December 1970/60c

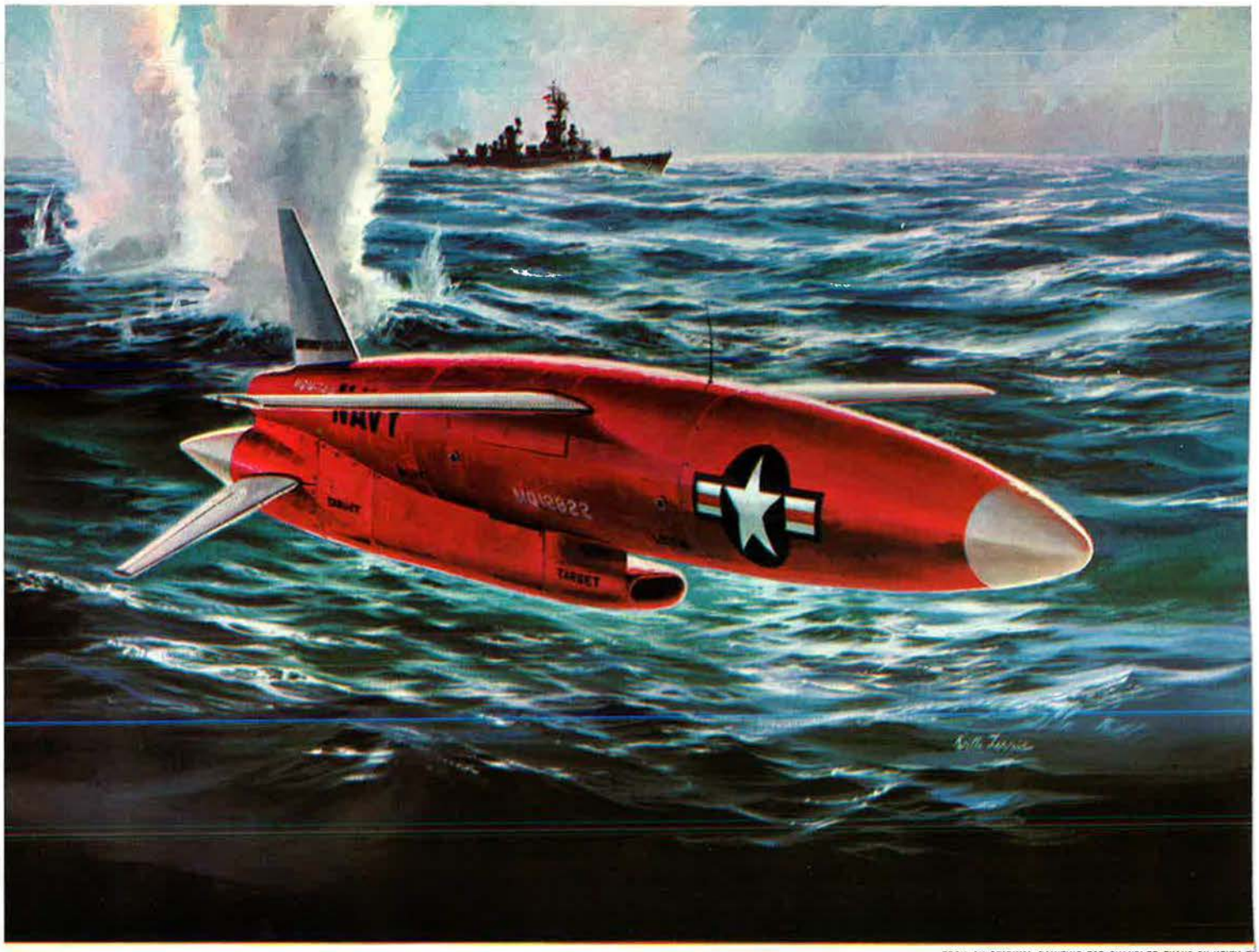
AIR FORCE

and SPACE DIGEST

The Magazine of Aerospace Power / Published by the Air Force Association

SEARCH AND SAVE!

HH-53 Jolly Green pilot Maj. George C. Hitt heads out from Da Nang Airfield on a rescue mission. For a special report on how 7th AF's Joint Rescue Coordinating Center saves downed pilots,
see page 40 . . .



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MAIN FUEL CONTROL by Chandler Evans

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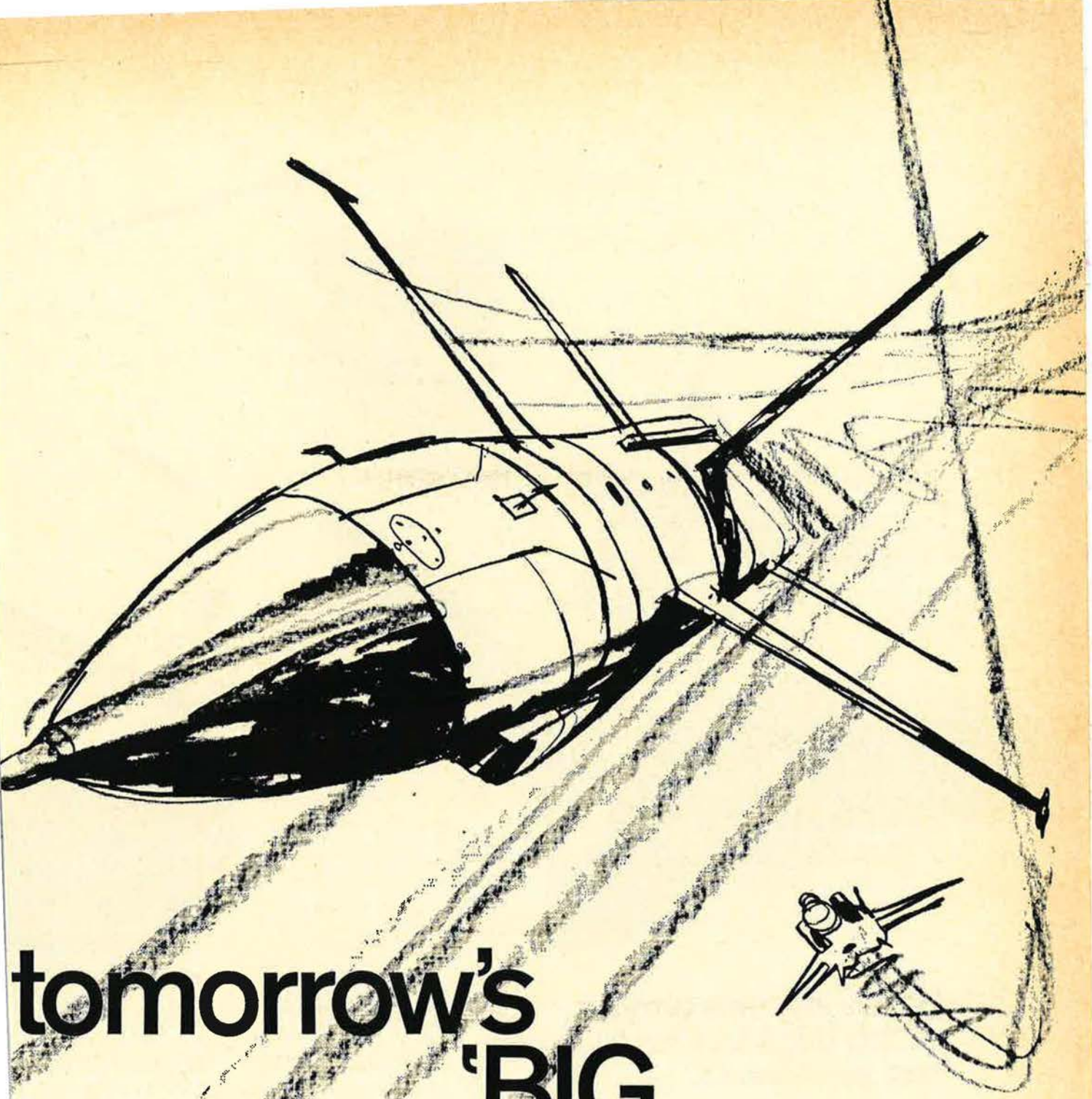

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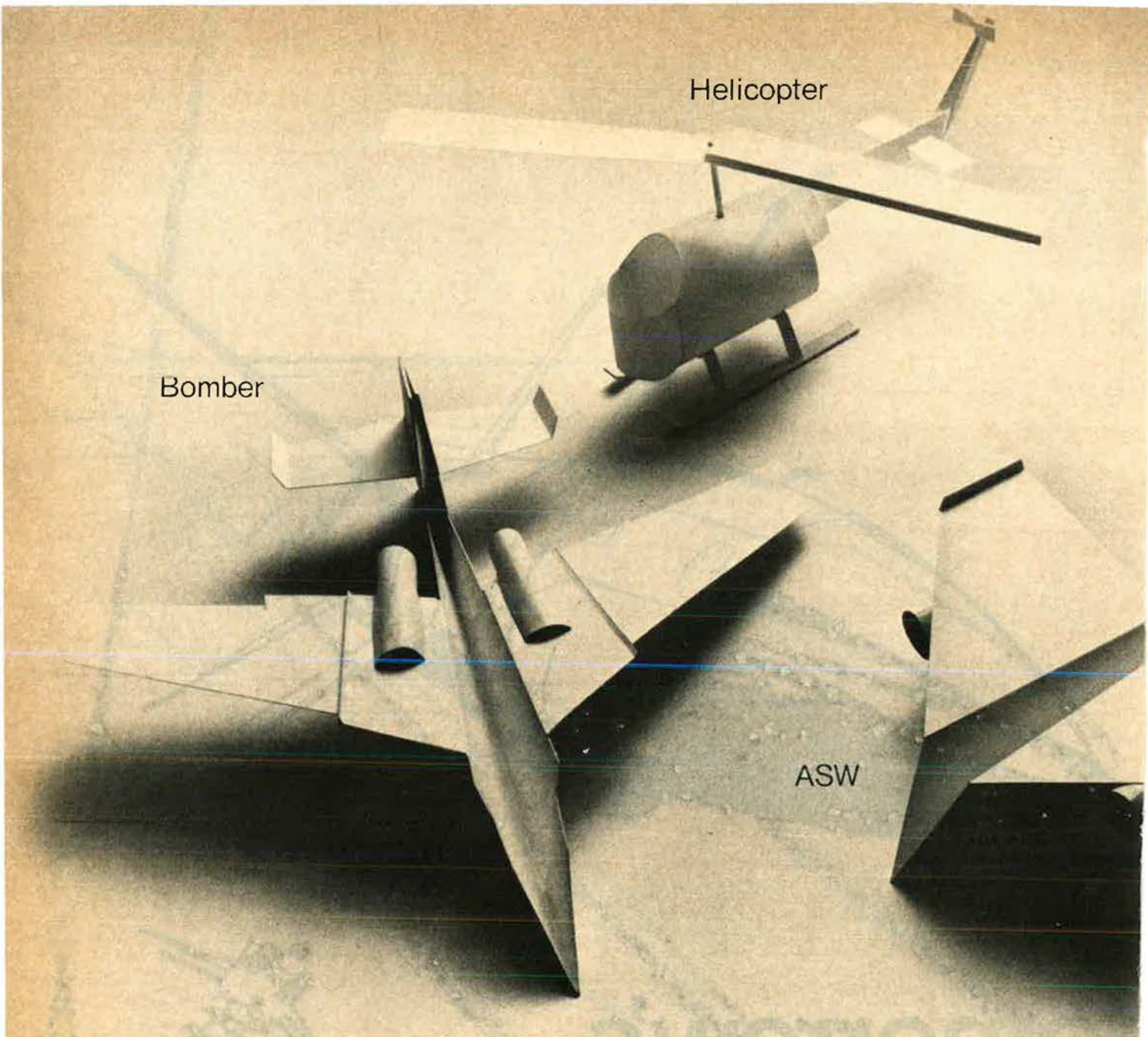

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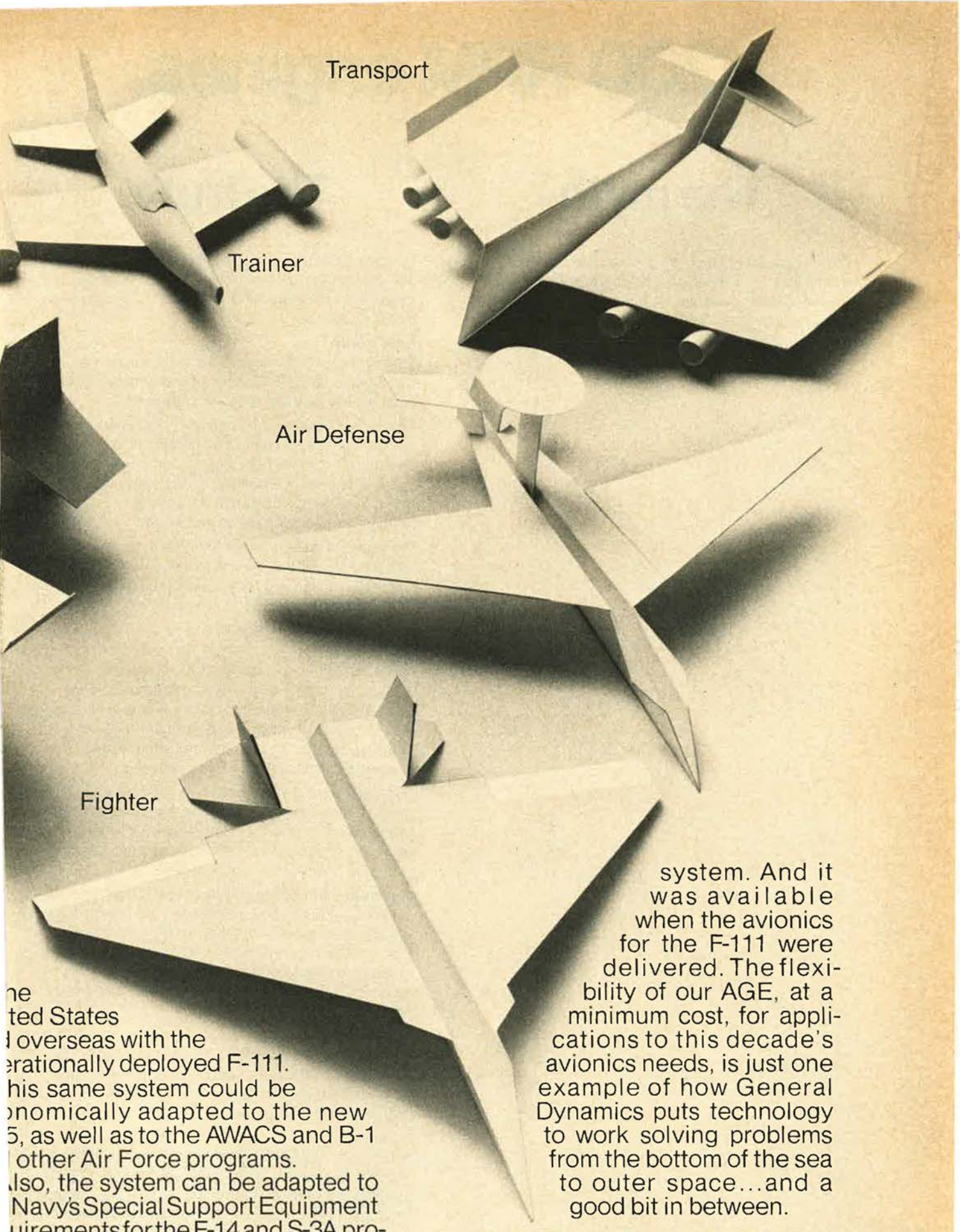

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DEPARTMENTS

An Editorial

Silence Isn't Always Golden

By John L. Frisbee

SENIOR EDITOR, PLANS AND POLICY

FOR reasons that are not really clear to us, the Air Force has been something of a Silent Service so far as professional literature is concerned. The Air Force has yet to develop the strong tradition of professional writing that is the mark of the legal, medical, and teaching professions, and indeed of the other military services.

If anyone knows the reasons for this reticence, we wish he'd let us in on the secret. It can't be youth. The Air Force, in its various organizational stages, now is more than sixty years old. There are third-generation airmen on the rolls today. It can't be an educational inferiority complex, for the Air Force is the best educated of any of the services, if the number of college diplomas and advanced degrees is any criterion. It can't be inexperience. The USAF is the most combat-seasoned air arm in the world. And certainly it can't be a lack of ideas in the service that has revolutionized military science twice in the past fifty years.

Perhaps it's excessive modesty, but we find this hard to believe. We've heard too many fighter-pilot stories to buy that one.

It's true, of course, that serious professional writing wasn't exactly encouraged during most of the 1960s. But that situation has changed. There always will be subjects—or parts of subjects—that can't be discussed publicly for reasons of security or policy. From our own talks with people on the Pentagon side of the Potomac, we're convinced that reasonably free discussion of professional matters is more than merely tolerated once again. It's encouraged. The military profession can't function in an intellectual straitjacket, and that fact is accepted in the Department of Defense today.

Whatever the cause may have been, we think that the still relatively small volume of professional writing does the Air Force a disservice. Aerospace power, though often the most evident of the various forms of military power, is the least understood because its effectiveness in battle and its usefulness as a deterrent are probably the most difficult of all to measure.

There is, for example, a widespread loss of confidence in air interdiction, based on a misreading of USAF interdiction accomplishments in Vietnam. The usefulness of both the manned bomber and of land-launched missiles has been challenged with little apparent understanding of the interactions of bombers, land-launched missiles, and sea-launched missiles in deterring attack on this country and in protecting our allies. Take an example in a different area—people. Not many young people have any idea of the career challenges in a service that has become at least as sophisticated in all its aspects—operations, logistics, planning, management—as any profession known to man.

You can say that creating an understanding of these and other important issues is the business of the Air Force Information people, and let it go at that. But, as Gen. Bruce K. Holloway points out in his article on page 68 of this issue, it really is a responsibility of everyone in Air Force blue.

Part of the responsibility of this magazine is to encourage professional writing by Air Force people. There are too many public misunderstandings that need to be set right, but may not be unless professional airmen begin to participate more actively in the discussion and analysis of their own profession.

What does AIR FORCE Magazine offer the professional airman in the way of a forum for his ideas? To begin with, it's the largest aerospace publication in the country. The magazine is read not only by the 106,000 members of the Air Force Association, but also by members of Congress, officials of many federal and state agencies, and leaders of business and industry here and abroad.

For our readers who are active-duty officers and airmen, AIR FORCE Magazine is a medium for exchange of ideas within the profession. The same is essentially true for our Air National Guard and Reserve readers. Our industry executives and professional people, many of whom have worn the Air Force uniform in other times, want and need to know more about what the Air Force is thinking, as well as what it is doing.

Readers of this magazine, individually and as members of Air Force Association chapters throughout the country, have contributed significantly to furthering the cause of aerospace power during the last quarter century. If they are to continue to do so, they will need an up-to-the-minute understanding of the Air Force, and that can be provided best by Air Force professionals.

In recent months, AIR FORCE Magazine has published (and paid for at better-than-average rates) an increasing number of articles bylined by active-duty people. We want this trend to continue, and will encourage it in every way we can. We look on it as a service to AFA members, to the Air Force, and to the country as a whole.—END

SCIENCE/SCOPE

The first Intelsat IV communications satellite has been readied for delivery to Comsat by Hughes, prime contractor to the International Telecommunications Satellite Consortium (Intelsat) and is scheduled for launch this winter. The 17½-foot-high satellite will be capable of relaying 3,000 to 9,000 two-way telephone calls, depending on the mode used, or 12 color television programs, or any combination of communications including data and facsimile, from its synchronous orbit 22,300 miles above Earth. Intelsat recently contracted with Hughes for four additional satellites, making a total of eight.

Los Angeles' overburdened communications system is under the scrutiny of aerospace technology. A team of Hughes scientists is at work on a special study aimed at giving the city's emergency services -- police, fire, and ambulance -- a modern command-and-control system. They are evaluating the efficacy of equipping all police vehicles and control centers with electronic devices that would make it possible to determine every vehicle's location almost instantaneously in order to speed the nearest patrol car or cars to respond to a specific situation.

A temperature/humidity infrared radiometer (THIR) for the next two versions of NASA's Nimbus weather satellite is being built by Santa Barbara Research Center, a Hughes subsidiary. The THIR is a two-channel, high-resolution scanning radiometer which measures the earth's terrestrial, cloud, and atmospheric radiation to provide day-night cloud maps and moisture distribution on a global basis. The timely information it will provide on storm buildups and movements is expected to aid in weather forecasting.

A new insulation to shield wiring from high heat has been developed by Hughes research chemists for the U.S. Air Force Materials Laboratory. Electrical wiring coated with the polymeric material can withstand temperatures of 600°F. indefinitely -- or 700°F. for short periods -- without degradation or danger of fire. The new material, in development for nearly two years, also seals wire against the effects of moisture and air and maintains its flexibility down to -100°F.

A supersensitive level sensor invented by a Hughes scientist is so accurate that it could level an imaginary beam 100 miles long to within 1/32-inch of true level. It is now being used by various government and private agencies in tilt measuring instruments, leveling systems, and level reference bases. At Hughes, for example, the sensor holds a 3600-pound granite block level for 15 hours during the final testing of accelerometers for the inertial guidance system of the U.S. Navy's Poseidon missile -- despite vibrations, temperature variations, tides and earth tremors.

A new high-speed analog/digital converter from Hughes -- said to be one of the fastest ever developed using all-integrated circuitry -- can sample inputs every one hundred-millionth of a second. It operates at 100 megawords per second with six-bit resolution and provides high-resolution video with 64 separate shades of gray. Anticipated uses: in aircraft radar signal processing systems and as a high-speed digital link for communications satellite video.

AIRMAIL

Happy Reader

Gentlemen: I wish to compliment you on the October 1970 edition of AIR FORCE/SPACE DIGEST, published by your organization. Seldom have I encountered an issue of a periodical that has contained such a number of interesting articles. Usually I scan a periodical and if I find one article worthy of time spent in reading, I am somewhat surprised and pleased.

Your October issue was a total delight from cover to cover!

MAJ. JAMES K. HARRIS
Elgin AF Auxiliary Field #2, Fla.

Book Review Reprise

Gentlemen: Some anonymous person in the Washington, D.C., area recently sent me a clipping of [Claude Witze's] review of my book, *Militarism, U.S.A.*, which I presume was in AIR FORCE/SPACE DIGEST [October '70 "Airman's Bookshelf"]. As an editor of AF/SD, I can understand [his] criticism of my book because of my comments about the Air Force Association and quotes from AF/SD. I tried to be as accurate as possible.

Actually, you may be interested to know that your article, "The Case for a Unified Command: CINCSEA" [January 1967 issue], was one of the main "seed" ideas that eventually resulted in the book. In fact, Chapter VII is based upon your main thoughts. It was such excellent articles that made up my file of references used in writing the book. The command problems in Vietnam, which you noted in 1966–67, also prompted me to editorialize on the subject while I was publisher of *The Armed Forces Journal*. They were then, and still are, very touchy subjects at CINCPAC and the Pentagon. To a large degree, command relations are also probably at the root of much of the tragedy of Vietnam.

As for your lumping General Shoup, Senator Proxmire, screaming kooks, and me together merely because you disagree with us, it is the technique of Agnew and really beneath a good reporter and editor. I believe it's called demagogy.

You are quite right; I do not have access to the records on the bungling use of airpower in Vietnam, which are "now in the vaults of the Pentagon." Does any public writer? But you admit there was bungling, and articles in AF/SD and other unclassified publications have so indicated over the years. A careful reader can put the picture together—which results in the "great bombing hoax." I don't say in the book that the military are to blame for it.

And finally, of course, I know how to spell General Greene—but my editors, and indexer, did not. My corrected page proofs were lost in the New York mail strike, so many corrections were done by phone. We missed that one.

Your comments in total strike me as being rather immature, emotional, and directed at me rather than the book. In fact, it has been interesting to note that the *very few* critical reviews we have received have attacked General Shoup and me—rather than the book. But I understand such critics each have *their* vested interests, and yours is AIR FORCE/SPACE DIGEST and AFA—and that is what the book is all about. Millions of Americans have personal, financial, and emotional interests in the extent of our militarism.

COL. JAMES A. DONOVAN,
USMC (RET.)
Atlanta, Ga.

• *Senior Editor Witze comments: Colonel Donovan's book made me more sad than mad. I have known too many dedicated and competent military officers, in all hues of uniform, who do not fit his concept. It is impossible for me to believe that, after all the years the Shoup-Donovan team spent in the service, they can honestly believe our Army, Navy, Marine Corps, and Air Force men have the base motivations fixed upon them in* Militarism, U.S.A. *So far as demagogy is concerned, the shoe does not fit. After more than thirty-five years in this inky realm, demagogues are easily recognized. In very recent years, it seems to me, a lot of new ones have appeared in the most unexpected places.*

Gentlemen: . . . A review is often a vehicle for discussing an issue brought up in a new work. To use a review to swipe at an author is a narrow-minded, childish exercise, an exercise, especially in Mr. Witze's situation of editorial responsibility, which can ruin any impact or useful discussion the reviewer may bring to the issue. Mr. Witze's use of such words as "renegade Marine," "screaming kooks," and such adds nothing to a discussion of the merits, or lack of same, of any work. This review raises, to me at any rate, serious questions concerning the reviewer's objectivity and sense of fairness, to the extent of very seriously questioning the depth of thought, research, and even truth that he has put into his column.

The American military as an institution has some rather obvious shortcomings, due in part to an excessive bureaucracy, probable excessive use of paper to becloud issues and communications, and an apparent parochialism on the part of its personnel, young and old.

Mr. Witze speaks of Colonel Donovan's misrepresentations, yet dismisses pointing them out and countering them by specific "counterresearch." He is correct to point out the credibility gap caused by Colonel Donovan's (in Mr. Witze's view) allegations of villainy (Mr. Witze gives no examples, so I can't tell). Often in this country, what passes for conspiracy, it seems, is merely stupidity, carelessness, and thoughtlessness (even selfishness, arrogance, and a little fear) on the part of institutionalized mentalities afraid to rock a boat or do a little exploration.

A very overgeneralized example of this might be the requirement to go outside the organization, as in the case of the von Kármán committee, to set goals for the organization. This condition seems to be true for university administrations, military organizations at all levels, and the civilian government of this country. As far as conspiracy, we have seen the Birchers' charges of Communist collusion on the part of Eisenhower as well as the Weatherman's charges of Fascist repression toward Nixon.

Mr. Witze writes of Colonel Donovan's "unfounded" criticism of the Vietnam bombing program, and speaks of the lack of access to records "now in the vaults of the Pentagon." Yet he never mentions the continuing charges that the DoD has been the most serious offender in the failure to disclose records and information to justifiable inquiry as required by law.

To lastly state that a misspelled name is the most incredible error in a book seems to reveal a lack of a sense of proportion of the reviewer (how many times has his column suf-

fered from a printer's error, for instance?), and ultimately it calls into question his real qualifications to comment meaningfully upon anything.

2D LT. E. E. FRICKS, JR.
Lemont, Pa.

Space Program in the '50s

Gentlemen: [I believe there are] several misleading aspects in the article by William Leavitt ["The Air Force and Space," September '70 issue] as they pertain to the Atlas, Vanguard, and Explorer I [Jupiter C] situation in the middle 1950s.

First, and contrary to the author's words, including those quoted from Gen. B. A. Schriever, in the fall of 1957 the A Series Atlas SM-65 was no more ready to insert a satellite into earth orbit than "the man in the moon." The record proves failure of the first Atlas, S/N 4A, on June 11, 1957. . . . The first successful flight of the Atlas Series B (booster and sustainer) did not occur until August 2, 1958, and the Series B was [the one] that might have been able to insert an earth satellite; in fact, it did so by inserting itself, in Project SCORE, with the communications repeater satellite and President Eisenhower's voice from space, but not until December 18, 1958. In other words, the Atlas had too many "bugs" and was not ready in 1957.

However, back on March 17, 1958, Vanguard TV-4 showed a successful launch of a three-stage vehicle, which placed the six-inch, 3.25-pound test satellite and the fifty-pound third stage into an orbit that still exists and is expected to last about 200 years. It also was the first satellite to use solar cells for power and gimbaled engines as steered by the flight control system, revealed that the earth is pear-shaped with a peak at the North Pole and a flattening at the South Pole, established that the atmosphere at 400 miles is three times more dense than previously thought, demonstrated that the earth's magnetic field damps the rotation of orbiting satellites, and showed that sunspots produce periodic energy gusts called solar winds that affect a satellite's orbit. . . .

On September 9, 1955, Project Vanguard was set up by the Naval Research Laboratory under the watchful eye of the Department of Defense. Vanguard drew no money from the Congress, relying instead on emergency funds supplied by DoD. On September 23, 1955, the Martin Co. received the prime contract to build the Vanguard airframe. Program goals were to develop a launching rocket to orbit at least one satellite during the IGY and to track its flight. . . .

At the same time, DoD specified that the Vanguard was in no way to interfere with the development of ballistic missiles, which carried a top, or 1-A, priority. Thus, when Martin received a USAF contract to develop the backup ICBM, SM-68, or Titan I, it had to shift some of its experienced engineers from the Vanguard program to the Titan I at Baltimore and Denver. This action undoubtedly hurt the Vanguard. Then came October 4, 1957—and Sputnik.

Then the political pressure started to rise—on an IGY program that had been set up, not as any race, but as a deliberate, scheduled, scientific program.

When the post-Sputnik hysteria subsided a bit, excessive pressure was exerted to speed up the Vanguard orbital launch. Vanguard officials informed Eisenhower that they *expected* to test all three stages *for the first time* and *hoped* to orbit a test satellite at that time. On November 5, I was in Denver; on November 8, on Pad 18A, and "all hell had broken loose." During late November, the X-405 S/N 10 and the Aerojet second-stage pressure-fed engine S/N PU-1 had completely successful static firings on 18A, but the pressure and the "crowd" were on. Washington politicians in mufti and Navy brass were clambering all over 18A and Hangar S, going up and down on the gantry's elevator, *ad absurdum*. Shortly after Dr. Hagen's expressed *hope* to the White House, it surprisingly announced, without qualification, that the US would orbit a satellite by year's end. Both the Navy and DoD were shocked, but their clarification was lost in the wave of publicity that flooded the press. . . .

On December 6, TV-3 suffered a random failure malfunction in the booster section that is detailed in the classified final report, and a few weeks later the Army's original "orbiter" proposal was justified when the Jupiter C version of a Redstone put up the first US orbital satellite [Explorer 1]. . . .

In 1959, USAF took the upper two stages of Vanguard, mounted them on a Thor IRBM, and called the combination Thor-Able. Then NASA made minor modifications in the vehicle's coast-attitude control system, put in a new autopilot system (in the basic Thor-Able airframe), and called it Thor-Delta, which subsequently went on and on.

Vanguard was originally budgeted for $20 million (naïvely), and ended up at about $105 million, including cost of the worldwide Minitrack network that was utilized in Project Mercury. Each [vehicle] cost about $3 million and each pound orbited about $1,223,000, but the subsequent fallout to other programs and scientific knowledge is difficult to cost/calculate. All Titans and Gemini owed much to the Viking/Vanguard rockets. And when you look at or study the Titan III's transtage engine, you see the lineage and derivation from Aerojet's 10-37 second-stage engine of Vanguard.

R. H. HODGES
Pelham, N.Y.

• *The main points made by Mr. Hodges, who is a veteran missileer, are that (1) despite statements on its potential, the Atlas really wasn't ready for use as an orbital booster in the pre-Sputnik period, and that (2) the Vanguard program was underfunded and not given any priority. He is correct, and the Leavitt article's quote of General Schriever has the General talking about the potential of Atlas, just that. The burden of Mr. Leavitt's article was that the need to have a high-priority satellite program was not seen by the civilian and military leadership, which is why what we ended up with was an underfunded and too-late Vanguard. No one denies Vanguard's eventual contributions, and no one is criticizing the Vanguard people. They performed gallantly under the absurd circumstances of the period, muddied as it was by interservice rivalry over the missile mission and a governmental policy of refusal to acknowledge the need to counter what intelligence was telling us the Russians would do in space.*—THE EDITORS

A Need for *Esprit*

Gentlemen: I enjoy your magazine very much and feel, as a support soldier, I should express my views on "Those Illegal Shark Teeth" ["Airmail," October issue].

The officer who let his men add some special sign to show or express their pride not only in the weapon, but themselves, should be given an award.

In this present-day society, all the serviceman sees is protest after protest, and lawbreakers still free. His morale has been lowered and he needs something to let him show the world that he not only belongs but that his outfit has some *esprit* left in it.

The generals must remember the World War II days when they went into battle with their colors flying. . . .

Morale, pride, and *esprit de corps* are part of the Air Force, and, if some of it isn't put back, then all the sweat and hard work have been for nothing. . . .

TSGT. THOMAS O'NEILL
Beale AFB, Calif.

AIRPOWER IN THE NEWS

By Claude Witze
SENIOR EDITOR, AIR FORCE MAGAZINE

How Not to Win

WASHINGTON, D.C., Nov. 11

When the history of the war in Vietnam is written, years from now, the conflict will go down as our longest conflict and certainly one of our worst managed. The source documents are building up fast these days. In the past month, the focus has been on logistics. The Military Operations Subcommittee of the House Committee on Government Operations, headed by Rep. Chet Holifield of California, has come up with a report on what we learned about military supply systems in Vietnam. The chairman of the subcommittee says that supply management is a neglected area, so far as he is concerned. The spotlights go on procurement, because procurement is more visible and there is competition that dramatizes the issues. An overrun in the procurement stage is good for a lot of headlines, but supply overruns—excesses—are looked upon as part of the cost of running a war.

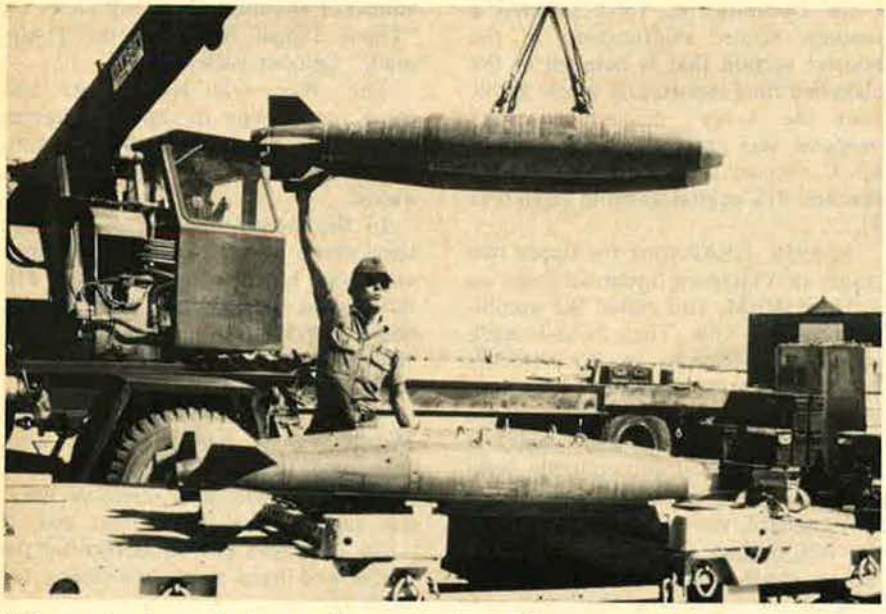
"One central fact that thrusts its way to the foreground of any evaluation of Vietnam supply support is that, for more than three years, it was relatively uncontrolled," the subcommittee report says. "The zeal and energy and money that went into the effort to equip and supply US forces in Vietnam generated mountainous new procurements, choked supply lines, overburdened transportation systems, and, for a time, caused complete loss of control at depots in Vietnam."

Some of the facts of life in Vietnam that prompted the subcommittee to investigate are preposterous. Catalogues of excesses on hand in the theater not long ago included such items as 47,376 decks of pinochle playing cards, 6,106 sets of horseshoe games, 2,000 Canadian flags made of rayon, and 39,562 pounds of dog-food pellets. The subcommittee points out that each of these items represents buying and shipping action in the United States, requisitioning, receipt, storage, and distribution efforts by men in the combat area, and an investment by the taxpayers.

For a long time, the subcommittee found, the bookkeeping appears to have been nonexistent. Sometimes as much as fifty percent of the items on hand were not recorded. In one case, 12,000 tons of toilet paper—the equivalent of a shipload—were in one location, where the books showed a zero balance. The subcommittee finds it "remarkable" that three years passed with this kind of mismanagement "before a draconian measure was taken to staunch the flow." That was Project Stop, which canceled orders for certain categories of material not essential to combat.

In its report, the subcommittee seemed to have one eye, at least, on the attitude of the Secretary of Defense, who was Robert S. McNamara, a man with a heavy reputation as a master manager. Near the end of 1967, he seems to have discovered the mountains of excesses in Vietnam and established the Pacific Utilization and Redistribution Agency (PURA). It was, Mr. McNamara said, timely to look at the management aspects. From now on, economy was to be the watchword. In this, the subcommittee sees some irony, because the command in Vietnam, MACV, headed by Gen. William Westmoreland, already had a management improvement program, called Project Maconomy, and the General claimed it already had "saved" more than $100 million. Mr. McNamara viewed PURA as an opportunity to save money and add to his record as an economical administrator. Military witnesses, on the other hand, emphasized that there is more to it than putting new figures into the Pentagon's cost-reduction tables: "The delivery of unnecessary material to a combat area, with its handling and storage, saturates logistic capabilities and degrades the effectiveness and efficiency with which important needs of the operating forces are fulfilled."

The Military Operations Subcommittee and its staff have been studying the subject of supply concepts in Vietnam since early 1968. In a characteristic performance by the Washington press corps, there was almost no mention of the recent report in the newspapers, when it was released about a month ago. Several days ago, however, reporters came across a copy of a three-volume study of "Logistic Support in the Vietnam Era," by the Joint Logistics Review Board, better known as the "Besson Board," for its chairman, Army Gen. Frank S. Besson. This group was created in February of 1969, in a memorandum signed by David Packard, Deputy Secretary of Defense in the Nixon Administration. The Besson report far antedates the Holifield subcommittee report. In fact, General Besson testified before the subcommittee in November of 1969 about his plans for



What we've learned about military supply in Vietnam is the subject of a new report by the House Military Operations Subcommittee. Above, Cam Ranh Bay.

Bombs being unloaded in Saigon harbor in 1966. Whether or not there was a shortage of munitions is still controversial, but the report of the "Besson Board" sheds some new light on the subject.

the study, and he appeared again at open hearings held last August 4 and 5 to talk about his findings and recommendations. The subcommittee obviously leaned heavily on the Besson report, and with some gratitude. This document runs to several thousand pages, it represents "several hundred man-years of work," and it cost somewhere between $3 and $5 million.

Mr. Holifield's subcommittee, examining all this evidence, concludes that "supply support to Vietnam was at once a demonstration of superb performance and appalling waste." The reason is that supply systems organized in peacetime are not good enough for war, and better ones must be devised for emergencies. This is the assumption behind the Besson Board report and its total of 265 recommendations.

