning Staff, Seoul, Korea . . . **B/G James R. Brickel,** from Dep. Asst., Sec'y of Defense (Atomic Energy), OSD, Washington, D. C., to Dep. Dir., Office of Information, SAFOI, Hq. USAF, replacing B/G (M/G selectee) Guy E. Hairston, Jr. . . . **B/G (M/G selectee) John W. Burkhart,** from Asst. DCS/Plans, to DCS/Plans, Hq. SAC, Offutt AFB, Neb., replacing M/G Harry M. Darmstandler . . . **B/G William C. Burrows,** from C/S, US Taiwan Def. Cmd., Taipei, Taiwan, to Dep. Dir. of Plans, DCS/P&O, Hq. USAF.

M/G Kenneth R. Chapman, from Cmdr., AF Eastern Test Range, AFSC, Patrick AFB, Fla., to Asst. DCS/R&D, Hq. USAF, replacing M/G Harold E. Collins . . . **B/G Richard N. Cody,** from Cmdr., 93d Bomb Wg., SAC, Castle AFB, Calif., to DCS/P, Hq. SAC, Offutt AFB, Neb., replacing M/G Billy J. Ellis . . . **M/G Harold E. Collins,** from Asst. DCS/R&D, Hq. USAF, to C/S, Hq. AFSC, Andrews AFB, Md., replacing retiring M/G Vernon R. Turner . . . **Col. (B/G selectee) Gerald E. Cooke,** from Dir., AF Board Structure, Office, Vice C/S, Hq. USAF, to Sec'y, JCS, Washington, D. C.

M/G Wilbur L. Creech, from DCS/Ops & Intelligence, to Special Asst. to CinC, Hq. USAFE, Ramstein

publication, *TIG Brief*, is encouraging commissary patrons to use the money-saving coupons found in food packages, magazines, etc. . . . The final Air Force campaign in Vietnam has been designated the "Vietnam Ceasefire Campaign," for the period March 30, 1972, to January 28, 1973; units that participated or were in direct support of Vietnam operations during this period are being identified . . . Following the decision to let Air Reserve and Air Guard members wear short-haired wigs at training sessions *(see July '74 "Bulletin Board")*, the components' headquarters have told states and units to report, by August 14, the impact of the ruling on morale, retention, and recruiting—in other words, the hair problem is far from over . . . Enlisted aides for generals and admirals are fast disappearing; not long ago 1,245 were authorized for all services, then last year Congress cut the figure to 675, and the Senate recently voted a further reduction to just 218. . . . Air Force ended FY '74 with approximately 645,000 active-duty troops. . . . Hq. USAF is warning travelers filing for temporary lodging allowances about submitting phony receipts—could be big trouble . . . The latest recommendations of USAF's Retiree Council appear in the April–June issue of the pamphlet, "News for Retired Personnel," but they aren't likely to get far; for example, one recommendation calls for "routine dental care" coverage for active, retired, and dependent personnel under CHAMP-US. ■

At Nellis AFB, Nev., Gen. Lucius D. Clay, Jr., Commander in Chief of NORAD, presents the Joint Service Commendation Medal to retiring Air Force Reserve Col. G. Barney Rawlings and a certificate of appreciation to Mrs. Rawlings.

AB, Germany . . . **M/G Harry M. Darmstandler,** from DCS/Plans, Hq. SAC, Offutt AFB, Neb., to Special Asst. to C/S for B-1 Matters, Hq. USAF, replacing M/G James R. Allen . . . **B/G Richard T. Drury,** from Dir. of the Staff, Inter-American Defense Board, Washington, D. C., to V/C, 22d AF, MAC, Travis AFB, Calif. . . . **M/G Frank W. Elliott, Jr.,** from Cmdr., Chanute Tech. Tng. Ctr., Chanute AFB, Ill., to Cmdr. TUSLOG, USAFE, Ankara, Turkey . . . **M/G Billy J. Ellis,** from DCS/P to DCS/Ops, Hq. SAC, Offutt AFB, Neb., replacing M/G Ray B. Sitton, Jr.

M/G Lawrence J. Fleming, from Cmdr., 24th NORAD/CONAD Region with add'l duty as Cmdr., 24th Air Div., Malmstrom AFB, Mont., to C/S, USAFSO, Quarry Heights, C. Z., replacing retiring M/G John B. Henry, Jr. . . . **Col. (B/G selectee) Norman C. Gaddis,** from Cmdr., 82d FTW, ATC, Williams AFB, Ariz., to Dep. Dir. for Operational Forces, DCS/P&O, Hq. USAF . . . **B/G Eugene W. Gauch, Jr.,** from Cmdr., 834th Air Div., TAC, Little Rock AFB, Ark., to Dir., Mobility ADP Rqmts Base Lvl Study Gp., DCS/P&O, Hq. USAF, with duty stn Langley AFB, Va.

B/G George R. Guay, from Air Attaché, France, to Defense Attaché, Egypt . . . **L/G Daniel James, Jr.,** from Asst. Sec. of Defense (Public Affairs) OSD, to V/C, Hq. MAC, Scott AFB, Ill. . . . **B/G (M/G selectee) Lloyd R. Leavitt, Jr.,** from Dep. Dir., J-3 (Regional Ops) Jt. Staff, OJCS, to Cmdr., Chanute Tech. Tng. Ctr., ATC, Chanute AFB, Ill., replacing M/G Frank W. Elliott, Jr. . . . **B/G Harrison Lobdell, Jr.,** from Dir., European Region, OASD (ISA), (OSD), to DCS/Plans, USAFE, Ramstein AB, Germany, replacing B/G William C. Norris . . . **L/G (Gen. selectee) William V. McBride,** from Cmdr., Hq. ATC, Randolph AFB, Tex., to Cmdr., Hq. AFLC, Wright-Patterson AFB, Ohio, replacing retiring Gen. Jack J. Catton . . . **B/G (M/G selectee) Ralph J. Maglione, Jr.,** from Dep. Dir., Legislative Liaison, to Dir. Legislative Liaison, OSAF, Washington, D. C. . . . **Col. (B/G selectee) William B. Maxson,** from Cmdr., 416th Bomb Wg., SAC, Griffiss AFB, N. Y., to Dep. Asst. Sec'y of Def. (Atomic Energy), Washington, D. C., replacing B/G James R. Brickel.

B/G William C. Norris, from DCS/Plans to IG, Hq. USAFE, Ramstein AB, Germany, replacing M/G Edwin W. Robertson, II . . . **Col. (B/G selectee) Jerome F. O'Malley,** from C/S, 15th AF, SAC, March AFB, Calif., to Asst. DCS/Plans, Hq. SAC, Offutt AFB, Neb., replacing B/G (M/G selectee) John W. Burkhart . . . **Col. (B/G selectee) John E. Ralph,** from Cmdt., Sqdn. Officer School, AU, Maxwell AFB, Ala., to Dir. of Doctrine, Concepts, and Objectives, DCS/P&O, Hq. USAF, replacing M/G William Y. Smith . . . **M/G Edwin W. Robertson,** from IG, Hq. USAFE, Ramstein AB, Germany, to Cmdr., 24th NORAD/CONAD Region with add'l duty as Cmdr., 24th Air Div., Malmstrom AFB, Mont., replacing M/G Lawrence J. Fleming . . . **M/G Ralph S. Saunders,** from V/C, 22d AF, MAC, Travis AFB, Calif., to Cmdr., ARRS, Hq. MAC, Scott AFB, Ill., replacing retiring B/G Glenn R. Sullivan . . . **B/G Carl G. Schneider,** from ACS/J-3, UNC/USFK and Dir. US/ROK Operational Planning Staff, Seoul, Korea, to V/C, Warner Robins ALC, AFLC, Robins AFB, Ga., replacing B/G Garry A. Willard, Jr. . . . **M/G William M. Schoning,** from Acting Dep. Asst. Sec'y of Def. for Policy Plans and NSC Affairs, OASD (ISA) Washington, D. C., to Cmdr., 1st Strat. Aerospace Div., SAC, Vandenberg AFB, Calif.

