MAY 1965 | 50¢

# AIR FORCE

and **SPACE DIGEST**

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

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—*See Page 60 for more*

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# AIR FORCE and SPACE DIGEST

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

**VOLUME 48, NUMBER 5** — **MAY 1965**

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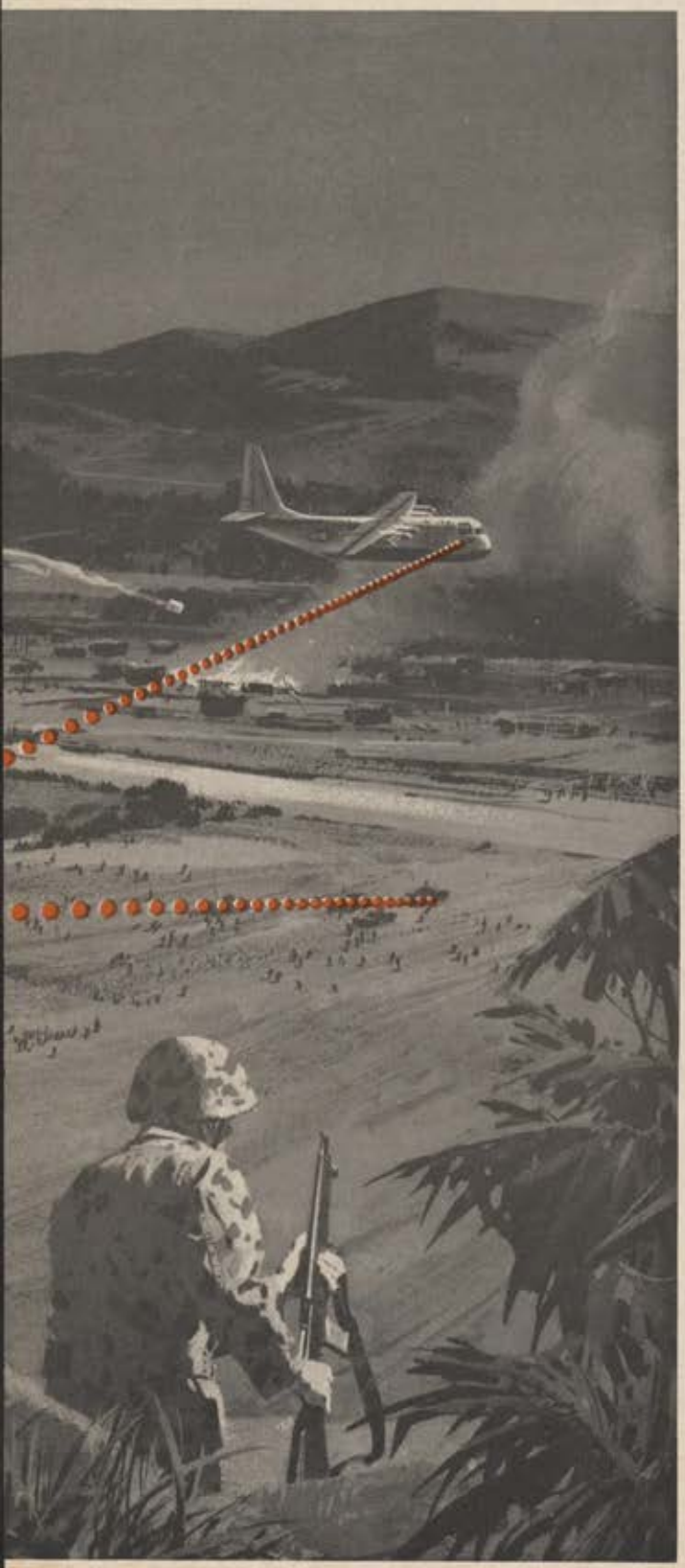

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*Congress and Bolté . . . An Editorial*

# Eighteen Years of Neglect

**By Allan R. Scholin**
ASSOCIATE EDITOR, AIR FORCE/SPACE DIGEST

A MILITARY pay boost is rightly the top priority subject now before Congress which affects military personnel. The House Armed Services Committee will soon conduct hearings on a pay bill drafted by its new Chairman, L. Mendel Rivers of South Carolina. Meanwhile, a Presidential commission, headed by Marion B. Folsom, has submitted its recommendations to the White House on pay increases for all government personnel, which the Administration is expected to submit to Congress in the near future.

The Air Force Association has strongly endorsed the Rivers pay bill. At the risk of prejudging the Folsom report, we believe the Rivers proposal will come closer to meeting the objective of restoring military compensation to some semblance of parity with that of civilian pay in and out of the government.

But when Congress and the President complete action on the pay bill, there will remain another piece of legislative business which, in perspective, can be of far more significance to national security than is pay. We refer to the Defense Department's proposal to reform officer career management, more generally known as the Bolté study, named for Gen. Charles L. Bolté, USA (Ret.), who headed the study panel.

We would be the last to minimize the importance of adequate pay in a military career. But a man's ambition is not directed solely to achieving periodic increases in the size of his paycheck. It is, rather, to prepare himself for higher responsibilities, to see his developing abilities recognized by assignments with progressively greater challenge, to have, at the least, an equal opportunity for promotion with others of his age, background, and ability.

This opportunity is denied to many Air Force officers today. The Bolté proposal would rectify this manifest injustice.

The Bolté study has many enthusiastic friends, and it has some foes. In the main it is regarded with apathy, even apprehension, because it seems so complex. DoD's draft of a bill embracing the Bolté recommendations runs to 160 pages. But it all boils down to this elemental purpose: to establish a common system for the appointment, promotion, and retirement or separation of officers in the Army, Navy, Air Force, and Marine Corps.

One reason that the Bolté legislation is so extensive is that it is an attempt—and on the whole an excellent one—to make up for eighteen years of neglect by the Congress to legislate on personnel problems as they arose subsequent to the Unification Act of 1947.

Before that time, for a century and a half, separate committees of Congress had dealt with the Army and the Navy. In 1947, Congress merged the Naval Affairs Committee and the Military Affairs Committee of the House and Senate into their respective Armed Services Committees. But it has never really sought to bring together the body of laws affecting military personnel that had gone into the books over the years. Military personnel of the various services are working side by side in joint headquarters and commands worldwide. Yet, after eighteen years of unification, they are still governed by widely differing standards of promotion, retention, and retirement, which inevitably create problems in morale and command relationships.

The immediate, but perhaps not the most important, problem which Bolté legislation would resolve is the disparity in promotion opportunities for Air Force field-grade officers, which is "substantially lower than for their counterparts in the other services," as Gen. John P. McConnell, USAF Chief of Staff, told the House Armed Services Committee in March.

"In addition, those who can be promoted must wait up to three years longer than officers in other services," General McConnell said. "The disparity results in large part from the difference between statutory field-grade authorizations for the services."

As Maj. Gen. Thomas E. Moore, USAF Director of Personnel Planning, explained in reviewing the problem before a House subcommittee recently:

"In 1954, the Officer Grade Limitation Act . . . provided separate field and general officer grade tables for the Army, Navy, and Air Force. The Air Force table was much more restrictive than those that applied to the other services. This restriction was reasonable in 1954 since Air Force positions were manned by a relatively young officer force. The table was designed to provide a restricted promotion flow which would prevent too many young officers from progressing too rapidly to the higher grades. . . . It was recognized, however, that as the officer force matured, the Officer Grade Limitation Act table would have to be adjusted."

Congress has never gotten around to adjusting the 1954 OGLA table. Instead, in 1959, it gave the Air Force temporary authority to exceed the limitation by 3,000 major spaces. In 1961 it extended the Air Force temporary authority to exceed OGLA limitations by 4,000 lieutenant colonels, and renewed that authority for two years in 1963. The latter extension expires on June 30.

But even these periodic adjustments, welcome as they are to the officers they made eligible for promotion, have not given the Air Force equal treatment in promotion opportunities.

As a result of the "cumulative and continuing effect of this disparity," General Moore declared, "the Air Force has gradually fallen behind the other services in both promotion service points and opportunity of selection.

"The Bolté proposal," he said, "will provide comparable percentages of field-grade officer for each service." But even if it is passed this year, the Air Force would not achieve full promotion parity with the Army and Navy for five years.

Congress itself initiated the request for the Bolté study. In 1959, when the Air Force persuaded Congress that some relief was needed in restrictive provisions of the 1954 OGLA Act, several members of both houses suggested that this piecemeal action was no substitute for a general overhaul of personnel legislation. President Eisenhower agreed and called on the Defense Department to establish an *ad hoc* committee to perform the task. That committee, composed of two senior retired officers of each service, was headed by General Bolté.

Rep. Carl Vinson of Georgia, then Chairman of the House Armed Services Committee, wrote the Defense Department in June 1960 saying: "I quite agree that a study of this nature should be conducted. . . . I know that the Committee . . . will be vitally interested in this undertaking. I can assure you that we wish to cooperate. . . ."

The Bolté committee completed its draft in December 1960. Then followed more than two years of review and amendment by the services. By the time the legislative proposal was submitted to Congress in March 1963, the "vital interest" had apparently waned. Neither the House nor Senate took it up.

In their defense, it is only fair to note that Congress did pass several important bills affecting the armed forces that year, including the biggest pay raise in history. But the Bolté proposal was also ignored in the second session of the Eighty-eighth Congress last year. It died when that session came to a close.

This year, on March 12, the Defense Department again forwarded the measure to Congress. It has not yet been introduced in either the House or Senate.

The House Armed Services Committee is busy on Secretary McNamara's proposal to reorganize the Reserve Forces. Next it will take up military pay. Not until these are out of the way, says Chairman Rivers, can they even look at Bolté. Besides, he has noted privately, the Senate Armed Services Committee has indicated little interest in the bill. Why should we spend a lot of time on it, he says, if the Senate isn't interested?

There is just a possibility, however, that some interest may be generated in the Senate. If so, the House could be expected to follow suit.

As with any proposal of this magnitude and complexity, the Bolté proposal has some critics. Reserve officers object to the fact that it would wipe out ROPA "hip-pocket" promotions, overlooking the point that in the Air Force at least it would make possible more rapid promotion of active-duty Reservists and Regulars alike. Nor would it deprive anyone of promotions already earned. Some generals—and senior colonels, perhaps—object to the fact that it authorizes no additional general officer spaces in the Army and Air Force.

But these objections are minor compared with the results the Bolté proposal is designed to achieve. The proposed legislation goes into so many different but related matters that singling out any one change could only serve to distort the over-all framework. It will take some time for both houses to give it a thorough airing, when diverging viewpoints can be presented. Certainly, since the reforms the study proposes are far-reaching, they require detailed analysis.

The type of men we need as career officers are always in short supply in comparison with our total national needs. The management of military officer careers must offer recognizably fair opportunity for advancement as a basic condition of career service. *All* of these problems, in the broad sense, are common to *all* of the services, and in unanimously endorsing this legislation, the President, the Secretary of Defense, and the Service Chiefs have underscored their concern for timely and effective reform.

The task may be formidable, but the Congress of the United States is no place to shrink from an urgent duty. The action is long overdue. Putting it off any longer can only make a bad situation worse.—END

**Senate Armed Services Committee, led by Georgia's Sen. Richard Russell, may be first to take up Bolté bill.**

**Chairman L. Mendel Rivers (D.-S. C.), says his House Armed Services Committee is busy on pay, Reserve merger.**

**Gen. Charles L. Bolté, USA (Ret.), headed group which prepared comprehensive officer personnel proposal.**

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# AIRMAIL

**Don Quixote Revisited**

*Gentlemen:* While I enjoyed J. S. Butz, Jr.'s article titled "The Test of Fighter Aircraft," in the February issue of AIR FORCE/SPACE DIGEST, I feel your photograph of successful fighter operations in World War II was the worst you could possibly have used. Don Quixote had nothing on that pilot. The target in the photograph, while supposed to be a flak tower, is merely a water tower common throughout France and Germany.

Having flown 100 missions in the ETO in a P-47 I have for many years held the opinion that almost all of those so-called flak towers which were attacked with ferocity were of absolutely no military significance.

I would certainly be glad to be proved wrong, and hope I may hear from you on this matter.

MAJ. J. A. SWEIZIG,
APO 207, New York

• *We've taken a closer look and must agree that it's most likely a water tower, not a flak tower. Our only defense is that the caption furnished by USAF called it a flak tower.*

*We are told by AF photo-office people that our photo appeared originally in an intelligence manual in which it was also referred to as a flak tower. The error apparently has been compounded down through the years. USAF has assured us that the accompanying photo is a real, honest-to-goodness flak tower.*—THE EDITORS

**Letter to a Congressman**

*Gentlemen:* In connection with your excellent editorial "To 'Rat' Or Not to 'Rat,'" in the March AIR FORCE/SPACE DIGEST, I thought you might find of interest a letter I wrote in January to Senator Stuart Symington.

R. D. FISHER
Willow Springs, Mo.

• *We do indeed find the letter of interest and think our readers will too.* —THE EDITORS

*Dear Mr. Symington:* You are going to get a lot of mail and personal contact on this subject, and it will be pretty one-sided, I fear, so I don't want to let the opportunity pass to register with you an opposing view.

News media are filled with the story of the Air Force Academy cheating scandal. Widely read columnists and editors are questioning the wisdom and merit of the traditional honor code. Parents of sons who were not guilty of cheating, only of failing to report violations known to them, are crying, "I didn't raise my boy to be a tattletale." And from reports of public reaction it appears likely there will be "parent's" investigations following congressional investigations following military investigations of the whole affair.

**The photo above, which appeared on page 26 of the February issue of AIR FORCE and was identified there as a World War II German flak tower, turns out to be, instead, a defenseless water tower under attack by a P-47. At left, also under attack, is what USAF photo officers tell us is a genuine flak tower.**

With your congressional committee position, plus your own Air Force background, I can safely bet you are going to be right in the middle of it all.

Without doubt you are reading everything I am, and more, and it occurs to me from these reports that all these people are overlooking the point that there is a vast ethical and moral difference between malicious tattling and the essential duty of informing in a matter of importance relating to the fundamental principles of honor and integrity affecting the development and growth of these young men in a career of their choosing.

For those who appropriated and sold, and those who bought the examinations, no comment is needed. But it is in the area of those who wavered in an unpleasant decision and turned about face to the character flaws of fellow airmen who disappointed their ideals in violation of the code of honor all had sworn to uphold, that lies the danger of public attitude weakening a tradition which is the foundation and strength of a firm reliance of one man upon another. And without this unquestioned and unspoken trust in one another, these men cannot function ably in the rarefied atmosphere of the career to which they aspire. They must be able to rely on one another when the chips are down, as we rely upon them. These are the men who must be a nation's model. Those who do not, or will not, measure up simply belong in another area of endeavor.

I value the solidity the honor code gave to me and my fellow Cadets years ago. We became truly "birds of a feather."

I say it works. It is a required ingredient to the confidence of all people everywhere. Any weakening of it diminishes you, and me, and the nation.

R. D. FISHER

**Into the Big Drink**

*Gentlemen:* I am most anxious to locate the four members of my crew who were involved in an incident off

*(Continued on following page)*

the coast of Atlantic City, N.J., on the night of June 7, 1942. My purpose is to have a reunion and to gather data for an article about the incident.

While on patrol duty searching for enemy submarines we were caught in a storm shortly after midnight. Running low on fuel, the bomb load was jettisoned and I ordered the men to jump for the beach. Lt. R. W. Depke, copilot, Lt. Col. Carson Borror, a passenger, and Sgt. F. R. Luke, radio operator, bailed out. Sergeant Luke landed waist deep in the surf, climbed from his parachute harness, and waded ashore. Pvt. Walter B. Egoff, the bombardier, and I came down in the plane fifty feet offshore.

I would also like to find out the name and address of a B-18 pilot from Mitchel Field who made a night forced landing in the Atlantic Ocean, south of Jones Beach, L.I., N. Y., while on an antisubmarine patrol mission sometime between the period of May 1942 and August 1942. I have an important message for this pilot and/or crew members.

LT. COL. M. J. FITZGERALD, USAF (Ret.)
3401 So. Louisville
Fort Smith, Ark.

## WE HAVE NOT FORGOTTEN

In the spring of 1940, the French radio announced the armistice, but for many of the combatants and others among the youth of France, the war was not considered terminated. Many volunteered to reenter combat. The allies offered this opportunity, but the volunteers were required to depart from France on their own initiative. The route through Spain was the principal path of escape, but capture usually meant a long prison term or internment in a concentration camp. Many went directly from Spain to England, or onward to Canada. Others who crossed to North Africa were sent to the United States for training.

For most aviators, this reentry into service involved an extensive training program. More than 5,000 men profited from the wartime training courses sponsored by the US Air Force between 1943 and 1945. During this period, 1,202 Frenchmen were awarded American pilot wings (657 were assigned to fighters and 545 to bombers), sixty-two graduated as navigators, 221 as bombardiers, and 2,371 received diplomas as radio operators, gunners, or mechanics. About eighty trainees were lost as the result of stateside training accidents.

After the war and up to 1954, an additional 2,310 Frenchmen were sent to the United States as student pilots, and 1,427 were commissioned.

Today, all those who were welcomed into the United States for USAF training hold fond memories of their stay on the other side of the Atlantic. This opportunity offered them experience in the American way of life, the chance to receive valuable technical training, and the establishment of a close working relationship with their American comrades-in-arms.

To keep in touch after their return home, the French veterans immediately established an association known as "Veterans of C.F.P.N.A." (Centre de Formation du Personnel Navigant Formé en Amerique). Unfortunately, the original organization, perhaps premature, lasted only a few months. Finally, in 1961, Roland Willaume decided to revive the association. His dynamic presidency resulted in today's active 200-man organization, now known as the "Association du Personnel Navigant Francais Formé aux Etats-Unis."

The objective of this association is not only to maintain the ties of friendship among former trainees for mutual aid, but also to revive the bonds of friendship with their American friends who yesterday were their instructors or brothers-in-arms. They also wish to promote, by all possible means, the relationship between France and the United States in the field of aeronautics, and for that reason their French group retains close ties with the US Air Force Association.

More than 500 active-duty officers of today's French Air Force have received training in the United States; in fact, one-quarter of all current French Air Force pilots have received American wings.

All the members of the association of French trainees desire to maintain a close liaison with their American friends and stand ready to provide a current knowledge of the activities of France's Air Force, her aviation industry, and her aeronautical technology.

Depending upon the specific interests of the readers of AIR FORCE/SPACE DIGEST, the French vets are prepared to communicate with their former comrades-in-arms through the pages of this magazine.

JACQUES NOETINGER
President de l'A.P.N.F.-USA
US Graduate Fighter Pilot
Former Instructor at Craig Field, Ala.
*(Translated from the French by J. J. Driscoll.)*

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# AIRPOWER in the news

**By Claude Witze**
SENIOR EDITOR, AIR FORCE/SPACE DIGEST

## Our Intent and Resolve

WASHINGTON, D. C., APRIL 13

Dwight Eisenhower's careless debasement of the "military-industrial complex" in his White House valedictory has been rebutted again, this time by Gen. Curtis E. LeMay, recently retired USAF Chief of Staff.

General LeMay recalled that in 1946 General "Hap" Arnold, wartime boss of the Army Air Forces, had urged that the alliance credited with beating both Germany and Japan be continued. Those victories, it was made clear, were not made possible by mass production alone. The technical superiority of the weapons was equally important.

This was recalled by General LeMay at the annual dinner of the National Security Industrial Association, where he was named recipient of this year's James Forrestal Memorial Award. Last year the distinction was won by Defense Secretary Robert S. McNamara, who used the platform to give the first public hint that the Johnson Administration was considering the option of attacking targets in North Vietnam.

General LeMay found it fortunate that we still have an alliance of the military, industrial, and scientific communities. He sees no reason to assume that it will not endure, but he thinks there will be some discouraging years ahead. The general said that we have created a dilemma in the struggle for technical superiority because the things we can do in the area of weaponry "cost so much that we must pass up more than we can elect to build." This means that conservatism is fertilized by economy at a time when the nature of the technology calls for us to be bold.

The former Chief of Staff emphasized that he was not attacking the size of the military budget, or saying that our security is being endangered in the interests of economy. His concern is with the fact that the services have to get along with what is authorized, even when they know better weapons can be built. He did not cite cases or persons in this regard, but it was clear that he is worried by the prospect that potential enemies may find application for technological advances.

General LeMay then pointed to the constant effort to improve existing weapons instead of developing new ones —and to the school that would stop looking for new breakthroughs or the one that views weapon advances as provocative. Then he said, "It is the patriotic duty of the military, industrial, and scientific communities to speak out firmly if they feel the danger signs are not being heeded." He said that these communities have "a right and duty to express opinions along these lines in direct proportion to the responsibility we bear for defending the country."

The General then urged that attention be given to three potential development areas:

● Space: Watch for developments by Russia "that are more in keeping with aggressive than peaceful objectives."

"Already there is considerable reason for concern about Soviet capabilities in space. Many of the techniques the Soviet Union has developed so far point strongly toward a military space effort. The development of a capability by the Soviet Union to deliver strategic weapons from near space or to deny to the US the opportunity to continue its present programs in space would amount to a serious threat and would negate our present favorable balance of military power.

**Gen. Curtis E. LeMay, retired USAF Chief of Staff, right, receives the 1965 James Forrestal Memorial Award, top annual honor bestowed by the National Security Industrial Association. Presentation is made by Robert S. Stevenson, award chairman and Chairman of Allis-Chalmers Mfg. Co.**

"It is in the area of space that Soviet technological developments are most likely to bypass this generation of US weapon systems.

"At the present time, the US is busily attempting to assess Soviet intentions in space. Are they peaceful or aggressive? Our national record during the past twenty years in evaluating Soviet intentions has not been outstanding. Very nearly all Soviet acts of aggression have had an element of surprise attached to them. The Soviet space program is being conducted today in the same secrecy that is used to protect military operations, and it, too, has been characterized by surprises.

"Under the circumstances, then, we would do well to keep a watchful eye on the Soviet space program, and to give the benefit of all doubt to our national security and not to unsubstantiated Soviet statements of peaceful intentions."

● China's A-bomb: Watch for development of a true nuclear weapons capability, "ominous from a free world point of view."

"Though the Red Chinese do not at present possess an intercontinental delivery system for carrying out a

*(Continued on following page)*

surprise nuclear attack upon this country, the development by them of such a system is within their technical competence. Any effort on their part to develop such a delivery system along with a continuing effort to develop a nuclear weapon would have to be viewed as an extremely serious threat to the United States.

"We must recognize that a delivery system for a preemptive nuclear attack by Red China could be very unsophisticated, as compared with one that would have to withstand an initial attack and operate in retaliation.

"We should also bear in mind that Red Chinese leaders have often declared that they do not fear a nuclear war and that they believe their massive population could absorb the losses from such a war."

General LeMay held up the threat that world agreement to ban all nuclear weapons would not end the threat of Red China. That country would gain a major strategic victory, he said, "by emerging as a leading conventional power in a world of weakened conventional nations."

• The United Nations: Watch for further deterioration "of the power of the United Nations or of its related regional defense organizations to maintain peace. . . ."

"In recent years Communist bloc countries have tried with some success to undermine the efforts of the United Nations and the several regional defense groups in their attempts to apply their legitimate international police powers.

"The United States and the free world nations have all endorsed the principle that aggression anywhere is a threat to world peace, and they have supported international police action as a proper means for halting aggression. If the UN and the regional defense organizations, however, continue to lose their effectiveness in discouraging aggression, or in suppressing it if it breaks out, then the US will have to consider adjustments in its defense policies."

He did not mention policies but declared "our intent and our resolve are more in question than our strength."

As for the military-industrial complex, with its scientific supporters, he said, "We must look further into the future to foresee the threats that lie ahead and to provide the means to protect our land and people."

Left unsaid by the General, was the clear message that the complex *has* to look ahead because many of its worrisome critics are shortsighted.

## Give and Take

The vote in the Senate was 85-0, and there was no controversy on the floor. The bill provided authorization for expenditure of $15,283,800,000 in Fiscal 1966 for military procurement and research and development. It was Senator John Stennis, Mississippi Democrat, who acted as floor manager. For a man who has been fairly critical of the Pentagon, he was generous in his praise of Defense Secretary Robert McNamara's ability and energy and the economy with which the nation's security status has been attained.

At the same time, there are at least a couple of instances in which the Armed Services Committee endorsed recommendations of the Joint Chiefs of Staff after they had been turned down by the Defense Secretary. Senator Stennis told the Senate: "The committee added $82 million to the Air Force research and development authorization in the aircraft and related equipment activity. This additional $82 million is intended to fund the project definition phase of work on an advanced manned strategic aircraft in Fiscal Year 1966. The Joint Chiefs of Staff unanimously recommended that work on this aircraft should proceed to the project definition phase in 1966, and the committee agreed. This committee action is consistent with its frequently expressed opinion that it is important to expedite work on a new manned bomber. . . ."

He went on, saying that the committee "is inclined to believe that the estimates of the Department of Defense are too optimistic on this point and that it is a matter of urgency to hasten the development of a new manned aircraft. . . ."

Senator Howard Cannon (D.-Nev.) lent support to this. He pointed out that the matter of a new manned bomber has been under review since 1961 and that the Defense Department has refused to spend the funds authorized and voted for the project. Mr. Cannon said that the older models of the B-52 will have to be retired by the end of fiscal 1966, long before a replacement aircraft can be ready. He disclosed that the USAF Chief of Staff, Gen. John P. McConnell, had testified that the decision to proceed on a new bomber cannot be put off beyond Fiscal 1967.

The committee, and the Senate, also took issue with Mr. McNamara on the nuclear submarine program. Mr. Stennis recalled that the program presented by the Pentagon a year ago called for the construction of six nuclear-powered attack submarines each year for several years. Now, for Fiscal 1966, the request was cut to four.

"The Joint Chiefs of Staff had unanimously recommended that this construction be at the rate of six," the Senator said. "The committee agreed with this view and added the necessary $133.6 million to permit the construction of two more nuclear-powered attack submarines."

A new and stern approach to research and development came to surface in the Senate action. It has made an across-the-board cut of five percent in the requested funds for research work in all branches. Mr. Stennis said the cost of military R&D has increased steadily in the past four years and that a large part of the work has been basic research, or study, or analysis. He continued:

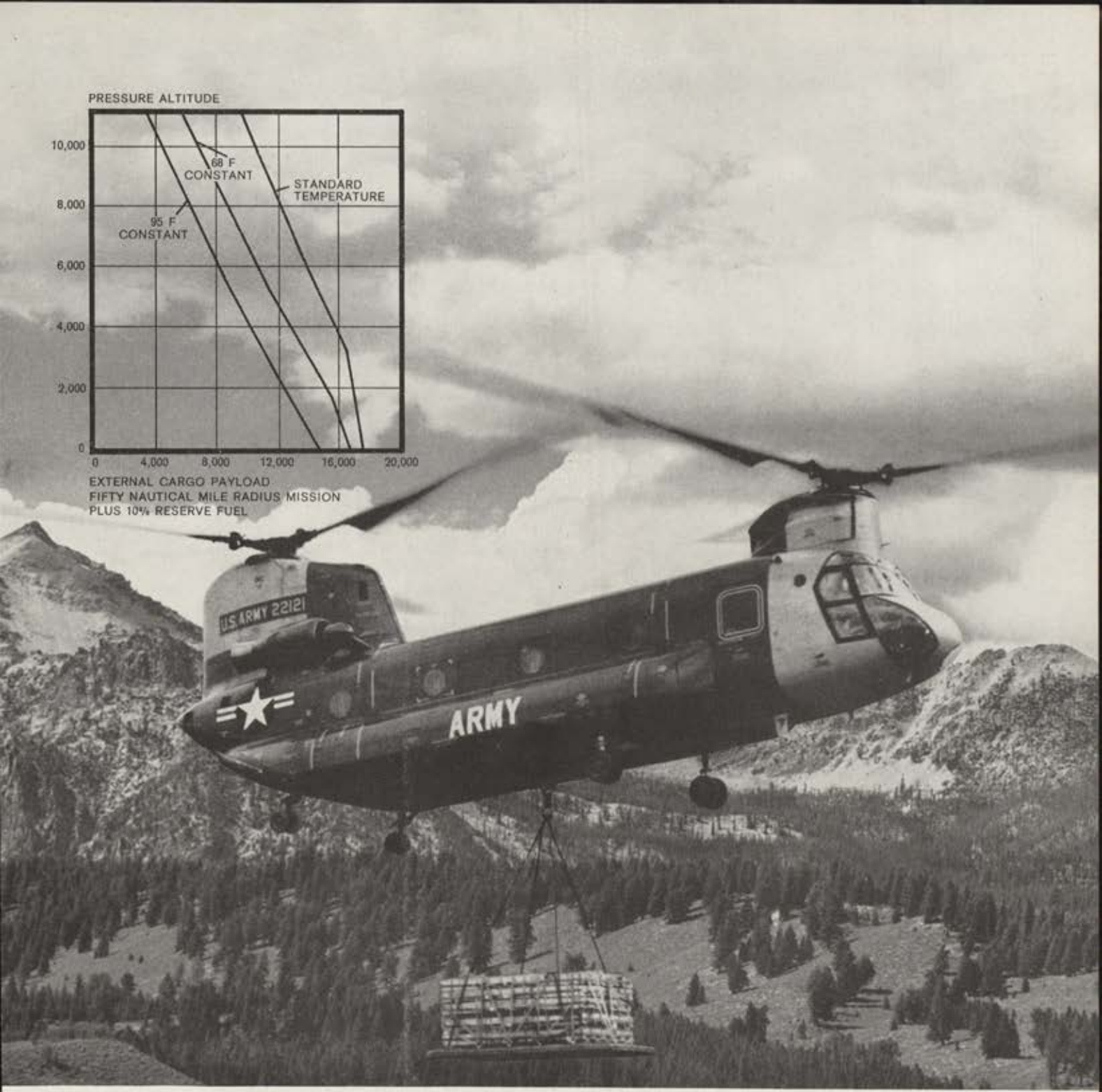
"The Committee has made its research reductions in the military science activity because of an opinion that the practice of contracting for study and analysis by nongovernment agencies is perhaps being overdone, and also because of a doubt whether much of the work . . . really produces results beneficial to the national security.