The vital recognition in the Besson report lies not in the acknowledged foul-ups and shortages and surpluses in Vietnam, but in the analysis of the background. A major contributing factor to the highly inefficient and wasteful Vietnam supply situation was the national policy of limiting our application of power against the enemy and having a President (Lyndon Johnson) and a Secretary of Defense (Mr. McNamara) who exercised unprecedented close control over the details of military operations. The Besson report does not say, outright, that these policy decisions caused a gigantic snafu. It does say the policies were laid down by public officials who had a right to do this, and that the military, laboring under these policies, were unable to avoid the snafu.

"Much of the detailed management of the Vietnam War has taken place in the Office of the Secretary of Defense (OSD), rather than in the military departments," the Besson report says. "Budgeting for the war has been accomplished on an annual basis, with the understanding that supplements would be requested as required. This procedure has created considerable turbulence in logistic planning.

"Unlike the two World Wars, US military operations in Vietnam have been characterized by the limited application of military power, expressed in measured responses to North Vietnamese acts of aggression. Furthermore, in the application of force, the United States has consistently indicated an intention not to utilize the full power at its command. The gradual and limited application of power has sometimes reduced the time interval for planning and the lead time needed for materiel acquisition."

USAF veterans of the SEA front will recognize their favorite complaint in these paragraphs from the Besson report:

"Unlike the World Wars and unlike the Korean War except for the restriction against military operations north of the Yalu River, the air war in Vietnam has been inhibited from a military standpoint. Rules of engagement, imposed in the interest of confining the struggle, precluded maximum utilization of both tactical and strategic air capability.

"Certain air operations against the North were prohibited, and all were stopped in April 1968. The enemy's use of sanctuaries in Laos and Cambodia made the air problem of interdicting the flow of personnel and supplies into RVN more difficult. Air strikes were prohibited in Cambodia, and ground action in Laos was not permitted except in hot pursuit, allowing the enemy to take maximum advantage of dispersal and cover in his deployments.

"The lack of a conviction of national urgency, the no-front-lines nature of guerrilla warfare, the primitive conditions, and the peculiar demands of this difficult war for new equipment have created new challenges for logisticians in supporting round-the-clock air attacks on the enemy and in maintaining extensive airlift support of the war.

"Like surface shipments, the movements of aircraft, troops, and supplies by air have been uninhibited by enemy action, except when landing at combat zone airstrips in direct support of engaged forces."

There is one key paragraph on military operations in the Besson report that summarizes the atmosphere in which the military were asked to fight in Southeast Asia:

"The Vietnam War expanded gradually as the President attempted to limit US commitments and the impact of those commitments on other national problems. The desire to limit the war has resulted in close control of military operations by DoD and other government agencies; consequently, conventional war capabilities for airborne operations (not air assault), mechanized warfare, air-to-air warfare, air defense, and naval warfare have been only partially exercised.

"Decisions were made: (1) not to neutralize Haiphong; (2) not to interdict North Vietnam's external supply lines by bombing, mining, or blockade; and (3) not to destroy North Vietnam's basic petroleum, oil, and lubricants (POL) supplies, and other resources.

"These decisions permitted the unobstructed flow into North Vietnam of arms, ammunition, oil, trucks, generators, machinery, spare parts, steel, and cement, as well as food and other consumables for the population. The secure continuation of external shipments to the enemy also contributed to the steady provision of arms and supplies to his forces in South Vietnam.

"Since DoD ruled that the material could be destroyed only after its removal from the points of entry, Haiphong and Hanoi, the US armed forces have been required to attack supply lines to South Vietnam that are widely scattered and generally hidden from view, rather than striking primary targets in North Vietnam. This tactic was less efficient than if the United States had attacked the primary targets, and increased operational and logistic requirements significantly."

The Besson report points out that the Vietnam War is the first major conflict in which the Reserve Forces have not played a significant role, and the failure to activate them was inconsistent with military planning. This contributed to the logistics prob-

(Continued on following page)

lem, because the armed services had expected the activation of Reservists skilled in this field. It says, further, that US industry was not mobilized for the war, carrying on business as usual. This led to competition between military and civilian requirements until, in some cases, such as the garment industry, pressure was needed in order to obtain allocations for military needs.

It was the Secretary of Defense, the report says, who retained all authority for building up the armed forces. He did this with the Program Deployment Plan, which imposed ceilings on military strength, program objectives, and project goals. When a deployment was proposed, it required "extensive justification" to the Secretary, who always had an eye on the economy. After the Tet offensive of 1968, the report says, Mr. McNamara "considered that the cost to the national economy of committing a requested 200,000 additional troops to Vietnam would be so great as to cause the country to face possible credit restrictions, tax increases, and wage and price controls. Thus, fiscal as well as political, technological, and other considerations have influenced the formation and execution of military strategy. Throughout the war, troop deployment to Vietnam, with its essential logistic support, has been programmed to minimize the effect on the national economy."

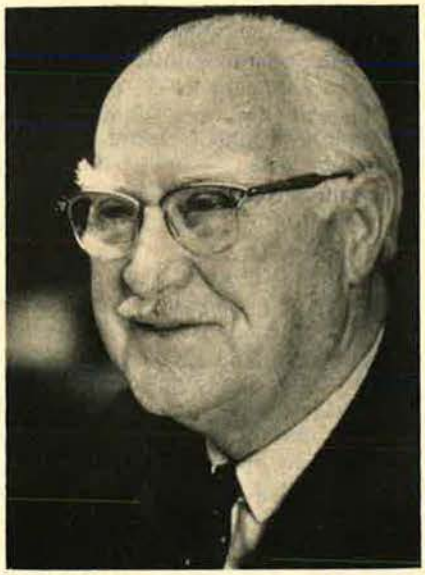
It was in 1966 that Mr. McNamara called reports of a bomb shortage in Vietnam "baloney." The Besson report says it was not baloney and that both the Air Force and the Navy were "seriously short" of requirements for "many items of modern munitions." USAF's Logistics Guidance objectives for Fiscal 1965 and 1966 provided for attack aircraft sorties only, with no authorization or planning for B-52 missions. There appears to have been plenty of bombs on hand for the B-52s, but they were primarily general-purpose bombs left over from the Korean War. The Administration provided no advance preparation for the B-52 activity. The munitions shortages were most critical for the newer jet aircraft of both services.

One section of the Besson report not released concerns the impact of the war in Vietnam on our readiness in other areas of the world. A summary statement of the findings says only that personnel, equipment, and supplies were withdrawn for use in Vietnam from outside Southeast Asia. The withdrawals reduced mission capability and readiness. And, "the risks incurred by these drawdowns were considered and accepted at the highest national levels."

Coming: The 92d Congress

The pundits are busy, at the moment, analyzing the election results. So is the Pentagon, for that matter, where the focus is on possible changes in the margin of support expected for military programs. There are no important shifts scheduled for the Armed Services Committees or Defense Appropriations Subcommittees. Probably the most significant change in the offing did not result from the election, but from the more recent death of Congressman William L. Dawson of Illinois. He was chairman of the House Committee on Government Operations. With his passing, the senior Democrat is Rep. Chet Holifield of California, who is expected to take over the leadership. Mr. Holifield has for many years been chairman of the Subcommittee on Military Operations, a post in which he has displayed a sharp interest in the armed forces. He has a reputation for being frequently critical but, unlike some of his colleagues, always fair and never flamboyant.

The election results show no clear national trend on defense questions. Even the war in Vietnam was not an issue. A survey by *Congressional Quarterly* shows nine winning Senate candidates backed President Nixon's present course of action on the war.



Rep. Chet Holifield (D-Calif.) is expected to be the new chairman of the House Committee on Government Operations, following last month's death of Rep. William L. Dawson of Illinois.

Ten winning candidates said they would rather see "rapid troop withdrawals according to a fixed timetable." On the House side, support for the Nixon policy was stronger. There are three new Senators coming to Washington who never served in Congress and have no voting record on the Hill. They are Lawton Chiles (D-Fla.), Adlai Stevenson, III (D-Ill.), and James L. Buckley (C-N.Y.).

There will be two vacancies on the Senate Armed Services Committee. Sen. George Murphy was defeated in California, and Sen. Stephen M. Young of Ohio will retire the first of the year. The only possible change in the Senate Defense Appropriations Subcommittee will come about if Sen. Karl E. Mundt, of South Dakota, retires because of his serious illness. There are three vacancies ahead on the House Armed Services Committee—two of them Republican and one Democratic. There are no changes anticipated for the House Subcommittee on Defense Appropriations.

Another thing that will not change will be the challenge to all military spending by Sen. William Proxmire, who won an easy victory in his race for reelection in Wisconsin. A press release from the Senator's office says he believes his vote "a smashing mandate to cut federal spending, especially military spending." He declared:

"It is time for the Congress of the United States to move decisively in reordering our national priorities and in making the hard decision to say no to glamorous SST and space programs and politically appealing public-works programs and to superfluous and excessive military programs.

"This will be my prime objective in my new term in the Senate."

So, what else is new?

The Wayward Press (cont.)

There is no way of counting the number of voters who were confused on election day. And there is no way of telling how they got that way. These headlines may help:

HOUSE VOTES $66.6 BILLION
FOR DEFENSE, BLOCKS CUTS

That was in the Washington *Post* on the morning of October 9, 1970. On the same morning, over a report of the same House session in the New York *Times*, the headline said:

HOUSE VOTES CUT
IN PENTAGON FUND

What newspaper d'ya read?—END

FAN JET FALCON

LE ***ROI*** DES AVIONS
L'AVION DES ***PRÉSIDENTS***

AVIONS MARCEL DASSAULT

AEROSPACE WORLD

News, Views & Comments

By William P. Schlitz
NEWS EDITOR, AIR FORCE MAGAZINE

WASHINGTON, D.C., Nov. 11

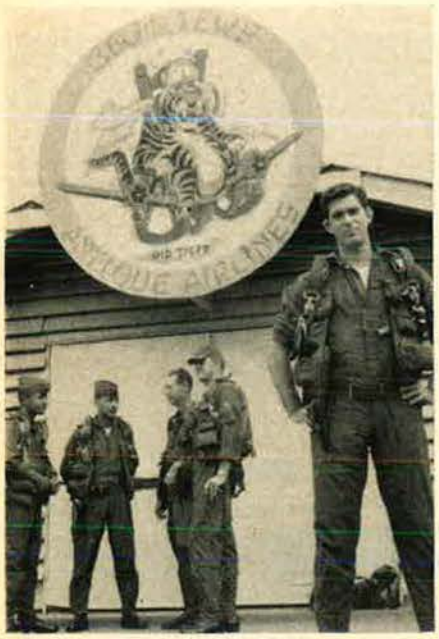
With the return of the 355th Tactical Fighter Wing from Southeast Asia, another chapter in Air Force history ends. Plans call for the wing to be deactivated in the near future.

One of the most decorated USAF units in SEA, the 355th flew the famous F-105 Thunderchief, or "Thud" as it is affectionately called. Actions by the 355th's Thud pilots resulted in three Presidential unit citations and two Outstanding Unit Awards. Maj. Merlyn H. Dethlefsen (then captain) received the Medal of Honor for his role in attacking SAM sites in North Vietnam in March 1967.

In five years, the 355th flew 101,304 sorties and dropped 202,596 tons of bombs on 12,675 targets. The wing has a tally of 19½ MIGs to its credit.

For its part, the Republic F-105 became highly regarded for the damage it could sustain from enemy fire and still return its crew to safety.

In strictly human terms, the 355th paid a price to accomplish its mission: Listed are 104 aircrew members missing in action, nine killed in action, and twenty-three others dead in noncombat operations.



There is considerable ground for confusion aboard USAF Capt. Craig Smith's EC-47 Skytrain serving with the 360th Tactical Electronic Warfare Squadron, Tan Son Nhut AB, South Vietnam. Seems the entire crew is named Smith. That's right, but don't ask how it happened. They are, from left to right: 1st Lt. Quentin J. Smith, copilot, Hampton, Va.; Lt. Col. Carl R. Smith, navigator, Leola, Pa.; TSgts. Charles H. Smith, Fort Myers, Fla.; and Glenn R. Smith, Canton, Ohio, both radio operators; and Captain Smith.

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Britain's government, ruled by the Conservative Party, technically reversed a decision to withdraw all military forces from east of Suez, a move planned by the previous Labor government.

The force involved, however, constitutes only a token of what was talked about when the Conservatives—under Edward Heath—were campaigning last spring to unseat the Wilson government.

In a White Paper on Defense recently released, Britain disclosed that it plans to keep a battalion-size group, with support elements, at Singapore, along with a number of reconnaissance aircraft and a detachment of helicopters. In total, there will be a 2,000- to 3,000-man garrison, plus about 1,000 seamen operating five frigates and destroyers stationed east of Suez.

It is believed that budgetary reality dictated the size of the force, rather than political considerations. The estimated cost—up to $24 million annually—is about a tenth of the outlay mentioned during the campaign.

Britain also concluded her commitment to unilaterally defend Malaysia and Singapore if attacked. Instead, there will be a mutual defense pact among Britain, Malaysia, Singapore, Australia, and New Zealand.

Also in the White Paper, Britain detailed plans to increase her commitment to NATO. In the works are four new squadrons of Jaguar close-support aircraft, to be operational by 1973. Britain's aircraft carrier *Ark Royal*, which was to be phased out, will be retained, as will some small Army units previously scheduled for dissolution.

Critics, both in Britain and abroad, contend there is far less to the White Paper's increased aid to NATO than meets the eye. For example, the Jaguars were originally to have been trainers, which will still have to be supplied in the late 1970s. The government said it plans to furnish less expensive and less complicated aircraft to meet the trainer requirement.

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Another US ally—Japan—also recently issued a White Paper, which reaffirmed that its military forces were strictly for defense.

Under a treaty with the US, Japan relies on us for the security umbrella of such offensive weapons as long-range bombers, aircraft carriers, and intercontinental ballistic missiles.

Of particular significance, however, is that the White Paper on Defense carefully left open the option of including nuclear weapons in any future defensive weapons mix. It stated: "Legally [in terms of Japan's constitution], we may possess small nuclear weapons, so long as they fall within the range of the minimum necessary for self-defense, and do not pose an aggressive threat to other nations."

As for the present, ". . . the government's policy is to have no nuclear weapons, even if these are allowed by the constitution."

In acknowledging its military reliance on the US, which provides for

US bases in Japan, the Paper said: "Since we possess neither nuclear nor offensive weapons, unless a great change occurs in the international situation, we consider that the Japanese/American security treaty system is necessary to assure the security of Japan."

The White Paper also is significant in that its presentation climaxes several decades of controversy stirred up by wording in the post-World War II constitution, which pledged not to maintain "land, sea, or air forces, as well as other war potential." But, since about 1950, successive Japanese governments have interpreted the constitution as providing for the "inalienable right of self-defense," the legal basis for establishment of Japan's armed force, currently an all-volunteer organization totaling about 240,000 personnel.

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With the new year also will come Apollo-14, the US's sixth manned lunar flight and the fourth with a scheduled moon landing as primary mission.

Apollo-14 is set for liftoff at 3:23 p.m., on January 31. Aboard will be Spacecraft Commander Alan B. Shepard, Command Module Pilot Stuart A. Roosa, and Lunar Module Pilot Edgar D Mitchell *(see page 58)*. Shepard is a Navy captain and a veteran astronaut, Roosa is a major in the Air Force, and Mitchell is a Navy commander.

Prior to launch, NASA will apply to the three its new Flight Crew Health Stabilization Program, which is to provide close medical scrutiny of the Apollo-14 crew and those with whom they are closely associated. The number of persons having contact with the men will be limited, and the crew will be confined to areas where microbial contamination is minimized.

It is planned that Apollo-14's crew will take up residence in the crew quarters at Kennedy Space Center for twenty-one days before launch.

If crew members need to return to Houston's Manned Spacecraft Center during that period, they will live at their own homes or at the Lunar Receiving Laboratory. At both places, all contacts will be controlled, and at the homes, children and everyone except wives—whom NASA describes succinctly as "primary contacts" (along with essential mission personnel, backup crews, etc.)—will be excluded.

Once on the moon, Shepard and Mitchell are to explore the hilly uplands region fifteen miles north of the rim of the Fra Mauro crater. Among other jobs, they are to bring back materials that scientists believe were dredged up from deep inside the moon when a large object struck the lunar surface several billion years ago.

The lunar matter sought could reveal the early history of the moon, earth, and our solar system, a period erased here on earth because of erosion and other natural events.

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The Department of Defense has taken another step in its effort to make more information available to the general public and the technical community. In the past, a bar to the distribution of much data was created because of stringent classification, set up in the interests of national security.

Secretary of Defense Melvin R. Laird has ordered the institution of procedures to assure that "only that defense technology which clearly needs to be protected in the national interest bear a security classification and that such security classifications be retained for the shortest possible time."

Previously, the chief consideration in type of classification has been the possible benefit of the information to potential enemies, rather than the value it might have for the US government, industry, the domestic community, and our allies. Under the new system, these factors will be carefully weighed before a decision is reached regarding classification.

Parallel to the above is the initiation of several programs to declassify existing technical information no longer needing classification.

DoD hopes that the entire program will reduce and avoid costs within DoD and industry, by eliminating substantial security maintenance expenses while simultaneously making a large amount of valuable information available to the scientific, academic, and technical communities.

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A tripartite agreement has been signed by British Aircraft Corp., Aerospatiale France, and Boeing Co. to exchange data on environmental

(Continued on following page)

—Wide World Photos

Navy Cmdr. Edgar D. Mitchell, in training as Lunar Module Pilot aboard Apollo-14, explains how a moon cart will haul tools and moon rocks. Flight is set for January 31.

—Wide World Photos

Soviet Cosmonauts Andrian Nikolayev, right, and Vitali Sevastyanov, center, are escorted by US Astronauts Armstrong and Aldrin on a recent goodwill tour of the US.

problems associated with supersonic transports.

The British and French concerns developing the Concorde SST are in competition with Boeing, which is designing the US SST. The new pact is an extension of previous agreements to exchange information among the three.

The agreement, however, is a reflection of the companies' awareness of concern about what potential effect a fleet of SST aircraft could have on the environment. It noted that the companies have undertaken studies to collect and analyze the facts concerning "this complex subject."

The agreement said: "The results of these studies have enhanced our confidence in the future of supersonic transport operations. However, additional data is needed to confirm our conclusions, and further studies are therefore required."

Under the agreement, all information exchanged is for unlimited use and may be "freely used for development or marketing" of SST aircraft. The pact runs until December 31, 1971, and may then be extended.

On November 4, the Concorde prototype achieved Mach 2 flight, a milestone in the history of civil aviation.

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The US has notified Australia, Canada, and Britain that it will withdraw from the Mallard Project, a research-and-development program for tactical communications, in which the four nations were cooperating jointly.

Dr. John S. Foster, Jr., DoD's Director of Defense Research and Engineering, said that, although the project had been an extremely productive development whose international character was beneficial to its ideas and productivity, lack of congressional support resulted in the decision to end US participation.

Mallard was established to share the cost of R&D for an advanced tactical communication system to provide the same equipment and standards for the armies and air forces of the cooperating countries.

Begun in April 1967, the project had reached the point where preprototype models of system components were being constructed for feasibility tests. Target data for initial introduction of operational Mallard standard equipment was to have been in 1978.

The US has spent $34 million on the program itself thus far and another $15 million in unilateral support efforts.

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Bell Helicopter Co. of Textron, Inc., Fort Worth, Tex., has been picked by USAF to build the local base rescue helicopter (HHX).

The HHX will be powered by a single Avco turbine T53 engine and will be an off-the-shelf aircraft developed with a minimum effort. It will be qualified to either military or FAA standards.

The $9,593,833 contract was won over proposals submitted by Kaman Corp., Bloomfield, Conn., and Sikorsky Aircraft Div. of United Aircraft Corp., Stratford, Conn.

The contract calls for the acquisition of thirty helicopters at a unit cost of $282,676. Bell will have total responsibility for integration and delivery, including training and support.

With the current local base rescue mission helicopter—the HH-43—being assigned to Southeast Asia and suffering natural attrition, the HHX is to bring the force of such helicopters to the required strength.

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The Air Force plans to equip eight groups of Air Guard and one group of Air Reserves with more modern aircraft in the next six months.

No significant personnel changes will occur in the process, and the aircraft being replaced will be retired if not needed elsewhere in USAF.

The Air Guard units involved:

The 174th Tactical Fighter Group, Syracuse, N.Y., now flying F-86 aircraft, is presently converting to A-37 aircraft.

The 132d Tactical Fighter Group, Des Moines, Iowa, and the 149th Tactical Fighter Group, San Antonio, Tex., both flying F-84s, will convert to F-100s next spring.

The 192d Tactical Fighter Group, Richmond, Va., also equipped with F-84s, will be equipped with F-105s next spring.

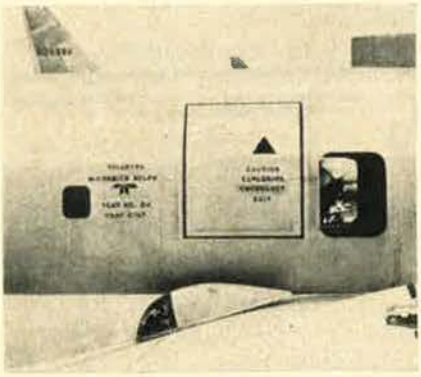
The 184th Tactical Fighter Group, Wichita, Kan., which now has F-100s, will convert to F-105s and be redesignated the 184th Tactical Fighter Training Group in the spring.

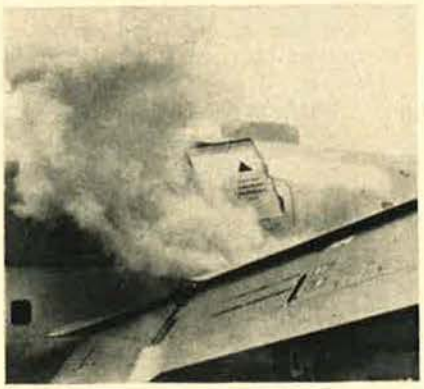
The 109th Military Airlift Group, Schenectady, N.Y., and the 133d Military Airlift Group, Minneapolis-St. Paul, Minn., both now flying C-97 transports, will be equipped with

The first woman from the Air Guard to graduate from OTS is Lt. Connie Kries, shown here with her husband, Capt. David Kries, and Brig. Gen. N. O. Nowell, Commander of the 136th ARW, Hensley Field, Tex., where she is attached.

TAC's Capt. John Canty, Langley AFB, Va., has won a contract with MGM Records for guitar skill and singing.

High in the autumn skies over St. Louis, Mo., is the latest version of the McDonnell Douglas Phantom—the RF-4E reconnaissance aircraft. Eighty-eight are being built there for the West German Air Force. Delivery began in November.





Teledyne McCormick Selph, Hollister, Calif., is testing "high-energy exit systems" for military and commercial use. It has been determined that many crash fatalities are the result of a lack of operable fuselage exit points.

C-130 transports. The 133d will receive its aircraft this winter, the 109th in the spring.

The 118th Military Airlift Group, Nashville, Tenn., which has C-124 transports, will also receive C-130s in the spring. All three airlift groups will be redesignated the 931st Special Operations Squadron.

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Retired USAF Lt. Gen. Benjamin O. Davis, Jr., recently addressed the Aviation/Space Writers Association in Washington, D.C., on the state of the program to contend with air piracy. He is director of the overall effort within the Department of Transportation *(see November* AF/SD, *page 22).*

General Davis stressed that the program to put armed guards aboard commercial airliners was simply an interim step, and that the airlines themselves must institute conclusive security measures in the terminals to guard aircraft against hijackers, and airport facilities from sabotage.

He called for the application of procedures and equipment by trained airline personnel to achieve this goal, and said it was possible within "the state of the art," although advanced systems, such as electronic sensing devices, were also under examination.

General Davis said that legislation was before Congress to allocate $50 million for air marshal salaries in Fiscal 1972, but that the armed guards would come off the aircraft once adequate ground security systems were put into effect by the airlines.

He said that the various governmental agencies would cooperate fully in helping to curb skyjacking, which he termed a threat to "the well-being of the entire nation."

Regarding international cooperation against air hijacking, General Davis said that, among other steps, the US has called for joint action—including suspension of air transport services—against countries that detain passengers, crews, and aircraft, or fail to extradite or prosecute hijackers.

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After an on-again-off-again situation stretching back several years, the Soviet Union has finally become a member of the International Civil Aviation Organization (ICAO).

With Russia joining, the world's major nations are now represented in the international agency (with the exception of Red China).

Just how far the Soviet Union will go in cooperating in such matters as ICAO inspection of domestic navigation facilities remains to be seen. Another question is whether this move signals renewal of interest by Russia's

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INDEX TO ADVERTISERS

Several notables at a recent UN gathering: from left, Maj. A. P. deSeversky, aviation pioneer; Gen. Wang Shu-ming, former "Flying Tiger" and head of Taiwan's delegation to the UN Military Staff Committee; Dr. M. E. deBakey, a pioneer heart surgeon; and USAF Col. G. M. Adams, Deputy US Rep., UNMSC.

state airline, Aeroflot, in becoming a member of the International Air Transport Association, with that organization's assorted self-policing regulations and policies.

The Soviet Union, according to CAB Chairman Secor Browne, is currently offering, to certain foreign-flag carriers, supersonic overflight rights involving large portions of Siberia. This represents a significant development with regard to SST operations because most Western countries, including the US, either have barred or are in the process of barring such flights over their territories.

☆

Effective November 1 was the institution of a policy that would limit the commanders of Aerospace Defense Command DOBs (dispersed operating bases) to two-year tours. Previously, the policy affected only commanders of fighter-interceptor squadrons. Replacement commanders also must be lieutenant colonels (or selectees).

In extending this policy to DOB commanders, Lt. Gen. Thomas K. McGehee, ADC Commander, said that it would result in a "greater number of qualified officers having the opportunity to enhance their careers by progression to positions of command. A command assignment gives an officer a unique opportunity to develop and demonstrate his leadership abilities."

A commander's two-year tour will not be curtailed unless the air division commander determines that the officer should be relieved of his duties or his reassignment is directed under other existing policies.

☆

Delivery of C-5 Galaxy aircraft to the West Coast to create a second operational C-5 squadron began late in October. Military Airlift Command's 60th Military Airlift Wing, Travis AFB, Calif., is receiving the aircraft.

The squadron will provide transport for bases throughout the Pacific and Far East, mainly via Hawaii, which is MAC's "mid-Pac" route.

The first C-5 squadron was initiated at Charleston AFB, S.C., last June. The eight aircraft now based there fly regular overseas missions to Europe, and by the northern route to the Pacific. These C-5s and those being utilized for tests and training have racked up more than 9,000 flying hours thus far.

The delivery schedule calls for Charleston AFB to receive sixteen C-5s while the squadron at Travis continues to form. Another squadron of C-5s is planned at Travis, along with one at Dover AFB, Del.

☆

North Field, S.C., in early November was the scene of the first field test of the first USAF unit equipped for Bare Base mobility.

The unit, the 336th Tactical Fighter Squadron, Seymour Johnson AFB, N.C., conducted the exercise—dubbed "Heavy Bare"—over the period of a week.

On November 1, the exercise began with Tactical Air Command C-130 transports and Military Airlift Command C-141s airlifting personnel and equipment from Seymour Johnson to North Field, which has the characteristics required of a bare base: runway, taxiway, aircraft parking area, and a source of water.

The mobility equipment includes dorms, dining halls, latrines, workshops, hangars, a control tower, a medical facility, an electrical system, and water purification and distribution gear.

After a frantic first few hours, made difficult because of adverse weather conditions, the unit proved its capability of supporting its twenty-four F-4 Phantom II fighters in full combat operations. The aircraft then flew simulated air-superiority and strike missions.

Following the deployment, 336th personnel repacked their equipment for the return trip.

☆

NEWS NOTES—Another USAF unit—the **45th Tactical Reconnaissance Squadron** stationed near Saigon—is being disbanded and its twenty **RF-101 Voodoo** jets reassigned to ANG units in the US.

On November 1, the USAF's **Air Weather Service** observed a century of operation, having been set up in 1870 under the Army Signal Service.

DoD has ordered the initiation of pilot programs aimed at increasing the scope of **legal services** available to military personnel and their dependents who are unable to afford a civilian lawyer.

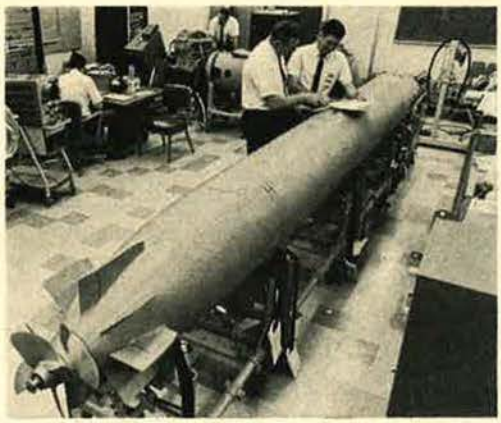
The **Hughes Trophy,** awarded in recognition of the importance of the USAF defense mission, was won by ADC's **57th Fighter-Interceptor Squadron,** Keflavik International Airport, Iceland.

NASA recently **bought eight new T-38** jet trainers at a cost of $6.4 million for its fifty-man **astronaut corps.** With delivery of all eight, the astronauts will have thirty-one T-38s.

USAF's **Eastern Test Range** and NASA's **Kennedy Space Center,** Fla., announced they will consolidate a number of launch-support functions—medical services, life-support services, and nondestruct testing, among others—to save an estimated $1 million annually.

The **6994th Security Squadron,** Tan Son Nhut Air Base, South Vietnam, was awarded the **Travis Trophy** for its outstanding contributions to the US cryptologic effort.—END

COST-CONSCIOUS TECHNOLOGY AT NORTHROP



This underwater vehicle designed by Northrop for the U.S. Navy to simulate a full-sized submarine will permit significant savings in anti-submarine warfare training.

Northrop saved more than 2,000 critical pounds in designing the 153-foot fuselage for the magnificent 747 airliner.

The most modern target in service for low-level surface-to-air missile training, the MQM-74A has the lowest cost per mission in its performance class.

Northrop is a major designer and builder of navigation and guidance systems for long-range subsonic and supersonic aircraft. The heart of one such system is this unique spherical platform.

More than 14,000 USAF pilots have graduated in the T-38 Talon, world's first supersonic trainer. Since 1961, more than 1,100 of the Northrop jets have logged over 2½ million hours in Air Force, Navy, NASA and German Air Force service.

Iran's new nationwide communications system will double the number of phones, provide a national TV network and expand telegraph and data transmission facilities. A Northrop-led consortium of multi-national companies is building the 8,700-mile system.

Northrop is one of the nation's biggest producers of special purpose, light-weight, low-cost digital computers for airborne electronics and navigation systems.

The Northrop F-5, in service with 15 nations, is designed to provide the needed performance level while taking into account purchase, maintenance and operation costs.

POW ACTION REPORT MIA

By Maurice L. Lien
SPECIAL EDITOR FOR MIA/POW AFFAIRS

POWs and the Telephone Co.

Two million customers of the Northwestern Bell Telephone Co. received with their phone bills last month a reminder of the plight of the Americans who are missing in action in Southeast Asia or are prisoners of war.

The mailing came about through the efforts of Paul W. Gaillard, of Omaha, Neb., a vice president of Northwestern Bell, and a National Director of AFA. The insert included a detachable postcard, addressed to the President of North Vietnam, asking that government, and its allies, to comply with the Geneva Convention in its treatment of those men who are being held prisoner.

Northwestern Bell, headquartered in Omaha, serves customers in five states—North Dakota, South Dakota, Nebraska, Iowa, and Minnesota.

Mr. Gaillard said the mailer was a direct result of his attendance at AFA's National Convention. Information he received at the Board Meeting, and at the MIA/POW Seminar, he said, impresed upon him the need for immediate, massive action, since time is running out for these men.

"Many people have thought that writing to the Communists was a waste of time," he said, "but the positive reaction we have seen from Hanoi to the pressure of public opinion proved to me that something like this, done on a huge scale, was needed to keep this campaign going."

In a letter to Thomas S. Nurnberger, President of Northwestern Bell, the Hon. Daniel Z. Henkin, Assistant Secretary of Defense for Public Affairs, wrote, "Let me applaud you for the fine public spirit which prompted this action, and congratulate you for the creative ingenuity with which it was carried out. I sincerely hope that others will see fit to follow your lead in focusing public attention on this humanitarian issue."

The Hon. Michael Collins, former astronaut and now Assistant Secretary of State for Public Affairs, wrote to Mr. Nurnberger "to commend you for your company's initiative in telling your subscribers about the grave plight of our American prisoners of war and missing-in-action personnel.

"The card you are sending," he wrote, "movingly describes what our men are experiencing as prisoners of war in Southeast Asia. I hope this will help to gain for our men the humane treatment to which they are entitled by the Geneva Convention and to speed their release."

Mrs. Howard J. Hill (left), whose USAF husband is a POW, examines handout material with Mrs. Richard N. Ellis, wife of CAP national commander, at exhibit on POWs during CAP's National Board meeting in October.

Food-Industry Involvement

On another front last month, AFA's National President George D. Hardy took direct aim at executives in the $100-billion-a-year food industry.

The Harry B. Cook Co., a major East Coast food brokerage firm of which Mr. Hardy is president, sponsored a full-page ad in *Food World*, a food-industry publication geared to top management of food manufacturers, brokerage houses, wholesalers, retail chains, and independent markets. The November issue was selected, Mr. Hardy said, because it will be distributed at three major food-industry conventions, assuring the widest possible readership.

The ad, in addition to outlining the MIA/POW problem, urges industry executives to designate one department or person within their companies to develop a publicity and letter-writing campaign that would involve customers as well as employees. This aspect of the ad, Mr. Hardy said, was being used as a test case. If successful, it will be repeated in the future in other food-industry publications.

Civil Air Patrol

Since early August, the Civil Air Patrol has been carrying on one of the most comprehensive, national MIA/POW publicity programs we have learned of to date. Detailed articles have been published in *Civil Air Patrol News* each month; the problem has been featured in all speeches and briefings; a mobile exhibit has been built; special handout materials have been prepared, along with a slide presentation; and CAP has distributed some 100,000 bumper stickers and a like number of mini-stickers nationwide.

Brig. Gen. Richard N. Ellis, USAF, CAP National Commander, kicked off the campaign in August with a letter in *Civil Air Patrol News*, wherein he stated, "With this article, I pledge that this problem will have my personal and continuous support. My initial task . . . and yours . . . is to ensure that the American public never forgets these men or the shocking treatment and degradation they are undergoing right now."

In a challenge to CAP members, General Ellis said, "In my judgment, this problem is tailor-made for [our] mission. It's a problem that can be attacked by any CAP unit, and there's a very special role for the individual.

"Civil Air Patrol has the people, the drive, and the ability to take the leader's role in strengthening public understanding and concern for these valiant Americans."

CAP, an auxiliary of the US Air Force, has nearly 36,900 cadet members and more than 36,500 senior members in 2,300 units located in all fifty states, Puerto Rico, and the District of Columbia.

National League of Families

The National League of Families held its first, and hopefully last, national convention in Washington, D.C., October 2–5. More than 700 members registered for the four-day meeting, which concluded with a mass visit to Capitol Hill.

On Saturday, October 3, more than 450 Air Force family members were

guests at a luncheon hosted by USAF Vice Chief of Staff Gen. John C. Meyer and Mrs. Meyer. This was followed by a series of presentations by Air Force officials to update the families on the MIA/POW situation. Banquet speaker that night was H. Ross Perot, from Dallas, Tex., who has devoted much time and personal effort in support of MIA/POWs and their families.

A major highlight of the convention was a discussion on "Rehabilitation and Readjustment," by Dr. Martin T. Orne, Chairman of the Department of Psychiatry and Director, Institute of Experimental Psychiatry, of the University of Pennsylvania. Purpose of this presentation was to inform next of kin of what to expect in physical health and mental attitude from a returnee—such as apathy, hostility, and suspicion—and to advise on ways in which to make readjustment easier for both the family and the serviceman.

This briefing was reinforced by participants in a "Returnee Symposium," which included five of the nine men released by Hanoi to date, three men released and one who escaped from the Viet Cong in South Vietnam, and their wives. Moderator for the symposium was Lt. Col. Norris M. Overly, whose experiences while a POW in North Vietnam were reported in AF/SD last month.

Other USAF "family" participants were Mrs. Overly, Maj. Joe V. Carpenter (a returnee from North Vietnam) and Mrs. Carpenter, from Williams AFB, Ariz.; and Maj. Fred N. Thompson (a returnee from North Vietnam) and Mrs. Thompson, from Randolph AFB, Tex.

Pointing up the readjustment problems faced by both the families and returnees was a comment by Mrs. Thompson: "It took us almost eighteen months to completely readjust to each other," she reported, "because we were so busy explaining our feelings to one another that we didn't take time to listen to what the other was saying.

"We had no real major problems, but I had learned to do things for myself while he was gone. If I had known then what I have learned during this convention," she said, "it would not have taken nearly that long. I would have known what to expect, and what my role should have been."

Elected to the League's fifteen-member Board of Directors during the convention were the wives or parents of four Army men, four Navy personnel, one Marine, and six Air Force men.

Elected Chairman of the Board, succeeding Mrs. Sybil Stockdale, was Mrs. Kenneth W. North, of Wellfleet, Mass., wife of an Air Force major who is a POW in North Vietnam. Mrs. North had been Vice Chairman.

Mrs. Bobby G. Vinson of Alexandria, Va., wife of a missing Air Force colonel, former Assistant National Coordinator, was elected National Coordinator, succeeding Mrs. Iris Powers. Elected Assistant Coordinator was Mrs. James E. Plowman of Alexandria, Va., wife of a Navy pilot (MIA), and Secretary/Treasurer for the coming year is Mrs. Kevin J. McManus, of Brightwaters, N.Y., whose Air Force captain husband is a POW.

Air Force family members reelected to the Board were Mrs. Arthur J. Cormier (TSgt.-POW), Bay Shore, N.Y.; Col. Edwin Brinckmann, USA (Ret.), Shalimar, Fla., father of Lt. Col. Robert E. Brinckmann (MIA); and Mrs. Robert C. Davis (Capt.-MIA), of Willingboro, N.J. Newly elected to the Board was Bernard L. Talley of Baltimore, Md., father of Capt. Bernard L. Talley, Jr., a POW since 1966.

Postage Stamps

At this writing, two postage stamps with military themes are scheduled to be issued with dual, first-day ceremonies on November 24, at Maxwell AFB, Ala., and in Cincinnati, Ohio.

One recognizes the contributions of US servicemen to the nation, particularly those who are prisoners of war, missing, or were killed in action. The second stamp celebrates the fiftieth anniversary of the Disabled American Veterans (DAV). The initial printing order was for 135,000,000 stamps.

First-day-of-issue ceremonies for the stamp honoring US servicemen were scheduled at Maxwell AFB, to recognize that more than half of the MIA/POWs are Air Force personnel.