M/G (L/G selectee) Ray B. Sitton, from DCS/Ops, Hq. SAC, Offutt AFB, Neb., to Dir., Ops, Jt. Staff, OJCS, Washington, D. C. . . . **M/G William Y. Smith,** from Dir. of Doctrine, Concepts, and Objectives, DCS/P&O, Hq. USAF, to Dir., Policy Plans and NSC Affairs, OSD (ISA) Washington, D. C. . . . **Col. (B/G selectee) Robert B. Tanquy,** from IG, Hq. ATC, Randolph AFB, Tex., to Dep. Dir., Legislative Liaison, OSAF, Washington, D. C., replacing B/G Ralph J. Maglione . . . **B/G Garry A. Willard, Jr.,** from V/C, Warner Robins ALC, AFLC, Robins AFB, Ga., to DCS/P&O, AFLC, Wright-Patterson AFB, Ohio . . . **B/G David O. Williams, Jr.,** from Dep. Dir. J-3 (NMCC), Jt. Staff, OJCS, to C/S, US Taiwan Def. Cmd., Taipei, Taiwan, replacing B/G William C. Burrows.

L/G (Gen. selectee) Louis L. Wilson, from Vice CinC, Hq. USAFE, Ramstein AFB, Germany, to CinC, Hq. PACAF, Hickam AFB, Hawaii, replacing Gen. John W. Vogt. . . . **Gen. John W. Vogt,** from CinC, PACAF, Hickam AFB, Hawaii, to CinC, USAFE, Ramstein AB, Germany, and Cmdr., 4th ATAF, Allied Command, Europe.

—Compiled by Kathryn Foxhall

Joe L. Shosid

Martin M. Ostrow

AFA Nominees

BY DON STEELE
AFA DIRECTOR OF FIELD ORGANIZATION

Incumbent President Joe L. Shosid has been unanimously nominated to serve a second term. A slate of four national officers and twenty Directors will be presented next month to Delegates attending AFA's 1974 National Convention.

At its meeting in Colorado Springs, Colo., on June 1, AFA's Nominating Committee, comprised of the Board of Directors and the State Presidents, chose a slate of three National Officers and twenty-one Directors (including a nominee for Chairman of the Board) to be presented to the Delegates at AFA's 1974 Annual National Convention in Washington, D. C., on September 16–19.

Incumbents Joe L. Shosid (President), Martin M. Ostrow (Board Chairman), Martin H. Harris (Secretary), and Jack B. Gross (Treasurer) were nominated unanimously for reelection to their respective offices.

Mr. Shosid, of Fort Worth, Tex., is President of Advertising Unlimited, Inc., a public-relations and advertising agency, and serves as a football and basketball official in the Missouri Valley and Southwest Athletic Conferences, and the National Collegiate Athletic Association. Also, he is an assistant to Congressman James C. Wright, Jr. (D-Tex.).

A World War II veteran, he currently is an Air Force Reserve officer with an assignment as Assistant Director of Information, Office of the Secretary of the Air Force, Washington, D. C.

In addition to serving as the current AFA National President, he is Chairman of AFA's Executive and Convention Site Committees, an ex-officio member of all AFA Committees and Councils, and a member of the Board of Trustees of the Aerospace Education Foundation, AFA's education affiliate. Mr. Shosid has served AFA as Board Chairman, an elected National Director, a Vice President (Southwest Region), Chairman of the Organizational Advisory Council, a member of the Air Reserve Council, and as a State and Chapter officer. He has received AFA's Medal of Merit and Exceptional Service Plaque, and was named AFA's "Man of the Year" in 1963.

Mr. Ostrow, of Los Angeles, Calif., is an attorney with offices in Beverly Hills. Now serving as Board Chairman, he also serves as a member of the Executive, Finance, and Convention Site Committees, and as a member of the Aerospace Education Foundation's Board of Trustees. He has served AFA as National

Martin H. Harris

Jack B. Gross

for 1974-75

President, an elected National Director, National Committee Chairman and member, Vice President (Far West Region), and as a State and Chapter President.

A veteran of World War II and the Korean War, he currently is an officer in the Air Force Reserve with an assignment in the office of the Judge Advocate General of the Air Force at Hq. USAF, in Washington, D. C. He has received AFA's Medal of Merit and Exceptional Service Plaque, and Gold Life Member Card #9.

Mr. Harris, of Winter Park, Fla., is an industry research scientist and an officer in the Air Force Reserve with an assignment at Hq. Air Force Systems Command, Andrews AFB, Md. He serves AFA as National Secretary, Chairman of the Resolutions Committee, a member of the Executive and Finance Committees, and as a member of the Aerospace Education Foundation's Board of Trustees. Mr. Harris has served as a member of the Organizational Advisory Council, a Vice President (Southeast Region), and as a State and Chapter President. He has received AFA's Medal of Merit and Exceptional Service Plaque, and was named AFA's "Man of the Year" in 1972.

Mr. Gross, of Hershey, Pa., is a prominent civic leader and businessman. He is now serving his eighth consecutive term as AFA's National Treasurer, making a total of thirteen terms he has served in that important office. Also, he is Chairman of AFA's Finance Committee, a member of its Executive and Convention Site Committees, and 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. Mr. Gross has received AFA's Medal of Merit, Exceptional Service Plaque, a Special Citation, and was named AFA's "Man of the Year" in 1958. In 1964, he received AFA's Gold Life Member Card #5. He retired from the Air Force Reserve as a colonel.

The following are permanent members of the AFA Board of Directors, under the provisions of Article X of AFA's National Constitution:

John R. Alison, Joseph E. Assaf, William R. Berkeley, Edward P. Curtis, James H. Doolittle, A. Paul Fonda, Joe Foss, Jack B. Gross, George D. Hardy, John P. Henebry, Joseph L. Hodges, Robert S. Johnson, Arthur F. Kelly, George C. Kenney, Thomas G. Lanphier, Jr., Jess Larson, Curtis E. LeMay, Carl J. Long, Howard T. Markey, John P. McConnell, J. P. Montgomery, Martin M. Ostrow, Julian B. Rosenthal, John D. Ryan, Peter J. Schenk, Joe L. Shosid, C. R. Smith, Carl A. Spaatz, William W. Spruance, Thos. F. Stack, Arthur C. Storz, Harold C. Stuart, James M. Trail, and Nathan F. Twining.