"There is no failure to recognize that much of the basic research is nonproductive by its very nature, or that it is difficult to judge performance or success in this kind of work," Mr. Stennis said. He added that the committee does not believe the five percent cut will be harmful and that the Secretary of Defense can transfer funds from other accounts if he has to.

While he did not offer any suggested program, Senator Stennis said Congress should do something to stop current speculation that the draft may be ended. He said he cannot see any basis for the discussion and said it hinders "the proper flow of men into the services."

The war in Vietnam was recognized to the extent that it is draining the combat readiness strength of the US Army. Mr. Stennis said, without criticism, that Secretary McNamara has given the Vietnamese theater a top-priority claim on Army men and money. He recognized that rate of attrition is a deep concern of the armed forces.

There was no mention of the Air Force in this connection. The continued and stepped-up intensity of the air war against North Vietnam is costing both the Air Force and Navy a toll in men and aircraft. These losses have not yet been faced by the Pentagon or Capitol Hill.—END




# Take to the hills...and hover

High terrain may be the optimum for line-of-sight communications links, but it poses tough transportation for men and equipment.

And here's where the CH-47A Chinook will prove itself invaluable for the USAF's Tactical Air Control System, key to joint Air Force & Army coordinated operations. This versatile helicopter, with its remarkable hover capability, can externally lift radar and communication systems, supplies and ancillary equipment with the systems personnel in the cabin. Other missions in the Tactical Air Control System such as the deployment of vehicles, equipment and personnel of the Forward Air Control Parties can be totally carried internally. All can be accomplished in a minimum of time and with a minimum of landing site preparation.

Part of this is due to the tandem-rotor configuration which develops high lift and exceptional balance and stability. It gives the Chinook the ability to hover out of ground effect at a 6,000 foot altitude in temperatures of 95 F; lift an external load of 8,200 pounds; take it on a 50 nautical mile mission and return to base. On missions to low-lying savannahs it can perform even better, carrying up to 17,850 pounds external payload for the same 50 nautical mile range.

The CH-47A Chinook is in volume production and as a result of extensive field operations and testing was designated by the Dept. of Defense as "Standard" equipment. It is the product of creative engineering and forward-thinking weapons system management of the Boeing Company.

**BOEING**
VERTOL DIVISION
MORTON, PENNSYLVANIA


PAN AM

PHOTOGRAPHED AT PAN AMERICAN WORLD AIRWAYS, HANGAR 14, KENNEDY AIRPORT, NEW YORK.

# This JT4 is not scheduled for another overhaul for 3,000,000 miles.

The Federal Aviation Agency recently authorized an increase in the time between overhaul of the Pratt & Whitney Aircraft JT4 engine to a new high level of 6,200 hours.

This authorization, to Pan American World Airways, means that the JT4 may power aircraft 3,000,000 miles between overhauls. These engines, in service nine hours every day, will not require overhaul for 22 months.

The FAA has increased TBO authorizations for Pratt & Whitney Aircraft turbofans at even faster rates. The military turbofans have also shown remarkable improvements in operational service.

Reliability characterizes all Pratt & Whitney Aircraft powerplants, whether for aircraft, spacecraft, industrial or marine use. Proved reliability is one reason why Pratt & Whitney Aircraft engines power so many of the commercial and government aircraft of the Free World.

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A

*A Special Report on Titan III*

# Accent on 'Can Do' at Low Cost

**Brig. Gen. Joseph S. Bleymaier, USAF, Deputy Commander for Manned Space Systems, Space Systems Division, AFSC, Los Angeles, Calif., reported to Aviation/Space Writers in Washington April 13 on the encouraging progress and prospects of the Air Force Titan III family of versatile space boosters.**

BRIG. Gen. Joseph S. Bleymaier, USAF, Deputy Commander for Manned Systems, Space Systems Division, Air Force Systems Command, was in Washington, D.C., the week of April 12 to receive the Arnold Air Society's John F. Kennedy space achievement award for his management leadership in the USAF Titan III space booster development program.

During his visit to the capital, he appeared before an Aviation/Space Writers Association meeting to report on the progress of Titan III. What he said should provide strong encouragement to space planners who have for years been calling for lower space-boosting costs and the use of advanced technology in the development of versatile second-generation space vehicles.

## Lower Costs

"Typically," the General told the aerospace correspondents, "our present inventory of smaller vehicles costs $2,000 to $3,000 per pound of payload delivered to low orbit. Our larger existing boosters still are costing more than $1,000 per pound of payload.

"Now, with the introduction of the Titan III, we can come down to *$500 per pound of payload put into orbit for certain missions.*" Italics are ours.

## Flexibility

"Titan III's flexibility," he reported, "is not necessarily confined to the 5,000- to 25,000-pound payloads possible in the A [minus the two 120-inch solid-fueled strap-on motors] and C [with the solid-fueled strap-ons] configurations.

"...By substituting segmented 156-inch solid-rocket motors for the 120-inch motors of the Titan III-C, a new performance plateau becomes possible. Two three-segment 156-inch solids could almost double the payload capability of the system, or, in other words, give us a payload in the neighborhood of twenty tons.

"The flexibility implicit in the system is further illustrated," he said, "in the Titan III-X configuration," which will be able to accommodate a variety of upper stages, including the NASA Centaur.

Payload flexibility is another plus of the Titan III system, the General pointed out:

"Depending on how many segments we add during assembly of the two solid motors, we can—in effect—program payloads of 10,000, 12,000, 14,000, 18,000, on up to 31,000 pounds, using two to seven segments in the 120-inch [solid] motors.... [This] is comparable to off-loading unneeded fuel from a large aircraft. You don't have to lift the extra weight, and furthermore, you don't have to pay for it.

"We can perform, with Titan III, the five basic space maneuvers—direct injection into circular orbit, attainment of a precise earth orbit, transfer from one orbit to another, attainment of synchronous earth orbit, and escape," the General emphasized.

That, plus Titan III's quick reaction time required for military operations, bought for a development price within planned limits, is heartening space-age news.—END

**An artist's sketch of Titan III-C as it would look rising from its Cape Kennedy, Fla., pad. Strapped to the Titan core are two solid motors, one on each side, which give an added powerful kick to the thrust power and can be tailored to various missions.**

## Another job for the versatile Hercules: Rescue service on the fly

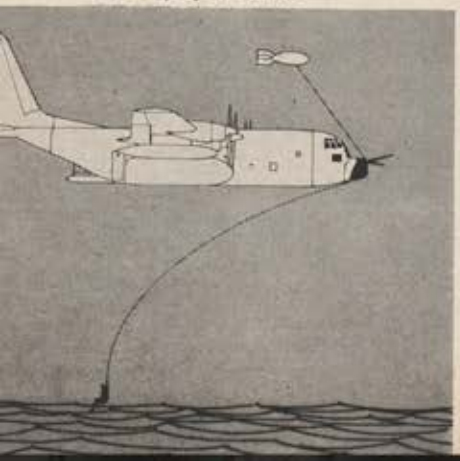
When is a C-130 not a cargo plane? When it's an aerial tanker, an assault troop carrier, a zero-G test plane—or in the case shown above, when it's the Air Rescue Service's new global search-recovery-rescue HC-130H Hercules.

This newest role for our amazing workbird makes possible the recovery of personnel and materiel anywhere on the earth's surface, day or night. Astronauts or valuable space hardware can be snatched from the ocean. Civilian and military people in distress can be picked out of trouble zones. With bigger engines, more fuel and special tracking electronics, the HC-130H system will patrol the world in support of NASA's manned space flight programs.

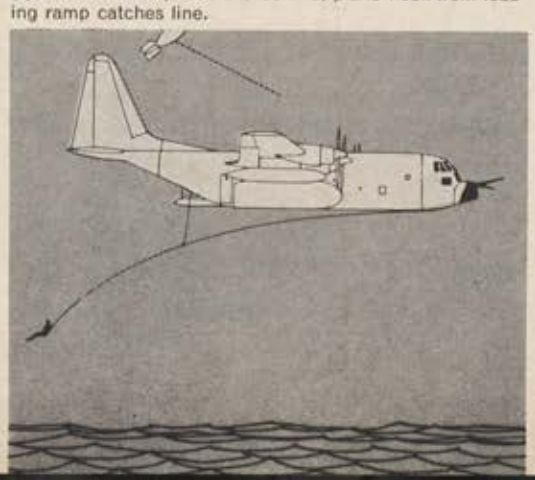
It's not surprising that Air Force Systems Command chose Hercules for rescue missions. With more than 775 at work around the globe in 29 other versions, the C-130 has proved itself to be just about the most dependable, most adaptable airlifter in production today . . . a plane that will be on the job for years to come.

Lockheed-Georgia Company, Marietta, Ga.: A Division of Lockheed Aircraft Corp. **LOCKHEED**

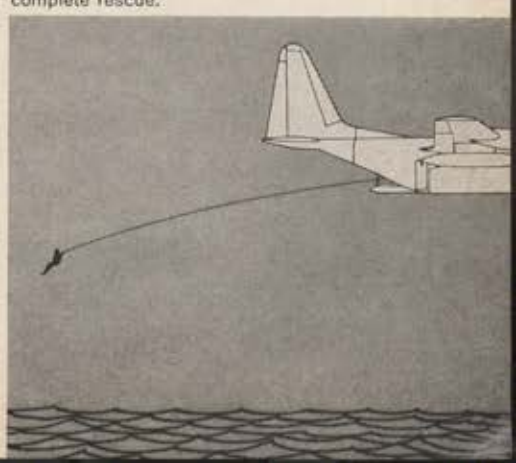
**(1)** V-yoke on nose snares balloon-lifted nylon line sent up by astronaut.



**(2)** As recovered pilot trails behind, plane hook from loading ramp catches line.



**(3)** Pilot is reeled safely into Hercules to complete rescue.



*News, Views & Comments*

# AEROSPACE WORLD

**By Allan R. Scholin**
ASSOCIATE EDITOR, AIR FORCE/SPACE DIGEST

WASHINGTON, D. C., APRIL 15

USAF B-52 bombers are standing by in the wings on Guam, ready to play a major role if they should be needed in the air drama unfolding over Southeast Asia.

For the present, the SAC bombers are performing their familiar role as a deterrent to any further plans the North Vietnamese and Communist Chinese might be hatching to enlarge the war in South Vietnam.

As the US made clear in its White Paper on Vietnam, attacks by US and South Vietnamese aircraft on targets in North Vietnam were in response to North Vietnam's overt support, in terms of men and equipment, to Viet Cong guerrillas. Neither the US nor South Vietnam has initiated steps to enlarge the war, but both make it clear they will not hesitate to take effective countermeasures against new acts of aggression by the Communists.

B-52s, armed with conventional munitions, would be particularly effective against stationary targets—airfields, radar sites, and bridges. Working with KC-135 tankers based on Okinawa, the Philippines, and Thailand, B-52s could carry four times the bomb load of an F-105.

In air strikes against North Vietnam, it has been US policy to use the minimum force necessary to hit sensitive points in North Vietnam's rail and road network, hampering the flow of men and supplies into South Vietnam while seeking to convince Ho Chi Minh that his country will get hurt if he persists in supporting the Viet Cong. (*See also the article on Vietnam, page 33.*)

The flaw in that policy is that US and South Vietnamese air forces have been getting hurt too. Even without air opposition, aircraft losses have been high. According to US count, twenty-seven US and VNAF planes have been shot down by enemy ground fire in 1,400 sorties since the strikes began February 7. Twelve aircrew members were killed or are missing or captured.

It was particularly embarrassing that, in the first engagement with enemy aircraft on April 4, a flight of antiquated North Vietnamese MIG-17s shot down two F-105 fighters. That kind of result, far from discouraging the North Vietnamese, can only whet their appetite.

USAF leaders in South Vietnam, not all of whom subscribe to the inch-by-inch theory of meeting aggression, protested in strong language that we were sacrificing men and aircraft, and damaging the credibility of our air strength, by withholding the kind of aircraft that could have shot the MIGs out of the sky.

Within twenty-four hours, the US set up a shuttle of USAF F-4Cs between the Philippines and Thailand, and the Marine Corps shifted a squadron of eighteen Phantom IIs into Da Nang in South Vietnam.

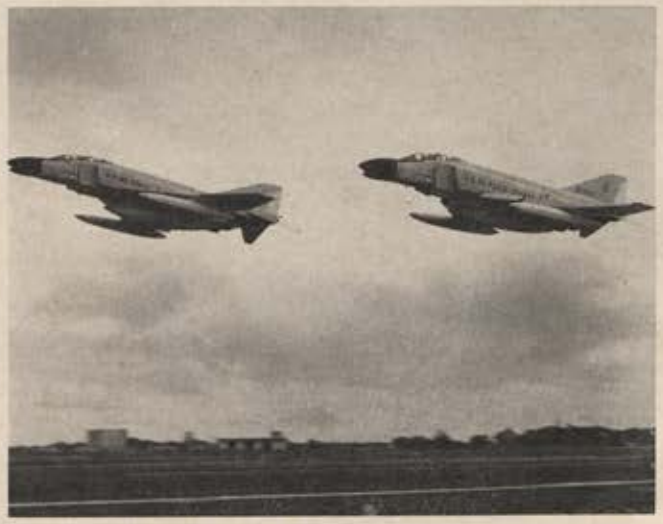
These planes, with airborne radar capable of spotting intruding aircraft and the speed to engage them quickly, are now flying cover for the fighter bombers. In the maze of diplomatic ground rules governing US use of Thailand bases, planes may not take off from there directly for action against North Vietnam or Laos, but must stage elsewhere en route to possible combat. It is possible, of course, that this staging may occur at 35,000 feet over South Vietnam in a refueling contact with a SAC KC-135.

At this writing, the presence of Phantoms has apparently persuaded the North Vietnamese not to risk their MIG-15s or -17s against US and VNAF fighter strikes. None of their MIGs has appeared since the April 4 encounter. US Navy Phantoms tangled with a flight of MIG-17s near the Chinese Communist island of Hainan off North Vietnam on April 9. But these, according to the Red China news agency, were Chinese MIGs based on Hainan which rose to the attack when the Navy planes "intruded into China's territorial airspace."

The next move is up to North Vietnam. If they decline to challenge the F-4s, US and VNAF fighters will continue to hit the sources of their military strength until they withdraw their support of the Viet Cong. But if they call for help from Communist China, and get it, the B-52s will be ready.

☆

The British decision to cancel their TSR.2 tactical strike/reconnaissance fighter has been a traumatic expe-



**USAF and Marine Corps F-4s are now flying top cover for fighter bombers in North Vietnam raids. They were rushed into area when MIG-17s shot down a pair of USAF F-105s.**

rience for Britain which may have a far-reaching effect on the US and the entire free world.

It brought forcefully home to the British that they can no longer afford to maintain an independent frontline aircraft industry, but must seek closer ties on the Continent. And it has prompted the British government to reexamine its military role in NATO and elsewhere.

The British had previously accepted the cancellation of their P.1154 VTOL fighter, which is to be supplanted by the McDonnell F-4 Phantom II, and their HS 681 VTOL transport, succeeded by the Lockheed C-130.

But giving up the TSR.2 was much like having the finance company repossess your brand-new car, after all your neighbors had complimented you on it.

Under the circumstances, it was hardly consoling to be told that the US was prepared to furnish still another replacement in the F-111, along with a billion-dollar long-term credit to pay for it.

The first real blow was dealt to the TSR.2 program late in 1963 when the Australian government chose to buy the F-111 instead of the TSR.2. Britain had counted on export sales to reduce unit costs. To equip its own forces, the British needed only 150 planes. At an estimated over-all production cost of more than $2 billion, each plane would have cost $14 million. With much of the British aircraft industry already subsidized, and facing a serious balance of payment deficit, the Labor Government saw no choice but to cancel the program.

"After taking full account of all future charges and payments on both aircraft," said James Callaghan, Britain's Chancellor of the Exchequer, "it now is estimated that a full program based on the F-111A would be £300 million [$840 million] less than the corresponding TSR.2 program."

But in discussing the TSR.2 decision before the House of Commons, Denis Healey, Britain's Defense Minister, acknowledged that the whole question of whether Britain really needs the F-111, and if so, how many, is under review.

In a White Paper issued in February, Mr. Healey had indicated that the British government now regards a nuclear war between the Soviet Union and the West as unthinkable, and a European ground war so unlikely as to make substantial forces there largely unnecessary. Instead, it intends to concentrate its military strength in a peacekeeping role "East of Suez," mainly in the Middle East and in the Malaysian-Indonesian confrontation.

Under those circumstances, the British may well decide they can get along for some years with Phantom IIs and the P.1127 VTOL fighter they have just ordered into production to replace their Hawker Hunters. (*See also "Letter from Europe," page 70.*)

The second effect is to drive the British into closer liaison with the French. They recently decided that, despite the budget problems, they could continue the Concorde supersonic-transport program in partnership with France. Britain is also planning to join the French in building a low-cost trainer/strike fighter, apparently based on the Breguet 1210 design. This, in turn, may lead to joint development of a first-line variable-geometry fighter roughly equivalent to the F-111 and tentatively designated the P.45. This aircraft could be ready by the time Britain's Phantom IIs are obsolete.

"The French realize that we both face very similar problems in our aircraft industries, and that our operational requirements have much in common as well," Mr. Healey said.

"Whatever operational needs we have in common we will produce together or buy from one another. Apart from the strike fighter and the variable-geometry aircraft, we found we both need certain types of helicopters and an airborne early-warning craft. Some of these aircraft will undoubtedly be produced jointly in both countries."

It would be ironic if the US F-111 offer should turn out to foster a closer British-French partnership. De Gaulle would like nothing better than to unravel some of the ties between Britain and the US. But the US is moving steadily toward closer technological relationships with West Germany—a number of US aircraft manufacturers have bought an interest in German firms—and the British-French partnership may seem to both nations a necessary antidote.

Roy Jenkins, Minister for Aviation, put it this way in a recent BBC television interview:

"I don't intend that we do everything with the French and nothing with the Americans, though I believe that collaboration with the French will tend to flow more successfully, not because of any good will or ill will on one side or the other, but because of the facts of the situation. . . .

"From a political point of view it is on the whole easier at the moment to cooperate with Washington than with Paris. . . . On the other hand, you have the difficulty that the American aircraft industry is self-sufficient and doesn't really want much, if anything, from the British aircraft

*(Continued on page 26)*


**SAC KC-135 tankers based on Okinawa and Philippines to refuel fighters on missions to and from North Vietnam would enable the Guam-based B-52s to deliver heavy bomb loads.**


**Record-breaking rotorcraft speed of 250 mph was logged by this Bell compound helicopter, basically a UH-1B modified by adding stubby wings and pair of J69 turbojet engines.**


# New Charger completes

**General Dynamics' Charger is one of the most practical planes ever to fly. It can take off in as little as 225 feet. It can "live" with military forces in primitive areas. It can carry 6,000 pounds. It can do many jobs: close air support, surveillance, cargo transport, evacuation.**

HERE are facts to help you evaluate General Dynamics' remarkable new Charger.

**1.** It can take off with a 1,200-pound load in 225 feet—less than the length of a football field. The Charger can clear a 50-foot-high obstacle by taking off in just 485 feet.

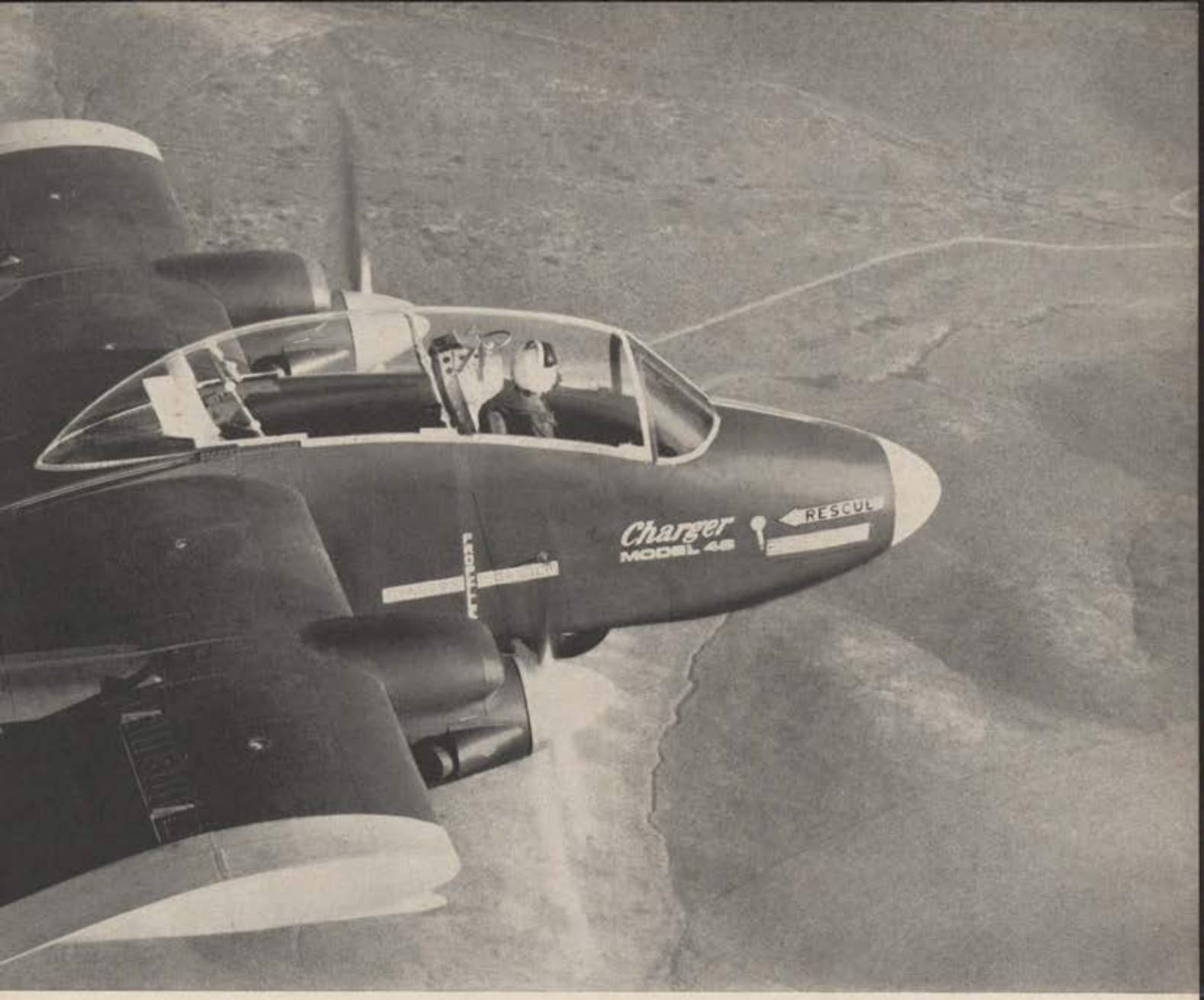
**2.** It can fly as slowly as 50 miles per hour at tree-top level, or as fast as 325 miles per hour at higher altitudes. It can attack dive at 400 miles per hour.

**3.** It can operate from a jungle clearing studded with four-inch rocks, or from a muddy field.

**4.** It can carry 6,000 pounds. This payload can be cargo or armament (see photo at right).

**5.** It can take off at sea level, fly 50 nautical miles, circle a target area for two hours, then return to base with adequate fuel reserves.

**6.** It can fly 2,600 nautical miles without refueling—more than the distance from Los Angeles to Hawaii. This makes




# 5th month of flight testing

possible quick tactical disposition to anywhere in the world.

**7.** Its two 650 h.p. PT6A17 turboprop engines can be changed in the field by two men in 30 minutes. It can be easily maintained with a minimum of ground support equipment.

**8.** It is ideal in rough terrain for any of the following jobs: close air support, reconnaissance, surveillance, cargo transport, helicopter escort, and evacuation of wounded.

For information, write: Convair Division of General Dynamics, P.O. Box 1950, San Diego, California.

*Photo shows some of the weapons and equipment Charger can carry in various combinations on five external stations. Left to right: Napalm tank, USMC M4A 580-lb. drop container, MK82 530-lb. bombs, MK81 260-lb. bomb, Aero-1C 150-gal. fuel tank, M60C machine guns, 150-gal. fuel tank, 260-lb. bomb, 530-lb. bombs, X5A 500-lb. flare dispenser, launcher rail, Sidewinder 1C.* →

**GENERAL DYNAMICS**

**Basketball has been played in gyms more confining than this mockup of Boeing C-5A fuselage. Three US manufacturers are engaged in design competition for huge transport. Mockup, built in sections, will be moved to Ft. Lewis, Wash., for loading tests with Army gear.**

industry. . . . The French and British industries are much more complementary."

☆

A contract totaling $45 million to buy ten F-111As and long-lead-time items for fifty-nine more was signed in mid-April by Air Force Secretary Eugene M. Zuckert. This was the first formal contract for production models of the F-111A. Until now General Dynamics has had only a contract to build eighteen prototypes of the F-111A and, with Grumman, to turn out five F-111Bs for the Navy.

DoD still estimates the total F-111 procurement may run to 1,500 aircraft at a cost of $6 to 7 billion.

The first F-111B prototype is scheduled to be rolled out about the middle of May at Grumman's Peconic River facility in Long Island, N. Y. Reports persist that the Navy version will weigh perhaps 10,000 pounds more than the 56,000-pound limit which the Navy set some months ago as the maximum it wanted in a carrier-based fighter.

☆

A one-year course to train military officers and selected civilians in the intricacies of cost/effectiveness as practiced in the Defense Department has been established by DoD.

The new course, leading to a master's degree, will begin on August 1. It will be conducted by the Institute for Defense Analyses in cooperation with the University of Maryland, which will award the degree. The first class will be made up of eight officers from each of the three services and two to four DoD civilians.

The Defense Department said the course is being set up to meet the "critical shortage" of personnel trained in the techniques of the planning-programming-financial management system.

"While many military and civilian personnel have studied national security policy and have trained in operational research, engineering, and economics, the task of choosing weapon systems and determining force levels requires a particular combination of three disciplines and the ability to relate cost and performance considerations to national policy objectives," the DoD announcement declared.

In three academic semesters, students will study economics, mathematics, statistics, mathematical operations research, strategic studies, politico-military situations, and analysis of significant Defense Department policy decisions.

Prospective students are now being screened by the services. Minimum qualifications include a bachelor's degree and proficiency in differential and integral calculus.

Graduates will be assigned to the Joint Staff, the staffs of the military departments, and the Office of the Secretary of Defense in duties particularly concerned with systems analysis and force-level planning.

The course, conceived by Charles J. Hitch, Assistant Secretary of Defense (Comptroller), will be run by the Navy.

☆

Thirty-one US military aircraft will be displayed at the Paris International Air Show June 11-20.

USAF planes are the Lockheed C-141 StarLifter, C-130 Hercules, and C-140 JetStar; McDonnell F-4C Phantom II and RF-101 Voodoo; Convair B-58 Hustler and F-102 Delta Dagger; North American F-100 Supersabre and T-39 Sabreliner; Northrop F-5A and B Freedom Fighter; Republic F-105 Thunderchief; Boeing KC-135 Stratotanker; Cessna YAT-37D COIN fighter; and Kaman HH-43B Huskie.

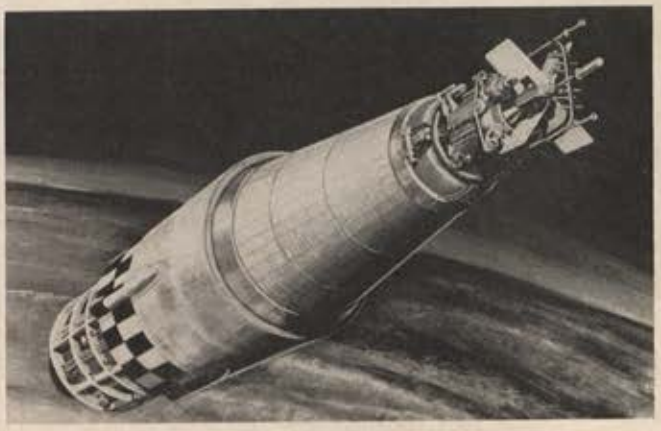
The Army will show the Bell UH-1B and -1D Iroquois and OH-13A Sioux; Grumman OV-1B Mohawk; Boeing Vertol CH-47A Chinook; Beech U-8F Seminole; and, jointly with the Navy, the experimental Lockheed XH-51A Aerogyro.

Navy entries also include the McDonnell F-4B; North American A-5A and RA-5C Vigilante; Grumman A-6A Intruder and E-2A Hawkeye; Ling-Temco-Vought F-8 Crusader; Lockheed P-3A Orion; Boeing-Vertol CH-46A Sea Knight; and a mockup of the Douglas TA-4E carrier trainer version of the Skyhawk.

☆

The US will stage an International Aerospace and Science Exposition at Dulles Airport near Washington, D. C., in the summer of 1966, President Johnson has announced. This will be the first major air show in the US since the Air Force Association sponsored the World Congress of Flight in Las Vegas, Nev., in 1959.

Objective of the exposition is to demonstrate US accomplishments in aerospace and related sciences and to stimulate export sales of US products. Although it is intended primarily for potential buyers from around the world, the exhibits—ranging from light private planes to space vehicles—will be open to the public, and there will be flight demonstrations.



**SNAP-10A nuclear reactor, above, producing 580 watts of power in space, is shown in this artist's sketch. With Agena second stage attached, it is in a 700-mile-high polar orbit.**

**John F. Loosbrock, Editor and Assistant Publisher of AIR FORCE/SPACE DIGEST, received the Paul T. Johns Award for outstanding contributions to aeronautics and astronautics at the Arnold Air Society's 17th National Conclave in Washington April 11-14.**

**William Leavitt, Associate Editor of AIR FORCE/SPACE DIGEST, was awarded Citation of Honor by Arnold Air Society for exceptional services. Leavitt also edited report of US Air Force Academy's 1965 American Assembly in early April.**

"Our intention is to make the exposition a permanent event like the Farnborough and Paris air shows," said Najeeb E. Halaby, who, as Administrator of the Federal Aviation Agency, headed a government task force in planning the show. "We intend to show the world that this nation is still the leader in aviation and aerospace science and technology."

☆

The 1964-65 edition of *Jane's All the World's Aircraft*, published April 23, is once again a handsome and indispensable volume for anyone who hopes to become or remain knowledgeable on the aerospace world. From the Argentine Republic to Yugoslavia, it describes all that's new and current in aircraft, engines, missiles, air-cushion vehicles, gliders, and—reappearing after an absence of several years—airships.