One of the earliest suggestions for a postage stamp calling attention to the plight of the MIA/POWs, if not *the* first, came from the Alabama unit of the National League of Families, headed by Mrs. Michael K. McCuistion, wife of an AF captain POW. The families were strongly supported in this effort by Rep. William L. Dickinson (R-Ala.), from Montgomery, who wrote to each of his colleagues in the US Congress asking that they write the Postmaster General to urge issuance of such a stamp.

The ceremonies in Cincinnati recognize the founding there fifty years ago of the DAV. National headquarters are in Cincinnati.—END

Mrs. Bobby G. Vinson (standing), whose USAF husband is MIA, was elected National Coordinator for the League of Families at their recent convention. Others pictured are (left to right) H. Ross Perot, of Dallas; USAF Chief of Staff Gen. John D. Ryan; Assistant Secretary of Defense G. Warren Nutter; and Army Vice Chief of Staff Gen. Bruce Palmer. The meeting was in Washington, D.C.

Postmaster General Winton M. Blount and Mrs. Michael K. McCuistion, whose Air Force husband is a POW, at unveiling of stamps honoring the Disabled American Veterans and US servicemen. One of the first requests for a stamp to call attention to the plight of MIA/POWs came from the National League of Families in Alabama, headed by Mrs. McCuistion, who was supported by Rep. W. L. Dickinson.

AIRMAN'S BOOKSHELF

SECDEF: Office and Man

Decisions of Robert S. McNamara. A Study of the Role of the Secretary of Defense, by James M. Roherty. University of Miami Press, 1970. 172 pages plus appendix. $7.95.

The McNamara watchers, by this time, have at least ten feet of books on the shelf. Most of them are useless, and that includes one written by Mr. McNamara himself. Professor Roherty has come up with the single volume that can be classified as required reading. It is required reading, not only for those of us who looked on in awe or distress while Mr. McNamara ran the Department of Defense but, even more importantly, for our fellows who toil at the World Bank where Mr. McNamara now rules the roost.

The professor has done the only exhaustive and intelligent analysis we have seen of the McNamara regime at the Pentagon. His thesis is that the Secretary, who took office in January of 1961, after forty-two days as president of the Ford Motor Co., had no interest in, or competence for, his main job, which was making policy. He says, in the introduction:

"The major issues with which he had to cope were understood by him as functions of management and most readily resolved through a managerial process."

The McNamara management was, in the author's word, apolitical. Apolitical is a designation like amoral. It means that Mr. McNamara had no interest in the political involvement of his position, and possibly an aversion to it. He considered himself a manager and his conduct of no political significance. He was wrong, as any intelligent military officer could tell him, and many competent military officers tried to do so.

The Roherty analysis is far from superficial. He reviews the history of the job, directing attention to five of Mr. McNamara's predecessors. Secretaries James V. Forrestal, Robert A. Lovett, and Thomas S. Gates are classified as "generalists." This means they put policy as their prime responsibility. Policy was viewed as "the heart of the political function of national leadership." And it follows that a Defense Secretary properly preoccupied with policy recognizes the "integrity of professionalism." This is essential if we are to have "objective civilian control."

"The responsibility of the Secretary of Defense," Professor Roherty says, "is the final consideration in the generalist-role concept. The position of the Secretary will be defined by his responsibilities, not by his functions, by his overall control of the system, not by the degree of his direct involvement."

The "generalist" is offset in the history of today's Pentagon by the "functionalist." This role was practiced by Charles E. Wilson and Neil H. McElroy. The interesting thing is that its precepts were laid down by no less a person than Dwight D. Eisenhower, the "former military person," and by Nelson A. Rockefeller, who played a key role in defense reorganization plans in 1953 and 1958. Under these rules, Charlie Wilson, this book makes clear, was prepared to "leave the military stuff up to the military," and take charge of what he called "production"; he would "manage" and not "make" military policy.

Secretary McElroy, who came to the Pentagon from the soap business, had no background for the job and served with reluctance. Professor Roherty says McElroy "was caught up in a maelstrom of strategy and weapons that was barely comprehensible to him." He thought the language of Congress was "spooky," although some of the things he told competent Capitol Hill committees came closer to the category of weird.

With the advent of John F. Kennedy in the White House, we acquired Robert S. McNamara, who had strong convictions, Professor Roherty says, about techniques of administration and how they should be applied in the Pentagon. Immediately, he introduced Charles J. Hitch as Comptroller, and Alain G. Enthoven, who eventually achieved a title as Assistant Secretary for Systems Analysis. Their thought, as Professor Roherty sees it, was that the "analytical approach" was needed because an important part of McNamara's job was to "stimulate innovation and reform." Then, the author says:

"So-called 'direct experience' and 'reading history books' might have been sufficient for the military planner at one time, but today, according to Mr. Enthoven, in order to assess the relevancy of accumulated experience, it is necessary to apply 'the careful rules of scientific method.'"

There is a review in the book of Mr. McNamara's relations with the Joint Chiefs of Staff, covering his basic incompatibility with such vaults of experience as Adm. George W. Anderson, who was fired and sent to Portugal as an ambassador, and Gen. Curtis E. LeMay, who was extended as USAF Chief of Staff in 1963 because the Kennedy Administration did not dare to fire him. The author's conclusion:

"Secretary McNamara's exercise of direction, authority, and control in the Department of Defense has been an effort to encompass within his purview the full decision spectrum. It is a supreme effort to bring the policy, strategy, resources, and operations continuum within the terms of an a priori system. Mr. McNamara has consciously undertaken to elaborate and impose system. At the center of this effort is a rejection of political process which alone can be productive of policy."

This means there was no policy in the McNamara regime. To prove this point, Professor Roherty concludes his study with a chapter detailing the fight over a new manned bomber, the AMSA, or B-1, as it is now known, and another about the Navy's requirement for carriers with nuclear power. Airmen and sailors already know the sad stories.

On the advanced bomber, Mr. McNamara's opinion was based on his conviction, the author says, that the technology would remain stable, and that: "The enormity of nuclear arms was outside the grasp of laymen; consequently, steps toward 'minimization of risk' were urgent."

The idea that strategy should be based on possibilities "was not a congenial process for the mind of Robert McNamara," is the conclusion. "There was nothing in his previous experience, of course, to provide him with a grasp of high strategy and international political-military relations. Moreover, Mr. McNamara gathered around him in 1961 men who did not complement his own intellectual processes so much as reinforce them."

In the chapter explaining why the Secretary looked with a cold eye on an improved manned bomber capability, there is a fascinating section about the cancellation of the Skybolt air-to-ground missile project. It was a move that almost wrecked our relations, militarily, with Great Britain. There was salvation, but not until after Mr. McNamara realized what he had done. The Nassau agreement of December 1962 "deprived the British of a credible strategic bomber force in the ensuing decade." They were given the submarine-based Polaris, but the Skybolt affair was "a second kind of Dunkirk." Mr. McNamara simply did not want new systems because "we do not live 'in an age of rapid and accelerating scientific knowledge.'"

So far as the nuclear-powered carriers were concerned, Mr. McNamara's fight was based on the usual stubbornness, plus more than a little bit of deception. Full credit should be given to Sen. John O. Pastore of Rhode Island, then Chairman of the Joint Committee on Atomic Energy, who did the best he could in the face of the McNamara stand, backed, at that stage, by Dr. Harold Brown, who came out second-best in a conflict with the admirals. We built a conventionally powered carrier, says Professor Roherty, and we took this step "in spite of practically unanimous professional opinion to the contrary."

The war in Vietnam gets almost no mention in Professor Roherty's book. This may be for the best, from Mr. McNamara's viewpoint. The Secretary's thing was management, and the war in Vietnam was badly managed.

There also is the thing about people, another McNamara failing. This has not been pointed out, by this professor or anyone else, but Secretary McNamara is the only man in the job, to our recollection, who steadfastly refused to make an appearance before his troops on Armed Forces Day.

—Reviewed by Claude Witze. Mr. Witze is Senior Editor of this magazine.

A Thoughtful Look at Vietnam

Strange War, Strange Strategy, by Gen. Lewis W. Walt, USMC, with Foreword by Lyndon Johnson. Funk & Wagnalls, New York, 1970. 207 pages. $7.95.

Many books on the Vietnam War have been written in recent years. Some are so general in scope that the reader is able to discern only fanciful generalities, which may or may not be relevant to the brutal reality of this particular conflict. Others are written in an intellectually supercilious context, treating the thorny political issues of the war with erudite ease and either ignoring or grossly misinterpreting the military aspects of the problem. Still other books on the war have been written to proclaim a cause, and emotion and intuition, rather than fact and reason, have determined the nature of the conclusions reached.

Fortunately, there are some authors with a realistic sense of intellectual endeavor, and Marine Corps Gen. Lewis W. Walt clearly is one of them. His rational and balanced approach to a truly controversial subject is refreshing. He candidly states that when he first arrived in Vietnam, he "had neither a real understanding of the war nor any clear idea as to how to win it." As he develops his thesis, General Walt makes no attempt to glorify the positive aspects of the American war effort, nor does he discount or conveniently omit the horror or suffering endured by the peasant population of Vietnam. In his own words, his book is a "Marine's story about Marines," and from this conceptual context emerges an interesting and informative analysis of what he euphemistically terms "that kind of war."

General Walt elucidates many of the lessons learned in this most unpleasant war, but primary emphasis is placed upon pacification and population control. Pacification cannot be effective until one wins the "hearts of the people." This catchy phrase has been freely used by many who do not even remotely grasp its psychosocial implications in the bloody arena of combat, but it is quite clear that General Walt and his Marines do indeed comprehend its true meaning. Walt's Combined Action Program infused US Marines into the very fabric of Vietnamese rural society, and the Viet Cong stranglehold on the peasant population was slowly but surely broken.

The dedication, patience, and perseverance of the individual Marines involved were central to the noteworthy success of this bold stroke. General Walt's subsequent allusion to "Rice Roots Support" in I Corps for the government effort against the Viet Cong is not an overstatement.

General Walt leaves the reader with a sense of positive accomplishment regarding the war, and his book is one of the most penetrating and enlightening accounts ever written about this indeed very strange war. Despite the author's optimistic outlook, the specter of a war effectively divorced from national sentiment remains painfully present. The heroes of General Walt's "Chevron War" are doing a superlative job, but in many respects they are forgotten men—forgotten in their dedication, suffering, and, sometimes, death. Hopefully, the author's worthwhile contribution to the literature on Vietnam can do something to change this unfortunate perspective.

—Reviewed by Capt. James L. Cole, Jr. Captain Cole is a faculty member of the Air Force Academy's Department of History.

Understanding Insurgency

Strategy for Conquest: Communist Documents on Guerrilla Warfare, edited by Jay Mallin. University of Miami Press, Coral Gables, 1970. 384 pages. $12.

Peasant Wars of the Twentieth Century, by Eric R. Wolf. Harper & Row, New York, 1969. 328 pages. $7.95.

Controlling Small Wars—A Strategy for the 1970's, by Lincoln P. Bloomfield and Amelia C. Leiss. Alfred A. Knopf, New York, 1969. 421 pages. $8.95.

These three books provide excellent insight into the problems of insurgent conflict. First, *Strategy for Conquest* reveals the view from behind the ideological Guardal Shield, as seen by several of the major Communist protagonists. In *Peasant Wars,* an analysis of the conditions of rural society amenable to rebellion is presented. Finally, in *Controlling Small Wars,* a tentative strategy for the successful management of such conflicts is discussed.

The thrust of *Strategy for Conquest* is that the United States has failed to comprehend, and therefore to interface efficiently with, the tactics of Communist insurgency. This contention is no longer novel, but the use of what amounts to personal testimony by some of the most successful practitioners of the art is tellingly effective.

Mao Tse-tung dispassionately analyzes the Sino-Japanese War in 1938, and, in so doing, produces a blueprint of action for would-be revolutionaries everywhere. Lin Piao carries the idea further, extrapolating the country vs. cities argument as applicable to the underdeveloped vs. developed areas of the world, complete with the concept of inevitable conflict and man's humanitarian duty to revolt and triumph, a do-it-yourself antidote to a devil theory of history.

Vo Nguyen Giap and Hoang Van

(Continued on following page)

Thai present their perceptions of Vietnam—Giap with propagandistic inaccuracies concerning the "mountain-moving and river-filling" invincibility of his nation, accompanied by a shrewd analysis of dissent within the United States. His repeatedly stated contempt for the US Air Force is perhaps indicative of the importance he places on discrediting airpower as a counterinsurgent weapon.

Che Guevara agrees that conflict is inevitable and believes the proper conditions for victory can be created—as well as manipulated—particularly in Latin America. Raul Castro reflects on his stratagem of kidnapping American civilians in 1958 to gain publicity and force the Batista regime to halt its painfully effective air operations. Finally, Alberto Bayo, an ex-Spanish Republican officer who trained Castro and his original cadre, gives his "One Hundred Fifty Questions to a Guerrilla," with such curious admonitions as "planes always take off and land into the wind" alongside chilling instructions concerning the construction and employment of fire bombs.

The central unifying theme of these selections is their common antipathy toward the United States as the major originator of the world's ills, and the call for violent redress. With such testimony, it is difficult to disbelieve the intent of the authors.

Peasant Wars of the Twentieth Century discusses and analyzes the rebellions in Mexico, Russia, China, Vietnam, Algeria, and Cuba. Using his training as an anthropologist, Professor Wolf pinpoints the development of a rural "proletariat" in Mexico, Cuba, and Algeria, corresponding roughly to the industrial proletariat in pre-1917 Russia. He traces the influence of peasant village attitudes and Russian historical experience on the Soviet psyche, as well as the effect of Christian missionaries and periodic attempts at the reformation of society in China. In Algeria, the gradual disintegration and displacement of Arab society under the pressure of European colonialism is catalogued.

Drawing from his examples, Professor Wolf concludes that the ultimate cause of revolt was the impact of North Atlantic capitalism, which increased the insecurity of peasant existence while decreasing the traditional societal safeguards. The revolt and subsequent substitution of a rigidly structured political order is seen as a defensive maneuver to reestablish peasant security—security that had been lost when the products of peasant labor were given only finite value in the marketplace. The hypothesis is supported by the common phenomenon of land-tenure problems, unincorporated intelligentsia, and the resort to the dominant central executive. Professor Wolf's conclusion supports former Secretary of Defense Robert S. McNamara's contention that the natural volatility of the underdeveloped areas of the world, as they attempt to modernize, constitutes a major danger to peace.

Controlling Small Wars—A Strategy for the 1970's attempts to draw conclusions from case studies of the Soviet-Iranian conflict of 1941–1947, the Bay of Pigs, the Arab-Israeli Wars of 1956 and 1967, the Indonesian War of Independence, and the Greek insurgency. Professor Bloomfield and Miss Leiss view the Soviet-Iranian Conflict of 1941–1947 and the Bay of Pigs as somewhat similar cases, involving superpower attempts to change political structures in nearby smaller countries that were, in turn, supported by distant superpowers. The authors' experience in arms-control and disarmament research allows them to construct a conflict matrix, in which each of the examples moves from Phase I of a dispute through four additional phases of conflict to settlement. In each of the phases, alternative options for management of the conflict are provided with the 20-20 vision of hindsight.

Indeed, that shortcoming is aptly noted in the relevant control measures that might have precluded the Greek insurgency. (One such measure was to have avoided World War II.) Several useful insights are considered, such as: Political activity in a conflict life cycle usually increases in inverse proportion to realistic policy options, only to trail off again as the conflict subsides and the policy options once more become available. Among the more mundane proposals, the book argues for authority for the United Nations to publish information on worldwide military establishments and inventories, in order to dispel misinformation and misinterpretation on the part of potential adversaries. Along this line, UN efforts can only be effective in areas where the superpowers are either in concert, such as in the Suez crisis of 1956, or in areas where they have agreed to abstain from interfering, as in Nigeria/Biafra.

The preconceptions of the United States are considered and the hope is expressed that technology will render obsolete the traditional need for strategic real estate and political control of potential allies, thus lessening the probability of conflict.

In summation, *Strategy for Conquest* and *Peasant Wars of the Twentieth Century* are valuable books whose appeal will extend well beyond the academic and defense communities. In contrast, *Controlling Small Wars—A Strategy for the 1970's* is designed for a smaller audience of limited-conflict management professionals.

—Reviewed by Maj. Richard L. Kuiper. Major Kuiper is a member of the Department of Political Science at the Air Force Academy.

Stranger than Fiction

The Escape Room, by Airey Neave. Doubleday & Co., Garden City, New York, 1970. 319 pages. $7.95.

Here is the inside story of the World War II underground escape lines, which were credited with bringing back to Britain more than 4,000 Allied servicemen. Objective and comprehensive, the text (supplemented with photographs and maps) covers the whole range of escape operations by land, sea, and air from 1940 to 1945. The author was a central but unobtrusive character in the drama that began in the first dark hours of German occupation, reached its climax with the liberation, and is still seared into the memories of thousands of survivors.

Neave himself escaped after being captured at Calais in May of 1940. After his return, his experience and resourcefulness got him assigned to M.I.9, the British operation concerned with Allied prisoners of war. It was within this organization that Intelligence School Number 9 (referred to as Room 900) was organized in 1942 as the secret and executive branch charged with the responsibility of facilitating escape and evasion of Allied servicemen.

The Escape Room (entitled *Saturday at M.I.9* in its British printing) is not an official history of M.I.9; however, the episodes in this book vividly tell Room 900's story.

Operating under the code name of Saturday, Neave, with an underfunded and understaffed Room 900 organization, set about the awesome task of establishing and maintaining escape lines. Plagued by a lack of direct communications with Resistance leaders, betrayals, and Gestapo arrests, the success Room 900 achieved dur-

ing 1942–43 was attributable to the determination and courage of a few trained officers and agents and the support of countless ordinary people who hid, fed, and guided Allied servicemen to safety. More than 500 people who took part and got caught were executed or died in concentration camps.

With the increase in air operations over Europe by 1944 came more-specialized techniques of rescue and training of aircrews for escape and evasion. Local Resistance leaders gradually gave way to trained agents, able to mount evacuations by sea and air.

But the focal point of the book is the common, untrained people—typified by Frédéric de Jongh and his daughter Dédée, who organized the Belgian escape organization. As Neave reminds us, "Escape and evasion are not only tests of nerve and endurance. They enrich the understanding of human values in time of danger." Neave's appreciation of these values and his ability to articulate them elevate this book above the mainstream of wartime memoirs.

The author served in 1946 as Assistant Secretary of the International Military Tribunal, which tried the major war criminals at Nuremberg, and as Chief Commissioner for Criminal Organizations during these trials. A member of Parliament since 1953, Mr. Neave has also held several Ministerial posts, including Undersecretary of State for Air.

—Reviewed by Col. George R. Weinbrenner. Colonel Weinbrenner is Commander of the Foreign Technology Division, AFSC, Wright-Patterson AFB, Ohio.

A Unique Perspective

The War of the Innocents, by Charles Bracelen Flood. McGraw-Hill, New York, 1970. 480 pages. $7.95.

Novelist Charles Bracelen Flood spent a year in Vietnam with the 31st Tactical Fighter Wing (F-100s), during 1966–67. From that tour, he has produced a well-written, but sometimes difficult to follow, nonfiction account of his encounters with a wide range of characters and events throughout a limited period of the Vietnam War. Starting with sea-survival training, F-100 familiarization, deployment to Tuy Hoa, and through participation in various combat experiences, Mr. Flood searched for the meaning of the war.

Fighter pilots will initially be impressed because they and their mission are glorified. As the pages unfold—starting with his welcome to the 31st by history's first jet ace, the late Col. James Jabara, who could read a man's name tape at seventy feet—the author is introduced to a full range of typical squadron characters such as Special Stud and Misfitte Glare (who, to everyone's delight, toward the end of his tour inadvertantly drops his full armament load on the ramp). After flying the gamut of missions, including troops in contact, night attack, Combat Sky Spot, and even an out-country mission to Tchepone in Laos (where the North Vietnamese had 37-mm and 57-mm automatic antiaircraft guns), Flood comments that the fighter pilots "gladly took the risks of being shot at, in return for the joy of flying their planes." He also was impressed with the reluctance of the FACs to bomb in any area where there were innocent civilians.

One of the more tension-laden episodes concerns an early, full-scale rescue effort in Laos. The mission, reported to have been personally directed by Gen. William Momyer, represented a Seventh Air Force blank check to recover the 31st Wing's Director of Operations, Col. Frank Buzze. In his own formal report, Colonel Buzze said he was "humble over the self-sacrifice, raw courage, outstanding airmanship, and determination demonstrated by all the participants. . . ."

But early in his tour, author Flood realized that a complete understanding of the war could not be gained from the air alone. He joined the US Army Dragoons of the 8th Infantry Regiment, operating out of Phuc Yen province. With them he experienced the new Three Hundred and Sixty Degree War, the panorama of helicopter assault, and the personal involvement of ground combat (in contrast to the strange impersonality of aerial warfare). Ultimately he traveled to beleaguered Dak To, where he vicariously relived an NVA suicide attack and the calling in of friendly fire upon one's own position.

In addition to the ground and air wars, the author extended his quest for understanding to Saigon, resulting in commentary on, among other things, the "Five O'Clock Follies" (the daily MACV briefing) and Saigon social life, with some interesting candid philosophy concerning American-Asian encounters.

After a year of involvement with the war, Charles Flood concludes that the Vietnamese themselves are the key to success in Vietnam. If the United States were then (in 1967) to achieve the goal of providing security, Flood believed it would require two million men and from five to ten years.

The War of the Innocents, although inappropriately titled, is a courageous attempt to describe one segment of the Vietnam conflict during a relatively short time span. It admittedly does not deal with the entire war. For example, the bombing over North Vietnam is alluded to only as an illustration of an exception to the rule that we normally commit Americans in combat only on fairly equitable terms. Nevertheless, the book represents a worthy addition to a growing bookshelf of Vietnam literature.

—Reviewed by Maj. Richard P. Dowell. Major Dowell flew F-4s in SEA, and now is a planner in the Air Staff.

Greatest of the Great

Fighting Mustang: The Chronicle of the P-51, by William N. Hess. Doubleday, New York, 1970. 198 pages with appendix and index. $7.95.

North American Aviation's "Dutch" Kindleberger turned out the first Mustang from scratch in 125 days, but its maiden flight had to wait for the Allison V-1710-39 engine. That first of a long line of great aircraft was developed for the British Air Purchasing Commission. But the P-51 earned its enduring fame in the hands of young USAAF pilots, many of whom had been schoolboys only a few months before they roamed the skies of North Africa, Europe, China, and the Pacific.

Without doubt, the P-51—which went through innumerable modifications that transformed it from an attack aircraft to a long-range fighter and reconnaissance plane—was the finest all-around fighter of World War II. It was on hand again in Korea, no match for MIG-15s but doing yeoman duty in an attack role. Between wars, civilian versions dominated many air races; they still draw admiring crowds at any air show. And now, refitted Mustangs—one model with a Rolls-Royce Dart turboprop engine that gives it a dash speed of 470 knots and seven-and-a-half-hour endurance—are serving in a counterinsurgency role with the air forces of several countries.

All of this long and distinguished history is told by Mr. Hess in his fast-moving, battle-laden, and beautifully illustrated book. The great P-51 aces are there, telling in their own words about missions that made air-combat history in all the theaters of operation. So are the recce pilots and

(Continued on following page)

the RAF and French Air Force men who flew the Mustang. The story of USAAF Mustang encounters with Luftwaffe jets during the closing months of World War II makes particularly exciting reading.

The book's appendix includes a flying evaluation of the P-51B and D by Lt. Col. Richard E. Turner, who flew 109 missions in the Mustang. Other appendix entries are the vital statistics of all models from the original to the P-51M and the various P-82s, or Twin Mustangs; brief notes on every USAAF, RAF, and French Mustang-equipped combat unit of World War II and Korea; and a list of the top-scoring P-51 aces. The end papers are North American engineering drawings of the D model.

Those who did not know why the Mustang holds a special place in the hearts of airmen will know when they have read William Hess's book. Those who already know—the thousands of pilots and support people who made history with the Mustang—will find its story, and theirs, told with the skill and perception of a top-flight aviation writer.

—Reviewed by John L. Frisbee. Mr. Frisbee is Senior Editor for Plans and Policy of this magazine.

Up From the Ashes

The Rebirth of Europe, by Walter Laqueur. Holt, Rinehart and Winston, New York, 1970. 434 pages. $8.95.

In his latest contribution to historical studies, Walter Laqueur has produced a comprehensive, one-volume history of political, cultural, and socioeconomic developments in Europe since 1945. From the fall of Hitler through the invasion of Czechoslovakia in 1968, Professor Laqueur persuasively demonstrates how Europe moved back into the center of international affairs, and, in so doing, caused the United States and the Soviet Union to reorient their policies toward Europe.

In four general divisions—the postwar period, economic and social trends, the cultural scene, and European politics from 1955–1969—Professor Laqueur discusses the common features and patterns, as well as the individual nations, in "the rebirth of Europe." In 1945, according to Professor Laqueur, governments and political parties faced the common problems of the transition from war to peace, the purge of collaborators, the challenge of communism, the reintroduction of democratic institutions, and the reconstruction of the national economies. The European states not only solved these problems by 1969, but as Professor Laqueur points out, "in a wider sense the European age has only begun."

Professor Laqueur sees no single explanation for the economic recovery of Europe. The creation of EFTA and the Common Market were certainly contributing factors, as was the application of Keynesian economic techniques. Along with economic recovery, political stability and social progress came to the European nations. The unskilled worker became the skilled, and the farmer became the agricultural specialist. Through increased social legislation by nearly every postwar government, the "deproletarization of the working class" came about. As Professor Laqueur points out, recovery was not limited to a few, and prosperity affected all classes. He argues that "the new prosperity gave rise to self-confidence and optimism, but . . . it also produced signs of demoralization and decay."

Professor Laqueur discusses the weakness of democratic socialism, the retreat of communism after 1948, and the emergence of strong Christian Democratic parties as common features in political developments throughout postwar Europe. In analyzing the political and economic recovery of Europe, Professor Laqueur places European recovery in a global perspective, and points to the cold war as a stimulus to European unity.

The book is organized both chronologically and topically. In addition to the multitude of facts and figures in the many economic charts, there are sketches of the personalities involved in the recovery of Europe. A fourteen-page bibliography will be helpful to students of postwar Europe.

—Reviewed by Capt. John E. Merchant. Captain Merchant is an Assistant Professor of History at the Air Force Academy.

NEW BOOKS IN BRIEF

Aircraft Engines of the World, by Paul H. Wilkinson. This revised edition of the book, first published in 1941, has been updated through July 1970. It contains photos and standardized technical data in both English decimal and metric systems, on 188 gas-turbine engines manufactured in sixteen countries, including the USSR. There also is a similar section on reciprocating engines, and sections on equipment and materials, aviation fuels and lubricants, and an index of earlier engines. Published by the author, 5900 Kingswood Road, N.W., Washington, D.C. 20014, 1970. 304 pages. $27.50.

Banner of People's War, The Party's Military Line, by Gen. Vo Nguyen Giap. The text of a major statement on Communist political and military strategy in the Vietnam War by the Commander in Chief of North Vietnam's Army, who is also Defense Minister in the Hanoi government. The Introduction by Georges Boudarel is a discerning—and sympathetic—analysis of the development of Giap's concept of strategy, which probably is unique in the Communist world. An appendix contains brief biographical notes on the principal Vietnamese mentioned by Giap. Praeger, New York, 1970. 118 pages. $5.50.

The Development of the German Air Force, 1919–1939, and *Command and Leadership in the German Air Force,* both by Richard Suchenwirth with Introductions by Telford Taylor. These are the two most recently published volumes in a series of studies of the World War II air war, sponsored by the Air University's Aerospace Studies Institute. Dr. Suchenwirth is an Austrian historian. The other volumes were prepared by former Luftwaffe generals. These latest two scholarly, but very readable, studies are invaluable to military or general students of the period. Arno Press, N.Y., 1970. "Development"—259 pages, $12.50; "Command and Leadership"—351 pages, $15. Both volumes illustrated and annotated.

Typhoon of Steel: The Battle for Okinawa, by James H. and William M. Belote. This is the first comprehensive history of the Okinawa campaign, written for the general reader by the authors of *Corregidor: The Saga of a Fortress.* This last great battle in the Pacific, which claimed the lives of 39,000 Americans, including Ernie Pyle and Lt. Gen. Simon Bolivar Buckner, is described from both sides of the battle lines and from its initial plans through the kamikaze attacks to the Japanese surrender. There are thirty-two pages of combat photographs. Harper and Row, N.Y., 1970. 368 pages with bibliography and index. $10.

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Editor Davis Thomas has contributed a year-by-year text summary of Space Age achievements, supplemented by a chronology listing all significant flights—both U.S. and Soviet—leading up to the manned landings of Apollo 11 and 12. Numerous maps, charts and diagrams amplify the text throughout. Forty-four pages, including 40 full-color photographs, are devoted to the Apollo 11 mission alone.

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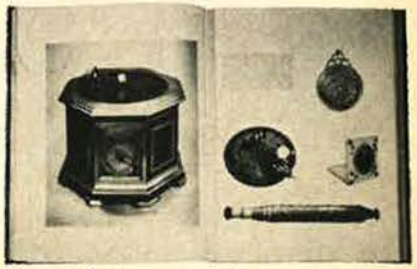
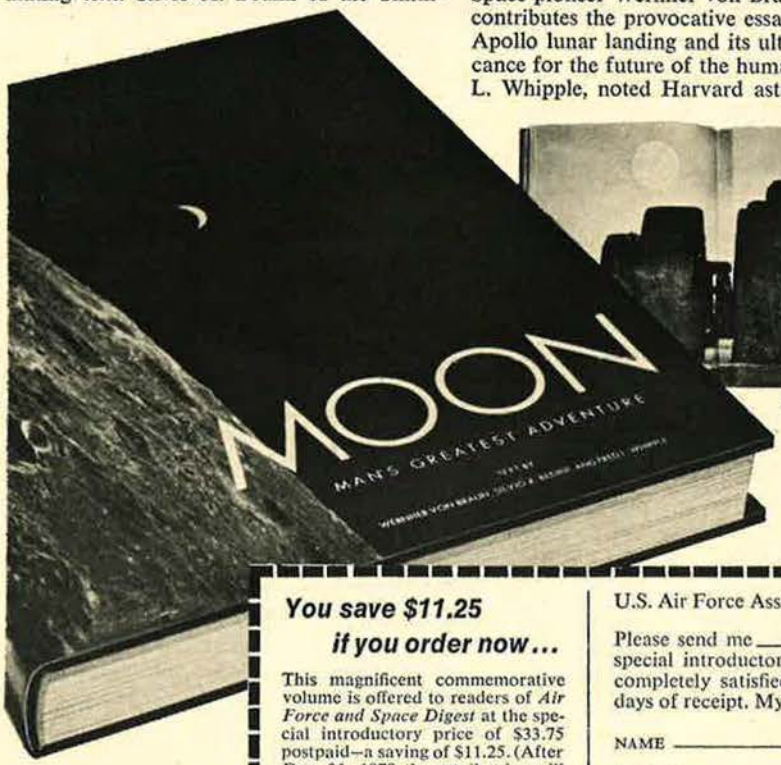


Early astronomical instruments



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Exotic Weaponry

AIR FORCE
DECEMBER 1970

Ten years ago, the first laser stimulated a spate of fanciful predictions about its unlimited potential as a "death-ray" weapon. But reality, in the form of high costs, limited efficiency, and low power levels, confined the laser to specialized tasks and precluded the use of the laser as an active weapon system. Shielded by the psychological backlash caused by this initial disappointment, and protected by stringent security measures, laser technology now has matured to the point that its entry into the arsenals of the United States, the Soviet Union, and several other countries must be rated as imminent . . .

LASER

By Edgar E. Ulsamer

ASSOCIATE EDITOR, AIR FORCE MAGAZINE

IN THE beginning, it was derided as a "solution in search of a problem." Today, the laser (short for Light Amplification by Stimulated Emission of Radiation) is the hottest property in modern technology. It is the object of a worldwide technological race that is progressing openly and rapidly so far as civilian uses are concerned, but is proceeding under extreme security precautions in the weapons area where its impact is already substantial and its future potential enormous.

The product of extensive research during the 1950s, initiated largely by DoD and USAF, the "miracle beam" can radiate light energies at many trillion times the intensity of the sun's surface. It has already been used to "ignite" nuclear fusion in matter exposed to its thermal shockwaves. Authoritative scientists predict such varied futuristic applications as laser-triggered neutron bombs uniquely capable of "defuzing" incoming ICBM warheads, power transmission by lasers from the ground to satellites, and hard-rock tunneling at more than twice the speed and less than half the cost of the most efficient existing methods. Even transforming atomic energy into laser irradiation of airborne targets may become technically possible toward the end of the century.

Closer at hand is the prospect of laser weapons for tactical defensive applications where their lethal thermal powers could be substituted for such systems as on-board bomber-defense and air-to-air missiles. Already the laser has wrought a revolution in accurate delivery of aerial weapons under good weather conditions. The Air Force's Deputy Assistant Secretary for Research and Development Joe C. Jones told this magazine: "CEPs [circular error probabilities], effectively, are no longer a factor" because of target designators working in concert with ranging and homing devices employing infrared laser and other electro-optical technologies. Other important military laser applications include secure communications at 100,000 times the present bit (information) rate and laser radar systems of far greater resolution than can be attained with conventional systems. The laser's use by defense industry as an ultra-precise, versatile manufacturing tool is already widespread and routine and, among others, opens the door toward the design and manufacture of substantially improved jet engines and better wind-tunnel information.

Remarkable laboratory progress, spearheaded in part by the Soviet Union, has confirmed the laser's potential as a means for triggering, and eventually sustaining, nuclear fusion. Nuclear fusion reactors are the

most desirable and efficient power generators that science can envision at this time, superior in almost all regards to the present family of fission reactors used both commercially and aboard nuclear submarines. (Solar energy is generated by nuclear fusion.) This process leaves no radioactive residue, and its principal "raw material" is deuterium—the heavy hydrogen atom that can be extracted from ordinary water.

The Different Types of Lasers

The laser, an ingenious marriage of optics and electronics, attracts the weapons technologist primarily because it can focus vast amounts of energy very rapidly and with pinpoint accuracy. Its speed is the highest attainable absolute—the speed of light. Its destructive power is derived mainly from the ability to concentrate the energies it emits into very narrowly confined areas and, when desirable, to compress these energy bursts into extremely short pulses. Oversimplified, the laser is to other forms of energy transmission as the penetrating power of a razor-sharp arrowhead is to a club.

All types of lasers share the common feature of emitting light waves so closely in phase with one another, in terms of frequency and direction of propagation, that they radiate "coherently." Because of this peculiarity, the laser's light waves reinforce each other so that the intensity of energy radiation within a given band width can exceed that of the source. All light consists of electromagnetic radiation, the product of energy transitions in matter, principally caused by the collision of excited particles. The photon or "quantum" is the fundamental bundle of radiation whose energy is directly proportional to the frequency of radiation. Photons result from each energy transition and normally go off in all directions, are not in phase with one another, and range over a relatively broad frequency band. Laser light, by contrast, emits its photons, or "light bullets," in one direction, at a sharply confined frequency, and in phase with one another.

The first lasers achieved their action by employing solid materials, such as ruby-red transparent rods, chemically like gemstones, that are an aluminum oxide containing large chromium impurities. The energy levels of the chromium atoms are changed by subjecting them to electric currents in order to generate laser light. The same result is achieved by other so-called solid lasers, usually employing glass with neodymium impurities (neodymium is a metallic element of the rare-earth series). While solid lasers are reasonably useful, they have a fixed number of atoms of the radiating impurities, which limits their power and requires them to function in a pulsed, rather than continuous, mode. Also, they can absorb only a limited power input, which, if exceeded, melts the solids. Because of their power limitations, lasers of this type do not lend themselves to weapons use.

But in 1965, the concept of the CO_2 (carbon dioxide) gas laser was introduced to overcome the drawbacks of the solids. The solids can radiate energy only in pulses. The gas laser can also produce a continuous visible light or invisible infrared beam from electromagnetically stimulated or otherwise "pumped" (energized) carbon dioxide. A gas laser with a 500-watt infrared output burned through a high-grade firebrick in five seconds, during tests at the Air Force Systems Command's Weapons Laboratory at Kirtland AFB, N.M., in 1966. This early gas laser, operating at about ten percent efficiency and involving a power source of 5,000 watts, consists of a double-walled glass tube forty-four feet in length. The inner portion of the tube is filled with a mixture of carbon dioxide, nitrogen, and helium. The outer section is filled with water that circulates through a heat exchanger to cool the laser. At one end of the tube is a gold-plated mirror, which reflects light back into the gas mixture. As the laser action takes place, the beam is emitted through a "window" at the opposite end of the tube. The "salt window," actually a sodium-chloride crystal two and a half inches in diameter, absorbs none of the laser beam's energy but reflects about eight percent of it back into the tube in order to sustain continuous laser action.

Gases, by definition, represent low concentrations of molecules and atoms. For this reason, in order to achieve higher power levels, gas lasers require some sort of pumping action whereby the old gas is rapidly and constantly replaced by new gas. In the case of the first gas laser at Kirtland AFB, the gas exchange was achieved by means of electric discharge. Since then, a number of ways have been found to accelerate the gas-pumping action and to excite the carbon-dioxide molecules by using rocket-type nozzles and other advanced aerodynamic devices and principles.

Such systems are known as gas dynamic lasers. The same effect is also being achieved by chemical lasers, using either a burning process or chemical interaction. Dr. Charles H. Townes, winner of the Nobel Prize in physics in 1964 for the fundamental research in quantum electronics that led to the development of the maser-laser principle, told this reporter he felt that the latter two categories of laser systems show the greatest potential for use in active weapon systems. (Dr. Townes shared the Nobel Prize with two Soviet scientists who

(Continued on following page)

A Weapon Whose Time Is Near

discovered the maser/laser principle at about the same time and by independent effort.)

Still another group of lasers, capable of functioning in either a pulsed or continuous-beam mode, use semiconducting materials (such as are used in transistors) to produce laser action. Lasers of this type are highly efficient in terms of the ratio between the power needed to drive them and their output, but share the power limitations and overheating tendencies of conventional solid lasers.

Operation "Eighth Card"

About two years ago the Department of Defense and its Advanced Research Projects Agency (ARPA) decided that the then only vaguely defined but seemingly extraordinary potential of laser weapons warranted advanced development under special security measures. A hush-hush, triservice, ARPA-guided project, code-named "Eighth Card," was set up. Centered at the Air Force Weapons Lab at Kirtland AFB, its security level was comparable to the World War II atomic bomb project. ARPA Director and Deputy Director of Defense Research and Engineering, Dr. Eberhardt Rechtin, told this reporter that "Eighth Card was in effect for about a year because we wanted to keep things close to our vest—especially pertaining to advanced engineering problems—until we understood them better. Later we changed to a conventional security project when we obtained the answers we needed."