The twenty men whose pictures appear on the following page are nominees for the eighteen elective Directorships on the AFA Board of Directors for the coming year. (Names marked with an asterisk are incumbent National Directors.)


Brosky


D. Callahan


D. F. Callahan


Damman


Douglas


Fisher


Gilstrap


Harris


Hasler


Higgins


Keith


Lawson


Mazer


Nedder


Nettleton


Price


Stewart


West


Wilson


Withers

***John G. Brosky,** Pittsburgh, Pa.—judge. Former Chapter, State President; National Convention Parliamentarian; National Council Member. Current National Committee member; Aerospace Education Foundation Board of Trustees member. Life Member.

***Dan Callahan,** Warner Robins, Ga.—physician. Former Chapter President. Current National Committee member; Aerospace Education Foundation Board of Trustees member. Life Member.

***Daniel F. Callahan,** Nashville, Tenn.—retired USAF major general. Former Chapter, State President; National Council Chairman. Current National Committee member. Life Member.

***Floyd Damman,** Whittier, Calif.—aerospace industry executive. Former Chapter, State President. Current National Council member. Life Member.

***George M. Douglas,** Denver, Colo.—telephone company executive. Former Chapter, State President. Current National Committee member; Aerospace Education Foundation Board of Trustees member.

Herbert O. Fisher, New York, N. Y.—metropolitan area aviation official. Former test pilot; Chapter President.

Jack T. Gilstrap, Huntsville, Ala.—aerospace program analyst. Former Chapter President; State officer; Vice President (South Central Region); National Director; National Committee member.

***Alexander E. Harris,** Little Rock, Ark.—property management executive. Former Chapter, State President; Vice President (South Central Region). Current National Council member.

***Gerald V. Hasler,** Endwell, N. Y.—architectural design and remodeling corporation executive. Current Chapter, State President; National Committee member; Aerospace Education Foundation Treasurer.

***Joe Higgins,** North Hollywood, Calif.—TV and motion picture personality. Former Chapter President. Master of Ceremonies and principal speaker at many AFA and USAF functions around the nation (including AFA's Outstanding Airmen Dinner and its dinner honoring the Outstanding Squadron at the Air Force Academy). Current National Committee member. AFA "Man of the Year" 1973. Life Member.

***Sam E. Keith, Jr.,** Fort Worth, Tex.—traffic and maintenance engineering manager. Former Chapter, State President; National Council member; Vice President (Southwest Region). Current National Committee member; Aerospace Education Foundation Board of Trustees member. AFA "Man of the Year" 1967. Life Member.

Robert S. Lawson, Los Angeles, Calif.—textile industry executive. Former Chapter, State President; National Committee Chairman; National Director. Current Vice President (Fa West Region); Aerospace Education Foundation Board o Trustees member. Life Member.

***Nathan H. Mazer,** Roy, Utah—industrial development bureau director. Former Vice Presiden (Rocky Mountain Region); National Council Chairman National Secretary. Curren National Committee member National Adviser (Retiree) Aerospace Education Foundation Board of Trustees member. Life Member.

***Edward T. Nedder,** Hyde Park Mass.—attorney. Former Vice President (New England Region). Current National Council member.

***J. Gilbert Nettleton, Jr.,** New York, N. Y.—aerospace industry executive. Former Squadron Commander and Chapter President; Chairman of National Air Force Salute; Chairman o the Board of Trustees, Aerospace Education Foundation Current National Committee member; Aerospace Education Foundation Board of Trustees member. Life Member.

***Jack C. Price,** Clearfield, Utah—AF civilian executive. Former Chapter, State President. Vice President (Rocky Mountain Region); National Council member. Current National Council Chairman. Life Member.

Hugh W. Stewart, Tucson, Ariz.—attorney. Former Chapter, State President; National Director; National Committee chairman. Current Aerospace Education Foundation Board of Trustees member.

A. A. West, Newport News, Va.—aerospace industry executive. Former Chapter, State President; National Director; National Council Chairman. Current Vice President (Central East Region); National Committee member.

***Winston P. Wilson,** Alexandria, Va.—industry consultan Retired USAF major genera Former Chief of the National Guard Bureau. Current National Council Chairman. Life Member.

***Jack Withers,** Dayton, Ohio—aerospace consultant. Former Chapter, State President. Current National Committee member. Life Member.

A 10% DIVIDEND

has been paid to Air Force Association Military Group Life Insurance participants for 1973 – the ninth dividend in the last 12 years . . . plus four benefit increases at no extra cost.

That's *in addition* to the finest group life insurance coverage ever provided by the Air Force Association to its members.

Details? Please turn the page.

AIR FORCE ASSOCIATIO

with Life Insurance Protection up to $100,000 for USAF Personn

Two Great New Plans! Choose Either One . . . AND Get Big, Strong Coverag

The Standard Plan ($66,000 Maximum)

The High-Option Plan ($100,000 Maximum)

Insured's Age	Coverage	Extra Accidental Death Benefit*	Monthly Cost	Optional Family Coverage Spouse	Each Child**	Month Cost Family Coverag
20-24	$ 66,000	$12,500	$10.00	$6,000	$2,000	$2.50
25-29	60,000	12,500	10.00	6,000	2,000	2.50
30-34	50,000	12,500	10.00	6,000	2,000	2.50
35-39	40,000	12,500	10.00	6,000	2,000	2.50
40-44	25,000	12,500	10.00	5,250	2,000	2.50
45-49	15,000	12,500	10.00	4,050	2,000	2.50
50-59	10,000	12,500	10.00	3,000	2,000	2.50
60-64	7,500	12,500	10.00	2,250	2,000	2.50
65-69	4,000	12,500	10.00	1,200	2,000	2.50
70-75	2,500	12,500	10.00	750	2,000	2.50
20-24	$100,000	$12,500	15.00	$6,000	$2,000	$2.50
25-29	90,000	12,500	15.00	6,000	2,000	2.50
30-34	75,000	12,500	15.00	6,000	2,000	2.50
35-39	60,000	12,500	15.00	6,000	2,000	2.50
40-44	37,500	12,500	15.00	5,250	2,000	2.50
45-49	22,500	12,500	15.00	4,050	2,000	2.50
50-59	15,000	12,500	15.00	3,000	2,000	2.50
60-64	11,250	12,500	15.00	2,250	2,000	2.50
65-69	6,000	12,500	15.00	1,200	2,000	2.50
70-75	3,750	12,500	15.00	750	2,000	2.50

* In the event of an accidental death occurring within 13 weeks of the accident, the AFA plan pays a lump sum benefit of $12,500 *in addition to* the benefit, except as noted under AVIATION DEATH BENEFIT, above.

** Each child is covered in this amount between the ages of six months and 21 years. Children under six months are provided with $250 protection once they are 15 days old and discharged from the hospital.

AVIATION DEATH BENEFIT: A total sum of $22,500 under the High-Option Plan or $15,000 under the Standard Plan 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.

CHECK THE ADVANTAGES OF THESE AFA PROGRAMS

Wide eligibility! If you're on active duty with the U.S. Armed Forces [regardless of rank], a member of the Ready Reserve or National Guard [under age 60], a Service Academy or college or university ROTC Cadet, you're eligible to apply for this coverage [see exceptions].