"Availability of the right military aircraft and equipment is more vital today than it ever was," the editor notes in his preface. "Millions of people now alive would be dead but for the airplane. Military and political situations like the Berlin blockade and airlift of 1948-49, the Korean War of 1950-53, Suez in 1956, Cuba in 1962, would probably have exploded into a major war had they occurred half a century ago. Instead, the airplane and its offspring, the rocket, by the threat of nuclear annihilation, have kept the peace. It may be an uneasy and costly peace, but it is better than war."

*Jane's All the World's Aircraft* is published in the US by McGraw-Hill, 330 W. 42d St., New York, N. Y.

☆

SNAP-10A, the nation's first nuclear powerplant to operate in an orbiting satellite, is working flawlessly, the Atomic Energy Commission has reported. Launched atop an Air Force Atlas-Agena from Vandenberg AFB, Calif., on April 3, SNAP-10A's reactor was not turned on until it was safely in orbit.

The achievement "represents a significant advance in this country's space and atomic energy programs," AEC Chairman Glenn Seaborg declared. Extended space probes, he said, require long-lived sources of power that are not dependent on sunlight or affected by the harsh environment of space. SNAP—which stands for Systems for Nuclear Auxiliary Power—can fill the bill.

Lofted into a nearly circular 700-mile-high polar orbit, the 970-pound satellite is expected to remain in space for 3,000 years, although SNAP-10A's reactor is designed to operate for only a year.

The satellite also carries a cesium ion engine developed for the Air Force by Electro-Optical Systems, Inc., of Pasadena, Calif. Unfortunately for this test, some malfunction in telemetry each time the engine is signaled to turn on has made it impossible to tell for sure whether it's working. It has been shut off until USAF and Electro-Optical scientists, reviewing tapes of its transmissions, can figure out a fix for the problem.

The engine, two and a half inches in diameter and seven and a half inches long, weighs just over two pounds. Although it generates a thrust of only two-thousandths of a pound, its continuous acceleration in space would steadily build up to speeds of 100,000 miles an hour. An ion engine of this modest thrust could send a spacecraft to Jupiter in a year, compared to two and a half years for a chemically boosted vehicle.

Meanwhile, Early Bird, the Communications Satellite Corporation's first operational test venture, is on station over the Atlantic. It was boosted into stationary orbit 22,300 miles high by a Thrust-Augmented Delta from Cape Kennedy, Fla., on April 6. All tests so far have proved highly successful.

Two other notable space achievements—the first manned Gemini flight with Maj. Virgil Grissom and Lt. Cmdr. John Young, and the moon photo mission accomplished by Ranger IX—are described in detail in "Speaking of Space," beginning on page 53.—END

## INDEX TO ADVERTISERS

AIR FORCE
MAY, 1965

**Supersonic-combustion ramjet engines capable of pushing aircraft to speeds up to Mach 20 have been determined to be feasible. The materials to build the aircraft around such a ramjet—capable of withstanding the high skin temperature that would be generated—are within reach. And, on the basis of these findings, it has been recommended strongly that the Air Force immediately begin development of a . . .**

# Hypersonic Aircraft: Possible and Practical

**By J. S. Butz, Jr.**
TECHNICAL EDITOR, AIR FORCE/SPACE DIGEST

THE time has come to begin exploitation of existing technology leading to development of a Mach 12, 8,000-mph research airplane. A logical and feasible follow-on to the X-15, the hypersonic research vehicle would be powered by a hydrogen-burning, air-breathing engine. Such research aircraft could be flying in the early 1970s. The scope of the technological base and the research flight program should be extensive enough for design of operational hypersonic aircraft by the mid-1970s, if a military requirement should exist at that time.

In general, these are the conclusions arrived at by a group of distinguished scientists who investigated the present state of hydrogen-burning, supersonic-combustion ramjet technology and examined the possibility of using these engines to power hypersonic aircraft in the near future. The group was convened at the direction of Gen. B. A. Schriever, Commander, Air Force Systems Command. It was chaired by Dr. B. H. Goethert, Systems Command Chief Scientist (*see box at right*).

Two technical questions of great importance, both to the future of aeronautics and to spaceflight were answered with strong affirmatives by the group. Its review of all the available research data resolves all doubts about the feasibility of:

- Operating air-breathing engines through the entire Mach number range up to Mach 20 and above, or more than 15,000-mph. In other words, it is possible to orbit vehicles without using rocket engines exclusively.
- Building lightweight structures which can withstand the extremely high external skin temperatures of hypersonic flight (more than 2,000 degrees Fahrenheit) while carrying liquid hydrogen fuel at temperatures of —423° F and sustaining the fluctuating loads imposed by a wing.

Only a few years ago there were a number of valid reasons for questioning the feasibility of using such an engine and structure in a Mach 12 aircraft, no matter how conservatively it might be designed. Even if all of its payload-carrying capacity were given up to in-

**GROUP MEMBERS**

***COORDINATOR***

**Dr. B. H. Goethert, Chief Scientist, Hq. AFSC**

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**Dr. M. J. Zucrow, Purdue University**
**Dr. F. E. Marble, California Institute of Technology**

creased structural weight and the most favorable possible engine arrangement, there were serious questions about the flight safety of such a vehicle and its ability to accelerate to Mach 12.

Now, the AF consultants feel there is no longer any valid cause for such doubts. Recent advances indicate that a Mach 12 research airplane, which would enjoy the same probability of success as the X-15, is now available within the technology.

This new research airplane would be a necessary prerequisite to further progress with manned aircraft capable of sustained flight at very high speeds. Now that feasibility is no longer in doubt the key questions concerning such aircraft involve their operational attractiveness—that is, stability and control characteristics, maneuverability, and payload-carrying capacity for various missions.

Today there are strong indications that the hypersonic airplane can carry a significant payload and can perform a variety of missions.

There are two main categories. One calls for sustained cruising at hypersonic speed. Passenger transport, strategic reconnaissance, and bombardment are the purposes most often mentioned.

The other basic class is a hypersonic airplane designed to accelerate continuously to orbital speeds. This is the single stage-to-orbit recoverable booster, or "aerospace plane" mentioned often in the past.

Enough research information is on hand now to convince a sizable group of aeronautical scientists and engineers that the continuous-acceleration hypersonic airplane can replace such heavy rocket-powered boosters as the Saturn and Titan within fifteen years and provide great savings to the US space program. This opinion is based partially on the demonstrated capability of vehicles using chemical rockets and partially on the estimates for the orbital airplane. Under the best circumstances, chemical rocket vehicles carry considerably less than five percent of their total takeoff weight as payload when flying into low earth orbit. And it appears to some qualified engineers that the hypersonic airplane could carry from fifteen to twenty percent of its total weight as payload into orbit. This means that a 500,000-pound hypersonic airplane, about the size of a B-52, might be able to carry as much payload into orbit as a three- to four-million-pound rocket. The real payoff is that the hypersonic airplane can be used over and over again whereas a rocket can be fired only once.

These favorable weight-to-payload estimates spring from the fact that the air-breathing engine uses the oxygen in the atmosphere for combustion and does not need to carry an oxidizer as part of its load, as does the rocket. Consequently, the fuel specific impulse, that is, the amount of thrust developed per pound of fuel, is much higher for the air-breather. The hypersonic, air-breathing engine's advantage varies

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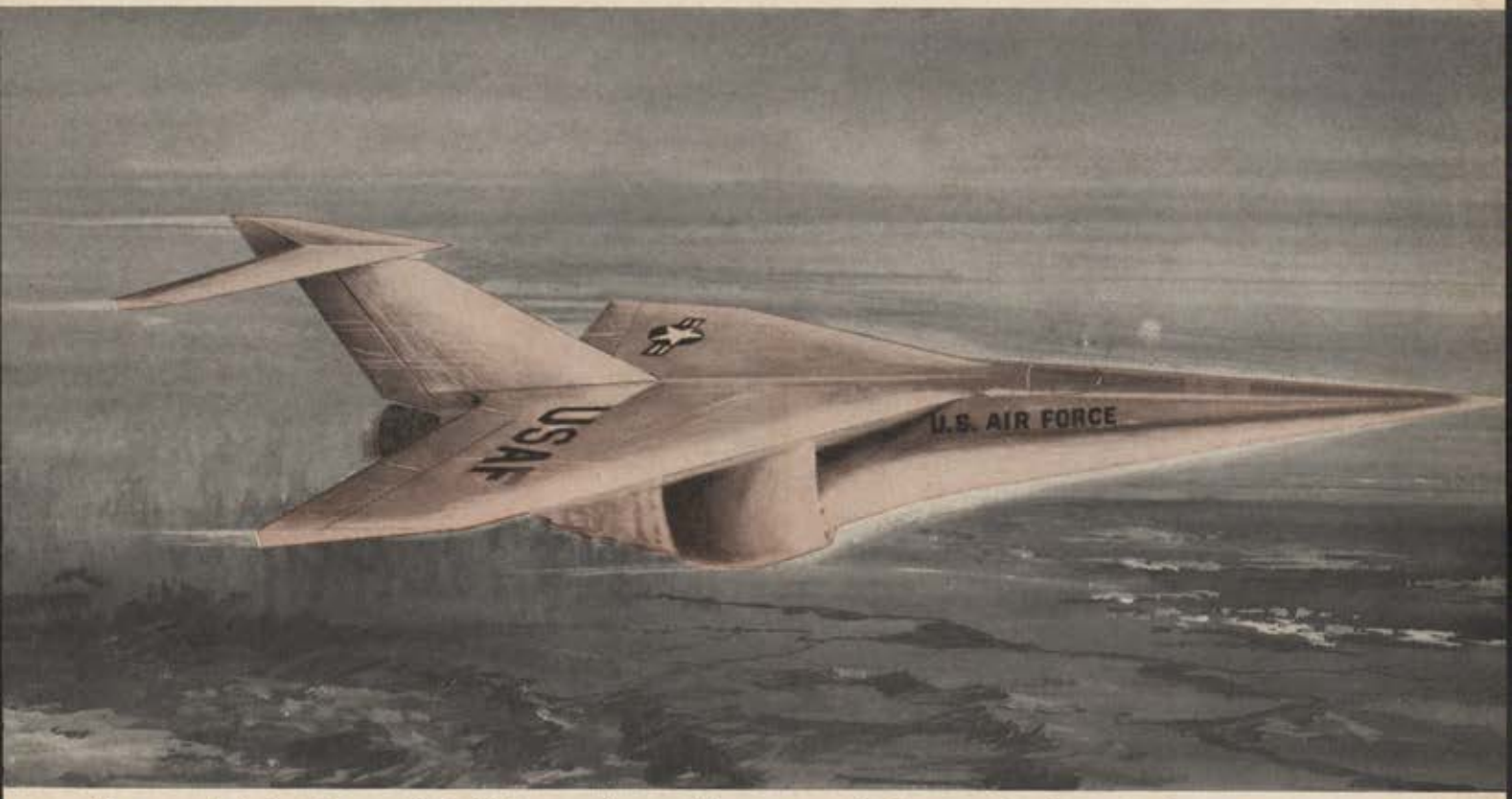
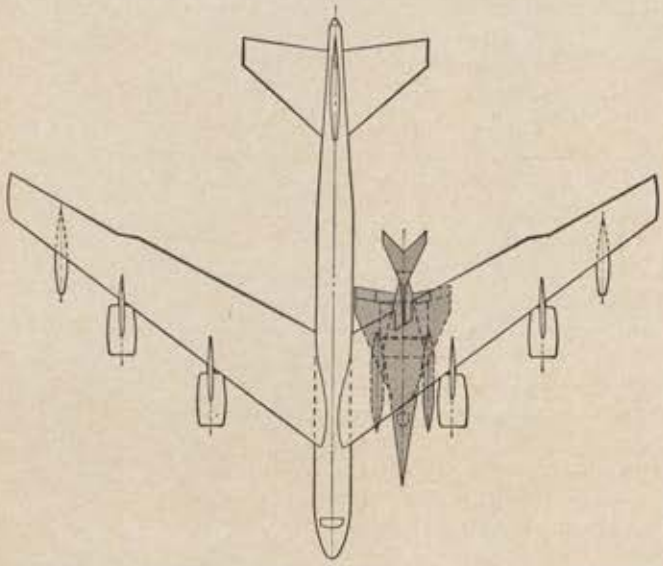



**The general design of a new Mach 12 hypersonic research airplane now under consideration by the Air Force is shown above. Key feature of the new vehicle is its hydrogen-burning ramjet engine which has the potential of operating efficiently at all speeds from Mach 3 to Mach 20. This powerplant is more closely "integrated" with the airframe design than any other type of engine. The engine inlet is the entire forward section of the fuselage. A small cowl covers the burner section located at the point of maximum fuselage thickness. Sloping aft section of the fuselage serves as engine's exit nozzle. Current experiments strongly indicate that the engine control system will be relatively simple; no complicated variable-geometry mechanism will be necessary in inlet or nozzle. Pilot's capsule is shown in retracted position for high-speed flight. During landing phase of the flight it would be raised to provide visibility.**



**Air-launch technique of the X-15 program also would be employed for the new experimental airplane. After drop from the B-52, a hydrogen-oxygen rocket would provide acceleration to Mach 3, the starting point for the ramjet. Two external tanks containing oxidizer would be jettisoned.**

with speed (*see chart on page 31*), but it is more than three times better than the rocket over most of the Mach number range. The practical result of this specific impulse advantage is a substantial weight saving. Most chemical rockets carry about ninety percent of their takeoff weight in fuel and oxidizer. With the orbital airplane it may be possible to keep the fuel fraction down to only fifty percent or so of the takeoff weight.

According to these estimates the orbital airplane would have about the same weight breakdown as the current jet transports—approximately 50 percent fuel, 30 percent structure and equipment, and 20 percent payload. If the estimates are correct, substantial savings in US space operations could be realized by developing an orbital airplane for use in the late 1970s.

However, there is far from unanimous agreement that this high payload efficiency can be achieved. And the final decision to develop the orbital airplane will depend not only on its payload efficiency but also on its development costs and the total number of pounds that the US plans to put into space each year. All three of these factors are highly debatable today.

To clear up the situation and judge fairly the orbital airplane versus the rocket a hypersonic research airplane must provide flight-test data.

Flight tests, of course, would provide positive answers to thousands of questions on all aspects of hypersonic airplane design. However, there are two basic questions which now seem to overshadow all others.

First is the efficiency that can be achieved in the major components of the ramjet engine—the inlet, burner, and nozzle. If the efficiency is low, and the pressure losses, drag, and heating relatively high, then the specific impulse will drop and the payload efficiency of the aircraft will suffer. Extensive small tests of each engine component separately have been encouraging and show that specific impulse is not strongly affected by minor deterioration in inlet, burner, or nozzle efficiency.

Dr. Antonio Ferri of General Applied Science Laboratories, who has worked in this field for years, reported such favorable results in detail almost a year ago in making the Seventh Lanchester Memorial Lecture to the Royal Aeronautical Society in London. Many other organizations have been active in this research. They include: McGill University in Montreal, Canada; Bristol Siddeley in England; and in the US, Marquardt, General Electric, Boeing, United Aircraft, the Applied Physics Laboratory of the Johns Hopkins University, AFSC's Arnold Engineering Development Center in Tennessee, and the Aeropropulsion Laboratory at Wright-Patterson AFB, Ohio. Through their combined efforts the main argument that has been used against hypersonic air-breathing engines in the past has been completely eliminated.

According to this old argument there were just too many problems with all types of air-breathing engines for any of them to be practical on an orbital airplane. Turbojets were said to be out because their rotating machinery could not operate at the high temperatures involved.

Conventional ramjets also were rejected because the flow entering the engine is slowed down to subsonic speeds, which means that pressure and temperature rise excessively. At hypersonic flight speeds, the temperature rise in a supersonic-flow combustion chamber is extremely high, which limits the amount of fuel that can be burned and the thrust produced by the engine. In addition, a complex variable-geometry inlet and exhaust nozzle are needed to adjust the engine flow conditions so that high efficiency is achieved at all flight Mach numbers.

Another type of ramjet, which shows high theoretical efficiency, also has been rejected as impractical. In this device combustion takes place through a strong shock wave inside the engine. The engine is extremely sensitive to inlet flow conditions, as well as to internal temperature and pressure changes, and would require an elaborate control system.

The final basic type of hypersonic air-breathing engine that has been under study for many years is the supersonic-combustion ramjet, in which the flow in the combustion chamber is slowed down to supersonic rather than subsonic speeds. This provides many advantages. The temperature rise in the combustion chamber due to slowing the air is relatively small, allowing more fuel to be burned and greatly increasing the thrust produced by an engine of a given size.

Another important feature is that the flow in the combustion chamber theoretically can vary over a very wide Mach number range without affecting engine performance significantly. This means that the supersonic-combustion ramjet may not need a variable-geometry inlet or exhaust nozzle, and it could be operated by a relatively simple fuel control.

Until a year or so ago, many scientists did not believe that combustion was possible in a supersonic stream of air, even combustion of a highly reactive

fuel such as hydrogen. It was argued that the high-speed air would literally blow out the flame and that steady combustion would be impossible. The researchers who claimed they had achieved steady supersonic combustion were challenged on many counts, involving their test facilities, instrumentation, and data interpretation.

Apparently, all of this has changed, and the weight of experimental evidence from many respected sources has become so heavy that there is no longer reasonable doubt that a supersonic-combustion ramjet will operate over the entire Mach number range. It also has been established that a relatively simple fixed-geometry inlet, combustion chamber, and exhaust nozzle will provide the minimum efficiency needed to accelerate to Mach 12.

The specialists in this field believe that the component efficiencies will be much higher than this minimum, high enough to make the fixed-geometry, supersonic-combustion ramjet a key propulsion system of the future. However, there is no way for anyone to prove this conclusively without flight tests. No facility on the ground is large enough or will run long enough to thoroughly test a complete engine. In the final analysis only flight tests will show just how the major engine components will interact at hypersonic speeds and just what performance can be expected.

The second major question to be answered by flight test concerns the flight altitude. If the ramjet is really to be competitive with the rocket, it must have nearly the same weight per pound of thrust produced. This is difficult to achieve because the rocket is one of the lightest powerplants on this basis. Since the ramjet's thrust is proportional to speed and altitude, it must be operated at relatively low altitude if it is to challenge the rocket as a high-thrust acceleration engine.

The limitation on lowering the flight altitude is that the increase in air density causes a rapid temperature rise in the airframe's outer skin. It is possible to predict rather accurately the heating tradeoffs. Detailed analyses show that orbital airplanes designed for high thrust and rapid acceleration are possible using current structural technology and liquid hydrogen as a coolant. Some studies have shown that these recoverable boosters could hit Mach 5 at as low as 75,000 feet, Mach 15 at 125,000 feet, and orbital speeds at less than 200,000 feet, or about forty miles altitude, without exceeding the safe temperature limits on their structure. If flight tests show such performance is possible, then the one-stage orbital airplane will be a highly efficient recoverable booster with a large payload.

The other basic type of very-high-speed, air-breath-

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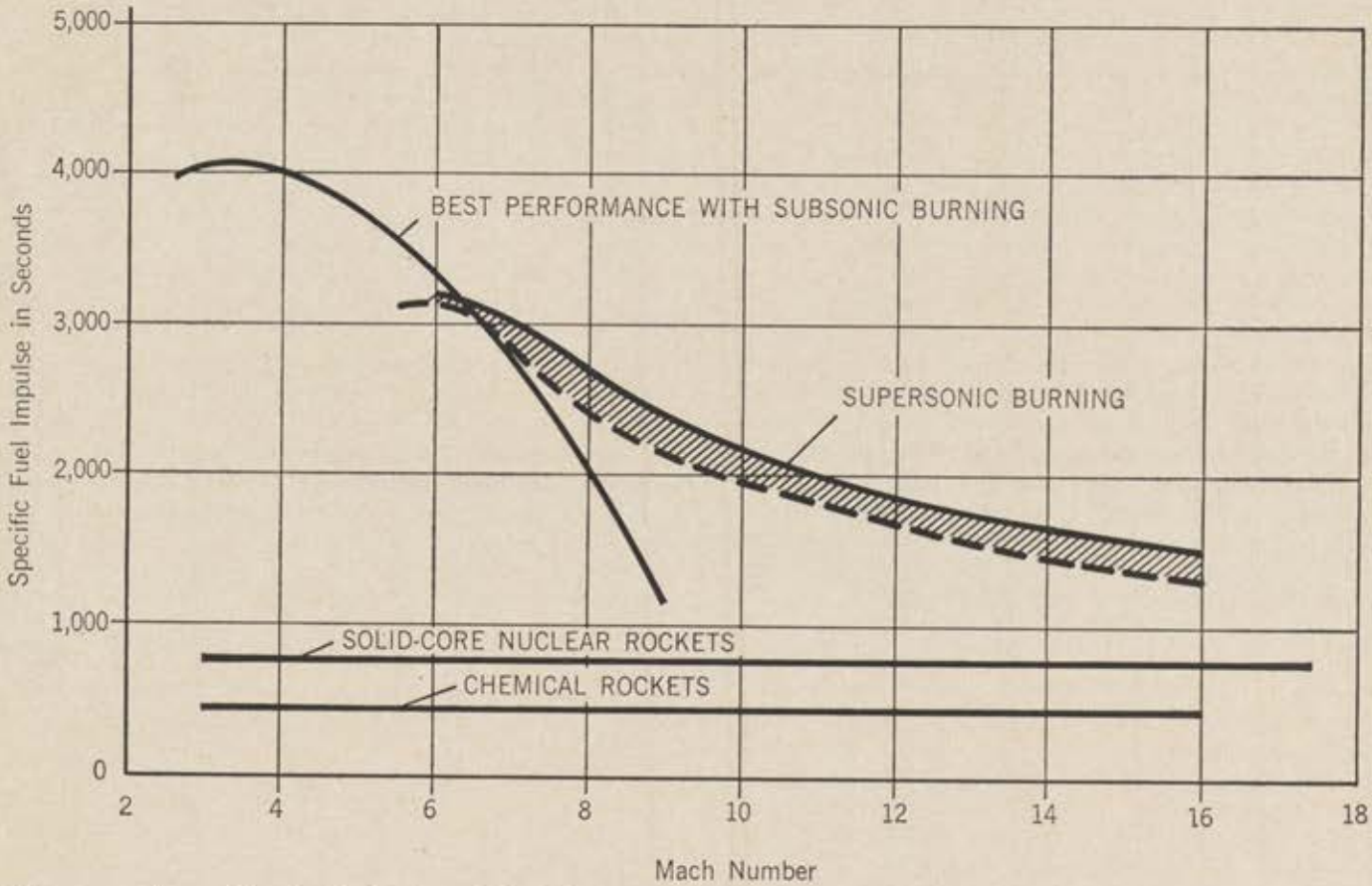


**Major reason for pushing the development of the hydrogen-fueled, hypersonic ramjet is illustrated here. The fuel specific impulse (amount of thrust produced per pound of fuel burned per second) for the air-breathing engine is compared with that of the best liquid rockets and the Rover-type nuclear rocket. According to current predictions, the supersonic combustion ramjet performance should fall in the shaded zone. Such performance holds the promise of greatly increasing the payload of orbital launch vehicles, possibly to about the proportions of today's jet transports.**

ing vehicle—the hypersonic cruise transport or strike-reconnaissance aircraft—will have different design requirements. It can get by with a heavier engine than the orbital acceleration machine; that is, the cruise airplane can fly higher and its engine can produce less thrust per pound of engine weight without compromising the mission. The key requirement on the cruise airplane is to use the fuel in the most efficient manner possible, to get the highest possible efficiency from each engine component and to achieve the highest possible specific impulse. High engine performance pays off in high payload/range performance for the cruise aircraft much more than it does for the recoverable booster type.

Flight altitudes for the cruise aircraft will be relatively high, depending upon the wing loading. For continuous flight at Mach 5 they could top 140,000 feet and for Mach 15 cruise exceed 200,000 feet.

According to most predictions today, it is going to be easier to achieve high performance with the recoverable-booster-type vehicle than with the hypersonic cruise airplane. Flight testing is necessary to prove this theory.

How is all this to be paid for?

It was strongly recommended that we should put the experimental hypersonic airplane at the head of the list of aerospace engineering development projects. These are the projects in which prototype hardware of all types is designed, produced, and tested. Currently, the Air Force is investing a little more than $500 million a year in this work, but this money is spread over a relatively large number of projects.

Many experts believe that the new experimental airplane is so important that, if additional funding cannot be obtained specifically for it, it should be supported out of the engineering development budget. This would result in a considerable reorientation of the current program.

This approach, in effect, calls for a focusing of the USAF's advanced development program from a broad series of small, loosely related efforts into a strong effort that will push the aerodynamic, structures, and propulsion technologies to the limit.

By current estimates, development of the new Mach 12 follow-on to the X-15 would cost in the neighborhood of $250 million to first flight. This would pay for one or two years of accelerated experimental research to firmly establish the basic design of the cooling system, structure, and aerodynamic layout. It would also cover three to four years of detailed design, fabrication, and ground testing prior to the first flight, which could take place in 1972 without a crash effort. Under this plan, even in the peak expenditure year, such an experimental airplane should not absorb an overly large percentage of the USAF's exploratory development budget. Probably this estimate is cautious, for undoubtedly any major research airplane effort of this type will be a joint DoD-NASA effort, following the pattern of the X-15 and other X-series aircraft. NASA would then share in the funding.

At any rate, if the air-breathing, hypersonic research airplane project remains a relatively modest effort, as described below, it should be achievable within the current Air Force and NASA budget structures.

The Mach 12 experimental aircraft would make use of many proven X-15 techniques. It would be approximately the same size as the X-15, fifty feet long with twenty-two-foot span and 50,000-pound gross weight, and would be air-launched. Either a B-52 or a B-70 could serve as the mother aircraft. If the B-52 is used it will be necessary to provide the hypersonic aircraft with a controllable hydrogen-oxygen rocket and jettisonable oxygen tanks to accelerate to Mach 3.

After Mach speed is attained it will be possible to start the hydrogen-fueled supersonic-combustion ramjet. This engine extends the entire length of the aircraft. The long forward section of the fuselage doubles as the fixed-geometry engine air inlet. The shock wave pattern off of the forward fuselage slows the air entering the burner down to supersonic speeds. A small cowl located at the point of maximum fuselage thickness encloses the burner area. The sloping aft fuselage section is the fixed-geometry nozzle.

This design is a slightly modified form of the ideal fixed-geometry configuration for a hypersonic air-breathing engine. Ideally, the fuselage would be circular and the engine would extend around its complete circumference. However, to carry the experimental aircraft under another airplane it will be necessary to flatten its upper portion and limit the engine to its lower sections.

Several types of structures now being studied in research programs apparently could be used on the Mach 12 airplane. All of them consist basically of an outer heat shield which gets very hot (in some sections more than 2,000 degrees Fahrenheit) and is cooled by radiation. Columbium, molybdenum, and nickel alloys are being considered for this heat shield, which is similar to the canvas covering on light planes in that it does not have to withstand major air loads.

Under the heat shield will be a layer of insulation, and beneath that will be the relatively cool inner truss structure which bears the main loads. Under that will be more insulation to protect the liquid-hydrogen tanks. Several types of insulation and several design techniques for minimizing thermal stresses are in advanced stages of research and experimental investigation.

It is contended that this design is the most technically conservative and the lowest-cost Mach 12 research aircraft that can be built. And it is quite clear that such an aircraft must be flown extensively before there will be any real hope that hypersonic vehicles powered by air-breathing engines will receive strong consideration in the national planning councils. The technological feasibility appears so clear, and the potential operational payoffs so compelling, that a comprehensive research-and-development program, followed by early flights of a hypersonic vehicle, would seem to be an unavoidably attractive investment. Such a program will be required soon to ensure that future research money in this area can be spent wisely and fruitfully.—END

**The air war against North Vietnam, which the United States has undertaken in retaliation against long-term provocation and in a determined effort to convince Ho Chi Minh that his support of the Viet Cong in South Vietnam is an endeavor that could cost him the life of his own Communist North, is perhaps the most unusual conflict in which we have ever been involved.**

# US Airpower in Vietnam— Scalpel Rather Than Broadsword

**By Jerry Greene**

SAIGON, SOUTH VIETNAM

AMERICAN airpower was poised and sharply honed for battle when the big challenge came. The mission was not, perhaps, as some air strategists had envisioned. It would not be as some might have recommended—a massive, mighty blow to wipe out an enemy's capacity to continue.

It would be something without precedent in the history of warfare, the delicate, careful wielding of airpower as a scalpel in the hands of diplomatic surgeons, cutting away the military sinews of a nation one slice at a time in the hope the patient could be cured without wholesale amputation.

North Vietnamese-directed attacks on American installations at Pleiku on February 6, 1965, and Qui Nhon on February 9, 1965, brought the first "retaliatory" raids. Then, because there could be no discrimination between Americans and the South Vietnamese we were trying to help, we would retaliate for any suitable reason.

In truth, the North Vietnamese had been racking up reasons enough for retribution for three long years, and retaliation became routine within a matter of weeks. As this is written, the heat from the bombs and rockets delivered on North Vietnamese targets has been growing almost daily for more than two months. The experts here believe it might take another two months, perhaps more, of the selected air strikes to convince Ho Chi Minh and his Communists that real ruin lies just back of yonder cloud if they do not change their ways.

The first two months of air strikes by our fighter-bombers destroyed an estimated ten percent of the North Vietnamese ammunition capacity; there were plenty more purely military targets available before the attack aircraft turned to the fatly vulnerable twenty-five industrial complexes which have been targeted.

This is as strange a war as the United States will ever encounter, and it is packed with angles peculiar to behold. In the first place no state of war exists between the US and North Vietnam. And never before has the US eased so completely into armed conflict by driblets. The driblet technique has undoubtedly cost lives, yet it may have also kept the war on a comparatively low burner and prevented a flash fire involving the big nations directly.

The air strikes up north are a thing apart, still a part and parcel of the all-out war in the south, because they are designed to cut the flow of men and munitions into the south and because some of the US and Vietnamese aircraft are flying missions on both sides of the border.

