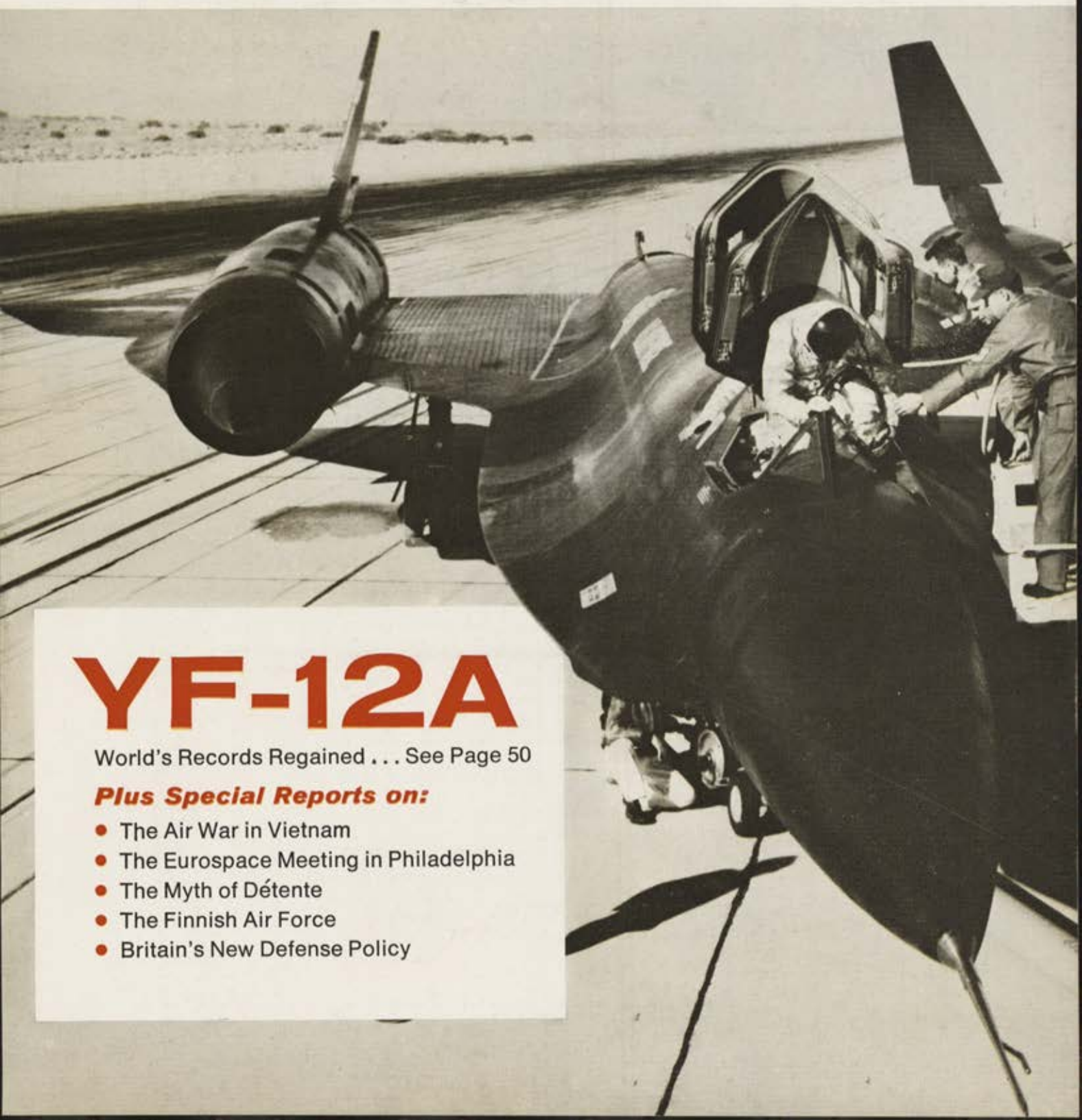


JUNE 1965 / 50c

AIR FORCE

and **SPACE DIGEST**

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



YF-12A

World's Records Regained . . . See Page 50

Plus Special Reports on:

- The Air War in Vietnam
- The Eurospace Meeting in Philadelphia
- The Myth of Détente
- The Finnish Air Force
- Britain's New Defense Policy



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American Airlines

ON APRIL 23, 1965

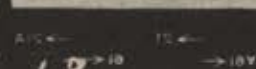
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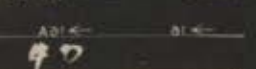
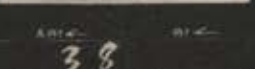
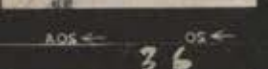
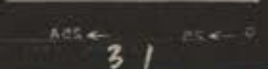
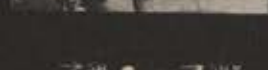
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At precisely 1450 PST on April 23, USAF 38088 arrived at Travis Air Force Base. No. 1 in the new generation of giant cargo jets was now operational—and the first C-141 StarLifter squadron officially activated. □ Following dedication ceremonies, a demonstration of the C-141's automated cargo loading system was held. In 30 minutes, less time than it takes to refuel and service the aircraft, 68,500 pounds of cargo was loaded into its massive hold. The remarkably efficient system was developed by USAF for the C-141. □ With the delivery of 38088, another major program milestone was met by the Lockheed-Georgia Company. On schedule. Date of delivery had been set 4 years before, while the C-141 was still in early development. □ From the outset to operational activation, the C-141 has met—or beaten—every major production and delivery schedule. This newest and biggest of the famous airlifters is one more example of an unmatched systems management ability. □ When it comes to giant airlifters...go to Georgia.

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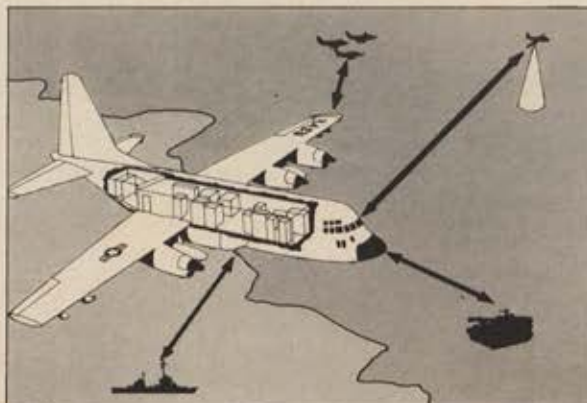
(1) Through the use of sensor aircraft and television, SLR (side looking radar), infrared and photographic devices, ABC³ reconstructs reconnaissance information and provides it for near-real time display for the battle commanders. (2) Through HF, VHF, and UHF, battle commanders communicate with and control all strike forces, air, sea and ground, for total and maximum effectiveness.

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AIR FORCE

—and SPACE DIGEST—

The Magazine of Aerospace Power
Published by the Air Force Association



JUNE 1965

VOLUME 48, NUMBER 6

The White Committee Report on the Air Force Academy

BY WILLIAM LEAVITT

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The Committee that analyzed the causes of the Academy scandal has come up with sound recommendations.

Airpower's Buildup in Vietnam / BY JERRY GREENE

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The Vietnamese war must be ultimately won on the ground, but it cannot be won without airpower. A reporter in Vietnam traces the dedicated effort that has made Vietnamese and Vietnam-based USAF airpower the strong force it is today.

British Labor Party's Defense Program—New or Old?

BY NORMAN H. GIBBS

44

An eminent British historian and military expert reports on the Labor Party's defense policy and concludes that—because of Britain's commitments and international trends—there can be basically little change between it and the defense program of the Conservatives.

Fastest in the Air—USAF's YF-12A / BY ALLAN R. SCHOLIN

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Affirming President Johnson's statement that this revolutionary Lockheed-built aircraft's performance "far exceeds that of any other aircraft in the world today," the YF-12A takes back several world records from the USSR.

The Myth of Détente: "We Can Win Without Trying"

BY HERMAN S. WOLK

52

A military historian questions some of the assumptions that have led writers and thinkers to proclaim a new stability in US-Russian relations and wonders if we aren't letting ourselves fall dangerously behind in military technology as a result.

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European Space Policy / BY JEAN DELORME

59

The head of Eurospace, the industry group promoting a European space program that would transcend national frontiers, believes the continent needs a policy-making "NASA" as well as projects to capture the popular imagination.

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62

A leading West German industrialist calls for a European "space-plane" project to meet European launch site limitations and to ensure development of European space skills comparable to those of the US and Russia.

Problems of American-European Space Cooperation

BY LORD CALDECOTE

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The Director of the British Aircraft Corporation suggests that, although the US has been generous in its aid to European space efforts, various problems of security and fear of competition still remain.

Speaking of Space / BY WILLIAM LEAVITT

72

Dr. Edward Teller points out to the House Committee on Science and Astronautics that applied science, key to technological advance of our whole society, is not receiving the emphasis it needs.

Between East and West—Finland's Air Force

BY STEFAN GEISENHEYNER

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Restricted by a post-World War II peace treaty requiring minimal military forces, a limited budget, and a geopolitical position that requires neutrality, Finland has developed a modest but dedicated air arm to preserve her freedom.

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CONSTRUCTIVE CRITICISM

By William Leavitt

ASSOCIATE EDITOR, AIR FORCE/SPACE DIGEST

THE five-man special committee—headed by Gen. Thomas D. White, retired Air Force Chief of Staff—which, at the request of the Secretary of the Air Force, analyzed the causes of the recent Air Force Academy cheating scandal, pulls no punches in its report.

"A remarkable document," the *Washington Post* called the ninety-four-page report. "[It is] thorough, extensive, firm, and written in a clear prose too seldom found in official documents that deserve wide readership." We strongly agree.

In its investigation, the White Committee interviewed scores of witnesses, including expelled Cadets and their parents, Academy officials, Academy graduates now on active service, outstanding civilian educators, past and present Academy faculty members, high military officers and defense officials, as well as psychologists and psychiatrists.

In addition, the Committee examined a mountain of written materials, ranging from the existing Academy regulations to a recent analysis of collegiate cheating prepared by the Bureau of Applied Social Research at Columbia University.

The Committee's charter was "to analyze the basic causes of the cheating episode in terms of an evaluation of the structure and workings of the Academy." It approached this core question in terms of Academy staff and faculty leadership, academic and other pressures at the Academy, the proper role of intercollegiate sports, and the validity and workability of the Cadet Honor Code.

In blunt terms, the Committee listed the underlying causes of the cheating episode as:

- Confusion as to Academy mission among officers and Cadets, leading to conflicts of loyalty.
- Overconcern with "the symbols of achievement, sometimes at the expense of reality."
- Rigid, centralized leadership combined with Cadet failure to maintain morale in the face of such policies.

At the same time, the Committee found the Academy's program "fundamentally sound." It said that "any notion that the . . . episode reflects either a major institutional collapse or requires a major overhaul of the Academy program may be dismissed as misguided." It rejected the suggestion that academic pressure on Cadets played any significant role in the cheating episode. The Academy's shortcomings have been in how it approached its mission, the Committee said, not in the mission itself.

The Committee laid to rest, we hope for all time, those criticisms of the Honor Code which have equated the honor system with "ratting" on one's buddies. It reported that "the heavy majority of graduates identified the Academy's honor system as having been of great value to them in their new Air Force careers." It went on to say that "indeed the [honor system] was singled out by most Academy alumni as having been of greater value than any other aspect of their Cadet military training experiences." The Committee further pointed out that "the strong feelings of Academy graduates about the Honor Code are shared in even greater measure by Cadets who are now at

the Academy." The Committee emphasized, too, that the Columbia University academic cheating study had demonstrated that honor systems have tended to reduce the level of academic dishonesty at colleges where they are in force.

"The fundamental demand which an Honor Code makes on an individual is not that he be ambiguously good but that he be unambiguously strong, *i.e.*, that he resist the easy temptation to use a shoddy means to attain a desired end," the Committee said.

"To suggest that such terms as 'squealer' or 'informer' are applicable is to indulge in a misconception. It suggests that future Air Force officers have no higher duty than loyalty to their personal friends even at the expense of loyalty to the Air Force or the nation it is dedicated to serve. Such epithets are rightly applied only to those narrow relations between man and man in which larger interests and commitments are not involved."

While defending the validity of the Code and acknowledging the difficulty of its implementation, the Committee sharply criticized a tendency of the Academy administrative staff to use the Code to enforce military regulations that had nothing to do with matters of honor. This, it said, helped create an atmosphere which contributed to the genesis of the cheating.

The Committee criticized Air Force headquarters for lack of attention to the continuing needs of the Academy, and called for a permanent advisory board to aid the Secretary of the Air Force and Chief of Staff in matters of Academy policy.

It criticized the frequent changes of administration which, it said, have had a bad effect on Cadets who have had to cope with sudden switches in philosophies of discipline ranging from permissive to rigid.

It criticized the treating of athletes as a separate group, citing the fact that more than a third of the 109 expelled Cadets were football players. These Cadets apparently felt greater loyalties to the team with which they spent so much of their time than to the Cadet Wing. The development of United States Air Force officers is the mission of the Academy, the Committee said, not big-time sports.

"Plainly, intercollegiate athletics must be kept in perspective," the Committee warned, saying that there was no provable relationship between excellence in sports and future military leadership. This may go down hard with many, but it is difficult to quarrel with the findings of a group as prestigious as the White Committee.

While acknowledging the remarkable academic progress of so young an institution as the Academy, the Committee criticized overly centralized control of the curriculum and the tendency to emphasize the trappings of achievement. In short, too much academic "front office" supervision, too many quizzes and examinations, and too much stress on standings.

The Committee has done an excellent job in a tough assignment. We are sure that its findings will result in changes that will permit the Academy to do an even better job in the future than it has during its short, but illustrious, past.—END

X-22A roll out introduces new V/STOL concept

The new generation V/STOL is here.

Official ceremonies on Tuesday, May 25, in which the Bell X-22A was unveiled, marked the beginning of a new and significant era in V/STOL flight research. Designed and built for the Navy-managed portion of the Tri-Service V/STOL Research Program, the primary mission of this pioneer aircraft is to explore the mechanical and aerodynamic characteristics of a dual-tandem, ducted propeller configuration and to evaluate its military potential.

Power from four T-58 General Electric turboshaft engines rated at 1,250 horsepower each, twin mounted between the two aft ducts, is transmitted through an interconnected system of gears and shafts to drive the propellers. The ducts, which serve as lifting surfaces (wings) in transition and forward

flight, give the X-22A two of its most rewarding characteristics. One is its compact configuration, so essential for aircraft carrier service or operation into or out of small clearings. Secondly, the ducts increase the thrust of the propellers providing a generous surplus of control capability under various conditions of aircraft speed and attitude.

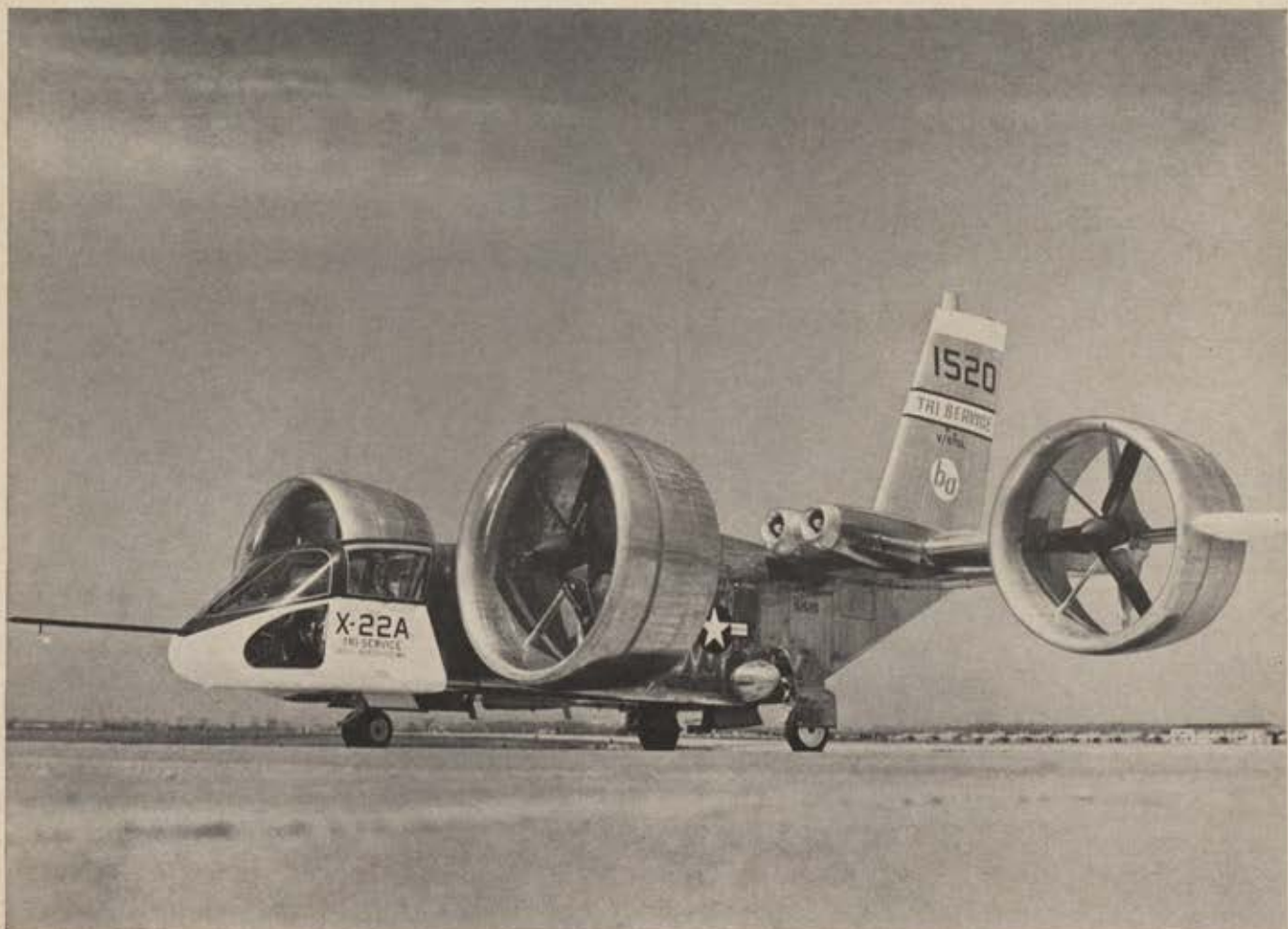
For takeoff, the four ducted propellers are rotated to the vertical thrust position. As altitude is gained, they are transitioned gradually to the horizontal thrust position for forward flight. A comprehensive all-axis variable stability system (VSS) is an important feature of the X-22A. It permits thorough investigation of the flying and handling characteristics of airplanes of the X-22A type. In addition, it can be used to investigate the handling qualities of other V/STOL types by artificially



simulating their physical and aerodynamic characteristics.

In the months ahead, exhaustive ground and flight tests with the X-22A will make valuable contributions to the V/STOL state of the art.

BELL AEROSYSTEMS Division of Bell Aerospace Corporation—A **Textron** COMPANY Buffalo, New York



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Minuteman Team

Gentlemen: While we here at Autonetics look upon your fine publication as one of the "bibles" of the industry, we do wish you would correct your information concerning the Air Force Minuteman ICBM contractor team [April "Missile and Space Almanac"].

We noted on page 106 that you mistakenly called the Boeing Company the prime contractor for the Minuteman system.

... Boeing is an associate prime contractor responsible for Minuteman's assembly and test. The other contractors mentioned in your rundown are also associate prime contractors, each responsible for his particular part of the program.

We are sure the Air Force will confirm the fact it (the Air Force) has retained the "prime" status within its Ballistic Systems Division and not given such a designation to any of the contractors that make up the Minuteman team.

PARK H. IRVINE
Minuteman Coordinator
Public Relations
Autonetics, a Div. of North
American Aviation, Inc.
Anaheim, Calif.

Praise and Barbs

Gentlemen: "How Serious Are We About V/STOL," by J. S. Butz, Jr., in the March issue is very good. This is one of several articles by Mr. Butz which certainly do keep interested readers up on V/STOL. Unfortunately, I find too few people read these articles because there is still too much V/STOL ignorance among DoD and the military. But I guess the old saying still holds—"You can lead a horse to water, but you can't make him drink."

The second reason for this letter is not so complimentary. On page 37 is a four-photo sequence of a napalm drop in South Vietnam. Now, as an old Marine Corps fighter-bomber pilot in World War II and Korea, I have dropped a lot of napalm, and I have made a few inaccurate drops. However, to print pictures of an inaccurate drop is not very smart. The pilot who dropped the napalm in the four-picture sequence just heated a lot of canal water. I have seen too many of

such drops of napalm and other ordnance where many false claims have been made. Consequently, I wonder how many other claims of vast destruction of enemy and equipment in Vietnam have been made. Perhaps that is why we do not seem to be winning against the Viet Cong.

The other beef is that it seems a shame that our pilots are still doing aerial spotting in such obsolete, unarmored aircraft as the O-1F. ... I know for a fact that the USA could provide good armored light spotting planes if DoD would get its head out of the sand. I have an article on just such an airplane in the May 1965 issue of *Infantry Magazine*. The article is titled "The Flying Tank." The same design was mentioned in an article of mine three years ago, but I have the same problem as Mr. Butz. Many people subscribe to the military magazines, but few read them.

J. H. REINBURG
Washington, D. C.

Title Correction

Gentlemen: I enjoyed Gene Bylinsky's excellent and informative report on the NASA Orbiting Astronomical Observatory program ("Clear Window to Infinity," May *SPACE DIGEST*). But I would like to point out an error in the title, as published, of Dr. Nancy Roman, who was also erroneously described as being based at the Goddard Space Flight Center, Greenbelt, Md. Dr. Roman is based at NASA's Washington headquarters, and her proper title is Chief of Astronomy, Physics and Astronomy Programs, Office of Space Science and Applications, NASA.

MAX TENNER
Washington, D. C.

• We regret the switch in Dr. Roman's title, which resulted from an error in our editing of Mr. Bylinsky's article, and are happy to set it right.
—THE EDITORS

Expanded Editor's Note

Gentlemen: It seems to me that your editor's note in connection with the letter from John J. Kovalic in your March issue regarding the closing of certain Air Force installations was rather cool in tone.

AFA has many members among the civilian employees who are subjected to uprooting and dislocation when a base is closed or reoriented in its mission. It is understandable that AFA, as a national organization, cannot take sides in essentially local problems. But it should show a greater degree of concern for the individuals involved than was indicated in your editor's note.

J. F. MICHAEL
Ames, Iowa

• We are grateful to Reader Michael for giving us this opportunity to expand on our previous note. It should be pointed out that, while AFA as a national organization has refrained from taking a pro or con stand on the closing of any specific installation, individual AFA leaders have worked long and hard in behalf of their own communities. This work includes the development of studies, counterproposals, and representations to the Pentagon and to Congress. As an organization, AFA has lent its assistance to these leaders when requested and when appropriate. The civilian employees of the Air Force are full-fledged members of the Air Force team and as such AFA has a deep and continued interest in their welfare and keen appreciation of their contributions.—THE EDITORS

Agreed

Gentlemen: Your April article "Defense Posture Statement: A Five-Year Look Ahead," leaves me concerned, especially Defense Secretary McNamara's statements pertaining to the strategic manned weapon system.