Keep your coverage at the low, group rate to age 75, if you wish.

Full conversion privilege. At age 75 [or at any time, on termination of AFA membership] the amount of insurance shown for your age group at the time of conversion may be converted to a permanent plan of insurance, *regardless of your health at that time.*

Disability waiver of premium, if you become totally disabled for at least nine months, prior to age 60.

Convenient premium payment plans. Pay direct to AFA or by monthly government allotment.

Reduction of cost by dividends. Net cost of insurance to AFA insured persons has been reduced by payment of dividends in eight of the last eleven years. However, dividends cannot, of course, be guaranteed.

Administered by insurance professionals on your Association's staff, for excellent service and low operating cost.

EXCEPTIONS:

Group Life Insurance: Benefits for suicide or death from injuries intentionally self-inflicted while sane or insane shall 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, 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.

The insurance will be provided under the group insurance policy issued by United of Omaha to the First National Bank of Minneapolis as trustee of the Air Force Association Group Insurance Trust. However, because of certain limitations on group insurance coverage in those states, nonactive-duty members who reside in Ohio, Texas, Florida, and New Jersey are not eligible for AFA group life insurance coverage.

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. Coverage runs concurrently with AFA membership. AFA Military Group Life Insurance is written in conformity with the Insurance Regulations of the State of Minnesota.

Yes, now the Air Force Association offers members of the United States Air Force their choice of two great new life insurance plans, both designed to meet the special requirements of Air Force personnel.

Planned for You

Both plans have been specifically designed to fill your particular needs. This is full-time, worldwide protection. There are no war clauses—no hazardous-duty restrictions, or geographical limitations on AFA life insurance protection. At AFA, our policy is to provide the broadest possible protection to our members, including those in combat zones.

Low Group Rates

And, as a member of AFA, you are able to secure this outstanding protection at low group rates. What's more, there's no increase in premiums for flying personnel. In fact, in most cases, flying personnel are entitled to full death benefits. Only when death is caused by an aircraft accident in which the insured was serving as pilot or crew member does the special Aviation Death Benefit take effect.

Higher Benefits for Young Families

The higher benefits for younger members make both plans particularly outstanding buys for the young family. The young family breadwinner can make a substantial addition to his life insurance estate at a time when his family is growing up—when his financial obligation to his family is at its greatest!

CHOOSE EITHER OF THESE GREAT PLANS! MAIL THIS APPLICATION TO AFA TODAY!

BREAKS THE BENEFIT BARRIER!

APPLICATION FOR AFA MILITARY GROUP LIFE INSURANCE

United of Omaha

Group Policy GLG-2625
United Benefit Life Insurance Company
Home Office: Omaha, Nebraska

Full name of member _____
Rank Last First Middle

Address _____
Number and Street City State ZIP Code

Date of birth Mo. Day Yr.	Height Weight	Social Security Number

Please indicate category of eligibility and branch of service.

- ☐ Extended Active Duty
- ☐ Ready Reserve or National Guard
- ☐ Air Force
- ☐ Other _____ (Branch of service)
- ☐ Air Force Academy
- ☐ _____ Academy
- ☐ ROTC Cadet _____ Name of college or university

Name and relationship of primary beneficiary

Name and relationship of contingent beneficiary

This insurance is available only to AFA members

- ☐ I enclose $10 for annual AFA membership dues (includes subscription ($9) to AIR FORCE Magazine).
- ☐ I am an AFA member.

Please indicate below the Mode of Payment and the Plan you elect.

HIGH OPTION PLAN			STANDARD PLAN	
Members Only	Members and Dependents	**Mode of Payment**	Members Only	Members and Dependents
☐ $ 15.00	☐ $ 17.50	**Monthly** government allotment. I enclose 2 months' premium to cover the period necessary for my allotment to be established.	☐ $ 10.00	☐ $ 12.50
☐ $ 45.00	☐ $ 52.50	**Quarterly.** I enclose amount checked.	☐ $ 30.00	☐ $ 37.50
☐ $ 90.00	☐ $105.00	**Semiannually.** I enclose amount checked.	☐ $ 60.00	☐ $ 75.00
☐ $180.00	☐ $210.00	**Annually.** I enclose amount checked.	☐ $120.00	☐ $150.00

Names of Dependents To Be Insured	Relationship to Member	Dates of Birth Mo. Day Yr.	Height Weight

Have you or any dependents for whom you are requesting insurance ever had or received advice or treatment for: kidney disease, cancer, diabetes, respiratory disease, epilepsy, arteriosclerosis, high blood pressure, heart disease or disorder, stroke, venereal disease or tuberculosis? Yes ☐ No ☐

Have you or any dependents for whom you are requesting insurance been confined to any hospital, sanitarium, asylum or similar institution in the past 5 years? Yes ☐ No ☐

Have you or any dependents for whom you are requesting insurance received medical attention or surgical advice or treatment in the past 5 years or are now under treatment or using medications for any disease or disorder? Yes ☐ No ☐

IF YOU ANSWERED "YES" TO ANY OF THE ABOVE QUESTIONS, EXPLAIN FULLY including date, name, degree of recovery and name and address of doctor. (Use additional sheet of paper if necessary.)

I apply to United Benefit Life Insurance Company for insurance under the group plan issued to the First National Bank of Minneapolis as Trustee of the Air Force Association Group Insurance Trust. Information in this application, a copy of which shall be attached to and made a part of my certificate when issued, is given to obtain the plan requested and is true and complete to the best of my knowledge and belief. I agree that no insurance will be effective until a certificate has been issued and the initial premium paid. I understand United reserves the right to request additional evidence of insurability in the form of a medical statement by any attending physician or an examination by a physician selected by United.

Date _____, 19 ___ _____
Member's Signature

8 / 74
Form 3676GL App

Application must be accompanied by check or money order. Send remittance to: Insurance Division, AFA, 1750 Pennsylvania Avenue, NW, Washington, D.C. 20006

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, Tuscaloosa): **Cecil Brendle,** 3463 Cloverdale Rd., Montgomery, Ala. 36111 (phone 281-7770, Ext. 28).

ALASKA (Anchorage, Fairbanks, Kenai): **Charles W. Lafferty,** 1045 Pedro St., Fairbanks, Alaska 99701 (phone 456-5167).

ARIZONA (Phoenix, Tuscon): **H. J. Bills,** P. O. Box 1431, Phoenix, Ariz. 85001 (phone 973-1210).

ARKANSAS (Blytheville, Fort Smith, Little Rock): **Frank A. Bailey,** 605 Ivory Dr., Little Rock, Ark. 72205 (phone 988-3432).

CALIFORNIA (Apple Valley, Burbank, Edwards, Fairfield, Fresno, Harbor City, Hawthorne, Long Beach, Los Angeles, Marysville, Merced, Monterey, Novato, Orange County, Palo Alto, Pasadena, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, Santa Barbara, Santa Clara County, Santa Monica, Tahoe City, Vandenberg AFB, Van Nuys, Ventura): **Ben F. Snell,** 11 Sharon Dr., Salinas, Calif. 93901 (phone 422-7571).