All military services, he said, are currently conducting coordinated, "significant and vigorous" advanced development efforts with regard to lasers, with ARPA "taking an early lead when specific applications are not yet clear." Such work, he said, "is going on in many places, including Kirtland." Dr. Rechtin said the basic findings of Eighth Card were that "the laser turns out to be a fairly specialized device, with its own unique problems and constraints." The basic obstacle to the use of the laser as a weapon is "now not in the physics but in the extraordinarily high engineering costs. This seems to preclude its use in the immediate future as an all-purpose system," he emphasized. He added that in order to find out whether seemingly promising military applications of laser weapons are really feasible, it is necessary to "actually build" such systems. Such steps, he cautioned, cannot be taken lightly because of the "very high early engineering costs" involved. The defense community's investment in laser R&D—of which Eighth Card was only a small part—is reputed to be already in excess of $100 million. According to unconfirmed press reports, one of the laser systems developed or tested at Kirtland destroyed a drone in flight by a lasered energy burst. Air Force sources say only that the Air Force Weapons Laboratory has "a project entitled 'Aerospace Laser Weapon Technology.' The project includes studies and experiments to explore the feasibility or potential utility of using lasers for various functions within advanced weapon concepts applicable to Air Force missions. Details of the studies and tests are classified."

A key engineering problem, Dr. Rechtin said, is the extraction of large amounts of energy from small quantities of matter. "In the rocket engine, we achieved rapid energy extraction by what is in fact a [controlled] explosion. The problems of highly efficient lasers are quite similar to the problems resulting from the internal kinetics and chemistry of an extremely efficient rocket engine," he said, adding that, in predicting when such lasers might become available, "It is worth remembering that solving these problems, in the case of rocket engines, defied solution for the better part of ten years."

Further complicating the design engineering of advanced lasers, Dr. Rechtin explained, is the need "to get a highly controlled beam of light out from inside a very explosive box where all these forces are at work. And there is no obvious or easy way of doing this. We, therefore, protect [by stringent security measures] the various tricks of doing the job, which are as significant as the tricks you worried about when you put the first atomic bomb together. So, you don't give away the things that might make this a practical device."

Lasers in Guidance and Control

When it comes to using lasers as the guidance and control systems of conventional aerial weapons, Dr. Rechtin cautioned that atmospheric conditions, such

" . . . AN AVALANCHE OF PHOTONS"

Until early in the twentieth century, scientists thought of light in terms of continuous waves of radiation. But this concept was at odds with a number of clearly observable characteristics of light. This caused Max Planck, the celebrated German physicist, to postulate, at the turn of the century, that radiation consists of small units, or "bullets," of light, just as matter is made up of individual units, or atoms.

Planck called this "bullet" of radiation a "quantum" and concluded that the amount of energy each quantum contained depended on the wavelength of the radiation—the shorter the wavelength, the greater the quantum's energy.

Building on this postulate, other scientists (foremost among them Albert Einstein, in his "Special Theory of Relativity") concluded that matter has individual and distinct energy levels that can change, up and down, only in increments equal to a quantum, or, as Einstein called it, a "photon."

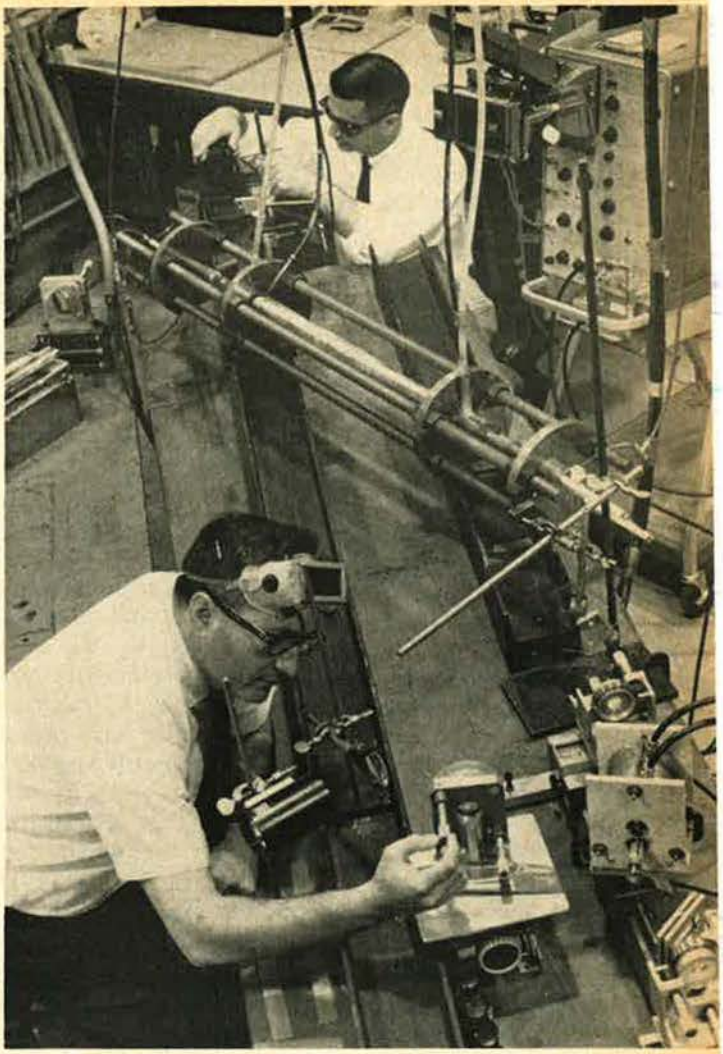
In that sense, laser action begins when a photon strikes a molecule that—by electrical or chemical means—has been "excited" into a high energy level.

When this happens, the photon that strikes the excited molecule knocks off another (and identical) photon. Both photons leave the molecule at the same time and travel in the same direction. (The molecule, robbed of one photon, drops down to a low energy level.) Each photon travels on until it strikes another excited molecule, and the process creates still additional photons, forming a chain reaction. The result is an avalanche of photons, all of the same size and all moving in the same direction. This avalanche we call a "laser," short for Light Amplification by Stimulated Emission of Radiation. By comparison, the photons of ordinary light are "undisciplined," and move in spurts and in different directions.

as dust, humidity, and fog, which attentuate, or reduce, radiation, limit laser use to special applications. Among them are limited-war conditions where weapons delivery has to be reliably pinpointed and where visual identification is required to avoid hurting friendly forces or civilians.

Regarding the proposed use of laser weapons aboard aircraft or in place of ABM interceptors, Dr. Rechtin commented, "The enthusiasm of the theorists is a good deal greater than that of the potential users" because of the enormity of the engineering problems. This includes the proposed use of lasers in space operations or as thermal weapons utilizing power generated by nuclear means, he said. While there is no hard intelligence that shows where the Soviet Union currently stands, Dr. Rechtin intimated that the steady, sharp increase in Soviet RDT&E efforts could well include advanced engineering work on lasers. "Clearly, the laser represents one of several areas where a great deal can be done [by the Soviet Union, without giving any clues to US authorities] before the actual weapon system is surfaced. If our own research effort is below theirs, the time we might have to react will be terribly short, once the impact of what they are doing today hits us, several years from now," he said.

Some yardsticks for measuring Soviet competence in the laser field do exist in information exchanges involving such areas as laser-induced nuclear-fusion processes. Dr. Anthony DeMaria, the head of United Aircraft Corp.'s Quantum Physics Laboratory and an internationally famous laser expert himself, has toured the major Soviet laser research centers. He has reported that the "quality of their work is excellent, and, in some areas, is ahead of our own." At one installation alone, the Lebedev Physics Institute, several hundred Ph.D.s are known to be working on laser research. United Aircraft Corp.'s Director of Research, Dr. Russell G. Meyerand, Jr., told AIR FORCE Magazine that most US experts believe the Soviets have more "people working on lasers than we do, and they obviously have staked out this area as one of their key research programs."



United Aircraft Corp.'s Research Laboratories developed a type of ultra-short pulse laser which is capable of producing energized plasmas, as a first step toward laser-induced thermonuclear power generation. UAC's Dr. Anthony J. DeMaria adjusts a laser to generate picosecond pulses.

Laser/Fusion Reactors or Bombs

Dr. Robert L. Hirsch, senior physicist in the Atomic Energy Commission's Controlled Thermonuclear Research Program, told AIR FORCE Magazine that about two years ago the Soviets informed free world scientists of a "significant achievement involving the use of a high-powered, short-pulse glass laser to irradiate a pellet of lithium and deuterium with such enormous energy bursts that limited fusion was achieved." Deuterium, also called heavy hydrogen because it is a hydrogen isotope twice the atomic weight of ordinary hydrogen, is a fusionable material. Lithium was used by the Soviets because it acts as a convenient carrier of the deuterium, which otherwise would require cryogenic (ultra-cold storage) handling.

That the Soviets did indeed achieve fusion was confirmed by the presence of a limited number of neutrons, the small, subatomic particles that are removed from the atomic nuclei whenever the latter are caused to fuse. French researchers also achieved similar results through laser-induced fusion and produced even more neutrons, shortly after the Soviet experiment. Subsequently, an accelerated research program of the US Atomic Energy Commission's Sandia Laboratories led to full verification of the Soviet experiment, and, since then, Italian scientists have achieved identical results.

The potential importance of the Soviet laboratory achievement lies in the fact that, to date, only one form of full-scale nuclear fusion has been produced—the H-bomb. It achieves a one-time fusion of hydrogen nuclei by trapping them in the superheated fringe of a fission-bomb blast. The H-bomb, then, is really two bombs in one, where the fission burst is used to generate the immense energy levels—in excess of 100 million degrees Fahrenheit—required to induce fusion. The difficulties of achieving fusion in a practical, meaningful sense by any other means are enormous. The reason is a matter of basic physics.

Both fission and fusion work because the nuclei of atoms tend toward a size where the least amount of

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energy is needed to hold together their components—positively charged protons and neutrons (assumed to have equal, self-canceling positive and negative charges). In the case of the fission, or splitting, process, extremely heavy nuclei, either plutonium 239 or uranium 235, are "being helped along" in their natural tendency toward this optimum size. (Achieving this is generally rated as being less difficult than designing the gas-diffusion plants, chemical separators, and breeder reactors necessary to produce enriched uranium and plutonium. In the case of smaller countries, it also is difficult to "hide" such facilities.)

Conversely, fusion employs very light nuclei, such as hydrogen or helium, and seeks to combine them. This is much harder to do than splitting atomic cores since all nuclei contain positively charged protons. Because of this charge, they repel each other. The only working models for a sustained fusion process not employing a fission trigger are the stars. Our sun, for example, is sometimes referred to as a "thermonuclear furnace." The enormous heat and excessive energy densities (pressures) produced by the sun's gravitational forces are the result of its massive size. Attempts to duplicate the sun's processes by magnetic means for either military or peaceful uses have proved elusive, despite vigorous efforts by the world's ranking technological powers.

In the case of the United States, these efforts can be traced back at least to 1951 when the initially top-secret project, Matterhorn, followed a year later by Project Sherwood, was launched to explore the potential of thermonuclear fusion reactors. As for the feasibility of pure fusion weapons, the Atomic Energy Commission will only admit that it is "conducting [such] research" as part of its wider program involving "enhanced radiation weapons," and that these efforts include the use of lasers. This would seem to imply that no operational system yet exists. With regard to fusion reactors, Dr. Hirsch and other scientists believe that prototype systems could come into being in ten years at the earliest.

The Slippery Plasma

Nuclear fusion can only take place after matter has been heated into such a furiously "energized state" that the nuclei, separated from the electrons that normally surround them, smash into each other despite their strong mutual repulsion. The crucial and difficult step that has to be taken before fusion can occur involves heating matter—deuterium and/or tritium (the latter another heavy hydrogen isotope)—into what scientists call an energized plasma. This also is called the "fourth state of matter," meaning that it is not solid, or liquid, or gaseous, but an ionized vapor consisting of negatively charged electrons and positively charged nuclei or ions, which are atoms stripped of at least one electron.

But matter, of course, does not want to remain in the excited plasma state and seeks to escape with furious speed and, as one frustrated scientist put it, "with considerable cunning." Dr. Meyerand likened the difficulty of containing plasma to "trying to carry a blob of mercury around in rubber bands." Plasma scientists the world over have created a series of ingenious devices and techniques to contain plasma long enough to sustain fusion by a large enough number of nuclei to achieve a worthwhile thermal output.

The Soviet Kurtchatov Institute has developed what many scientists rate as one of the most successful laboratory machines for plasma containment. Called the *Tokamak,* this doughnut-shaped device refined earlier US and other Western techniques by creating multiple magnetic fields, which help tame the expansive nature of plasmas. All these processes have yielded very limited numbers of neutrons and are a far cry from a viable fusion reactor.

Early US Laser-Induced Plasma Research

Several years ago, American nuclear physicists recognized the potential of the laser in plasma containment and, in a larger sense, fusion research.

The first successful experiment in the US was conducted by United Aircraft's scientist, Dr. Alan Haught, involving a particle of lithium and deuterium about the size of a piece of dust. Suspended in a high-vacuum vessel by an electrostatic field, this particle was placed at the focal point of the lens of a laser and irradiated with power levels of up to one gigawatt (a billion watts) for periods of not more than ten nanoseconds (the billionth part of a second or 10^{-9}). More recently, Dr. Meyerand said UAC lasers have achieved pulses as brief as three-tenths of a picosecond (a picosecond being 10^{-12}) by using sophisticated schemes involving spectral grating to compress pulse length, thereby increasing the energy concentration that is being transmitted.

Because of the immensity of the power pulse and the speed-of-light instancy with which it is applied, the exposed particle does not have time to dissipate the energy that is pumped into it, and it literally explodes, becoming a liquid, a gas, and a plasma, in that order. The plasma then expands until it is trapped in the magnetic field of the containment vessel, undisturbed by the electric currents flowing in plasmas produced by any other means. This research effort, which continues to be carried out under the AEC aegis, does not seek to sustain the plasma by laser action, but rather envisions its role as that of a spark plug, or kindling, which, as Dr. Meyerand described it, "starts the fire. We would expect to sustain the process by bringing in additional particles from the outside." Other AEC as well as foreign research, involving a number of varied approaches, seeks to establish whether a sustained laser-induced fusion reaction can be attained. "The threshold of interest that we hope to attain," Dr. Hirsch said, "is a balance between the power we put in and the power we take out."

The Soviet laser experiment exceeded the achievements of previous free world laser/fusion research by producing the critical temperatures needed for isolated fusions to occur. What worries many scientists is that while fusion reactors require both contained and sustained fusion, in "weapons applications, the fusion process is not sustained since everything happens at once, and, of course, there is no containment requirement." It follows that, theoretically at least, a laser-triggered fusion or neutron bomb may be closer to reality than systems employing the same principles

to provide propulsive or commercial power. Even more ominous is this widely circulated hypothesis: If the Soviets, with their notorious penchant for secrecy, reveal in full the details of their limited fusion experiment, their actual state of the art is likely to have reached substantially higher levels. While the strategic significance of neutron or fusion bombs is considered classified information, it is known that they are essentially "clean bombs" and, in the case of the neutron bomb, highly effective in instantly disarming the fission triggers of ICBM warheads.

The Laser's Communications Potential

The amount of information a communications system can transmit depends largely on the frequency of its carrier. The higher the frequency, the greater the volume of information that can be transmitted. This is the reason the laser is considered by many scientists the ne plus ultra communications device. Light, and laser, frequency is 10^{15} cycles per second. By way of a bench mark, ordinary radio frequencies are in the 10^{6} cycles per second range; TV levels are in the 10^{8} range, and radar functions between 10^{8} and 10^{10} cycles per second. Because the bit rate (a unit of digital communication) of information to be transported can never be higher than the carrier frequency, lasered information theoretically could achieve volumes many million times greater than radio transmissions.

The laser's basic "blemish," the weakening of its beam by the atmosphere, proportional at least to the square of the distances involved, and its complete blockage by such extreme weather conditions as blizzards, suggests its initial use as a communications device in high-altitude or space applications where no such handicaps are encountered. An early experiment with regard to space applications, and involving atmospheric attentuation to boot, was conducted by a Surveyor spacecraft whose TV camera on the moon had no difficulty picking up laser signals from the earth, employing only two watts of power.

A high-intensity laser pulse, about a millionth of a millionth of a second in duration, is being directed into a dye solution at United Aircraft Research Laboratories. During this brief period, light covers only a distance equivalent to the thickness of ordinary paper, but contains enormous amounts of energy.

According to Dr. Meyerand, a type of laser that shows great promise for use aboard satellites or spacecraft is a neodymium YAG (yttrium aluminum garnet) laser, which can achieve its pumping action with the aid of solar radiation. While such lasers appear to be limited to power outputs of about one watt, he said, this would be adequate for many applications. In what he termed a "decidedly futuristic application," highly sophisticated and powerful laser systems eventually might be used to beam "power in the kilowatt range to orbiting satellites because there are no practical means for generating such power levels in space for the time being." Work toward overcoming the weather dependency of lasers is said to be progressing, but is of a classified nature.

Another feature of the laser that is not desirable so far as communications applications are concerned is its dependency on line-of-sight operation. Some modifications of this condition have been achieved by Bell Laboratory's "Light Pipe," which caused modest "bending of the beam" through the use of hot gases, but this requires the use of an underground tube. The military utility of this application would seem to be limited to special conditions where highly secure communications are involved. Dr. Rechtin stresses that a significant incentive to use laser communications devices for military purposes is the difficulty of intercepting its point-to-point beam.

Many scientists believe that laser radars show great promise because of the much greater resolution of the "picture" that results from its directionally confined beam. It is theoretically possible, for instance, that laser radar, used as part of an ABM system and operated presumably aboard an AWACS-type aircraft flying sufficiently high to avoid atmospheric at-

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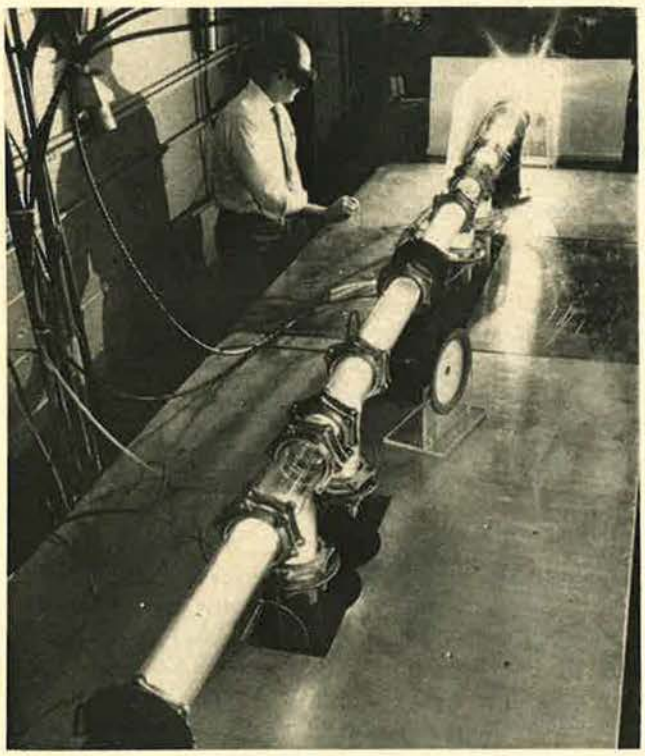
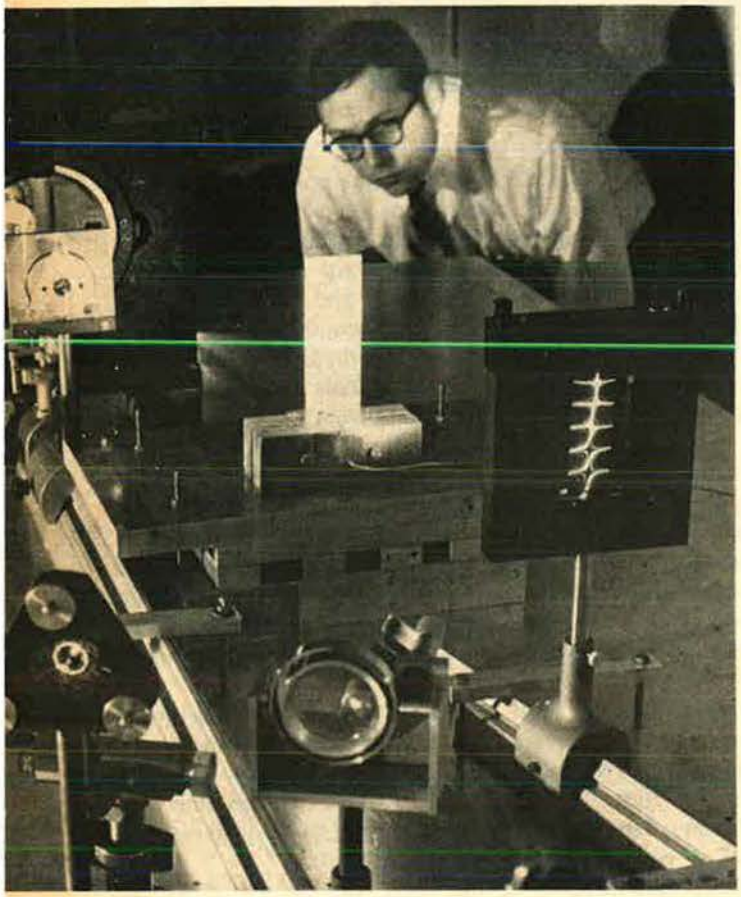


A firebrick is being "burned" by one of UAC's high-powered lasers. One of the applications of high-powered, continuous-output lasers is promising from a military as well as a civil engineering point of view. Such lasers can cut hard-rock tunneling costs and speeds in half, compared with today's best methods, and also provide greater safety.

tenuation, could differentiate between incoming warheads and decoys, since it would be able to measure the size and shape of the object.

The Versatile Laser

The most intriguing, yet closely guarded, field of future laser uses involves tactical laser weapons, presumably involving high-powered, short-pulse or continuous-beam systems with an output of about five megawatts or more to instantly vaporize objects on which they focus. Again, the assumption suggests itself



Three-dimensional pictures created with a laser on a single sheet of film—a technique called holography—offer a unique means for testing such components as jet-engine blades. Another laser-hologram technique is being used in the wind tunnels at AFSC's Arnold Engineering Development Center, Tenn., to obtain three-dimensional pictures.

that such weapons would be deployed by aircraft operating and "defending" at high altitude. Obviously, only aircraft with large payloads represent possible candidates for laser weapons, because of the need to transport a substantial power source aboard. Among this category, future AWACS aircraft can be assumed to rank prominently because their ability to defend against interceptors would be highly useful, and their regular mission automatically necessitates high power sources. An inherent advantage of laser weapons is the rapidity of their action and the elimination of the requirement to "lead" moving targets.

Among the variety of other suggested military uses of laser systems is that of relatively cheap and fast hard-rock tunneling. Under contract to the US Department of Transportation, United Aircraft Corp. scientists are working on the concept of "heat-assisted tunneling," which, Dr. Meyerand said, "at this time appears feasible and cost-effective." On the basis of existing 11.1 kilowatts of continuous-output, nitrogen-CO_2-helium lasers, developed by United Aircraft Corp. by incorporating advanced aerodynamics for gas expulsion, heat-assisted hard-rock tunneling costs can be "cut in half and the speed of the process at least doubled" compared to the best currently known methods. (The world's most powerful continuous-output laser believed to have been operated was used by the Air Force to produce eighteen kilowatts, but "burned up" its mirror system.)

The aerospace industry, in this country as well as abroad, has been using laser tools with considerable success for a wide range of activities. Among the more spectacular is the laser's ability to cut heated titanium sheets of half-inch thicknesses at the rate of three to four inches per second. England's Rolls-Royce Ltd., for instance, is testing a continuous-output gas laser with a power level in excess of 600 watts, for cutting and welding exotic metals used in jet engines.

UAC engineers believe that research involving a gas laser that produces fifty pulses per second at peak powers of one megawatt will significantly advance the performance of future jet engines. Because of the laser's proved ability to burn minute (about one-5,000th of an inch) and completely clean holes into the hardest superalloys such as nickel and cobalt, "we look forward to a new era in transpirational turbine-blade cooling," Dr. Meyerand said. By increasing turbine-inlet temperatures through the use of large numbers of tiny holes in the blades, which cannot be drilled by other means and which cause a protective film of air to form around the blade, he said, substantial advances in the efficiency of future military and commercial jet engines can be attained. This might even become a factor in the attainment of a stoichiometric engine, the ultimate in efficiency that can be envisioned.

Scientists and weapons technologists recognize that much additional research and development work is needed to make the laser a military household word. But there can be no serious doubt that, if the laser's efficiencies and power outputs can continue to grow at the high rates of the past five years, the laser will not only bring about a revolution in technology, but in doctrine as well. Bombers that can vaporize interceptors by thermal radiation, an AWACS that not only detects threats but destroys them, and a new generation of nuclear weapons dramatically different from the fission/fusion devices of today could be, at least in theory, the payoff of vigorous laser R&D programs.

For the time being, there is no way of knowing which of these potentialities can be translated into practical realities—or when. The only certainty about the laser is that, if the United States should fail to exploit its potential, the Soviet Union assuredly will not. In such a case, as ARPA's Dr. Rechtin put it, "The time to catch up might be terribly short."—END

For nearly a decade, the US has relied on Assured Destruction, achieved largely by US missile superiority, as a deterrent to nuclear war. One element of the deterrent forces—air defense—has been left increasingly out in the cold. That neglected element now is growing in importance as the US missile lead vanishes, and as realistic appraisals of the Soviet bomber capability show it to be greater than formerly acknowledged. But reductions in our air defense forces continue. The result . . .

AIR DEFENSE:

Weakest Link in the Deterrent Chain

By John L. Frisbee
SENIOR EDITOR/PLANS AND POLICY

SEVERAL years ago, a top official in the Department of Defense remarked (off the record, of course) that Secretary of Defense Robert McNamara had come to office with a built-in prejudice against the manned bomber as an element of deterrence. Subsequent events did little to disprove that contention. Mr. McNamara's lack of enthusiasm for the bomber has some bearing on the sorry state of our air defenses today. If one rates a particular weapon system (the bomber, in this case) as only marginally useful to deterrence of general war, and the potential enemy has far fewer bombers than he, it's not likely that he will be inclined to spend much on air defenses. What do they contribute to deterrence?

It may seem a bit strange to begin a discussion of air defense by talking about deterrence. If so, that's only because so many people have forgotten, during the last few years, that deterrence is—*or should be*—a product of *both offensive and defensive* forces. To oversimplify the matter, a 100 percent effective defense would deter attack on this country, at the very least. Also, a 100 percent effective offensive ability would deter attack on the US, and probably on our allies as well. Since neither perfect offensive nor defensive forces are attainable, deterrence has to be found through an interaction of offensive and defensive capabilities.

That statement was both valid and credible during the 1950s. But during the 1960s, it lost some of its validity and most of its credibility. In the last three years, the statement has regained a good bit of validity, but considerably less credibility. The reasons for this less-than-full-circle turn of the wheel go back a few years.

When Mr. McNamara moved into the Pentagon in January 1961, US deterrence was based almost solely on manned bombers and on an extensive air defense system to protect both the population and the bomber force. Missiles were in their operational infancy. But a crash deployment of land- and sea-based missiles soon gave the United States overwhelming missile superiority over the USSR. The strategy that evolved under McNamara became one of deterring nuclear war through a principal reliance on missiles as the instrument of Assured Destruction—that is, the ability to decimate an enemy even after he had struck the first blow. In all fairness, it must be said that, in the early 1960s, Mr. McNamara's position was not without its own logic.

During most of the 1960s, US land- and sea-based missiles enjoyed a very high degree of invulnerability to attack. Initially, neither we nor the Soviets had reconnaissance systems that provided continuous, comprehensive, and precise coverage of the other's missile deployments. For both sides, particularly for the US, locating and targeting each other's missiles was a difficult problem.

Early in the game, both sides began to bury their ICBMs in hardened silos. Neither side had missiles

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accurate enough to destroy the other's on anything close to a one-to-one ratio. For example, the first generations of operational Soviet missiles had an accuracy, at intercontinental range, of between a half mile and a mile. With nuclear warheads in the one-megaton range, the Soviets would have had to target at least three missiles against each of ours, in order to ensure a high probability of destroying the US missile force.

It simply was not conceivable that the USSR, with a missile inventory considerably smaller than ours, would launch a surprise attack on the US. More than enough US missiles would have survived to destroy the attacker. So who needed bombers in the missile age? Assured Destruction appeared to be just that, achievable with missiles only. Apparently our policy-makers believed that the Russians saw the logic of this situation, too. Premier Khrushchev himself had publicly stated that the manned bomber was obsolete.

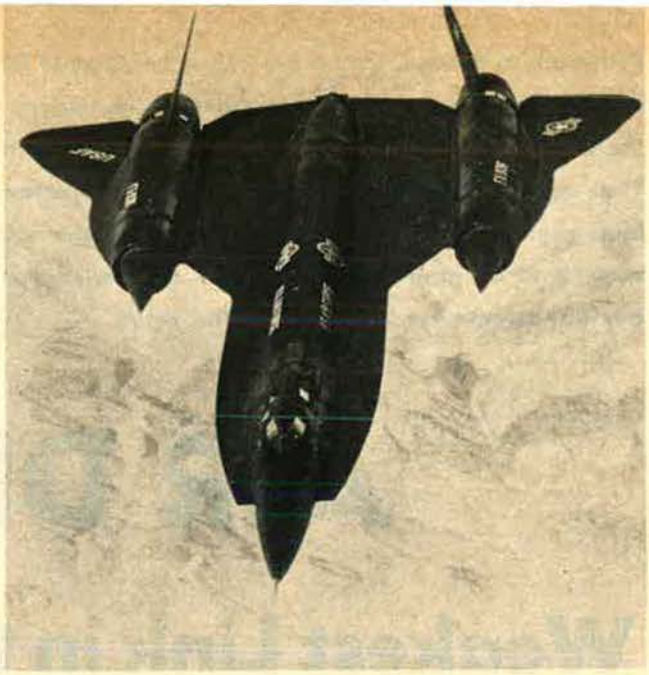
Nevertheless, during the early part of the period, we did maintain—and in some areas improve—the air defense system that had been built up during the 1950s. The system consisted of Distant Early Warning (DEW) Line sites in the far north; the Mid-Canada Line of radars; the Pine Tree radar line; a large number of gap-filler radars; offshore warning provided by Navy picket ships, Air Force Early Warning and Control aircraft, and Texas Towers; the SAGE system for controlling the air battle with a backup interceptor control system (BUIC); plus the active defenses provided by forty-five squadrons of USAF manned interceptors and a growing number of Army and Air Force surface-to-air defensive missiles. These defenses were kept intact while the intercontinental missiles were being deployed, tested, and shaken down. But the defensive systems soon came to be regarded as grossly excessive in relation to the Soviet bomber threat.

Damage Limitation—A Poor Second

The strategy articulated by the Department of Defense during the 1960s was not wholly oriented toward Assured Destruction. It had two elements—Assured Destruction and Damage Limitation. The latter included the ability to reduce damage to this country by destroying attacking missiles or bombers in flight, or before they were launched. But Damage Limitation took a seat so far to the rear that it was almost off the wagon.

The rationale for inattention to Damage Limitation took several turns. Those who believed in the existence of a technological plateau saw no possibility of a workable missile defense, and little likelihood of developing high-confidence defenses even against manned bombers. The alternative was to rely on the ability to ride out an attack and still be able to destroy the attacker—or Assured Destruction vested in offensive systems, principally missiles.

Others held that it made little sense to spend a lot of money on antibomber defenses when we had no defense against missiles. This despite the fact that studies of a nuclear exchange between the US and USSR showed that an effective US bomber defense would reduce US fatalities by about ten million. However, it was concluded that bomber defenses were not



The Lockheed YF-12, with a look-down radar and a shoot-down missile, performed spectacularly in tests but was turned down because of high cost and a belief that a large investment in air defense modernization wasn't justified.

"cost-effective," since there was no way of preventing some sixty-five million deaths from missile-delivered nuclear warheads. This reasoning didn't appear to place a very high value on American lives.

Still others—including members of the technological-plateau and the both-or-neither schools—refused to acknowledge the existence of a genuine threat from Soviet bombers. By their terms of reference, it was foolish to invest in defense against a nonexistent threat.

Air defense was never really accepted as an essential element of deterrence. In fact, however, the balance of deterrence must be struck by analyzing the interactions of *all* an enemy's strategic forces—offensive and defensive—against *all* of our strategic forces—offensive and defensive. The equation is not static, either quantitatively or qualitatively.

Five years ago, if one chose to look not far into the technological future, deterrence could be based safely on Assured Destruction guaranteed by the invulnerability of US land- and sea-based missiles. At that time, the USSR had neither enough missiles, nor enough accuracy in its missiles, nor good enough anti-submarine-warfare techniques to threaten US missiles in their silos or at sea.

The Strategic Balance Shifts

Today, the situation is drastically different. The Soviet Union, not the US, holds a numerical advantage in land-based missiles, including some 300 SS-9s, each of which is—or can be made—capable of delivering three five-megaton warheads against one or more of the 1,054 US missile sites. Soviet construction of both hunter-killer and missile-launching submarines exceeds our own by a wide margin. The Soviets are known to be emphasizing antisubmarine warfare, apparently with some success. Their recently discussed antisatellite

capability could be used to destroy the navigation satellites that are used to calculate launch positions for Polaris submarines, with the precision that is necessary in order to hit a target 2,000 miles away. And the USSR has built a limited antiballistic missile defense system, in advance of our own Safeguard ABM, which is now in the early stage of its deployment.

When all of this is added up, it seems clear that deterrence is too important to be left solely to the missiles. That is why the "triad" of manned bombers, land-based missiles, and sea-based missiles has become increasingly important to US national security. Somewhat ironically, technology—which was thought to have outmoded the bomber at the dawn of the missile age—in fact has made it more important, as technological advances reduced the earlier invulnerability of missiles.

But what does this have to do with air defense? Again, the answer has to be approached by a circuitous route.

Bomber Forces Compared

It often has been pointed out that, in recent years, whatever lead the US has had in deliverable megatonnage (a persuasive measure of deterrence) has rested largely on the US bomber force. If you look only at the number of US heavy bombers compared to the Soviet heavy bomber force, that margin may appear assuringly favorable to us. But, to repeat, *all* offensive systems have to be measured against *all* defensive systems on both sides. That comparison reveals two facts. First, the Soviet bomber force is a genuine and growing threat to our security. Second, US bomber superiority—certainly one key, if not *the* key, to effective deterrence today—is considerably less clear than has been supposed.

At its peak strength in the late 1950s and early '60s, SAC's fleet of strategic bombers numbered more than 2,000 aircraft. Some reduction in the bomber force was proper as ICBMs came into the operational inventory. But, as is often the case, economy teamed up with a reduced operational requirement. That argument for reduction was abetted by the low esteem in which the bomber was held as a deterrent factor by many Defense officials of the 1960s, and by the tendency to overlook the offensive/defensive equation. "Reduction" came to resemble "decimation." Modernization of the bomber fleet ground to a halt. Today, SAC's bomber force is made up of about 500 B-52s embodying the technology of the early- to mid-1950s, and thirty-five FB-111s. The B-1 will not be operational until the late 1970s.

For so many years that it became almost traditional, the Soviet bomber force was tallied at about 150 heavy bombers, some of them converted to tanker configuration. That is a small number compared to the SAC peak figure, and modest by comparison even to SAC's 1970 bomber inventory. Only recently have official spokesmen, other than airmen, begun to take note of the Soviet medium bomber force, all of it nuclear-capable and all of it able to reach targets in the US, with refueling, on one-way missions, or, conceivably, through shuttle-bombing tactics, using bases in Cuba. It should be remembered that, for several years, the backbone of SAC's intercontinental bomber force was the B-47, which had a shorter unrefueled range than do some of today's Soviet medium bombers.

When the USSR's medium bombers are added to its heavy bomber force, the numerical balance between US and Soviet bomber strength looks considerably different, as shown in Columns 1 and 4 of Table I. Opposed by the shrinking and obsolescing US and Canadian air defense forces, Soviet bombers probably could deliver from 1,000 to 1,200 nuclear warheads on US targets without recycling the force. Soviet bomb-

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In recent years, SAC bombers have given the US a deterrent lead over the USSR in deliverable megatonnage. That lead looks less certain when bombers are measured vs. opposing air defenses. The ratio of US interceptors to Soviet bombers is 0.6:1; of Soviet interceptors to US bombers from 6:1 to 9:1. Ratio of SAMs to bombers is even less favorable: on our side 1.1:1 and on the Soviet side from 13:1 to 16:1.

Table I

COMPARISON OF US-USSR BOMBER AND AIR DEFENSE FORCES

(Strength figures from **The Military Balance 1970-1971.** *The Institute for Strategic Studies, London)*

Col. 1 Soviet Bombers		Col. 2 US Aerospace Defense	Col. 3 Soviet Aerospace Defense	Col. 4 US Bombers	
Heavies		**Personnel**	**Personnel**	**Heavies**	
Bison	90	57,000 Air Force	500,000	B-52 C-F	250
Bear	100	28,000 Army		B-52 H, G	255
Mediums		**Interceptors**	**Interceptors**	**Mediums**	
TU-16	550	250 Aircraft Reg. AF Squadrons	3,300 aircraft plus 1,400 to 1,500 in Warsaw Pact air forces	FB-111	35
TU-22 (supersonic)	175	300 ANG aircraft*		Total	540
Navy TU-16	300				
	1,215*	* Only a small number of ANG interceptors are on alert, available immediately in case of surprise attack.			
Minus Tankers	300				
Total	915				
* An estimated 300 of the bombers have been converted to tankers.		**Surface-to-Air Missiles** 1,000	**Surface-to-Air Missiles** 8,000 to 10,000		
		AWACS 1976 (?)	**AWACS** Operational		

ers could be used in a variety of attack patterns: for suppression of US missile and bomber defenses, to attack missile sites, as a mop-up force, or against urban areas with resulting US casualties running into the millions.

Russia's Rampant Air Defenses

The real Soviet counterbalance, however, is not so much its medium bomber force as it is the Russian air defense system. The Soviets have not reduced their air defense forces as the US bomber fleet decreased in size. While maintaining its quantitative standing, the Soviet force has been greatly improved in quality. This has been done through the introduction of very advanced interceptor aircraft like the MIG-23 Foxbat —a Mach 3, all-weather interceptor—an airborne warning and control aircraft similar to, but perhaps less sophisticated than, the AWACS we hope to have by the late 1970s; the long-range, surface-to-air missile system, known as Tallin, which may also have some ABM capability; and many advanced radars.

Conversely, as the Soviet bomber force remained quantitatively level while improving in quality, US air defenses have declined dramatically, especially since 1966, as shown in Table II. A comparison of US and Soviet offensive and defensive strategic airpower as of mid-1970 is shown in Columns 2 and 3 of Table I.