I cannot understand why a strategic missile system, which has not been tested under wartime conditions, can be regarded favorably over the manned weapon system, which has passed the test of combat. A manned weapon system can carry many times greater destructive power than the missile system. Not only that, the manned weapon can be used to destroy more than one target on any single mission, and it can be used more than once, as compared with the missile system's one-target, one-mission capability.

(Continued on following page)

When Secretary McNamara uses his statistics he fails to include that the missiles have been tested mostly under favorable conditions. Nor is there mention of the "partial successes"—a missile landing twenty-five miles from the planned impact area. More important, no missile has been tested using a live nuclear warhead.

I am not against the unmanned weapon system, but I do think the Defense Secretary is dangerously playing down the importance of the manned bomber and overplaying the importance of the missile in a mixed weapon system.

As can be well remembered from World War II, the development of the P-47 Thunderbolt weapon system was delayed because someone thought air-cooled engines were inferior to water-cooled ones. How many of our bombers were lost for lack of a long-range fighter escort that could have been saved by the P-47? Or how many of our fighter pilots died needlessly in inferior aircraft?

Secretary McNamara's stand on the controversial unmanned weapon system versus the manned weapon system leaves too many important questions unanswered for acceptance of his stand. While the outcome of the next

global war may be decided in less than a day, a mistake at the Secretarial level of command may be fatal.

WILLIAM JOINTER, JR.
Sheppard AFB, Tex.

• We hope you haven't assumed that our publication of part of Secretary McNamara's posture statement implies endorsement of what he said, or even agreement. All of your points are well taken. We're with you.—THE EDITORS

UNIT REUNIONS

2d Armored Division

The 2d Armored Division ("Hell-on-Wheels") will hold its annual reunion August 6-8 at the Sheraton-Park Hotel, Washington, D. C. For further information contact

Col. R. F. Perry
Box 2115
Satellite Beach, Fla. 32937

7th Bombardment Group (H)

Former members of the 7th Bombers held a Reunion at the Officers Club, Hamilton AFB, Calif., May 14. Honored at the Banquet was former Commander, Maj. Gen. Conrad F. Necrason, who retires from active duty this month. Former members of the 7th who are not "on the list" should send their names and current addresses to the following in order to update our records.

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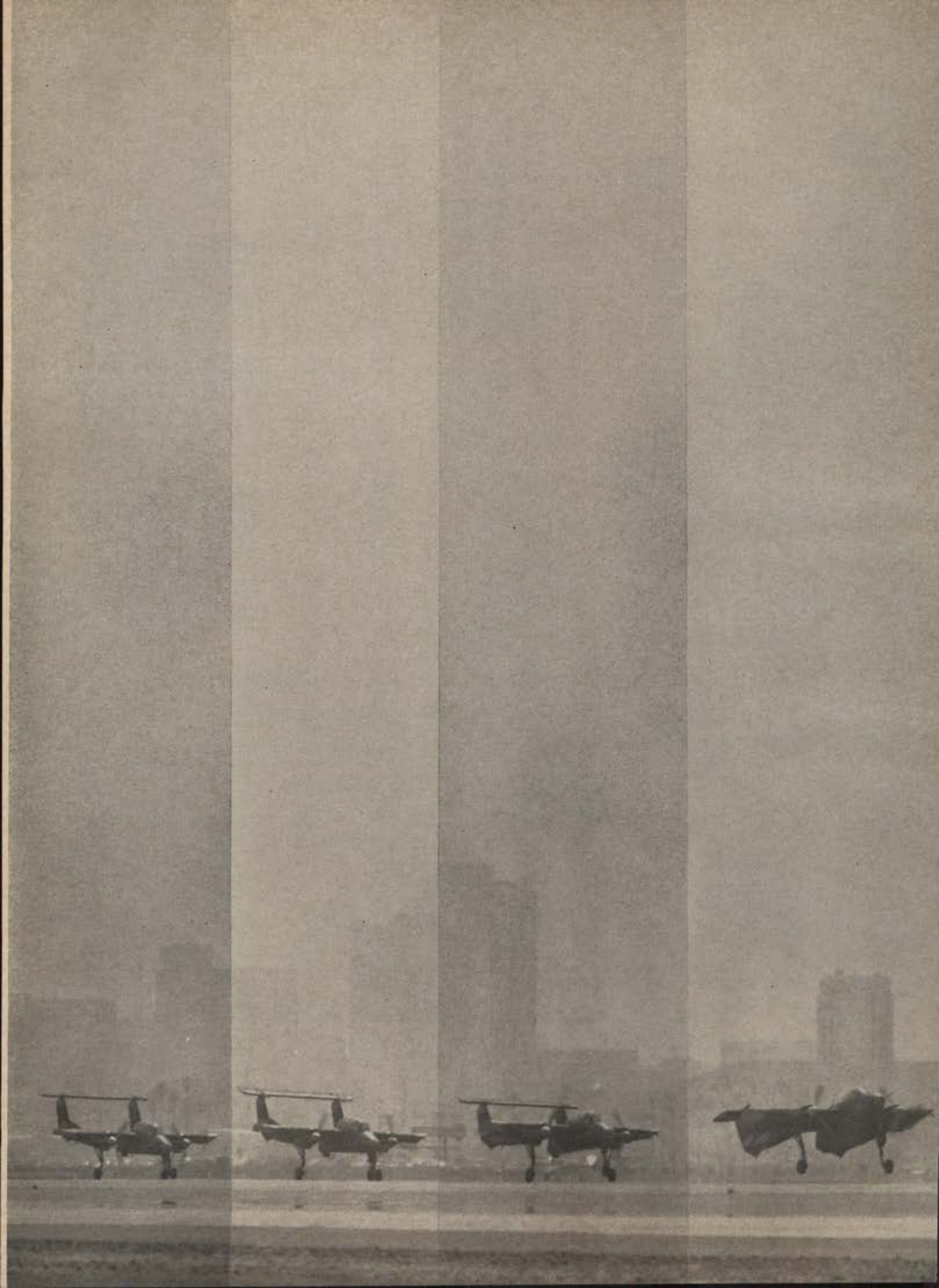
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C-5A

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AIRPOWER in the news



By Claude Witze

SENIOR EDITOR, AIR FORCE/SPACE DIGEST

A Limit on What We Can Do

WASHINGTON, D. C., MAY 11

If we run out of other people to feel sorry for in this turbulent spring, we can always turn to the historians. Whatever their specialty—military, political, social, or economic—the chore of compiling the record in a way that makes sense will be elephantine. Maybe it can't be done.

To begin with, there is an extremely complex man in the White House. One experienced observer has written that President Lyndon B. Johnson is not what the scholars call a "conceptual thinker." This, alone, will complicate the job for the historians. It is reported that the President does not like to philosophize about the tides of history. He wants to act, or at least to react, to the crisis of the moment. In the past couple of weeks events in the Dominican Republic have been heaped on top of those in Vietnam to stimulate Mr. Johnson and add to his burdens.

It is old hat, by this time, that in Vietnam we have to reconcile our role as "advisers" with our limited and restrained utilization of airpower. There was an unfulfilled requirement for air strikes in Vietnam during this reporter's visit there last summer. On page 33 of this issue, Jerry Greene tells how airpower now is being used. The effort of the President to portray this shift was put in his own words when he sent a request to Congress on May 4 for additional funds—\$700 million—to fight this war. He said, "Each member of Congress who supports this request is also voting to persist in our effort to halt Communist aggression in South Vietnam. Each is saying that the Congress and the President stand united before the world in joint determination that the independence of South Vietnam shall be preserved and Communist attack will not succeed."

These words were a manifestation of the President's eagerness to show he is supported, that the "consensus" is in favor of what he is doing. Dissension in Congress annoys him. The dissension of the press is almost equally annoying and a topic of more discussion.

This brings us to the second situation in which there is need for a reconciliation of what we say with what we do. A few days ago top Administration spokesmen were strained to explain different reasons that were given for the dispatch of Marines and Army troops to the Dominican Republic. Were they there to protect American nationals in Santo Domingo or to prevent a Communist takeover—another Cuba? Historians will find the record badly muddled, with both rationalizations on the record.

As recounted by the President, it would appear that our forces started out with one mission—to protect the Americans—and wound up with another—to keep the Reds from taking power. Mr. Johnson made it sound as if the Communists, many of them trained in Cuba, had joined the revolution a few days after it started. He said that "what began as a popular democratic revolution, committed to democracy and social justice, very shortly moved and was taken over and really seized and placed

President Johnson, asking for money to fight the war in Vietnam, told Congress it also was voting to persist in our effort to halt communism.



—Wide World Photos

into the hands of a band of Communist conspirators."

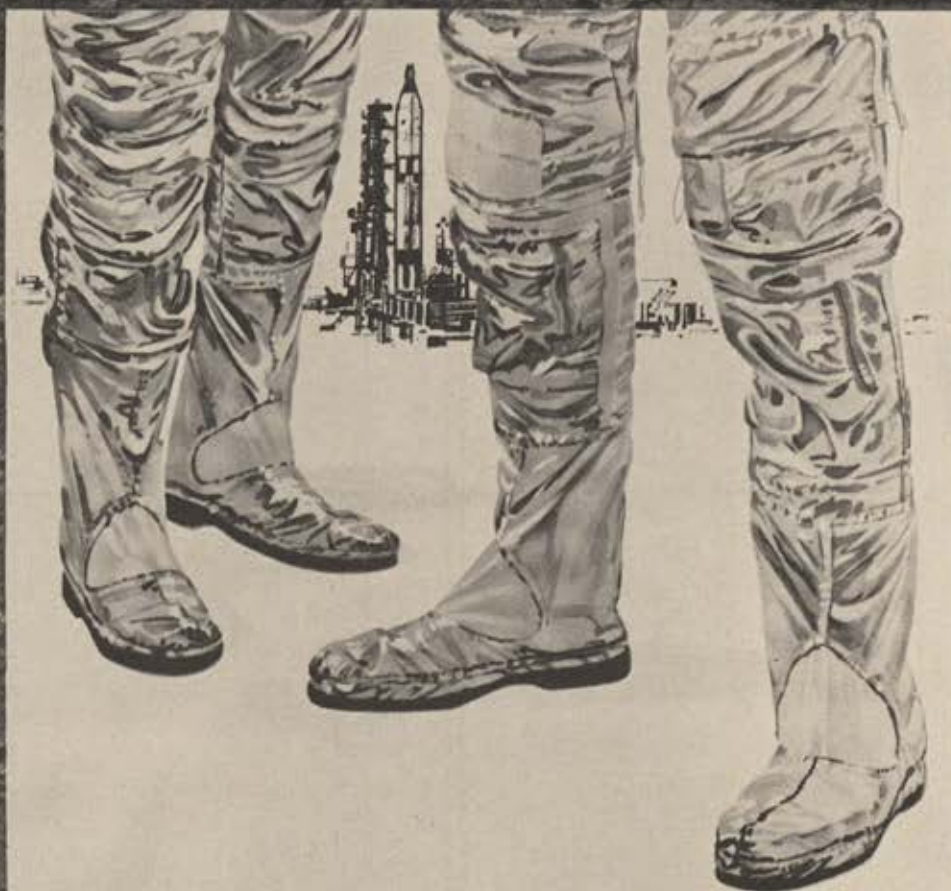
There was some skepticism about this, and it was understandable. The State Department had said our troops would not take any sides in the conflict, but at least one admiral had predicted what the President would say four days later or, more accurately, the admiral said it four days before the President did.

It is not necessary to labor the point that the credibility of what is put in the record by government officials is not high. The press, of course, is convinced that its government is trying to manage the news, and the case for this is not without foundation. But there are other factors, almost all of them centered in the entire question of how our policies are formulated and how we decide to use money or soldiers or bombs or simple conversation to carry them out. The "Conduct of National Security Policy" is the label put on it by Senator Henry M. Jackson, Democrat of Washington. Mr. Jackson is chairman of what now is called the Subcommittee on National Security and International Operations of the Senate Committee on Government Operations.

A new set of scholarly hearings on this subject will open in a few days. The Senator says he will "take a frank and impartial look at America's number-one problem—the conduct of national security policy." The session will be a continuation of work the Senator has been doing since 1959.

In a preliminary memorandum, setting the stage, Mr. Jackson still detects an "absence of a clear sense of direction and coherence of policy at the top of the government." He laments the ambiguity he finds when the executive branch of the government deals with foreign affairs. He says this ambiguity results in missed opportunities and, what is worse, setbacks in advancing our purposes. Here are the words of the committee paper:

"It [ambiguity] encourages departments and agencies
(Continued on page 17)



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to mount their horses and ride off in all directions. It fosters pressure groups and empire building. It creates strong temptations for Indians to act like Chiefs—and for Chiefs to look for cover. . . .

"The result, to use a word in fashion, may be disarray—a disarray inviting others, including members of Congress, to peddle, sometimes in an irresponsible manner, their own special tonics for our national aches and pains.

"The result may also be an unwarranted extension and scattering of American commitments which may have to be redeemed by the American soldier backed up by the American taxpayer.

"The very dimensions of the national security organization are part of the problem.

"It is too big for any one man—even one with extraordinary energy—to know all that goes on. It is so big that unusual knowledge and acumen are needed to draw upon its resources when conducting national policy."

Mr. Jackson's group faces five critical questions:

- How can executive departments and agencies be better furnished with timely, coherent, sharp-edged policy guidance on national security issues?

- What more can be done to staff and organize the Department of State to provide leadership across the whole front of foreign affairs?

- What can be done to relate the concerns of the State, Defense, and Treasury Departments so that these agencies may better reinforce each other in their international operations?

- How can we fight the tendency for organizations to overexpand as problems multiply and become more complex and as knowledge becomes more specialized?

- How can we arrest the tendency of individual agencies—encouraged by pressure groups—to enlarge their jurisdictions and to outlive their problems?

If these queries appear distant from the current problems in Vietnam and the Dominican Republic that call for almost daily decision-making in the White House, it is because they hide the details. Senator Jackson is aware of this and makes reference to the individual complexes that lead executive officials to "sweeping declarations of our world mission" even when the words commit the United States to projects it cannot always carry out. He says this conduct can leave us "entangled in projects that are incompatible with the real needs of other peoples, or are, in some cases, actually repugnant to them."

It is clear that Senator Jackson believes there is a bit of American folklore—the idea that we can do almost anything, anywhere—that is being outmoded. He thinks there is a limit on what we can do. He expanded on this theme in a speech early this month at Boston College:

"The 'can do' philosophy grows out of America's successful experience in taming a continent, building a free society, and developing the most productive economy the world has ever seen. But even the United States cannot do everything.

"For power is relative. It cannot be measured except in relation to another's power. Strictly speaking, it makes no sense to say, as we often do, that the United States is strong. We should use the comparative—the United States is stronger—or weaker—in this or that respect than some other state."

He added later that power is relative to the goals sought and that we can use limited power when our objectives are limited. He said President Johnson has made it clear we have a limited objective in Vietnam. The Communists there must realize we have put a high price on their own success, higher than they may be prepared to pay.

Senator Jackson is no dove. Yet his "hawkishness" is definitely limited by what he perceives to be our capability and the size of the problem.

"In the best of circumstances," the committee memorandum says, "it is difficult for the powerful to escape the yes-man hazard. It is easy for a man to confuse his possession of power with the possession of knowledge. In certain departments and agencies, pomp and circumstance add to the danger that the executive may believe his own publicity agents."

The Chief Speaks Out

On the twentieth anniversary of V-E Day the Russians paraded their rockets again. And there was a television show, picked up by the American networks, that the Communist announcer said was "a stern warning to aggressors." It was called "Rockets in the Defense of Peace" and showed test firings of a whole family of missiles. Included were pictures of Russian antimissile defense installations. Then



Senator Henry M. "Scoop" Jackson says the conduct of our national security policy is America's "number-one problem."

there was the firing of an antimissile missile that intercepted an ICBM. One Moscow report said it was assumed that the films were at least three years old.

Only a few days before this exhibition, Gen. John P. McConnell, USAF Chief of Staff, made an appearance before the National Press Club. The audience is considered the most receptive in Washington and the platform ideal for putting things on the record where they will stick. The General probably didn't realize it, but he wrote the introduction for the Communist scenario. Clearly disagreeing with the school that believes military technology is on a plateau, he asked for "quantum advances." He said he believes we have the competence and resources that will permit additions to our deterrent capability of a magnitude as big as the atomic bomb in the past.

General McConnell suggested that USAF has requirements that could be met "through bolder approaches and through the discovery of new phenomena or revolutionary techniques." It can be assumed that he has accurate knowledge of Russian capabilities and could have predicted what they could show world TV audiences.

"For instance," the Chief of Staff said, "it is generally (Continued on following page)

taken for granted that the best, if not the only possible defense against hostile ICBMs is another missile, an anti-ICBM missile.

"This may well be the case, but conceivably, there is some phenomenon or technique waiting to be discovered that might eventually lead to a far more effective system for preventing any hostile missiles from reaching our shores. If such a system could be conceived and developed, it would mean a tremendous boost to our deterrent posture."

There are other plateaus of military technology that he thinks can be challenged, if we have the will to do so. He gave the example of the gap that exists between our most powerful conventional munitions and the smallest nuclear weapons:

"If some phenomenon—perhaps already known or yet to be discovered—could help us fill that gap in firepower, we would gain a vital advantage in conventional warfare. Such 'subnuclear' munitions would give us the capability to attack major strategic targets with greater effectiveness and precision, yet without the problems and risks involved in the use of nuclear weapons."

From these areas where there is a requirement to press the frontiers of technology, General McConnell turned to the premature dismissal of proven systems. He said "some students of strategy" feel that the manned bomber is obsolete and should be phased out.

"I am convinced," he said, "that for the foreseeable future there will be continued need for a considerable number of bombers and for a variety of other manned systems, and that it is necessary to replace the obsolescent types with newer and better ones." He added that he hopes there will be an Advanced Manned Strategic Aircraft (AMSA) to replace the B-52 in the 1970s.

On the subject of space, General McConnell agreed with the civilian analysis that says the requirements for a military mission are not clearly defined.

The other major area for emphasis by the Chief of Staff was his concern about the men who make up the Air Force. He pointed out that today's equipment requires personnel with above-average intelligence, education, and training. And, he said, money alone will not attract them. If it would, USAF could be manned by mercenaries.

79 Pages of Debate

It is a tiresome but necessary part of the democratic process. In the *Congressional Record* for May 5 and 6 there is a total of seventy-nine pages of fairly fine print, three columns to the page, all devoted to debate on a single subject. That was the President's request for a supplemental appropriation of \$700 million to support the war in Vietnam.

There is no room here to review the entire discussion in the House and Senate and no man should have to face the boring details. The Resolution was passed in the House by 408 to 7 and in the Senate by 88 to 3. In both cases the margin was generous enough to instill confidence in any President and his Cabinet. It was, in short, a generous vote of confidence in Lyndon Johnson's execution of foreign policy, and there are reasonable reports that this is what he wanted more specifically than the \$700 million.

It is hard to see how any American can argue against either issue, but some of them did. Ernest Gruening, the Senator from Alaska, for example, took up more than twenty pages of the Senate Proceedings with his long speech and reprints of articles, all in some way critical of our involvement.

In both chambers it was the top expert on Defense Appro-

priations who defended the program. They were John C. Stennis of Mississippi in the Senate and George H. Mahon of Texas in the House. The former gave the more complete explanation. He said that \$100 million was needed for construction, and that it will be matched with another \$100 million salvaged by the Defense Department out of savings and deferred projects. Another item of \$135 million will be used for maintenance and operation, to keep the Army, Navy, and Air Force moving in the battle. Approximately \$275 million is needed for ammunition. Mr. Stennis indicated that some of this will be used to replace funds already spent out of other pockets in order to keep the boys shooting in the months past. Then there is work to do on the modernization of ammunition, rockets, aircraft, and related equipment. The final major item was \$180 million to go into the procurement of aircraft and helicopters and the necessary spare parts.

In the debate, Senator Karl Mundt wanted to know how a defeat of the \$700 million request would be interpreted. Senator Leverett Saltonstall replied for the committee. He said Mundt had gone to the heart of the matter.

"If we do not pass the appropriation by a very substantial vote," he said, "it will be reflected not only in Southeast Asia and in the Communist countries, but in every one of the countries that are our friends today and who are counting on us to carry on the leadership of the free world." He added that disapproval also would amount to repudiation of an earlier joint resolution in support of the war already passed by Congress.

Senator Albert Gore of Tennessee argued bluntly that our soldiers, sailors, and airmen are in Vietnam, fighting the war, and there is no choice but to support them. He said, however, that he did not want his vote to give them this support misinterpreted. He was not voting an endorsement of American policy in Vietnam. The Gore criticism was the mildest from the small minority of protestants.

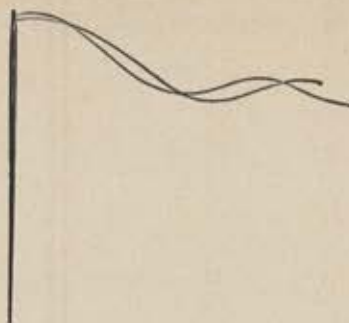
Senator Jacob Javits of New York, who voted yea on the resolution, used the debate to tell President Johnson he wants to be consulted before we bite off another big job in Vietnam, as we would if we sent in a full division of troops. He said, "I hope the President will not let this vote go to his head."

There were others who took this viewpoint, such as Senator George D. Aiken of Vermont. He made it plain that "my vote is not intended as an endorsement of the costly mistakes of the past, nor as authority to wage war in the future unless such war has been declared by Congress."

From Senator Frank Church of Idaho came the observation that the character of the war has changed a great deal since Congress passed a resolution of support following the Gulf of Tonkin incidents last summer. He said that when the President took new and big steps, like the extension of the air war into North Vietnam, it seemed that the old resolution still was offered as a conferred approval for his program. Will the approval of these funds, now, be construed "as giving congressional approval to a future decision, let us say, to bomb Hanoi?"

Mr. Stennis replied that this is an appropriation bill and does not set "policy language." He did not think it would prevent the bombing of Hanoi if the Administration decided that is what must be done. Mr. Stennis did not feel that a vote for the money was a vote for the declaration of war.

This sample of the argumentation in the Senate suffices for the purpose. There are seventy-nine pages of it, all evidence of how Congress struggles to keep its control that is being eroded by a constant influx of new problems, mostly of Communist origin.—END



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Letter from Europe

By Stefan Geisenheyner

Editor for Europe, AIR FORCE/SPACE DIGEST

Europe's Last Stronghold

WIESBADEN, GERMANY

Cancellation of the tactical strike reconnaissance bomber, the TSR.2, by the Labor Government in Britain and its decision to opt for the F-111 instead apparently ties the British aircraft industry to future dependence on American know-how and aircraft design. Since Germany and Italy succumbed rather early to the political and economic pressures generated by the concentrated US export sales drive, the French aviation industry has now become the last stronghold of European aerospace independence and export capability.

The best standard by which to measure an industry's financial stability and soundness is its export records. For the French aerospace industry, these figures are in remarkably good shape and give credit to the long-range planning ability of its leaders. France's aerospace exports in 1964 represent about fifteen percent of the total industrial export business of the country. This percentage indicates the vital importance of a healthy and productive aerospace industry for France and the stability of her finances.