COLORADO (Aurora, Boulder, Colorado Springs, Denver, Ft. Collins, Pueblo): **James C. Hall,** P. O. Box 30185, Lowry AFB Station, Denver, Colo. 80230 (phone 366-5363, ext. 459).

CONNECTICUT (East Hartford, Torrington): **John McCaffery,** 117 Bridge St., Groton, Conn. 06340 (phone 739-7922).

DELAWARE (Dover, Wilmington): **Franklin R. Welch,** Greater Wilmington Airport, Bldg. 1504, Wilmington, Del. 19720 (phone 566-9520).

DISTRICT OF COLUMBIA (Washington, D. C.): **George G. Troutman,** 1025 Connecticut Ave., N. W., Washington, D. C. 20036 (phone 785-6500).

FLORIDA (Bartow, Broward, Daytona Beach, Ft. Walton Beach, Gainesville, Homestead, Jacksonville, Key West, Miami, Orlando, Panama City, Patrick AFB, Redington Beach, Sarasota, Tallahassee, Tampa, West Palm Beach): **A. W. Haymon,** 1421 S. E. 3d Ave., Ft. Lauderdale, Fla. 33316 (phone 525-4161).

GEORGIA (Athens, Atlanta, Savannah, St. Simons Island, Valdosta, Warner Robins): **D. L. Devlin,** 1651 McKinnon Dr., Savannah, Ga. 31404 (phone 234-0109).

HAWAII (Honolulu): **Larry Ronson,** 21 Craigside Pl., Apt. 7A, Honolulu, Hawaii 96817 (phone 525-6160).

IDAHO (Boise, Burley, Pocatello, Twin Falls): **Clarence E. Hall,** 3531 Windsor Dr., Boise, Idaho 83705 (phone 344-7283).

ILLINOIS (Belleville, Champaign, Chicago, Deerfield, Elmhurst, O'Hare Field): **William A. Johnston,** 302 Harvard Dr., O'Fallon, Ill. 62269 (phone 632-2021).

INDIANA (Indianapolis, Lafayette, Logansport): **C. Forrest Spencer,** 910 W. Melbourne Ave., Logansport, Ind. 46947 (phone 753-7066).

IOWA (Des Moines): **Ric Jorgensen,** P. O. Box 4, Des Moines, Iowa 50301 (phone 255-7656).

KANSAS (Topeka, Wichita): **Don C. Ross,** 588 Broadmoor Ct., Wichita, Kan. 67206 (phone 686-6409).

LOUISIANA (Alexandria, Baton Rouge, Bossier City, Monroe, New Orleans, Ruston, Shreveport): **Louis Kaposta,** 6255 Carlson, New Orleans, La. 70122 (phone 422-5140).

MAINE (Limestone): **Alban E. Cyr,** P. O. Box 160, Caribou, Me. 04736 (phone 492-4171).

MARYLAND (Baltimore): **James W. Poultney,** P. O. Box 31, Garrison, Md. 21055 (phone 363-0795).

MASSACHUSETTS (Boston, Falmouth, Florence, Lexington, L. G. Hanscom Fld., Taunton, Worcester): **Arthur D. Marcotti,** 215 Laurel St., Melrose, Mass. 02176 (phone 665-5057).

MICHIGAN (Dearborn, Detroit, Kalamazoo, Lansing, Marquette, Mount Clemens, Oscoda, Sault Ste. Marie): **Stewart Greer,** 18690 Marlowe Ave., Detroit, Mich. 48235 (phone 273-5115).

MINNESOTA (Duluth, Minneapolis, St. Paul): **Victor Vacanti,** 8941 10th Ave., Minneapolis, Minn. 55420 (phone 854-3456).

MISSISSIPPI (Biloxi, Columbus, Jackson): **Wm. Browne,** P. O. Box 2042, Jackson, Miss. 39205 (phone 352-5077).

MISSOURI (Kansas City, Knob Noster, Springfield, St. Louis): **Robert E. Combs,** 2003 W. 91st St., Leawood, Kan. 66206 (phone 649-1863).

MONTANA (Great Falls): **Jack K. Moore,** P. O. Box 685, Great Falls, Mont. 59403 (phone 761-2555).

NEBRASKA (Lincoln, Omaha): **Lyle O. Remde,** 4911 S. 25th St., Omaha, Neb. 68107 (phone 731-4747).

NEVADA (Las Vegas, Reno): **Floyd White,** 2446 E. San Lucas Dr., Las Vegas, Nev. 89121 (phone 384-8077).

NEW HAMPSHIRE (Manchester, Pease AFB): **R. L. Devoucoux,** 270 McKinley Rd., Portsmouth, N. H. 03801 (phone 669-7500).

NEW JERSEY (Andover, Atlantic City, Belleville, Camden, Chatham, Cherry Hill, E. Rutherford, Fort Monmouth, Jersey City, McGuire AFB, Newark, Trenton, Wallington, West Orange): **Amos L. Chalif,** 162 Lafayette, Chatham, N. J. 07928 (phone 635-8082).

NEW MEXICO (Alamogordo, Albuquerque, Clovis): **John J. Dishuk,** 8204 Harwood Ave., N. E., Albuquerque, N. M. 87110 (phone 298-0788).

NEW YORK (Albany, Bethpage, Binghamton, Buffalo, Catskill, Chautauqua, Elmira, Griffiss AFB, Hartsdale, Ithaca, Long Island, New York City, Niagara Falls, Patchogue, Plattsburgh, Riverdale, Rochester, Staten Island, Syracuse): **Gerald V. Hasler,** P. O. Box 11, Johnson City, N. Y. 13760 (phone 754-3435).

NORTH CAROLINA (Charlotte, Fayetteville, Goldsboro, Greensboro, Raleigh): **Monroe E. Evans,** 607 Tokay Drive, Fayetteville, N. C. 28301 (phone 488-6008).

NORTH DAKOTA (Grand Forks, Minot): **Kenneth A. Smith,** 511 34th Ave., So., Grand Forks, N. D. 58201 (phone 722-3969).

OHIO (Akron, Cincinnati, Cleveland, Columbus, Dayton, Newark, Toledo, Youngstown): **Robert L. Hunter,** 2811 Locust Dr., Springfield, Ohio 45504 (phone 255-5304).

OKLAHOMA (Altus, Enid, Oklahoma City, Tulsa): **David L. Blankenship,** P. O. Box 51308, Tulsa, Okla. 74151 (phone 835-3111, ext. 2207).

OREGON (Corvallis, Eugene, Portland): **John G. Nelson,** 901 S. E. Oak St., Portland, Ore. 97214 (phone 233-7101).

PENNSYLVANIA (Aliquippa, Allentown, Chester, Erie, Homestead, Horsham, King of Prussia, Lewistown, New Cumberland, Philadelphia, Pittsburgh, State College, Washington, Willow Grove, York): **Frank E. Nowicki,** 280 County Lane Rd., Wayne, Pa. 19087 (phone 672-4300, ext. 62).

RHODE ISLAND (Warwick): **Matthew Puchalski,** 143 Sog Riang, Warwick, R. I. 02886 (phone 737-2100, ext. 27).

SOUTH CAROLINA (Charleston, Columbia, Greenville, Myrtle Beach, Sumter): **Burnet H. Maybank,** P. O. Box 126, Charleston, S. C. 29402 (phone 722-4735).