To make a bleak picture even bleaker, the USSR is known to have developed a swingwing supersonic bomber that is now in prototype. Their TU-144 supersonic transport, now flying, could provide the basis for a bomber of longer range than the swingwing. Finally, it is generally accepted that the US air defense budget is in for further cuts next year.

US Modernization: Little and Late

The drastic cuts in US air defenses that have taken place during the past five years were made in anticipation of force modernization. Modernization either has not come at all, or is progressing at a snail's pace. This is due in part to the demands of the Vietnam War, followed by across-the-board reductions in the defense budget as US withdrawal from Southeast Asia progresses. Of all Air Force operational areas, air defense appears to have been given the lowest priority.

Modernization plans of the late 1960s called for replacing an obsolescent, vulnerable, and expensive ground-based system for controlling the air battle with an Airborne Warning and Control System (AWACS) *(see* AF/SD, *June 1970)*. AWACS will have the advantage of high survivability while airborne, it will extend the defense perimeter from 500 to 800 miles beyond the present limits set by ground-based radars, and it will provide effective look-down radar for locating and tracking low-flying penetrators—where our present ground-based systems are especially weak. A contract for airframe and system integration was awarded to the Boeing Co. last summer, with hopes for an AWACS fleet numbering about forty aircraft. According to the present schedule, the first of these could be operational by 1976.

A second element of modernization is over-the-horizon, backscatter (OTH-B) radar to provide long-range detection of approaching bombers, thus allowing AWACS time to reach its combat station from ground alert. The Air Force has requested development funding for OTH B, with operational deployment some years off.

A hoped-for modernization triumvirate would be rounded out by a new interceptor aircraft with greater speed, range, and loiter time than the present first-line interceptor, the ten-year-old F-106. A promising candidate was the YF-12, an experimental interceptor closely related to SAC's fantastic long-range reconnaissance aircraft, the SR-71. Test models of the YF-12, with a look-down radar capable of detecting and tracking low-flying aircraft through ground clutter, and with a shoot-down missile, performed "spectacularly," according to air defense experts. But the YF-12 is definitely out because of cost, clinched by the fact that

Table II
DECLINE OF USAF AIR DEFENSE FORCES, 1961-1970

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Regular AF Interceptor Squadrons	43	41	40	40	38	33	28	24	19	14*
Air National Guard Interceptor Squadrons	25	25	25	21	21	21	21	21	19	17**
Bomarc Surface-to-Air Missiles	168	224	300	300	188	184	170	163	155	140
Warning and Control Systems										
Search Radars	151	153	138	137	118	117	112	97	86	83
Gap Fillers	76	92	82	81	88	88	17	17	14	0
DEW Line Sites	57	57	38	39	33	33	33	33	33	33
Picket Ships	10	10	10	10	10	0	0	0	0	0
Texas Towers	3	2	0	0	0	0	0	0	0	0
AEW&C Squadrons	7	7	7	7	7	7	7	7	7	4
SAGE Centers	21	27	27	20	18	15	13	10	8	6
Personnel (in thousands)										
Military	102.9	101.7	103.3	96.9	91.1	83.4	80.9	71.7	63.9	48.1
Civilian	10.8	11.2	11.2	11.2	10.3	11.5	13.6	15.1	12.4	9.4

** One additional squadron of F-102s is based in Iceland, under command of CINCLANT*
*** Includes one training squadron*

Reductions in US air defense forces have not been offset by the kind of modernization that was planned several years ago. The net result is a declining level of US air defense, contrasted with the increasing air defense capability of the USSR. At the same time, the US bomber force has been cut to a quarter of its peak size, while the Soviet bomber force has remained at least level in size and quality.

Lockheed's SR-71 production line has long since been closed down.

As an alternative to the YF-12, the Air Force proposed to modernize the F-106 by giving it a look-down/shoot-down capability. That proposal was turned down by Congress. Now an interceptor version of either the Grumman F-14 or the F-15 air-superiority fighter, which is under development by McDonnell Douglas for Tactical Air Command use, is being discussed. If a USAF interceptor version of either materializes, it will be far down the road—probably in the late 1970s. Interceptor pilots look on these potential contestants with somewhat mixed emotions. Certainly, one or the other would be an improvement over the F-106, but either probably would lack the range for optimum teamwork with AWACS/OTH-B. Very likely, they would be inadequate if the Soviets came up with a 1,000-mile, air-to-ground, standoff missile, or with advanced supersonic bombers comparable to the B-1.

Obviously, the present kill probability (PK) of US interceptors against attacking Soviet bombers is not announced publicly. Whatever the current PK may be, some air defense veterans believe it could be increased by a factor of four or five with AWACS, OTH-B, and a new interceptor. Should an attack come, the number of American lives saved might not be in direct proportion to the improved PK, but it is reasonable to assume that several million fewer Americans would lose their lives. That is something to think about. It's also worth remembering that our national strategy is based on deterring nuclear war, and that deterrence is a function of both Assured Destruction and Damage Limitation. Our defense against a potent Soviet bomber threat is becoming a very rusty link in the deterrent chain.

At best, any significant modernization of the US air defense capability is from six to ten years off. The state of the art, a little more foresight, and adequate funding could have provided the US an air defense system currently comparable or superior to that of the USSR, if both systems were measured against the opponent's bomber force.

Problems and Palliatives

Beyond the need for those hardware items just discussed, air defense planners are reluctant to talk about the details of US air defense shortcomings. Certain weaknesses can, however, be deduced from publicly available information. Our existing radar coverage has shrunk to a relatively narrow band along the East and West Coasts and straddling our northern border in which penetrating bombers could be tracked and interceptors directed against them. (The MIG-17, piloted by a defecting Cuban, which underflew US radar coverage and landed at Homestead AFB, Fla., last year, demonstrated the inadequacies of our radar coverage against low-flying aircraft.) Once through this narrow electronic screen, attacking bombers could roam over the interior of the United States with little chance of detection, let alone interception.

Between the Mississippi delta and western Arizona, there is no radar-warning-and-control capability. Soviet bombers could take off from bases in Cuba, penetrate from the south at low altitude, attack targets in the interior, and withdraw on the deck, without ever being positively identified.

Furthermore, the small number of obsolescent interceptors in our air defense inventory could not provide adequate 360-degree defense of the continental US. The approximately 250 Regular Air Force interceptors are augmented by about 300 Air National Guard interceptors, many of them elderly F-102s. However, each Guard squadron is committed to provide only a small number of interceptors on alert. Only if there were strategic warning of several hours could the Guard squadrons field their full force of interceptors.

Another weakness, so long as the interceptor force is limited in range, is the lack of tankers to refuel the F-106s. In the event of a nuclear attack on the US, SAC's tankers, which normally work with the F-106s, would be largely committed to support of the B-52s and FB-111s. The interceptors would have to depend on those Air National Guard KC-97 tankers not being used to support TAC fighter deployments.

A number of stopgap measures to improve air defense under level or declining budgets are either under way or under study. The F-106s, which traditionally have carried only air-to-air missiles—some with nuclear warheads—are being equipped with guns. This will give them a higher multiple-kill capability under clear-air conditions.

Various ways of using Air National Guard and Air Force Reserve units to better augment the Regular aerospace defense units are under study. No doubt there are possibilities for improvement here, but in the absence of first-line equipment for the Guard and Reserves, any significantly larger contribution is hard to see.

The Question of Policy

Perhaps what is most needed at the moment is a clear statement of US aerospace defense policy. Without that, plans, programs, and the defense of budget requests all rest on a shifting foundation. The absolute minimum in continental air defense would be a warning system only. Certainly that is too frail a reed to lean on. The maximum would be an airtight defense against bombers. That will always be a technical impossibility; any attempt to achieve it would be prohibitively expensive. A rational policy for air defense of the United States must lie somewhere between these extremes. Logically, it would seem to fall at a point where the interaction of combined Soviet bomber and air defense forces with combined US bomber and air defense forces could not tilt the overall strategic balance in favor of the USSR. Where that point may be can be determined only by those who have all the facts.

If the present trend of large-scale reductions in air defense forces continues, it can only result in widening the air defense gap that already exists. The term "unilateral disarmament" describes accurately what has happened to at least this one segment of our deterrent and defense structure.

At a time when the balance of strategic power is rapidly shifting in the direction of the USSR, we cannot afford to lose our air defense capability through continued neglect.—END

"We always plan for the worst and hope for the best." That's the understated philosophy of Seventh Air Force's Joint Rescue Coordinating Center, located at Tan Son Nhut Air Base in South Vietnam. Here's a special report on one of the hairy but successful rescue missions chalked up by the JRCC, the men who . . .

SEARCH AND SAVE!

By Capt. Robert L. Hiett, USAF

RESCUE efforts for downed flyers in Southeast Asia are massive. Ask Maj. Petter B. Lee of Seattle. He can give you a firsthand testimonial.

Major Lee's A-1 Skyraider was shot down in July while on an interdiction mission along the Ho Chi Minh Trail in the Laotian panhandle. He was forced to spend eighteen long hours hiding and waiting for one of the big helicopters of the 3d Aerospace Rescue and Recovery Group to reach down from the sky and pluck him to safety.

"We were on a strike mission interdicting the enemy's supply route when I was downed," Major Lee explained. "We had five trucks cornered, and I had begun my last pass. As I was pulling out, I took two 37-mm hits. It must have sawed off the tail of my aircraft. My wingman reported that my aircraft was on fire when I ejected at 4,000 feet.

"I tried to tell my wingman that I had been hit, but my radios also had been knocked out. I went ahead and pulled the egress handle, which jettisoned me from the airplane. I was fired out of the airplane, the chute opened, and everything went normal.

"As I was coming down in the chute," he continued, "I noticed the river in the moonlight down below me. It was a pretty bad place to be bailing out. I tried to steer the chute to a point that would get me further away.

"I knew that my wingman did not know whether I had bailed out or not, so I was trying to get my survival radio in operation when I actually hit the ground, along the side of a hill about 1,500 feet above the river."

As the pilot called on his survival radio to his wingman, a quick jolt went through the Joint Rescue Coordinating Center (JRCC), and a massive operation was launched.

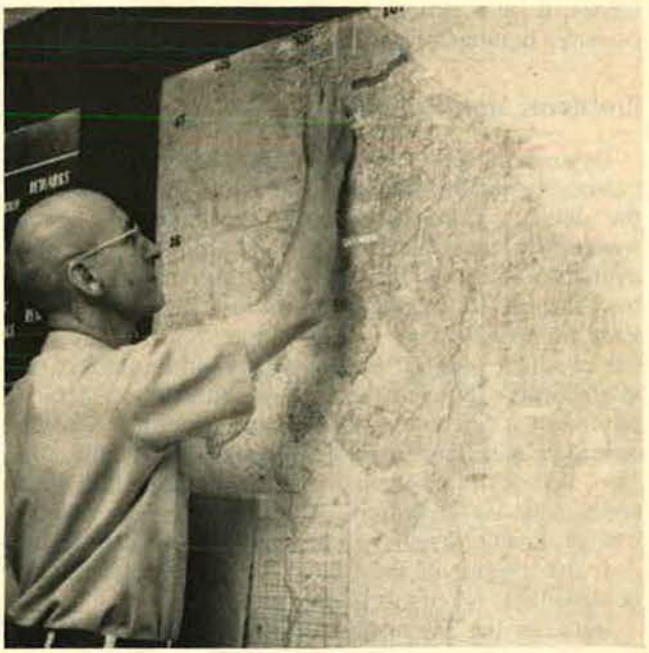
The JRCC, located in the Seventh Air Force command post at Tan Son Nhut, is the coordination center for all US Air Force rescues in Southeast Asia. Its commander has ready access to anything and everything that would be needed to carry out a life-saving rescue. As soon as notice was received that the pilot was down, the JRCC swung into action.

"Aircraft were scheduled to complete a 'first-light' pickup—meaning that at dawn the rescue craft would move into the area," explained Lt. Col. Clyde B. Routt of Tacoma, Wash., JRCC commander. "Meanwhile, one plane was kept in the air over the pilot to make sure that he was alive and uninjured."

In the rescue center, intricate details were worked out as to when and how each aircraft would be used.

Normally, one or more HH-3 Jolly Green Giant helicopters, escorted by several A-1 Skyraiders, are sent in to save a downed airman. Forward air controllers (FACs) circle the area to direct air strikes against enemy positions that may try to hamper the rescue.

High above the scene, HC-130 Hercules aircraft circle to provide air refueling for the thirsty Jolly Greens. The Hercules is also used as a flying command post, relaying radio communications.



Lt. Col. Clyde B. Routt, Commander of Seventh AF's Joint Rescue Coordinating Center, checks the location of the downed pilot, and sets in motion a massive rescue effort.

Launch times for the aircraft were planned so that strikes would be available on a continuous basis throughout the day. Holding patterns were set to keep the swarm of aircraft from crashing into one another. Holding areas were designated where the "fast movers" —jets—could wait until they were directed in by the FACs. Time over target had to be computed for each aircraft so that a steady barrage of bombardment on enemy positions could be kept up all day if necessary.

Two JRCC controllers, Maj. Eugene J. Michalski and TSgt. Edwin E. Bier, follow the progress of the mission. The JRCC coordinates all USAF rescue work in South Vietnam.

"We always plan for the worst and hope for the best," Colonel Routt said. "We recognized right away that he was in a very vulnerable position. It was going to be a difficult rescue problem."

An hour before dawn, the plan was laid out. There was nothing else to do in the JRCC but watch and wait as the Jolly Greens and A-1s took off and headed toward Laos, where they would do their work.

Major Lee, meanwhile, had readied himself for the ordeal that was ahead of him.

"Knowing I was in a dangerous position with enemy troops around," he said, "I climbed uphill to get as high and as far away as possible from the place where I had landed.

"I got up to a place where I would be covered by bushes, trees, and the undergrowth of that particular area. This would make it difficult for the enemy to find me.

"I dug myself a little pit in the ground and hid," he said. "From then on, the FACs were overhead talking to me every half hour.

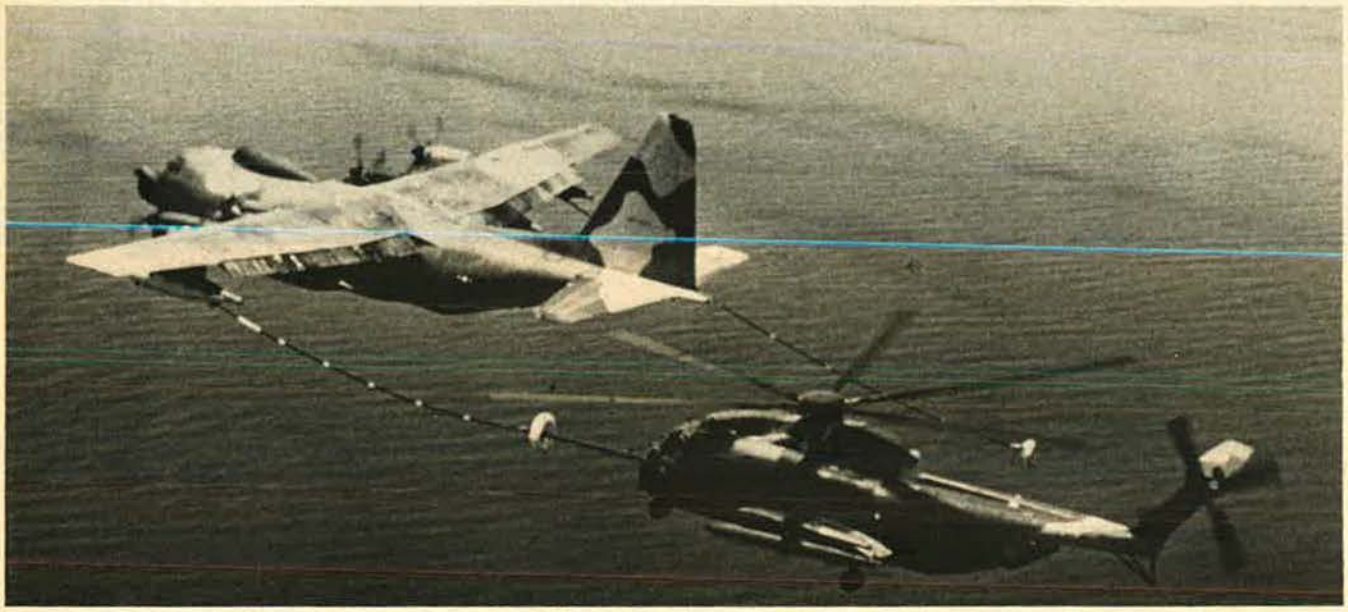
"In the distance I heard gunfire and voices in English telling me, 'American pilot, you're surrounded. Surrender!' Of course, being that far away, I knew they didn't know where I was. I just stayed well hidden and didn't expose my position at all.

"I would let the air controllers know what I heard and saw on the ground, and they would let me know what was going on as far as the search and rescue mission was concerned," he said.

"Of course, with my particular mission, flying A-1s,

(Continued on following page)

Time often is the critical element in the race between helicopter crews and the enemy to reach a downed airman. The crews of the HH-3s and HH-53s are among the most shot-at men in Vietnam. Their treetop-level missions into enemy-held territory require an incredible amount of training, guts, and dedication.



In long-duration search-and-save missions, the HC-130 Hercules is an indispensable member of the team. It stays in the rescue area to refuel the choppers, and doubles as a flying command post to control the mission.

we do a lot of search and rescue missions ourselves. I was fully aware of what was going to take place as far as the search and rescue mission went. This made it easier for me, because I knew what time they were getting up, what time they would brief, approximately what time they would get overhead, and what procedures they would use to silence enemy positions.

"I felt sure I would be rescued," he added.

No one else was as confident. Instead of bringing a quick rescue, dawn brought overcast skies.

"The first half of the day was frustrating for us because of the low cloud cover," Colonel Routt explained.

Everyone was waiting: FACs, A-1s, "fast movers," Jolly Greens, and the big HC-130, which acted as the flying command post. Because of the delay due to weather, planes were shuttling back and forth between their bases and the rescue location. Finally, about 11:00 a.m., the sky began to clear, and Capt. Jim Richmond of Blanket, Tex., a forward air controller with the 23d Tactical Air Support Squadron at Nakhon Phanom Royal Thai Air Force Base, Thailand, was ready to go to work.

Major Lee explained the procedure. "Seeing gun positions from the ground was fairly easy because I was close to them. I had a compass with me. A gun would fire, and I could take a compass bearing on it from my position. I could describe to the forward air controller where I was, so that he could take a fix from my position to where the guns were. Then he could pick up the gun position and guide the fighters in to make their strikes."

Captain Richmond began by putting in ten jets against the enemy gun positions. This pounding continued for several hours. Later in the day, Capt. Fred Parrott of Indianapolis, an OV-10 Bronco pilot, arrived on the scene. "More strike aircraft were just starting to get there," he said. "I took over and marked the enemy positions."

And then, late in the afternoon, Maj. John C.

Maj. Petter B. Lee, left, the downed pilot, talks with Maj. John C. Waresh, on-scene commander of the rescue mission. Both fly A-1 Skyraiders, which figured prominently in saving Major Lee. The A-1s normally operate in coordination with jet fighters to protect rescue helicopters and to keep enemy troops away from downed airmen.

Waresh of Minneapolis, the on-scene commander, decided it was time to attempt the rescue. An HH-53 Jolly Green from the 37th ARRS at Da Nang Airfield was ready for the task (*see front cover*).

"Arriving over the area," explained Maj. George C. Hitt, of Wellington, Kan., the aircraft commander, "I observed at least a half dozen A-1 Skyraiders bombing and strafing enemy gun positions. There were also several F-4 Phantoms and F-105 Thunderchiefs. All these fighter-bombers did an outstanding job of 'sanitizing' the area; otherwise it would have been impossible for us to get near the downed pilot."

Major Waresh ordered smoke bombs dropped to act as a screen for the downed pilot. Waresh knew that if Major Lee had to spend another night on the ground, there was a very good chance he would not be there the next morning.

"After a very thorough briefing on the situation, we started our run-in on the downed pilot," explained Major Hitt. "He was located at the end of a valley between a high ridge and a river. We started our approach about two miles out. On our left was another high ridge, with the river on the right.

"We knew there was hostile fire on both sides of us, so A-1 fighter aircraft accompanied us up the valley, bombing and strafing to suppress the enemy guns. Other A-1s put down a smoke screen on both sides of us. One of the A-1s dropped smoke flares for us to follow up the valley. It was almost like driving down the Los Angeles freeway along the white center line. As we cleared the ridge at the end of the valley, the flight engineer saw a smoke flare released by the trapped pilot," Major Hitt added.

"There he is!" shouted SSgt. Joseph J. Vai of Rutherford, N.J., flight engineer on the rescue helicopter.

"We held in a hover," Sergeant Vai explained, "and lowered the penetrator." The crew hoisted Major Lee aboard with no problems.

"We did receive some small-arms fire on the way out, but nothing serious," Sergeant Vai recalled.

And so it was all over—almost as suddenly as it had begun some eighteen hours earlier. A sigh of relief spread throughout Seventh Air Force.

"We each felt a sense of fulfillment in saving that one man's life," Colonel Routt explained.—END

All's well that ends well. Eighteen hours after he was shot down over hostile territory, Maj. Petter Lee is welcomed at Nakhon Phanom Royal Thai Air Force Base with the traditional hosing down. The team of FACs, A-1s, "fast movers," helicopters, and HC-130s, closely coordinated by the Seventh AF JRCC, has brought home another pilot.

The F-4s were dangerously low on fuel and the weather was poor. But even while these pilots were worrying about their plight, the KC-135 was getting ready to meet the unexpected demand for the precious fuel that would save them and their aircraft . . .

'I'm Below Bingo! Get Me a Tank!'

By Capt. William W. Heimbach, Jr., USAF

IT WAS a typical fall afternoon in Southeast Asia —gorgeous Thailand sun intermixed with the huge threatening clouds known only to those who have spent a monsoon season in the Western Pacific. Rain started and stopped so abruptly that it was useless to seek shelter.

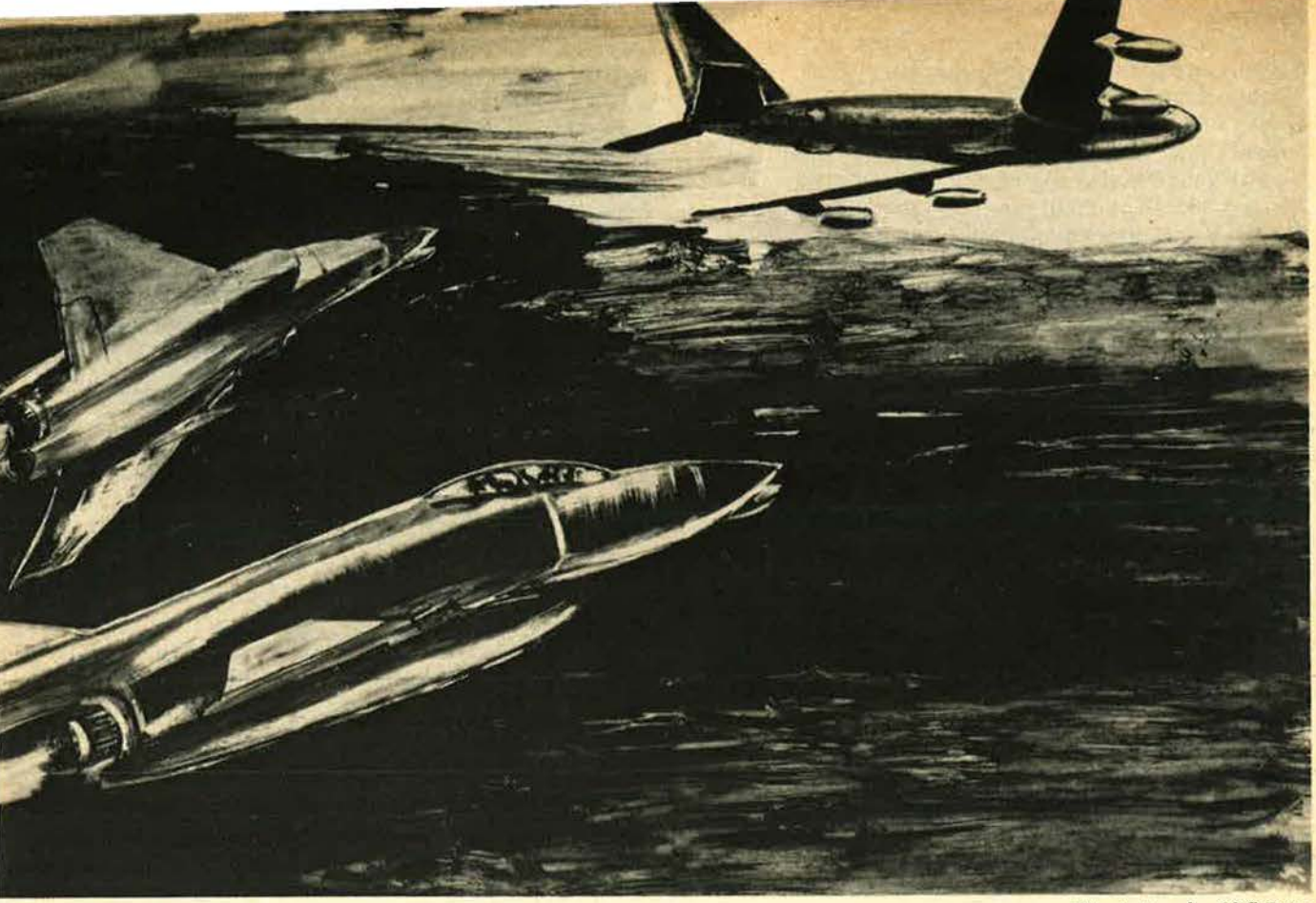
Maj. Richard E. Canfield, a veteran of fifteen years in the Air Force—twelve of those in a cockpit—readied his crew for another mission. The KC-135 Stratotanker foursome, Crew S-159, had been through the same procedure many times before, but this day's work would be different. Only they didn't know it yet.

After briefings, preflighting the aircraft, and take-off, the crew settled down to the task at hand—getting their Boeing-built aircraft in the right position at the right time to refuel whatever fighter or reconnaissance planes were scheduled to come their way that day.

The navigator, Maj. James M. McNamara, immediately began computing airspeed, altitude, and course. SMSgt. Lester C. Ringler, a former B-36 gunner turned boom operator, took his position in the boom pod tucked under the tail of the aircraft. Now he was just test-flying the high-speed boom. Later it would be for real.

Copilot Donald J. Cox, a young first lieutenant and the only one of the crew who hadn't been to Southeast Asia before, was already in radio contact with Ground Control Intercept (GCI) sites along their route. One of these sites would soon direct the "flying gas station" to its rendezvous point with thirsty customers.

Some thirty minutes later, Crew S-159 was approaching its refueling anchor—one of many areas



—Illustration by Cliff Prine

where the tankers orbit while awaiting their contacts.

Then, over the radio came a call on their frequency. It was an F-4 Phantom pilot requesting Ground Control Approach (GCA) to nearby Ubon Airfield. The ground controller below couldn't help him. Ubon was weathered in below landing minimums. Those damned clouds had done it again.

Now the F-4 jockey, a forward air controller (FAC), was in trouble. One of his engines was stalled and he couldn't restart it. This alone would not have been so bad, but his fuel gauge told him he was dangerously low on JP-4. His escort, another F-4 "Tiger" FAC, was also low on fuel. He, too, had planned on the diversion to Ubon.

The tanker crew now was listening intently to the conversation, unbeknown to either Lion—the GCI site—or the troubled fighters.

The FAC's voice became slightly strained over the radio. "Lion, I'm low on fuel." Then several minutes later came the words heard by Strategic Air Command tanker troops many times before: "Lion, Lion, I'm below bingo! Get me a tank! I need a tank."

"Below bingo" means that an aircraft does not have enough fuel to return to its home base. For any aircrew member, veteran or rookie, it spells bad news.

Before the ground site had time to answer, Major Canfield was on the radio. "Lion, we're the closest tank to the area. We can handle it. Give us vectors." Another "save" was now in progress.

The GCI controller worked frantically to get the tanker and the F-4s together. He fired directions at the three aircraft, but then lost contact with the lead F-4 . . . and then with No. 2. It was up to the tank crew.

Copilot Cox was already radioing their position directly to the F-4s. But now another complication was setting in. "Popeye" weather, a term used by pilots to refer to pea-soup conditions that occur during the Southeast Asian monsoons, was blanketing the area. Visibility was virtually nil.

The fighters had less than ten minutes of fuel left. They were getting edgy. The lead pilot tried to regain contact with the GCI site. They needed its radar. "Lion, can you read me. I've got about 2,500 pounds of fuel left. We need to make a decision pretty quick."

Now Lion was once more receiving the F-4's transmission. "Roger, understand."

More words passed while the tanker crew tried desperately to find a hole in the clouds. Then it came. "Level at 20,000 in the clear. Get 'em up here, Lion."

"Roger, climb to 20,000 feet now," Lion instructed the F-4s.

"Roger, I'm at 20," came the reply from the lead fighter, "but I don't see any tanker. I'm going to have to walk [bail out] pretty soon."

Then the clouds filtered away. "I've got you visual now," Major Canfield told the F-4s.

"Roger, we're on our way."

As the hookup was made, the tanker copilot was radioing ahead to find the nearest airfield not weathered in. With this information, the KC-135 took up a heading to that airfield while completing the refuel-

(Continued on following page)

ing. It would save the fighters time later, and one of the lead's engines was still shut down.

Within eight minutes after initial contact, both fighters were full and happy. "You guys are No. 1!" came the lead FAC's voice. "Thanks a lot!" And they peeled off and headed for the alternate airfield.

Crew S-159 from Plattsburgh Air Force Base, N.Y., had saved several million dollars worth of aircraft, to say nothing of the pilots involved. But their workday was just beginning. The GCI site was on the radio giving them vectors for their scheduled receivers.

"That's the way it should be," Sergeant Ringler said, matter-of-factly. "That's what we're there for."

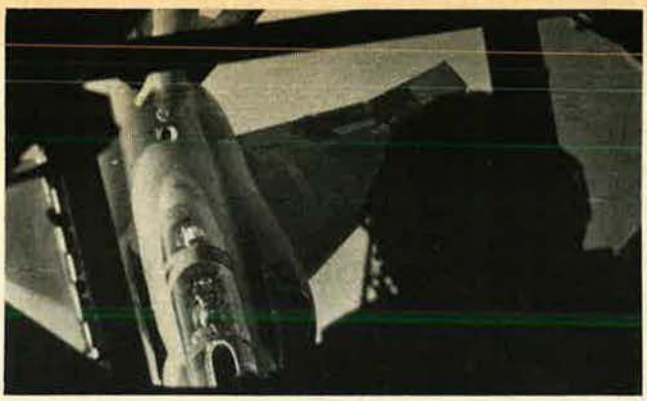
SAC tankers have been "there"—at the right time and place—almost without exception since they first were sent to Southeast Asia in 1964. And they have saved scores of aircraft and crews from disaster.

The "flying gas stations" have refueled everything that's refuelable, from fighters and FACs to reconnaissance and electronic-warfare birds.

Now the tankers operate mostly in the skies over South Vietnam and Thailand. But until former President Johnson halted all bombing of targets in North Vietnam on November 1, 1968, the KC-135 operation in the Western Pacific, nicknamed "Young Tiger," did a yeoman's job of getting US aircraft back safely from the north. The missions over Hanoi and Haiphong were long and dangerous—and a tanker was a valuable commodity to the fighter pilot with a battle-damaged bird and a light gas tank.

It was during these times that a bond of brotherhood developed between the fighter jocks and the tanker drivers. And it's still evident to the tanker pilot who tries to buy a drink at a tactical fighter wing base. He can't. He drinks for free.

Since the bombing halt, there still are a lot of hectic missions for the KC-135 crews, but, on the whole, the operation is a little more routine. Battle-damaged aircraft are few and far between, though there still are plenty of customers who need the JP-4 on a steady basis.

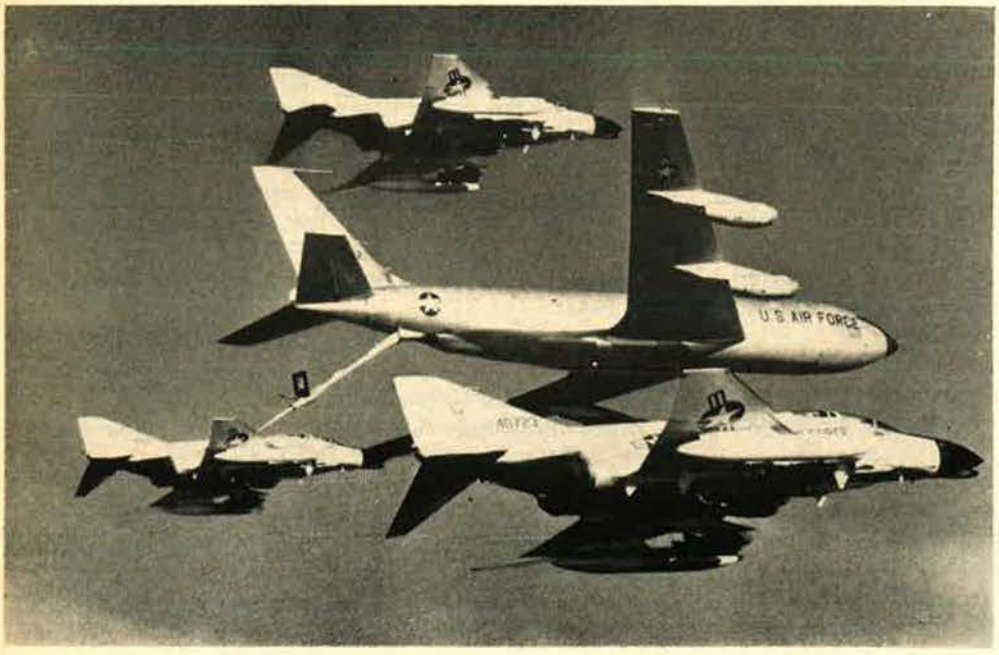


This is a close-in view of the F-4 from the tanker's business end. Tanker support is crucial to air war in SEA.

SAC's 307th Strategic Wing at U-Tapao Airfield, on the southern coast of Thailand, is currently handling a majority of the "Young Tiger" aerial refueling missions. Commanded by Brig. Gen. John R. Hinton, Jr., the unit flies more hours in a month than either of SAC's Stateside numbered air forces.

Manned by temporary-duty crews who come from all the KC-135 units in the States, "Young Tiger" definitely lives up to its name. If you don't believe it, ask any pilot who has had to say: "I'm below bingo—get me a tank!"—END

Captain Heimbach has been chief of information for SAC's 307th Strategic Wing at U-Tapao Airfield, Thailand, since November 1969. He is a graduate of Bradley University in Illinois, where he received a journalism degree in 1966. After graduation from Officers Training School at Lackland AFB, Tex., he attended the Defense Information School at Fort Benjamin Harrison, Ind. He also attended the USAF Information Officers Short Course at Boston University on temporary duty while serving an information tour at McConnell AFB, Kan.



The KC-135 refueling crews earned vast popularity for their many missions replenishing fuel of fighter-bombers during the campaign over North Vietnam. In fact, as the story goes, a refueler crewman can't pay for a drink on the ground between missions. Fighter pilots insisted on reciprocating at the bar for all those vital fill-ups aloft.

USAF Advisers in SEA

The Vietnamese Air Force has scored achievements unequaled by any developing nation's air arm. For twenty years, USAF advisers have been there . . .

Helping to Build the VNAF

By Lt. Col. Jim Taylor, USAF

"VIETNAMIZATION," a word that sums up the process of training and equipping the military forces of South Vietnam to shoulder the defense of their own country, is a relative newcomer to our vocabulary. But its roots go back more than twenty years, to the arrival of USAF advisers in Saigon on November 8, 1950. These were the first US Air Force people in Vietnam; it's likely that Air Force advisers will be the last blue-suiters to leave that land.

Advice and assistance on so large—and long—a scale have never before been provided by the air force of one country to the developing air arm of another. Certainly no country has ever conducted such an undertaking during twenty years of continuing combat.

Initially, USAF advisers, assigned to the Air Force Section of the Military Assistance Advisory Group (MAAG), Indochina, administered the transfer of equipment to the French, who at that time were deeply engaged in the Indochina war, and through them to the Vietnamese. Also provided were technical assistance in supply, operations, and maintenance.

After the fall of Dien Bien Phu in May 1954 and the partitioning of Vietnam at the seventeenth parallel, French influence waned, although the French retained a training mission in the south until May 1957. The South Vietnamese Air Force (VNAF) was born on July 1, 1955, with its headquarters at Tan Son Nhut Air Base near Saigon.

The USAF advisory organization went through several organizational changes, becoming the USAF Advisory Group in 1964. Since the creation of Seventh Air Force in Vietnam in 1966, the Advisory Group has been under its operational control, while still commanded by the Military Advisory Command, Vietnam (MACV).

The VNAF began its existence with thirty-two aircraft inherited from the French, and with fewer than 100 pilots. Until the early 1960s, it grew slowly. At the end of that year, there were about 100 USAF advisers in Vietnam. However, in the early '60s, the VNAF began to build its strength with US-supplied replacements—L-19, T-6, A-1, U-17, H-19, and H-34—for the equipment turned over to them by the French. Between 1962 and 1965, VNAF manpower increased

(*Continued on following page*)

Vietnamese Air Force officer students at the Intermediate Command and Staff School at Nha Trang Air Base, work on problems of troop and supply movements. Simulated battlefield conditions—swamps and minefields—help make things realistic, and a time limit is set on the solution of problems. These and many other training programs have helped improve the quality of South Vietnam's Air Force.

At the right, a Vietnamese Air Force A-1E takes off from the world's busiest airport, Tan Son Nhut. Lower left, a troop-lifting H-34 chopper comes in for a landing during a combat assault mission in the Delta. And, lower right, Vietnamese roar through the sky in their A-37s. As of October, they had four squadrons of A-37s.

from 4,000 to 10,000 officers and airmen, its inventory jumped from 180 to 380 aircraft, and the number of USAF advisers grew to 391.

After the Tonkin Gulf incident in August 1964, Brig. Gen. Robert Rowland became the first general officer to head the USAF's Vietnam advisers, now headquartered at Tan Son Nhut Air Base. In 1966, self-sufficiency for the VNAF entered into planning, with emphasis on modernization and improved organization. On June 1, 1967, Vice President Nguyen Cao Ky, who then was Premier and Air Vice Marshal, accepted twenty supersonic F-5s in ceremonies at Bien Hoa Air Base.

Planning for the VNAF took another change in course in 1968. In December of that year, the Department of Defense approved an Improvement and Modernization Program for the VNAF. Its purpose was to expand, train, and equip the VNAF to handle any Viet Cong threat. While doing so, it had to continue to maintain flexible and effective operations against the enemy.

On April 19, 1969, in ceremonies at Nha Trang Air Base, some twenty A-37 jets were turned over to the VNAF to supplement the propeller-driven A-1s. The pilots had been undergoing transition training for months, and many already had combat sorties to their credit. Before the end of 1969, two more A-37 squadrons were added, and more may well be on their way.