The air war north of the seventeenth parallel is being directed and conducted by the Joint Chiefs of Staff through Adm. Ulysses S. G. Sharp, Commander in Chief, Pacific, at Pearl Harbor. Because the decision to strike north was packed with highest international implications, this was of necessity a presidential decision. It was a White House judgment, too, to use the scalpel instead of the broadsword, to use airpower

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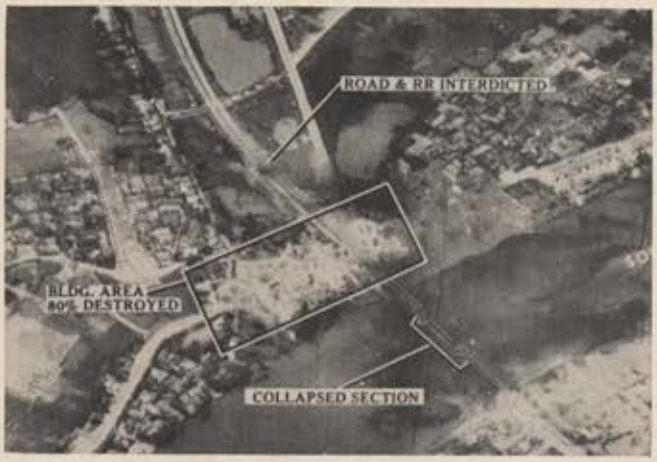



**This is what the railroad and high bridge at Dong Phuong Thoung in North Vietnam looked like after getting a taste of airpower as the air war was stepped up. Post-strike reconnaissance photographs show the extensive bomb damage.**

A USAF B-57 starts its bombing run over a concealed Viet Cong concentration in the central Vietnamese highlands. The mission was flown in support of South Vietnamese ground units. Forward air controllers identify VC targets.

USAF commanders in Vietnam. Left to right, Col. W. E. Bethea, Tactical Group Commander; Gen. Hunter Harris, PACAF Commander; Maj. Gen. Joseph H. Moore, Commander, 2d Air Div.; Maj. Gen. Sam Maddux, Commander, 13th AF.

as the finest edge of diplomacy. During the initial phase, while awaiting world reaction, President Lyndon Johnson himself announced that his approval was required for each air strike north of the parallel.

But as quickly as he believed appropriate, the President turned the conduct of operations back to his military chiefs. Plan "packages" outlining future moves are sent to the White House regularly, and the President is known to check the future target lists with an eye to diplomatic importance. But the execution is in the hands of CINCPAC and his staff, and from them, the commander of the Seventh Fleet—Vice Adm. Paul Blackburn, Jr.—and the Second Air Division here—Maj. Gen. Joseph Moore, USAF. General Moore, of course, is air deputy for Gen. William Westmoreland, commander of the Military Assistance Command Vietnam, commonly called here MACV—"MacVee."

The Pearl Harbor supervision is the answer to the smooth cooperation which has been exhibited between aircraft from Admiral Blackburn's three carriers and General Moore's jet squadrons which operate off half a dozen bases in "Southeast Asia." The identity of the squadrons, the number of aircraft, and the location of bases used is classified, although fairly common knowledge here. But some of our Asian friends are touchy about behavior of their guests, and what they don't admit, they don't have to deny.

There are three jet-capable bases in South Vietnam: Da Nang, up near the seventeenth parallel; Bien Hoa, seventeen miles from Saigon; and Tan Son Nhut, the Saigon international airport, which handles almost as much, or much more, probably, military than civilian traffic.

The Tan Son Nhut tower handled more than 63,000 helicopter missions and 149,000 fixed-wing aircraft movements in 1964, with the totals rising rapidly each month this year.

For his strike aircraft, General Moore has had F-105 and F-100 fighter-bombers, and aging B-57s. He has on hand additionally an assortment of F-102 interceptors for base defense, and RF-101s for the ever-needed photo-reconnaissance missions. As this is written, Washington has announced it is also assigning USAF and Marine Corps F-4s to fly cover for the fighter-bombers.

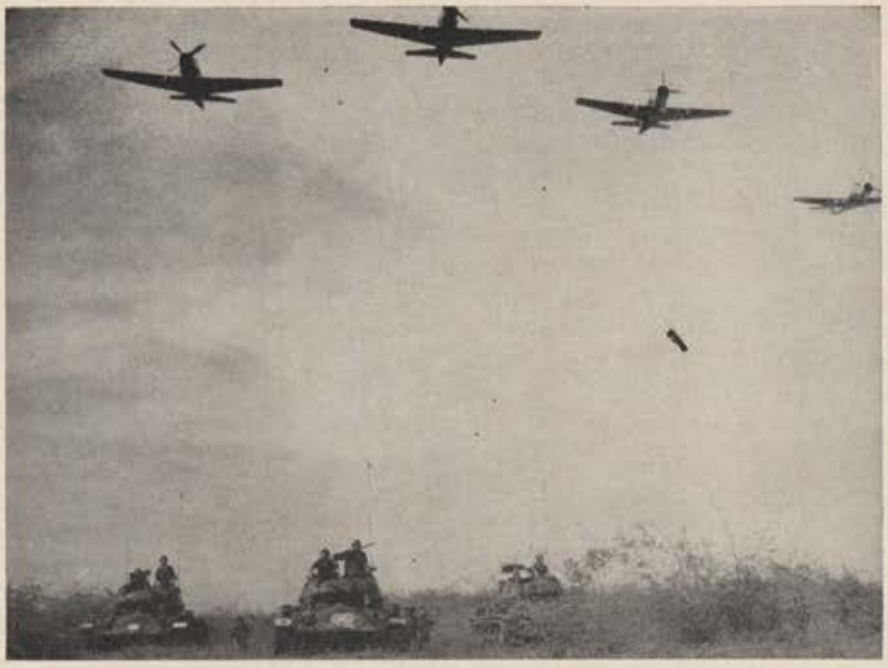
It must not be forgotten that the US also has a commitment for the defense of Thailand and is lending a requested hand to Laos. Both Westmoreland and Moore have command of the forces in Thailand—USAF personnel number more than 6,000—and at least four, perhaps five, of the Thailand Air Force bases can handle jet traffic.

But the dramatic and spectacular air strikes north, the open entry of US units into the war—these are but an element of the utilization of airpower in South Vietnam. The utilization has been growing mightily, and it is here, in a combat testing zone, that airmen of today and tomorrow are learning of "brushfire wars"—the hard way.

Few will dispute, probably, the contention that the guerrilla war in South Vietnam will be extinguished finally on the ground, by Vietnamese ground forces and their American advisers.

But it would be difficult to see how anyone could dispute the statement that airpower in its varied

Clouds of black smoke are produced by explosive cartridges used to start B-57 engines. Canberras, formerly based in Japan, were destined for ANG when rerouted to Vietnam.



**A formation of South Vietnamese Air Force A-1H Skyraiders roars overhead in a strafing run against Viet Cong, supporting South Vietnamese troops during a massive battle in central plains area. Such large battles are more common in stepped-up war.**

forms has saved South Vietnam from being swept into the Communist fold, and that airpower, used to its fullest extent with the ground forces, and the Navy, is the telling factor in stemming the onslaught and turning back the drive of the Reds for domination.

Any casual visitor who moves about South Vietnam can learn quickly that considerable work needs to be done at some level, probably at the Pentagon or in Congress, to smooth out the differences between the Air Force and the Army over the possession and the employment of aircraft. To an interested observer who has lived in the midst of this uproar since the first unification act was proposed at the end of World War II, this nonsense has gone on long enough. It's not the prestige of the Army or the Air Force or the Navy that suffers as a result, when the chips are down as they are down here. It's the kids flying those helicopters and those aircraft of whatever stripe and vintage.

Communications are one specific example. Ask the young professionals who are trying to make-do with the Army's FM radio and the USAF's VHF and UHF.

**South Vietnamese Air Force pilot and his American adviser hold last-minute premission conference before setting out on flight against Viet Cong. Both men are assigned to VNAF's 76th Fighter Squadron at Tan Son Nhut.**

They are managing to make it work, one way or the other, but, unfortunately it is usually the hard way.

The Army's helicopters—surely a part of airpower—are writing their own history in South Vietnam, a colorful history and a new chapter in troop mobility and close support. But only in the past few months has the fixed-wing aircraft come into its own. And the decision in late February to use USAF jets for support strikes within South Vietnam as well as to the north brought a new surge of sorely needed power into the struggle.

The story of the USAF participation in the Viet war began long years ago in the program to build a Vietnamese Air Force. The USAF started from scratch. Pilots were trained here and finished in the US, then returned here for combat training. The war picked up faster than did pilot training. First there was the T-28, and then the B-26. Americans were giving advanced training and combat training with live ammunition against defended targets. Only three years ago, and much less, they were arguing at the Pentagon whether USAF pilots were actually flying combat missions, whether the Viet "copilots" were ever that. Those were rough, difficult years.

Then came the decision to build the Viet Air Force to four squadrons of A-1H Skyraiders. The process was slow and, for the American public, confusing. It is quite probable that few Americans actually knew that there was a genuine Vietnamese Air Force, or one in the making.

But there was, and is, and by last November, under the fiery, tough, and competent Air Vice Marshal Nguyen Cao Ky, the Viet Air Force had come of age—four full squadrons of A-1H Skyraiders, with an assist from two squadrons of USAF A-1E two-seater types, used for training, transition, and otherwise, and for combat operations. These A-1E craft carry VNAF markings.

The VNAF, in training, and with USAF pilot-instructors, had been doing a constant, laborious, and duly

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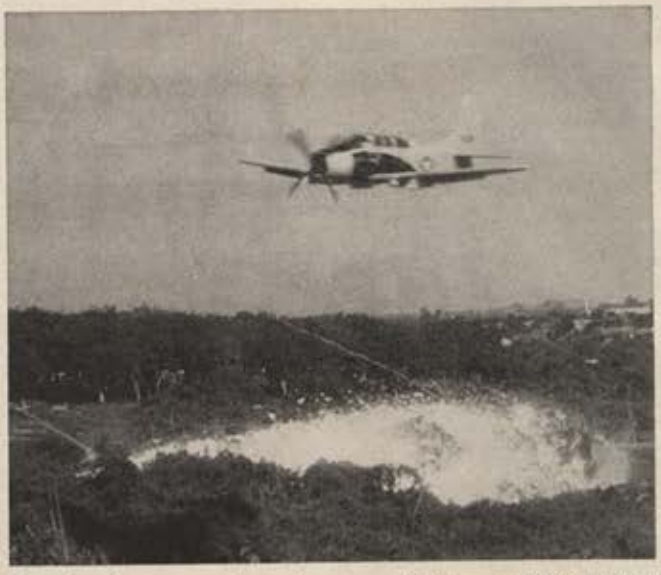
Contrails streaming from its wingtips, a South Vietnamese Air Force Skyraider strafes a jungle area that provides good cover for a concentration of Viet Cong riflemen on Mekong Delta. Skyraiders are a mainstay of the VNAF.



Napalm has proved to be an effective anti-Viet Cong airborne weapon and the guerrillas have paid a high price in personnel to such strikes as this Skyraider mission as VNAF pilot takes A-1H low to spray his lethal payload.

appreciated job of troop support. It had been in there pitching and shooting with telling effect—all planes being controlled by the Air Operations Center at Tan Son Nhut, a low, white building with blue trim crammed into the midst of a line of others looking just like it.

Some reasonably elaborate claims of kills on support strikes were made by the pilots in the first couple of years of the war and the reports met with natural skepticism. Positive figures were difficult to obtain because of the terrain, the nature of the battles, and the Communist Viet Cong practice of carrying off all dead and wounded whenever possible. The Viet Cong have been remarkably successful in removal of battlefield dead, and only recently have the Vietnamese regulars begun to find mass graves of the enemy.

So new rules were applied. Communist dead claimed as air victims must be confirmed by a ground count, attested by Americans or ranking Vietnamese officers.

The records showed the VNAF kill for the first ten months of 1964 averaged about 300 Communists per month.

Then, in November, the VNAF was ready, and it moved into action full throttle. The kill count leaped to 1,300 in November, more than 1,200 in December, and continued above 1,000 in January and February—all this *before* the USAF jets were unleashed.

The USAF jets went into action the weekend of February 20, purely as a supplementary effort to the VNAF, and distinguished themselves in the first operation. Under F-100 suppression fire, a helicopter company rescued an entire Vietnamese battalion which had been trapped and surrounded in a mountain pass along famed Highway 19.

Napalm has been a favorite weapon in attacks against the Viet Cong. Inevitably in a guerrilla war, and particularly with native pilots learning combat, there have been civilian casualties and wide criticism as a result. But the USAF, particularly with the jets, is doing everything possible to see that only the enemy, not the friendlies, get hit.

Forward air controllers, TAC fighter pilots flying slow, light observation planes, bear the heavy burden of target identification and location, working with the ground force commanders. The FAC people have been lucrative targets for the Viet Cong gunners.

For normal operations, the VNAF and USAF A-1 Skyraiders have proved an eminently satisfactory aircraft. They are sturdy, they carry an enormous bomb load, and they have a long loiter time over the target.

But here, as seems to be the case in any war, there just aren't enough of them to meet the demand. The jet squadrons are a most welcome addition.

And the jets have brought a new dimension to close support in this war—speed in reaction time. That's a threat the Viet Cong hadn't met before. And that speed, and the added jet firepower, were being counted upon heavily to crush any Communist ideas that they were about set for "Phase Three" of the classical guerrilla warfare—open battle with large units of the Viet regulars.

USAF transport aircraft, the old C-123 workhorse within the country, have without question been the sustaining lifeline of the government forces from the outset of the American assistance program, writing a chapter of high drama all their own.

But the wraps have been loosened now, and there's an excellent chance that airpower will be doing a rewrite job on those Chinese guerrilla warfare books flooding the market in recent years.—END

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*The author, Mr. Greene, is military writer for the New York* Daily News *and has written previously for* AIR FORCE/SPACE DIGEST. *He recently returned from several weeks of covering South Vietnam for his newspaper, where he reported in depth on escalation of the war. The above was written exclusively for* AIR FORCE/SPACE DIGEST.

**Technological intelligence, or reports on what a potential enemy has under development, is useless if it is interpreted by Conservatives. The Conservatives have been wrong more often than the Optimists, who are more willing to strain the state of the art. The idea that weapons technology is on a plateau has gained in popularity, and it raises the question of . . .**

# Our Answer to Future Threats: Action or Reaction?

**By Claude Witze**

SENIOR EDITOR, AIR FORCE/SPACE DIGEST

THERE is no denying that America, and Americans, have learned a lot from the cold war. Most of the lessons were taken the hard way. We have been amazed by many things, ranging from the Communists' speedy development of thermonuclear weapons to Sputnik and to the swamp war being waged against freedom in South Vietnam.

It seems a bit incredible, for example, that the Wright brothers came out of Dayton, Ohio, more than sixty years ago and that US airpower has dominated world aviation, yet the Russians were first into space. This was because we willed it so. Sputnik could have been ours; we were warned that the Russians were moving into space, and we did less than we could have done.

This kind of technological conservatism has been with us for a long time. The Wright brothers contended with it. In the years immediately after Kitty Hawk, the boys from the bicycle shop strove to interest their own government in the airplane. The skepticism was almost overwhelming. It was not until after the British, Germans, and the French displayed serious curiosity that the Signal Corps ordered the first military aircraft. Octave Chanute speculated that a European country would have bought the rights before we got around to it, except for the possibility that the Wrights could be kept "dangling in the expectation that some of your competitors will discover the secret and they can get your invention cheaper."

In this case, the assessment of a technological capability was more important to the US than the capability itself. If the Wright brothers had said they knew how to build a controllable airplane but couldn't convince anyone they could, there would have been no sale. History would have been different, but the possibility of that having happened is remote because someone in Europe would have believed them, even if their countrymen had refused to.

The quality of judgment exercised in evaluating information is critical. It was sad on the eve of Pearl Harbor, terrible during the events leading to the Korean War, faulty in its estimate of the Soviet nuclear timetable. In South Vietnam, where coups take place more frequently than a CIA agent gets his hair cut, somebody is consistently wrong.

Here is the place to introduce a disturbing axiom: *The most dangerous development at the decision-making level of any government is overcentralization of the assessment of technological, military, and political intelligence.*

At stake are the paths to be taken in military strategy and the efforts made to face up to technological and other threats.

These paths and efforts are always determined by those who may evaluate intelligence against the background of their own prejudices, opinions, and ambitions. With a system of checks and balances, pitting one prejudice against another, there is at least hope for objectivity in the final assessment. But with cen-

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tralized control of intelligence, the men in power may accept or reject intelligence information according to whether it confirms or refutes opinions already held. Let us examine a recent example.

Not long ago, at a public luncheon in Washington, a high Defense Department official scoffed at reports that a new source of energy is being explored and that it might have an application in weaponry. The project, it was emphasized, is only conceptual. The speaker was asked what his opinion would be if we were offered sound intelligence information indicating that the Russians were making spectacular progress toward an operational capability with this new energy source. His answer, in substance, was that he would not believe the intelligence. Within days, the same subject was brought up at a hearing before the Joint Congressional Committee on Atomic Energy. A witness from the Brookhaven National Laboratory testified that his organization has started basic research looking for the key to this new source of energy. If the secret can be unlocked, the hydrogen bomb will be overshadowed.

The important point is that one Pentagon official, who doubtless approves of the Brookhaven effort, apparently would not consider the applicability of this concept to weaponry, even if he were told the potential enemy had a head start.

It is currently fashionable to cite the steady increase in federal funds for research and development, and certainly we are accumulating scientific knowledge at a record rate. But the major problem of the next decade will be the application of that knowledge to translate it into working systems for military missions. If we don't *want* to believe there is a threat, the working systems will never show up in the arsenal of the free world.

Another aspect, brought to mind by Brookhaven's search for a new energy source, is the concern over the proliferation of thermonuclear weapons. The Chinese have shaken us for what is only the first time. France has a program and so does Great Britain. There is talk of the possibility in a long list of "Nth powers," from Sweden to Egypt. The full truth is that technology is in a constant surge against any and all of man's efforts to curb the spread of thermonuclear weapons. If it were possible to find a way for nations to stop building and storing bombs and missiles of this type, the Brookhavens of the world still would seek new sources of greater energy. It is their scientific mission to press for technological advances.

Edward Teller, fixing his sights on the part of the spectrum in which his expertise cannot be questioned, has said that nuclear explosives "are being developed with great speed and in an unpredictable manner." And, he adds, "technical surprises are an almost yearly occurrence in this rapidly advancing field."

The debate on the nuclear test-ban treaty is over, and it will not be reargued here. The treaty aside, it remains that Dr. Teller is but a voice. There are more influential men, some of whom believe military technology is on a plateau and should be kept there. They look for no surprises in the area of weaponry. It is a concept expressed recently in print by Dr. Jerome B. Wiesner and Dr. Herbert F. York. They hold that improved weaponry escalates international tension and makes war more likely. It would appear the only surprise they are willing to face is from another country — not necessarily Russia — when it succeeds in overturning the power advantages now claimed by the United States.

Gen. Curtis E. LeMay, recently retired USAF Chief of Staff, has avoided mentioning names, but he has replied to the Wiesner-York school.

"Some of the more conservative scientific voices," is the way he identified them in a recent Washington speech. And he said, "They see little possibility in the immediate future for new breakthroughs of major proportions in weapons technology, and they suggest that the scientific community needs a short breathing spell in which to search out the limits of military potential in the discoveries they have already made."

Then the General spotted another and more psychological argument for a conservative approach to new weaponry. This is the one that says, "New US weapons will automatically trigger the USSR to undertake still more costly programs for countering our weapons, and we, in turn, would then have to try to offset these developments, and so on up the never-ending spiral."

General LeMay did not throw any brickbats, but he declared that those who argue along this line "advocate that the US should try to establish a condition of military stability between the two great powers, and that from this condition of balance we might be able to steadily and mutually lower ourselves to more peaceful plateaus. This school, therefore, classifies all new weapon systems as destabilizing, and it urges that we hold off investing in radical new systems."

What the General really is warning us against is the acceptance of this philosophy, because it entails a bigger risk than its proponents realize. The basic idea that the contribution of technology to future military systems will be small is in error. During the LeMay career, as in that of captains and lieutenants many years his junior, other prophets have been wrong. And the optimists have not been wrong as often as have the conservatives.

The classic example is Dr. Vannevar Bush's statement that the ICBM was technologically impossible. There are others. Take the debate over the H-bomb. President Harry Truman gave the project a green light, but the decision was a marginal one. What would the situation be today if we had refrained from this effort because of any single argument or combination of arguments? It is enough to say that progress on the ICBM and on the H-bomb exceeded expectations; and because it did, the peace has been preserved. There are many who feel that the climate in 1965 is disturbingly like the climate when the ICBM and H-bomb decisions were made, reluctantly.

There is no intention here to imply that US policy is being made by men with blind spots about technological progress behind the Iron and Bamboo Cur-

tains. Nor are we disarming unilaterally in the belief that this is the way to prevent war. It is essential to recognize, however, that these philosophies exist, that they are widely promulgated, and that they affect the decision-making process.

This was brought home to the US Congress a couple of months ago during the debate on authorization and funding for the Arms Control and Disarmament Agency. There was nothing unusual about the fact that ACDA had both friends and foes on the floor of the House and Senate, or that both sides, in the heat of the argument, resorted to some alarmism.

In the course of this discussion, which went on for several days, an interesting development was the introduction into the *Congressional Record* (Senate Proceedings, March 10, 1965) of the text of a study called "Information and Strategic Stability," by Bruce

—Sovfoto

**Moscow always likes to display its newest achievements. US experts say this weapon, shown in parade last November, is exo-atmospheric antimissile missile. It is for defense of Russia and its development strains the state of the art.**

Russett, a political scientist from Yale University. Professor Russett took this assignment from the Institute for Defense Analyses, which had a contract sponsored jointly by the ACDA, the Department of Defense, and the US Naval Ordnance Test Station. ACDA's share was $10,000.

The Russett paper was part of a larger report. Counsel for the Arms Control and Disarmament Agency said that "no specific arms control or reduction proposal has resulted from suggestions contained in the study, although it provided some useful information. As with any study in this field, only those ideas which are clearly in the best interests of our national security will be selected as a basis of formulating US arms-control policy."

Nevertheless, the point was made in the Senate debate that the ACDA had been advised, in the words of Senator John G. Tower (R.-Tex.), "to bury our head in the sand and ignore what our enemies are doing." More precisely, the Russett report suggests that complete and accurate information—intelligence is another name for it—about a potential enemy's capabilities will not prevent an arms race. It suggests, further, that too much intelligence can fertilize competition.

"If the weaker side is to be satisfied with inferiority,"

**Marshal Malinovsky, Soviet Minister of Defense, puts emphasis on the team of military and technological capabilities in his promise that Russia will prevail over capitalism.**

—Sovfoto

the report says, "it must have some assurance that conflict is improbable."

Later there is a discussion of how this can be done. One idea of Professor Russett is that "it might be desirable, for instance, to reassure the Soviets that no Polaris submarines were within firing range of the USSR; and yet we could not afford to pinpoint the location of all of them. One proposed solution is for the Soviets to be able to demand that a few submarines, of their choosing, surface and make their positions known." Presumably this would convince the Russians we were not preparing for an attack, and, by calming their nuclear jitters, might prevent a preemptive attack by them on us.

More germane to this discussion of technological intelligence and how it is used is the Russett suggestion that this information could go through automatic data-processing equipment. The input would be from sensors, presumably in satellites. The machine would be programmed so that it gave out only sparse information, filtering out "sensitive" material that might provoke one side or the other to start a war.

Other ideas proposed include the use of observation systems with limited capability or automatic measures for delaying the transmission of information. Of the latter, "One example is building observation satellites which record images on film that must be recovered and processed before the information becomes available. This would provide no data, for instance, on the current location of mobile missiles, as would a satellite equipped with television."

Then there is a proposal that transmission of information be stopped entirely during a crisis, and another giving the observed nation a power to veto what information is transmitted.

While Senate critics centered their fire on the fact that the Arms Control Agency was spending public money to get this kind of advice, unaccepted even by the Agency, the point to be made here is that the philosophy behind it has some prevalence.

This becomes vitally important if an evaluator of intelligence should adhere to such a philosophy, taking the attitude that nobody should "bother me with facts, it's evidence I'm looking for." This danger is discussed at length in *The Strategy of Subversion*, by Paul W. Blackstock (Quadrangle Books, 1964). Professor Blackstock says that Allen Dulles, former head of the Central Intelligence Agency, recognized that "preju-

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—Sovfoto

**Russian technical experts, shown here in conference, are pressing new and exotic research areas, some of them nearly ignored in the US. They look for high-payoff projects.**

dice is the most serious occupational hazard we have in intelligence work." Then he points out that CIA itself allowed such a factor to distort its estimates before the Cuban Bay of Pigs invasion in 1962.

"From the point of view of management and control," the Blackstock text says, "there is no magic organizational formula for eliminating the distortion [thus] introduced into the system by the policy line of any one government agency. The theoretical solution most widely adopted by our own and most governments is to separate the intelligence collection and estimating functions from the policy-making and operational functions. Within the military establishment, the G-2 or intelligence is thus separated from G-3, plans and operations."

The author points out that CIA collects and evaluates intelligence and also is engaged in covert operations. He finds that this leads to the "comforting illusion, both in the field and in the intelligence center, that almost any hoped-for action can be carried off successfully."

It is not difficult to see how this approach can nourish illusions in the utilization of, or the failure to utilize, technological intelligence as well. Assessment of this data should not be made by the same persons who can flash a green or red light on development of an improved system that strains the state of the art. There is evidence that the Soviets do not work under this handicap.

A couple of years ago Moscow's Marshal Malinovsky made it known that "Soviet military doctrine . . . is based on the superiority of the armed forces of the USSR over the armies of the most powerful countries of capitalism, with respect to military-technological means. . . ." He did not indicate any relaxation of the Russian technological effort, nor a cutting back in the output of nuclear material, nor an eschewal of military missions in space, nor a determination to develop new weapons only when forced to do so by the capitalists. There is no intelligence signaling that Malinovsky's delineation of Russian doctrine is not correct.

Lt. Gen. W. A. Davis, Vice Commander of the Air Force Systems Command, spoke on the same point in a recent Washington address. Said General Davis:

"The vigorous advance of technology has a vital role in the security of our nation—not only military but also economic and political. This point needs to be strongly stressed. During the past twenty years we have had an explosion of technology that is unique in history. It has stimulated a rapid advance in our standard of living. It also has led to a revolution in military thinking.

"It is not too surprising to find a few people who believe that we have gone just about as far as we can go with technology—especially military technology—for the time being. These people seem to believe that the enormous wave of recent technological activity has just about crested. The conclusion is drawn that we need to absorb the impact of this wave before we move on to the next."

General Davis then put his finger on the threat, the one that will dominate American safety for the next decade:

"Of course, this attitude is predictable," he said, "but it is also a complacent one and, therefore, dangerous. The fact is that we simply cannot coast on our past achievements, and remain competitive at the same time. . . .

"Technology is just as dynamic today as it has been during the past twenty years. This is especially true in the area of military technology. Those who argue that this is not the case are really overlooking two fundamental facts.

"First, the Soviet drive against the free world is aimed at all areas of suspected weakness.

"Second, the Soviets are pushing military technology very actively in all areas."

The "few people" referred to by General Davis fail to give weight to factors other than the Soviet technological push. For the coming decade, there is no reason to believe the goal of a worldwide Communist society will change. The methods of reaching that goal will change, even to the utilization of coexistence as a tool. It is common today to speak of the détente, or the easing of strained relations. There have been détentes before—it is necessary to mention here only "The Spirit of Camp David"—and there probably will be more.

There is little peaceful about peaceful coexistence in the Soviet view. The Communists will continue to use political, economic, and subversive forces, backed by military strength, to exploit and undermine independent people. Their ruthlessness will not diminish, and they will continue to repudiate agreements when it serves their purpose. They are not satisfied with their present position vis-à-vis the United States so far as military power is concerned, and this is the main reason for Russia's great emphasis on technological superiority. They are today increasing the size and lethality of their nuclear stockpile. By the middle of this 1965 to 1975 decade, it is entirely possible their store of nuclear arms will surpass that of the free world. If we recall here Dr. Teller's observation that technical surprises come almost every year in this area, the Russian numerical superiority of the 1970s may be less important than the qualitative change that is bound to accompany their progress.

The news of this qualitative change, when it comes,

will be in the form of technological intelligence. Some skeptics, like those who discount potential new energy sources, will stand firm against facts that do not conform to their personal views.

Harry H. Ransom has written, in *Central Intelligence and National Security,* that history is "replete with examples of politicians who, for one reason or another, refused to believe intelligence estimates, which, in many cases, turned out to be accurate. There are instances, whether . . . in Hitler's Chancellery or more recently in the United States National Security Council, where the acceptance of hard and accurate intelligence has been impossible because of skeptical recipients."

In fairness, it must be added that the Ransom book, published in 1958, argued that more centralization was necessary. But it warned, also, that the intelligence producers should not lose their rapport with the users of intelligence. This warning has not always been heeded.

Prof. Richard E. Neustadt was quoted last year as saying "information is not only a key to action; it is a key to power in this government." And, he added, "the right to information" about important things "is hardly guaranteed to anybody." The practical meaning of this is that information, including that on technical capabilities, is subject to dilution along the route from gathering to assessment. The information input, by the time it reaches a highly centralized assessment center where decisions are made, may not be always right. The result can be a wrong decision, even though the chances are it will be an important one.

Consider the cancellation of the Skybolt air-launched ballistic missile. In announcing that the project had been killed, President Kennedy stated that Skybolt is technologically "beyond us." This was debatable. Skybolt was described by its designers two years earlier as "entirely within the state of the art." Today the Pentagon is developing a new short-range attack missile (SRAM). Like Skybolt, it is intended to prolong the usefulness of the B-52 bomber, although the mission has been altered. There are some who believe it is not as good a choice as Skybolt. But that is not the point.

The important point is that the Skybolt was portrayed as complicated, costly, and unnecessary. Information coming out of the White House made the missile look like a technological monstrosity, which it was not, and ignored other aspects of the project—most importantly, that Great Britain had the fate of its government, its independent nuclear force, and its diplomatic sovereignty, all invested in Skybolt. These facts were not in the White House presentation. If they had been, they would have worked against the cancellation. The resulting crisis in our relations with England was only patched up at the Nassau conference.