SOUTH DAKOTA (Rapid City): **Kenneth Roberts,** P. O. Box 191, Rapid City, S. D. 57701 (phone 342-0191).

TENNESSEE (Chattanooga, Knoxville, Memphis, Nashville, Tullahoma): **James W. Carter,** 314 Williamsburg Rd., Brentwood, Tenn. 37027 (phone 834-2008).

TEXAS (Abilene, Austin, Big Spring, Corpus Christi, Dallas, Del Rio, El Paso, Fort Worth, Houston, Laredo, Lubbock, San Angelo, San Antonio, Sherman, Waco, Wichita Falls): **Stanley L. Campbell,** 119 Bluehill, San Antonio, Tex. 78229 (phone 342-0006).

UTAH (Brigham City, Clearfield, Ogden, Provo, Salt Lake City): **Verl G. Williams,** P. O. Box 486, Clearfield, Utah 84015 (phone 777-5370).

VERMONT (Burlington): **R. F. Wissinger,** P. O. Box 2182, S. Burlington, Vt. 05401 (phone 863-4494).

VIRGINIA (Arlington, Danville, Harrisonburg, Langley AFB, Lynchburg, Norfolk, Petersburg, Richmond, Roanoke): **Orland J. Wages,** 210 W. Bank St., Bridgewater, Va. 22812 (phone 828-2501, ext. 91).

WASHINGTON (Bellevue, Port Angeles, Seattle, Spokane, Tacoma): **V. Lee Gomes,** P. O. Box 88850, Seattle, Wash. 98188 (phone 543-3860).

WEST VIRGINIA (Huntington): **Nelson Paden,** 1641 Wiltshire Blvd., Huntington, W. Va. 25701.

WISCONSIN (Madison, Milwaukee): **Kenneth Kuenn,** 3239 N. 81st St., Milwaukee, Wis. 53222 (phone 757-5324).

WYOMING (Cheyenne): **Elmer F. Garrett,** 109 E. 19th St., Cheyenne, Wyo. 82001 (phone 632-9314).

AFA News

PHOTO GALLERY

By Don Steele
AFA AFFAIRS EDITOR

At the California AFA's 1974 Convention, held in conjunction with AFA's Strategic Weapons Development Symposium at Vandenberg AFB, AFA President Joe L. Shosid was the guest speaker at the Awards Luncheon. Shown with Mr. Shosid, center, are, from left, Cadet Richard A. Kniseley, UCLA; AFA Board Chairman Martin M. Ostrow; Cadet Robert J. Buch, Fresno State Univ.; Mr. Shosid; Cadet Thomas N. Romeyn, Univ. of Southern California; California AFA President Ben Snell; and Cadet Michael Dunlap, Loyola Marymount Univ. at Los Angeles. The AFROTC cadets were guests of honor, and each was elected as the Outstanding AFROTC Cadet at his school. During the convention, John W. Lee was elected to succeed Ben Snell as State President for the coming year. State Vice President Barbara Rowland was named State AFA "Woman of the Year," and the Antelope Valley Chapter received "Chapter of the Year" honors.

One of the highlights of the Ohio AFA's 1974 Convention Banquet, recently held at the Newark Air Force Station NCO Club, was the presentation of the State AFA's Aerospace Power Award for significant contribution to the development of aerospace power. The recipient, Mr. Fred D. Orazio, Sr., right center, Scientific Director for Development Planning, Aeronautical Systems Division (AFSC), Wright-Patterson AFB, is shown with, from left, AFA National Director Joe Higgins, the master of ceremonies; Mrs. Orazio; and Ohio AFA President Robert L. Hunter, who was reelected for a second term. During the program, AFA National Director Jack Withers and Bernard D. Osborne, Vice President for AFA's Great Lakes Region, were named corecipients of the State AFA's "Man of the Year" Award.

Airman Wendy Whitfield, an inventory management specialist with the 6505th Supply Squadron at Edwards AFB, was named "Miss California AFA" during the State AFA's recent convention. She will represent the more than 16,000 California AFA members at various civic, social, and patriotic events during the year and will also participate in Air Force recruiting activities throughout Southern California. Airman Whitfield, nineteen, is from Cornwall, N. Y., and plans to make the Air Force a career.

During the Texas AFA's recent convention in Wichita Falls, AFA's "Freedom Through Vigilance" award was presented to SMSgt. Richard P. Cheney, "Outstanding NCO of the USAF Security Service for 1974." AFA President Joe L. Shosid, right, presented the award. At the head table are Stanley Campbell, left, Texas AFA President, reelected during the convention and named Texas AFA "Man of the Year"; and Lt. Gen. John W. Roberts, USAF's DCS/Personnel, the guest speaker.

FUND DRIVE FOR CARILLON IN COLORADO

The Officers and NCO Wives Clubs of the Ent AFB-Peterson Field complex are spearheading a fund drive to install a carillon at the new Peterson Field Chapel in Colorado Springs, as a living memorial to the devotion and sacrifice of all wives and mothers of military persons.

More than $2,300 already has been contributed toward a goal of $10,000. Persons or groups who wish to contribute $250 or more may have a special plate with the name of the wife or mother to be honored or remembered, affixed to the larger memorial. Other contributions will be recognized in a lighted "Book of Memories."

Contributions to the Peterson Field Carillon Fund should be mailed to The Base Chapel, Peterson Field, Colorado 80914. Please specify the name of the person to be remembered.

AFA News

Rep. Robert L. F. Sikes (D-Fla.), left, was named the H. H. Arnold (Bethpage, N. Y.) Chapter's "Man of the Year" at its recent 1974 Annual Awards Dinner. Rep. Lester Wolff (D-N. Y.), a member of the Chapter's Council, made the presentation. More than 300 aerospace leaders, members, and distinguished guests attended the dinner.

More than 300 leaders of Congress, the Air Force, AFA, and the civilian community attended a Dining-In cosponsored by the Texas AFA, the Alamo Chapter, and the San Antonio Chamber of Commerce to honor Congressman O. C. Fisher (D-Tex.), who is retiring after serving thirty-two years as a congressman. Shown here at the head table, front row, from left, Gen. George S. Brown, then USAF Chief of Staff, now Chairman of the Joint Chiefs of Staff; William P. Clements, Jr., Deputy Secretary of Defense; Congressman F. Edward Hébert (D-La.), Chairman, House Armed Services Committee; Congressman Fisher; and Sen. John G. Tower (R-Tex.). Back row, from left, Chapter President Frank Manupelli; Lt. Gen. William V. McBride, Commander, Air Training Command (General McBride has been nominated for his fourth star and selected to become Commander of the Air Force Logistics Command); retired AF Brig. Gen. Robert McDermott, President of the Dining-In and of the San Antonio Chamber of Commerce; San Antonio Mayor Charles Becker; Dr. Sean Burke, Incarnate Word College; Gen. John D. Ryan, retired USAF Chief of Staff, an AFA National Director, and Chairman of AFA's National Membership Committee; and Texas AFA President Stanley Campbell.