The year 1963 was closed with a record-breaking export figure of over 1,589 million francs (about \$318 million). The 1964 export total, 1,507 million francs (about \$301 million), heralds the beginning of a gradual decline which, according to the experts, will reach its low in 1967. This downward trend is not causing undue concern, however,

as it has been taken into account in long-range planning. By 1968, export sales are expected to show a steep rise, as projects presently under way come to fruition, such as the supersonic airliner Concorde, several STOL and VTOL designs, and other aircraft and missiles. Until that time, French aerospace exports will consist mainly of electronics equipment, missiles, engines, and ancillary supplies.

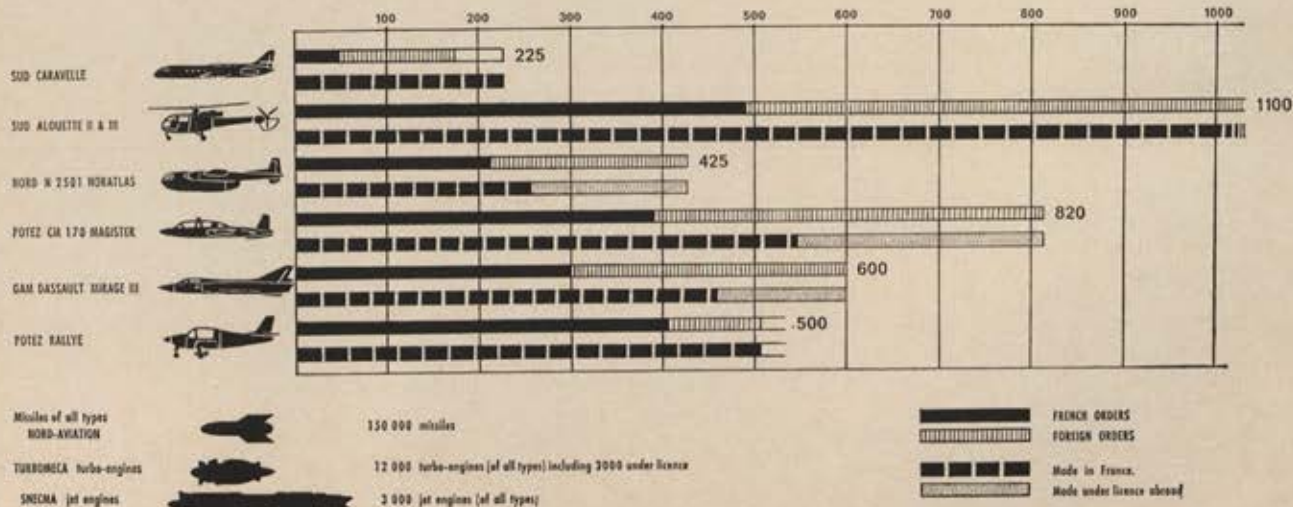
A breakdown of export figures for 1963 and 1964 illustrates the nature of the decline and the emerging trend. In 1963, missile exports accounted for thirteen percent of export sales. In 1964, missiles represented twenty-five percent of the total. The decline of airframe sales in 1964 to 51.4 percent as compared to seventy percent in 1963 was to be expected. The electronics and equipment sector continued the gradual rise dating from 1961, which in 1964 accounted for 8.8 percent of the export business.

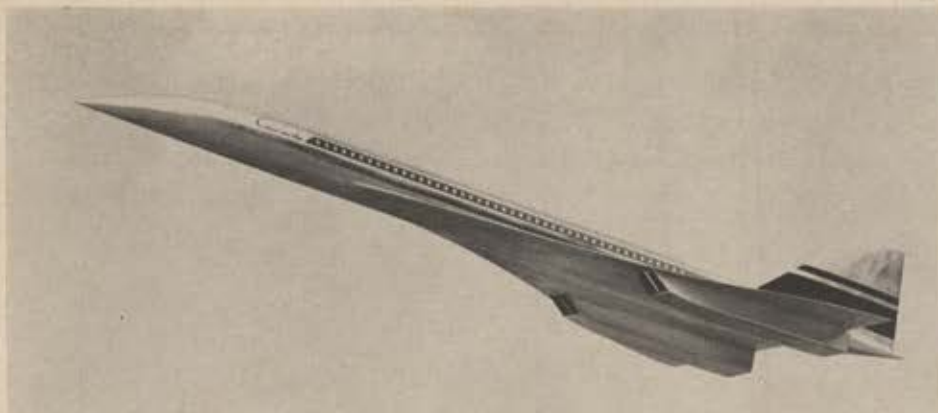
A further clue to the goals of the French aerospace industry can be found in the distribution of its goods on the world market. The French are wasting little time in trying to crack the American market. Instead, the French are concentrating on newly emerging nations—particularly those which seek to pursue a middle course between communism and the West—and on Australia. Half of its 1964 exports went to those customers; only 12.2 percent went to the US. Australia, in fact, has been France's best customer for the past three years, primarily through its orders for Mirage III fighters, missiles, and associated equipment.

France has been putting money into its military programs, but industry spokesmen believe the government is

MAIN SERIES

Production, Orders, Export (FRANCE and FOREIGN MARKETS)





The joint Anglo-French supersonic transport, Concorde, shown here in model form, is the only sizable joint venture France still is involved in. Because of political problems, the Concorde may lose the lead time it now enjoys when the US supersonic transport program gets underway.



The French Breguet short takeoff and landing transport, above, has just finished a demonstration tour in the US. It is likely it will bring large export sales to the French.



Shown flying over the clouds is a prototype of the Super Caravelle, powered by two GE CJ805-23C jet engines. It is a refined version of the short- to medium-range Caravelle.

impairing potential export possibilities by not funding sufficient research for civilian projects. An industrial committee stated recently that "one must sow in order to harvest." This statement was undoubtedly intended as a reminder that, over the past five years, foreign orders have represented three times the sum expended by the government for research and development of its own products.

Since continued export of aviation products is mandatory to maintaining the present favorable balance of payments in France, the government will likely be persuaded to keep the vital aerospace industry alive—and independent. Though out-and-out promises have not been forthcoming, nor have any official announcements been made, it is assumed that the French government will increase its investment in research and development during the next few years, at the same time remaining the best customer of its industry. It can also be expected to encourage a further concentration of the industry through mergers to increase its effectiveness and competitive position in world markets.

There have been some efforts, too, at developing closer ties with other European aviation industries. Discussions between France's de Gaulle and Britain's Prime Minister Harold Wilson in April led to a decision to increase technological cooperation between France and Britain. How extensive this cooperation may become depends in some measure on whether or not Britain accepts the US offer to buy F-111s in place of the TSR.2.

Aviation ministers of the two countries had met earlier this year when, on the tacit assumption that the TSR.2 would be canceled, there must have been some discussion about joint development of a first-line combat aircraft. The status of this project is now uncertain. France will apparently participate with Britain in the design and construc-

tion of a fighter-trainer aircraft, an early-warning plane, and possibly some helicopters. But, in view of the availability to Britain of the F-111, the French may now decide to design, construct, and sell on their own a variety of promising civilian projects in which Britain might have participated.

The only joint venture on a large scale remains the Concorde which, with all the political squabbling now going on, may be delayed to such an extent that it will lose most of its time advantage over the American SST. To assure a market for the Concorde it was considered essential that it be available at least two years before the SST.

With or without Britain or any other European country, French plans are laid to achieve an export figure of 2,200 million francs (about \$440 million) in 1970, which would mean an increase of 160 percent over the average exports of 1960 to 1964. This goal could be reached if the right aircraft, missiles, and engines are developed during the next several years. One does not need a crystal ball to guess that aircraft like the STOL Breguet 941, the Super Caravelle, the Mystère 20, and the Potez Magister twin-jet trainer, plus a variety of small jet engines, will become sales hits abroad, as some already are. French policy over the past years has been to develop aircraft of the gap-filler category; that is, designs for which a maximum requirement and a minimum of competition exist. Such designs as the Galion, a short-haul airliner; the Mercure (alias Mystère 30); military medium-sized helicopters of the SA 330 type; or new simple missiles can look forward with assurance to finding customers.

With sights set on future scientific development, France was one of the first European nations to enter the space race. The French government considers this field to be a
(Continued on following page)



From the outset the Mystère 20, above, an executive jet aircraft, has had success on the international market. Options and orders for more than 100 have been logged.



Above is a model of the French Mystère 30, now called the Mercure. It is a short-haul airliner that is to be put on the international market about three years from now.

vital element for the success of its aerospace and associated industries and, therefore, gives full support to its national space program. This domestic program, which includes extensive exploration of the upper atmosphere with rocket probes, the launching of satellites with the wholly French-designed booster Diamant, and advanced studies of rocket motors using high-energy fuels, is funded lavishly as compared to the support given to the international space programs in which France participates.

This attention, however, has a military background. Since the US is not willing to supply France with medium-range missiles needed to deliver the French A-bomb, the decision was made to develop a national missile program on the basis of self-generated technology. The Diamant booster contains the know-how and, in part, the hardware necessary for construction of a Polaris-type missile which will equip French submarines in the late '60s or early '70s. These submarine-based missiles will in the beginning complement the bomber command's Mirage IVs and later replace them.

France is a member of ELDO (European Launcher Development Organization) as well as ESRO (European Space Research Organization), instituted to advance European space technology and to launch satellites with European-constructed boosters. In the framework of these organizations, France has become the undisputed leader and

pacesetter simply as a result of its approach to space exploration and exploitation in its many unilateral projects.

Thus, the aims and tendencies of the French aeronautical industry for the future can be summarized as follows:

1. To fill national requirements through a coordinated production effort.
2. To produce aircraft and equipment of new and original design specifically for the export market.
3. To participate—if compatible with French foreign policy—in European cooperative programs, in particular if their scope makes national financing unrealistic.
4. To follow a policy of internal industrial cooperation to obtain the best utilization of existing facilities.
5. As an extension of point 4, to coordinate and centralize as many small companies as possible in the framework of the existing big companies, to make industry as a whole more competitive.
6. To continue a strong national space program as the spearhead of military and technological progress.

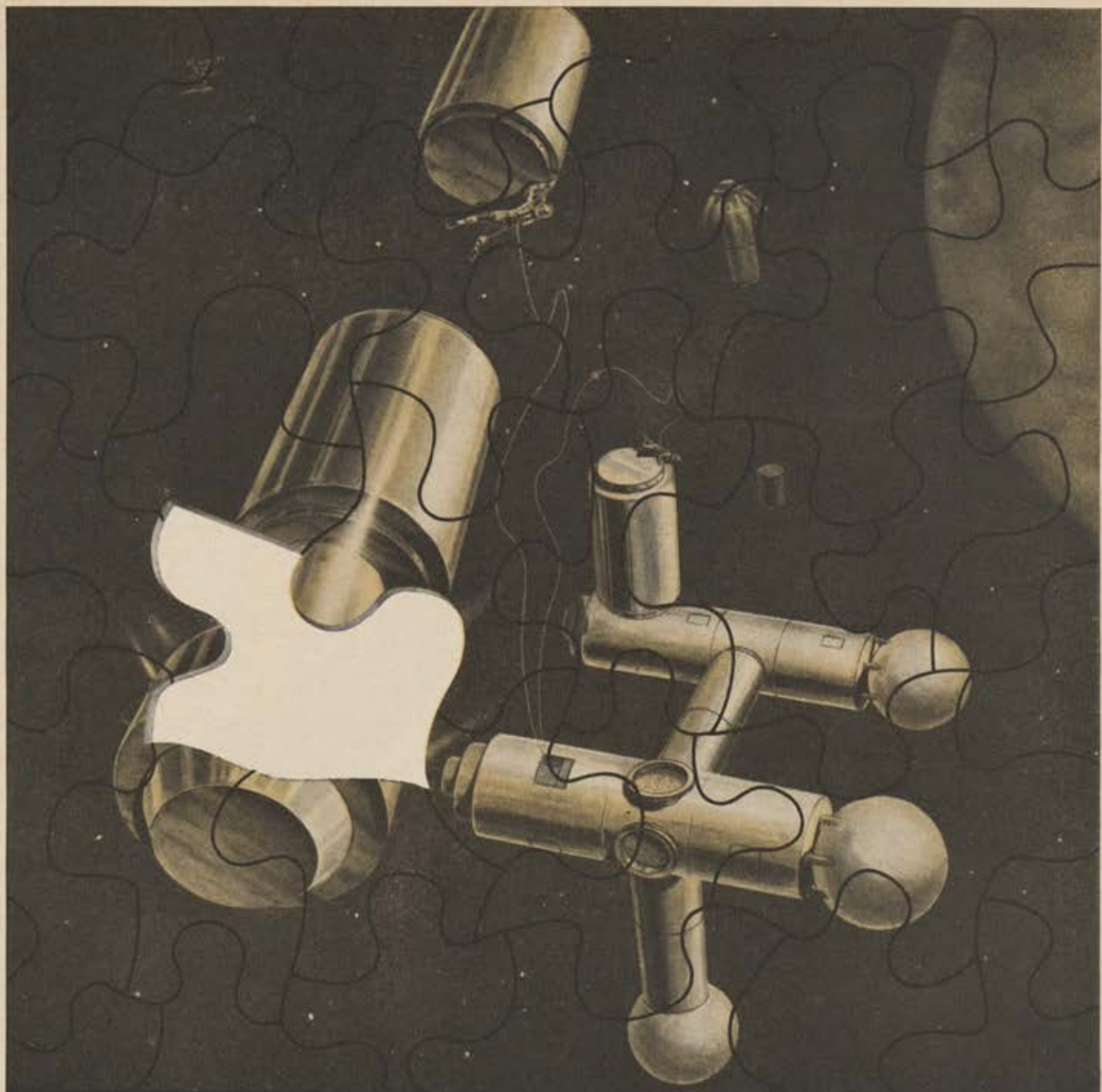
Realization of all six points is well under way. Thanks to excellent and far-reaching planning, keyed to de Gaulle's foreign policy, the French aerospace industry today is the strongest and healthiest on the continent. It has its woes, but if the present policies can be maintained in the face of ever-growing international pressures, it anticipates a promising future.—END



The Alouette II, below, and Alouette III helicopters have been and still are best selling French exports. More than half of those made have been sold to other countries.



This French Super-Frelon medium helicopter is presently a contender for a massive order from the German government. Its chief competition is the US-built Vertol Chinook.



In outer space, all the pieces better fit.



They will fit. Interface control for an incredible number of sub-systems can be accomplished when each contractor subscribes, without reservation, to the concept of team play. All the way from the first word of the contract through to rocket tractors (picture, above) hauling cargo in space.

At United Technology Center, our capabilities include intelligent coordination with other contractors and suppliers. Our technology—propulsion. Solids, liquids, hybrids, ranging from powerful boosters to delicate variable-thrust motors for landing and docking.

Just as important, our capabilities include a deep identification with the total mission, not just our part of it.



United Technology Center

DIVISION OF UNITED AIRCRAFT CORPORATION

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ASSOCIATE PRIME CONTRACTOR FOR THE AIR FORCE'S TITAN III PROGRAM.

In a fight at tactical altitudes the F-5's agility gives it an advantage over the highest-performance aircraft.

Its short turn radius enables it to circle onto the tail of its adversary.

With the F-5 on his tail, what are his chances of escape?

The F-5 carries both cannon and air-to-air missiles.



If the enemy tries to break off and run, cannon fire or a Sidewinder can get him.

If he goes for altitude, a missile will outclimb him.

In the air over a tactical battlefield, short turn radius, rapid acceleration, high rate of climb, outstanding maneuverability, long endurance are what count.

The air-to-air missile is the equalizer. No longer

can the faster, higher-flying airplane enter and leave combat as it chooses. Once engaged, it must fight to the end.

So if you're flying a Mach 2 airplane at 50,000 feet and you see an F-5 down there, don't be tempted to bounce him. Stay up where it's healthy.

NORTHROP F-5

**“...and in one and a half turns
we were sitting on his tail.”**



AEROSPACE WORLD

By Allan R. Scholin

ASSOCIATE EDITOR, AIR FORCE/SPACE DIGEST

Lined up on the ramp at San Isidro airport near revolution-torn Dominican capital of Santo Domingo, C-130s unload men and equipment to safeguard American citizens and prevent a Communist takeover of the island republic. Some 300 USAF transports delivered almost 17,000 people and 16,000 tons of supplies.



WASHINGTON, D. C., MAY 13
When order is restored in the rebellion-torn Dominican Republic, much of the credit must go to President Johnson's swift decision to commit US military forces to protect American lives and prevent a Communist takeover. Part of the credit must go as well to the ready transport planes of the Military Air Transport Service and Tactical Air Command which delivered US personnel and equipment to Santo Domingo.

Between April 29 and May 10, USAF transports had landed 16,995 people and 16,382 tons of supplies and equipment in the Dominican Republic. Included in the supplies were food and medicine distributed to Dominican victims of the struggle as well as to US military and civilian personnel. Some twenty C-130 sorties early in the operation moved an entire 100-bed hospital from Pope AFB, N. C., to San Isidro airport just outside Santo Domingo.

At the peak of the airlift operation, 328 USAF aircraft were directly involved—155 C-130s from TAC, fifty-seven C-130s and ninety-seven C-124s from MATS, and nineteen C-119s from CONAC.

Directed by Maj. Gen. Marvin L. McNickle, Commander of TAC's Ninth

Air Force at Shaw AFB, S. C., who was designated USAF Task Force Commander under the US Commander in Chief, Atlantic, planes arriving at San Isidro were unloaded and, often without shutting down their engines, departed within minutes to return to the US. There they took on new loads and new crews and were flown back to the beleaguered island.

TAC crews operating from Pope AFB told of flying round-trip missions in eight and a half hours. TAC C-130s were drawn from Langley AFB, Va.; Sewart AFB, Tenn.; Lockbourne AFB,

Ohio; Forbes AFB, Kan.; and Dyess AFB, Tex.

MATS units came from Dover AFB, Del.; Charleston AFB, S. C.; McGuire AFB, N. J.; Norfolk NAS, Va.; Hunter AFB, Ga.; Kelly AFB, Tex.; Hill AFB, Utah; Moffett NAS and Travis AFB, Calif.; and McChord AFB, Wash.

By May 10 the MATS aircraft had returned to their normal global missions. A number of TAC aircraft were retained to fill US Army and Marine Corps resupply requirements.

Though the struggle within the Dominican Republic was far from settled as this was written, the speed and scale of the US action provided clear evidence of US determination to oppose any further encroachment of communism in this hemisphere and our ability to render swift and effective aid to US allies.



Mariner IV is hourly chalking up new records for long-range communications through space as it continues toward its rendezvous with Mars on July 14. On April 29 it reached a straight-line distance from earth of sixty-six million miles, still transmitting engineering and scientific data,

USSR showed off this three-stage solid-fueled intercontinental missile in Moscow parade on May 9 celebrating twentieth anniversary of V-E Day. Shown here with war-head, it also served as booster for Soviet Vostok and Voskhod manned spacecraft.

—Wide World Photo from Sovfoto



to beat the mark set by the Soviet Mars I spacecraft in March 1963 when it stopped transmitting sixty-five million miles out.

Mariner IV may also have outstripped the Soviet's Zond II, directed toward Mars only five days after the US spacecraft was launched from Cape Kennedy, Fla., on November 28. A Soviet scientist attending a space symposium in Chicago early in May disclosed that Zond II has been "knocked out" of operation, presumably by solar radiation or micrometeoroids.

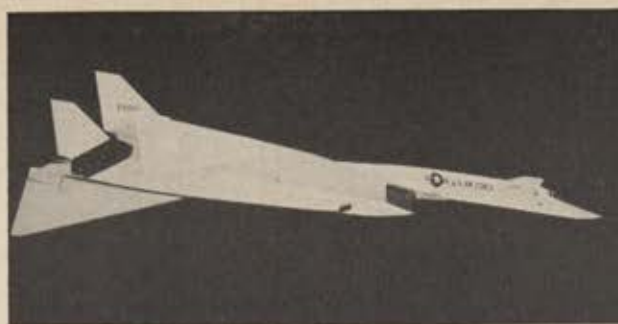
Mariner IV, expected to reach the 100-million-mile mark from earth on June 6, has not come through unscathed. An ion chamber experiment designed to measure certain levels of proton and electron radiation has stopped functioning, but the spacecraft continues to transmit other interplanetary measurements, and the TV camera, which is to be turned on to send back photos of the Martian environment, is apparently in good shape.



USAF's XB-70A jet bomber ran into a snag on its twelfth test flight when three of its YJ93 engines were chewed up by a stainless steel inspection plate that tore loose from the main wing apex just under the fuselage and was drawn into the inlet for the three right-hand engines.

Piloted by North American's Al White and USAF Lt. Col. Fitzhugh Fulton, the Valkyrie had just reached its test objective of Mach 2.6 at 65,000 feet—fastest and highest flight to date—when the mishap occurred. It set up a violent buffeting and for a few moments the pilots thought they might have to abandon the multimillion-dollar plane. But as the speed diminished, the buffeting tapered off and they were able to bring it in.

Replacement engines are available for those damaged, and skin repairs won't take long. But North American and USAF officials are making a microscopic survey of the XB-70's skin surfaces before subjecting the



Three engines in huge XB-70A were damaged when an inspection plate broke loose and entered air intake while plane was flying at Mach 2.6 over Edwards AFB, Calif.

plane to higher speeds toward its goal of Mach 3 at 70,000 feet.



The Soviet Union's fifth moon-exploring spacecraft, called Lunik V, hit the moon in the Sea of Clouds on May 12. In a rare prelaunch announcement, Soviet scientists said the flight objective was to test "elements" of a soft-landing system.

The soft landing didn't come off. Nor did the USSR announce any other results of the test, except to say that "a great deal of information was obtained, which is necessary for further elaboration of a system for soft landing on the moon's surface."

In an article not directly related to the Lunik V mission, a Soviet engineer explained that the main difficulty they face in achieving a soft landing is not the firing of retrorockets but in determining just when to fire them.

This problem is compounded by the 2.5-second time lag in receiving signals from the craft on its exact position and relaying instructions back to it from earth.

Fired too late, the retrorockets would not prevent the vehicle from smashing into the moon; too soon, and it might either be propelled away from its target or, with thrust exhausted, be drawn by the moon's gravity to a crash landing.

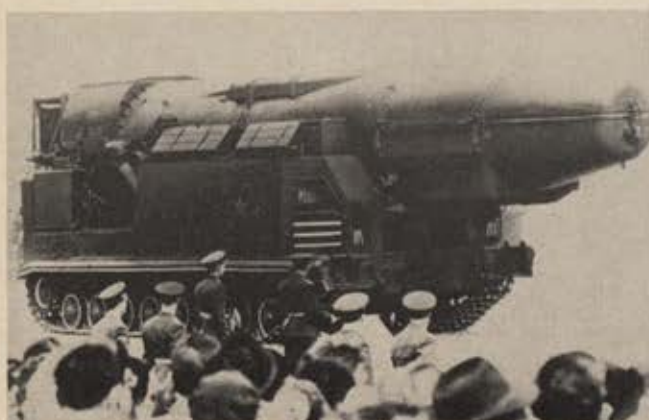
These are problems that the US must also solve before it sends its first Surveyor toward a soft moon landing this fall.