Some failures to react to intelligence, or reluctance to grind in observations, facts, and opinions that conflict with personal views, have their roots in several ingrained attitudes. Most of them are related directly to the Soviet threat. One is a hopefully held conviction that Russia is reducing its technological effort, particularly in the development of weapons and aerospace techniques. Another is that the Soviets are reducing their production of nuclear materials. A third is that the Communists are not preparing to use space for military purposes.

And here is another: the concept that Russians develop new weaponry only in response to provocation by the United States. This argument holds that the United States started the cold war and the arms race. The United States can, the reasoning goes, cool off the cold war by easing up on development of new systems, be they in space, the atmosphere, or on the ground. An extreme example is the conviction that the United States will remain fairly safe from nuclear attack so long as we do not build a defense against nuclear attack. This is part of the case against ordering the Nike-X system into production. It follows that we must not build a defense against intercontinental missiles unless we also have a shelter program, which Congress has refused to finance.

There is ample evidence that the Russians disagree. In addition to a shelter program, Moscow is working diligently on a missile defense system. In last November's Red Square parade the Soviets proudly displayed what appears to be the prototype of an exo-atmospheric defense missile. From photographs, the weapon is about the size of our Minuteman ICBM. It apparently is designed to intercept incoming missiles before they enter the atmosphere, a defense technique considered—in this country—as somewhat of a strain on the state of the art. There are competent observers who believe, judging by the Russian record, that this system can be operational before 1970.

The story of Russian aircraft development is another we cannot ignore. A large number of modern aircraft have appeared in the Soviet Union and there is no reason to believe they are not pressing developments in the supersonic flight regimes, up to and including hypersonic vehicles.

For the broad base of Soviet technology and a comparison with our own, the common measure is the output of graduates from scientific and technical educational institutions. For the United States, the last peak was in 1950. The total went well above 125,000 and that influx made an unmeasured contribution to our postwar progress in missiles, space, and aerospace technology. It is frequently overlooked that this vital strength was a byproduct, to a large degree, of the GI Bill of Rights. Many of those educated veterans today are in management positions.

According to the Bureau of Labor Statistics, at least 50,000 of these talented men have recently moved out of defense industry as a result of cutbacks.

Meanwhile, the Russians continue to increase their output of scientists and engineers. In 1964 there were about 140,000 new engineers added to the Soviet pool. There are 3,625 technical colleges in Russia, with an enrollment of 2,981,000 students. If we add higher degrees to the 140,000 new engineers, the total was about 190,000 graduates in Russia last year. The

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comparable figure for the United States is not more than 45,000. They are producing about three engineers to our one.

On top of this is the Soviet chain of research institutes and laboratories. Authoritative directives, published in Russia, list from 3,000 to 5,000 of these facilities, about double the number of ten years ago. They range from small laboratories to giant scientific complexes and the Soviet scientific city of Novosibirsk. There are at least a dozen institutes for which we have no parallel. These are research centers devoted to scientific subjects that do not warrant specialized attention in this country. One of the fields on which they are putting high emphasis is cybernetics and indications are that they intend to automate not merely industry, but large segments of Soviet society. It is an area where the payoff potential is the highest.

There is no implication here that the United States has faltered in the area of pure science and basic research. The blocks are accumulating. But we are in danger of being surpassed in applied science—applied, in this instance, to projects that can preserve our national security and that of the free world.

The great difficulty of an essay like this, trying to postulate the requirements of a future decade, is that we cannot know enough about what to expect. In the annals of the US Air Force there is an example of this inability to predict breakthroughs. It is the famous von Kármán report of the immediate postwar years, "Toward New Horizons." This is hailed in USAF history as a landmark, which it was, in that it pointed the way to the ballistic missile program. Yet the ballistic missile, and the space-age wonders that followed, would have been impossible without the transistor. And the transistor is not mentioned in the von Kármán report. Nobody had heard of it. Nobody predicted it.

What is certain about the next ten years is that the confrontation with Communism will continue. The pace and the strategy of the Red effort may change, but not the goal. The problem of maintaining world peace will become more complex as unrest accelerates in the underdeveloped and newly emerging nations. Technology will become more complicated and more expensive. Space competence will grow and we will have it thrust upon us that space is pregnant with military threat. The Russians recognize this and Lyndon Johnson, when he was a Senator, was apprehensive about the possibilities. Significant arms reduction is not likely, although there will be continued efforts at arms control, some of them effective.

Military power, as always, will remain the tool of national policy. The use of that power, in turn, will be limited by fear of escalation, the slippery character of alliances on both sides of the Iron Curtain, and all of mankind's opposition to the use of force. There will be frequent crises to test how much effect these limiting factors really have.

When we say our military policy must be responsive to our national policy, it is with the understanding that neither one is a neatly tied package. As we have seen in the case of South Vietnam, national policy is a fluid thing that comes out of speeches, interviews, congressional presentations, directives, and similar expressions of executive opinion. Pressures may come from East Berlin, the Suez Canal, Hanoi, or a Senate committee hearing.

In the midst of this flux, military superiority must be maintained. It must be able to deter war at all levels and be effective in all kinds of crises. It must be adaptable to realistic arms control efforts, which means that it must be a safe force and not provocative. The force must be survivable and flexible. It must provide multiple options and respond in a precisely controlled way to any challenge. It must be accurate and exercise precise discrimination in the selection of targets.

For all these requirements, vigorous application of technological advances is essential. Space, defense systems, and continued counterforce superiority must have priority. For the lower-level threat, which means the wars we are most likely to fight, the refinement of nuclear capability must continue, providing highly discriminatory tactical weapons.

The thrust of Russian power has been inhibited, since the end of World War II, by the capability of the United States to build modern weapons and deliver them. We must face it: there is going to be a redistribution of the power that is loose in the rest of the world, greased on the tracks of time by technological progress. Anyone who doubts this should study de Gaulle's France, Communist China, Nasser's Egypt, and—even—India.

C. P. Snow made an error in 1960 when he predicted that China and several other states would have nuclear capability by 1966. But his mistake was only on the calendar. He was making a guess without the benefit of intelligence. Intelligence enabled the United States to predict, quite accurately, when the Chinese would explode their first bomb. Intelligence did not let us know how sophisticated the Chinese bomb would be, according to the official statements. As in the case of Russia, technology moved faster than we anticipated.

To keep abreast of these challenges in the murky future, the American people must learn how to spend their money wisely. The choice is between risking our money or our security. A high risk with expensive technology means we will take a lower risk with the military threat.

How we assess technological intelligence in the long run will determine how we will use our money and ability for the application of breakthroughs to projects with high security payoff. On the basis of past experience, the giant steps will be taken only in response to an obvious threat. Thus it was that a decade ago we jumped into massive unknowns when the green light was turned on for the ballistic missile program. The Soviets forced us to do it and we did it successfully.

In the next ten years it could be fatal to wait for Soviet stimulation. The response from now on must be to the things we know about technological possibilities.—End

*THE SPACE AGE IN PERSPECTIVE*

# SPACE DIGEST

*VOLUME 8, NUMBER 5 • MAY 1965*

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*Since astronomers began their celestial scans, they have been frustrated by the atmospheric haze through which earthbound telescopes can never fully penetrate. Now the space age promises mankind its first clear observations, from beyond the haze, of the splendor and mystery of the universe, through the use of orbiting scopes. Major scientific data and new cosmic understanding are expected from . . .*

# OAO—Clear Window to Infinity

BY GENE BYLINSKY

THE earth's atmosphere has always frustrated astronomers' desire to see the universe in its true splendor. It hides from them such tantalizing riddles as the true nature of the Martian "canals" and planets circling other suns and robs them of precise knowledge about stellar evolution—a subject that may one day be of life-or-death significance to mankind.

Our biggest telescopes would be powerful enough to resolve many such riddles if it were not for atmospheric blurring of images and absorption of telltale radiations from the stars.

Modern technology is giving us the tools to vault this atmospheric barrier, and the attack is now in progress with rockets carrying detectors of ultraviolet and X-rays, balloons lugging telescopes high into the night sky, and improved auxiliary equipment for ground-based telescopes.

Yet all these means have limitations. No ground-based device so far can overcome the blurring of telescopic vision. The earth's gravity imposes a physical limit on the size of ground-based telescopes; no refractor, or lens, bigger than forty inches in diameter has been built because gravity makes the objective lens sag.

Rocket and balloon astronomy have been widening the spectrum window by a few cracks, but they have drawbacks, too. Rocketborne instruments get only a fleeting glimpse of a few preselected objects. Balloon telescopes, such as Princeton University's highly successful Stratoscopes, still find the full range of ultraviolet beyond their reach even when the telescope ascends to 80,000 feet, or above ninety-seven percent of the atmosphere. Most ultraviolet is absorbed by still higher layers of the air.

Even spectacular flybys and crash-landing photographic missions to the moon and the planets by spacecraft equipped with television cameras have their limitations. They may answer many questions about bodies in the solar system. But the nearest stars are hopelessly beyond their reach.

What is needed to fling the spectrum window wide open to let in, to record all, or nearly all, the sounds and sights of the cosmic drama is a platform in space stabilized with high precision to support a telescope. The space age has made such space observatories possible.

This kind of platform, the first Orbiting Astronomical Observatory (OAO), is now being completed under the sponsorship of the National Aeronautics and Space Administration at Grumman Aircraft Engineering Corp. in Bethpage, Long Island, N. Y.

An octagonal structure almost seven feet wide and twelve feet high, it has a central tube forty-eight inches in diameter, extending the full height of the body. Inside this tube, a 3,600-pound spacecraft package can accommodate optical systems up to ten feet in length, weighing 1,000 pounds. Horizontal shelves surrounding the tube will hold instruments and equipment. The OAO is

a general-purpose spacecraft intended to carry a variety of experiments with minimum redesign and retesting. The observatories could be launched at intervals for many years to come. The first is scheduled to be lifted into a 500-mile-high orbit late this year; two others will follow a year apart.

There is much excitement among astronomers at this first opportunity for a clearer view of the universe. "We're now looking at a landscape on a very foggy day," says Dr. Nancy Roman, the Director of Astronomy and Solar Physics for NASA at Goddard Space Flight Center, Greenbelt, Md. One of the prime movers of the OAO program, Dr. Roman says, "The OAO will clear it up and bring the sun out."

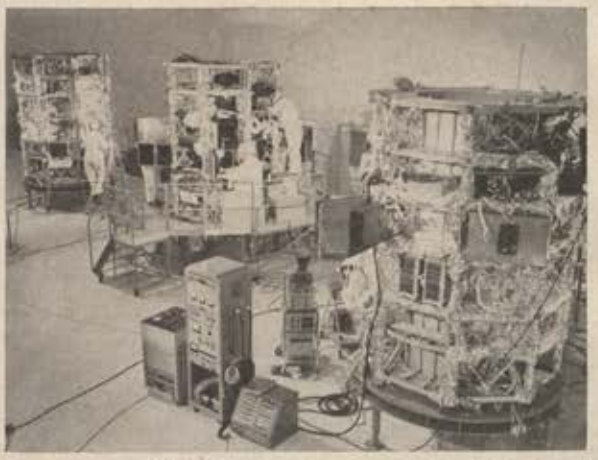
We have had to depend on such fleeting glimpses through the fog because only three small "windows" admit electromagnetic radiations through the atmosphere. There is a narrow slit in visible light, an even narrower one in the infrared part of the spectrum, and a larger opening through which radio waves between one centimeter and about a meter reach the earth's surface. Gamma rays, X-rays, most ultraviolet, infrared, radio waves, and some microwaves are blocked by the atmosphere.

If one compared the electromagnetic spectrum's length (from thousands of meters for radio waves to shorter than one-thousand-millionth of a centimeter for gamma rays) with a piano keyboard's eighty-eight keys, and put an astronomer in place of a pianist, his hands would be "glued" to just the ten keys he could touch in front of him.

Because of atmospheric distortion, we can't even see clearly details on nearby planets. Mars, at its closest an astronomically insignificant 35,000,000 miles away, appears as a dancing, fuzzy disc the size of a dime, even when photographed through the world's largest telescope, the 200-inch mirror at Mount Palomar.

The atmosphere limits the resolution of Mount Palomar's 200-inch giant to the theoretical resolving power of a mere twelve-inch telescope. As a result no detail smaller than about thirty miles across is visible on the surface of Mars. Without the atmospheric bar our biggest telescope could see objects on Mars only three miles across, and perhaps answer the "canals" question.

We aren't much better off where the immensely more distant stars and galaxies are concerned. (The nearest star, Alpha Centauri, is 4.3 light-years from earth. A light-year is the distance light can travel in one year moving at 186,300 miles each second.)



*Grumman technicians work on assembly of National Aeronautics and Space Administration's Orbiting Astronomical Observatory innards for 1965 launch.*

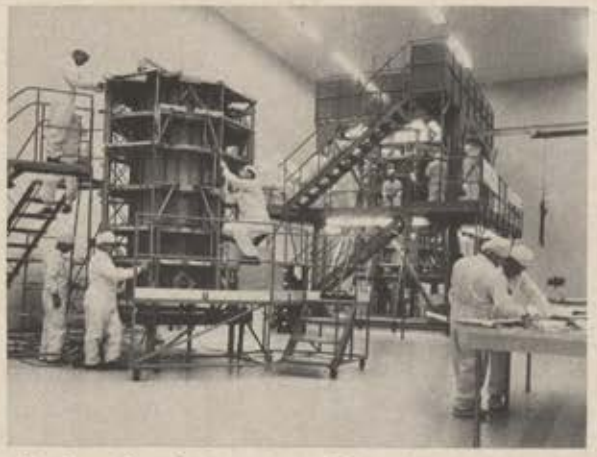
It is true that in observing stars and galaxies the telescope as a camera far exceeds the human eye. A look at the reflection of a galaxy in a mirror telescope would show a fuzzy patch of light, but an hour-long, even a day-long, exposure of photographic plates brings out detail of distant objects by gathering tremendous amounts of light. It is the limited diversity of radiations that puts the severe crimp in our knowledge of the universe.

"There's no guarantee that the galaxies and stars we see make up not more than ten percent of the observable universe," says Princeton's Dr. Martin Schwarzschild. "There's a fair chance that we have no idea of ninety percent of matter in the universe."

Our knowledge of distant cosmic objects comes from analysis of their electromagnetic spectra, the "fingerprints" of the stars. Just as rain droplets refract sunlight to form a rainbow, spectroscopes can break down radiations into their constituent colors, or wavelengths. Each chemical element has several sets of spectral lines all its own; each set tells without ambiguity about the particular state of excitation of the atoms comprising the elements. This in turn reveals pressures and temperatures in the stellar atmospheres.

The problem is that many stars and other objects emit most of the important information about their composition and the violent energetic processes taking place inside them in the only part of the spectrum that can't be recorded on earth—mainly ultraviolet.

Obtaining precise data on the life and death of stars is of far more than academic interest. It could become of life and death importance to man in the future. For if our sun, an incon-



*Absolute cleanliness in assembly area for OAO is essential to successful operation of intricate device. Above, the "clean room" OAO section at Grumman.*

spicuous "yellow dwarf" about five billion years old, is really moving upward on the evolutionary ladder, as most stars are believed to move, in another five billion years it may start heating up and consume the earth in a fiery holocaust.

With space travel now a reality, even though it is in its infancy, the idea of man migrating to another planet to escape a fiery planetary death is no longer completely in the realm of science fiction.

There are, of course, problems of more immediate concern to mankind, the solution of which could be aided by an unobstructed view of the heavens. Knowledge of how to harness the awesome power of thermonuclear reactions with the idea of eventually creating fusion reactors that would run on river or sea water, may well come from the stars. For these incandescent globes of gas are in reality gravitationally stabilized fusion reactors "burning" under control.

Another big practical benefit from analyzing the full range of radiations outside the atmosphere could be improved weather forecasting. The sun drives the earth's atmospheric "weather machine" with solar substance, or corpuscular radiation, serving as fuel. This radiation is absorbed by the upper atmosphere; its amounts and fluctuations, which have an immediate bearing on the weather below, could only be measured from above the atmosphere.

But even if observations from space contributed little in terms of immediately applicable, "practical" knowledge, their impact on our thinking still could be colossal. For space observatories put astronomy on the threshold of solving the mystery of the origin of the universe. The answer to the question of whether the universe was created in a cataclysmic "big-bang" explosion eons ago of a huge "atom" or primordial matter, or whether new matter is being continuously created to support the "steady-state" theory of continuous creation of new stars as old ones die might be obtained.

One reason for the expected big improvement in observations is that in space the thirty-six-inch mirror, which eventually will be used, should operate close to its theoretical resolution. Since the resolving power (the ability to discern the size of objects) of the Mount Palomar mirror—because of atmospheric limitations—equals only the theoretical resolution of a twelve-inch telescope in space, a thirty-six-incher aboard an OAO should be able to see three times finer detail than the 200-inch Hale reflector on earth.

This does not mean that a thirty-six-inch space telescope will see three times as far, at least not in visible light, because its light-gathering ability still would be exceeded by Palomar's bigger mirror. Yet the space telescope is certain to push the limits of the observable universe outward because it can "see" stars and galaxies in the full ultraviolet range.

Astronomers are particularly anxious to take a good look from an OAO at the mysterious, recently discovered "quasi-stellar radio source" also known as "quasars." These strange objects are 100 million times more massive than the sun and up to 100 times brighter than our whole galaxy, which has 100 billion stars. Matter is believed to be collapsing in the quasars at a velocity approaching that of light, suggesting energetic processes which are something of a mathematical "miracle." The puzzling objects are believed to lie at the edge of the universe visible from earth; the furthest seen so far is four billion light-years out. Their fantastic distance may give astronomers a clue to the shape of the universe.

At the other extreme, says Princeton's Dr. Schwarzschild, "I wouldn't be a bit surprised if we find an extremely nonviolent mass of molecular hydrogen—so quiescent that we haven't detected it yet." Molecular hydrogen emits in ultraviolet. Its detection would be a major find for two important reasons. First, in recent years astronomers have come to realize that the major portion of the mass in the universe is unaccounted for. It has been suggested that molecular hydrogen may be that missing mass. And secondly, molecular hydrogen may play a vital role in formation of

dust grains out of which stars are believed to be born.

Mapping of this interstellar matter is planned with a thirty-two-inch mirror telescope, which will be carried aloft in the third OAO. Lyman Spitzer, Jr., the noted Princeton astronomer, will supervise the project. That spacecraft will also measure up to 50,000 stars in ultraviolet to determine the shape of their energy distribution curves. The task will be done with four twelve-inch telescope cameras built by the Smithsonian Astrophysical Observatory.

The first OAO will attempt an ambitious survey of the sky in X-rays, gamma rays, and ultraviolet. Three telescopes will seek out sources and directions of emitters of X-rays and gamma rays; there is a chance that additional quasars as well as tiny, compact neutron stars will be detected. Aboard the same spacecraft will be five other telescopes, including one sixteen-incher, and two spectrometer systems designed by University of Wisconsin scientists. Because of the multiplicity of telescopes to be carried, the first OAO is designed for viewing from both ends of the tube. A ground command will roll the OAO around to enable a variety of observations.

The second OAO will carry a thirty-six-inch mirror telescope designed by NASA's Goddard Space Flight Center scientists for ultraviolet measurements of total energy of stars and galaxies. Photography of the planets is being postponed for subsequent OAOs mainly because there is no television system available that would retransmit the image to earth with the high resolution astronomers need. Findings of the first OAOs will be received on earth not as pictures but as electronic signals. These will be recorded on tape; some of the coded data will be reconstructed into pictures.

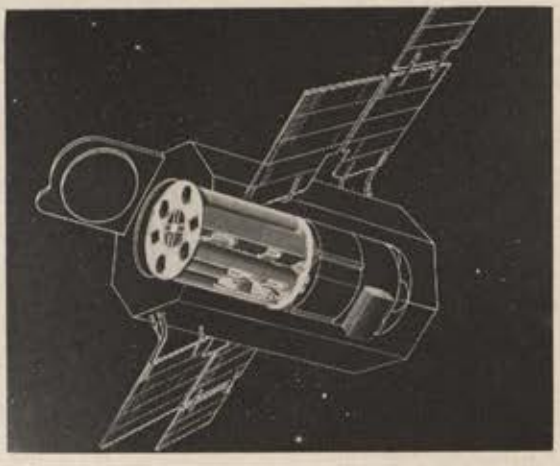
Strange and beautiful objects may be recorded on later OAO flights. The mystery of the Martian "canals," if not solved by Mariner spacecraft flying by Mars this summer or by balloon-telescope photography, should be resolved by telescopes in space. The curious large red spot on Jupiter and the rapidly changing, dark belts that encircle the planet should stand out clearly. Craters on the surface of Mercury, detail on the remote Uranus and Neptune, the outline of Pluto—the planet furthest away from the sun, which in earth-based telescopes now appears merely as a pinpoint of light—should all become visible. The nature of Venusian clouds may be explained.

Discs of distant stars, possibly even of planets circling other suns, should stand out for the first time. Theoretically postulated neutron stars, dying suns only ten miles in diameter and with matter condensed to a fantastic ten billion tons per cubic inch, producing such enormous gravity that light waves are bent into spirals, may be detected by the OAOs to give man new insight into the nature of gravity and the physics of elementary particles.

The OAOs also should tell us more about stellar evolution. After a star is born out of gas and dust, it presumably proceeds slowly to the giant size; some of these "red giants" are as big as our whole solar system. Many a "red giant" then flares up and leaves behind it a dying "white dwarf," which eventually becomes a "black dwarf" —an extinguished star.

But the theory is still sketchy. "We're swimming all over the place when it comes to red giants and white dwarfs," says Dr. Schwarzschild. "How to connect them is a complete mystery."

It must be stressed, however, that despite all



*Artist's conception of OAO deployed in space. Note sunshade open for focus of Wisconsin package.*

*Cook Electric Co. scientists assemble University of Wisconsin Experiment Package, containing telescopic and spectroscopic equipment, similar to the one which will be carried aboard the first Orbiting Astronomical Observatory.*

*Dr. James E. Kupperian, Jr., NASA's Goddard Space Flight Center, Md., is OAO Project Scientist.*

*Dr. Nancy Roman, Director of Astronomy and Solar Physics at Goddard, is a prime mover of OAO program, sees great potential.*

*Robert R. Ziemer of NASA's Goddard Space Flight Center is the Goddard OAO Project Manager.*

these exciting possibilities, OAOs won't suddenly put out of business our great ground observatories. Scientifically, it may be desirable to do all, or nearly all, observations from space. But engineering in space probably never will be as easy as on the ground. Much work remains to be done from the ground. And it remains to be seen whether the fantastic pointing accuracy of .1 of a second of arc—equal to pointing at a baseball 100 miles away—can be achieved in OAOs.

This accuracy, three times finer than that of ground observatories, is crucial to OAO's success. The spacecraft are designed to point the optical axis of the telescope to any point in the celestial sphere, with the exception of a ninety-degree cone about the sun line. To assure the needed accuracy, Grumman engineers have constructed a complex space stabilization simulator, a vacuum chamber inside which the complete OAO electronic system is installed atop a 5,300-pound platform. So precisely is the platform balanced on a twenty-two-inch steel ball bearing floating on a thin film of air, that a fly walking on its edge would set the platform wobbling.

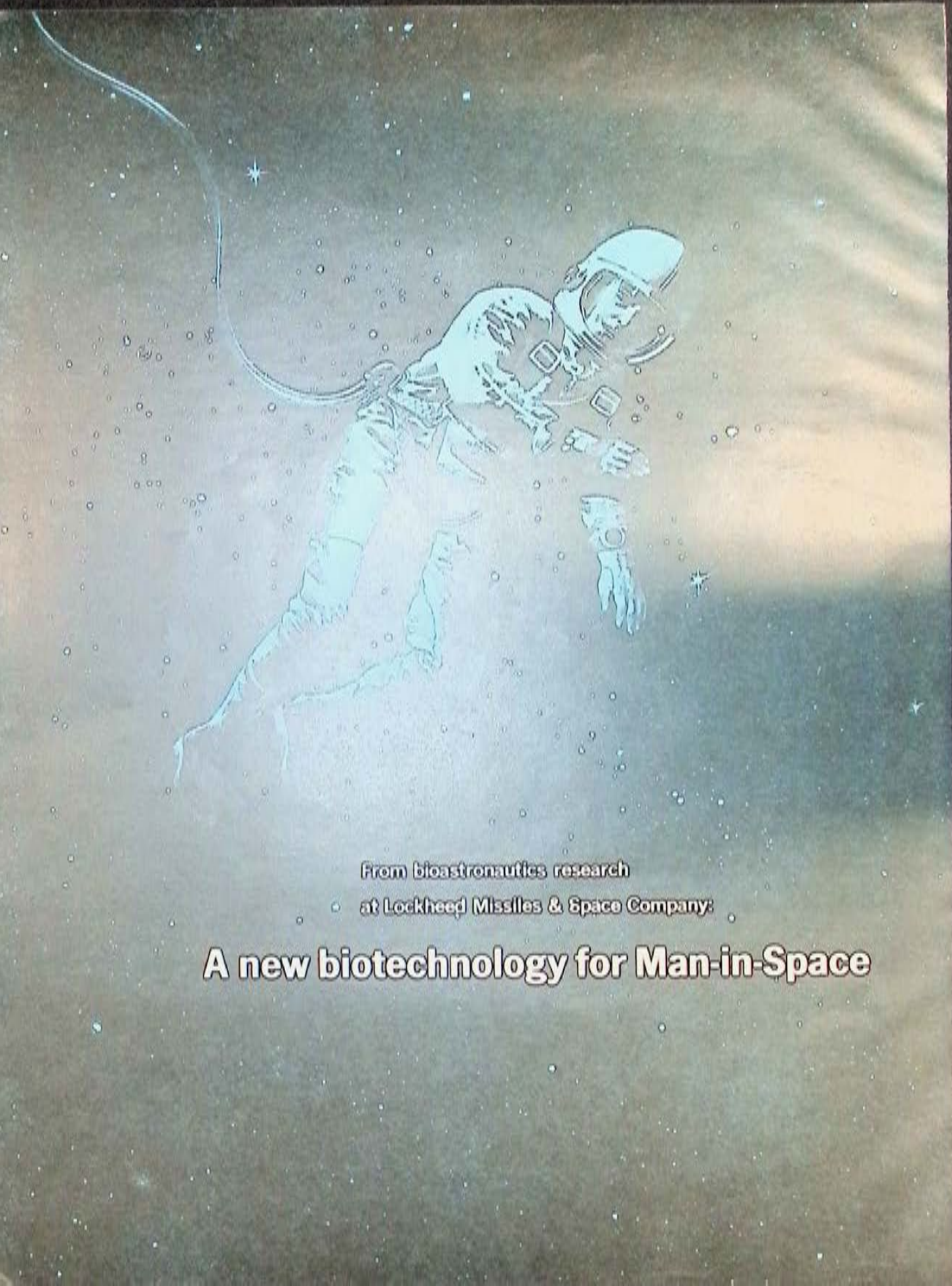
Inside the spherical vacuum chamber, five light sources simulate stars, and a powerful xenon arc lamp shines through a window from above to imitate the sun. Despite promising ground tests, "You can't really tell about pointing accuracy until you get in space," says Dr. Roman.

The space observatory will be subject to four small perturbing forces or torques. Electric current loops in the spacecraft will react to the earth's magnetic field; aerodynamic drag will still be noticeable, even at 500 miles; the pressure of solar radiation will be there, as well as a gravitational torque. The sum of these forces will be exceedingly small, "probably quite a bit smaller than the force a person could exert by blowing air at the spacecraft from one foot away," says Robert R. Ziemer, the OAO project manager at Goddard. But if left unchecked, the four torques eventually would make the OAO tumble.

To counteract the torques, engineers have developed an intricate, interlocking system of counterforce devices. Fine inertia wheels no larger than an ashtray will spin almost constantly to offset the torques. Tiny gas jets, firing nitrogen through openings narrower than a needle, can put a brake on the wheels, as can a novel magnetic-braking system, which uses magnetometers to sense the direction of the earth's magnetic field. Electric current shot through a set of coils would interact with the magnetic field, thus serving as a brake.

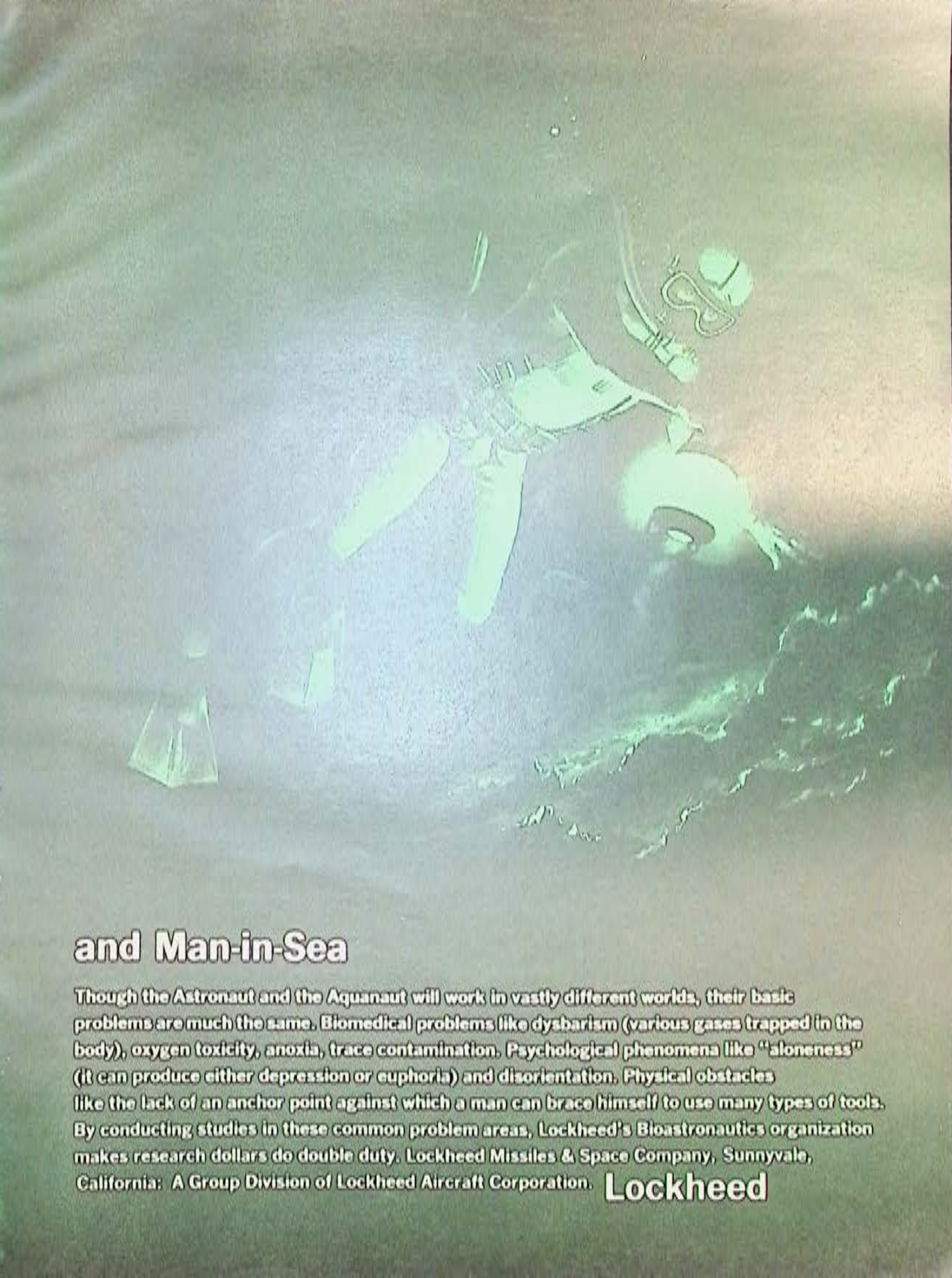
The key to OAO stability is a set of six gimbaled star trackers, mirror telescopes 3½ inches in diameter. After the big spacecraft is inserted into its 500-mile-high orbit by an Atlas-Agena D rocket, the OAO stabilization system must first reduce initial tumbling and then stabilize on the sun. Dark blue solar cell panels will open, and the star trackers will lock on preselected stars. The star trackers aim to an accuracy of one minute of arc; fine momentum wheels are then capable of holding the telescope for an hour or two to .1 of a second of arc.