In May of 1969, the first VNAF squadron completed its transition to the UH-1 "Huey" helicopters. Three more helicopter squadrons transitioned from the H-34s to Hueys during the year. By the end of 1969, some seventy Hueys were being flown by the VNAF on airmobile-combat and combat-support operations and on medical-evacuation missions. More squadrons have since been added.

On the last day of June 1969, five AC-47 gunships were turned over to the VNAF as part of the now-accelerated Improvement and Modernization Program. "Vietnamization" became US national policy. While the original I&M was intended to prepare the VNAF to cope only with the Viet Cong, Vietnamization included the added objective of also handling North Vietnamese invaders in the Republic of Vietnam.

Monthly, almost weekly, during 1970 the VNAF has been acquiring more facilities and graduating people from flying and technical schools both in Vietnam and the United States. It acquired two more squadrons of Hueys this year, one squadron of CH-47 "Chinooks," and will receive additional aircraft of other types before the end of the year. The VNAF is rapidly increasing its strength in talent, aircraft, and equipment, and constantly taking over new functions—control-tower operation, weather forecasting, fuel-facility operation.

Praise for VNAF from USAF

In the view of Air Force Secretary Robert C. Seamans, Jr., the Vietnamese Air Force has made tremendous progress during 1970. During a November 1970 visit to Vietnam, where he took part in the transfer of Soc Trang Air Base to the Vietnamese Air Force, Dr. Seamans said, "You can measure the progress in terms of the squadrons that are being activated, all on schedule, some ahead of schedule. I have absolute confidence that we are pursuing the right course, that President Nixon is right in drawing down our forces."

This summer, the VNAF assumed full operational control of the Direct Air Support Center in Military Region IV, which now controls all direct air strikes in the Mekong Delta.

Today, thanks to the energy, talent, and intelligence of the people who form the all-volunteer Vietnamese Air Force, and to the quality of advice and assistance it has received, the VNAF has scored achievements unequaled by the air force of any developing nation.

From thirty-two aircraft in 1955, primitive even by the standards of that day, the VNAF today has about 600 aircraft, some of which are the best in the world for the type of warfare being waged in Southeast Asia. Its people total more than 35,000, including approximately 5,500 officers. Some 2,500 of these are pilots or are in the process of completing pilot training.

The VNAF today has twenty-seven squadrons and is fleshing out its first four air divisions, with one more to be created from an existing tactical wing at some point in the future. It has an Air Training Center, an Air Logistics Command, a Tactical Air Control Center, and other specialized units directly under VNAF Headquarters.

Along with the VNAF, the Advisory Group has grown in size and responsibility. Commanded since August of 1969 by Brig. Gen. Kendall S. Young, the Advisory Group totals about 800 officers and airmen, who make up the headquarters and seven advisory teams. In addition to his responsibility to MACV and Seventh Air Force, General Young serves as adviser to Maj. Gen. Tran Van Minh, commander of the VNAF.

Students at VNAF's Air Training Center at Nha Trang receive instruction in aircraft instrument systems. The Center runs eight schools, including a flying and English-language school. Most of the instruction is by VNAF people.

One of the most successful techniques in Vietnam has been the mounting of Miniguns on combat aircraft. And among the most serious students of the Minigun have been South Vietnamese, here studying the weapon on an A-37.

General Young's staff similarly serves as advisers to their counterparts at the headquarters level. Comparable advice and assistance is provided by seven Air Force advisory teams (AFATs), each headed by an Air Force colonel and located at Binh Thuy, Tan Son Nhut, Bien Hoa, Nha Trang, and Da Nang Air Bases, with detachments at Soc Trang and Pleiku.

From these bases the VNAF fly assault sorties, photo and visual reconnaissance missions, close air support, resupply, medical evacuation, flare illumination, cargo drops, target marking, courier and liaison, and training missions.

A few statistics will illustrate the growth and ability of the VNAF, along with that of the USAF advisory efforts. During 1964, the year the Advisory Group was created, VNAF aircraft flew 14,251 sorties for a total of 24,139 operational hours. Over the twelve-month period ending on June 30, 1970, it had flown 324,350 sorties, totaling 308,450 operational hours. During July of 1969, VNAF crews flew 15,984 sorties, compared to 26,655 flown in July of this year at the height of the Cambodian operation.

Twenty years ago, USAF advisers came to Vietnam. They were the first, and have been some of the most active, Air Force people in Vietnam. When they depart, they will leave behind an air force that will be able to take care of the Republic of Vietnam's airpower interests. That is an impressive contribution to the people of South Vietnam and to the cause of peace and freedom.—END

Reflecting the close-knit cooperation of allied forces in the Mediterranean is this British Sea Vixen, temporarily at home aboard the carrier USS *Enterprise* (near right). Greek soldiers (far right) wade ashore from a landing craft during a joint allied exercise.

Defending NATO's Southern Flank

Soviet military and political incursions, less than ideal terrain, continued Arab-Israeli conflict, and the varying quality of available equipment are among the many problems faced by the commanders and the men of NATO in the Mediterranean . . .

NATO's Southern Command . . .

Vital Force in a Volatile Area

By Stefan Geisenheyner

AIR FORCE MAGAZINE EDITOR FOR EUROPE

AFTER three years as the neglected stepchild of Western politics, the Mediterranean was forcefully brought back into the spotlight of public attention during early September of this year.

Two closely related events, the hijacking and destruction of four airliners by Palestinian guerrillas and the subsequent war against the guerrillas by the government of Jordan, brought the USSR and the US close to a major confrontation. The West was militarily ready to intervene as, presumably, the Soviets were. Only the unexpectedly high combat proficiency of the Jordanian Army, which succeeded in subduing the guerrilla forces, prevented the direct confrontation of East and West in the region. A renewed flare-up of hostilities, however, is almost inevitable because the basic explosive situation among the guerrillas and Jordan, or Israel and the Arabs has not been altered by the present truce agreements.

All these well-publicized and widely discussed events did not concern NATO directly, because none of its member nations was involved or threatened. Nevertheless, the balance of power in the Mediterranean region and the general political situation exert a decisive influence on the defensive posture and force distribution of AFSOUTH (Allied Forces, Southern Command)—the NATO organization responsible for the defense of Southern Europe.

AFSOUTH's headquarters are located at Bagnoli, near Naples, Italy. It represents the hub of the far-

The NATO unit held responsible for the defense of Southern Europe is AFSOUTH, commanded by Adm. Horacio Rivero, USN. Italy, Greece, and Turkey, backed by the US Sixth Fleet, provide the major forces for AFSOUTH, which has its headquarters at Bagnoli, Italy.

flung defensive efforts of the organization. Its commander is Admiral Horacio Rivero, USN. The command has been operational since 1951. Three Mediterranean nations, Italy, Greece, and Turkey, provide the bulk of the forces available to AFSOUTH. Some British units, USAF squadrons, and the US Sixth Fleet are also assigned to the command.

The standard NATO procedure, which decrees that the direct command of the forces reverts from national command to NATO only under wartime conditions, is in effect in AFSOUTH as well. This excludes the air defense forces, which are under permanent NATO command. AFSOUTH is organized with the land forces in Italy under LANDSOUTH, and in Turkey under LANDSOUTHEAST. The air forces comprising AIRSOUTH are 5ATAF (Fifth Allied Tactical Air Force), in Italy, and 6ATAF, in Turkey and Greece. AIRSOUTH Commander is Lt. Gen. Fred M. Dean, USAF, whose headquarters are also at Bagnoli.

The naval forces are divided into Naval Striking and Support Forces (STRIKFORSOUTH), which is the US Sixth Fleet, and NAVSOUTH, combining the navies of the other allies, with headquarters on Malta.

AFSOUTH's forces are deployed facing east and north along a 1,700-mile arc, a considerable portion of which borders on the Iron Curtain. This defensive line extends from the Alpine passes linking Italy and Austria to the Yugoslavian border and continues, after being interrupted by the Western Balkans, along the northern borders of Greece and Turkey. From there, it stretches from the Bosporus along the Black Sea coast to Mount Ararat in the southeastern mountain ranges of Turkey. AFSOUTH is responsible for the defense of this line on land, on sea, and in the air. An additional mission was assumed by the organization after the Arab-Israeli War in 1967, when the defense of the lines of communication between the three NATO nations and the general security of the seas became a new responsibility.

Defending Europe's Southern Frontiers

The real problems of defending Europe's southern frontiers are posed by the geographical features of the area. While certain regions of northern Italy and eastern Turkey are relatively easy to protect because they are extremely mountainous and lack road or rail communications, the overall characteristics of the region place it in the difficult-to-defend category. Its topography shows long peninsulas projecting into the sea or, alternatively, long arms of the sea reaching far inland. The projections severely complicate the problems of logistics and communications and make the establishment of a continuous defense line impossible. Land communications between LANDSOUTH and LANDSOUTHEAST are, for instance, nonexistent because neutral Yugoslavia and hostile Albania bar the way. Thus, the sole link between the three NATO nations is by sea or air.

It is logical, therefore, that positive control against any enemy effort on and over the Mediterranean sealanes connecting the allies is a premise for a successful defense on the land fronts. The loss of secure sea connections would soon starve the fighting land forces out of their positions and expose them to amphibious landings of the enemy in their rear. Should the maritime defenses of AFSOUTH collapse, it is certain that NATO's southern defensive line would cease to exist.

Thus, one of the major concerns of AFSOUTH is the protection of its lines of communication against air attack, which takes second place only to air defense of its territories. Because of the geographical location of the three nations to be defended, airpower is vital as a deterrent and must include the ability for quick retaliation in the event of hostilities.

To carry out its defense mission on land, AFSOUTH will have, under wartime condition, thirty-three divisions and twenty-two brigades, which, brought up to strength, would number about 1,000,000 men. In peacetime, 500,000 men are immediately available. There are no large US Army units stationed in the region. Smaller US outfits handling nuclear weapons are attached to LANDSOUTH.

The combat value of the available troops unfortunately is lowered by their partly obsolete equipment. For instance, hand-me-down tanks from Germany are used in Turkey and Greece—tanks that are no match

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The Mediterranean throughout history has provided a natural avenue for military expansionism—from the establishment of Greek colonies in Africa to Rommel's campaign against British forces there. In light of this, it has appropriately been dubbed the "soft underbelly" of "Fortress Europa," terms that once again are sounding ominous.

for the combat vehicles used by the Soviets and their satellites. The Turkish Army still uses bolt-operated rifles and machine guns of early WW II vintage in some units. These weapons certainly cannot compare with the accuracy and firepower of the much more modern AK-47 automatic, the standard rifle of the East. It is recognized, however, that the NATO forces are very well trained, have excellent officers, and that their morale is high. There is, for instance, no room for doubt about the combat quality of the Turkish soldier, who gained everlasting fame for his army during the Korean conflict.

In addition to being outgunned by the Reds, AFSOUTH has to face numerically superior ground forces as well. No confirmed figures are available, but most sources give the total manpower strength of the USSR and its allies in the region as 1,500,000 men.

Balance of Power in the Air

In the air, the balance of power also favors the East. AIRSOUTH has to carry out operations over approximately 450,000 square miles of land and also has to cover the vital sea-lanes. For this task, fifty-four squadrons are available, comprising strike, interceptor, reconnaissance, transport, and long-range maritime surveillance units. To this number the USAF contributes six squadrons; the others are Italian, Turkish, Greek, and British. General Dean, Commander in Chief, AIRSOUTH, told this writer that his forces are outnumbered four to one, in addition to being handicapped by obsolescent and obsolete equipment. The air forces of the three nations still use aged F-84s, F-86s, C-54s, and C-47 Gooney Birds. The fighters, especially, are no match for more modern Soviet-built jets—even for the MIG-17, itself a vintage aircraft. One fighter squadron commander in the field gave an even bleaker picture of his sector. He said cheerfully, "Here I am, outnumbered eleven to one, but my men are better—we will reduce [the enemy's] advantage."

In order to keep full control of the air and to retain the effectiveness of AFSOUTH, it is absolutely mandatory that more modern aircraft be introduced into the three air forces. Great strides toward this goal have been made in Greece and Italy during the past years. The latter is replacing its F-86Ks with advanced F-104 Starfighters, and the attack squadrons are being re-equipped with the twinjet Fiat G.91Y. Greece has several squadrons of F-104Gs and F-5s, and took delivery recently of an undisclosed number of F-102s. This aircraft will give the nation a better all-weather intercept capability. The strained finances of Turkey preclude at the moment an extended reequipment program for its armed forces. The air force, however, is reasonably modern. About half of the force is equipped

Commanding AIRSOUTH is USAF Gen. Fred M. Dean, with headquarters at Bagnoli, Italy. Other top area commanders are Italian Lt. Gen. Francisco Sforza, Commander of the Fifth Tactical Air Force in Italy (left), and USAF Lt. Gen. Joseph H. Moore (right), Commander of the Sixth Tactical Air Force, set to defend approaches to Turkey and Greece.

with F-104s, F-5s, and F-100s; the rest consists of F-84F fighters.

At sea, AFSOUTH's defense rests on the mobile striking power and the deterrent effect of the US Sixth Fleet, the relatively small but very modern Italian navy, and the Greek and Turkish navies whose surface combat value is limited by the overage ships in service. The Sixth Fleet is without doubt the backbone of AFSOUTH's mission. At present, the fleet consists of three attack carriers, an undisclosed number of Polaris submarines, and the necessary screening and supporting elements. This force, which can put about 200 fighters in the air, naturally is not designed to be used for standard air defense missions. It is a mobile power center, which can be shifted quickly from one trouble spot to the other where it can gain temporary air superiority, carry out long-range nuclear or conventional strike missions, and execute and support amphibious assaults. In addition to these capabilities, it is fully self-supporting and able to defend itself. AFSOUTH plans its use as a fire-brigade-type force that can be shifted quickly to any critical point along the defense line.

The navies of the other three NATO allies are designed primarily for coastal protection and mine and antisubmarine warfare. They are utilized to protect the communication routes, which frees the Sixth Fleet from such duties so that full advantage may be taken of its high mobility and striking power.

Defense Posture of AFSOUTH

Under these premises, the defensive posture of AFSOUTH has been quite formidable during the past nineteen years. In spite of all the drawbacks incurred by the obsolescent equipment of the armed forces of Italy, Turkey, and Greece, an effective defense was possible. But this picture has changed drastically since the Arab-Israeli War in 1967. Today AFSOUTH is in dire danger of being outflanked, and some experts have come to the conclusion that this has already taken place.

The East bloc recognized early that the defenses of AFSOUTH on the land fronts to the north and east were difficult to breach. These defensive positions, in turn, are in Russian eyes excellent bases for an attack on the Soviet Union proper and pose serious problems for its defense planning. This is the basic reason for the political activity of the USSR in the Mediterranean. Since the NATO line could not be undermined directly, it had to be outflanked. To do that, the USSR needed bases and support on the North African littoral.

The Arab-Israeli conflict provided the leverage to take a hand in the affairs of the African and Middle Eastern nations. This activity was facilitated by the US preoccupation with Indochina, which during the past years gave the USSR almost unopposed freedom of action in the Med. The voices of NATO's leaders, warning about the impending problems, were not heeded. Neither in the United States nor in Europe was preventive action taken to halt the Russian advances.

In the past three years, every flare-up of hostilities or political upheaval in the region benefited the USSR and brought it closer to its goal of gaining a foothold in North Africa. All the past events are obviously the result of a well-conceived and well-executed plan. The Soviet activity centered on the exploitation of tensions created by the defeat of the Arabs in 1967. All moves, such as giving aid and comfort to the Arabs, the condemnation of Israel worldwide, and the introduction of Soviet troops and aircraft in Egypt, are primarily designed to change the political climate—and thereby the military climate as well—south of AFSOUTH's defense line.

Israel and its fate are apparently of secondary importance in Soviet planning; its plight is used only to further the Russian goal. For this reason, Russia places a restraining hand on Arab intentions to renew the war. A general conflict would call the full force of the US into the Med, a factor that would upset and possibly ruin basic Soviet planning. As soon as the North African littoral is firmly under Soviet control, AFSOUTH would have a vastly more difficult defensive task to perform. The manpower and equipment demands needed to set up a new defense line against the south might even overtax the resources of the allies. In addition, Israel would be almost completely isolated and eventually be forced to come to terms with Russia and its Arab friends.

Greek Air Force mechanics work on a dismantled F-104 in an example of nose-to-tail aircraft maintenance. In all, the Greek Air Force has at its disposal about 200 combat aircraft, most outclassed by the modern aircraft of today.

Threat to the Southern Flank

Today the situation on AFSOUTH's southern flank is already serious. Syria and Egypt are completely dependent on the USSR. Libya has broken its friendly ties with the West, and when, in June of this year, the last US airmen left Wheelus AB, a twenty-five-year-old friendship came to an abrupt end. Libya now supports the USSR. Tunisia remained neutral, but neigh-

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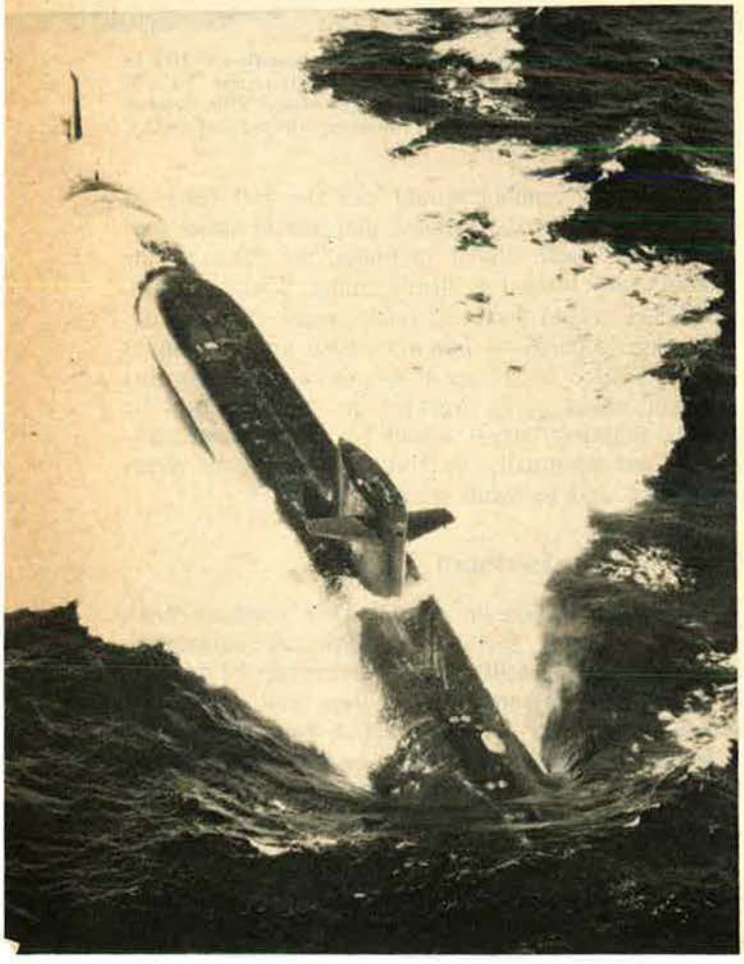
Resting at anchor in the Mediterranean, the Soviet helicopter carrier *Moskva* (above) reveals its sleek, modern lines. Her potent foe, a USN nuclear submarine (below), cuts a wide swath during a surface run while on patrol. It is feared that with Soviet penetration of the Middle East, the strike potential of the Sixth Fleet is eroding.



boring Algeria, with its vast land mass and coastline, is decidedly pro-USSR. Algeria can boast some of the best harbors and maintenance facilities in the Med. The French-built harbor of Mers-el-Kebir is the most modern in Africa. Algeria is still kept out of the Soviet orbit by its dependence on close economic ties with France.

Morocco remains neutral, but it may be forced to change its attitude. It needs outside help to obtain valuable enclaves held by Spain in its territory. Though Spain has been in possession of its North African colonies since the late 1400s, Morocco now wants them. The necessary moral and political support for this annexation is not likely to originate in the West, which needs a friendly and cooperative Spain in its defensive line against the south. Thus, Morocco has to turn to the USSR for help to put pressure on Spain. The Soviets might do it . . . for a good price.

Even if Tunisia and Morocco do not fall into the Soviet orbit, which is, in any event, unlikely in the near future, the military situation for AFSOUTH is critical enough. The alliance is faced on its southern flank by an almost uninterrupted line of territory, which, in time of tension, would most likely open its military facilities to the USSR and its allies.

Today, Soviet-manned aircraft, radar, and missiles are operational in Egypt. The same can be assumed, at a lesser scale, for Syria. Algeria is the recipient of massive Soviet arms aid. It is a certainty that all Algerian military airfields are equipped and ready to service and support Soviet AF aircraft. Libya will, without any doubt, equip its major airports with Soviet ground-support equipment, giving the USSR the potential of utilizing the facilities. According to AIRSOUTH, almost 100 airfields along the North African littoral are open to Soviet combat aircraft.

These land-based air forces would seriously jeopardize AFSOUTH's sea-bound lines of communication. Admiral Rivero, NATO's CINCSOUTH, told this writer: "The installation of substantial tactical air forces in North Africa, and particularly in the western littoral, would create a very serious threat, which does not exist now, against our lines of communication. It is really a potential threat to be concerned about."

Another new factor introduced into the Mediterranean power play by the USSR after the Arab defeat in 1967 is the "Eskadra," the Soviet Mediterranean fleet. Much has been written about it, and its military value has been widely discussed. Admiral Rivero, the NATO man most concerned with this fleet, explained: "I think that [the Eskadra] is an important threat. It is something which was not here before and now must be guarded against. We must be prepared against a surprise attack by it, so it creates new problems. It is a threat but we should be able to handle it with the resources we have, because we have air superiority [over the sea] and as long as we have that, the surface forces on the other side cannot survive for long. However, that means we have to devote our airpower assets to a threat that we did not have to face before. . . . The Eskadra is a threat against naval forces that do not have air cover, so we must provide it or handle our forces so that they can have air cover."

In view of the possibility that the Soviet Air Force can operate from bases in North Africa, the Eskadra

A Greek Air Force pilot climbs into the cockpit of his F-102 to prepare for a mission. The Greek armed forces, reliable and highly trained, are considered a major asset for AFSOUTH's defensive mission.

would have air cover over a large sector of the Med, and it would be a very dangerous weapon as long as it operated under the umbrella of this land-based airpower. Its major weapons are the short- to medium-range ship-to-ship missiles against which a defense is difficult, as the sinking of the Israeli destroyer *Elath* by such missiles demonstrated.

The Eskadra finds safe and well-protected harbors in Egypt and Syria. It has not been clearly established whether or not elements of the fleet are using Algerian harbors as well. This does not seem necessary, however, because, if the ships are in the western Med, they are usually replenished at sea. The Algerian harbors are used mainly by the fast missile-armed patrol boats of the *Komar* and *Osa* class. Algeria owns eight of these boats, but the Eskadra may have stationed some of its own vessels in Algerian waters.

Slow But Sure Erosion

This general situation report shows that the defensive posture of AFSOUTH is slowly but surely being eroded by the Soviet efforts, and that the value of the Sixth Fleet as a supporting element for the defense on the land fronts toward the north and east is diminishing. The altered situation on the North African littoral and the appearance of the Eskadra demand a power shift which, due to the limited resources of the allies, must weaken the original defense positions. Today AFSOUTH must be on guard toward the north and east in Italy and Turkey, to the north in Greece, and, as a precautionary measure, all along the imaginary sea frontier, against a threat from the south. This defensive line leans on the Mediterranean islands of Malta, Sicily, and Sardinia.

Unfortunately, the West's defense against this new threat from the south can by no means be called monolithic. Spain, which should be the true cornerstone of NATO in the western Med, is not a member of the organization. It has a bilateral treaty with the US from which it will, in compensation for the use of military bases by US forces, receive arms to modernize its military forces. But it does not participate in the defense efforts of AFSOUTH.

Admiral Rivero commented that: "It would be of great value if air forces based in Spain or the Balearic Islands were available to counter the threat from the south, which might develop. From Sardinia east, we can route our lines of communication so that they can always be within the area of protection of our land-based air forces, whereas, west of the islands, we have no such option; they must go within range of airpower from the North African coast."

France does not participate militarily in NATO although AFSOUTH hopes that it can count on French help in times of crisis.

Malta, the strategically located island republic, is not a member of NATO. Malta tried several times to join the organization but was turned down. Nobody wants to take the blame for this shortsighted decision now, but most probably economic reasons were the cause. Malta, as a NATO member, could have asked for work for its shipyards, which now are largely idle. Giving work to Malta would have reduced the work of the other NATO nations' shipyards. However, airfields on Malta are used by AIRSOUTH, and NAVSOUTH is based on the islands. The Soviets are trying to undermine the West's position on Malta, which finds itself in dire economic trouble. Maintaining and repairing Soviet ships would pump new lifeblood into its economy. The speaker of the leftist Labour party of Malta, Albert V. Hyzler, said in the Parliament: "We could not care less who lets us earn money. It can be the Russians."

Italy's defensive posture is jeopardized by its internal instability caused by Communist-inspired activities. Nothing demonstrates the difficulties Italy finds itself in better than the fact that, in the past twenty-five years, the nation has had a succession of thirty-one governments. It is understandable that, under such conditions, no firm, long-range defense policy could be developed.

The most solid point in the picture is supplied by

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Taking their job seriously, troopers of the US Army's 82d Airborne Division keep their heads down in a training exercise in Greece and Turkey earlier this year. Joint allied exercises are conducted on an annual basis.

Greece. It is highly unlikely that the nation will ever waver in its decision to stay within NATO. The Greek armed forces are a valuable asset for AFSOUTH's defensive mission. They are highly trained, reliable, and, as soon as the new equipment, which the US promised after lifting the arms embargo this summer, begins to arrive, they will be ready to face any threat from the north.

Turkey is a firm ally of NATO and its troops are of high quality. But its government has to steer a difficult course between common sense and public sentiment, which is largely anti-American as well as anti-Russian. The government in Ankara knows that Turkey cannot survive as a neutral nation. Its geographic location, which puts it in command of the Bosporus—the only route from the Black Sea into the Med—is too important for both East and West. One or the other will want to be in command of this vital channel. Turkey cast its lot with NATO because by culture and inclination it always tended toward the West. On the other hand, it does not dare to antagonize its powerful eastern neighbor. This leads to such seemingly schizophrenic acts as allowing Soviet combat aircraft on the way to the Middle East to refuel on Turkish airfields.

Economic and Political Counteroffensive

AFSOUTH is not in serious trouble yet, but it will be in an impossible military situation if nothing conclusive is done about stopping the Soviet advances on the North African littoral. Measures have to be taken to regain the already-lost positions, such as Libya and Algeria, and to strengthen the resolve of Tunisia and Morocco to stay in the neutral category.

This cannot be done by military means. It is up to European economic might to do something for the defense of the continent. The counteroffensive has to be economic and political. For instance, the EEC (European Economic Community), which operates so successfully in central Europe, could be extended into the Mediterranean region. A membership in this organization would give the economies of the North African nations a tremendous boost and create a political climate that would preclude any moves to escape from the economic dilemma, with the help of military alliances. Such an initiative would cost the Europeans dearly, but the cost would be less than that of building a new military shield on the southern flank of NATO.

Tunisia's Foreign Minister, Mohammed Masmoudi, explained recently: "Stability in the Med is not a matter of calling on the Russians and Americans to leave the region, but one of calling on Europe to make its presence felt in an effective, farsighted, and exemplary fashion."

However, judging by past European attempts at unified actions involving their national finances, the possibility of a joint economic effort in the Med seems remote. Thus, the defense of Europe will continue to rest on the military shoulders of NATO. That this organization and AFSOUTH mean to maintain their positions in the Med was confirmed recently by Vice Adm. Isaac C. Kidd, USN, Commander of the Sixth Fleet: "Some pundits have suggested we might be forced to leave the Mediterranean. Let me here and now, in temperance but in unquestionable terms, disclaim any such thoughts. We are here to stay."—END

A Turkish soldier, sun glinting on his field glasses, makes contact with his unit commander on a hand-held radio, during a break in a realistic field-training exercise.

MEET THE NEW LEADER IN THE LIVELY ART OF DRONE ELECTRONICS.

The most dramatic and far-reaching development in the history of drone control is now under way at Motorola's Government Electronic Division. It is called ITCS (Integrated Target Control System) and officially designated AN/USW-3 (V). ■ It is a tri-service procurement of an integrated target control system designed to meet the needs of all the services well into the '80's. ■ ITCS can handle both subsonic and supersonic targets, multiple targets, all attitude maneuvering targets, and targets in formation. It has a range of 250 NM which can be extended to 400 NM through the use of an airborne relay. It can control any type of tactical drone, be it winged, wheeled, hulled or tracked. ■ ITCS has the capability required to include a vector miss distance scoring system. It can be used as a lightweight, low-cost, bomb scoring or radar bombing system. ■ ITCS is comprised of a family of eight different control stations, each compatible with the single compact vehicle subsystem. ■ ITCS, or a portion of it, may meet your unique range or tactical requirement.

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The future of both the space agency and the space program hangs on the NASA shuttle program. Without the shuttle and the revolution in spaceflight that it would effect, a "Volkswagenization" of space operation would probably result . . .

The Future of the Space Program . . .

Riding on the Reusable Shuttle

By William Leavitt

SENIOR EDITOR/SCIENCE AND EDUCATION

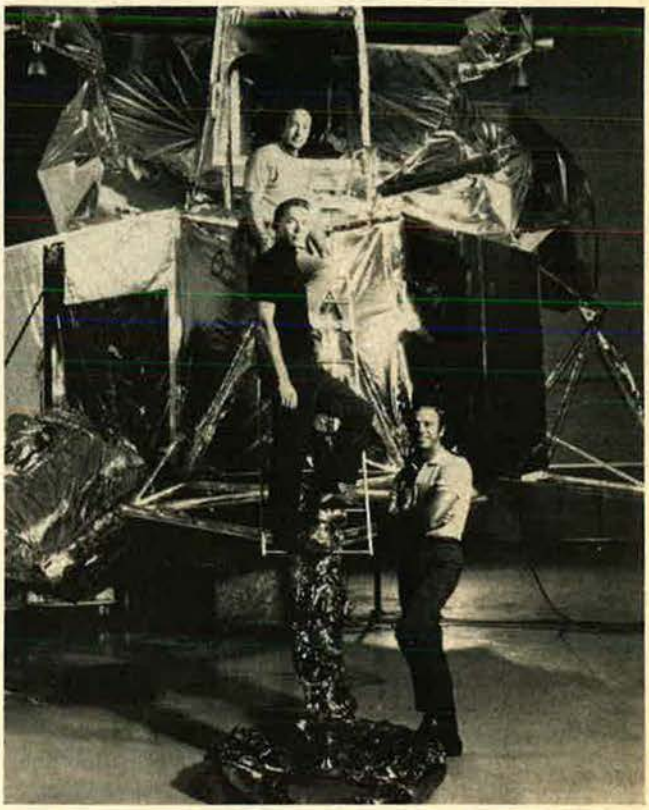
"WE'RE gambling everything on the shuttle. If that goes down the drain, then NASA will go back to being something like what it was in the old NACA days."

With those words, a knowledgeable space-agency official a few weeks ago summarized the current crisis of the national space program. He was saying that, unless the Administration, the Congress, and the country back the National Aeronautics and Space Administration's plan to develop its projected manned space-transporter system, the reusable space shuttle, then sooner or later the US space agency will wither on what was once so rich a vine.

The natural consequence would then be a reduction, over some years, of NASA's role to that of a research-and-development agency, more or less along the lines of its predecessor, the old National Advisory Committee for Aeronautics. The effects of rejecting the shuttle would first be felt, he said, in the manned-spaceflight area. But they would spread eventually to the unmanned applications and even the scientific-satellite enterprises. There would be little for NASA to do in space that other government "user agencies" couldn't do. User agencies interested in launching applications satellites could contract directly with industry for services. Scientific institutions that wanted to lob an occasional payload into the void could do the same thing. Space technology would still be useful, of course, particularly in the applications field. But the technology would get locked into place and lose its forward thrust. We would have a kind of "Volkswagenization" of space technology. Generally, the same sort of hardware would be used year after year, with only a few improvements as time went by. Particularly, the technology of space transportation would get frozen.

How is it that the future not only of the space agency but also, implicitly, the future of the entire civil space program, hangs on the fate of a program which is at the moment only funded for studies?

The answer is that the reusable shuttle represents a truly revolutionary advance in space technology. Once operational, it will eliminate the need for costly, expendable boosters for manned orbital operations and transform such operations, eventually, to nearly a rou-



There'll be a long hiatus in US manned spaceflight between the planned January 1971 Apollo-14 flight to the moon and the 1972 deployment of the manned Skylab experimental space station. Above, Apollo-14's prime crew members at Cape Kennedy, Fla. From foreground, Alan Shepard, commander; Stuart Roosa, command-module pilot, Edgar Mitchell, lunar-module pilot. Trio posed with lunar module.

tine and much cheaper endeavor than manned spaceflight has been up to now. (Shuttle operations won't be totally routine, as will be seen in the accompanying article, by Irving Stone, on the intricacies of shuttle-flying requirements; see page 62.)

The shuttle is an integral and indispensable part of NASA's complex post-Apollo earth-orbital program. The program includes deployment of a long-term, multipurpose, manned space station and a space "tug" that would be used to ferry crews and payloads from orbit to orbit.

Without the shuttle, the rest of NASA's post-Apollo program for the 1970s and 1980s doesn't make too much sense. This is true because, in order to make a multipurpose, long-term, large-crew, manned space station worthwhile, the station has to be easily and economically accessible so that scientists and technologists performing missions and experiments on board can get there, do their jobs, and return to earth on a regular basis. The shuttle is equally significant to the space-tug concept in the sense that the space station would be the main jumping-off point for orbit-to-orbit transfers. Thus, to make both the space station and orbit-to-orbit transfers viable, the earth-to-orbit shuttle is vital.

The *logical* arguments for going ahead with the shuttle are clear. But logic does not rule politics, and the politics of the day endanger the shuttle and with it the whole future of the US space effort. Except for people intimately involved in or affected by the space endeavor, and the small band of congressmen who don't want to see the huge investment of the past several years go down the drain—an investment that culminated in the Apollo-11 moon landing in 1969—very few people these days seem to care about the fate of an enterprise that so recently captured the imagination of the nation and the world. Indeed, the negative attitude has long since expanded to scapegoating.

Many people concerned with "national priorities" are still complaining about the money that has gone into space, money they insist should have gone for social-welfare programs on earth. No amount of argument will persuade these critics that (1) the space money would not necessarily have been voted by Congress for social programs, and that (2) there *has* been an important social yield, not only in terms of scientific knowledge but also in jobs and wealth on earth as a consequence of the space buildup of the past decade.

But politics is a reality. And as always, it is packed with ironies. For one thing, that segment of the politically liberal community that has for years been attacking the space program has, unconsciously, combined with the budgeteering conservatives who are perennially hung up on the issue of "government spending." The unanointed leader of this unlikely alliance is the President. In his efforts to combat the inflationary spiral set off, not by the space program but by the Vietnam War, which he inherited, he has adopted a meat-ax approach across the research-and-development board. A principal casualty of Mr. Nixon's policies has been the space program. There is what some people are calling a depression in the aerospace industry. Unbelievably, in what we've gotten used to dubbing the affluent society, a new class of poor people is being created, jobless aerospace technologists and managers. They are hurting badly, an increasing number of them unable to find new jobs in fields where they can put their technical experience to work. This is written before the off-year elections of 1970, and it is hard to know how much of a protest vote will materialize on this issue.

The vicinity of the Fra Mauro crater area of the moon is where the Apollo-14 is expected to land—a replay of the targeting of the aborted Apollo-13 mission. The Apollo-14 crewmen, if all goes well, will bring back lunar-matter specimens that scientists believe could provide important information on the history of the moon, earth, and solar system.

Europe's Interest

But there are further ironies. Just at the point when support for space seems weakest, the NASA space-station/shuttle/tug program for the 1970s offers a major opportunity, the first real opportunity, for American-European cooperation in advanced space development. The Europeans, after years of arguing among themselves about how best to develop European space capabilities, seem determined to overcome the nationalism that has beset their efforts. They hope to create a multinational European "NASA," and they appear to be seriously interested in participating in the NASA program for the future. At present, British participation is, unfortunately, being withheld.

Final decisions rest, of course, not with European space-industry and scientific-ministry officials, but rather with the European governments themselves. In those quarters, unfortunately, there is hesitation, as illustrated by the recent report of House space committee member, Rep. Joseph Karth, Democrat of

(Continued on following page)

Minnesota. The Congressman attended a recent round of European meetings on the subject of US-European space cooperation and came back with a negative feeling.

"The heart of the problem," he reported in late October, "is the lukewarm or even cool support for major European involvement in space, on the part of the various peoples and political leaders not directly involved with science and technology." He reported that, at a meeting held in Switzerland, government and business people impressed on him that "the same tough competition for limited resources is taking place in Europe as in the United States." He also cited what he felt was a feeling among the Europeans that the US "would stand a major portion of the costs even though [the Europeans] did the work."

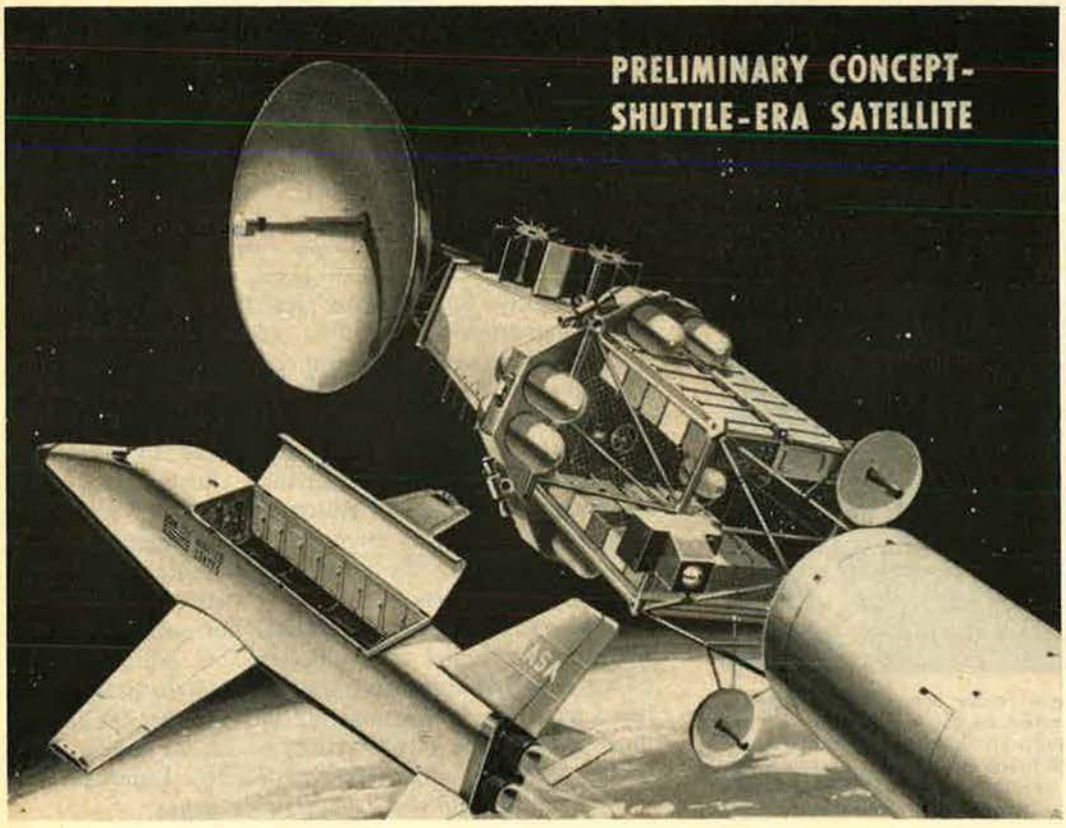
Also, according to Congressman Karth, "after listening to papers and discussions . . . it is apparent . . . that the Europeans are divided over a quite fundamental issue: the basic approach to be followed with respect to the nature of their involvement." Some Europeans lean toward direct involvement in the development of the shuttle itself, while others prefer working on a "visibly" European project, that is, a space tug, which would be designed and developed as a *European* vehicle compatible with the main shuttle craft. NASA's space-station/shuttle-program people seem to favor this latter approach.