Development of an 8,000-mph re-

Soviets also displayed this forty-foot medium-range ballistic missile mounted on heavy tracked mobile launcher in V-E Day parade. Dubbed "Iron Maiden" by western observers, solid-fueled rocket was shown for first time.

—Wide World Photos



search airplane which might eventually achieve orbital speeds has been forecast by Gen. B. A. Schriever, Commander of the Air Force Systems Command.

Speaking before a symposium on advanced propulsion concepts in Palo Alto, Calif., late in April, General Schriever said the Air Force is studying the possibility of using hydrogen-burning, supersonic combustion ramjet engines, known as Scramjets, to power hypersonic aircraft. Several engine manufacturers, including Marquardt, General Electric, Garrett Corporation, and Pratt & Whitney, are working on Scramjet engine designs.

"The Scramjet is the most promising approach we have today for sustained hypersonic flight," he said. "It could be used effectively on hypersonic aircraft with both military and commercial applications."

The Scramjet can be flexible enough to operate at speeds as low as 2,500 mph and eventually might reach 17,000 mph, General Schriever declared. Meanwhile, lightweight airframe structures capable of withstanding the high skin temperatures of more than 2,000° F generated at hypersonic speeds, while carrying the Scramjet's liquid-hydrogen fuel at temperatures of -423° F, are technically feasible.

He estimated that first flights of the research aircraft could be made in the early 1970s with design of the hypersonic aircraft following in three to four years.

Experience gained with the research airplane could make feasible the development of recoverable launch vehicles, he indicated, which would permit delivery of payloads into space at well below the cost of current boosters.



Comparative tests of three turbo-prop utility transport aircraft as a possible follow-on to the Helio U-10 Courier in air commando operations were recently completed by the Tactical Air Command's Special Air Warfare Center at Hurlburt Field, Fla.

The three planes tested are the De Havilland Turbo-Beaver, the Helio
(Continued on following page)

Capt. Charles C. Vasiladis, USAF A-1E pilot in South Vietnam, checks his "daisy cutter" bomb load before strike against Viet Cong. Pipe affixed to nose of 500-lb. bombs causes them to explode above ground, increasing fragmentation effect.



Stallion, and the Pilatus Turbo-Porter. All are turboprop versions of piston-powered utility aircraft, employing a United Aircraft of Canada PT6A-6 engine rated at 550 eshp.

Tests conducted by pilots of the 1st Combat Applications Group at Hurlburt included short takeoff and landing, rate of climb, speed-power evaluations, and stability control.

Turboprop aircraft have distinct advantages over conventionally powered planes, particularly when operating at high altitudes. The plane eventually selected will be used for aerial resupply of ground forces and guerrilla bands, troop paradrops, psychological warfare operations, and visual and photo reconnaissance.



Aspects of aerospace technology applicable to automobiles are being sought by researchers at Cornell Aeronautical Laboratory. As examples of aerospace developments which might contribute to driving safety, Raymond McHenry, CAL project engineer, suggested the use of radar to maintain spacing between cars or to avoid obstacles, image-intensification devices for driving at night or in fog, and audio cues to warn the driver when he strays from his lane. Developments

such as conductive-layer electrical heating of windshield glass, and auxiliary thrust devices will also be studied.



Two USAF F-105 pilots on a routine rotational flight have set what is believed to be an unofficial nonstop distance record for an operational flight in the Thunderchief fighter.

Maj. Burris Begley and Capt. Thomas C. Hopkins of the 421st Tactical Fighter Squadron, McConnell AFB, Kan., flew nonstop from Hickam AFB, Hawaii, to Kadena Air Base, Okinawa—a distance of 5,730 miles—in nine hours and forty-four minutes, aided by in-flight refueling.



With wings and flaps extended, USAF F-111A departs from Ft. Worth, Tex., for Edwards AFB, Calif., to undergo extensive flight tests. Meanwhile, first prototype of Navy's F-111B version was rolled out at Grumman's Long Island plant on May 11.

The previous unofficial distance record for an operational F-105 flight was set on February 14, 1964, by six Pacific Air Forces Thunderchiefs from the 18th Tac Fighter Wing at Kadena in a flight from Guam to New Zealand, covering 4,422 miles in seven hours and forty-five minutes.



The Royal Australian Air Force will host a tactical air exercise in eastern Australia early in October in which USAF and Royal New Zealand Air Force will participate, Australian Defense Minister Shane Paltridge has announced. The exercise, scheduled to run from October 4 to 17, is the first of an annual series involving the three Air Forces. It will also represent the first test of the RAAF's Dassault Mirage III-0 jet fighters in comparison with fighters of other nations. US will be represented by Pacific Air Forces, which will provide six F-105s, four RF-101 reconnaissance planes, five KC-135 tankers, and eight C-130 Hercules transports, while the Australian AF will fly Canberras and a dozen Sabrejets in addition to six Mirage III-0s.



The 613th Tactical Fighter Squadron, 401st TF Wing, England AFB, La., won the Tactical Air Command's

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Forerunner of shuttle vehicle to supply orbiting spacecraft, Northrop M-2 is sketched as it would appear from B-52 mother ship in glide tests to begin soon at Edwards AFB, Calif.

Match Point VI weapons meet at Hurlburt Field, Fla., in April, with a score of 18,795 points.

Second place went to the entry of the 354th TF Wing, Myrtle Beach, S. C., with 17,570 points, and third to the 3d TFW team, also from England AFB. Other teams represented the 31st TFW, Homestead AFB, Fla., and the 27th and 474th TFWs of Cannon AFB, N. M.

In Match Point competition, contestants are selected at random only a few days beforehand. At Hurlburt, teams were graded on pilots' skill in locating and destroying dispersed and partially hidden targets under conditions resembling actual combat, and on ability of forward air controllers to direct their strikes. Intelligence briefings and debriefings also figured in the scoring.



Gradual reduction in Strategic Air Command's manned bomber force and deletion of Atlas and Titan I missiles are reflected in a number of recently announced organizational changes in SAC.

The 820th Strategic Aerospace Division, Plattsburgh AFB, N. Y., will be inactivated June 25 and the 816th Division, Altus AFB, Okla., on July 1.

Plattsburgh AFB will be assigned to Eighth Air Force's 817th Air Division, Pease AFB, N. H., and Altus AFB to the 819th Division at Dyess AFB, Tex. At the same time, the 819th will be transferred from the Fifteenth to the Second Air Force, along with its 461st Bomb Wing, Amarillo AFB, Tex.

Clinton-Sherman AFB, Okla., now assigned to the 816th Division, will be transferred to the Eighth AF's 17th Strategic Missile Division, Whiteman AFB, Mo., and the 13th Strategic Division, F. E. Warren AFB, Wyo., will be shifted from the Eighth AF to Fifteenth AF on July 1.—END



Fats Scrud is a system.

Fats is a one-man band. He does not work for Hydro-Aire. Fats has a marvelous time with banjos and guitars and drums and things like that. In a manner of speaking, he is a system personified, a sort of musical series of components. His ability to coordinate these components into a heart-rending "Sweet Adeline" is an art in itself; but so is the more basic mastery of each individual instrument. ✻ Hydro-Aire does not make music. It does make valves, actuators, pumps, motors, filters, electronic control circuits, solid-state devices and a vast repertoire of other components. It understands hydraulics, electronics, pneumatics, electro-mechanics and fuel systems. And in this combination of systems knowledge with components experience there's a very happy tune for the aerospace industry. Examples: electro-hydraulic control systems, temperature control and coolant systems, even complete fuel management systems. Outstanding example: Hytrol Mark II, the world's leading automatic braking system for jet aircraft. ✻ It combines advanced servo-hydraulics with solid-state electronics. This system and its electro-mechanical predecessor are standard equipment on more than 11,000 aircraft. ✻ More recently, we've been developing liquid coolant pump assemblies for environmental control and life support on space satellites. And we've built a new air vane hydraulic servo control system for an ordnance type missile. It includes a hydraulic piston type pump, fluid filters, relief valves, de-pressurizing valves, servo valves, dual piston actuators and accumulators. ✻ One of these days we may even use all this know-how to figure out something to make life easier for old Fats Scrud. Meantime, we'll be appearing regularly in this space to fill you in on certain details. If you can't wait to get the big picture, we've got about 5,000 copies of a brochure that describes Hydro-Aire in detail. They cost a lot of money. Please send for one. On your company letterhead. Ready? All together now!

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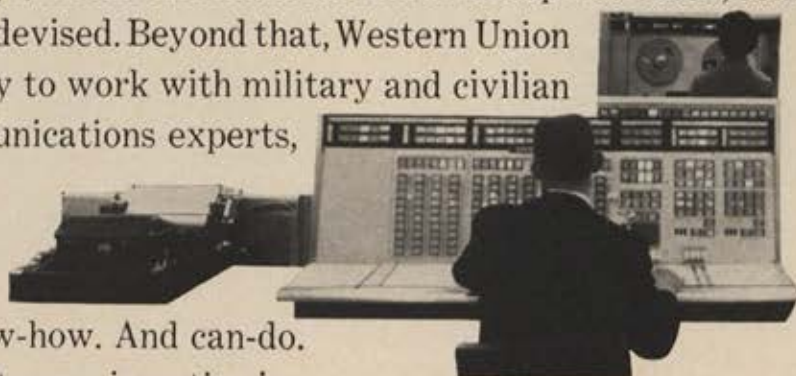
CRANE

Capability: When you think of communications capability, bear this in mind. Western Union has proved that

it has the administrative, technical and engineering skill to conceive, design, install and maintain the most sophisticated, complex communication systems ever devised. Beyond that, Western Union has proved that it has the flexibility to work with military and civilian government engineers and communications experts, and with the operating agencies, in the development of systems that meet each user's needs.

That takes *doing*. And know-how. And can-do. And has-done, in hardware, in software, in entire information systems.

It takes experience and vitality. It demands a penetrating insight into the



Control center in the AUTODIN system

user's needs. It calls for technical understanding that keeps pace with today's advancing knowledge. It requires managerial judgment; the resources, techniques and tenacity that bring a contract in as ordered, as promised.

In short, it takes capability. Western Union Capability. You saw it at work in the development of the Defense Department's AUTODIN (Automatic Digital Network). This complex system—the world's most advanced digital data network, for which Western Union is the prime engineering contractor and system manager—proves the point: Western Union has the ingenuity to develop, install and service communications systems of the highest capabilities.

That's Western Union for you.



ASSIGN THE TOUGH HAULING JOBS TO THE UH-1F

Sling the load, fill the cabin or extend the cargo out each cabin door, the UH-1F can air-haul your awkward loads. Hovering as an aerial crane, it can pick up two-ton loads from terrain inaccessible to ground vehicles or airplanes. Add seats, and ten passengers plus pilot are accommodated or add litters to evacuate three litter patients.

Low maintenance requirements assure high availability for the UH-1F. Turbine engine requires no warm up, speeding search and rescue missions. Selected by the U. S. Air Force because of its low cost, low maintenance requirements and outstanding performance, the UH-1F extends its usefulness by its heavy-lift capabilities. Put this Bell to work. It can take it!

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Although it is true that the Vietnamese war must be finally won on the ground, it is equally true that the war cannot be won without airpower. The use of airpower, Vietnamese as well as American, is having an increasingly important military effect on the Viet Cong. In addition, airpower is also providing an important deterrent to large-scale Communist aggression against Vietnam's neighbors. Here is a veteran military reporter's story of . . .

AIR FORCE

JUNE, 1965

Airpower's Buildup in Vietnam

By Jerry Greene

THE aircraft are different, the pilots seem a little older than they used to be, but the atmosphere is the same, and you feel almost at home in the drenching tropical heat and swirling dust as the bomb-laden jets waddle into position and creep awkwardly toward the end of the runway. You've stood on the edge of the flight line and watched this scene a hundred times back in that old war a full generation ago, yet the lump still rises in the throat as it always did at the sight of American planes airborne for combat. There's the feeling of pride, and the haunting, unspoken fear that some may not make it back.

You know you are watching men at war, whatever label may be hung on these operations by the statesmen and historians of a later day. And you know that the name Da Nang is destined for a high spot in the nation's archives and a place of honor in the military records. All branches of the armed forces could justly claim a share of the Da Nang story, but fundamentally

and lastingly, Da Nang is air, the springboard for the nation's most unique experience in airpower diplomacy.

Those strike launches quickly became routine after they were first ordered last February—as routine as any military operation can be when directed against an armed enemy.

They were, in fact, handled in a routine, professionally efficient manner from the outset by a group of highly trained experts who were ready when called upon.

The USAF had written a brilliant chapter in military history long before the first jet took off on a strike mission across the seventeenth parallel dividing line between North and South Vietnam, thus formally entering American units into combat. We observed the writing of this chapter three years ago and are seeing it in progress today. From our experience we offer this summation: It is true that the guerrilla war must be won finally on the ground, among the people

(Continued on following page)



A Communist PT boat burns after blasting by US Seventh Fleet aircraft that destroyed five enemy boats some fifty miles north of the seventeenth parallel in late April. Shadow of Navy recon plane can be seen.



Prime targets in escalation of air war in Vietnam in recent weeks have been supply lines. One of the spans of this 350-foot highway bridge along Route 12 was completely destroyed in a mid-April US raid.

and by the people. But it is equally true that this war cannot be won without airpower. Airpower has kept the government effort alive and prevented defeat; airpower will eventually point the way toward victory.

An examination of the action over Vietnam will explain these convictions.

More than Vietnam is involved in the story. Laos and Thailand also figure importantly. But the part of the story involving them must of diplomatic necessity be obscure. Laos is run, technically, by a coalition government which includes segments of the Communist Pathet Lao. Like the Viet Cong of South Vietnam, the Pathet Lao is a tool of the Communist Viet Minh of North Vietnam. There are no American forces in Laos. But Prince Souvanna Phouma, the "neutralist" premier, has requested and been supplied with American aircraft to conduct aerial reconnaissance of areas held by the Pathet Lao, and has authorized use of armed escorts for the photo planes.

The USAF and the Navy have shared the recon duty; the "escorts" have been vigorous in their protective work; and a total of six US aircraft have been lost to enemy fire. Phouma has a nifty and aggressive little one-squadron air force of his own, equipped with T-28 types, plugging away at Communist positions and suspected concentrations.

Thailand has been marked openly by the Chinese Communists as the next objective, after Vietnam, and the Thais have asked and received substantial, tangible guarantees of support from the US. Thailand's Air Force has more than nine squadrons, four of them jet fighter-bomber, equipped with F-86s. The country has half a dozen air bases capable of handling jet aircraft, several of them serving as home for USAF squadrons which could stage through Da Nang when required. Thailand wants nothing said about activities of its guests who for all public purposes are there purely for the defense of Thailand.

The record of the USAF in Vietnam must begin with the VNAF—the Vietnamese Air Force, inevitably called the "Vee-Naff" by the Americans. The VNAF is a creation of the USAF, a whole, complete

little air force organized, trained, nurtured, and brought into combat readiness and actual combat by the Americans in the short space of less than ten years. It hasn't been easy; there is bitterness and misunderstanding in the record. But the total achievement can only be described as magnificent.

The USAF had to start from scratch back in 1955, with organizational direction, pilot training, equipment, maintenance, and supply. Some primary training was done in South Vietnam; much more in the US.

By 1957, the VNAF had 4,000 men, a fighter squadron of twenty-one old F-8F Grumman Bearcats and thirty-two C-47s, along with an assortment of L-19 (now O-1A) liaison types pressed into multiple duty as trainers, transports, and observation craft.

Today the VNAF has 10,000 men and nearly 300 aircraft, with the striking power packed into four squadrons of A-1H and A-1E Skyraiders. It is commanded by the fiery Brig. Gen. (who calls himself Air Vice Marshal) Nguyen Cao Ky, one of the most powerful of the coterie of generals which exercises influence in running the nation.

The final "crash" transition of the VNAF into the Skyraiders, the completion of the combat-training cycle, came last fall, after which all squadrons became available for combat—and the kill rate of Viet Cong from air action skyrocketed.

There were tough years along the way. In the days of the T-28s and the B-26s great debates raged over whether or not American instructors were flying combat missions with or without Vietnamese student copilots. Grave questions were raised even in Congress about the choice of aircraft picked for the Vietnamese mission. But it was obvious here in Vietnam that USAF was using equipment that the Vietnamese could be taught to handle and maintain under field conditions that were, and are, rugged at best.

In 1961 from the Thirteenth Air Force in the Philippines came the "2d Advon," an advance echelon of the 2d Air Division, to lend a hand with organization and training. An air commando squadron arrived from Eglin AFB, Fla., to provide direct help. Head-



The latest game in air war is called "Hunter-Killer" by pilots. Low-flying observation aircraft scan country-side for Viet Cong, relay finds to A-1Hs for strafing missions.

quarters was established at Tan Son Nhut, the military-commercial field at Saigon, and a joint operations center—now called Air Operations Center—was created to direct combat and supply missions.

It was, and is, "joint" to the letter. Each desk is shared by opposite numbers, the Vietnamese commanding, the Americans advising. This is the operating headquarters of General Ky and Maj. Gen. Joseph Moore, Commander of the 2d Air Division now based here and the senior American air adviser.

The American jet squadrons used in strikes against North Vietnam are, of course, solely under US command.

Subordinate air support operations centers were established at each of the Viet Army Corps headquarters for conduct of tactical missions on an area basis and for coordination with the ground forces. Establishment of a communications network was a herculean task in itself, and the growing dependence of the outlying provincial capitals on air support of all kinds, civilian and military, brought a corresponding improvement program for the local airfields and bases.

The VNAF base at Bien Hoa, a dozen miles from Tan Son Nhut, was chosen as the major supply depot, and mobile maintenance teams of American technicians were sent from base to base teaching and training. There were ordnance teams and meteorologists. USAF gave the VNAF a solid foundation.

An idea of the expansion can be seen in a report that Tan Son Nhut was handling 20,000 flights per month, and Da Nang's traffic had increased more than twenty-two times in the four years before the United States squadrons moved in to begin their strikes in the north.

The first ten months of 1964 were grim, and the

prophets kept describing, with some justification, a situation which seemed to be "deteriorating." The Viet Cong grew bolder; more territory showed red on the maps; and the country's leadership overflowed with problems. But the Americans and the Vietnamese kept doggedly at their training, trying to hold what they had.

From North Vietnam came a swelling flow of infiltrating troops, many of them regular army.

In November three things happened: the Viet Cong emerged in strength from the jungles, the Vietnamese Army stiffened, and the VNAF came of age.

Ground forces, ever skeptical of claims by airmen and rightly suspicious of obviously inflated reports from overenthusiastic Vietnamese commanders, had long before instituted new procedures for kill and damage assessments. A ground count of enemy bodies had to be verified by either an American adviser or a ranking Vietnamese officer before any strike claims were accepted or figures released.

Early 1964 ground-counted kill statistics weren't encouraging. In January there were 270, February only forty-one, and March 300. This last was not bettered until July when 420 were recorded. The count dropped steadily each month to 200 in October.

The lyrical Operations Summary issued by the 2d Air Division last November 23 tells its own story of what happened in the eleventh month: "Tactical air operations in Vietnam [today] equaled the record high [number of missions for one day] set three days ago as fighter-bombers of the Vietnam Air Force, guided by forward air control observation aircraft, pounded Communist Viet Cong concentrations in virtually every corner of the strife-torn Republic. Their bombs and 20-mm. cannon fire demolished fifty-nine Viet Cong structures and damaged four others. A VNAF C-47 aided the successful defense of a district headquarters against a Viet Cong night assault. USAF and VNAF aircraft [today] completed a total of 440 successful operational missions."

The confirmed ground-count kill for November ex-

(Continued on following page)



VNAF and USAF advisers in corps tactical operation center at Pleiku receive a call for air support. Joint centers were formed in 1961 to direct combat and resupply missions.

AIRPOWER'S BUILDUP IN VIETNAM

ceeded 1,300 and went to 1,200 in December. The 1,000 per month or better rate held through the first quarter of this year.

From this time forward, the VNAF pilots have been as active as mad hornets, flying air-cover missions for ground operations, interdiction, close support and escort, throwing in a dash of tactical air evacuation, search and rescue, and visual reconnaissance. USAF pilots are now allowed to fly their own missions using Skyraiders from the two air commando squadrons in addition to continuing training activities. This has beefed up the available bomber force by about one-half.

VNAF, of course, has helicopters, used largely in supply, evacuation, and troop-lift missions, and the old plugging fleet of C-47s. The TO-1s are still handling primary flight training at Nha Trang.

Vietnamese forward air controllers are also being trained, but there aren't nearly enough of them, and most of the work thus far—a dangerous job in light observation aircraft—has been handled by TAC pilots who are also doing the training. The Skyraiders are used as both escort and support for the Army's helicopter troop lift.

They have invented a dandy new game out here recently called "Hunter-Killer." A helicopter or an observation aircraft will drift along at low level to draw fire from enemy positions. This is the best known way of "finding" such emplacements. When "found" the snooper marks the spot, yells for help, and gets out as best, and as fast, as he can, while a swarm of loitering Skyraiders dives for the target. The "hunters" are not pestered by insurance salesmen.

It is a notable boast of the VNAF that not a single convoy has been ambushed successfully when escorted by fixed-wing aircraft.

American instructor-advisers remain with the VNAF squadrons, often accompanying them on missions inside and outside the country.

An example of the work of the advisers came in one of the early attacks on a heavily defended target

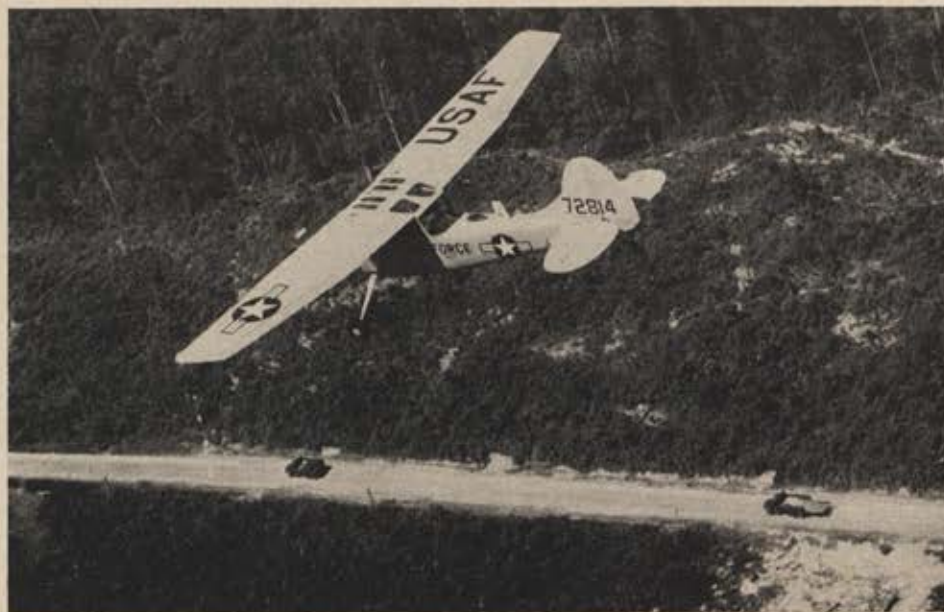


USAF advisers have brought their customs as well as their skills to the Vietnamese Air Force members they have trained. Here, new Vietnamese Air Force pilot gets the traditional dunking after completing his first solo flight.

in North Vietnam. In the premission briefing, the Vietnamese pilots had been instructed to pull up sharply to the right after dropping their bombs and to resume place in the formation.