As the OAO whips around the earth on its first 105-minute orbit, tracking stations interrogate the craft and check out about 400 items. Observations start with the second orbit. A tracking beacon will signal the OAO's approach to one of the three tracking stations at Rosman, N. C.; Quito, Ecuador; and Santiago, Chile. On each



From bioastronautics research
at Lockheed Missiles & Space Company:

# A new biotechnology for Man-in-Space



## and Man-in-Sea

Though the Astronaut and the Aquanaut will work in vastly different worlds, their basic problems are much the same. Biomedical problems like dysbarism (various gases trapped in the body), oxygen toxicity, anoxia, trace contamination. Psychological phenomena like "aloneness" (it can produce either depression or euphoria) and disorientation. Physical obstacles like the lack of an anchor point against which a man can brace himself to use many types of tools. By conducting studies in these common problem areas, Lockheed's Bioastronautics organization makes research dollars do double duty. Lockheed Missiles & Space Company, Sunnyvale, California: A Group Division of Lockheed Aircraft Corporation. **Lockheed**

orbit the spacecraft will be in view of ground stations for ten minutes.

Programs for observatory operations by then will have been converted into digital commands by a large computer at Goddard, the central OAO control station. Microwave and teletype will speed the programs to the tracking stations. Each of these will have a small digital computer to store commands, process data, and feed information to the displays.

Although the OAO will have to avoid a ninety-degree cone around the sun (the sun would burn out optical systems), within three months it will be able to observe the whole celestial sphere because the earth's rotation will shift the forbidden zone.

The space observatory's findings will be recorded aboard on 208,000 magnetic memory cores. Indicating the degree of care that is going into construction of the OAOs, each of the minuscule cores had to be checked for size and electric properties. All in all, the OAO is by far the most complex spacecraft built to date by US scientists.

If you wonder whether—with all this automation of observations (the only direct, instantaneous view of the stars will be provided by OAO's boresighted TV camera, not for study, but as a pointing backup)—astronomers are going to feel nostalgic for the "good old days" when they personally peered through telescopes, the answer is that they ceased looking through telescopes for direct observation of objects long ago. There are still some exceptions: specialists in Mars, for instance, scrutinize its surface occasionally by looking through a telescope. But, in the main, astronomy today consists of the somewhat impersonal use of a telescope as a camera. Personal participation comes through spending the night at a telescope's side, aligning it, and later studying the photographs.

The advent of space observatories may further reduce man's role as a direct observer, however. Putting a man inside an orbiting observatory is not as good an idea as it sounds. Not only his breathing, but even his heartbeat could upset the delicate balance of the space telescope. More importantly, being a child of the earth, with visual sensitivity limited to the few electromagnetic radiations we know as light, man wouldn't see much from aboard the OAO. His naked eye would be exposed to a velvety pitch-black sky, to a somewhat whiter sun shining without glare, and to stars unblinking and in their true colors—red, yellow, white, blue.

Lack of human access to an OAO will be a drawback. "If something goes wrong with one of our ground-based telescopes, we can go in and repair it in five minutes or five hours," says a Mount Palomar astronomer. "But a failure in space may mean the end of the project."

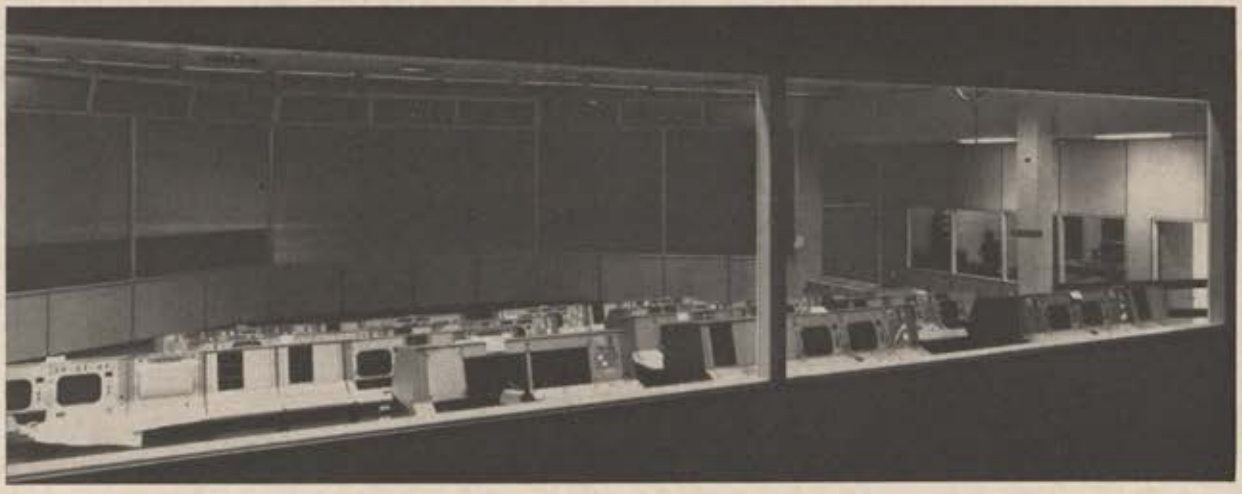
OAO builders recognize this problem. They hope that after orbital rendezvous techniques are perfected, astronomers will be able to visit orbiting observatories to update and repair instruments and to retrieve photographic records. Another possibility would be to locate an OAO near a manned space station. In the meantime, OAO builders concede that some OAO components, such as the stabilization system, hover at the edge of the "state of the art." But they also note that the first orbiting observatories are being meticulously designed to last at least a year.

Not all astronomers are as enthusiastic about telescopes in space. The risks involved (a good-sized meteorite would knock out a space telescope, although the danger is considered negligible), and the high cost, have led to some grumbling about spending too much for space astronomy. Mount Palomar's giant 200-incher cost less than $10 million, a pittance by space-age standards. The first three OAOs will cost a hefty $150-$200 million, and subsequent spacecraft will probably cost $30-$40 million each.

"A few directors of big observatories would like more money for ground-based work," says Dr. Roman. "A number are highly enthusiastic about the OAOs. None have said it's nonsense."

"The only thing we're opposed to is a few people who say that ground-based astronomy is through," says Ira Bowen, Director Emeritus of Mount Wilson-Palomar Observatories. "It's like saying that the OAOs will give us nothing. There's a lot of useful information we can get from above the atmosphere, and also from the ground. We need both."—END

*The author, Gene Bylinsky, is a Washington science writer for the Newhouse Newspapers. He studied journalism at Louisiana State University and upon graduation became a staff reporter for the* Wall Street Journal, *specializing mainly in science. He has also reported science for the* National Observer *and has written for various magazines, including* The Saturday Evening Post, Coronet, Mechanix Illustrated, The New Republic, *and* Science Digest. *This is Mr. Bylinsky's first appearance in* AIR FORCE/SPACE DIGEST. *His special interest is astronomy, and he keeps up with developments in this field by frequent visits to observatories in California and elsewhere.*



*A view from the visitor's section of NASA's new Mission Control Center at the Houston Manned Spacecraft Center. New MCC, with two identical control rooms on separate floors, will be used for the next Gemini flight. Data is displayed on television monitors. Philco Corp. implemented the MCC facility.*

auditorium was to announce that the new NASA Mission Control Center at NASA's Manned Spacecraft Center at Houston, Tex., would, for the first time, direct a manned spaceflight and that its partial use during the March Gemini mission had convinced NASA that Houston was ready to do the controlling job.

That announcement was made in fairly short order. Then the parrying began between Dr. Mueller and reporters over NASA's plans for Gemini-4.

Some choice selections from the transcript of the press conference will, we believe, support our suggestion that NASA would do well to avoid such pointless exercises in the future. Although it is true that the National Aeronautics and Space Act requires the agency to keep the public well informed of its activities, there is no requirement that the public be kept confused.

Here are some of the highlights of the conference:

*On the question of when Gemini-4 would occur:*

**Question:** In the handout here in the third paragraph you say the GT-4 flight is scheduled for the third quarter of this year. Some of us have heard rumors that it might be a little earlier than the third quarter.

**Dr. Mueller:** Well, our official schedule is still the third quarter. As you know, and as I said, we are working awfully hard to see if we can advance that date, and the results so far from the GT-3 analysis have been encouraging, but we won't have completed the analysis of what needs to be done for another several weeks.

[This, translated, means either: We really haven't determined the date for Gemini-4—or we're not telling.]

*On the question of extravehicular activity.*

**Question:** Do you plan any extravehicular experiments of any sort on the GT-4 [such as] decompression?

**Dr. Mueller:** Our present plans call for the first extravehicular experiments on GT-5. We, again, however, are looking into the possibility of accelerating the application of these experiments. We do not have, however, any firm plans now for flying any extravehicular experiments on GT-4.

**Question:** What are the four additional scientific experiments that you are still qualifying or remain to be qualified?

**Dr. Mueller:** Well, because of the fact that they are in the qualification process—they will be flown eventually—I'd rather not describe the particular four.

**Question:** Is extravehicular activity one of the four you are considering for GT-4?

**Dr. Mueller:** Yes, indeed. We are considering extravehicular activity. We are definitely working on the problems associated with extravehicular activity. It isn't just the equipment; it is the whole problem.

**Question:** But you haven't ruled it [extravehicular activity] out yet?

**Dr. Mueller:** No, we haven't ruled out any experiments at this point in time.

**Question:** How about the opening of the hatch?

**Dr. Mueller:** This in turn, of course, depends on whether or not we will decide that it is feasible

# Speaking of SPACE

*BY WILLIAM LEAVITT*
*Associate Editor,* AIR FORCE/SPACE DIGEST

## Between the Acts

WASHINGTON, D. C., APRIL 14

The toughest part of NASA's Gemini program is between the acts. That's when all the explaining gets everybody so confused.

Gemini-3 finally came off and for the most part was an unqualified success. Nearly 1,000 newsmen, including this correspondent, watched the incredibly smooth launch into orbit of Maj. Virgil Grissom and Lt. Cmdr. John Young aboard the sleek Titan II that sunny morning of March 23 at Cape Kennedy.

With the rest of the world, we followed the successful three-orbit flight, marred only by the undershot landing, the failure of the now-famous sea-urchin fertilization experiment, and the frivolous matter of the corned beef sandwich that was smuggled aboard by Astronaut Young. It was an incredible week at the Cape, marked both by the Grissom-Young exploit and the successful Ranger IX relay of live television photos of the moon.

Gemini-3 is out of the way. The thought now is of Gemini-4, the four-day, sixty-three-orbit mission Astronauts James A. McDivitt and Edward H. White, both Air Force majors, will fly, possibly as early as June, but officially still scheduled for the third quarter of 1965.

A hazy forecast of the particulars of the upcoming Gemini-4, or GT-4, mission was given the press a few days ago. From the colloquy between reporters and NASA's Dr. George E. Mueller, director of the agency's manned spaceflight efforts, one wonders why such a press conference was called at all.

Officially the purpose of the gathering in NASA's

*Astronauts Edward H. White and James McDivitt, both majors in the Air Force, visit the Martin Co.'s Denver, Colo., Division in preparation for their upcoming Gemini-4 flight. Major McDivitt will be command pilot on the flight and Major White will be pilot. Visit to Martin facility was for a series of practice Gemini "flights" in the company's Space Operations Simulator.*

*The Air Force Titan II, modified for man-rated space-boosting job in the Gemini program, proved itself the morning of March 23 at Cape Kennedy by its smooth performance as two-man orbital carrier. Right, Titan II lifts off carrying Grissom and Young.*

*After recovery, Astronauts Grissom and Young aboard USS* Intrepid*—Young clad in Navy bathrobe, Grissom in striped robe—get Presidential call.*

and practical to have this extravehicular activity.

*At this point the very definition of extravehicular activity came up:*

**Question:** Do you consider it extravehicular activity just to open [the hatch] and stick your head out?

**Dr. Mueller:** Yes, we do.

*That being cleared up, the questioning proceeded:*

**Question:** Do you think it is possible that a man might get completely out of the capsule on this [coming Gemini-4] flight?

**Dr. Mueller:** We have no present plans for it.

**Question:** That wasn't the question. The question was do you consider it possible?

**Dr. Mueller:** I said we have no plans for it.

**Question:** You have no plans for it at all?

**Dr. Mueller:** For the GT-4.

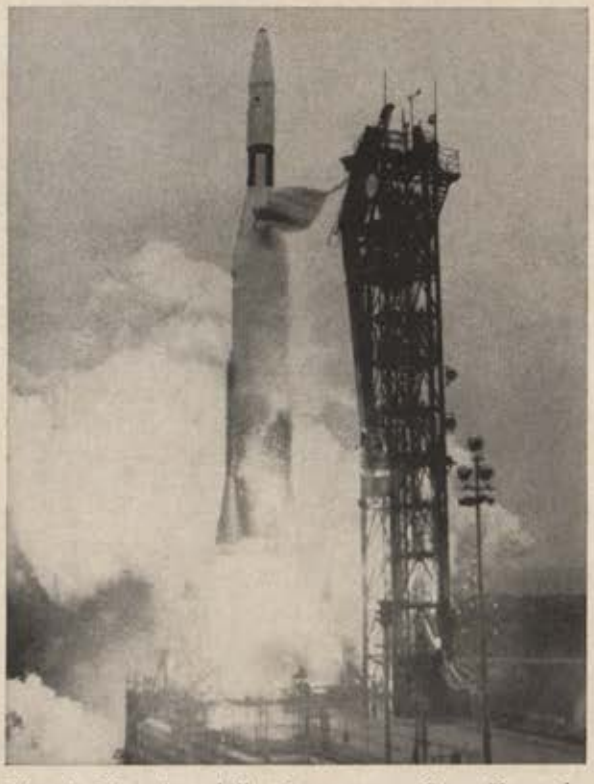
What information emerged from these exchanges eludes us. Speculation aplenty, of course. Perhaps also the indication that thus far NASA has successfully resisted the temptation—and pressure—to speed up the Gemini schedule and try to match to some degree the Russian walk in space in March. Or perhaps NASA may be trying to tell us that it really *has* something up its sleeve for Gemini-4 which, if we are patient, we will hear about in good time.

All this is not to give the thousands of hard-working and dedicated people of the space agency —or its leadership—a hard time; it is rather to suggest that both the press and that portion of the public that is interested could be better served, even at the price of one less press conference.

The Gemini project, as has been noted on these pages and elsewhere, is in many ways obsolescent, despite its initial success and future potential. It was conceived by NASA as a kind of quick-and-dirty interim follow-on to the Mercury program. It got swallowed up in cost overruns and time lags till it finally has become a millstone around NASA's neck. A few years ago, the sensible suggestion for an Air Force Blue Gemini program was shot down. Now is perhaps a sensible time to revive Blue Gemini, while it is still able to make important contributions to technology and national security in itself and in combination with the Air Force Manned Orbiting Laboratory program—still aborning. The massive Apollo moon-landing program has, virtually since its inception, taken up the major portion of NASA funding and talent and this has had an obviously deadening effect on NASA's Gemini progress.

The unhappy history of Gemini is no one's fault. But until policy decisions are made as to the future of the Gemini program, it *is* NASA's responsibility to press on with it. Any reasonable observer would acknowledge that. Whether Gemini will live out its scheduled life at NASA is not clear at all at this time. But NASA coyness, whether intentional or not, about the specifics of the next flight is a disservice to the agency and, more importantly, to the public.

Throughout the press conference that we have described, the answers to basic questions on such subjects as extravehicular activity, launch date, debriefing plans, and the like were virtually all in terms of "we-haven't-decided-that-yet." About



*March 21 and a chilly afternoon at Cape Kennedy: The Atlas-Agena carrying the Ranger IX lifts off from the pad, the first lap of the camera-carrying spacecraft's lunar trip and relay of live TV moon photos.*

the only piece of hard news was that the post-mission landing would be in the Atlantic instead of the Pacific. This decision was made probably for reasons associated with US Naval Force commitments in the Far East, but that was not admitted either.

The landing-site change and the announcement of the Houston Mission Control Center plan could have been handled with a mimeographed press release. And when there is something more than that to tell the public about Gemini-4, weeks from now, *then* a press conference could have been planned.

## Further Mysteries

The mysteries of the Gemini program are matched by questions about the future of the NASA program, after the Apollo moon-landing project is completed, and the fate of the Air Force Manned Orbiting Laboratory project.

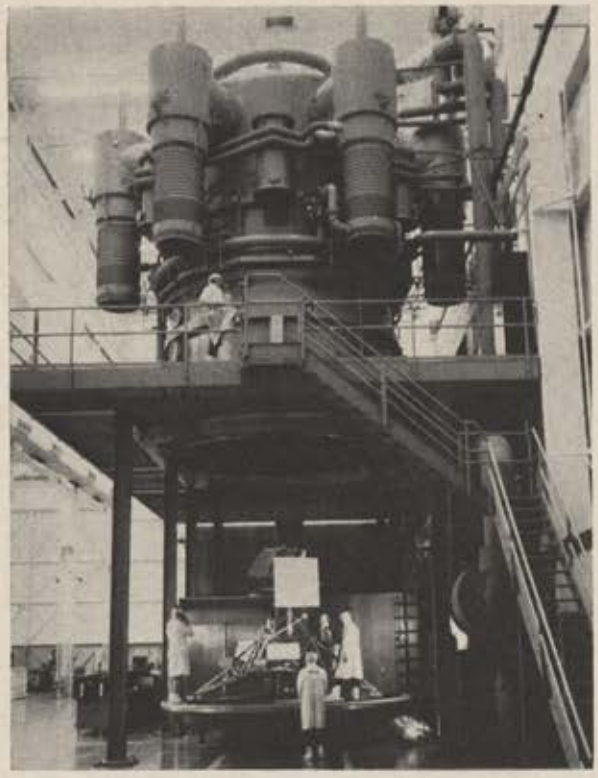
What happens after Apollo is still under continuing study at NASA and by the higher councils of the Administration. Vice President Hubert Humphrey, who is now Chairman of the National Aeronautics and Space Council—which is the top policy advisory group to the President on space—is described as enthusiastic about the space program in general. He watched the Gemini-3 launch from Cape Kennedy Mission Control last month and is reported to be doing a lot of homework on the intricacies of the over-all NASA program. This week he chaired his first full meeting of the Council. But indications are that no major decisions were made at that meeting and that most of the meeting was devoted to the international aspects of the space program.

The Vice President may be expected to play a significant role in future policy decisions on where we go, and how fast, after Apollo. In his new role, he will have to cope, at least indirectly, with the buffetings of that portion of the scientific community which is pretty dead set against major efforts in the search for life, particularly on Mars.

He will also have to deal with such nagging questions as the pace, style, and management of future space-station development efforts. NASA, up to its neck in the moon program, is still pushing quite hard for operational and hardware control of the space-station efforts, and has an array of developing Apollo capsule and Saturn booster hardware it believes can do any number of space-station jobs.

The Department of Defense, so far as can be seen through the haze, is apparently firm in its support of the Air Force Manned Orbiting Labo-

*It was March 24 when Ranger IX took this moon shot at an altitude of 1,470 miles just eighteen and one-half minutes before impacting on the lunar surface. Alphonsus crater in lower left of photo is target.*



*A NASA Surveyor spacecraft, like the one scheduled for soft-landing on the moon to relay lunar environmental data, is readied for elevation into huge space chamber at Los Angeles Hughes Aircraft Co. facility.*

ratory concept and its probable booster—the Titan III (*see page 20*). For a long time, DoD was unenthusiastic about studying in any practical way the potential utility of military man in space, and was consciously trying to get NASA to pick up most of the tab for whatever space efforts might have produced military utility. This picture seems to have changed. But in the face of the country's increased involvement in the Vietnamese war, the DoD tendency to let NASA do most of the space technology development job and pick up the check too may be renewed.

At any rate, a decision on the fate of the Air Force MOL project and probably Gemini's future, too, since it is currently planned for use with MOL, may be forthcoming in June. By then the industry design studies currently in progress should have been completed. And there will be the pressure to make fiscal plans for MOL if it is really going to go into business.

If MOL is approved for hardware development using the Titan III as booster—and there are excellent technical arguments for doing so—space planners are going to have to do some explaining on Capitol Hill.

This is true because at least some space committee members in the House and Senate may be expected to press for a basic policy decision on the management of future space-station development as well as acceptable proof that full-scale development of both Titan III *and* Saturn booster-systems are necessary for large-scale orbital operations, manned or unmanned. Millions of dollars and man-hours are at stake and eventually some choices as to whether NASA or DoD runs the space-station effort and which hardware will dominate the next several years of orbital operations will have to be made.

It is ironic that where once we suffered a poverty of boosters, space projects, program planners, and managers now we have an embarrassment of riches. They could choke us.—END

# An airplane that is designed to protect and support ground forces is called a tactical fighter.

**A tactical fighter** must prevent hostile aircraft from attacking tactical targets. It must be able to intercept, outmaneuver and shoot down any intruder which penetrates at low enough altitude to be a threat (anywhere from the treetops to 30,000 feet). To do this it must have supersonic speed, rapid acceleration, a very high rate of climb and outstanding maneuverability. It must have greater endurance than its antagonists. It must carry cannon as well as air-to-air missiles.

**A tactical fighter** must be able to attack and destroy military targets on the ground while surviving in the air. It must carry a variety of external weapons—missiles, bombs, rockets, napalm, dispensers—and must provide a stable launching platform for them. It must maneuver easily and safely at low altitudes with a heavy load of stores. If attacked by defending aircraft it must be able to counterattack.

**A tactical fighter** should be able to operate from dispersed fields and hastily prepared strips close to the combat zone—rough sod, packed earth, pierced-metal planking. It must be simple to rearm and refuel so it can turn around quickly between missions.

**A tactical fighter** should have a very high sortie rate – which means that it must be rugged, reliable and easy to maintain. All systems and components should be quickly accessible from ground level. Engine changes and field maintenance should not require heavy equipment. Maintenance man-hours should be very low.

**A tactical fighter** should be designed to survive combat damage and operational emergencies. It should present a small target to radar and ground fire. It should have redundancy where it counts—twin engines, dual hydraulic, electrical and fuel systems. It should be able to complete a mission and return to base if one engine is shot out, then take off on its remaining engine and fly to the rear for a replacement.

**A tactical fighter** should be readily adaptable to all types of support missions, including reconnaissance. Versatility and long-term growth should be designed into it from the start, so that major surgery will not be required to give it new weapons and avionics.


**The Northrop F-5 is a tactical fighter. It was designed to fill the total tactical requirement and still be affordable in large numbers. The F-5 is now in full production for deployment to nations throughout the free world.**

## NORTHROP F-5

**V-E Day Anniversary**

**It was twenty years ago this month, on May 8, 1945, that World War II ended in Europe with the collapse of Germany. The blood and anguish were very real, but there was a tinge of sentimentality about it that we very likely will never see again. On these pages are a nostalgic look back at some of the corny and classic shots of the AAF's war in Europe. Some ironic, some amusing, they are . . .**

# Fuzzy Images of a Long-Ago War

## An AF/SD Photo Feature

TWENTY years are one-fifth of a century. Hardly a tick of the second hand on the clock of history but a significant chunk from the life of a man—almost half a working lifetime.

So it is difficult to realize that two whole decades have passed since World War II ended in Europe on May 8, 1945. Pocked with craters, littered with rubble, stained with blood as it was at the end of that carnage, the world's future looked bright and the issues facing it seemed comparatively simple. The war against Japan was grinding on, true enough, but the ending of it was inevitable and coming into sight. Only a handful of men knew of the atomic bomb, and those few could see only dimly the impact the bomb would have on the relationships of nations. V-E Day, in a very real sense, marked the beginning of the end of the uncomplicated life. It was the twilight of naïveté, and it marked the stripping of the last shred of romanticism from the organized killing of men by other men.

The simplistic approach to war, so typical of World War II, was evoked for us when, in searching our photo files for World War II pictures, we came across a dusty cache of cliché-ridden stereotypes of the kind the home front found so enormously intriguing. Somehow, they pricked our palate with the bittersweet taste of nostalgia in a way that more realistic portrayals of battle could never have done. They represent the war as it never was and, in so doing, bring back to those who were there vivid memories of their own little slices of history.

Perhaps this is because the realistic cynicism of the men who had been to war in 1941-45 was exceeded only by the wide-eyed innocence of those who stayed at home. Even one's own memory can play strange tricks, and perhaps it is merciful that this is so. The blood, the sweat, the tears are quickly wiped away by

**Glamorous Atlantic City became a basic training center, with enemy subs patrolling just off its sandy beaches. Basic itself, then as now, proved a great leveling force, making skinny men fat and fat men . . . no, that's impossible.**


**An experienced aviation cadet could play a raucous symphony with the variable-pitch prop on the AT-6 advanced trainer. All cadets were experienced by the time they flew the Texan, with 150 hours logged in primary and basic.**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**No self-respecting outfit was without a mascot. Leading the chow line of this B-25 unit in North Africa is "Bergatroid," a sad-faced burro. Bergatroid's rank doesn't show but mascots always seemed to qualify for rapid promotion.**

**Those were the days when the Russians were our buddies. Bomber crews made shuttle runs from Britain and North Africa into Soviet bases. What with the language barrier, conversation tended to lag, but they liked our cigarettes.**

time. The ludicrous anomalies remain in one's mind.

Behind the stereotypes, of course, lies many a story of enormous accomplishment, of heroic devotion to duty, of daring feats of arms. The face of war had changed, more than any of us really knew. The sky had become a battlefield—and space as well, through the introduction of the V-2 rocket. Technology had become the pacing factor of national power relationships. Most importantly, Americans had become involved in the world—in a leadership role to boot.

But the price of that involvement, the costs of maintaining that leadership were lost, at first in the almost frantic disassembly of forces that, essentially, were made up of civilians who wanted only to get out and head home.

Almost as the United States picked up the mantle of world leadership it began robbing itself of the strength needed to fulfill its obligations. V-E Day marked the end of the war in Europe and the beginning of explosive demobilization. Some, of course, would go on to the unfinished business in the Pacific. But the vast majority would soon start counting their points and scratching off days on the calendar.

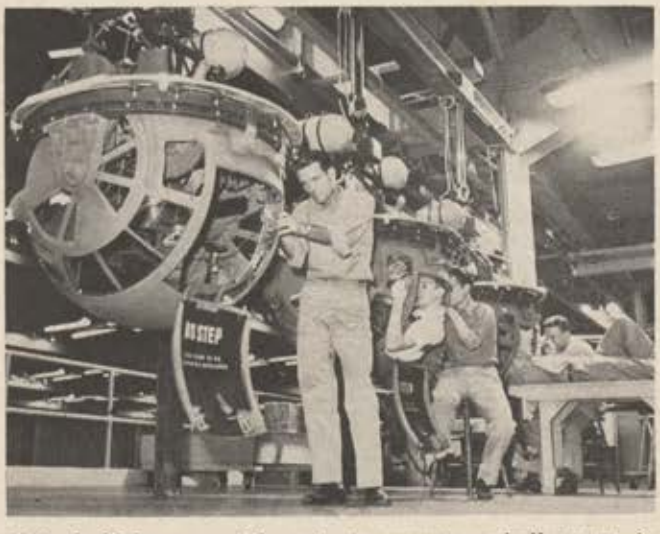
Yet only three years later some of these same men were flying the Berlin Airlift. In little more than five years after V-E Day the North Korean Communists poured across the thirty-eighth parallel. Sabres tangled with MIGs in history's first jet air war. The Army Air Forces, meanwhile, had become the United States Air Force. The atomic bomb gave way to the hydrogen bomb, with destructiveness measured in almost meaningless megatons. Missiles of intercontinental range flowed into the inventory. New clichés, grim and somber, came into use—the Iron Curtain, the Cold War, and now Escalation, as US airmen again carry the war to the enemy in Vietnam.

All in all, V-E Day was as much a beginning as an ending. Allies have become enemies and vice versa. Tension has become a way of life, for individuals and nations alike. And the price of freedom spirals upward.

—JOHN F. LOOSBROCK

*(More photos on following pages)*

**First assignment for the combat veteran lucky enough to return to the States was to visit the plant where his plane was built. Here a B-24 pilot who raided Ploesti describes the mission to Consolidated workers in Fort Worth, Texas.**



**It took little men with guts to operate a ball turret in combat, and considerable skill and agility to assemble them on the production line. In 1944, the peak production year, US industrial force turned out 96,000 aircraft.**

Generals never had trouble getting photo coverage. The one on the left wound up a few years later in the White House. Hap Arnold (right) built an Air Force in World War II.