Soviet Cooperation

Just to complicate matters further, beyond the tantalizing prospects for European-American space cooperation, there is a slight glimmering of hope that the Soviets might be persuaded to work with us. As this was written, US and Russian space officials had just completed a round of talks in Moscow on what were described as explorations of ways American and Soviet manned spacecraft might be standardized so that US astronauts and Soviet cosmonauts might be able to rendezvous in earth orbit. There were other subjects to be eventually discussed: prospects for a truly international space station and possible coordination of the two countries' unmanned scientific space missions. This is the first time official conversations of this kind have taken place. What will come out of them is, of course, impossible to predict. Past history of attempts at cooperation between the Soviets and us is pretty dismal. But there is always the hope that, if both sides can get something out of an agreement, things could happen that have previously been considered unlikely, although feasible. Political science fiction can come true.

Against this muddy background, NASA is doing what it can to proceed with its post-Apollo program, the first stage of which is the already-funded Skylab program. As noted at the outset, there is considerable gloom at the space agency, and a growing realization, perhaps long overdue, that the kind of public support that bolstered the Apollo program is simply not forthcoming as once it was. That lack of support has been bemoaned by NASA officials all along the line, including Acting Administrator Dr. George Low.

While Dr. Low and the agency sweat out the shuttle funding, NASA is proceeding with the Skylab experimental space station, which is expected to be launched for its first mission in 1972, many months after the 1971 Apollo-14 flight to the moon. Although there



This is one of the many artists' conceptions of the reusable, manned space shuttle. It shows how the shuttle could bring cargo and crew up to a large, manned space station, bring people and materials back to earth, and generally serve as a major factor in cutting the enormous costs of launching and payloads—problems that must be overcome if space operations are to be "routinized."

Dr. George Low, Acting Administrator of NASA since the departure of former NASA chief Dr. Thomas O. Paine, has publicly bemoaned lack of support for NASA post-Apollo programs. Dr. Low is a potential candidate to become NASA head in his own right.

Charles W. Mathews, who heads NASA's Skylab space-station/shuttle effort, acknowledges current political-fiscal troubles of NASA. But he is confident that the national leadership will give the green light. Not to do so will cost more in the end, he says.

is little that can be done about it under the present circumstances, NASA manned-spaceflight people are obviously disquieted by the long gap between these two manned space missions. As Charles W. Mathews, NASA's space-station task-force director, puts it, such a long gap doesn't help to keep that "high level of tuning of your people as to motivation." But the Skylab program is quite "stable," according to Mr. Mathews, his way of saying that it is moving along well technically and has the money it needs. The ballpark figure for the cost is about $2 billion, and, although it will provide good experience in manned orbital operations for periods up to fifty-six days, it has limitations because it is based on Saturn-Apollo-type hardware. It certainly is not in any way a permanent space station.

That takes the matter right back to the shuttle. In Mr. Mathew's view, the shuttle is essential because it will be the key to economy in manned spaceflight as well as a way to meld the best of manned- and unmanned-spaceflight operations and purposes. Up to now, the costs of both endeavors have been too high. As he puts it: Expendable boosters and payloads were the expedients in a period when there was no other way to get into space. But, with the reusable shuttle, there is a new, cheaper, and more efficient way to get into space. Therefore, "we feel it's important to go ahead [with the] shuttle [because] if we don't . . . we're just prolonging the approach to economical operations [and it will] end up costing us more." If the shuttle is scuttled or delayed, he suggests, the only course, as noted earlier, will be to use the present, obsolescent, booster-payload technology that is simply too expensive.

Savings in Payloads

Mr. Mathews points out that, while there's been a lot of emphasis on the savings in launch costs available from the shuttle, not enough people recognize savings that could be realized in terms of payloads. The shuttle would have a "bring-home-the-payload" capability, for one thing, a factor that would reduce the enormous reliability requirements of the present day, that add so much to the costs of payloads. Nowadays, when you're putting up a payload that's got to stay up there, you have to spend more than you really want to, to ensure that it will work properly for a long time. Also, the shuttle could be used as a kind of "common carrier," transporting *several* unmanned payloads into orbit at the same time.

Mr. Mathews, while he is realistic about the present political mood, says that he is not pessimistic. He believes that the decision-makers will not drop the shuttle but that the question is, rather, one of the level of effort that will be funded.

As to the space station toward which the Skylab will lead, that, too, is tied up with the shuttle's future. again for plainly economic reasons. To make a large, manned space station economically viable for many users, he points out, it will be necessary to maintain a large volume of business. The shuttle is vital, he says, to provide the transportation for the many kinds of people who would perform a wide range of scientific and technological missions aboard the craft, as well as providing the logistical support. The kind of space station he is talking about would accommodate a crew of at least a dozen and would be designed for at least a ten-year operational life.

He says the lead time for such a program would not be very long and that it could be operational in the late 1970s. Although it is important in terms of transport to the high synchronous orbits, the orbit-to-orbit tug could wait a bit, if choices had to be made. The shuttle would be able to operate up to about 800 miles out in space.

The arguments are persuasive. If, at long last, the nation is to have a space program geared to economic payoff and benefits to the earthbound, then the kind of hardware needed ought to be funded. In view of the other pressing problems facing the country, space is not automatically entitled to first priority, but it would be a sad waste of all that's gone before—and some of what's gone before was undoubtedly, and unfortunately, international show business—if the Administration and Congress let the space program wither, just when it could really begin to pay for itself and more.—END

LETTER FROM LOS ANGELES

By Irving Stone
AIR FORCE MAGAZINE WEST COAST EDITOR

Gentry on Reentry

The NASA space-station/shuttle program will draw heavily on Apollo experience, but the gap between this know-how and the experience required for the operation of such new systems will involve the development of many tiers of technology. Safe reentry, approach, and landing capability for the shuttle will be critically important.

In this connection, a pointed analysis of the resu'ts of the joint Air Force/NASA lifting-body program as they apply to the space shuttle was presented by USAF Maj. Jerauld R. Gentry at the recent Fourteenth Annual Meeting in Beverly Hills, Calif., of the Society of Experimental Test Pilots (SETP).

Although the Air Force and NASA have formed a joint liaison group to plan and review the NASA space shuttle's development phase, Major Gentry stressed that his comments were strictly his own and did not necessarily represent those of the Defense Department. Major Gentry is considered the most experienced lifting-body pilot in the Air Force. He is USAF's chief test pilot in the joint Air Force/NASA lifting-body effort at Edwards AFB, Calif. The program uses the USAF Martin X-24A vehicle—newer and more sophisticated than NASA's earlier Northrop M-2 and HL-10 lifting bodies. Major Gentry has flown twelve missions in the X-24A, eight in the HL-10, and five in the M-2. His opinions merit close attention.

Some of the proposed shuttle configurations resemble the lifting bodies that have been under test at Edwards AFB, Major Gentry pointed out. Generally, the high-cross-range orbiter configurations, he said, have higher hypersonic lift/drag (L/D) ratios than the lifting bodies, and all booster and orbiter configurations have increased L/D at subsonic speeds.

Learning from Lifting Body

NASA and Air Force personnel, especially at Edwards, have long been interested in the concept of flying back from orbit. Both groups participated in the old Dyna-Soar (X-20) program, and, of course, the X-15 was routinely flown back to unpowered landings from near-orbital altitudes. "It was quite logical," Major Gentry said, "to further investigate the lifting-entry concept. The advent of the space-shuttle program further increased our interest. We looked closely at test results of our program, to see what data would be applicable, what stumbling blocks we had encountered that could be avoided, and what testing could be accomplished that would be of value to the shuttle program. Not surprisingly, we found considerable information that we feel is pertinent to the aerodynamic and operational considerations for the shuttle."

A major decision yet to be made is whether or not the first shuttle orbiter is to have a hypersonic maneuvering capability in order to achieve a substantial aerodynamic cross-range, Major Gentry said. The high cross-range orbiter offers many advantages, particularly not having to wait for a proper orbit and explicit time to recover a low-cross-range vehicle at a preselected site. Also, the high-cross-range orbiter would be able to vary the down-range landing site by as much as 500 or more miles and thus would be less affected by errors in deorbit time, terminal energy-management system errors, or errors in predicted lift/drag ratios, Major Gentry said.

"Our lifting-body experience," he said, indicates "that seemingly unconventional high-cross-range configurations are practical and should have acceptable low-speed stability and control characteristics. State-of-the-art control systems can ensure good handling qualities over the entire flight envelope if the vehicle has reasonable aerodynamics."

This does not mean, he pointed out, that the lifting-body flight-test program has been without problems, but, from a test pilot's point of view, these problems and their solutions indicate the desirability of small-scale (one-third or less) flight testing of the shuttle configuration. The low-supersonic and transonic flight characteristics of these vehicles are generally the most critical and, unfortunately, the least well predicted, according to Major Gentry. It is in both these and the subsonic regions that maximum maneuvering occurs, he said. Hence, this is where the aerodynamic control system is defined. If such a subscale vehicle could be flown successfully from, at least, transonic speeds to landing, there would be considerably more confidence in the configuration for minimum cost and effort.

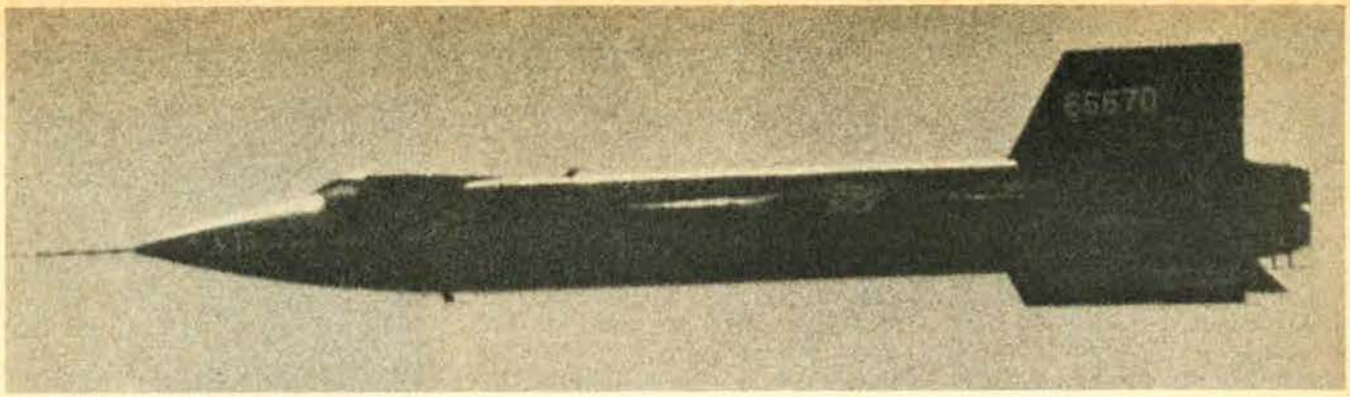
In a full-scale prototype effort as proposed for the shuttle, design and construction costs alone could become prohibitive if configuration changes were required at a later date. It is also unlikely that any black-box control system can compensate for basic vehicle deficiencies, Major Gentry said. The job of making this type of vehicle flyable is greatly simplified if the vehicle has directional stability, good roll power, and very small yaw due to aileron deflection, he added. Major Gentry urges that every effort be made to achieve these characteristics.

Air-Breathing Engines?

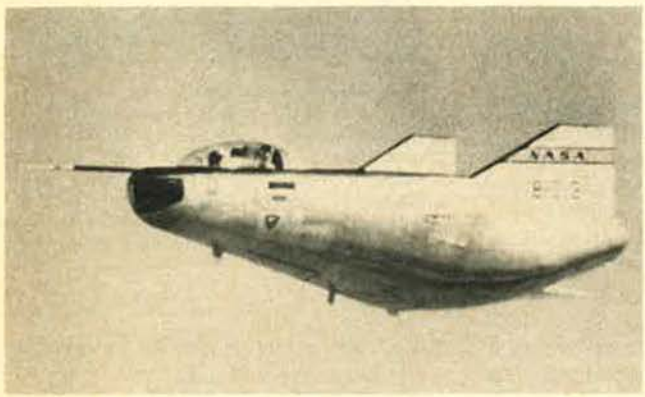
The USAF test pilot believes that another major consideration is whether the shuttle should have air-breathing engines for subsonic flight. Including such engines involves considerable weight and size trade offs as well as problems of reliability because of systems complexity. Aerodynamic considerations could also pose problems. In Major Gentry's words: "We have found that the lifting bodies are quite sensitive to flow separation over the upper aft portion of the vehicle." Careful tailoring of the thin leading-edge contours, as well as special attention to the forebody shape, has been necessary to achieve satisfactory flow conditions in the low Mach number range (below 0.6).

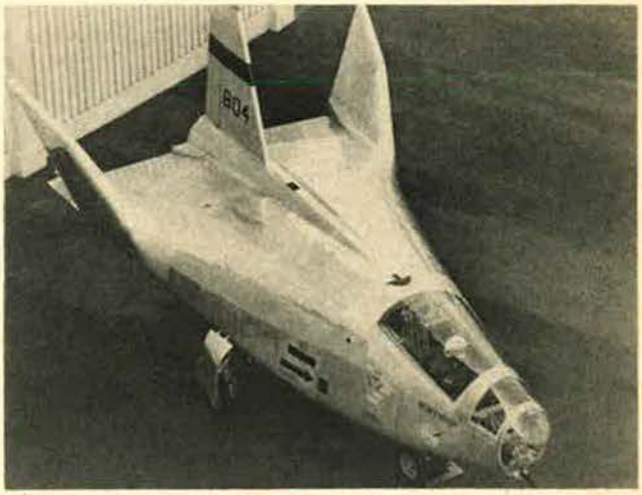
"I am especially curious about what L/D, flow, and trim changes would result when engines are extended, or, more importantly, what might happen if one of them did not extend," Major Gentry observed.

It has been demonstrated in seventy-two flights that lifting bodies with *significantly less* subsonic L/D (four maximum vs. six to eight) than the shuttle candidates can be controlled and maneuvered to a precise landing



Above is USAF's X-15 research vehicle; below and right, respectively, are the M2-F2 and HL-10 lifting bodies.





on a runway without landing engines, Major Gentry declared. "Many of us at Edwards feel that the requirement for the orbiter to have landing engines may be neither practical nor necessary. We also feel that the cruise- and landing-engine requirement for the booster could probably be eliminated by judicious selection of launch and recovery sites. These feelings have not been looked upon with much favor, sympathy, or credibility," he declared.

Critics have contended, he said, that, although unpowered, relatively steep, high-speed approaches may be satisfactory for Visual Flight Rules (VFR) conditions on a fifteen-mile lake bed with experienced test pilots, these techniques are not applicable to night or weather conditions on standard-length runways with less skilled pilots flying large-size vehicles. But Major Gentry's response to this argument was that the criticism had "forced us to prove our contention and reaffirm our own belief that unpowered approaches and landings can be flown under most any reasonable condition."

One aspect of lifting-body operation that seems to arouse special interest, and even cause alarm, is the relatively steep, unpowered landing approach. Lifting-body approach-and-landing procedures are to a certain extent carry-overs from the X-15 program. Because the flights are of short duration, the pilot is usually busy with data acquisition until entering a high downwind or low-key position at approximately 20,000 feet. From this point, an approach of 180 degrees is flown to landing. Energy management is accomplished by flight-path maneuvering, airspeed modulation, or speed-brake deflection.

Designers, engineers, and even some pilots often fail to appreciate the advantages of the steep, unpowered approach until they have been fully apprised of its benefits, Major Gentry said. "I believe that a high-energy approach is more accurate, safer, and actually less critical than most low-energy approaches. With a dive-bombing task, for example, we know that the steeper the dive angle, the greater is the accuracy. Our approach task poses basically the same problem. We want to position the vehicle on a flight path or dive angle to intercept a pre-flare aim point on the ground. This task is minimized by using a relatively steep approach of ten to twenty-five degrees," he said.

This pattern is just a means of establishing the vehicle on this flight path. Because, normally, flight is well on the high speed or front side of the L/D curve, it is never planned to be, and seldom is, short of energy. This energy is modulated to arrive on the desired flight path either by slowing or accelerating. Or the vehicle can remain at approximately the same speed and use speed brakes to alter the flight path as required. "I cannot emphasize too much the need for speed brakes or some similar management device. Speed brakes can be used much like engines to vary the landing-pattern parameters," Major Gentry declared.

The Transport Syndrome

Another fact that many people fail to recognize is that high-performance vehicles handle better at higher speeds where stability is greater and control surfaces are more effective, Major Gentry said. "Some of the people who dictated the landing requirements for [the] shuttle must be victims of what I call 'the commercial transport syndrome.'" A three- to four-degree, dragged-in, high-power, low-speed approach is much more demanding on

(Continued on following page)

a pilot. Most pilots, he said, do not appreciate this fact. Also, this type of approach can be catastrophic if an engine fails.

To document landing accuracy and rollout distances in the lifting-body program, a standard 10,000-foot runway was marked on a dry lake bed. Average landing dispersion for a recent total of thirty flights has been less than 250 feet from a preselected point, and this has been for conditions as high as Mach 1.9 and from an altitude of 90,000 feet. Major Gentry said that the vehicle can be stopped in a mile or less. There is undue concern, he said, about approach and landing speeds. He believes that the shuttle, or any vehicle for that matter, should be landed at a speed where the handling qualities are good—a safe speed, even if it is 160 to 200 knots.

Landing distances also should not be a problem of major significance for the shuttle, he said. The military services have found that parabrakes and arresting gear are quite effective in reducing the landing roll. It might be advisable to increase the length of the runways to be used for the shuttle. Pouring a few extra cubic yards of concrete, Major Gentry said, is likely to be far cheaper and pose fewer problems than designing these vehicles to land at very slow airspeeds. Assuming that the shuttle vehicle will have reasonable stability and handling characteristics, Major Gentry could not see any significant problems with unpowered approaches and landings. Although the shuttle is intended to operate somewhat like a commercial airliner, he doubted that the first shuttle pilots would be airline captains. He expects they will be experienced test pilots/astronauts.

The lifting-body research vehicles have not been usable for evaluation of actual Instrument Flight Rules (IFR) conditions. Nor do they approach the size or weights anticipated for shuttle vehicles. Accordingly, other vehicles have been used for such simulations. The General Dynamics F-111, with its variable-sweep wing and the capability of a relatively large variation in gross weights, was used to approximate a wide range of L/D values and planform loadings. Using only the basic inertial navigation system, coupled with the relatively unsophisticated airborne Instrument Landing System (ILS) capability of the F-111, power-off, low-L/D approaches from Mach 2 at 50,000 feet were demonstrated. This is about twice the speed and altitude planned for starting the jet engines in the shuttle vehicle, Major Gentry said. These ILS approaches were flown to precise touchdowns on a runway, both at night and under a hood (simulating instrument conditions), down to as low as 200 to 500 feet above the ground, at which point the pilot took over visually to complete the landing. All the pilots felt that these approaches were less demanding than flying a conventional three-degree, low-speed, powered ILS approach.

The lowest L/D that could be investigated with the F-111 was about 3.5. The F-104 with idle power, takeoff flaps, gear down, and speed-brake modulation made it possible to investigate an L/D range of 4.2 to 1.9. Using an ILS localizer for glide-path centerline information and an L/D of three for a nominal glide slope, GCA approaches were flown. The pilot was given glide-slope information by a ground controller using precision radar. Glide-slope adjustments were made by using pitch changes in accordance with ground-controller callouts on aircraft position above or below the planned nominal glide slope. Again, the most interesting finding of this phase of the program was the ease with which the task could be performed. Handling qualities were improved and, because there were no throttling requirements, the workload was less than for a normal Ground-Controlled Approach (GCA).

Landing Simulations

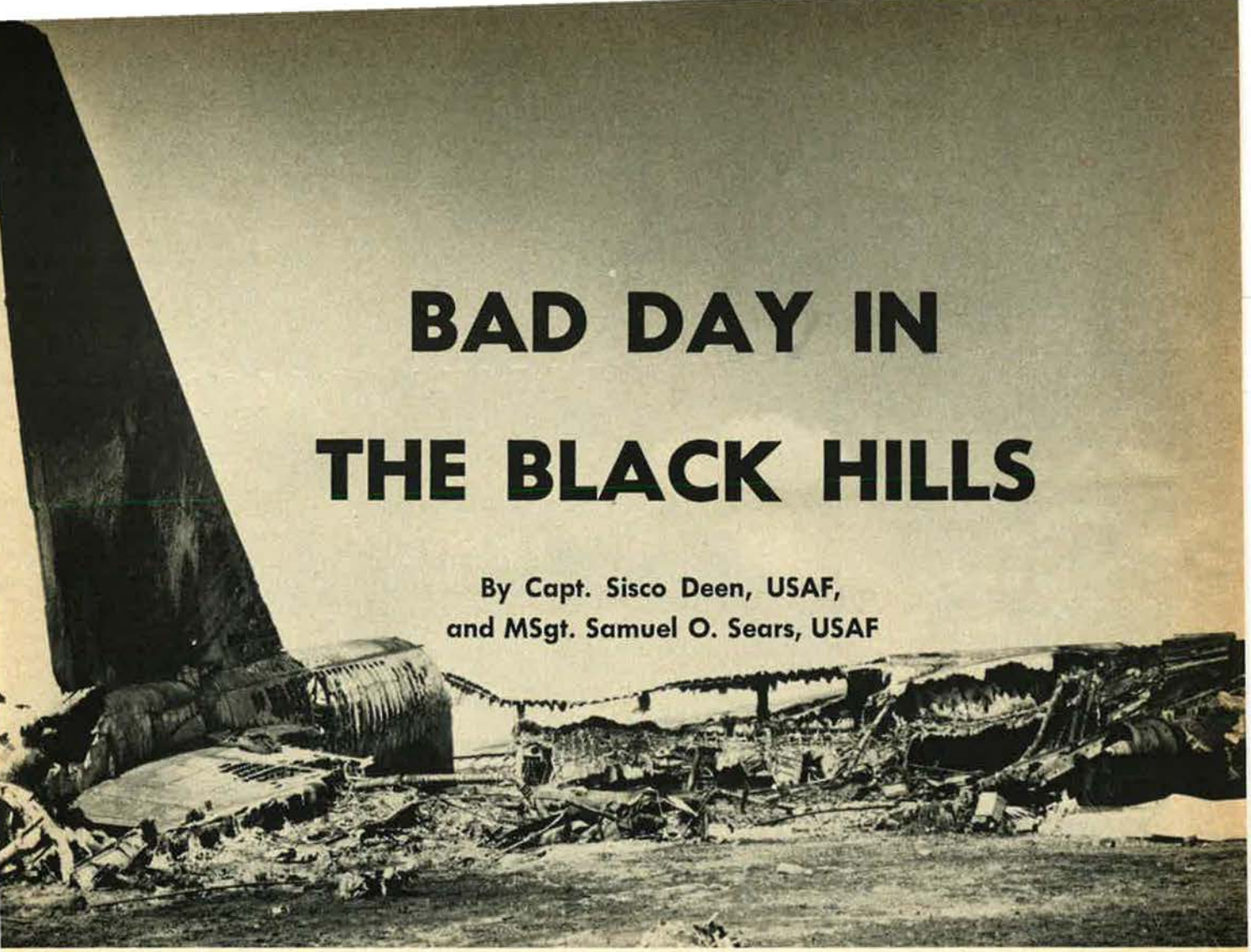
A B-52 and a Convair 990 were also used to demonstrate unpowered approaches in vehicles more representative of the size and weight of the shuttle configurations. All pilots—both lifting-body and large-aircraft pilots—felt that the pattern and approach were quite easy to fly, but the maneuver was somewhat more demanding because of slower lateral response and higher aileron forces.

Many people are apprehensive about steep approaches in large airplanes, probably because it is not a normal procedure, Major Gentry pointed out. Usually when a pilot in a large airplane dives at the ground, he does not know exactly how much altitude is required to pull out because he has not calculated or studied the problem. In the unpowered type of approaches flown in the lifting-body program, the aim point and the flare altitude have been calculated and the maneuvers were practiced. "We are confident," Major Gentry said, "that any skilled pilot can be taught to perform unpowered VFR approaches safely. Onboard or ground guidance systems can only improve this capability, and IFR approaches appear completely feasible with large vehicles."

Maj. Jerauld "Jerry" R. Gentry is considered the most experienced lifting-body pilot in the Air Force. He was first to fly the X-24 and is now USAF's chief test pilot in the joint NASA/Air Force lifting-body effort at Edwards AFB, Calif. His opinions on the space shuttle command attention.

Major Gentry does not propose that landing engines be eliminated because they are not desirable. But he questions whether they can be used and still allow for a reasonable payload. If this can't be done, he feels that most of the shuttle goals can be accomplished without landing engines. "If we can afford engines and still have the payload, then I think they should by all means be installed; however, I feel most pilots would rather not rely on landing engines to make a successful approach and landing. The shuttle, whether it has landing engines or not, must be maneuvered unpowered to a point near the destination because the engines cannot be started until the vehicle is subsonic.

"It seems ridiculous, with the demonstrated accuracy of our ballistic capsules and with the precise navigation capability of state-of-the-art terminal energy management systems, to maneuver to a position where power must be relied upon to reach the runway. The shuttle should be maneuvered into a position for an unpowered approach. Then, regardless of mission-induced variations in L/D or whether the engines are deployed, started, and kept running, a successful approach and landing could be made," Major Gentry declared.—END



BAD DAY IN THE BLACK HILLS

By Capt. Sisco Deen, USAF,
and MSgt. Samuel O. Sears, USAF

Corpse of a bomber. Flames threatened as firemen and medics fought to rescue the crewmen trapped in the wreckage of this SAC B-52. Risking their own lives, they performed heroically and did the job, and were specially honored for their courage and skill by SAC's Commander in Chief.

SWEAT poured from Sgt. David L. Roberts as he rammed his fire truck into the tail section of the burning Strategic Air Command bomber. The tail gunner was trapped in his compartment, and Roberts had to get him out. Earlier efforts to pull off the tail turret with a winch had failed. Now flames were nearing the gunner. A fireman quickly hacked through the gunner's canopy so he could get air. Suddenly there was an explosion. The force knocked Sgt. John Russell, a medic assisting in the rescue attempt, back about ten feet.

Roberts rammed the turret again and again. Finally, after what seemed an eternity, the turret inched away. Sergeant Russell, now back on his feet, ran to the small opening and helped the gunner, SSgt. Charles E. Adkins, out of the wreckage. Adkins' flying jacket was smoldering from the intense heat in what could have been a fiery tomb. He was taken to the hospital with a hip fracture and minor burns.

This was just one episode in the two-hour-long rescue drama that followed a B-52 crash at Ellsworth Air Force Base, S.D., last April 3. The lumbering bomber, with nearly 13,000 gallons of fuel on board, had crashed on landing, slid to a stop next to a fuel pumphouse, and blazed atop three of the pumphouse's six underground fuel-storage tanks, each of which held 25,000 gallons.

Six of the nine men on board were able to escape from the plane as it came to rest after sliding off the

(Continued on following page)

This was the ugly scene from the air as the corpse of the crashed B-52 lay spread over the terrain, with but a wing and the tail section recognizable. For their heroic action in saving crewmen, SAC firemen and medics received medals.

runway. Their exit, however, was not an easy task. The pilot, Capt. Wesley G. Swann, was suffering from smoke inhalation; Maj. Ralph P. Smiley, radar navigator, had fractured a vertebra; Lt. Col. Paul R. Houser, a pilot observer, had a fractured leg; the electronics warfare officer, 1st Lt. James L. Welch, and A1C Randall Hart, an avionics maintenance man, were both suffering from smoke inhalation.

The three men still trapped on board had to be rescued through thick, black, noxious smoke as the aircraft burned. Smoke billowed high into the sky and could be seen in Rapid City, S.D., seventeen miles away.

While Roberts was making his dogged attempts to free the tail gunner, another rescue was taking place near the nose of the flaming Stratofortress.

The copilot, Capt. Gary C. Christensen, had to be sawed out of the burning aircraft. His fractured collarbone further complicated matters.

For fifty-six agonizing minutes, Maj. Harry D. Meehan, instructor-navigator, was pinned under heavy equipment before the firemen could free him.

MSgt. Don L. Arnold, one of the two men responsible for the major's rescue, described it this way:

"I had gotten down on my knees and could see a small hole in the aircraft just at ground level. Looking through the hole I could see Major Meehan only a few feet away and unable to move.

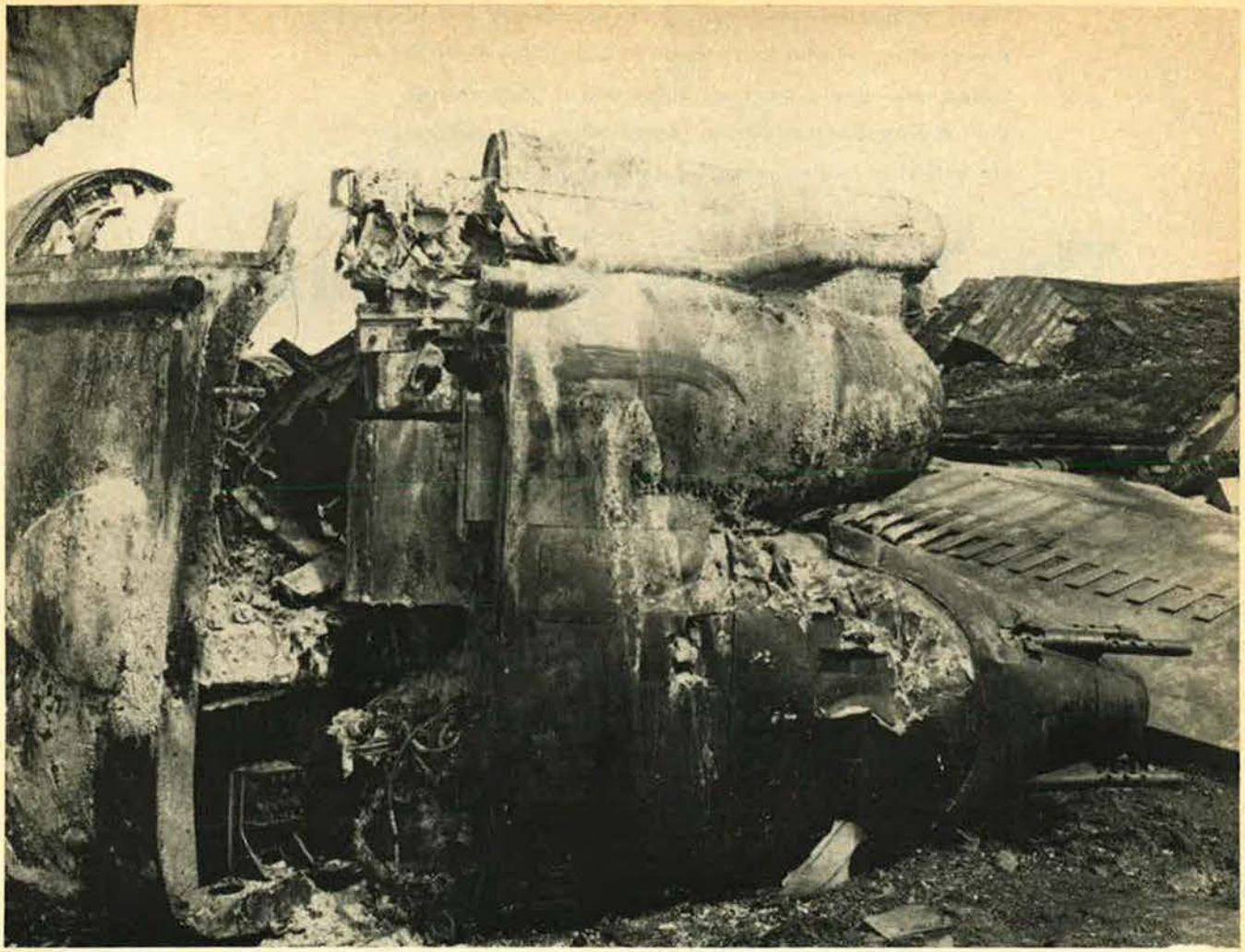
"I talked to him and tried to determine just what was pinning him in the aircraft. I then wedged myself through the opening. My thought at one point was that the only way we were going to get him out of there was to amputate his leg. I wiggled closer to the major and asked him if it was his foot that was holding him. SSgt. Tico Ramirez was helping me at the time. We tried to pull him free, but he wouldn't budge.

"Finally I worked my hand down his leg and managed to unlace his boot. In the meantime, we had to put a breathing apparatus on him as he was having great difficulty breathing."

Sergeant Arnold and others managed to turn Major Meehan's foot after removing the boot and were then able to pull him from the wreckage. The major suffered a dislocated shoulder, a fractured wrist, leg fractures, a ruptured leg artery, and smoke inhalation.

When queried about the performance of his medics in the rescue attempt, Capt. (Dr.) James P. O'Neal said, "It was as if they were following some gigantic plan."

The firemen who braved the inferno to rescue the



When it was all over, this was all that was left of the B-52's tail turret out of which Sergeant Adkins was rescued by Sergeants Roberts and Russell. Sergeant Roberts used a fire truck to crack open the aircraft's tail section.

Near what might have been a fiery tomb, the rescued Sergeant Adkins revisits the scene. The flames and heat of the crash were so intense that the airman's flight jacket was seared. He escaped with only minor burns and hip injuries.

crew did not emerge unscathed. Suffering smoke inhalation, broken bones, and lacerations were A1C Daniel Raymond, A1C William Herlund, and James E. Wilson, a civilian employee.

Heroics were many on that bad day in the Black Hills, and Gen. Bruce K. Holloway, Commander in Chief of the Strategic Air Command, personally presented awards to the men involved in the rescue. Twenty-three military men were awarded the Airman's Medal, for heroism involving voluntary risk of life under conditions other than those of combat. Four civilians assigned to the base fire department received the Strategic Air Command Civilian Award for Valor, for "demonstrating unusual courage or competence in an emergency while performing assigned duties." Three other Air Force men were presented the Air Force's Meritorious Service Medal, for "outstanding noncombat meritorious achievement or service to the United States."

The comments of A1C Jerry S. McCloud, a medic involved in the rescue, were typical. After receiving the Airman's Medal, he said unassumingly: "The experience we gained from our periodic fire drills came in handy. But, really, we just did what had to be done."—END

Today public misunderstanding of the military is widespread. Everyone in uniform bears some responsibility for that situation, and has a personal obligation to help correct it. A distinguished Air Force leader offers suggestions for bettering civilian-military relations and discusses why . . .

The Telling Is as Important as the Doing

By Gen. Bruce K. Holloway, USAF

COMMANDER IN CHIEF, STRATEGIC AIR COMMAND

SEVERAL years ago I had the rare privilege of helping to create a major unified command. In 1961 I was appointed as the first Deputy Commander in Chief of the United States Strike Command. US Army Gen. Paul D. Adams was the Commander in Chief. Strike Command was the final link in putting together all general-purpose air and ground forces under unified command. The challenges of starting an operation of such proportions were considerable and might well have been even more so without the leadership and experience of General Adams.

In the process of that achievement, we developed a lot of the air-ground techniques and procedures that are now standard practice. Those techniques we tested mercilessly in large- and small-scale exercises. In conjunction with the exercises, I was frequently called upon to "meet the press" and explain what we were doing and why.

In one of those meetings near Yakima, Wash., we coined a phrase that was quoted in the press and has since stuck with me: "The telling is as important as the doing." My point then was that Strike Command was rewriting all the military textbooks by developing and proving new, realistic concepts for Army-Air Force combat teamwork. Those doing the job knew about it and knew what it meant. But to millions of nonmilitary citizens our exercises were just "soldier games," using taxpayers' hard-earned money, until someone told them what we were doing and why.

Two weeks ago my words came back to haunt me. I saw in print a note by a prominent military affairs editor stating that air-ground concepts for general-purpose war were unchanged since World War II. After all that effort and all those years, even that normally well-informed military observer did not know what had been done. Too many people thought our "soldier games" were just wasting money without reason. The telling is as important as the doing.

It is the right of the citizen in a democracy to know what his public servants are doing and why, so that he may evaluate and change actions or servants. Congressmen spend a great deal of time acknowledging that right with letters, articles, and various public communications, explaining their votes and actions to their constituents.

Those of us in the military establishment are not able to follow suit. Our business is not open to any simple evaluation. We don't write legislation or sell cheese or build washing machines. There was a time when armies could prove themselves by citing battles won or territory gained. This measurement is not generally applicable today because the greatest measure of success is the absence of war. Then, too, the public eye cannot always see us in totality because we deal in national-security matters we cannot always fully discuss. We are perennially involved with classified information and are sometimes unable even to discuss our jobs.

It is understandably difficult for the concerned citizen to know what his military establishment is up to and he is, therefore, frequently easy prey to rumors and distortions from supposed experts. It, therefore, behooves each of us in the defense sector of public service to assist in providing the public all the available unclassified information consistent with national security.

Everyone in the service has been told that he is an ambassador in uniform. I would further add that we are all communications experts to the community at large. We are not public-relations experts or propagandists. It is not necessary to "sell Air Force to the public" because it already belongs to the public. But the airman does have an obligation to help keep the civilians with whom he comes in contact informed on service activities and issues. And because it is more difficult for the citizen to understand what's happening, the serviceman has an obligation to explain insofar as possible the who, what, where, when, and why of military affairs.