The USAF adviser, in his own Skyraider, noticed as he pushed over into his dive, that the North Vietnamese were throwing up a thick barrage of light antiaircraft fire to the right of the target area, a curtain through which the departing aircraft were flying. He dropped his ordnance and pulled up safely to the left, calling by radio to the planes following him to switch signals and avoid the fire zone. The American was astonished to see the next two Vietnamese planes pull right, catching a handful of slugs. Both, however, made it back safely and the USAF captain had to sit down with them and explain patiently that sometimes circumstances required that orders must be changed.

South Vietnam has only three air bases capable of comfortable jet operations, here at Da Nang, at Bien Hoa, and at Tan Son Nhut, on the outskirts of Saigon.



The TO-1D liaison aircraft performs a wide variety of jobs in Vietnam, including protective escort for ground convoys. If aircraft spots signs of Viet Cong ambush, it calls in supporting combat aircraft orbiting nearby.



The forward air controller job is most important to successful deployment of airpower. Here a USAF controller-adviser and his VNAF counterpart, aided by a USAF radio operator, move into position against VCs, ready to call in close-support fighters if necessary.

Many of the provincial capitals have fields which are acceptable if absolutely necessary. They are 3,000, or maybe 4,000 feet long, paved with pierced steel planking or "laterite" (pressed gravelly clay). The French, when Vietnam was a colony, were mindful of the small airplane's use in communicating with distant plantations and commercial centers. South Vietnam has 176 listed airstrips. Unfortunately, many of them are less than 2,000 feet long and no more than sixty feet wide.

Those few figures can tell a considerable story to an airman when it is understood that a war is very much in progress, that the country has only one railroad which is daily cut by the enemy, that highway traffic is sketchy, dangerous, and of small volume. The figures spell air transportation, and here again, without the USAF, it's a fair bet that South Vietnam long since would have gone down the Communist drain. The old C-47 is still in there pitching, to be sure, in service with both the VNAF and the USAF. But none can deny that the mechanical hero, noncombat type, of the war in Vietnam is the noisy, rattling, and generally unlovely C-123.

Pilots have been putting this aircraft down on, and taking off from, strips where a sane civilian wouldn't like to trundle a wheelbarrow—and collecting bullet holes in the process.

We flew in them three years ago and again this trip—the last time with a cargo of rocket ammunition destined for a helicopter company down on the Mekong Delta. Nothing much seems to have changed—except for the growth of a crisp, busy, bureaucratic efficiency at the terminals, made necessary to handle the enormous increase in traffic and human, animal, and inert cargo.

It all started with a detachment—everything in South Vietnam began with a detachment of some sort—which was once known as the "Dirty Thirty," a lone squadron of C-123s trying to supplement the VNAF C-47s, with little or no communications, ferrying men and supplies all over the countryside. The squadron grew into the 315th Group. Recognition of a sort came in March when the name was changed from the 315th Troop Carrier Group to the 315th Air Commando Troop Carrier Group, with the four

(Continued on following page)



Packing a pistol, a USAF ground crewman guides a C-123 into park position on a Vietnamese airfield. The Fairchild C-123 is considered the noisy, rattling airplane hero of the Vietnam war.



Airpower is a versatile medium, used not only for destruction but also for helping the common people of Vietnam, as witness this paratroop of a cow, needed by waiting people below. C-123s often supply units with fresh meat this way.

squadrons attached given the air commando troop carrier designation.

Headquarters for the group is maintained at Tan Son Nhut, where two squadrons are stationed to maintain service throughout the southern part of the country. A third squadron has been established recently at Nha Trang, and the fourth, the 311th, is based here at Da Nang. The 311th, as a sample, maintains a daily schedule linking Hue, Quang Ngai, Quin Nhon, Pleiku, Nha Trang, and Saigon, and keeps a connection with Bangkok, flying across Laos.

The 8th Aerial Port Squadron was brought in to establish and operate badly needed terminal facilities; the 315th Group has in recent times been airlifting more than 10,000 tons of cargo and personnel monthly.

Here at Da Nang, and at Nha Trang, and at Can Tho in the Delta, and mostly at Tan Son Nhut, the 315th Group and the port squadron operations look like stateside MATS terminals—buses at selected spots to ferry passengers out to the flight line, and a public address system that intones at precisely the proper hour: "Air Commando Troop Carrier Group 315 announces the departure of Flight 007 for Pleiku. . . ."

Tan Son Nhut, naturally, is the hub and the crossroads. Soft chairs fill the waiting room, never enough of them for the crowded assemblage of passengers, Americans and Vietnamese of all branches of the service and civilian technicians. Heavily armed Special Forces troops mill about the snack bar alongside the small Vietnamese. You might see a naval officer, an occasional snoopy reporter, a TV cameraman laden with gear. Tan Son Nhut boasts a stereo system which wafts out sweet music, the kind that makes a man think of things other than war.

There is, among the passengers, a constant struggle for priorities, for a place in line. The aircraft take on what passengers can be carried after the cargo load has been fixed. Three years ago, passengers on the C-123s were stuffed into parachute harness; the chutes aren't worn any more.

In three years improvements have been made at

some of the outlying fields, as well as at Tan Son Nhut. Quang Ngai has picked up considerably. Now there is a concrete patch for loading activities—the landing surface is still packed earth—and down along the runway is a snack bar—a sheet-metal soda palace with a plain dirt floor. Quang Ngai has more Viet Cong in the neighborhood, also, and squatting alongside the strip is a well-used 155-mm. howitzer and a pair of 105-mm. howitzers for company.

"Sometimes," a C-123 pilot told us, "I've had to come in under a barrage being laid on those hills over yonder."

Firing around the C-123s isn't always friendly. Snipers haunt the fringes of the airfields, even, occasionally, at Tan Son Nhut. Mostly they use rifles, sometimes automatic weapons—particularly when bad weather, of which there is a great deal, forces the lumbering aircraft to make long, low approaches. Steep, high mountains ring most of the coastal air bases in the northern part of the country, restricting the approach paths severely. One pilot reported his C-123 had been hit by gunfire seven times in three months.

These scheduled milk runs are but a part of the story.

The group also uses the short grass strips, old and new, to supply Special Forces outposts deep in the jungles; some units in remote areas too rugged to permit strip construction are supplied by paratroop. The C-123s are called for all sorts of emergencies—no-notice lifts of reinforcements, evacuation of refugees, the transfer of anything that will fit inside the fuselage. Live cargo, from chickens to pigs, is not unusual.

Some of this live cargo is food for the outposts where the troops have no refrigeration and must butcher their own fresh meat. Cows, on occasion, have experienced the joys of parachute delivery.

Then, with the VNAF and the air commando squadrons, the 315th Group is on call for flare drops, a procedure developed into a fine art in this war. The Communist guerrillas customarily attack by night,

and most often direct their attentions to relatively isolated outposts. The word "relatively" is used with reservation because frequently these outposts are within a few miles of downtown Saigon.

It has become established practice for outposts or villages under night attack to call for illumination. In some areas airborne flare alerts are flown, and the planes on station can reach a beleaguered spot in minutes. The multimillion candlepower flares pop out of specially designed racks in the tail loading doors of the C-123s, giving bright visibility to the battlefield, robbing the Viet Cong of a shield of invisibility. Often, the appearance of the flares alone is enough to force the enemy to break off an attack. On other occasions, the missions are sustained for extended periods.

A typical 2d Air Division daily activities summary reports: "The flareship commander called for fighter support, and two A-1Hs rendezvoused over the target area. By the light of 123 flares, the Skyraiders blasted the enemy positions with bombs and cannon fire. The insurgent force gave up the attack and dispersed after more than an hour of heavy action."

That same night, many miles away at another outpost, a VNAF C-47 crew dropped forty-two flares in less than an hour, "exposing the VC force to the small arms and automatic-weapons fire of the post garrison. The VC broke off the action and dispersed shortly after 1:00 a.m."

Still another reports: "At 8:55 p.m. a USAF C-123 flew to the aid of an outpost near the coast of the Mekong Delta northeast of Soc Trang, which was the object of a Viet Cong night attack. In the next three hours, the USAF crew dropped 105 parachute flares over the battle area, exposing the VC group to the rifle and machine-gun fire of the post garrison. Shortly after midnight the guerrilla force gave up the attack and dispersed into the surrounding jungle." And you can find similar ones almost daily.

The sketchy and scattered news reports from Saigon can't begin to portray the war as it is being fought, day after day, night after night, a few planes here, a few there, and a few more somewhere else in a ceaseless, never-ending probing and pounding. Somewhere in South Vietnam there's always action.

This is no second team flying these C-123s. A full fifty percent of the pilots in the 311th Troop Carrier Squadron here at Da Nang consists of long-experienced bomber pilots who have transferred out of the Strategic Air Command.

We flew with one major who began his operational work with B-17s in World War II. He left the service for a time and went in again for Korea. He graduated to the B-36 and put it to bed. He flew B-52s for years and then went to the B-58. Finally, deciding he ought to spend more time with his family, he took advantage of an opportunity to shift over into air commando training. A year in South Vietnam and he gets his choice of base assignments. A captain in the same outfit here told us: "I flew B-47s for ten years and never got near a war. I transferred to transports and thirty days later I'm getting shot at."

These C-123 pilots have a hand in another phase of this Vietnam war, which has been treated casually in the news dispatches but is deserving of the highest honors. This is the conduct of pilot rescue operations. There has never been anything like it in combat.

Aircraft losses were heavy in one particular raid, staged partly from this base. Six planes were lost to ground fire. What didn't make the headlines was the fact that five of the six pilots were recovered.

The rescue of the fifth and last pilot to be brought back was quite spectacular. The pilot was forced to eject from his crippled plane deep in the most rugged mountainous jungle, eighty miles northwest of Da Nang. His signals were heard and seen, eventually, but long after dark.

A C-123 loaded with flares took off, accompanying a rescue helicopter, homing in on the downed pilot. Flares brightened the skies over the area where the officer had signaled, and the missing man was spotted. Then the aircraft used a new wrinkle in night operations, one which has proved its worth in night operations in Vietnam. The C-123 was equipped with the ultrabright strobe light, and the aircraft made a low pass with this piercing illumination, giving the helicopter observers a clear chance to spot any possible ambushers in the immediate vicinity. None seen, the helicopter dipped swiftly. Minutes later the aircraft were en route back to Da Nang, and one more missing-in-action turned into a returned-safely.

They are going all-out in these rescue operations. Exact current figures are not disclosed, but official reports indicate that at least eighty percent of all pilots shot down on strike missions have been recovered.

An older report sent to Congress early in the year said that during the period July-December 1964, the Air Rescue Service in South Vietnam had participated in rescue/recovery missions involving 293 personnel, resulting in the assistance to, or the saving of, 145 people. This included all types of missions and was apart from the eighty-percent rate recorded specifically for pilots involved in the attacks on targets in North Vietnam.

(Continued on following page)



With safety belt securely fastened, a C-123 crewman prepares to kick a resupply bundle out the rear ramp on signal.

And all this is being done by a very few, as has become traditional in the USAF. There are a headquarters and two permanent Air Rescue Service detachments in South Vietnam as this is written—one here at Da Nang, one at Bien Hoa, and the headquarters at Saigon. Last year the total complement of the three consisted of twenty-four officers and sixty-two airmen.

At Da Nang the detachment has three HH-43 helicopters and four HU-16 Albatross aircraft, amphibians which can be found orbiting somewhere in the general area during strike operations. The orbit paths usually are located over the sea, and pilots whose planes are hit and damaged are instructed to make every effort to get out over the water before ejecting.

Maj. Ronald L. Ingraham and 1st Lt. Joseph P. Phelan, helicopter rescue crew commanders, were awarded Silver Stars for a mission on March 2, 1965. The terse, casual words of the two citations barely hid the drama of an action typical of their breed. The citations noted both officers "flew rescue missions totaling two and one-half hours over unfriendly territory in search of two downed American pilots." The term "unfriendly territory" may be called the understatement of the month. Both aircraft were under continuous, heavy fire.

"After the successful rescue of one pilot," one citation read, "Lieutenant Phelan made an approach to another parachute which had been sighted. While hovering over this area in search of the downed pilot, extremely accurate ground fire was encountered and a hit was sustained in one of the rotor blades and Lieutenant Phelan was forced to withdraw. With complete disregard for his personal safety, Lieutenant Phelan flew cover for a second helicopter crew while they rescued an additional pilot."

Major Ingraham's citation rounds out the story: "... Major Ingraham, after flying cover while another helicopter picked up the first pilot, proceeded inland for the second pilot. During this time, the helicopter encountered continuous antiaircraft and small-arms fire.

"Approximately ten miles further inland, the second pilot was sighted in the jungle and lifted 100 feet to the safety of the helicopter."

There are at least two TAC pilots who will readily agree that the "gallantry and devotion to duty" of both Ingraham and Phelan "reflected great credit" on both themselves and the USAF.

ARS people have the reputation of not quitting as long as there is the slightest chance—a great comfort to the pilots in South Vietnam, American and Vietnamese alike.

Weather is a severe problem in South Vietnam to air and ground forces alike. It is customary for the uninitiated to oversimplify and think of the weather here in the tropics as consisting of the wet and the dry seasons. Unfortunately, the facts of the case, as in so many other elements of Vietnamese operations, are not quite so simple. In the first place, South Vietnam is more than 700 miles long, running north and south, with many variations of climate and topography. The southern delta is pancake flat, surrounded

on three sides by the Gulf of Siam and the South China Sea. A mountain chain with peaks above 6,000 feet runs upward through the country from the delta, with a narrow coastal strip providing the location for most of the important provincial cities.

In addition to the seasonal monsoon rains, roughly May to November, there are sudden tropical storms and, for long periods, a curious ground haze which is deceptive and troublesome for all sorts of operations, particularly for dive-bombing and close-support missions.

To try to do something about the weather, USAF sent over the 30th Weather Squadron, which has eleven detachments operating throughout the country, serving as advisers to the Vietnamese, instructors for Vietnamese meteorologists, and, where necessary, acting independently as a reporting and forecasting service for USAF. A fantastic job has been done by the Americans in establishing a dependable communications network in the last three years.

At the present time, the weather squadron, working with the Vietnamese opposite numbers, is providing service for the Air Defense Control Center, the Combat Operations Center, the Joint Operations Center, the Transportation Control Center, the Army Flight Operations Center, MACV, and the US Navy, all in Saigon. Reports are available, of course, at subordinate headquarters and air bases.

Still another USAF outfit, Detachment Five of the 1352d Photo Group of APCS, is located at Tan Son Nhut, providing combat documentary photographic services, along with coverage of target areas for operational analysis. There has been a lot of photographic work over Southeast Asia which can't be discussed publicly.

Some old hands might be interested to know, however, that on more than one occasion, Vietnamese pilots and, sometimes, Americans take off on strike missions with a grease-penciled target photo strapped to the thigh instead of a map. Some of those targets in the jungle are extremely difficult to locate and identify, and maps, mostly old editions left by the French, can be substantially useless.

There seems little question that US airpower is, in a sense, on trial in the Vietnamese war. Airmen have been confronted with a challenge, though it has not been couched in direct terms. The challenge has what some might term exceedingly unfair restrictions and limitations, because airpower is not being exercised in a full and free manner, but is strongly fettered, to be applied in bits and pieces as dictated by the requirements of delicate international relations. Whether the course is proper or will be fruitful must be judged by historians a long time hence.

But there is the challenge, nonetheless, and with total war becoming a seemingly ever more remote threat, it may be the only kind of test airpower will face. There is a realization here, and there has been from the beginning, that the task, under the existing rules, will be of much longer duration than the general public might have been led to expect.

It is a mean, hard, nit-picking kind of a job, over-
(Continued on page 43)

WHAT IS LTV AEROSPACE CORPORATION?

Put briefly, it is a diversified aerospace company that traces its aeronautics manufacturing history to 1917, but through its store of engineering and scientific brainpower, experienced management and investments in research and development produces some of the most advanced products and services today in the fields of aeronautics, missiles, space, ground vehicles and range and launch operations management. /For example: Aircraft

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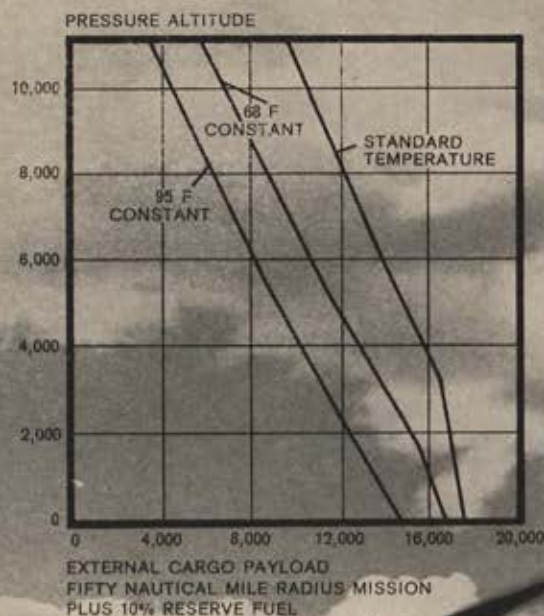
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Take to the hills...and hover

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



This was a two-span steel truss railroad bridge in North Vietnam before it was visited by US airpower in early April. One span of the 330-foot-long structure was completely destroyed and fell into river. Approaches were damaged too.

loaded with frustrations. But to this noncombatant observer, it is a job which is being done exceedingly well.

Direct US air intervention in Southeast Asia began about a year ago with the Laotian aerial reconnaissance missions and later armed escorts. That work has been continued steadily.

The big buildup came after the attack on units of the Seventh Fleet in the Gulf of Tonkin last August, and it appeared that the Communists, emboldened by a good year, might be getting set for a knockout punch.

The jets came in then, held strictly on alert for defensive purposes. Defensive forces in Thailand were strengthened, and a quick expansion of base facilities there was brought to a near-crash basis.

The total preparations were made under direction of the Joint Chiefs of Staff, through the Commander in Chief, Pacific, at Pearl Harbor, who coordinated the activities of the Seventh Fleet and the Military Assistance Command Vietnam-Thailand, with its subordinate 2d Air Division.

Still, the US held back, even after a surprise mortar attack at Bien Hoa destroyed and damaged part of a B-57 squadron. A December terror-bombing of the Brink Officers' Hotel in Saigon brought no reprisal, but in early February, a mortar attack directly on the US installations at Pleiku Air Base proved too much. The USAF went back to war, along with the carriers of the Seventh Fleet. First there were the selective "retaliatory" raids on North Vietnam, which developed within two weeks into a steady, relentless, continuous, pounding attack—on a highly selective basis.

And within those two weeks, General Moore's American jets were unleashed for "in-country" action, strikes on call on Viet Cong positions within South Vietnam itself. These actions required no delaying referrals to Pearl Harbor and Washington. Where aircraft were available, they could be used.

In the first days, jets working with a forward air controller beat down a successful Viet Cong ambush force along a highway in a mountain pass which permitted the highly successful helicopter evacuation of a full battalion of Vietnamese government troops.

The fast reaction time of the jets was a most welcome addition to the government forces. The major problem has been to find targets worth assigning to the jet fighter-bombers, but they have been kept busy.

At the beginning there were only the B-57s and the F-100s, while F-105s were on hand for the strikes to the north. A detachment of F-102s here maintained air defense alert; RF-101s were available for photo-recon missions. The air commando squadrons' A-1Es could now be flown openly by USAF pilots on their own attack assignments.

Strikes north were carefully planned with a blend of USAF and Navy strength, and where possible the VNAF Skyraiders were given all the work they could do. From the Navy's carriers came an assortment of F-8s, F-4s, A-4s, and A-1s.

And as the weeks progressed, so did the buildup and the massing of more airpower here to carry on the selective strikes—and to stand ready to meet any challenge the Chinese Communists might care to offer. F-104s came here to replace the F-102s for base defense and escort missions. And there were more F-4s, USAF models. Da Nang was busy enough back in March, to the point of overcrowding. A month later it was bursting to overflow proportions.

The same critics we hear in the US have been active here, contending that "indiscriminate" bombing which kills women and children and noncombatant civilians causes great harm, driving countless village people into the arms of the Communists. Napalm has long been considered a most effective weapon in the Vietnam war, and the terror-value of the fire bomb cannot, of course, be exaggerated.

But General Moore, and all the commanders concerned, have from the beginning insisted upon extreme care in target selection. This precautionary effort has been redoubled with the entry of jets and USAF squadrons into the "in-country" fighting. Air controllers, handling one of the riskiest jobs of any war, are the bosses on the spot. What can be done is being done.

No war can be quite so cruel as a guerrilla war. Good men have died because of the Communist use of women and children as agents and as bomb planters. And not long ago in a village near here, in the middle of the night, the Viet Cong cut the throat of and disemboweled a young bride who had tipped a government patrol to the location of a cave where a Communist squad was hiding.

When the squeeze is on, and the mortars crump, and the bullets are thick, the troops in the mud here, just as in other wars, are quick to call for "air." The USAF can be proud of what it is doing to answer the call.—END

The author, Mr. Greene, is a military writer for the New York Daily News. He began his aviation reporting in the 1930s and joined the Daily News in 1945 after serving three years in the Marine Corps in World War II. He recently returned from Vietnam where he spent several weeks reporting the escalation of the air war for his newspaper. He wrote an exclusive story for the May AIR FORCE/SPACE DIGEST on Vietnam. This story is a sequel to that report.

Although alterations in defense policy that have been made during the British Labor Party's short time in power—the cancellation of the TSR.2 and other aircraft, the Atlantic Nuclear Force proposal—have drawn a great deal of world notice, especially in the US, the first Labor defense statement seems to add up to very little change from the Conservative defense policy. A thorough analysis of Labor's first major defense statement is offered by an eminent British authority on military policy, and point-by-point answers are given to the question . . .

British Labor Party's Defense Program—New or Old?

By Norman H. Gibbs

The Labor Party will ensure that Britain is adequately defended. . . . [Our] first concern will be to put our defenses on a sound basis and to ensure that the nation gets value for money on its overseas expenditures. . . . Our stress will be on the strengthening of our conventional regular forces so that we can contribute our share to NATO defense . . . and [we] will put forward constructive proposals for integrating all NATO's nuclear weapons under effective political control.

—LABOR PARTY'S ELECTION MANIFESTO, 1964

MR. HAROLD WILSON, Britain's Prime Minister, gave only a minor place to national defense in his election campaign last year. Politically, that was almost certainly wise. Actually, it did not reflect his view of the importance of defense, or of his eagerness to introduce changes in defense policy. What, then, has he achieved since last October, particularly as seen in the annual Statement on Defense published in February 1965?

The most obvious over-all conditioning factor in the new defense program is the need for economy or, in other words, "to relate the resources made available for defense to the economic circumstances of the nation." This is hardly surprising. Quite apart from the persistent problem of Britain's balance of payments—and annual overseas military expenditure now amounts to £300 million (\$840 million), or fourteen percent of the defense budget—there is the natural wish of a left-wing government to save elsewhere in order to spend more on social reform. As the largest single item in the budget, defense expenditure is the obvious place to look for economy.