"Geronimo" was what paratroopers said they shouted as they left the aircraft. And, of course, if your parachute didn't work, you could return it and they'd give you a new one.

*"I am tired and sick of war.*
*Its glory is all moonshine.*
*It is only those who*
*have never fired a shot*
*nor heard the shrieks*
*and groans of the wounded*
*who cry aloud for blood,*
*more vengeance, more desolation.*
*War is hell."*

—Gen. William T. Sherman

You wouldn't think that pierced steel planking would be a very good spot for a GI hootenanny. You're right. They broke it up right after the photographer got his pictures.

The lived-in look, circa 1944. The accompanying slit trench was for those annoying people who drop in unexpectedly without calling first. The newspaper often did double duty.

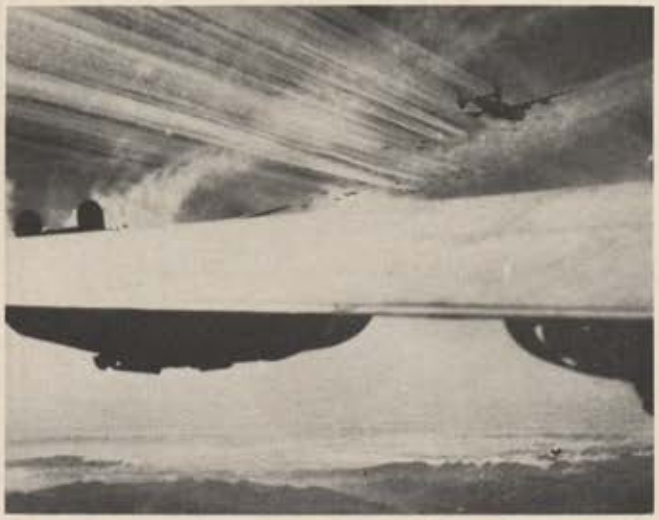
GI photographers shot more bathtub scenes than Cecil B. DeMille. A roll of film and some flashbulbs were packed with every cake of soap. Or so it seemed.

There was this French guy in a beret and all, see, and we got this little boy and a dog and with all those sheep and the airplanes in the background. It gave it a flavor.

Women in uniform were something new and the photographers made the most of it. This was an unusual approach —taking a picture of a picture in a photo lab at Maxwell.

Puzzle: find the lead bombardier. Pre-mission briefings were one instance where the drama was real and the tension legitimate. Not all tickets were for round-trip flights.


The Glenn Miller band became an AAF trademark, and the classic arrangements still bring whistles as USAF's Airmen of Note carry on the Miller tradition at banquets and balls.



The vapor-trail pattern is still good photo material. These were shot on a B-24 Liberator mission somewhere over Europe. The bombers were elements of the 15th Air Force.

"And the flak was so thick you could have walked home on it." Wherever you were it was always thickest, of course, and the only place it was ever light was at the briefing.

*"I would give all my fame*

*for a pot of ale*

*and safety."*

—WILLIAM SHAKESPEARE
(King Henry V, Act III)

We combed the files for a new angle on the standard bombs-falling shot . . . like from the ground up. No luck, so we settled for this sample of what must have been thousands.

Coalition warfare. The pound had not yet been devalued, and you could lose your shirt, tie, and dogtags before you knew what hit you. And the RAF competition loved it.

The caption on the back of this says "THIS IS IT—good old American earth to pat and feel as four airerewmen arrive from Europe." We happen to think it's a crap game.

"Off we go . . ." A surefire shot was the boys coming back from a mission. Or were they just leaving? These are P-47 Thunderbolt jockeys heading for interrogation.

This man has seen the worst of war. What happened was that he was transferred from Luftwaffe aviation cadet training into the infantry.


*Stars and Stripes* brought the word of the German surrender to the 303d Bomb Group. The "Hell's Angels" scoreboard in the background gave the group's combat box score.

No more missions for the men of the 381st Bomb Group, shown here happily clustered around the control tower at their English base, 8th Army Air Force Station, on V-E Day.

This is where they went after the control tower ceremonies—the Noncommissioned Officers' Club of the 381st just a little later and a little gayer in the day on May 8, 1945.

This Stuka J-87 crew is not doing calisthenics. It is surrendering to a tac reece group of the 9th Air Force. They flew out of Czechoslovakia to avoid the Russian rush.

In many ways V-E Day was a bigger occasion for European civilians. This throng gathered in Luxembourg to whoop it up for victory. The Royal Family is watching from balcony.

**1. Short, rough airfields** are no problem to the U-8 shown at the top, with its 340 hp supercharged engines.

**2. Two 380 hp Lycoming supercharged** fuel injection engines power this U-8 to speeds of 252 mph.

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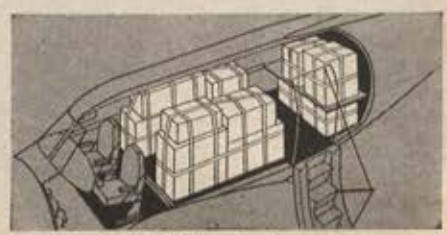
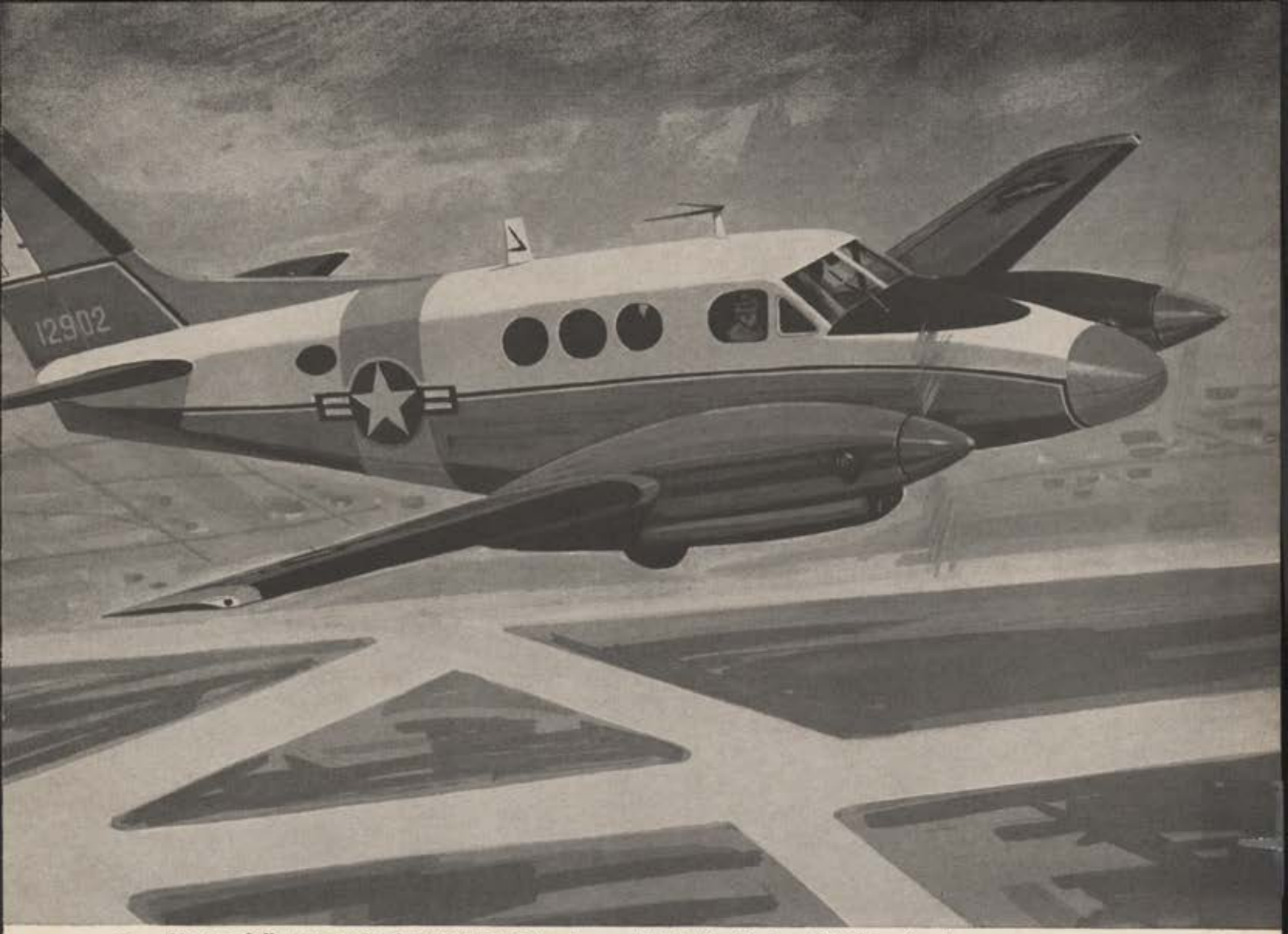


**This much high-priority cargo** can be loaded into a Beechcraft U-8 when seats are removed. Or use cabin for conference seating for 4-5; high-density seating for 11.




**3.** **Now a fully pressurized TURBOPROP** has been added to the Beechcraft U-8 family of military aircraft. It flies "on-time" missions *over* the weather—at speeds to 280 mph.

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# Letter from Europe

# Crisis and Cutback—Britain's Aerospace Plight

**By Stefan Geisenheyner**

**Editor for Europe, AIR FORCE/SPACE DIGEST**

WIESBADEN, GERMANY, APRIL 9

Two news stories from Britain have caught the attention of the aviation community in Europe this spring. First, reliable sources report that the Beatles, the scourge of the eardrums of fathers and mothers the world over, are making a bigger profit than the British aircraft industry and—some cynics claim—bigger than the automotive industry as well. This disclosure contains the core of the second development in Britain: the cutbacks in the aircraft industry.

In spite of hopes that the British aviation industry may achieve an all-time high overseas sales record of £180 million ($504 million) in 1965 as opposed to £90 million ($252 million) in 1964 (the lowest in ten years), the picture looks grim. The figure for 1964 in itself should not cause undue dismay, since aerospace export figures are known to move cyclically up and down the scale. The real cause for concern lies in the fact that the British Government is subsidizing its aircraft industry to such an extent that one cannot talk of true profits at all.

In 1963 the industry's total output amounted to £460 million ($1,288 billion) and government subsidies to £325 million ($910 million), of which £205 million ($574 million) was used on procurement for the services, and the balance mainly for research and development. This indicates that the government subsidizes about three-fourths of the British industry output.

This kind of calculating is inconclusive, however, since it is a simplification and does not take into account long-term investments, labor force problems, and possible future needs. But it seems that the Labor Government elected last October used such reasoning as the basis for its decisions, as shown by the predicament which befell Britain's aviation industry early in February this year. Two important aircraft developments were canceled in the course of the new government's austerity program, which is designed to shrink the industry to a healthy and profit-making size. The British Government cutback, representing some major changes from the Conservative's aviation policy, was announced by Prime Minister Harold Wilson personally.

The US-built Lockheed C-130 Hercules will be bought for delivery next year, instead of the Hawker Siddeley STOL HS 681 transport will not be developed.

Besides being a bad blow for Hawker Siddeley, this may affect Rolls-Royce too. That company was developing the Medway engine for the four-engined, advanced HS 681 transport. The HS 681 was meant to support the dispersed bases of the VTOL fighters and fighter-bombers of the P.1127 and P.1154 types.

Secondly, the Hawker Siddeley supersonic VTOL P.1154 with the Bristol Siddeley BS 100 plenum chamber burning engine is canceled.

This leaves Britain without a supersonic VTOL interceptor. Instead, the government decided that the Royal Air Force has an urgent need for an operational version of the transonic VTOL HS P.1127 Kestrel aircraft. The Kestrel was developed on an experimental basis to furnish the data necessary for the development of the P.1154.

Thus, the world's first production contract for a jet-lift VTOL fighter was finally placed. The contract, which will ultimately cover 100 aircraft and is worth £65 million ($182 million), was negotiated in seventeen days after a delay of nearly three years during which the aircraft could just as well have been ordered, saving the industry a lot of anxiety and financial losses. The first RAF squadron will become operational in 1968. No decision has yet been made whether the long-life, 15,200-pound-thrust Bristol Siddeley Pegasus allowing STOL takeoffs only, will be used, or the short-life, 18,000-pound-thrust Pegasus, making VTOL feasible.

The US McDonnell Phantom F-4 will be bought for the

**World's first production contract for a jet-lift VTOL fighter has been placed by British Defense Ministry for Hawker Siddeley P.1127 Kestrel, shown here on night-landing trials. US and German pilots are also flight-testing the plane.**


**McDonnell F-4 Phantom II is being bought by Britain as a replacement for Hawker Hunter fighter in RAF, and will be flown by Royal Navy as well. British industry expects to provide many parts, including Rolls-Royce Spey engines.**

RAF as a replacement for the Hawker Hunter as well as for use by the Royal Navy. The Phantom will be fitted with Rolls-Royce Spey engines and additional British-built equipment.

This version of the Phantom may become operational in 1967-1968. Some doubts exist in Royal Navy circles, since the landing decks of the present British aircraft carriers may not suffice for the Phantom. But the fleet building program includes new carriers which can be redesigned to accommodate the new aircraft.

The British press reacted furiously to the cancellation of the HS 681 and HS P.1154 and the "Buy American" policy of the Labor Government. The London *Sunday Telegraph* on February 21 commented as follows:

"Mr. McNamara, the cost-accountant American Defence Secretary . . . is quite frank about [America's keenness to sell Britain her Lockheed C-130 transport aircraft]. In his eyes the £230 million sterling's worth ($645 million) of aircraft he had Britain sign up for on Monday last [which was over and above those Phantoms ordered last June by the Conservative Government] represented an excellent piece of business. He boasted of it as part of a colossal arms-export sales drive in the higher interest of helping to solve America's balance of payments difficulties. There is no nonsense about the man—nothing sentimental about helping a staunch ally or anything like that."

The British press certainly overplayed the facts somewhat, since only a small initial order was placed for the aircraft, with an option to buy more. Moreover, the final cost depends on arrangements for the incorporation of British equipment in the planes ordered.

An unspecified number of Hawker Siddeley Comets with Spey engines will be ordered as maritime reconnaissance aircraft for the RAF, replacing the obsolete Shackletons which have been in service since 1948.

Whether the old Comet, once a very modern and useful civil aircraft, is adaptable to the antisubmarine-warfare (ASW) task remains to be seen. A very "European" solution would have been to participate in the French-German program, which covered the joint development and production of a big ASW aircraft—the Atlantique. The first squadrons of the French and German Navy equipped with the Atlantique will become operational this summer.

The Comet solution is in any event a purely political one. Hawker Siddeley, which claims that with the cancellation of the two VTOL programs up to 14,000 employees may be laid off, received assurance of government assistance when needed. Still, the first few hundred qualified designers, plus nearly 1,000 workers, were dismissed. Whether or not they will return to work for the British aerospace industry when their services are needed is doubtful. Other nations have already opened recruiting stations in London to take advantage of the situation.

On top of these reverses, it has now been decided to turn thumbs down on the British Aircraft Corporation's TSR.2, a tactical strike reconnaissance aircraft with H-bomb capability. If the industry could survive the earlier blows, and they did not leave it too desperate, loss of the TSR.2 can make the situation more critical.

The word from London is that Great Britain may buy American again, this time selecting the General Dynamics/Grumman F-111, formerly called the TFX. In addition to being another shock for the British industry, it may prove to be also another boost for the US export effort sponsored by Defense Secretary Robert S. McNamara.

Secretary McNamara has extended Britain a credit of $1 billion (£357 million) for the F-111 purchase.

The decisions on the future of the TSR.2, which up to now has performed successfully in its flight tests, became a hot political issue for the Labor Government, which may find itself in an internal crisis. The Opposition has already stated, "If this [the cancellation of the HS 681 and HS 1154] is followed by the cancellation of the TSR.2 it would, in the view of the Opposition, mean the end of the aircraft industry in this country."

The reason for cancellation of the TSR.2 is the high cost of the aircraft. Prime Minister Wilson stated that the original estimate for R&D of £90 million ($252 million) had now risen to £300 million ($840 million) "and the most authoritative estimate I can get for research,

*(Continued on following page)*

**Tripartite squadron evaluating P.1127 includes pilots of RAF, West Germany, and all three US services, led by Wing Cmdr. D. M. Scrimgeour, RAF, top row center. USAF is represented by Maj. J. K. Campbell, at center in lower row.**

**US and Britain have concluded an agreement which would enable the British to buy substantial numbers of the General Dynamics F-111A (above) as replacement for their canceled TSR.2 strike fighter, but no firm order has yet been placed.**

—Wide World Photos

**This is the TSR.2 tactical strike reconnaissance aircraft on which British aircraft industry had pinned high hopes, only to see project canceled because of unacceptably high costs.**

design, and production is £750 million ($2.1 billion), which on an order of 150 [aircraft] means £5 million [$14 million] per aircraft, or twenty-five times the cost of the Canberra it is designed to replace." Each TSR.2 would thus cost as much as a prewar battleship.

The F-111 can be bought at a lower price. An evaluation of both aircraft is envisioned for the future.

These changes will cost the British aerospace industry dearly, not only in money but in image abroad. Industry is particularly concerned at the way in which the continuing atmosphere of crisis over the past several weeks is now being reflected in the minds of overseas customers. It fears that if the present situation goes on, it will lose airline orders which are at present in the balance. Furthermore, with the TSR.2 cancellation the current prices of the BAC 111, a short-haul jetliner, will be placed in jeopardy since there is a sharing of overhead costs between the two aircraft, built by the same company.

Seen as an austerity measure, the cutback orders, which affected R&D primarily, are sensible. Seen, however, from the view of long-term effects, the results may be disastrous. Britain, once one of the foremost aircraft builders of the world, will have to take a second or third place among the world's aviation industries with more slippage to come as the years go by, if the government's policy continues.

It should not be forgotten that R&D today is the lifeblood of industry. Industry will always find welders, fitters, and mechanics to put aircraft and their engines together. But where then will be the scientists to design them?

An example of this disintegration process has taken place in Germany during the past ten years. Germany's best engineering teams moved to foreign countries—to France, the US, the USSR, India, and Egypt—because a short-sighted government policy did not provide them with challenging work at home. This policy has changed slightly as the German government has begun to understand that without a lively aviation and space industry as pacemaker, the whole industrial capability of a nation begins to suffer, as shown in outmoded products and merchandise and a proportional decline in export sales.

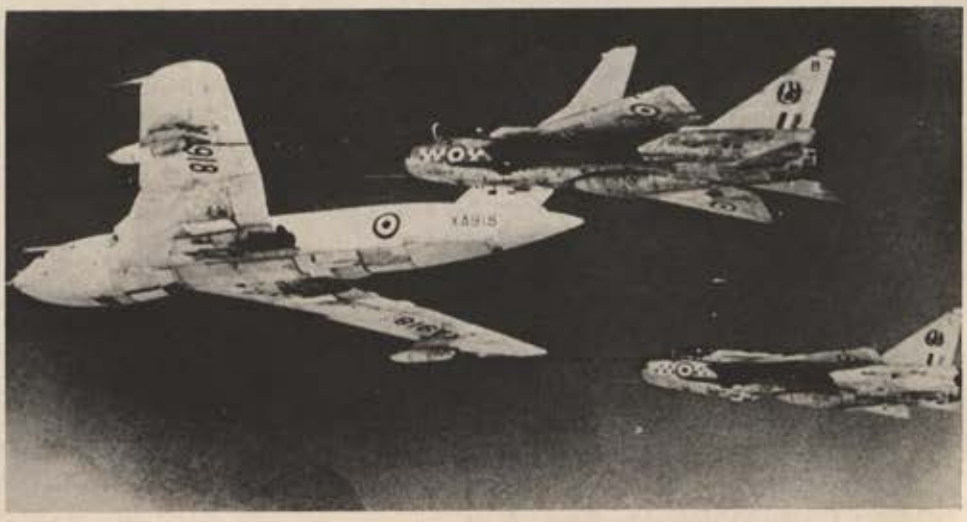
Germany learned its lesson—possibly too late. Britain has not learned it yet, but it surely will when licensing fees amount to more than the bill for R&D.

The only ray of hope in this picture lies in the intention of the Labor Government to cooperate closely with the French and possibly other European countries on various projects. Up to now, Anglo-French cooperation has been limited to the joint development of the Concorde, the European supersonic airliner which several months ago also was nearly canceled by the Labor Government. Bristol Siddeley Engines and its French counterpart, SNECMA, who are already working jointly on the Olympus 593, the powerplant of the Concorde, are to collaborate on a series of new jet engines. It is believed that the intention is to provide an engine suitable for a proposed Anglo-French strike aircraft, and another one, the P.45, employing variable geometry.

A further joint program may be the French-designed Gallion, a projected short-haul liner. Rolls-Royce and Turbomeca of France have announced a joint program centered around a new jet engine which, with a weight of only 835 pounds, will deliver 4,200 pounds of thrust, later to be raised to 6,200 pounds. Other still undefined plans include joint production of helicopters.

This "Entente Aeronautique" is looked upon in Germany with certain misgivings. Germany would like to participate in this pooling of Europe's resources, but the American influence and know-how which are now available to Germany (Boeing owns one-third of Bölkow, the most important development group in the country; United Aircraft owns one-third of Vereinigte Flugzeugwerke; there are reports that Lockheed may buy into Messerschmitt; and Douglas may soon acquire a share of Dornier) probably brought about the Anglo-French cooperation since France and Britain were justifiably afraid of being completely pushed out of the European aviation market by a powerful German-American combine.

In any event, many an executive of the British aviation industry would today prefer managing the money-making Beatles instead of a giant with feet of clay, who is tottering dangerously.—END



**Britain is converting a number of Handley-Page Victor bombers to tankers, replacing Valiants which are suffering from metal fatigue. Here a pair of Lightning supersonic interceptors "belly up" to a Victor in refueling tests. The new tanker is scheduled to enter service with RAF Bomber Command this summer.**

—Wide World Photos

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*News and Comment about Air Force People . . .*

By Jackson V. Rambeau

*AFA DIRECTOR OF MILITARY AND INDUSTRIAL RELATIONS*

## To Merge or Not to Merge

A couple of months ago we would have bet that, while the Defense Department's plan to merge the Reserve with the National Guard would cause quite a stir in Congress, it would eventually be approved. Today, after several weeks of hearings on the plan by Rep. F. Edward Hébert's subcommittee of the House Armed Services Committee, we're not so sure of anything but the stir.

As we mentioned last month, the Defense Department has apparently decided not to produce its parallel plan to merge the Air Force Reserve and Air National Guard until the Army merger is resolved. Many of the criticisms voiced on the Army plan would also apply on the Air side.

The principal issue before the Hébert subcommittee is what Mr. Hébert has repeatedly called the Defense Department's "contemptuous disregard of the Congress" in announcing the merger plan.

"I do not wish to leave the impression that I am committed to opposing these changes," Mr. Hébert said. "Perhaps the Department can present very persuasive and cogent reasons which justify this radical departure from our Reserve Forces concept. However, the point I wish to emphasize is that this is an area in which the Congress must operate. . . . I will not be a party to the relinquishment of the powers of Congress to the Executive."

Mr. Hébert quoted from the record of the press conference held by Secretary McNamara in announcing the Army merger plan, in which Mr. McNamara indicated that, except for congressional authorization to increase the strength of the National Guard, other reorganization measures could be handled administratively.

Mr. Hébert insists that the Secretary overlooked certain other statutory aspects. "The Secretary of Defense . . . has unilaterally indicated his intention to eliminate all units of the Army Reserve," he said.

But, he noted, the Armed Forces Reserve Act of 1952 stipulates that Reserve components be "maintained for the purpose of providing trained units and qualified individuals . . ." and its list of Reserve components includes the Army Reserve (and Air Force Reserve). "It is therefore evident," Mr. Hébert said, "that Congress not only established an Army Reserve component, but intended that it be composed of both individuals and units."

Mr. Hébert also discussed at some length the Defense Department's plan to "attach" to Army Guard units those needed Reservists who do not volunteer. He quoted from a letter sent by Maj. Gen. Winston P. Wilson, Chief of the National Guard Bureau, to all state adjutants general:

"Those individuals in a USAR unit who do not elect ARNG membership . . . will be attached to the appropriate ARNG unit, if it is determined by the state AG that their services are needed to meet combat readiness standards."

Yet, Mr. Hébert recalled, in 1955 when President Eisenhower asked Congress for such legislation, the president of the National Guard Association strongly opposed it.

**Showdown between House Armed Services Committee and Secretary of Defense McNamara is being directed by Rep. F. Edward Hébert (D.-La.), whose subcommittee is taking a critical look at DoD's Reserve-Guard merger plans.**

A Reservist attached to a Guard unit, said Maj. Gen. Ellard Walsh, then NGA President, "would only have to perform the duties required by this act and could not be required to perform any duties ordered by state authorities. . . . This provision would destroy the integrity of units, be destructive of discipline and morale, and be a long step toward federalization of the Army National Guard and Air National Guard."

Largely because of General Walsh's argument, Congressman Hébert explained, Congress eliminated that provision from the Reserve Forces Act of 1955 and "has, to date, pointedly refused to provide the Executive with this authority."

Subcommittee members also have criticized the fact that the Army's Committee for Reserve Forces was not consulted on the plan, even though federal law requires that each service's committee "shall" participate in the preparation of plans affecting its Reserve Forces.

Mr. Hébert suggested that if the Defense Department objects to this or any other provision of law, it should come to Congress with suggested changes. "But don't ignore the law," he said. "Don't flout it."

The Air Force is walking into the same trap. USAF has scheduled a meeting of the Air Reserve Forces Policy

**Maj. Gen. John K. Hester, former Assistant Vice Chief of Staff at Hq. USAF, and Commander of Seventeenth Air Force, Ramstein, Germany, since last October, died April 8 from injuries suffered in practice parachute jump.**

**Senior Master Sergeant George Morar of Travis AFB, Calif., featured as Sergeant Lakewood in "Steve Canyon" comic strip, receives Milt Caniff drawing from Maj. Gen. George B. Dany, WESTAF Commander. Sergeant Morar, MATS's Outstanding Airman of 1964, is on AFA Airmen's Council.**

Committee in Washington May 3-5, but the Committee will not be asked to review the USAF plan.

It is becoming evident that the House Armed Services Committee has settled on the merger issue for its showdown with Secretary McNamara. Certainly, from the evidence so far presented, McNamara seems more vulnerable than he has been on such matters as military hardware and base closings.

But a more ominous foreboding of what Secretary McNamara may have in mind is emerging from the hearings.

Last month, in discussing the ramifications of Secretary McNamara's Defense Posture Statement, we pointed out that he proposes cuts in Air Reserve Forces transport aircraft which are just about equivalent to the equipment in present flying units of the Air Force Reserve. Our point was that there wouldn't be much to merge.

Now the suspicion is growing that Mr. McNamara has about the same goal in mind for the Army Reserve Forces—cutting it to about the present strength of the Army National Guard.

Officially, the DoD plan calls for an end strength of 550,000 men for the Army Guard—a reduction of 150,000 from the present unit structure of 400,000 in the Guard and 300,000 in the Reserve.

In fact, if the merger is approved, the reduction is likely to be considerably greater because, from all indications, only a small percentage of Reservists will volunteer for transfer to the Guard. Among career Reservists—that is, men with no remaining service obligation—estimates range from fifty to 100 percent. But among obligors, who constitute by far the bulk of Army Reserve strength, probably less than twenty-five percent would volunteer.

Unless Secretary McNamara is stupid or misinformed, he must know that relatively few Reservists would volunteer for Guard service and that Congress won't buy his suggestion to attach nonvolunteer Reservists to Guard units. If you concede, as we do, that the Secretary is neither stupid nor misinformed, you may well conclude that he is willing to accept wholesale losses of Reserve personnel, thus effectively trimming down the Reserve components.

But the members of Congressman Hébert's subcommittee aren't stupid either. Their questions have pinpointed flaws both in the conception and content of the merger plan. It's to be expected that Congress will not only revise the plan substantially, but that it also will put new teeth into Reserve Forces administrative laws.

Mr. Hébert, incidentally, has introduced a bill to restore authorization for general officer promotions in the Air Force Reserve. Previous authority expired last June.

## AFA Wins a Case

The Air Force has announced it will retain 354 individual training units similar to the present Air Reserve squadrons. These are the units whose future was jeopardized when the Defense Department summarily disbanded Reserve recovery groups and squadrons.

USAF's action to preserve the units, whose membership totals 25,000 Part III officers and airmen and could reach 50,000, was a direct result of an appeal to Secretary of the Air Force Eugene M. Zuckert by AFA President Jess Larson in January *(see March 1965 "Bulletin Board")* and many hours of effort by AFA staff members.

In his reply to Mr. Larson, Secretary Zuckert said:

". . . Members of the Air Reserve squadrons constitute a potentially valuable pool of manpower. To that end we are now in the process of establishing a program based on the firmest kind of requirements for reinforcement skills matched against the qualifications of present and possible future members of the . . . squadrons."

Retention of the units was approved by DoD. Action is under way now at the Air Reserve Records Center to draft an effective training program—including annual tours of active duty for a considerable number of men.

Mr. Larson also has corresponded with Secretary Zuckert on the status of the National Guard Technician retirement program.

**Brig. Gen. Willard W. Millikan, Commander, 113th Tactical Fighter Wing, DC Air National Guard, has been awarded Legion of Merit for conceiving and leading Operation Ready Go, first nonstop transatlantic jet fighter deployment in Air Guard history last August. General Millikan flew lead F-100 from Andrews AFB, Md., to Hahn AB, Germany. Nineteen DCANG Supersabres made the flight.**

Late in March, Mr. Larson wrote the Secretary expressing his concern that: "This program, if not in being [before the proposed Reserve-National Guard merger], might well cause thousands of highly skilled Civil Service technicians in the Reserve—both Army and Air Force—to remain under the federal Civil Service retirement system rather than continue in the Reserve Forces program. . . .

"I am confident you are acutely aware that a loss of these individuals, so vital to the functioning of units of the Reserve Forces, would cause a severe reduction in combat capability for a long time to come.