Some people may regard that obligation to explain as a dangerous Pandora's box, but I believe that it is our only hope. Public understanding of the military seems to be at its lowest since before World War II. There are several identifiable reasons for this era of bad feelings. The American public is generally disappointed and frustrated over the war in Vietnam. It

is disgusted over real and imagined abrogations of trust by the military in many facets of its endeavor. It is incredulous of huge and apparently nonproductive defense costs at a time when domestic needs are great and the budget tight. It is transfixed by "bad" news about the military. And it is lulled into a euphoria of "all's well" abroad by international negotiations and the poetic platitudes of some vocal citizens.

I believe that all these reasons are substantiations of my conviction that the public is too often not aware of the crucial facts or what they mean.

A central fact of life for every person on this planet in the year 1970 is that the USSR threatens to exceed the United States in strategic military power. This fact is central because it is that power that is a critical factor in all international negotiation, all coercion, to include war, and it will always be so until we live in a world ruled by law. This fact is central because I think that, as we view current Soviet actions, we must recall the USSR promise to "bury" us. It is central because experience warns us that the Soviet Union has not been hesitant to use power, even against its allies. It is a fact of life that every person on this earth could live or die at Soviet whim before this decade is out.

Beside this, other problems pale. Yet our public too often seems unaware of it and unknowing or unbelieving of it. People simply do not know the facts and are not aware of their meaning. The average American seems to believe that the only purpose of strategic forces is to defend our nation against some Armageddon which he rightly feels is highly improbable. He may also believe that this defense is being accomplished by some "X" hundred Minuteman missiles (or some "X" hundred Polaris missiles), and that all the rest is "overkill." Now that may sound absurd, but I have heard these misconceptions offered by honest men in complete seriousness. We are trying to deter the loss of a way of life, and much of the public apparently does not know, does not understand, is not aware of the danger.

That lack of public knowledge, that lack of public understanding, that lack of public awareness is our fault—yours and mine—everybody's on the defense team. We simply haven't done a part of our job as responsible citizens. I think we have failed in a number of ways.

I do not believe the military community has worked hard enough to declassify information. I think some things have been mistakenly or wrongly classified. Defense Secretary Melvin R. Laird has made a great effort to improve this condition. Our efforts should be at least as great. Sometimes we are even made to appear ludicrous as a result of inconsistency in our classification system.

I believe the military community hasn't worked hard enough to present positive information. We regularly and responsibly gather information for the public by reacting to press queries or crises which frequently mean news critical of us. There are millions of productive happenings we don't take the time to discuss or explain because we are too busy putting out fires or because of what I call don't-rock-the-boat-itis.

The military community hasn't tried hard enough to explain the reason why. We know that modern armies can no longer be motivated without rationale. Yet, time and again, we see released news of a "happening" and leave it to the military analysts to explain why it happened. Shortly after I became SAC Commander, we had a test of a Minuteman missile at Grand Forks. The object of the test was to ignite the specially configured first stage, getting the missile out of the hole and up enough so that it would land about a mile away. There were newsmen, military men, congressmen, and even a governor along to see the show. There was a great air of expectancy as we initiated the firing sequence.

The "button" was pushed. Nothing happened. There stood the newsmen, there stood the military men, there stood the congressmen, there stood the governor, and there I stood with that missile—trying to cover it up with my hat. Well, the basic facts were pretty plain. SAC ran a test of an operational missile, and it failed. It failed because an electrical circuit failed. But some people "explained" the whole affair, showing how it indicated that the missile would not have fired in execution. This was not necessarily the case. We were unsuccessful in explaining the whole "reason why." As a result, there were a lot of misinformed people.

The military community does not speak with one voice. That is a very hard saying, but I'm afraid it's true. Some people become so concerned with their own interests that distortion creeps into their comments. For instance, the Department of Defense (including all members of the Joint Chiefs of Staff) has repeatedly examined present and future US strategic offensive forces. It has repeatedly found that we are best served by a triad of strategic offensive forces—long-range bombers, land-launched intercontinental ballistic missiles, and sub-launched ballistic missiles. It is difficult for me to see how one could reach any other decision, all factors considered. Yet, we have of late seen what I believe to be one-sided arguments presented on this subject. Sometimes some members of all the services are guilty of divisiveness, and I believe we must, all of us—of all services—guard against this. How can one expect knowledgeable understanding of military programs unless the military unitedly supports those programs itself?

We are at fault also because we don't keep abreast of the times. In the early years of aviation, there was a public empathy with the Air Corps because our business was strictly airplanes, and airplanes had captured the public imagination. Today, our business is not strictly airplanes, and the public has become space-oriented. The Air Force mission is still accomplished in many exciting ways; yet, the public is not aware of many of these ways and we seem no longer to capture its imagination.

Finally, the military community is at fault because it has not cared enough about its responsibilities to the public. This is a minority attitude but one that exists and must be rectified.

But one thing is abundantly clear: A great many of our citizens (including some in uniform) are either not receiving or not understanding the critical facts of defense. We are not afraid of the truth. But we are afraid of propaganda, half truths, emotional thinking, and misrepresentations. We have to do a better job in telling.—END

THE BULLETIN BOARD

News and Comment about Air Force People . . .

By Patricia R. Muncy
ASSISTANT FOR MILITARY RELATIONS

All-Volunteer Army

Gen. William C. Westmoreland, US Army Chief of Staff, has declared that the Army is committed to a volunteer force. Speaking in October before the National Convention of the Association of the US Army, General Westmoreland stated, "I am announcing today that the Army is committed to an all-out effort in working toward a zero draft—a volunteer force. In accepting this challenge, we in the Army will bend every effort to achieve our goal. But we need support and understanding from the Administration, the Congress, and our citizenry."

General Westmoreland believes, however, that the draft must be extended beyond its current expiration date of June 30, 1971, to "guarantee a transition period without jeopardizing the nation's defenses."

To meet the Army's people requirement, General Westmoreland advised that it needed quality as well as quantity and that success can only be achieved by a concerted effort in four areas simultaneously:

- Those holding positions of high responsibility must attack the problem with all the vigor, imagination, and dedication that can be mustered.
- Where they exist, unnecessary irritants and unattractive features of Army life must be eliminated.
- Must have an application of resources (money) for increased pay, housing, etc.
- Must have the support of the American people and their leaders in business, industry, the church, education, and the news media.

Understanding Computation

Air Force personnel not understanding retired-pay computation might find retirement checks smaller than anticipated, according to the USAF Military Personnel Center, and the misunderstanding could crimp their post-service plans.

Inquiries to the retirement division at the Personnel Center indicate some members are not clear on the computation method. The problem stems mainly from misinterpretation of the basic pay rate and percentage multiplier.

It's the term "over" in connection with base pay—over eighteen, over twenty, over twenty-two, etc.—that causes confusion.

In the computation formula, the term means just what it says. The retiring member must have a day or more beyond a specific longevity step before he can draw pay for that step. Personnel retiring with exactly twenty years cumulative service, for example, will have retired pay computed at the "over eighteen" rate. Members must put in that extra day to get paid for the full twenty. Both officers and airmen are credited with all active and inactive Reserve service for basic pay. (Part 1, DoD Military Pay and Allowances, Entitlements Manual is the governing directive.)

Voluntary retirement statutes require twenty years of minimum active service of all Air Force members for retirement eligibility. Past the active service minimum, nonactive Reserve time may then be counted by officers in determining the percentage multiplier.

Officers, after being credited for all active duty, receive credit for nonactive service before June 1, 1958, on a day-for-day basis. Nonactive Reserve duty after May 31, 1958, is credited via a point-day system up to sixty days a year. For parts of years in the total, periods of six months and more count

CAP Cadet Col. Maureen P. Donlan (center) is the recipient of AFA's Outstanding CAP Cadet of the Year award. The twenty-two-year-old aviation enthusiast from New Orleans, La., receives the trophy from AFA President George Hardy. She earned a similar honor from CAP, awarded by Brig. Gen. R. N. Ellis, CAP Commander, left.

Hugh E. Witt (left), former Deputy for Supply & Maintenance, Office of Assistant Secretary of the Air Force (Installations & Logistics), accepts Air Force Decoration for Exceptional Civilian Service from Assistant Secretary P. N. Whittaker (right). Before moving to a new Navy post, Mr. Witt served on AFA's Civilian Personnel Council.

as a full year, and less than six months is disregarded.

Active service plus Reserve credit is multiplied by two and a half percent, then this product is multiplied by the basic pay figure to arrive at officer retirement income.

Only active service is counted in determining the percentage multiplier for airmen. As with officers, airmen receive full-year credit for six months or more in the total, and periods less than six months are not computed. The formula is the same: active service times two and a half percent times basic pay equals retired pay.

Personnel nearing retirement should consult their local consolidated base personnel office concerning these issues before making application for retirement. The Military Personnel Center warns that failure to reach an understanding before application is not a reason for later withdrawal of the application.

Senate Veterans' Committee

The Congressional Reorganization Plan recently submitted to the President contains provisions for a Veterans' Committee in the US Senate. While the House has a separate committee to handle veterans' matters, the Senate divides them among three standing committees—Finance (general legislation, pensions, insurance, etc.); Labor (education and similar benefits); and Interior (cemeteries).

Proponents of the new committee had to fight opposition from the chairmen of the subcommittees that currently handle these matters. The arguments for creation of the new committee generally revolved around three propositions—that veterans' organizations strongly favor dealing with one committee; that the current system leaves the initiative on most veterans' legislation to the House, and that the change would bring the Senate and House committee structures in line.

Opponents argued that there are many problems, like health, which do not go through parallel committees in the House and Senate. They said there is not enough work to justify a full-time committee and staff, that the Senate has more committee meetings now than senators can attend, and that the Senate has a better record than the House in this Congress in initiating and passing veterans' legislation.

Airmen Council

AFA's Airmen Council met in Washington during the National Convention and received comprehensive briefings on both the Total Objective Plan for Career Airman Personnel (TOPCAP) and the Weighted Airman Promotion System (WAPS) programs.

Members of the AFA Airmen Council listen intently as SMSgt. William M. Goyer (far right) proposes a resolution during the Airmen Council's recent meeting in Washington, D.C. Seated, from left, are TSgt. Mary M. Morris, Office of the Chief Master Sergeant of the Air Force, and Council members CMSgts. Victor P. Tron, Jr., Paul J. D. Barton, Jesus Morado (Chairman), and Bobby L. Gonshor.

The Council then made recommendations to the AFA President on the following subjects:

- A computerized system for identifying individual assignments on a north/south basis, with use of the forty-third parallel as a dividing line, aimed at providing more equitable distribution of assignments between warm and cold climates.
- A proposal to allow early release for first-termers after thirty-six months of active duty, provided they agree to participate in a Ready Reserve or ANG unit program for a period of twenty-four months.
- Stricter compliance with Air Force policies for retraining airmen with "imbalanced" AF specialties.
- Conversion of certain junior-officer functions to performance classification for enlisted superintendents.
- Proposed authorization of a flexible forty-five-day grace period for personnel committed to a certain retirement date but liable to suffer a hardship because of delayed hiring decisions by potential civilian employers.
- Support of the Air Force Enlisted Men's Widows' and Dependents' Home Foundation.
- Adoption of the title "Chief" as the term of address for all E-9s in the Air Force.

With only partial implementation this year of the restructured Outstanding Airman Program, due to the change in AFA's Convention dates, the Council urged that the selection criteria be further modified to ensure that an individual once honored may not be eligible for nomination a second or third time without a waiver from Hq. USAF. It was pointed out that there were only twelve Outstanding Airmen this year, as opposed to as many as twenty-two in the past; and, because there have been duplications since the program started in 1956, this further limits the chances of selection for a great number of highly qualified personnel.

Col. Samuel L. Finklea, Jr., Assistant Adjutant General (Air), S.C., died in October, in Columbia. He was fifty-three years old. Colonel Finklea's military career spanned thirty years. He was Vice President of the South Carolina AFA at his death and a member of the Air Force Association's Air Guard Council for the last two years.

JOAC Recommendations

The Junior Officer Advisory Council also met in September and made

(Continued on following page)

recommendations to AFA President Hardy.

The Council expressed its interest in and urged that appropriate action be taken regarding:

- Establishment of an Air Force-level Junior Officer Council (JOC) to help guide command and base JOCs by establishing better lines of communication and recommending improvements for both local and Air Force-wide operational problems.
- Recision of a recent change to Air Force Manual 900-3, which prohibits the categorization and filing of letters of commendation and other recommendatory documents in the field, major command, and master personnel records of officers in the grades of lieutenant colonel and below.
- Passage of H.R. 16771, which would authorize a service member who is reassigned directly from one overseas location to another, within the same operational theater (*e.g.*, the Pacific area), to accompany his family in the relocation process at government expense.
- Recommendations emanating from the 1970 USAF-wide Career Motivation Conference, which convened at Ent AFB, Colo. Additionally, the Council expressed a desire to see the major commands and separate operating agencies organize and host seminars and workshops for their JOC and NCO advisory groups on a periodic basis.
- Incorporation of a more human approach by commanders in dealing with their subordinates in order to fully capitalize on the available human resource potential.
- Establishment of a USAF-wide base seminar program to bring together senior staff officers and their junior officers in an idea-exchanging session on matters of mutual interest and concern, such as job performance, career planning, etc.
- Implementation of a vigorous information program, including improved printed material, on CHAMPUS (Civilian Health and Medical Program of the Uniformed Services) as it pertains to active-duty Air Force personnel.

The Council also expressed its support for the USAF Personnel Plan (nicknamed TOPLINE), and requested that a new look be given to an OER promotion plan proposed by this Council several years ago, which would combine the nomination promotion procedures with a weighted factors promotion system.

AAS Alumni Council

The Arnold Air Society Alumni Council also met during the National Convention. Of primary concern to the Council was the best method by which the Society can be brought into a closer working relationship with AFA at the state and community level.

The Society's National Commander, Cadet Col. Philip Robinson, agreed that such a closer affiliation would be mutually beneficial to both organizations. One method suggested was that AFA Chapters be encouraged to invite the Arnold Air Society and Angel Flight units in their respective communities to participate in at least one major aerospace project a year.

The Council also called upon the AAS to appoint unit liaison officers to work with local AFA groups in order to emphasize the AAS relationship to AFA, and to coordinate joint AAS/AFA projects.

In view of the increase in AAS alumni membership, the Council expressed concern at the expected unwieldy size of future Alumni Directories, the projected printing and mailing costs, and the uncontrolled availability of the Directory as a mailing list. It recommended that publication of the Alumni Directory be discontinued and administrative funds budgeted for this activity be directed to defraying AAS Executive Board expenses for annual meetings in conjunction with AFA Conventions.

In lieu of the Directory, the Council suggested the possibility of establishing a "Locator Service" whereby AAS alumni, upon request, could be kept current on address changes of other members.

It was the Council's consensus that, if more AAS news were printed in AIR FORCE Magazine, the printing and mailing of AAS Newsletters for distribution to alumni could be eliminated. This would alleviate the financial burden on the Society and the distribution problems imposed on AFA. Further, it was felt that printing AAS news in the magazine would provide an excellent vehicle to educate the general AFA membership on the Society and its accomplishments.

Samuel H. du Pont, Jr., rose from a cadet in the CAP to vice chairman in fifteen years and now has been elected National Board Chairman, the youngest to hold the top management post in CAP history. The 34-year-old du Pont currently holds the rank of brigadier general in Civil Air Patrol service.

Maj. Gen. Donald S. Dawson (right) receives DSM from USAF Chief of Staff Gen. John D. Ryan. General Dawson, who is Chairman of AFA's Civilian Personnel Council, recently retired from the Air Reserve after many years of distinguished service.

Parting Shots

- The Air Force Uniform Board, following its customary detailed probe, which included a survey of the major commands and separate operating agencies, has concluded that a change in the enlisted-grade insignia is neither necessary nor desirable at the

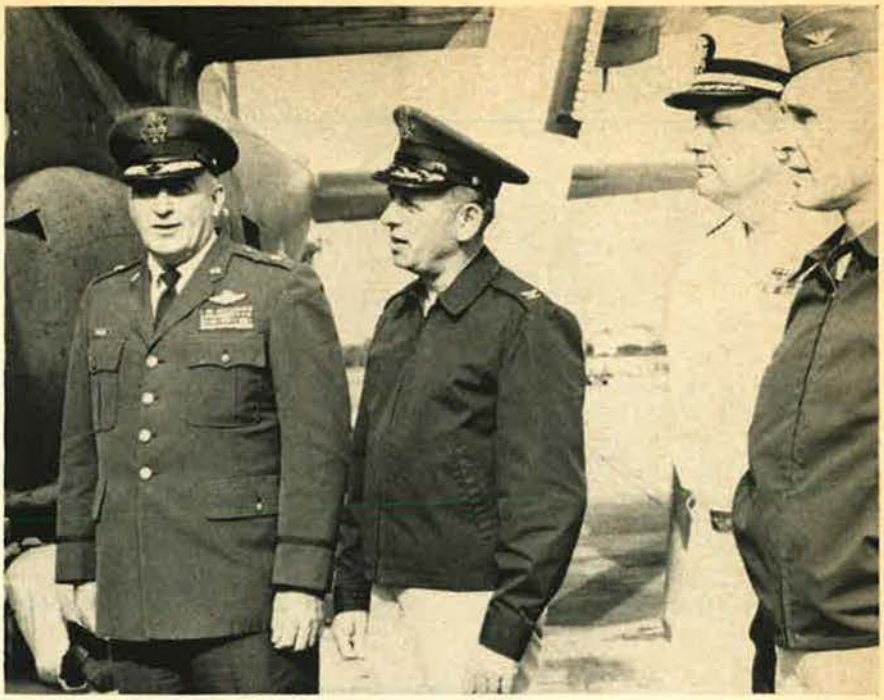
present time. However, the proposal for collar insignia for wear by enlisted personnel on certain articles of clothing, which was put forward by AFA's Airmen Council two years ago, is still under consideration.

• The Air Force reports that its April 1970 Sample Survey indicates the initial reaction of airmen to the new Weighted Airman Promotion System (WAPS) is favorable. The results of the survey show that forty percent prefer the WAPS, while only twenty-eight percent favor the previous promotion selection system. The remaining thirty-two percent were either undecided or had no opinion. The same sample survey indicated, however, that, despite an intensive publicity and educational program to inform all airmen about the new system, almost one-third of the airmen did not understand it.

• The USAF Military Personnel Center has announced a change of policy that will allow certain Army and Navy ROTC graduates to qualify for Air Force commissions. Those with a year or more active Air Force service, or whose fathers have performed active Air Force service, are now eligible for direct Air Force commissions, a change which responds to a long-expressed desire of students at schools offering only Army or Navy ROTC. Similarly, graduates of AFROTC may qualify for transfer to another service.

• Beginning January 1, 1971, former first-term airmen who have been out of the Air Force for less than three months will be allowed to reenlist. Those who were separated on or after October 1, 1970, will be eligible under this program and must be so advised at the time of their separation. They will be eligible for regular and variable reenlistment bonuses applicable at the time of reenlistment and will retain the grade held at time of separation.

• The VA reports that its fastest growing program to encourage veterans, their survivors, and servicemen still on active duty to continue their education or job preparation is on-the-job training (OJT), which has jumped seventy-six percent over the 1969 enrollment. Among the more popular OJT training programs are those in the areas of public need—health care, education, recreation, welfare, and pollution control.



The first C-130 Hercules transport is welcomed at the Willow Grove Air Reserve Facility, Willow Grove, Pa., by, from the left, Brig. Gen. Ben J. Mangina, 302d Special Operations Wing from Clinton County AFB, Ohio; Col. T. G. Behling, 913th Tactical Airlift Group Commander; Capt. Robert Godman, CO of Willow Grove's Naval AS; Col. D. Reed, Dir. Ops, 514th MAW (Associate), McGuire AFB, N.J. The 913th was the first East Coast Reserve unit to receive the C-130s.

Members of the 20th Air Force Association pose for a picture on their return from a Pacific tour of the Mariana Islands group and Hawaii. Fifty-eight veterans of the 20th AF, many with wives and children, visited the B-29 bases on Guam, Saipan, and Tinian, and toured Hawaii. The 20th is currently scheduling a similar tour for the summer of 1971, with the return trip via Japan.

SENIOR STAFF CHANGES

B/G Levi R. Chase, from Asst. DCS/Ops, to DCS/P, TAC, Langley AFB, Va., replacing B/G Frank P. Wood . . . **Dr. Ulrich K. Heidelauf,** from Technical Adviser (Weapon Systems), DCS/Systems, Hq. AFSC, Andrews AFB, Md., to Technical Director (Reconnaissance), Deputy for Reconnaissance and Electronic Warfare, ASD, AFSC, Wright-Patterson AFB, Ohio . . . **B/G Harrison Lobdell, Jr.,** Cmdr., 3510th FTW, to IG, ATC, Randolph AFB, Tex. . . . **B/G Cuthbert A. Pattillo,** from Asst. DCS/Plans, to Asst. DCS/Ops, TAC, Langley AFB, Va., replacing B/G Levi R. Chase . . . **Dr. Ernst A. Steinhoff,** from Chief Scientist, AF Missile Development Center, AFSC, Holloman AFB, N.M., to Scientific Adviser (Configuration Technology), AF Flight Dynamics Lab., AFSC, Wright-Patterson AFB, Ohio.—END

THE OGDEN, UTAH, CHAPTER . . .

cited for very effective programming in support of the mission of the Air Force Association.

". . . one of the most thrilling public events ever staged in our area." That is the way the Ogden, Utah, *Standard-Examiner* described the **1970 Weber County Air Fair.**

Sponsored annually by **AFA's Ogden Chapter,** the Air Fair drew more than 50,000 spectators, who crowded the Ogden Municipal Airport. Thousands more were stranded in the traffic jams on airport-access roads.

A flyby of the C-5A Galaxy and a spectacular performance by the USAF aerial demonstration team, the Thunderbirds, highlighted the show. Also included on the program were airplane rides, skydivers, experimental aircraft and aerobatic demonstrations, low-level jumps by personnel of the Utah National Guard, model-airplane demonstrations, and static displays of military and civilian aircraft.

James T. Brown is President of the Ogden Chapter, and **Ray Cassell,** Assistant Ogden City Manager and a Past President of the Chapter, served as Chairman of the fair.

Special guests included **Sen. Frank E. Moss** (D-Utah), **Maj. Gen. Richard M. Hoban,** Ogden Air Materiel Area Commander, and **Col. W. D. Kyle, Jr.,** Hill AFB Commander.

In the words of the Ogden *Standard-Examiner,* "The Air Force Association [Ogden Chapter] did a tremendous job in preparing for the '70 Air Fair and in conducting the show." We add our congratulations to the Chapter for this very successful and effective annual program and are happy to name the Ogden Chapter AFA's "Unit of the Month" for December.

* * *

Mrs. Anna Chennault, widow of Gen. Claire Chennault, leader of the famed World War II "Flying Tigers," recently hosted a party in her home at which some $60,000 were distributed to beneficiaries of the **Iron Gate**

Air Force Secretary Robert C. Seamans, Jr., receives an Iron Gate Chapter plaque from Mrs. Anna Chennault at a reception hosted by Mrs. Chennault at her home. During the ceremonies, the net proceeds from the Chapter's Seventh Annual Air Force Salute—$60,000—were distributed to four Air Force-oriented charities ***(see story).***

At Mrs. Chennault's reception, J. Gilbert Nettleton, left, Chairman of the Aerospace Education Foundation's Board of Trustees and Chairman of the Iron Gate Chapter's Seventh Annual Salute, presents a check to Gen. John D. Ryan, AF Chief of Staff, for the Falcon Foundation.

Mrs. Joseph J. Cody, Jr., wife of Maj. Gen. J. J. Cody, Jr., Commander, Electronic Systems Division (AFSC), presents the Massachusetts AFA award for military leadership to her husband. Lt. Gen. J. W. O'Neill, seated, Vice Cmdr., AFSC, and Brig. Gen. C. D. Briggs, 94th MAW, look on.

Chapter's Seventh Annual Air Force Salute.

On hand to receive checks for the individual charities were Secretary of the Air Force **Robert C. Seamans, Jr.,** for the **Air Force Aid Society;** Air Force Chief of Staff **Gen. John D. Ryan,** for the **Falcon Foundation,** an organization that provides preparatory-school scholarships to motivated young men seeking admission to the USAF Academy and a career in the USAF; **Mrs. Ryan,** for the **Air Force Village Foundation;** and AFA President **George D. Hardy,** for the **Aerospace Education Foundation.**

Among the many distinguished guests were **Secretary of Agriculture and Mrs. Clifford Hardin; Deputy Secretary of Defense and Mrs. David Packard; Rep. Leslie Arends** (R-Ill.), House Minority Whip; **Rep. L. Mendel Rivers** (D-S.C.), Chairman of the House Armed Services Committee; AFA National Treasurer **Jack B. Gross;** and **J. Gilbert Nettleton,** Chairman of the Board of Trustees, Aerospace Education Foundation.

Through its **Annual Air Force Salute,** a $100-per-plate fund-raising ball, the Iron Gate Chapter has raised **$518,000** for Air Force charities over the last seven years.

The 1971 Salute will be held in New York City's Americana Hotel, on March 26. Oil multimillionaire **J. Paul Getty** is honorary chairman; **J. Raymond Bell,** a Past President of the Chapter and vice president of Columbia Pictures, is general chairman. Newscaster **Walter Cronkite** and Astronaut **Frank Borman** are vice chairmen, and **Mrs. Chennault** is chairman of the Women's Committee.

* * *

"Patriotism, Peace, Potential!" was the theme of the twenty-third Annual Convention of the **Massachusetts AFA,** held at Hanscom Field, Bedford, Mass., September 11–12.

John A. Luongo, President of the **Minuteman Chapter,** which was host to the Convention, was Chairman of the Convention Committee. During the business session, **James O. Fiske, Jr.,** current State AFA Senior Vice President, was elected to succeed **Andrew W. Trushaw, Jr.,** as President of the state organization for 1970. Elected to serve with him: **John White,** Senior Vice President; **John Luongo,** Junior Vice President; **Mrs. Dorothy Seligman,** Executive Secretary; **Michael Votta,** Recording Secretary; and **Arthur Marcotti,** Treasurer.

The President's Luncheon featured an address by **Kay H. Barney,** Program Manager of the SAM-D Missile Division of Raytheon Co. Mr. Barney spoke on "Air Defense—From Bug to SAM-D." State President Trushaw was Master of Ceremonies.

Lt. Gen. John W. O'Neill, Vice Commander, Air Force Systems Command, featured speaker at the Awards Dinner, remarked on the mission and function of AFSC. **Brig. Gen. Charles D. Briggs,** Commander, 94th MAW (AFRes), was Master of Ceremonies and presented the State AFA awards.

AFA President **George Hardy** concluded his brief remarks as follows: "President Nixon recently issued a call to service and selflessness, which I commend to you: 'The greatest privilege an individual can have,' he said, 'is to serve a cause bigger than himself.'

"I think you and I have this cause —the United States Air Force and AFA. Let's serve both of them to the very best of our abilities in this hour of national need and national peril."

Awards presented included a plaque to General O'Neill in appreciation of his support of Massachusetts AFA activities; the State AFA's Education Award to **Dr. William H. Hebert,** Executive Secretary and Treasurer of the Massachusetts Teachers Association; an award for military leadership to **Maj. Gen. Joseph J. Cody, Jr.,** Commander, Electronic Systems Division (AFSC); its Youth and Community Relations Award to State AFA Chaplain **Monsignor R. L. U. Montcalm;** and its Outstanding Airman Award to **TSgt. John J. Ditroia,** 94th Military Airlift Wing.

Special guests included **Maj. Gen. Harry L. Evans,** USAF (Ret.), Vice President (Corporate Development), Raytheon Co.; **Col. Garland Farris,** base commander and military host to the Convention; **Col. Dale Flinders,** Commander, AFCRL; **Col. Julius Goldman,** Commander, Massachusetts Civil Air Patrol; **Col. Howard W. Dye, Jr.,** Commander, 905th Military Airlift Group, Westover, AFB; **Edward Nedder,** Vice President for AFA's New England Region; and **Joseph Assaf,** AFA National Director.

* * *

The twenty-second Annual Convention of the **New Jersey AFA,** held in Hasbrouck Heights October 16–18, saluted the **Teterboro Airport** on its fiftieth anniversary.

During the business session, delegates elected **Mrs. Mamie Kinsley,** current State AFA Vice President and a Past President of the Garden State Chapter, to succeed **James P. Grazioso** as President of the State AFA for 1970. Others elected to serve with Mrs. Kinsley: **Amos Chalif** and **Martin Capriglione,** Vice Presidents; **James Grazioso,** Secretary; and **Lloyd Nelson,** Treasurer.

William J. Caputo, a former state and chapter officer, was Master of Ceremonies at the Convention Awards Banquet. The State AFA's top award, **The Sal Capriglione Memorial Airpower Award,** was presented to the Metropolitan Air Facilities Division of **Pan American World Airways** for "their continued planning and contributions to the field of general aviation and encouraging and building a new and modern facility for their use." The award was accepted by **O. J. Studeman,** general manager of the division.

(Continued on following page)

Some of the principals in New Jersey AFA's recent convention were, from left, front row, State President James Grazioso, Anthony DiStefano, and Billy Diehl; second row, Fred Wehran and Col. Edwin E. Aldrin, Sr.; third row, Duke Krantz and Mrs. Mamie Kinsley, New Jersey AFA President-elect; top row, O. J. Studeman and Herbert O. Fisher ***(see story for details).***

Frank G. Anger, recipient of the Wright Memorial Chapter's Aerospace Power Award, accepts a $500 check, to go to the Air Force Museum Foundation, from Chapter President Glen J. McClernon, left, Brig. Gen., USAF (Ret.), as Chapter Treasurer Ken Puterbaugh, left center, and Gen. Jack Merrell, Commander, AF Logistics Command, look on.

The wives of two USAF POWs from Pittsburgh, Pa., were banquet speakers at the Pennsylvania State AFA Convention in Erie recently. From left to right are National Vice President John G. Brosky; National Director James Wright; Mrs. Glenn L. Myers; State President Gilbert Petrina; Mrs. Mark J. Ruhling; and AFA National Director Carl J. Long.

The state AFA's **Airpower Achievement Award** was presented to **Fred Wehran,** aviation pioneer and former owner of Teterboro Airport, for "many years of pioneering in the field of aviation against great odds and obstacles, for persistency and faith in the growth of aviation." Its **Aerospace Education Award** was presented to **Anthony DiStefano,** Director, Teterboro School of Aeronautics, Inc., for "twenty-five years of continued programming of Air Education at Teterboro School of Aeronautics, and his continued guidance and assistance in Air Education programs in the community and state."

The **Sal Capriglione Chapter** received an award for the **Best Yearly AFA Programs,** and the **Garden State Chapter** was honored with the **Best Single AFA Activity** award.

The Convention program included a tour of Teterboro Airport and the Teterboro School of Aeronautics.

John Curry, a former AFA National Director, was Convention Chairman. Special guests included **Mrs. Blanche Noyes,** Chief, Air Marketing Division, FAA; **Col. Francis R. Gerard,** Director of Aviation, Department of Transportation, N.J.; **Howard Beuschel,** Director of Aerospace Education, N.J.; **Col. Edwin E. Aldrin, Sr.,** father of Astronaut "Buzz" Aldrin, second man to walk on the moon; **Duke Krantz,** famed stunt pilot; **Herbert O. Fisher,** aviation official for the Port of New York Authority; and **Miss Irene Keith,** New York AFA Vice President.

* * *

Meeting in **Erie, Pa.,** on October 9–10, delegates to the **Pennsylvania AFA's** twenty-second Annual Convention elected **Robert Carr** of Pittsburgh to succeed **Gilbert Petrina** of Harrisburg as President of the state organization for 1971. **W. Robert Johnson,** Convention Chairman, was elected State Treasurer. Others elected during the meeting: **Frank Nowicki, Fran Sigmund,** and **H. M. Eaton,** Vice Presidents; and **Thomas Fry,** Secretary.

Charles Sharp, Jr., State Vice President, was Toastmaster for the Con-

(*Continued on page 79*)

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Active Members: US citizens who support the aims and objectives of the Air Force Association, and who are not on active duty with any branch of the United States armed forces—$7 per year.

Service Members (nonvoting, nonofficeholding): US citizens on extended active duty with any branch of the United States armed forces—$7 per year.

Cadet Members (nonvoting, nonofficeholding): US citizens enrolled as Air Force ROTC Cadets, Civil Air Patrol Cadets, Cadets of the United States Air Force Academy, or a USAF Officer Trainee—$3.50 per year.

Associate Members (nonvoting, nonofficeholding): Non-US citizens who support the aims and objectives of the Air Force Association whose application for membership meets AFA constitutional requirements—$7 per year.

Objectives

• The Association provides an organization through which free men may unite to fulfill the responsibilities imposed by the impact of aerospace technology on modern society; to support armed strength adequate to maintain the security and peace of the United States and the free world; to educate themselves and the public at large in the development of adequate aerospace power for the betterment of all mankind; and to help develop friendly relations among free nations; based on respect for the principle of freedom and equal rights to all mankind.

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Dr. Harold Agnew, center, Director, Los Alamos Scientific Laboratory, guest speaker at an Albuquerque Chapter meeting, visits, from left, Lt. Gen. H. C. Donnelly, USAF (Ret.), Manager, Albuquerque Ops., Office, AEC; Chapter President W. A. Gardner; Maj. Gen. F. W. Nye, USAF, DASA; and Col. A. G. Swan, AF Weapons Center.

vention's Aerospace Luncheon. During the program, AFA National Director **Carl J. Long** presented the State AFA's **Carl Long Aerospace Science Award** to **Kevin Boran,** a freshman at Lafayette College, Easton, Pa.

The Convention's Aerospace Awards Banquet highlighted the Convention theme—**"Our Prisoners of War in North Vietnam"**—and featured presentations from **Mrs. Patricia Ruhling** and **Mrs. LaVerne Myers,** President and Secretary-Treasurer, respectively, of the Pittsburgh Chapter, National League of Families of American Prisoners and Missing in Southeast Asia.

During the awards portion of the banquet program, State President Petrina presented the State AFA's **Man of the Year** plaque to **Charles Sharp, Jr.,** Past President of the Erie Chapter. Judge **John Brosky**, AFA Vice President for the Northeast Region, was Toastmaster. Dancing followed the banquet.

Special guests included **Brig. Gen. R. B. Posey,** Deputy Adjutant General for Air, Pennsylvania, and Chief of Staff, Pennsylvania Air National Guard; and AFA National Director **James Wright** of Williamsville, N.Y.

* * *

CROSS COUNTRY . . . Rep. William C. Cramer (R-Fla.) was the guest speaker at a recent Orlando meeting of the **Central Florida Chapter** observing the twenty-third anniversary of the Air Force. Chapter President **Martin H. Harris,** who is also an AFA National Director, reports that more than 200 members and guests attended the meeting, including **Brig. Gen. Woodrow A. Abbott,** Commander, 823d Air Division; **Capt. Enders P. Huey,** Commander, Naval Training Center, Orlando; Florida AFA President **Taylor Drysdale;** and **William Parker,** President, Department of Florida, ROA.

Charles W. Mathews, Deputy Associate Administrator for Manned Space Flight, NASA, was the speaker at the **H. H. Arnold Chapter's** Fall Dinner Meeting at Hicksville, N.Y. Mr. Mathews spoke on the "Space Shuttle and Future Space Programs." Chapter President **John F. Dolan** reports that he was pleased to have as special guests **Miss Irene Keith** and **Robert Sieloff,** New York AFA Vice President and Treasurer, respectively.

—By Don Steele

Bob Stevens'

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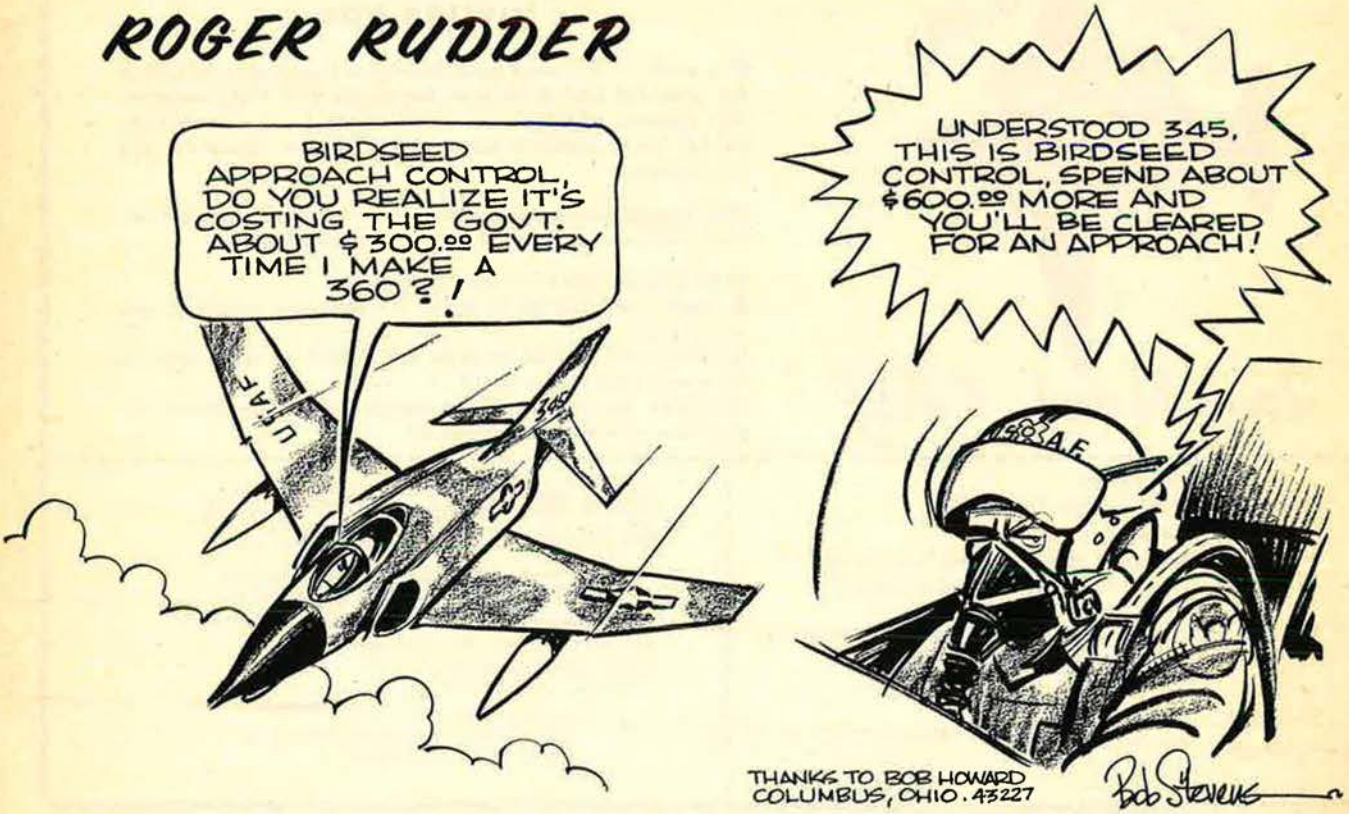

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