The immediate aim of economy is to stabilize defense costs in real terms. The Labor Government accuses its Tory predecessors of allowing the rising cost of defense to outstrip both the changing value of money and the annual rate of increase in the nation's wealth. All three, it is planned, will now stay in step. And, at just over £2,100 million (\$5.9 billion) for the year 1965-66, the defense budget will absorb about 7.5 percent of the gross national product. Savings on previous estimates have been affected, partly, at least, by canceling contracts for British-made military aircraft and by buying American instead. In the process, the P.1154, a supersonic low-level strike and reconnaissance VTOL fighter; the HS 681, a STOL tactical transport to which

VTOL capacity might have been added later; and the TSR.2, a low-level bomber and reconnaissance aircraft, have been cut out. The Phantom F-4, the Lockheed C-130, and perhaps the F-111A (TFX) will, respectively, replace them. In addition, one out of the fleet of five planned Polaris submarines has been canceled, with no planned replacement.

In the current financial year from £60 million to £100 million (\$168 million to \$280 million) will be saved in this way and, over the next ten years, £600 million to £700 million (\$1.68 billion to \$1.96 billion). Mr. McNamara and the US Defense Department are said to be "elated" with the news, as well they might be. The Tory opposition in Parliament is, however, passionate in its denunciation of actions which, it claims, will undermine, and in the end probably destroy, Britain's aerospace industry. Britain is similar to America, and presumably every other country, in needing a financial basis for civil technical advance to be provided by military research and development. The TSR.2 was expected to provide, among other things, useful information for the development of the Anglo-French supersonic civil airliner, Concorde.

Several points of interest emerge here. First, that the stabilization point of defense costs seems to have been established at least as much by a comparison between what is going on in the United Kingdom with developments in other countries, as by an estimate of what the proper level of defense expenditure should be—whether 7.5 percent of the GNP or some other figure, less or more. Within the last two or three years the United States has substantially reduced her defense expenditure in GNP terms, even though it is still very much higher in these terms than that of the UK. By the same standard France spends less than Britain does. And this year, for the first time in ten years, West

Germany has reduced her defense spending, and that by as much as five percent. This point was strongly emphasized by the Secretary of State for Defense, Mr. Denis Healey, in a major speech in the House of Commons early in March of this year.

"The fact remains," he said, "that we are still spending a higher proportion of our national wealth on our defense forces than any other country of our size, than any of our major competitors in world trade, and this expenditure bears particularly heavily on our balance of payments and on the type of resources, both in manpower and in manufacturing capacity, which we need most of all to get our economic situation right."

This concept of Britain doing her fair share and no more—fair, that is, in comparison with what is done by other powers of her own size and standing—will be mentioned again later.

Secondly, the job of stabilizing real costs is not an easy one. Sizable reduction is obviously more difficult still. More than half the defense budget goes for personnel and their support costs. And competing for manpower in a society of full employment means that those costs are likely to rise rather than fall so long as military manpower remains at its present level. In these circumstances there is not the least likelihood that the Labor Party, any more than their Conservative opponents, would plan to introduce any measure of selective conscription.

So far as the remainder of the defense budget is concerned, the basic problem of modern defense is that the cost of equipment rises very much faster than the increase in national wealth. Thus, the only long-term hope of stabilization, let alone actual reduction, is, to quote Mr. Healey again, "to reduce the number of men and women in the forces, because then both manpower and equipment expenditure will fall proportionately." But cuts in manpower depend on reduction of national commitments.

Although Mr. Healey has stated that he is engaged in a worldwide review of such commitments, in order to measure costs against value to the nation, it is far from clear where substantial cuts can be made unless the government radically alters some major features of its recently outlined defense policy.

Thirdly, the concept of stabilized real costs is not a new one. It was explicitly accepted as a condition of efficient and economic defense in the famous Sandys Defense Statement of 1957. On that occasion, too, manpower cuts were a vital item in the process: But then it was possible to end conscription. Then, again, economy was sought through greater dependence on weapons than on men, in particular on nuclear weapons.

Despite a smokescreen of phrases, it is difficult to avoid the conclusion that Mr. Wilson's Labor Government is now taking much the same line. It will be seen from the quotation at the head of this article that the Labor Party election manifesto last year laid stress on "the strengthening of our conventional regular forces . . ." and there is no doubt that many people, both within and outside the Labor Party, took that to imply a parallel running down of Britain's nuclear armaments.

Let us be clear about the facts here. There are many nuclear disarmers in the Parliamentary Labor Party and among Labor's supporters in the electorate as a

whole. But the official party doctrine is not and never has been antinuclear. When in opposition, the Labor Party quarreled with Conservative governments because the latter claimed "independence" for Britain in these matters; and their opposition was based not only on what they argued to be a spurious claim to independence, but also on the ground that Britain was quite unnecessarily adding, for purely national reasons, to an existing sufficiency of nuclear weapons within the Western alliance, provided by the United States. It was, therefore, not altogether unreasonable to expect, as many did, that in coming into office Labor would plan to hand over the nuclear defense of the West entirely to the Strategic Air Command.

In fact it has done nothing of the kind. True, the TSR.2 has been canceled and so has one Polaris submarine. But the rest of the V-bomber force will see out its useful life, and the rest of the Polaris submarine program will go on. Some changes of control are proposed in that, while the bombers and submarines are now committed to NATO but within the limits outlined in the Nassau agreement of December 1962, they will be committed to Mr. Wilson's proposed Atlantic Nuclear Force without reservation.

But what if the ANF proposals fail to gain acceptance by the other powers concerned, as now seems almost certain? Will the Labor government then renounce its strategic nuclear weapons program entirely? The longer this decision is delayed, the more difficult it is bound to be. Besides, Britain's nuclear weapons are now justified at least partly on the grounds that they make it possible to provide some reassurance to nonnuclear powers—an argument which, from its context in the Defense Statement, appears to imply reassurance to India and her neighbors against a nuclear-armed China.

Labor's commitment to a nuclear weapons policy, whatever the means of control, goes further than this. Such weapons are justified as producing, by an increased understanding of the consequences of nuclear warfare, a very much reduced likelihood of major war between the Communist and Western alliances. This has important implications for Labor's views about NATO strategy.

The fact that the United States "has developed an overwhelming nuclear strike force which is committed to the direct support of Europe in case of war," is taken to imply that "it is pointless to tie up resources against the risk of a prolonged war in Europe following the nuclear exchange." All that NATO's forces should be designed for is to deal with "miscalculated incursions and to suppress any ambiguous and unpremeditated local conflicts first and foremost by conventional forces." Current NATO strategy of massive tactical nuclear war on land is condemned.

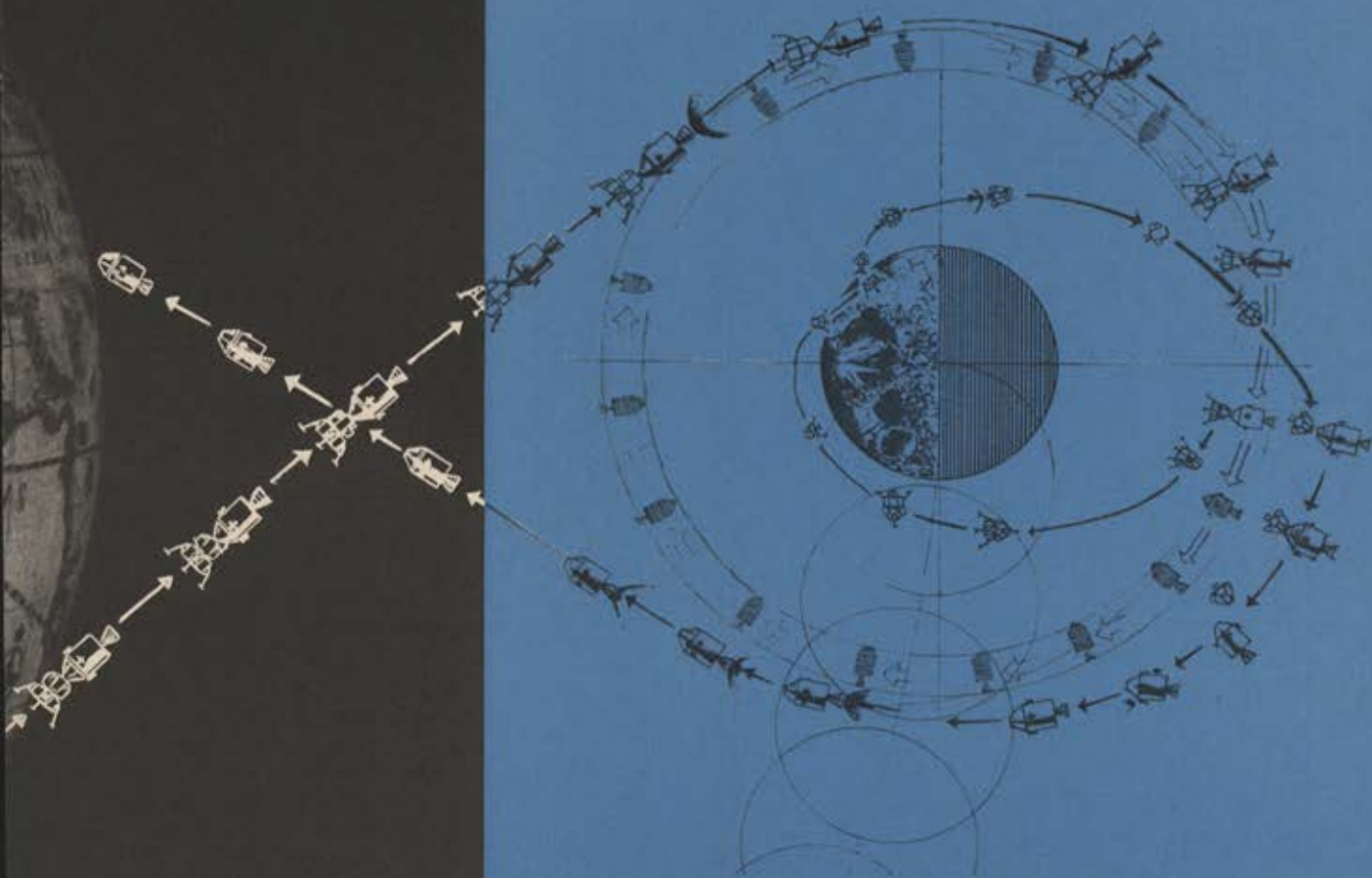
But so also, it appears, is the Kennedy idea of building up larger conventional forces to postpone the appeal to nuclear weapons as long as possible. What is wanted is protection against unpremeditated local incursions at the lower end of the scale and deliberate aggression at the top; small conventional "police" forces and strategic nuclear ones supply all the answers.

Given that all these are matters of unagreed definition, nonetheless this appears to be a Gaullist strategy

(Continued on page 48)



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go down to the moon
in ships...**



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TRW will help them get back. In 1970 two Apollonauts will descend onto the moon in their Lunar Excursion Module (LEM). They will explore the lunar surface, then begin the long journey home. After blastoff they must rendezvous with their return vehicle, holding in orbit 80 miles out from the moon. During this leg of the flight a TRW-built abort guidance system will assure their safety.

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of massive retaliation. It has been condemned as such by some of Labor's own supporters, and supported for the same reason by the Conservatives.

If such a Gaullist approach to strategic theory might be thought likely to propitiate de Gaulle himself, Labor's next proposal has run into difficulties with both France and Germany. The Kennedy MLF proposal was opposed by Labor—then in opposition—partly because it made better relations with Russia impossible by giving Germany a finger on the nuclear trigger. The Labor solution was Mr. Wilson's proposal of an Atlantic Nuclear Force—basically a multinational as distinct from a multilateral arrangement, and one designed to minimize German participation.

From the domestic British point of view the virtue of this proposal—as Mr. Wilson sees it—is that Britain's nuclear weapons would be handed over to a NATO-controlled force, thus getting rid of the illusion of national independence in nuclear matters. Since that illusion is likely to foster a similar error in other countries, the ANF, so it is argued, would be an important antidissemination move. But the American veto implicit in such an arrangement, as outlined so far, is the last thing to appeal to de Gaulle. And Mr. Wilson's talks with the General in Paris in March do not seem to have gotten him any further along this line.

Even more important, the ANF does not meet with German approval. So far as the Germans are concerned there appear to be three conditions which must be satisfied in any force of this kind: It must be genuinely integrated in manning and control; it must be under SACEUR's (Supreme Allied Commander, Europe) command, and thus be committed specifically to European defense; and the weapons involved must be of a strategic variety. Labor's ANF proposals meet only the last of these conditions. Already suspicious of what is thought to be Labor's anti-German bias, the West German government has shown no sign of willingness to compromise on the ANF, whatever its eagerness to get on good terms with the United Kingdom in other matters. And the Labor Party has, unfortunately, far too long discounted the possibility that West Germany may look elsewhere for a solution to her problems if moves of this kind should, in fact, fail.

The last major item in Labor's defense policy concerns what is called "peace-keeping outside Europe," i.e., mainly in areas east of Suez. There are some differences of wording—"international peace-keeping" takes the place of "British interests"—but this is, in essence, a continuation of Conservative policy as is so much else in Labor's first defense program for fifteen years. The defense of the Indian Ocean and Southeast Asia areas is still based on Aden and Singapore. Commitments in these areas are seen as both likely to continue and likely to involve Britain in war or near-war crises. There is no sign of a reduction of forces there—despite the fact that two or three years ago it was Labor's policy to reduce forces east of Suez in order to build them up in Germany—and those forces will normally need to operate on a close interservice basis.

But there is something new in this part of the Defense Statement. The government bluntly states that

what it is doing east of Suez (together with the United States) is as much in the interest of Britain's allies as of Britain herself. "The whole of Western Europe benefits from our contribution to stability in the Middle East," Mr. Healey told the House of Commons. The implications of this are, first, that Labor may seek to reduce yet further its forces in Europe in order to deal with crises in the Middle East and Far East; second, that Britain's European allies should take account of what Britain does elsewhere when discussing how to deal with common burdens in Europe.

In the short term that could imply little more than a more sympathetic consideration of support costs in Germany or a reduction in the strength of British Army of the Rhine. In a longer term it could perhaps lead to a degree of specialization hitherto unknown within the Western alliance. Mr. Wilson may be right in claiming that some other countries look to Britain for a way out of the tangle of their combined political and military problems. If so, then the concept of sharing by function could well prove more fruitful than the ANF or any similar project. The trouble is that there is no reason to expect that an approach of this kind will, in fact, hold any appeal for Britain's European allies.

What does all this amount to? That Labor's defense policy is not, so far, very different from that of preceding Conservative governments. And why should it be? The country's interests remain the same, and a defense establishment of 800,000 soldiers and civilians cannot be radically changed in a short time without producing social and economic dislocation which would make the cure far worse than the disease. The *London Times* called the Defense Statement "scrappy and inconsequential." But any document which attempts to dress up minor modifications as a new policy is bound to give such an impression. Mr. Healey has assured Parliament that he is engaged in a comprehensive review of national defense, and it is possible that a second statement later this year may genuinely break new ground.

But it would be unwise to expect that. A new defense policy, particularly one involving considerable saving of money and other scarce resources, can be achieved by a responsible government only if other policies succeed first, thus making possible a reduction of national commitments. In disarmament, in relations with NATO, in commitments east of Suez, in East-West relations generally, Mr. Wilson has announced his ambition to go further and faster than his predecessors. But in matters of this significance, movement is never fast. Years, not weeks or months, are the likely units of time.—END

Norman H. Gibbs is professor of the History of War at Oxford University and a Fellow of All Souls College, posts he has held since 1953. He is a well known interpreter of British defense policy and his articles have appeared in AIR FORCE/SPACE DIGEST on several occasions since 1956. His most recent piece was "Skybolt, Polaris, and British Public Opinion," in May 1963.

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"The performance of the A-11 (YF-12A) far exceeds that of any other aircraft in the world today," is what President Johnson said of this remarkable Lockheed-built airplane. The President's words were underscored in May when the handiwork of Kelly Johnson's "Skunk Works" showed itself as . . .

Fastest in the Air

—USAF's YF-12A

THE US reclaimed the world absolute speed record for aircraft from the USSR when a US Air Force YF-12A interceptor was clocked at 2,062 mph over Edwards AFB, Calif., on May 1.

The two-man YF-12A, revolutionary Lockheed-built plane formerly designated the A-11, also set five other

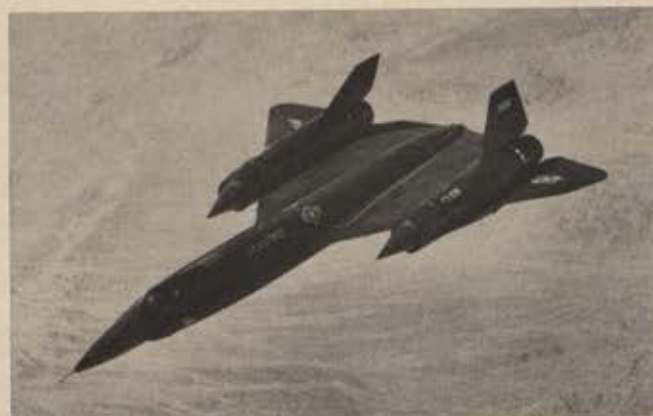
records for speed in various categories and one for achieving horizontal flight at an altitude of 80,000 feet.

Four records were claimed for flying over a 1,000-kilometer closed-circuit course at 1,688 mph. They were for speed over a closed circuit of any distance, for speed over the 1,000-kilometer course without payload, and with 1,000- and 2,000-kilogram payloads. It also logged a record 1,642 mph over a 500-kilometer closed circuit.

Thus it bore out President Johnson's statement in announcing existence of the A-11 on February 29, 1964, that "the performance of the A-11 far exceeds that of any other aircraft in the world today. The development of this aircraft has been made possible by major advances in aircraft technology of great significance to both military and commercial application."



Pilot of the YF-12A on the straight speed run was Col. Robert L. Stephens, front, YF-12A task-force director, with Lt. Col. Daniel André serving as his fire-control officer.



The YF-12A in flight during testing at Edwards AFB, Calif., where it has recently reclaimed four speed records that had officially been held by the Russians under FAI rules.



Although dimensions of the YF-12A have not been released, it is estimated to be 100 feet long with fifty-foot wingspan.

Electronics equipment to operate its fire-control system and guide its AIM-47 missiles is housed in the fuselage.

Pilot of the YF-12A on the straight speed run and altitude mark was Col. Robert L. Stephens, Director of the YF-12A task force, with Lt. Col. Daniel André as fire-control officer. Crew on the 1,000-kilometer closed-circuit runs were Maj. Walter F. Daniel, pilot, and Capt. James P. Cooney, fire-control officer. The 500-kilometer mark was set by Major Daniel with Maj. Noel T. Warner as fire-control officer.

The flights were performed in accordance with the internationally recognized rules of the Fédération Aéronautique Internationale (FAI) with headquarters in Paris. The new records have been submitted to FAI.

Of the seven records set by the YF-12A, four had officially been held by the Soviets—speed in a straight line, 1,665.9 mph; over a closed circuit of any distance, 1,491.9 mph; over a 500-kilometer closed circuit, 1,452 mph; and for altitude in horizontal flight, 74,376 ft.

The three 1,000-kilometer closed-circuit records were officially held by a USAF B-58 piloted by Maj. H. E. Confer at Edwards AFB in January 1961 at 1,284.73 mph. The USSR in mid-April, however, had filed with the FAI new claims for these marks of 1,441.5 mph, reportedly flown in an experimental E-266. These records had not yet been certified by FAI when they were topped by the YF-12A.

Dimensions of the YF-12A have not been released, but it is about 100 feet long, with a fifty-foot wingspan. Electronics equipment to operate its Hughes ASG-18 pulse doppler fire-control system and guide its Hughes AIM-47 long-range missiles is housed in a twenty-foot section of the fuselage.

The plane is powered by two Pratt & Whitney J58 engines, each producing more than 30,000 pounds of thrust with afterburner.

Commenting on reports that Secretary of Defense Robert S. McNamara does not intend to commit the YF-12A to production, Gen. J. P. McConnell, USAF

Chief of Staff, told a National Press Club audience in Washington early in May that he and Mr. McNamara are in agreement on its development program as a long-range interceptor. He pointed out that the Fiscal Year 1966 budget contains \$28 million for continuing work on its electronics and fire-control systems.

"Secretary McNamara hasn't rejected it," he said. "I think we're going to need it, and therefore I think we'll get it."

For designing the A-11, Clarence L. (Kelly) Johnson, Lockheed's Vice President for Advanced Development Projects, was awarded the Collier Trophy for 1963 by President Johnson at the White House last September. He had previously received AFA's Theodore von Kármán Science Trophy at Honors Night on September 11, climaxing the 1964 AFA Convention in Washington, D. C.

—ALLAN R. SCHOLIN



The YF-12A stands on the flight line beside the massive XB-70 experimental bomber giving an idea of its size, which is extremely large compared to present interceptors.

Over-all US international political and strategic positions, despite recent events, remain a combination of détente plus a form of minimum deterrence. This new stability is based upon rationales that are open to question: That, with the 1962 Cuban missile crisis, we convinced the USSR she must "coexist" with us or risk nuclear war, and that a technological solution to the arms race does not exist. The fact is that our continued technological effort over the last ten years is what has given us the strategic nuclear position of strength upon which we are resting. The example of Khrushchev's surprising ouster is enough to make the dependability of the Russian thaw questionable. Thus the détente, built on unsupported prophecies and dependence on the unpredictable, is tenuous at best. We must beware of allowing our technology to fall behind while being soothed by what can only be termed . . .

The Myth of Détente: "We Can Win Without Trying"

By Herman S. Wolk

THE United States' international political and strategic positions, in a state of subtle flux during the past several years, have recently emerged in more definite form. The combination for the future appears now as one of détente plus a form of minimum deterrence.

Recognizing the capriciousness of history and the inevitability of change, let us examine the validity of this combination and its effect upon the future of the United States. Can we expect international politics to stand still or technology to freeze? Can lead time lost while we stabilize be regained?

Although military policy forms an intrinsic part of national security affairs, it is subordinate to the political "grand design." Today, then, a significant measure of US national security is predicated upon a burgeoning rapprochement between the United States and the Soviet Union.

What precisely does détente mean? Narrowly defined, it denotes an easing of strained relations. It does not denote specific settlement of outstanding political issues. Indeed, as Grayson Kirk, President of Columbia University, has pointed out, we have no reason for expecting any dramatic solutions to festering problems such as the German question or our Southeast Asian difficulties.

The real significance of the latest American-Soviet détente lies in the changed psychological environment between the two nations. The acceptance of this psychological shift toward what the Russians call "co-existence" is the result of the lessening of tensions which—from the American view—grew out of the 1962 Cuban missile crisis, the limited nuclear test ban treaty, and the Sino-Soviet schism. Underlying the

rapprochement is the prevailing US view that both countries share an overwhelming common interest, i.e., the prevention of nuclear war.