"We understand that the Air Force has worked on necessary legislation in this regard for many months. . . . I take this opportunity, therefore, to ask that you give your backing to a suitable Administration-sponsored measure which will establish such a program at an early date."

In reply, Secretary Zuckert said:

*(Continued on following page)*

"I share your concern regarding legislation for a suitable retirement program for Air National Guard technicians. As you know, the Department of Defense gave approval to a proposed report in HR 2504 for such legislation during the Eighty-eighth Congress. That report was not cleared by the Bureau of the Budget in time for consideration. . . . At the present time, development of a legislative proposal on this subject is under consideration by DoD. I will keep you apprised of any decision which may be reached."

## Retirees Need Retraining

A formal program of job counseling and placement assistance for military retirees is moving into high gear, representatives of the US Employment Service of the Department of Labor reported to AFA's Retired Council at its first 1965 meeting early in April.

Under its new chairman, Gen. William F. McKee, USAF (Ret.), former USAF Vice Chief of Staff, the Council heard a report by Dan Gainey and Frank Powell of USES that in the last six months of 1964, Employment Service representatives spoke to more than 26,000 prospective retirees at 136 bases in the US and certain overseas locations. Mr. Gainey credited AFA's First National Conference on Utilization of Retired Personnel in December 1962 with getting the program under way.

The second phase of the program, which includes individual counseling and placement assistance, is just getting started, Mr. Powell said. Some thirty-five industrial firms contacted by USES have expressed interest in hiring military retirees.

General McKee suggested that modern computer techniques be used to match the qualifications of prospective retirees with job vacancies nationwide. Mr. Gainey said USES is now working on a plan to employ electronic data processing throughout the Employment Service and that it should be possible to incorporate retiree qualifications into the system. Since the meeting, General McKee has discussed these plans with Air Force Secretary Zuckert and Lt. Gen. W. S. Stone, DCS/Personnel, and has been assured of full USAF cooperation.

Opportunities for retirees to start their own businesses were discussed by Irving Maness, Deputy Administrator of the Small Business Administration. He noted that franchising is currently the "hottest area of opportunity in small business" and pointed out that SBA offers guidance, training, and financial aid to qualified individuals.

Gen. Charles L. Bolté, USA (Ret.), was designated to work with the Retired Officers Association in seeking more reasonable conflict of interest laws. General Bolté has also offered to appear before Congress as a DoD or AFA witness in behalf of Bolté legislation *(see page 8)*.

° ° °

**STAFF CHANGES** . . . **Maj. Gen. Walter E. Arnold,** from C/S, TAC, Langley AFB, Va., to C/S, Combined Military Planning Staff, Central Treaty Organization, Central Control Group (US Element CENTO), Hq. USAF, Washington, D. C., with duty station Ankara, Turkey . . . **Brig. Gen. John R. Dyas,** from Cmdr., USAF Military Personnel Center, Headquarters Command, USAF, Randolph AFB, Tex., to Dep. Asst. DCS/Personnel for Military Personnel and Dep. Cmdr., USAF Military Personnel Center . . . **Maj. Gen. George B. Greene, Jr.,** from Dir. of Military Personnel, Office DCS/Personnel, Hq. USAF, Washington, D. C., to Asst. DCS/Personnel for Military Personnel and Cmdr., USAF Military Personnel Center, Randolph AFB, Tex., replacing Brig. Gen. John R. Dyas

**Signaling buildup of USAF Military Personnel Center, Randolph AFB, Tex., Maj. Gen. G. B. Greene, Jr., Director of Military Personnel, Hq. USAF, has shifted his Directorate from Pentagon to command the Center as well.**

. . . Orders of **Brig. Gen. Ernest C. Hardin, Jr.,** to command 839th Air Div., TAC, Sewart AFB, Tenn. *(p. 147, April* AIR FORCE/SPACE DIGEST) recinded; he will remain with Hq. 9th AF, TAC, as Asst. to Cmdr., with duty station Ft. Bragg, N.C. . . . **Maj. Gen. Henry K. Mooney,** from Vice Cmdr., ATC, Randolph AFB, Tex., to Cmdr., Lackland Military Training Center, ATC, Lackland AFB, Tex., replacing Maj. Gen. Prescott M. Spicer, who will retire.

**Brig. Gen. Norman L. Peterson,** from Cmdr., Pacific Communications Area, AFCS, and additional duty as ACS/Communications-Electronics, PACAF, Wheeler AFB, Hawaii, to Asst. to Cmdr., AFCS, Scott AFB, Ill., with duty station Hickam AFB, Hawaii . . . **Brig. Gen. Anthony T. Shtogren,** from Cmdr., Eastern Communications Region, AFCS, Westover AFB, Mass., to Cmdr., Pacific Communications Area, AFCS, Wheeler AFB, Hawaii, replacing Brig. Gen. Norman L. Peterson . . . **Brig. Gen. Robert H. Strauss,** from Cmdr., 801st Air Div., SAC, Lockbourne AFB, Ohio, to Asst. to Cmdr., 8th AF, SAC, Westover AFB, Mass., with no change in duty station . . . **Brig. Gen. John B. Wallace,** Cmdr., APCS, MATS, Orlando AFB, Fla., to Cmdr., 1607th Air Transport Wg., Dover AFB, Del., replacing Col. David E. Daniel.

**STAFF REALIGNMENTS**. . .Directorate of Operational requirements, headed by **Maj. Gen. Jack J. Catton,** transferred from DCS/Programs and Requirements, Hq. USAF, Washington, D.C., to DCS/Research and Development, Hq. USAF . . . **Brig Gen. Philip H. Greasley,** from DCS/Plans, Programs, and Operations Services, ATC, Randolph AFB, Tex., to DCS/Plans, and **Brig. Gen. William C. Lindley, Jr.,** from DCS/Flying Training, ATC, to DCS/Operations.

**NOMINATED FOR PROMOTION** . . . To major general: Robert W. **Burns,** Thomas G. **Corbin,** Otto J. **Glasser,** Donald W. **Graham,** David M. **Jones,** Lewis E. **Lyle,** Carroll W. **McClopin,** Gilbert L. **Pritchard,** Jay T. **Robbins,** Charles R. **Roderick,** Robert R. **Rowland,** Harry J. **Sands,** Jr., Emmett M. **Tally,** Jr., Alonzo A. **Towner,** John W. **Vogt,** Jr., Don S. **Wenger.**

To brigadier general: John W. **Baer,** William **Burke,** Sam J. **Byerley,** Paul K. **Carlton,** Roland A. **Campbell,** Joseph J. **Cappucci,** Robert J. **Dixon,** Robert J. **Gibbons,** Guy H. **Goddard,** William L. **Hamrick,** George M. **Johnson,** Jr., Clifford J. **Kronauer,** Jr., Joseph J. **Kruzel,** Jack C. **Ledford,** William H. **Lumpkin,** John M. **McNabb,** Alvan N. **Moore,** William G. **Moore,** Jr., John E. **Morrison,** Jr., Edmund F. **O'Connor,** Robert W. **Waltz.**

**PROMOTIONS (ANG)** . . . To major general: Dale E. **Shafer,** Jr. (Ohio), Donald J. **Smith** (Ill.). To brigadier general: John A. **Johnston** (Mich.), Robert H. **Morrell** (S.C), Jack H. **Owen** (Ky.), Robert L. **Pou,** Jr. (Tex.), William H. **Webster** (Ky.).—END

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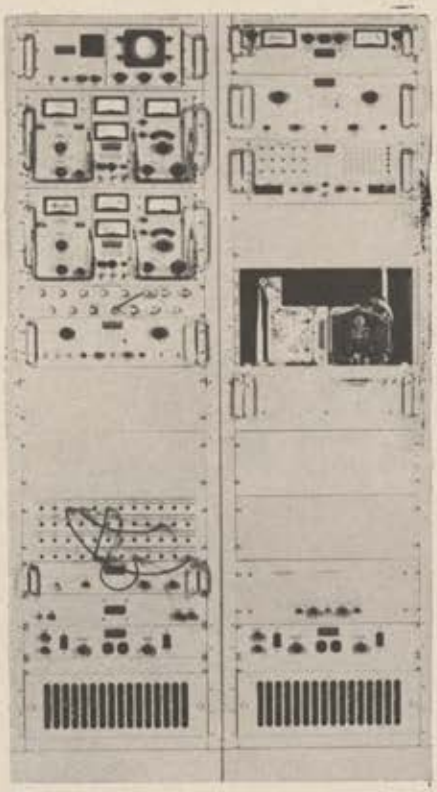

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At the same time, and **even more important,** we have made tremendous **benefit increases** for all participants at **no increase in premium.**

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Full details on the new, liberal benefits are given at right:

## NEW, BIGGER BENEFITS AT THE SAME LOW COST

| AGE | NEW BENEFIT SCHEDULE* | EXTRA ACCIDENTAL DEATH BENEFIT* |
|---|---|---|
| 20-24 | $20,000 | $12,500 |
| 25-29 | 20,000 | |
| 30-34 | 20,000 | |
| 35-39 | 20,000 | |
| 40-44 | 17,500 | |
| 45-49 | 13,500 | |
| 50-54 | 10,000 | |
| 55-59 | 10,000 | |
| 60-64 | 7,500 | |

**A flat sum of $15,000 is paid for all deaths which are caused by an aviation accident (civilian or military) in which the insured is serving as pilot or crew member of the aircraft involved. In this case, the additional accidental death benefit does not apply.*

## OLD BENEFIT SCHEDULE

| AGE | FLYING STATUS | NON-FLYING STATUS | EXTRA ACCIDENTAL DEATH BENEFIT |
|---|---|---|---|
| 20-24 | $10,000 | $20,000 | 50% OF STANDARD BENEFIT |
| 25-29 | 11,000 | 20,000 | |
| 30-34 | 12,500 | 20,000 | |
| 35-39 | 13,000 | 20,000 | |
| 40-44 | 13,500 | 17,500 | |
| 45-49 | 12,500 | 13,500 | |
| 50-54 | 10,000 | 10,000 | |
| 55-59 | 10,000 | 10,000 | |
| 60-64 | 7,500 | 7,500 | |

## OTHER FACTS ABOUT YOUR COVERAGE

All certificates are dated and take effect on the last day of the month in which your application for coverage is postmarked. Coverage runs concurrently with AFA membership. AFA Military Group Life Insurance is written in conformity with the insurance regulations of the District of Columbia.

## EXCLUSIONS— FOR YOUR PROTECTION

In order to provide maximum coverage at minimum cost for all participants, there are a few exclusions which apply to this insurance. They are:

Death benefits for suicide or death from injuries intentionally self-inflicted while sane or insane shall not be effective until your policy has been in force for twelve months. The Accidental Death Benefit shall not be effective if death results: (1) from injuries intentionally self-inflicted while sane or insane, or (2) from injuries sustained while committing a felony, or (3) either directly or indirectly from bodily or mental infirmity or poisoning or asphyxiation from carbon monoxide, or (4) during any period while the policy is in force under the waiver of premium provision of the master policy, or (5) from an aviation accident (civilian or military) in which the insured was acting as pilot or crew member of the aircraft involved.

The insurance will be provided under the group insurance policy issued by United Benefit Life Insurance Company to the Air Force Association. However, National Guard and Reserve members who are permanent residents of Ohio, Texas, Wisconsin, and New Jersey will not be covered under the group policy, but will be eligible under individual policies providing somewhat similar benefits.

# GROUP LIFE INSURANCE BENEFITS

# NEW, LIBERAL BENEFITS AT NO INCREASE IN PREMIUM

## EQUAL COVERAGE NOW PROVIDED FOR FLYING AND NON-FLYING PERSONNEL*

All participants are now insured for the same basic amounts whether or not they are on flying status.* *This eliminates the penalty of lower coverage for the man on flying status* whose death is caused by illness or ordinary accident. The only exception* to this provision is that a flat sum of $15,000, regardless of age, will be paid for deaths caused by aviation accident (military or civilian) while the insured is serving as pilot or crew member of the aircraft involved.

## $12,500 EXTRA FOR ACCIDENTAL DEATH

An *additional benefit* of $12,500 will now be paid for accidental death—*even those caused by aviation accidents* except when the insured is serving as pilot or crew member of the aircraft involved (*see above*).

This is a *substantial increase* in the policy's accidental death benefit for every age group.

## SAME LOW PREMIUM

In spite of these dramatic increases in coverage, there is *no increase in premium.* The same low premium rate of $10 per month continues to apply for both flying and non-flying personnel. And even this low cost may continue to be reduced by annual payment of dividends.

## OTHER MAJOR ADVANTAGES OF AFA MILITARY GROUP LIFE INSURANCE

***Give Your Family New, Bigger AFA Group Life Protection! Mail This Application Today!***

- KEEP YOUR COVERAGE AT THE LOW GROUP RATE (up to age 65) even if you leave the service, provided your insurance has been in force for one year prior to leaving extended active duty, or three years prior to leaving the National Guard or Ready Reserve.
- ELIGIBILITY. All active-duty personnel of the U. S. Armed Forces (under age 60) and all members of the Ready Reserve or National Guard (under 50) are eligible for this insurance.
- GUARANTEED CONVERSION PRIVILEGE regardless of your health.
- NO SPECIAL MEDICAL EXAMINATION is required.
- WAIVER OF PREMIUM FOR DISABILITY prior to age 60, continuing as long as you remain totally disabled.
- FULL CHOICE OF SETTLEMENT OPTIONS.
- GOOD ANYWHERE IN THE WORLD. No war clause, hazardous-duty restriction, or geographical limitation on your coverage.

**AIR FORCE ASSOCIATION GROUP LIFE INSURANCE**
(UNDERWRITTEN BY UNITED OF OMAHA)

Rank (*please print*) Name

Address (*please indicate permanent address if paying by allotment*)

City State Zip Code

Date of Birth

Beneficiary Relationship

Please indicate below the form of payment you elect:
- ☐ Monthly government allotment (I enclose $20 to cover the period necessary for my allotment to be processed.)
- ☐ Quarterly (I enclose $30)
- ☐ Semi-annually (I enclose $60)
- ☐ Annually (I enclose $120)

Category of eligibility (please check appropriate box in *each* column):
- ☐ Active Duty
- ☐ Ready Reserve
- ☐ National Guard
- ☐ Air Force
- ☐ Army
- ☐ Navy
- ☐ Marine
- ☐ Coast Guard

This insurance is available only to AFA members:
- ☐ I enclose $6 for annual AFA dues (includes subscription ($5) to AIR FORCE/SPACE DIGEST).
- ☐ I am an AFA member.

I understand the conditions governing AFA's Group Life Insurance Plan. I certify that I am eligible for this insurance under the category indicated, that I am currently in good health, and that I have successfully passed, within the past two-year period, the last physical examination required by my branch of service. (Reserve and Guard personnel not on extended active duty must include with this application a copy of their most recently completed SF88.)

Signature of Applicant Date

*Application must be accompanied by check or money order.*

Send remittance to **INSURANCE DIVISION, AFA, 1750 PENNSYLVANIA AVE., N.W., WASH., D. C. 20006**

**The Secretary of the Air Force and USAF's incoming and outgoing Chiefs of Staff, with their wives, were guests of honor at the second annual Air Force Ball, sponsored by AFA's Iron Gate Chapter in New York City, and what with Hollywood celebrities among the 1,200 guests . . .**

# Everyone Had a Ball

Gina Lollobrigida, international cinema actress, gazes soulfully at Master of Ceremonies Tex McCrary. During the evening she drew a number of soulful gazes in return.

GUESTS of honor at the second annual Air Force Banquet and Ball, sponsored by the Iron Gate Chapter of AFA and held in the Grand Ballroom of New York City's Waldorf-Astoria on February 22, were Gen. Curtis E. LeMay and his successor as USAF Chief of Staff, Gen. John P. McConnell.

Net proceeds from the event, which was attended by numerous dignitaries, Hollywood celebrities, and New York socialites, will go to the Air Force Aid Society's CHAP (Children Have a Potential) program, which helps handicapped children of Air Force personnel, and the Aerospace Education Foundation, concerned with interesting young people in aerospace subjects.

The program included a taped message from President Lyndon B. Johnson to General LeMay; filmed tributes by Arthur Godfrey and Bob Hope; and the presentation of fishing gear to General McConnell and a hunting rifle and bronze trophy to General LeMay. The latter was presented by Milton Caniff, President of the Iron Gate Chapter and creator of the comic strip "Steve Canyon."

Maj. Gen. Roger Browne, representing Mayor Robert F. Wagner, presented General McConnell with a medallion.

John Reagan "Tex" McCrary, who was chairman of the event, shared Master of Ceremonies duties with news commentators John Daly and Walter Cronkite. Sammy Davis, Jr., provided entertainment, as did the Air Force's Strolling Strings. Dance music was provided by the Air Force's Airmen of Note and the Meyer Davis Orchestra.

Among the 1,200 guests were numerous US generals and ranking military officers from eighteen countries. General officers attending included Generals Carl Spaatz, Thomas White, and Lauris Norstad. A group of Medal of Honor winners joined in the salute. Among them were Gen. Leon W. Johnson, National Security Council staff director, and Capt. Eddie Rickenbacker. Foreign officers present included Air Chief Marshal Sir Charles Elworthy, RAF; Gen. S. A. Aldo Remondino, Italian Air Chief of Staff; Gen. Einar Tufte Johnsen, Norway, a NATO Deputy Commander; Gen. Jean Houssay, Chief French Representative to NATO Standing Group; and Gen. S. M. (Tiger) Wang, Chief, United Nations Nationalist Chinese Military Staff.—END

Milton Caniff, left, President of the Iron Gate Chapter of AFA, which sponsored the Ball, and creator of the adventure strip "Steve Canyon," presents a trophy to Gen. LeMay.

General LeMay describes his safari plans to General McConnell as he shows off the handsome hunting rifle presented to him. In center is AFA's Jess Larson.

Mrs. Hugh Chisholm not only served as Chairman of the Women's Committee for the Second Annual Air Force Ball at the Waldorf-Astoria, but helped with decorations and ticket selling, too.

# AFA NEWS

## CHAPTER OF THE MONTH

*Iron Gate Chapter, N. Y., Cited for*

*outstanding support of the objectives of the Air Force Association and its Aerospace Education Foundation.*

AFA's **Iron Gate Chapter** held its **Second Annual Air Force Banquet and Ball** at the Waldorf-Astoria Hotel in New York City on February 22, honoring both the former Chief of Staff **Gen. Curtis E. LeMay** on his retirement from active service in the US Air Force and **Gen. John P. McConnell**, new USAF Chief of Staff. Proceeds from the function will benefit AFA's Aerospace Education Foundation and the Air Force Aid Society. For more details, see the related article and photos on opposite page.

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AFA's **Utah Organization** held its **Tenth Annual Aerospace Power Symposium** in Salt Lake City, Utah, March 4-6. The Symposium had as its theme "**The Challenge of the '70s—Phase II**," and dealt with the problems of travel and transportation, scientific literacy, and national defense facing our country in the coming decade. General chairman for the event was **David Whitesides**, who received the AFA Medal of Merit last year for his efforts as Program Chairman of the 1964 Symposium.

Utah's **Governor Calvin L. Rampton** spoke at the opening luncheon. Other speakers were **Lt. Gen. Thomas P. Gerrity**, Deputy Chief of Staff for Systems and Logistics, Hq. USAF; **Jess Larson**, AFA President; and **Dr. B. J. Chandler**, Chairman of the Aerospace Education Foundation's Advisory Council.

**Dr. Don Kline**, Head of the Dept. of Education, Idaho State University, and **James H. Straubel**, AFA's Executive Director, moderated the panel sessions which featured as panelists **Dr. Milton O. Pella**, Professor of Science Education at the University of Wisconsin; **Dr. William F. Mortimer**, Utah State University; **Dr. Wendell L. Esplin**, Weber State College; **Col. R. W. Miller**, Chief of Personnel and Administration at Hill AFB, Utah; **Leonard J. Corti**, Litton Industries; **Lester K. Fero**, Director of Advanced Manned Spaceflight Vehicle Studies for the National Aeronautics and Space Administration; **Dr. Mervin Strickler**, Chief, Aviation Education Division, Federal Aviation Agency; **Dr. Chandler**; **Lt. Col. R. C. Collver**, Hq. MATS; **Harry Carter**, Boeing Co.

**After addressing the Utah AFA Organization's Honors Award Banquet in Salt Lake City, Lt. Gen. Thomas P. Gerrity, Deputy Chief of Staff for Systems and Logistics, receives a Golden Spike desk set from the Golden Spike Chapter President Edward Przybys, right, as the Air Force Association's Utah State President R. Ray Yates looks on.**

In conjunction with the Symposium, the **Air University's Presentation Team**, commanded by **Lt. Col. Richard Olney**, presented its space briefing at the University of Utah, Brigham Young University, Utah State University, Hill AFB, and area high schools.

At the awards banquet, which concluded the three-day symposium, **R. Ray Yates**, President of AFA's Utah Organization, presented the group's annual Aerospace Industry Technical Award to **E. G. Dorsey, Jr.**, Director of the Space Booster Program at the Wasatch Division of Thiokol Chemical Corp., for "distinguished service in the advancement of aerospace technology and national defense by directing the development of the world's largest solid-propellant space booster."

Mr. Yates presented a similar plaque for industrial management to **William H. Charlot**, now assistant manager of the Boeing Company's Manned Orbiting Laboratory program, for "distinguished service to the aerospace industry and national defense by maintaining a perfect production and delivery schedule of 348 Minuteman missiles as manager of Air Force Plant 77 at Hill AFB."

° ° °

The **Greater Pittsburgh Chapter**, one of AFA's oldest active units, recently paid tribute to those most responsible for its outstanding success—its **Past Commanders**—at a Past Commanders' Dinner in the Hotel Penn-Sheraton, Pittsburgh.

**Judge John G. Brosky**, Chapter President, served as Master of Ceremonies, and **Robert A. Patterson**, President of AFA's Pennsylvania Organization, gave the address of welcome. **Carl Long**, National Director


**AFA President Jess Larson, guest speaker at the recent Past Commanders' Dinner sponsored by the Greater Pittsburgh Chapter, is shown with the Chapter's President, Judge John Brosky; Robert Patterson, President of the Pennsylvania Organization; and Carl J. Long, an AFA National Director.**

and the Chapter's third Commander, introduced the Past Commanders. Afterward, **Jack Gross**, National Director, spoke briefly. **President Larson** gave the principal address of the evening *(see cut)*.

° ° °

**Lt. Gen. Edward J. Timberlake**, Commander of the Continental Air Command, was guest speaker at the recent Installation Dinner of the

*(Continued on following page)*

**The new permanent entrance sign at Charleston AFB, S. C., is the subject of discussion for Walter H. Andrews, left, President of the Charleston Chapter of the Air Force Association; John T. Welch, Jr., Past President of the Chapter; Lt. Gen. Edward J. Timberlake, Commander of the Continental Air Command; and Brig. Gen. Howard E. Kreidler, 1608th Air Transport Wing Commander. The sign was donated to the base by the Charleston Chapter.**

**Charleston Chapter,** S. C., held at the Charleston AFB Officers' Open Mess.

**Walter H. Andrews,** newly installed President of the Chapter, presented a painting of a Charleston scene to General Timberlake as a memento; and the Chapter's immediate Past President **John T. Welch, Jr.,** briefed the guests on the new permanent entrance sign donated to Charleston AFB by the Chapter *(see cut, page 81).*

° ° °

The Schlitz Country Club in Milwaukee, Wis., was the scene of the **Billy Mitchell Chapter's** recent Memorial Dinner.

**Gen. B. A. Schriever,** Commander of the Air Force Systems Command, was the principal speaker. **State Senator Taylor Benson** presented the Billy Mitchell Memorial Award, given annually by the Chapter to a Wisconsinite who has made an outstanding contribution to aerospace power, to **Gen. Nathan F. Twining,** USAF (Ret.), former Chairman of the Joint Chiefs of Staff, and a native of Monroe, Wis. *(see cut).*

**Recipient of Billy Mitchell Chapter's Memorial Award is Gen. Nathan F. Twining, USAF (Ret.), shown here with Dae Shawl; Wisconsin Governor Warren P. Knowles; Leonard Dereszynski; and Gen. B. A. Schriever.**

**Circuit Judge Robert M. Curley** presented a unit achievement award to **Brig. Gen. Joseph J. Lingle,** Commander of the 440th Troop Carrier Wing, USAF Reserve, based at General Mitchell Field.

Among the distinguished guests were Wisconsin's **Governor Warren P. Knowles; Representative Clement J. Zablocki** (D.-Wis.); and **Msgr. August F. Gerhard,** former Chief of Air Force Chaplains.

° ° °

At its recent Charter meeting, the newly formed **North Georgia Chapter** of Atlanta, Ga., received its charter from **A. P. Phillips, Jr.,** AFA Vice President for the Southeast Region.

More than 200 members and guests attended the reception and dinner and heard **Jess Larson,** AFA's National President, emphasize the need for airpower to maintain national security and world peace.

New officers for 1965 who were installed by Mr. Phillips are **Robert T. Harris,** President; **Edwin Johnston,** Vice President; **Robert Tidwell,** Secretary; and **M. W. Warring,** Treasurer.

**A. P. Phillips, Jr., left, Vice President of AFA's Southeast Region, presents the newly formed North Georgia's charter to Charles Ford and Tom Turbiville who served the Chapter as President and Secretary during its organization.**

Among the distinguished members and guests were **W. A. Pulver,** President of the Lockheed-Georgia Co.; **Brig. Gen. Asa W. Candler,** member of AFA's Air Reserve Council; **Lt. Gen. Troup Miller,** USAF (Ret.); and **Dr. James R. Carey,** President of AFA's Middle Georgia Chapter.

° ° °

On a recent three-state visit, AFA President Larson spoke to an audience of some 500 junior officers of Air Force Systems Command's **Aeronautical Systems Division** (ASD) Junior Officers' Council at Wright-Patterson AFB, Dayton, Ohio.

That evening about 175 members and guests attended the **Wright Memorial Chapter's** annual Honors Banquet at the Wright-Patterson AFB Officers' Open Mess. **Tom Frawley,** News Director for WHIO-TV, served as Master of Ceremonies. **Glenn D. Mishler,** Vice President of AFA's Great Lakes Region, installed the following officers for 1965: **Allen J. Cannon,** President; **Russell W. Kuehl,** Vice President; **Ronald L. Seipel,** Secretary; and **Kenneth C. Puterbaugh,** Treasurer. Following the installation ceremony, **Charles H. Whitaker,** President of AFA's Ohio Organization, presented special citations to all Past Commanders and Life Members of the Chapter. President Larson spoke on "AFA and What It Stands For."

**Guest speaker at the Lincoln Chapter's meeting was AFA President Jess Larson, shown above at a reception preceding the meeting, with Chapter President Tyler Ryan and Col. Edwin Garrison, Commander of the 818th Strategic Aerospace Division, Lincoln AFB.**

Among the guests were **Maj. Gen. C. H. Terhune, Jr.,** ASD Commander, and **Maj. Gen. Fred J. Ascani,** Commander of the AFSC's Systems Engineering Group at Wright-Patterson.

President Larson's next stop was **Lincoln, Neb.,** where he attended a reception and spoke at a banquet at the Lincoln AFB Officers' Open Mess, sponsored by AFA's Lincoln Chapter *(see cut).*

The next day, President Larson addressed a luncheon meeting of AFA's **Iowa Organization** in Des Moines. **Robert Collins,** President of the Iowa Organization, presided; **William R. Berkeley,** AFA's Vice President for the Midwest Region, also spoke.

° ° °

AFA's **Great Lakes Region,** made up of the states of **Illinois, Indiana, Michigan, Ohio, and Wisconsin,** recently held a regional meeting in Columbus, Ohio. Conducted by **Glenn Mishler,** Vice President for the Region, the meeting was attended by representatives of four of the five states in the region and by **Harold G. Carson,** AFA National Director.

Following the Regional Meeting, the **Ohio Organization** held its quarterly meeting to discuss, among other items, the 1965 State Conference.

—DON STEELE

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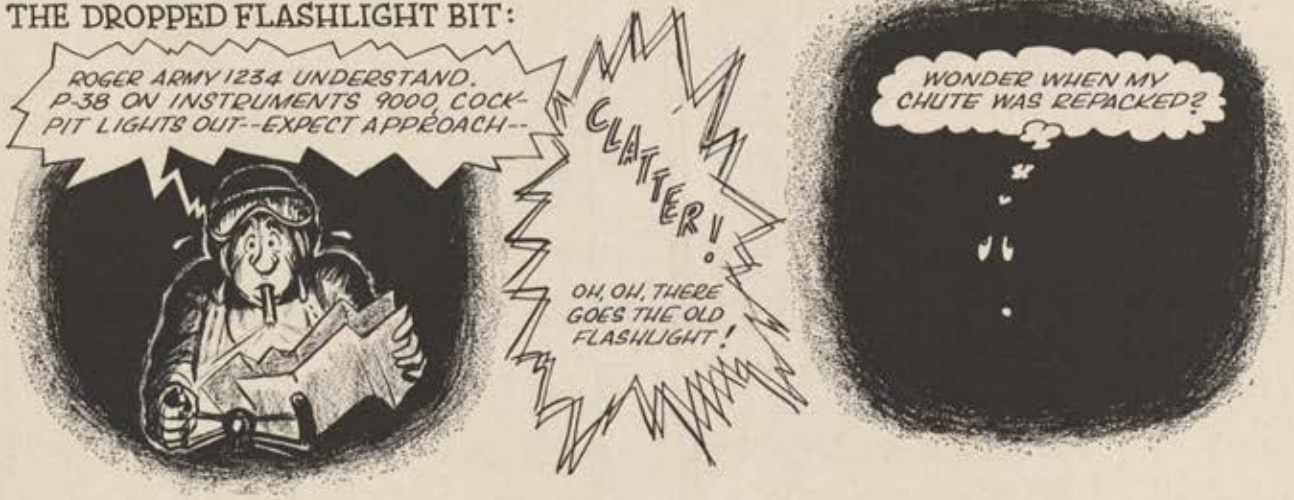


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**—Gen. Curtis E. LeMay, in a letter to all Air Force personnel.**

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## Objectives

• To assist in obtaining and maintaining adequate airpower for national security and world peace • To keep AFA members and the public abreast of developments in the field of aviation. • To preserve and foster the spirit of fellowship among former and present personnel of the United States Air Force.

## Membership

**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—$6 per year.
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