While touring USAFE bases in Germany and Spain, AFA President Joe L. Shosid attended the USAFE Stars and Bars Dining-In, held in conjunction with the USAFE Junior Officer Council Conference at Ramstein AB, Germany. Only captains, lieutenants, and general officers were invited. Mr. Shosid, an honored guest, is flanked by, from left, Capt. David Harrington, President of the mess and of the Ramstein JOC; Gen. Russell Dougherty, SHAPE Chief of Staff (now Commander in Chief of the Strategic Air Command); Mr. Shosid; Gen. David Jones, USAFE Commander in Chief (now USAF Chief of Staff); and Capt. Michael Crosby, a member of the Executive Committee of AFA's Junior Office Advisory Council. (USAF Photo by TSgt. James E. Skarsten)

AIC Susan Holmes, center, a WAF student at the Lowry Technical Training Center, was the winner of a cassette tape recorder at the Front Range Chapter's Second Annual Salute to the Women in the Air Force. Announcing the winner is Chapter President Ed Marriott, and holding the prize is Rosemary "Barney" Barnwell, Denver TV and radio personality, who was the mistress of ceremonies. The guests of honor were more than 250 WAFs from the Denver area. More than 400 AFAers, and leaders of the Air Force and the community attended, including Medal of Honor winners Col. Bernard Fisher and Capt. James Fleming; Rep. Patricia Schroeder (D-Colo.); Maj. Gen. Charles Pattillo, Commander, LTTC; Maj. Gen. Joe C. Moffitt, Adjutant General of the State of Colorado; and Capt. Micki King, Olympic gold medalist.

CHAPTER AND STATE PHOTO GALLERY

New state officers elected and installed at the Illinois AFA's recent convention in Belleville are, from left, Charles W. Harriss and William P. Turk, Vice Presidents; William A. Johnston, Secretary-Treasurer; Charles C. Oelrich, President; and M. Lee Cordell, Vice President. Gen. Paul K. Carlton, Commander of the Military Airlift Command, was the guest speaker at the Convention Awards Banquet.

Col. Walter C. Schrupp, right, 7th Bomb Wing Commander, accepts a check for $8,000, presented to Carswell AFB, Tex., by AFA's Forth Worth Airpower Council. Making the presentation are, from left, Herman Stute, Council Vice Chairman, and Joe L. Shosid, Council Chairman and AFA's National President. The money will help refurbish such areas of the base as the hospital, the CHAP building, and the swimming pool at the alert facilities.

More than 300 military and civic leaders attended a recent luncheon cosponsored by AFA's San Bernardino Area Chapter and the San Bernardino Chamber of Commerce. Lt. Gen. William F. Pitts, left center, Commander, Fifteenth Air Force, March AFB, Calif., was the guest speaker. Shown with General Pitts are, from left, Chapter President A. H. von der Esch; Edward Stearn, General Chairman for the Chapter's Sixth Annual Charity Golf Tournament; and Angus W. Clain, Vice President of the Chamber and a Past President of the Chapter, who served as Chairman of the luncheon.

During his recent tour of USAFE, AFA President Joe L. Shosid visited five Air Force bases in Germany and Spain. At each base, he talked with representative groups of junior officers, NCOs, and airmen. Here, he makes a point at Ramstein AB, Germany, as SMSgt. Ralph Daniel and SMSgt. R. L. Ainsworth listen. (USAF Photo by SSgt. Bobby Cuyler)

Four Scott AFB personnel were recognized as "outstanding" during the Illinois AFA's recent Convention in Belleville. In the photo, Scott Chapter President Charles W. Harriss, left, who was named the State AFA's "Man of the Year," presents citations and US Savings Bonds to, from left, TSgt. James Baird, 375th Air Base Group, "Outstanding Airman"; SMSgt. John Vernon, 375th CAM Squadron, "Outstanding NCO"; and, from MAC Headquarters, Capt. Lawrence S. Neznanaski, "Outstanding Junior Officer," and Mr. Graden T. Valleroy "Outstanding Civilian Employee."

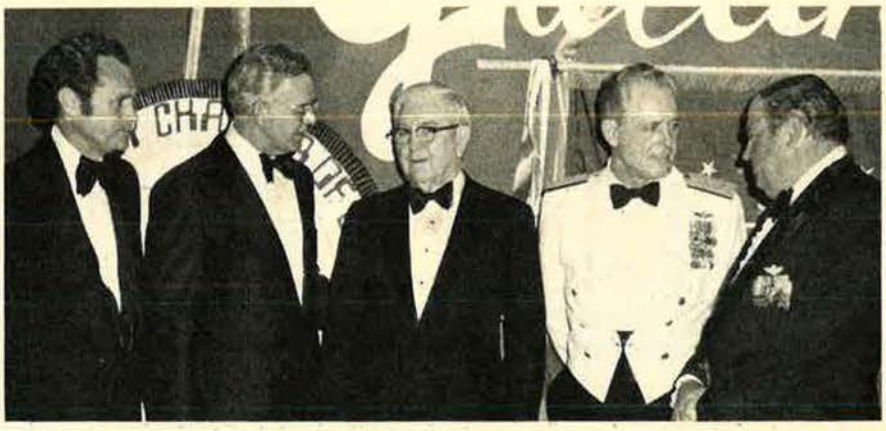
AFA News

Members of the Ak-Sar-Ben Chapter's Council recently visited the Strategic Air Command Headquarters at Offutt AFB, Neb., for briefings on SAC and the worldwide command control system. Shown touring the underground command post are, from left, Conrad S. Young, Vice President, United Benefit Life Insurance Co.; John S. Reinhart, President, First National Bank of Bellevue; Harold R. Craddock, southern directory manager, Northwestern Bell; Edward A. Crouchley, executive assistant, Northwestern Bell; Hugh W. Campbell, Bank of Bellevue Board Chairman; Robert J. Taylor, Vice President, United Benefit Life Insurance Co.; Chapter Secretary Frank W. Kauffman, government communications coordinator, Northwestern Bell; Lloyd H. Grimm, US Marshal; Dr. Charles T. Yarington, Jr., professor of medicine, University of Nebraska Medical Center; and Chapter President Bob Runice, Vice President, Northwestern Bell. Not shown, but also on the tour were, Nebraska State President Lyle O. Remde; Howard S. Silber, military affairs editor, Omaha World-Herald; AFA National Director Arthur C. Storz, Sr.; and Arthur C. Storz, Jr.

AFA's Billy Mitchell Chapter and the General Wm. Mitchell Post No. 388 of the American Legion cosponsored a Memorial Day service at the Mitchell family plot in the Forest Home Cemetery, Milwaukee, Wis. In the photo, Chapter President Stanley H. Wagenknecht is shown laying a wreath on the grave of Brig. Gen. Billy Mitchell, the aviation pioneer and prophet for whom the Chapter is named.

Lt. Gen. Albert P. Clark, Superintendent, United States Air Force Academy, the General Jimmy H. Doolittle Chapter's "Military Man of the Year," shows award to Chapter President Dolly Foster, left, and Lt. Col. Betty J. Paris, USAFR, Chapter Secretary. The award was presented at the Chapter's Fifteenth Annual Awards Banquet held recently at SAMSO in El Segundo, Calif.