Another vital ingredient is the growing mood of turning inward, of redirecting our attention and energies toward pressing domestic matters and away from efforts to unlock long-neglected international problems. There is abroad in our land a new feeling of peaceful coexistence.¹ Ironically, this feeling has arisen from the success of US strategic nuclear deterrence, which in large measure has preserved the peace for almost two decades. Increasingly, the aura of détente has taken on the attributes of a new orthodoxy.

While the reality, depth, and permanence of the thaw are open to question, its by-products are clearly visible. Foremost is the drive toward what has been called nuclear stalemate. This has been made possible by the concomitants of détente, which include a lessening of cold-war ideology and a downgrading of military and strategic considerations.

It is important to recognize that this nuclear stalemate lacks the legitimacy of a formal agreement. As far as the US is concerned, it has been implemented primarily by unilateral initiative with perhaps a tacit understanding that the Soviets also have accepted a strategic slow-down as in their best interest.

¹One indicator of the popular acceptance of détente has been the almost unanimous support and acceptance of Senator Fulbright's *New Realities and Old Myths*, which, in effect, formed a theory and rationale for accommodation. There have been exceptions to this consensus. See my "Is History Obsolete?", *AIR FORCE/SPACE DIGEST*, August '64, and Morton Kaplan's searing indictment of the Fulbright thesis, "Old Realities and New Myths," *World Politics*, January 1965.

With the disintegration of the bipolar world on which the cold war was based, Americans . . . have begun to shift their attention . . . to problems of their own domestic society. . . . At last they begin to feel themselves able to dismiss from first place in their minds the external world that, for a generation past, has intruded itself so alarmingly on their consciousness.

—LOUIS J. HALLE

All sensible people in all our countries agree that the threat which brought our Alliance into being—the direct military threat to Western Europe from Soviet Russia—has receded. But all sensible people know that it has not disappeared; and nobody can feel sure that it will not loom again should the West weaken its defensive posture. If we were in danger of forgetting this, the fall of Khrushchev and the explosion of a first nuclear device in China have been a salutary reminder.

Both sides in the arms race are . . . confronted by the dilemma of steadily increasing military power and steadily decreasing national security. It is our considered professional judgment that this dilemma has no technical solution.

—JEROME WIESNER AND HERBERT YORK

. . . the Chinese nuclear explosion . . . was perhaps the most immediately dramatic of all the warnings we have had. Militarily and in the short term, it is of very little importance. Politically and psychologically, and in the long term, it is very important indeed. . . . The only safe working hypothesis for us to adopt is that if the Soviet Union resigns itself to the prospect of China's becoming a nuclear power—and it can hardly do otherwise—it will have somehow or other to come to terms with China; and that if it succeeds in doing so, the implications are not likely to be to the advantage of the West.

—MANLIO BROSI

SECRETARY GENERAL OF NATO

Thus we find the United States leveling off development of offensive strategic nuclear weapon systems. Proponents of what we may call "strategic stability" have won out over the adherents of "strategic superiority." Strategic military stability can be seen as a means of arms control. It forms a midpoint between those who clamor for disarmament and those who seek clear strategic superiority.

But, as an outgrowth of détente, stability rests upon a dual rationale. Along with the arms-control syndrome, there has evolved a growing conviction in US political and scientific circles that a technological solution to the arms race does not exist. There is an assumption that further technological development or breakthroughs are not possible. Jerome Wiesner, scientific adviser to President Kennedy, and Herbert York, Director of Defense Research and Engineering under President Eisenhower, have recently espoused this viewpoint and declared that since World War II our national security has been decreasing while at the same time our military power has been increasing.

The philosophies of détente and technological rigor mortis lead logically to a strategy of minimum deterrence, which is seen as perfectly compatible with a period of accommodation.

Minimum or finite deterrence signals an end to any doctrine that relies *primarily* on counterforce strategy. Much of the confusion in the debate over counterforce and city-busting minimum deterrence can be traced to the tricky business of force structure and the particular period in time that one is talking about. For example, the US today possesses a good measure of both counterforce capability and city-busting punch. The B-52 fleet ensures a significant measure of dis-

criminating counterforce ability. The growing hardened and dispersed Minuteman force, together with the Polaris submarine fleet, augments counterforce with a powerful missile force.

But if one wishes to look into the 1970s, it becomes equally obvious that—given the present policy direction—the United States will rely primarily on the Minuteman-Polaris combination as far as a strategic nuclear deterrent is concerned. The signs are unmistakable. This trend toward minimum deterrence and away from preponderant counterforce has sometimes been described as "controlled" or "limited" counterforce.

The strong pull of détente, with its emphasis on mutual deterrence and strategic stability rather than superiority, fosters both the strategy and force structure which will govern the future US posture. Thus, while it is admitted that the B-47 is obsolete and is, in fact, being phased out; that the B-52 will be entering a period of obsolescence (it has been announced that early model B-52s will be phased out in the near future); and that Atlas and Titan I ICBM units are phased out, the basic rationale for the strategic moratorium rests upon a tacit international détente between the United States and the Soviet Union.

Yet nuclear strategy is only as credible as the means available to carry it out. A Minuteman-Polaris force is primarily a minimum deterrent. The future design of the strategic deterrent force is consistent with the halt in the arms race, the establishment of a rapprochement, and the assumption that no significant technological breakthroughs are over the horizon. The strategic situation toward which we are headed is

(Continued on page 55)

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in perfect concert with politics of continuing détente.

The present climate did not develop overnight. For several years, despite setbacks, an accommodation has been building. It has been nurtured by the idea that money siphoned from weapons can be used in a thousand peaceful pursuits without having to pay any price and without degradation to our national security. An influential segment of the US population has never accepted the fact that nuclear deterrence has anything to do with the pursuit of peace and freedom. A tinge of nuclear pacifism has always been present. Too, in the absence of direct crises between America and Russia, some have become tired of the cold war. Others will argue that the cold war, with its ideological overtones and large military expenditures, is a thing of the past.

In addition, the so-called end of bipolarity has accelerated the pull of accommodation. Since it is felt the United States and the Soviet Union are now only two of many power centers, it is said that nationalism and regionalism have tempered the cold war.

If all of this sounds like an overly neat package, it is nevertheless precisely in tune with the times. However, in the interests of distasteful realism, several questions must be raised. The first has to do with what the diplomatic historian of World War II, Herbert Feis, has called "the prankishness of history."² Khrushchev's ouster serves as an excellent example of historical surprise—strategic intelligence was conspicuous by its absence. What further unpredictable events lie around the corner? Who is audacious and foolish enough to claim foresight?

There is danger in attempting to settle for a technological stalemate in an age of political revolution. International communism being no longer monolithic, we shall have to deal with a fluid international situation. In view of Mao Tse-tung's age, we may be entering a period when the top leadership of both Soviet Russia and Red China will be in a state of flux. Today's détente may be tomorrow's conflict.

As to prophecy, we must relearn the old lesson that we cannot unilaterally foreclose technological development. It would, of course, be comforting if we could make positive predictions about the course—or the end—of technology and then sit back and relax, ending the drain on our pocketbooks. Yet, the hard facts of technology and the contemporary world do not allow us this luxury.

Technology, advanced weapons development, strategy, and politics are not separate entities but meshing segments impacting on the nation's over-all standing in the international community. Great powers are those that are technologically advanced. Technological timidity has become a direct road to second-rate power status.

The United States has all the tools to set the technological pace in the second half of the century. As the American gross national product continues to grow, as our research centers advance the boundaries

of knowledge, and as US industry continues to gain in efficiency and productivity, it becomes mandatory to channel the results into the nation's lifeblood, including the defense establishment in general and the tools of strategic nuclear deterrence in particular.

Our national power has been progressively built over the years. Its solid foundation was constructed as an answer to aggression in the post-World War II period—to the enslavement of Eastern Europe, the Berlin blockade, the Korean War, and the Soviet thrust into the space age on October 4, 1957. The design, evolution, and production of strategic weapons take years. Dynamism today—or lack of it—will shape our national posture in the years ahead. Lead time remains a reality to be grappled with; there are no magic detours.

History has demonstrated the lesson of technological preparedness. It was the USSR's Sputnik that thrust space into the cold war. Have we forgotten that following the moon shot of Lunik II on September 14, 1959, Khrushchev arrived in the US the very next day and presented President Eisenhower with a replica of the hammer and sickle Russia had sent to the moon?

Too often ignored in the lessons of the Cuban missile crisis is the role and importance of strategic military superiority. Many have pointed to the Cuban crisis as a kind of watershed which turned nuclear confrontation into rapprochement. Yet it also proved the flexibility and utility of strategic power both as a deterrent and as an umbrella for conventional forces. The Cuban crisis demonstrated the correlation between usable strategic power and political leverage.

We still have a long way to go in mastering the psychological use of military strength. Escalation, for example, is a two-way street; it is a danger to be guarded against and a threat that can be magnificently exploited under proper conditions. There is no substitute for strategic superiority.

This point has not been lost on the Soviets. Robert D. Crane of the Center for Strategic Studies, Georgetown University, Washington, D. C., in discussing the aftermath of the missile showdown and the connection between a new Russian power buildup and détente, has put it this way:

The future success of the strategy developed by Khrushchev during the late 1950s and early 1960s would require another period of détente similar to the one he initiated soon after coming to power. The new period of détente, however, would have to be basically different in purpose. It would not be designed merely as a temporary measure to gain time for building up the defenses of the Soviet Union against outside pressures. Rather it would have to make possible a long-range program of basic military research and development. . . . This military R&D program in turn would rely on political and diplomatic support in the form of a "strategic dialogue" on arms constraints.³

² Herbert Feis, "The Prankishness of History," *Virginia Quarterly Review*, Winter 1965.

³ Robert D. Crane, "The Sino-Soviet Dispute on War and the Cuban Crisis," *Orbis*, Fall 1964, p. 548.

(Continued on following page)

Thus, the Wiesner and York thesis that our national security has declined with the increase in US military power is misleading at best and patently false at worst. If our power had not dramatically increased in the years after World War II, we might not have any national security to worry about today. Further, they seem to infer that the decrease in security has come about as a consequence of the increase in military power. This is a strange and perverse logic.

No sane person argues with the often-stated fact that the US and the USSR share a common interest in avoiding nuclear war. Yet, surely this is not our *only* interest, nor does it take precedence over all others, including the preservation of a free, democratic society. Is Soviet occupation of Western Europe preferable to a policy which possesses a minimum risk of nuclear war? Those who stress the common-interest theme seem willing to turn their backs on a host of problems including a rapidly deteriorating Western alliance. Paradoxically, the American penchant for détente has reinforced the French position for going full speed on building a *Force de Frappe*.

Today's liberals who preach the new isolationism because of their obsession with nuclear weapons and escalation are practicing escapism and parochialism under the guise of restraint and moderation.

The dilemma remains: What is the role of strategic nuclear deterrence in the age of détente? Most importantly perhaps, despite the existence of an accommodation, one must certainly underscore the requirement for specifically defined long-range objectives in our national-security policy; objectives that will withstand unsuspected future shocks. Logically, this calls for continuing the policy of nuclear deterrence that has been the cornerstone of American national-security policy for two decades—years that have seen almost unbelievable transformations in world politics and the very fabric of our lives.

The fact is that our strategic retaliatory force is basic to our security. It demands top priority because any weakness here could be fatal. This does not mean neglect of conventional and unconventional forces. Bernard Brodie has described the interrelationship of general and limited-war forces this way:

... the more effectively we do our job in the area of total war capabilities, the greater the range of possible cases for the application of limited force. In other words, we probably have to spend more on total war in order to have sound reasons for spending more on limited war.⁴

Deterrence cannot be bought cheaply nor can it be taken for granted. If deterrence is to be maintained, it must be dynamic—based on technological advance, not technological stalemate. To gamble with technology is tantamount to playing Russian roulette with survival.

Of equal importance to technology is the use of

the nuclear deterrent on the international political stage. The supreme irony is that, in certain situations, nonuse of deterrence in international politics can be as dangerous as overplaying one's nuclear capability. Neither of these extremes can substitute for timing and dexterity.

Recognition that change and uncertainty are the stuff of history demands flexibility and an open mind. The idea that the existence of nuclear weapons plus accommodation equals the absence of war and that we can therefore settle for a policy of inaction is spurious and self-defeating.

The United States must not turn its back on the future. Should we think that today—or tomorrow—might be a convenient place to stop, even for a breather, other nations will pick up the challenge. And with what philosophies and purposes to guide them? We dare not risk it.

The present world situation and our commitment to freedom demand that no artificial obstacles be placed in the way of scientific progress and the technological revolution. Technological stability cannot be decreed.

The slowdown in the pursuit of technological progress can result only in wasting away our hard-earned stockpile of scientific knowledge. Lead time being what it is, this would create a built-in hiatus between the time unanticipated events shock the nation into moving forward in weaponry and the time when the needed new systems can become operational.

Western democracy's best safeguard is strategic military superiority. Without it our free institutions could be wiped out in hours. Neither the Soviet leaders nor the militant Red Chinese hierarchy have forsworn their ultimate objectives.

In an age which pays homage to images, euphemism, and cutely turned phrases, we must guard vigilantly against any unilateral act of technological stalemate or cutback. There is evolving a cult which seeks to cloak constraint and cutback under the cover of rapprochement and reasonableness. Such distortion attempts to circumvent realities by incessantly telling us we can win without really trying.

When survival depends upon knowledge and its constant application, wisdom becomes the ability to recognize and accept the realities of the nuclear age.

Until world powers have reached agreement on outstanding political questions backed by guaranteed arms inspection and a supranational organization with the power and means of enforcement, Oskar Morgenstern's admonition will remain sound: The defense we need is the defense we can afford.—END

Mr. Wolk is a historian at SAC Headquarters, Offutt AFB, Neb., and specializes in the military-political aspects of the cold war. He has written on facets of this subject for AIR FORCE/SPACE DIGEST several times over the past few years. His most recent offering was an article in the August '64 issue, "Is History Obsolete?" Others by Mr. Wolk have appeared in October '64, March '62, and December '61. The opinions and conclusions expressed here are Mr. Wolk's own and do not necessarily represent official positions of the US Air Force or the Strategic Air Command.

⁴ Bernard Brodie, "Defense Policy and the Possibility of Total War," *Daedalus*, October 1962, reprinted in *Survival*, The Institute of Strategic Studies, London, November-December 1962.

THE SPACE AGE IN PERSPECTIVE



SPACE

DIGEST

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Toward a European Space Program—Three Views from Eurospace

European Space Policy

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The head of Eurospace, the industry group promoting a European space program that would transcend national frontiers, believes the continent needs a policy-making "NASA" and projects to capture the popular imagination. The money to fund a vigorous space effort is available, he says.

Proposals for European Space Projects

By Erhard Löwe62

A leading West German industrialist calls for a European "space-plane" project, to meet European launch site limitations and to ensure development of European space skills worthy of comparison with those of the US and Russia. Without space skills, Europe's survival may be in doubt.

Problems of American-European Space Cooperation

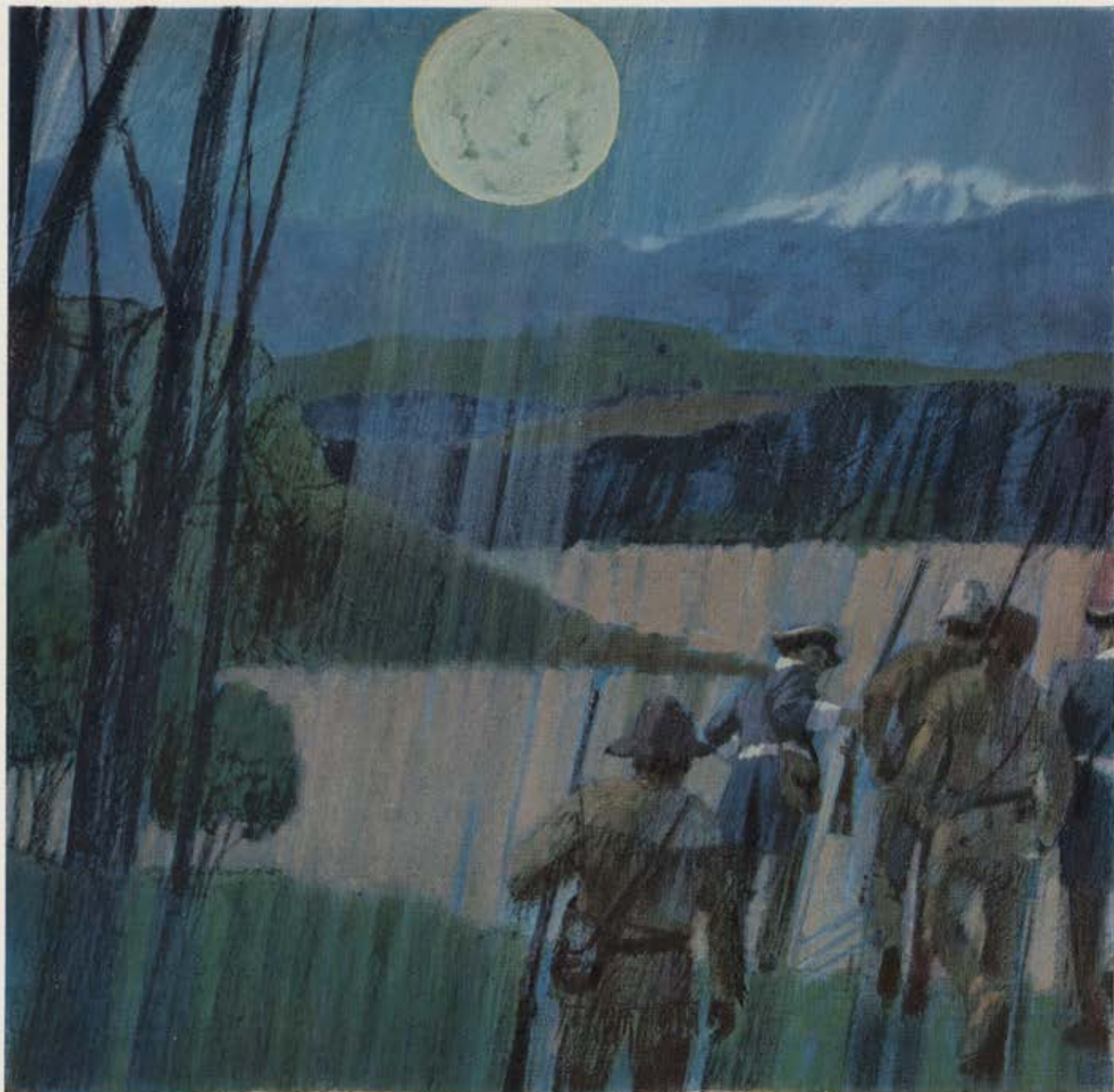
By Lord Caldecote66

The Director of the British Aircraft Corporation suggests that although the US has been generous in its aid to European space efforts, various stumbling-blocks to cooperation still exist. Among them: security problems, US fear of potential European competition, and European fear of US domination.

Speaking of Space

By William Leavitt72

Dr. Edward Teller points out to the House Committee on Science and Astronautics that applied science, key to technological advance of our whole society, is not receiving the emphasis it requires.



from land exploration to lunar navigation

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Leaders of Eurospace—the association of European aerospace, technical, and financial firms dedicated to the promotion of a large-scale European space program—met in Philadelphia recently with American aerospace-industry colleagues. Here is some of what was said at this significant meeting . . .

Toward a European Space Program —Three Views From Eurospace

Late in April more than 100 top-level representatives of European aerospace and technical firms and a number of important European banks—all members of Eurospace, the nonprofit industrial association formed in 1961 to promote formulation of a European space program that would transcend national frontiers—met in Philadelphia to analyze problems and prospects of US-European industrial space cooperation.

They were joined at the meeting by a number of representatives of US aerospace firms that are corresponding members of Eurospace.

The announced theme of the meeting was US-European industrial cooperation in space efforts. And there was plenty of lively discussion, public and private of that subject, among the Europeans, and between the Europeans and their American industrial colleagues.

The prime question that hung over the conference throughout its proceedings was: Can Europe,

with its multinational structure, realistically hope to develop a truly European space effort that would earn it status as a third "space power" of equal standing with the US and Russia, especially in a fast-moving technological field in which both the Americans and Russians have a long lead?

From the three articles that follow, adapted from the major presentations by Europeans at the Philadelphia meeting, it is clear that the leaders of Eurospace are convinced that, despite sizable obstacles, a European space program, geared to European needs and to the vitalization of European space skills as an aspect of European overall technological advance, is not only possible but vitally needed.

Approaching it from different angles, Monsieur Delorme, Dr. Löwe, and Lord Caldecote all assert their conviction that Europe must build a European space program. In July, we will present US responses to European views.—THE EDITORS

*Jean Delorme, L'Air
Liquide company,
France; President
of Eurospace.*



European Space Policy

BY JEAN DELORME

that their relation with each other does not form an over-all policy.

The consequences are easy to foresee. When financiers and government officials are asked to

IN A RAPID survey of the [space] situation in Europe, it must be stated that a number of separate activities, without any direct link between them, exist, and

grant funding for a new form of activity which might involve others, it is their duty to ask themselves whether or not this action falls within their sphere of responsibility. If it is logically linked to a serious motive, a coherent plan is more likely to receive sympathetic attention. On the other hand, repeated requests concerning closely related subjects bearing no signs of coordination risk refusal. There is a possibility that our countries may unite in this matter. Space activity must be promoted in Europe repeatedly as long as the countries and organizations exist.

Let us view this situation on a budgetary level.

The basic factor in any forecast is an appreciation of the financial and budget prospects. On examining [European spending on space] we can see that the rate of increase is slackening. Certain governments of the major European countries are going through a period of strict economy. The NASA budget is tending to level out at around \$5.5 billion while that of Europe is in the region of \$160 to \$200 million, about thirty times less. It could be concluded that the European space budget will never reach 1,000 million francs.

Such thinking is basically faulty. First of all, the US space budget increased rapidly after the atomic budget had reached its maximum value. Although the aims of each are relatively independent, the effect on each other is very understandable. Probably this experience will be repeated in Europe. Space expenditure will grow rapidly when the nuclear prospects are more clearly seen.

In the second place, it is quite normal that the NASA budget should show a certain leveling out. After a period of technical exploration during which a very wide range of possibilities were studied, representing a great creative period which has rarely been equaled but which was, of course, extremely expensive, the time has come to take stock and make a choice. This is a logical process.

If Europe were to stabilize its space budget now, it would be difficult to pretend that it had made a reasoned choice after making a profound study of all space questions. Europe is going through a period of exploration and development which requires an expanding budget; no restriction due to circumstances can alter this fundamental fact.

As to the limitation which might be imposed on the space budget by a curtailment of national expenditures, it is wise to approach this question with a few figures in hand.

Annual expenditure is approaching 800 million

francs for the whole of Europe. Let us formulate a generous hypothesis, so generous that it has little chance of being realized. Let us suppose that it is decided to double this budget next year thus coming nearer to the Eurospace proposals. Europe would have to find 800 million francs more, or about 200 million each for Germany, France, and Britain. This figure represents about 0.05 percent of the gross national product or 1.5 percent of the military budgets—percentages which are very low. But, in my view, there is another point.

The sum of 200 million francs is less than or equal to a great many budget items, some of which correspond to activities which are practically unknown and never discussed. It is equivalent to the degree of error which can be noted at the end of the financial year between the estimates and actual figures of large budget items. Also this is a very conservative estimate too for certain items. It is, finally, an order of magnitude of the adjustments which have to be made between various items during the course of the year. I believe that a government which took such a decision would not endanger its financial position.