AFA National Director George M. Douglas, center, of Denver, Colo., was recently promoted to brigadier general in the Air Force Reserve. Doing the "star-pinning" honors are his wife, Lee, and Gen. L. D. Clay, Jr., Commander in Chief, North American Air Defense Command and, also, Commander of ADC. General Douglas' Reserve assignment is as mobilization assistant to the Vice Commander of ADC.



Gen. Jack J. Catton, Commander, Air Force Logistics Command, was the guest speaker at a recent Dining-Out cosponsored by AFA's T. P. Gerrity Chapter of Oklahoma City, Okla., and the Oklahoma City Chamber of Commerce. Distinguished guests included, from left, Ed Cook, President, Oklahoma City Chamber of Commerce, and President of the Dining-Out; Paul Strambaugh, Executive Vice President, Oklahoma City Chamber of Commerce; Rep. Tom Steed (D-Okla.); General Catton; and Chapter President James A. Mullins. More than 400 leaders of the Air Force, the community, and AFA attended.

PHOTO GALLERY

Among the many hats worn by retired Air Force MSgt. Cal Garing are those of Georgia AFA Vice President, Editor of the Savannah Chapter's Newsletter, and member of Senator Nunn's (D-Ga.) Academy Review Committee. Members of the Committee are, from left, Maj. Gen. Harley Moore, USA (Ret.); Capt. James V. Kelso, USAF, Moody AFB; Lt. Michael Haddon, USN, Navy Supply Corps School, Athens, Ga.; Mr. Garing; Miss Joyce Chestnut, of Senator Nunn's staff; Adm. Hugh H. Howell, Jr., USN (Ret.); Col. Ed Patterson, USAF (Ret.); Capt. Robert J. Balog, USA, Fort Benning; and Lt. Col. Roy Jones, USA (Ret.).

During a recent visit to Rep. Joel T. Broyhill's Washington office, Northern Virginia Chapter President Thomas "Tony" Anthony, right, presented an AFA membership to the congressman. Brig. Gen. William McCall, left, Chief of Staff, D. C. Air National Guard and a Past President of the Chapter, accompanied Mr. Anthony.

During recent ceremonies at K. I. Sawyer AFB, Mich., Maj. Gen. Eugene Q. Steffes, Jr., left, Vice Commander, Second Air Force, presents a plaque to Lynn B. Coleman, President of the LS & I Railroad and, also, President of AFA's Lake Superior Northland Chapter, as Mrs. Coleman looks on. The award was for the "continued and dedicated support rendered the Air Force" by Mr. Coleman.

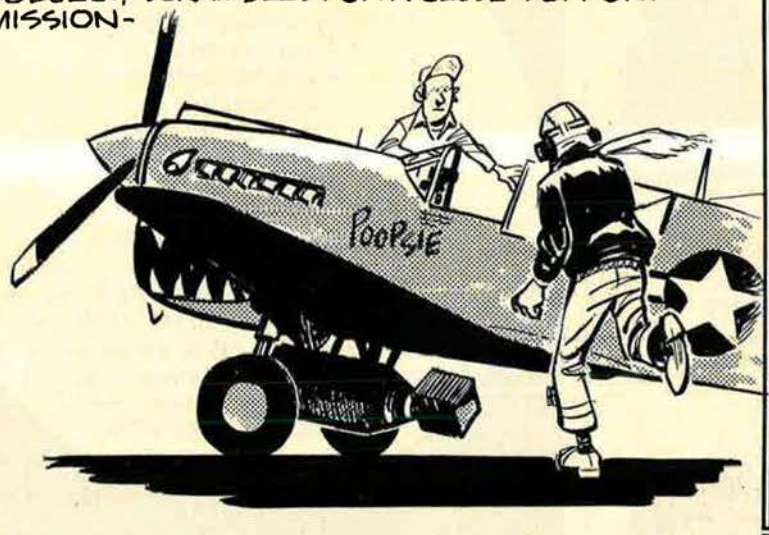
Bob Stevens'

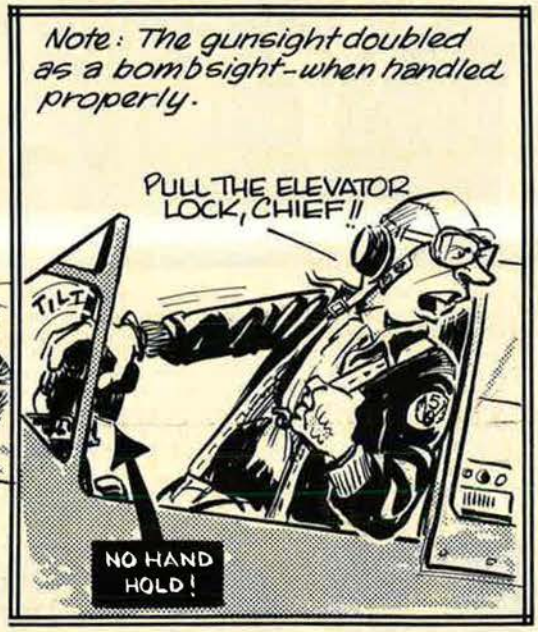
"There I was..."

THE FOLLOWING STORY-WHICH MIGHT HAVE BEEN ENTITLED "HOW I LEARNED TO STOP USING THE GUN-SIGHT FOR A CRUTCH *and* START LIVING"—IS TRUE.

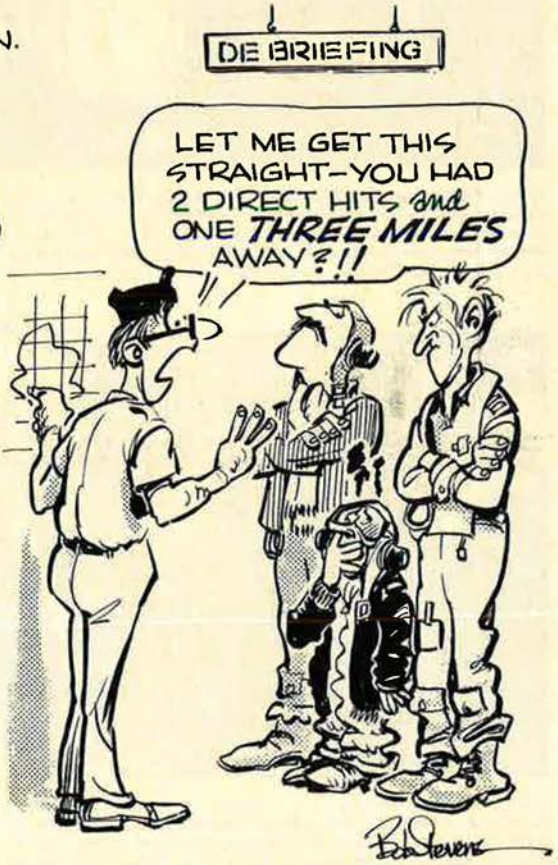
I HOPE THE PRINCIPAL CHARACTER IS STILL WITH US!

P-40S WERE SOMETIMES USED AS DIVE BOMBERS IN "THE BIG ONE". BLUE 3, OUR SUBJECT, SCRAMBLES FOR A CLOSE-SUPPORT MISSION-





DURING THE BOMB RUN THE TILTED GUN-SIGHT PRODUCED A RATHER UNUSUAL FORMATION.



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