To take another example: A few months ago, the British government, faced with a situation of undeniable gravity, envisaged taking the strictest economy measures. One of the possible victims of these measures involved the Franco-British Concorde project. The nature of this project was such that the decision stirred up a lot of trouble and finally it was decided to continue the development of the Concorde project. I have not heard that the reestablishment of these budgets modified the opinion in financial circles regarding British Treasury prospects. Yet the sums devoted to the Concorde project by the French and British governments are much greater than those which would be required from the same governments for the doubling of the European space budget.

Although our governments are capable of rapidly producing 200 million francs—and more—for a project which attracts public interest, they will refuse the same amount to a fishing club. So, our real problem is to encourage interest, showing the position that space should occupy in the aims of our countries. We are thus brought back to the fundamental task of Eurospace, which is one of promotion.

It is appreciated that this is a very difficult task. In the US the general prosperity allows the average citizen to tolerate his country's expenditure for objectives which show no quick return and

they may even give him a certain satisfaction. In Russia the people submit to the government's decision. Europe is between two stools. Even though certain legitimate needs are badly served, people must be convinced that this expenditure is necessary. Such a task requires convincing persuasion and a great stubbornness.

A second edition of Eurospace proposals is due at the end of 1965. We shall not wait until then to present those subjects worthy of interest or which require immediate examination.

The first edition of the Eurospace proposals presented a survey of various possibilities some of which were only outlined and, in these circumstances, we did not pretend to be able to arrive at any choice. In the second edition, too, we shall not attempt to determine the program that Europe should follow, or suggest anything as an only possible choice. We realize that the choice rests with those who are in charge of the funding.

The Need for a Focus

But we do believe that these proposals should give particular emphasis to one or two major projects which might become the central themes around which may be arranged the principal elements of a coherent program. These projects should be sufficiently clear and attractive for enlightened opinion, even the general public, to understand and support. The governments will then realize that it is impossible to evade an issue which popular consent has turned into a matter of public interest.

To take an example: The Apollo project, which absorbs a major part of NASA resources and which governs its activities while covering an extremely wide range of different techniques. Now, I am not questioning the value of being on the moon on a particular date, but I can see that it has become an objective which involves the whole American nation and not only a few specialists. That is why I am convinced it will succeed. I would like to see Europe, on its own scale, find an equivalent to the Apollo project. I shall not attempt here to say what this project should be.

It is not good enough only to conceive a major program. It must be implemented too. The existence of European, intergovernmental, or national space authorities that are only partly acquainted with each other, or not at all, is a major obstacle to the adoption and carrying out of this major program.

I believe that there can be no large-scale European space program if there is not a European "NASA." Some of my colleagues on the Eurospace Board of Administration share this conviction and go so far as to recommend an immediate merger of the executive committees of the various European space organizations. I am afraid, in this case, that the very real problems which would arise would slow down the measures which we want to speed up. It seems to me that an efficient coordinating body with the power to take financial decisions, among other things, could be set up first without affecting the legal structure of the existing organizations, while leaving the negotiation of actual merger until such time as the problems to be solved are better known.

One would also have to orient this future European program in relation to the American program. There is no question of placing it in an opposing camp. Eurospace has well-known corresponding American members, and this is because, since the very beginnings of Eurospace, we have been convinced that any major achievements must arise by way of the cooperation of US and European industries.

I can only hope that the solutions will be inspired by a spirit of partnership, and I am sure that this idea will become more evident as the days go by. However, I should like to reply in advance to those who might say or think: "Let Europe first of all make the effort and organize itself along the lines you have suggested and then, if it looks serious, we shall see whether we can treat it as a partner." I might say that, in certain cases, principles lead to achievements; in other cases, achievements lead to principles. If we were to find a worthy object for collaboration which could be made known in Europe and be of interest to it, this would lead to the achievement of a European space program.

Again, some might say: "Will we be assisting the development of a competitor?" Their fears may be set at rest. In an expanded market, everyone will gain. As for bilateral collaboration between individual companies—we know and appreciate the value of this already—it will be even more fruitful if exchanges work in both directions.

I should like to add that a joint undertaking between Europe and the United States, capable of generating a certain enthusiasm, could, on a wider level, bring a better understanding between peoples. In my opinion, such a contribution, however modest, is so essential that anything which goes any distance toward it is of priceless value.

Erhard Löwe, Vice President, Telefunken company, Germany.



Proposals for European Space Projects

BY ERHARD LÖWE

WE JUDGE the significance and suitability of Eurospace proposals by the following criteria: What role must Europe play in the space field if it is to maintain a standard of technology indispensable to our continent? What are the things we ought not to do, because they are beyond our capacity or have already been done or are being done in the US? What are the things we ought to do, although the US has already dealt with or is dealing with them only to a limited extent?

Launchers

Space activity begins with the development and construction of launchers. Europe has met this requirement by working in the European Launcher Development Organization to develop and build a European launch rocket. European industry fully supports this. The ELDO-A launch vehicle represents ELDO's first objective. For this a launching system was deliberately chosen largely based on generally known principles. Simultaneously, however, initial studies for a future program were carried on.

After the completion of this work we will possess in Europe a "workhorse" and—since we will have developed the rocket ourselves—a good deal of experience and knowledge of our own.

Work on launch rockets is also being done in France and the United Kingdom within their national programs. These are the programs for the Diamant series and for Black Knight, as well as numerous probe rockets. Germany so far has no satellite launcher in its national program. This is due in part to the late start in space activity, which on the industrial plane only began late in 1962. Neither is there an operational German probe rocket. Larger ballistic launch vehicles will presumably no longer figure in national programs,

since ELDO is working on a European vehicle which should satisfy most requirements.

On the basis of the original work done by ELDO and the knowledge and experience which were gained thereby it seems logical to us to proceed from the experimental to the operational stage. The ELDO program for the future accordingly plans in its first phase a progression in launch technology in the following direction—the development of the ELDO-B launch rocket capable of carrying larger payloads. ELDO-B will also be suitable for equatorial synchronous orbit at an altitude of 22,300 miles. One thinks particularly of its application for communications satellites. In this connection the use of high-energy propellants, such as the combination of liquid hydrogen and oxygen, is envisaged.

Consideration is also being given to recovery of the launch system or of some of its parts.

Aerospace Transporter

Recovery of launch vehicles involves ideas which have occupied the European space industry for some time and which, to a greater or lesser extent, have been taken up within the framework of national programs.

These include a spacecraft which can take off and land in the manner of an aircraft, recoverable and reusable. Eurospace has concerned itself with this idea—provisionally called "Aerospace Transporter"—and, in its report of September 1964, set forth for the first time the reactions of European industry to the idea. We are to some extent aware how industry in the US looks upon such projects. We also know of the trouble which American industry has had, and still has, with "spaceplane" efforts.

The Aerospace Transporter signifies about as much to Europe as the trip to the moon does to

the US and the USSR, namely manned spaceflight.

We consider it more appropriate to our situation to take more modest steps toward the mastery of space and have adopted for the time being, as our most ambitious aim, the mastery by man of nearby space, *i.e.*, up to about 300 miles.

We are also influenced by the conviction that, if we are unable to realize of our objective, we will fall far behind in the technical field. This does not mean that we are ruled only by considerations of prestige. We are, on the contrary, much more inclined to think that what confronts us is a necessity with which we have to come to terms whether we like it or not and which will no doubt demand considerable sacrifices from us. While, in the American program, the Aerospace Transporter may represent only a variant, one more or less important item, for us it is crucial, since on its realization depends the decision whether Europe is to count among the space nations or not. That is in many respects a decision on our destiny.

In addition to this basic point of view, there are several important factors in favor of such a project.

The point about the recovery of the vehicle has already been made. That this is the logical link to launcher development, its division into ballistics and aerodynamics, is made clear by the deliberations of ELDO in connection with its future program.

From this, the next logical move is toward the reusability of spacecraft, which represents an important economic aspect that has to be taken into consideration in the further development of launchers.

Of special importance in the European approach is the question of launching sites. We know that on our densely populated continent it is quite impossible to operate rocket-launching bases to any extent. This is why we are forced at the moment to ship any larger rocket across half the globe for launching. It is obvious that a vehicle able to take off and land like an aircraft can be used from a base in Europe.

We in Europe are still a very long way from the realization of such a project. All we have at present is a proposal by European industry of a concept. Perhaps I should call it a "declaration of intent."

Nevertheless, a beginning has been made. As I have already mentioned, work in this direction has been done within the framework of national programs, and will be continued. Certain work undertaken by ELDO can also contribute. We

have provided for the coordination of the efforts in national space programs in order to accomplish this concept. We hope a start can be made on the investigation of the feasibility of such a concept.

These investigations should, in about two years' time, enable the governments and industries involved to judge whether a project of this kind can be realized and on what scale.

Aerospace Transporter is envisaged as:

- A system consisting of two piloted stages, with maximum acceleration limited to about 2.5 Gs,
- Takeoff from a base located in Europe, with a maximum total launch weight of about 200 tons;
- Return of each stage in the shortest possible time to a predetermined base, and reusability of each stage for at least fifty operations in two years; the orbital stage carrying a crew of two and designed to place into orbit, at an altitude of 186 miles, a payload area of 105.94 cubic feet and about 2.5 metric tons mass, equivalent to the amount of propellant required for a rendezvous operation with another spacecraft in orbit plus the load to be transferred to the other spaceship.
- This second stage is to be powered by rocket engines using liquid oxygen and hydrogen.
- First-stage propulsion could be air-breathing engines—in which case its range would be restricted to the atmosphere—or by rocket engines, or by a combination of both.

The two most fundamental decisions to be made concern the choice of propulsion for the first stage and the method of launching—vertical or horizontal.

For certain designs, such as a ramjet engine with supersonic combustion, further research may be necessary.

We believe the development of a European launch rocket is indispensable. A first version will provide the know-how and the knowledge on a broad front, while the next version will be produced for a specific purpose. In addition, we see a necessity for the development and construction of systems for manned spaceflight to meet European conditions.

Communications Satellites

As early as 1961 interested parties in Europe were acquainted with the idea of the establishment of a communications satellite system. Even earlier the problem had been discussed on a national level, but it was soon concluded that such systems were beyond the reach of national efforts. The results of these discussions in several countries

were pooled in Eurospace and, on the basis of an even wider partnership, the data were evaluated as a joint effort.

The suggestion was for a European communications satellite system to be synchronized with an American system and, together with the latter, be integrated into a worldwide communications satellite system.

It would have been utopian to think a European system could be completed at the same time as an American system, or anywhere near it. Consequently, it was decided to build up a worldwide communications satellite network based on an American system.

To be quite honest, European industry has regretted this development. At the same time, we do not begrudge you your well-earned success, nor harbor the illusion that we could have produced a system like yours in the same time.

Perhaps I may here allude to the not insignificant contribution which the European countries have made to the first phase of the worldwide communications satellite system. The American Communications Satellite Corporation, known as Comsat, needs for the realization of its program, the so-called First Phase, funds amounting to \$200 million, of which 30.5 percent has been contributed by the European countries. Even if the US, with about sixty percent, carries the greatest burden, the European share of thirty percent is quite a considerable contribution to this project. It surely entitles the European countries to participation in, and the use of, the communications satellites developed and built by Comsat.

The European governments are represented in Comsat by the so-called Interim Committee and thus there is close cooperation between the US and Europe.

On the European side, we are also interested in the research problems of Comsat, and it is our aim by technical development concentrated on specific fields, *e.g.*, electronics, to make contributions of our own to the global communications satellite system. We hope that certain advanced techniques will enable us to do so in the foreseeable future.

The desire to expand and perfect the global communications satellite system by our own efforts, is—I think—shared by all the European members. We are motivated not merely by considerations of prestige or the wish to emulate the US, but also by the conviction that it is our duty to ensure that we in Europe uphold a high technical standard and become fully conversant with

this new medium of communication. In addition, there is the fact that the communications satellite is the first instance of the commercial application of space activity and that economic considerations play a decisive role.

It is evidently for this reason that Comsat was formed in the US, to operate an American system of communications satellites. American interests are, however, not always analogous to European interests in this respect.

In this connection I need only mention the interest of the European users of a communications satellite system in north-south traffic, while for American interests the east-west transatlantic traffic is likely to play a predominant role.

Europe is a major customer of a communications satellite system. Her interests do not always coincide with those of the US. Her desire—apart from her vital interest in the mastery of this technique—to participate actively and extensively in the realization of such a plan is not unreasonable.

We want to take advantage of the interval between now and the beginning of the second phase of the global communications satellite system at the end of 1969 and prepare ourselves for that moment in two ways: (1) We want to be fully conversant by then with the new techniques and, (2) we want to be able from that time onward not only to deliver components for a global system, but also to create integrated systems of our own.

In our practical approach we shall again have first to bring about a correlation of our national programs, and in the course of an over-all program detect and fill in any gaps that may have occurred. Secondly, we must devise a division of labor which avoids any duplication of effort, at the same time guaranteeing that data will be made available to all the European nations involved.

For a global communications satellite system, various proposals have been put forward, of which the synchronous satellite is at present being favored for east-west and west-east traffic, especially between the US and Europe. But, with the satellite orbiting at an altitude of 22,300 miles, a time lag of about 300 milliseconds intervenes between transmission and reception, more than the 150 milliseconds provisionally recommended. The experiments to be carried out with the synchronous satellite will show to what extent this time lag will affect the quality of telephone communication.

France has proposed a medium-altitude system of twelve or fifteen satellites traveling in twelve hours around the earth in circular orbits, about 12,000 miles out. Three orbits are considered,

each inclined at about thirty degrees to the equator and spaced by 120 degrees longitude to each other. In each orbit there are four or five satellites equidistant from each other.

French investigations show that the system provides very good coverage for the main traffic lines between Europe and the US, South America, Africa, and India on the one side, and the US Japan, India, and Australia on the other, since from the ground stations in these countries at least one satellite is always visible, *i.e.*, 100 percent of the total period, while two satellites will be in line of sight for fifty to 100 percent of the time. At certain periods even three satellites will be visible from ground stations.

The system is based upon estimates of traffic density and the number of channels therefore required by the year 1975.

Television Satellites

Another field to which we ought to apply ourselves in Europe, and for which the mastery of communications satellite techniques is a prerequisite, is that of active television-broadcast satellites of high capacity.

We are, of course, fully aware of the considerable problems which such a project presents and of the difficulties which today still appear insoluble. We believe that Europe simply cannot afford to do without such a device. In the foreseeable future politics may be conducted through this medium; and if you look at the geographic-political position of our small continent between the gigantic masses of Asia and Africa, then the significance of such a project for Europe is quite obvious.

Meteorological and Scientific Satellites

Besides the commercial payload we have the scientific payload. A borderline case is meteorology because scientific knowledge acquired in this field can very quickly be translated into economic benefit. The present aim is a reliable five-day weather forecast. To achieve this, data from a close net of observatories are essential. We are thinking here in terms of a satellite net of several synchronous satellites for, primarily, optical observations, and of a few polar-orbiting satellites, which supply supplementary information and at the same time collect data from a large number of automatic stations, of a simple and robust type of

construction, and transmit them for evaluation to specified centers.

The European Space Research Organization is working on small, relatively conventional satellites. Interplanetary probes, large and versatile satellites, even a manned space station for scientific purposes, could result from such work.

Space Stations

Space stations interest us too. We simply must work on them.

The assumption—which colors our view of space stations—that near-space is going to be important scientifically and economically, as well as in other respects, makes us regard the whole problem of manned spaceflight from a different standpoint than the one the US has taken or was forced to take. Our concept of the Aerospace Transporter alone, with a maximum acceleration of between 2 and 3 Gs, shows that what we want to do is put into near-space men who need not be subjected to exacting special training. This is only possible on the basis of the knowledge and experience gained in the US and USSR. We are not committed to any "crash" program.

Ground Installations

These are of interest to Europe for several reasons. First, there can be no space activity without laboratories, launch facilities, ground stations, etc. Secondly, these installations make up a considerable part of the whole space effort, both financially and in terms of the work involved. It is this order of magnitude which chiefly prompts the close scrutiny of all major installations as to their economic utilization. Tight coordination on an international level would bring about notable reduction in cost. Certain installations will, of course, always have to be in close proximity to production plants. Eurospace has set up a special working group to look into these matters.

As principal stations for the global communications satellite system we require ground terminals like the US built at Andover, Maine. The great interest Europe shows in this problem is evident from the fact, that, in the meantime, several active ground terminals with large aerials have been erected in England, France, and Germany, while a number of other ground stations have been provided in Scandinavia, Italy, and Spain. In this work we were, of course, helped by previous American experience. To some extent, however,

we have developed a few techniques of our own and generally made good progress in this field. With these stations, the Early Bird experimental communications service between the US and Europe can now proceed. We should be delighted if "flying" equipment, too, could in an equally harmonious fashion be incorporated by Europe into a worldwide system.

Basic Research and Advanced Techniques

The European states have created in the European Space Research Organization an active inter-governmental research agency.

In the field of space technology proper, only some national programs concern themselves at present with basic research and the achievement of advanced techniques; an over-all European program for this purpose does not yet exist. Euro-



*Lord Caldecote,
Director,
British Aircraft
Corporation*

THE advantages to Europe of technical cooperation with the US in the space field are self-evident. However, the full benefit of access to US experience can only be derived if Europe itself has viable programs across a sufficiently broad front capable of digesting American experience. This is because the main emphasis in space work is on research and development, on the solving of new technical problems, and not primarily on production activity.

The United States approach to overseas cooperation has been sufficiently enlightened to realize that, despite the enormous US lead in space activity over European countries, such cooperation can be of mutual benefit.

One of the encouraging facets of space technology is that over wide areas there are few security problems to impede collaboration. Owing to this factor and the vast resources required,

space has worked out proposals in this respect.

If we examine quite dispassionately the question as to what it is, precisely, that constitutes the advantage which the US enjoys in the space field, it is the fact that you have flight-tested equipment while we have not. The reason is that your space effort began very much sooner than ours (although not a little of it had its origin and roots with us in Europe). The US realized its space projects in a concentrated way, while we started on a national level and our efforts are only gradually beginning to be integrated on a continental scale. Our technical-industrial capacity as such cannot be to blame. Taken as a whole, Europe is, in this respect, not that much inferior to the US. If we multiply our capacity by the factors of time, coordination, and volume of activity, the inevitable result must be that we will achieve a status which, though not the same as yours, is equivalent in proportion to our respective sizes.

Problems of American European Space Cooperation

BY LORD CALDECOTE

space is an almost ideal field for the spread of international collaboration.

Space research, by its very nature, continues to present new and unprecedented problems over an extremely wide field of technology. Moreover, since the ratio of research and development to production is even higher than in present-day defense work, the technological returns may be even greater than in defense for a given investment. Thus it could be that in a saner world, space research and activity could eventually replace military expenditure as the main forcing [function] for technological progress.

The assistance provided by the United States to friendly countries, therefore, has significance quite outside the space field in that it is helping to promote a general technological advance and in doing so is strengthening the free world.

This cooperation takes several forms but, so far as Europe is concerned, the aspects of direct

interest to US industry are provision of equipment and facilities to promote and assist European programs and technical assistance to Europe based on US experience.

The first provides US industry with an additional market both directly in the form of equipment supplied (especially launchers) and, indirectly, due to the promotion of European programs through US encouragement. The second—technical assistance—can take several forms, such as technical collaboration and license agreements, as well as direct assistance on the part of NASA. While the royalties and other payments for such technical information often do not represent very large sums in themselves, they provide an additional yield on existing US company turnover and a means of making better use of knowledge already gained, and in this respect such payments can be financially attractive. It must also be realized that Europe cannot afford simply to place orders on US companies to develop equipment for space activities nor would any useful purpose be served by so doing.

As, with the help of American know-how, the European space programs begin to expand, they will inevitably create an expanding market for American components and lead to wider technical cooperation. It is to be hoped that in due course there will be a two-way traffic in ideas, the first glimmerings of which are already seen in the carriage of European scientific experiments in US spacecraft. The extent of the potential European space market is illustrated by the infinitesimal portion of European gross turnover devoted to space work compared with that of the United States. Whereas the US space program is more than one percent of the gross national product, the total European program is only one-twentieth of one percent of the European gross national product.

The difference cannot be explained away by the greater prosperity of the United States. It is largely due to a greater awareness in the US of the significance of space leadership as an indicator of general technical progress, an awareness which is shared by some European countries to a much greater extent than others and which is steadily growing.

Apart from cooperation on [scientific space] projects, the cooperation between US and European industry has been increasing steadily. Such cooperation can take several forms apart from the outright purchase of US space hardware of which equivalents are not yet available from European

production lines. First, there are financial partnerships whereby US companies have partial ownership in European companies or where they form subsidiary companies under common ownership. Next, there are technical assistance agreements whereby a US company can make the whole breadth of its space expertise accessible to European partners. Finally, there are license agreements covering a whole range of specific projects or techniques. The full extent of such collaboration is wider than indicated since some past agreements have not been made public and others are no doubt in the process of negotiation.

Satellite Communications

Whereas international cooperation in many spheres in the past has either been unforthcoming or only attainable after a great struggle with national outlooks, in the sphere of satellite communications the idea of a global system has been accepted from the outset, both in the US and in Europe. The international agreement signed last July stipulates that European and other member countries should have equal opportunity with US industry in supplying hardware to both the experimental and global systems to the extent of their equity holding in the global organization, although this is naturally subject to their being competitive in performance and price. In the ground elements of the system Europe should be able to play a full role because the state of her technology in this area is well advanced. There is considerable experience in European industry in the construction and management of large communications systems on an international scale. It is in the interest of all concerned that such experience should be used to the fullest to establish and extend the worldwide networks which will be made possible by satellite communications.

However, competition in the space elements presents a real challenge to European industry in view of European inability at present to demonstrate successfully orbited communications satellites. Either European industry must attempt to enter the satellite market with independent designs, and in this case it will be at a disadvantage for several years with respect to US industry, or, alternatively, licenses may be negotiated for US communications satellite designs to be manufactured in Europe. Between these extremes there is a possibility of cooperative design ventures involving an element of European design with the assistance of US firms that have successfully or-

bited their own designs. A likely possibility is that US designs will be used initially with the incorporation of European features in future versions. These schemes do, however, depend on a readiness on the part of the US government and US industry to promote communications satellite technology in Europe.

What has been said could lead to the proposition that in the global systems Europe should confine its contribution to the ground segment. On the basis of a purely financial shareout this might be logical. However, I believe it is essential in this important new field that there be complete and unrestricted technical collaboration on suitable terms as well as a financial split of the work. This is necessary in order to give full scope to European initiative as well as US initiative in order to maximize progress in the mutual interest of both the US and Europe. The present great imbalance between the space activity of the US and Europe must not be allowed to obscure the importance of a two-way flow of technology across the Atlantic.

We must hope that the international agreement on communications satellites will be interpreted as a real transatlantic cooperation both in the spirit as well as the letter. Thus while US genius and initiative is given its rightful reward, I hope to see collaboration between our industries on a scale which will advance this new communication medium as rapidly as possible. We are now only at the beginning of an exciting new development which, as well as opening up new markets, will also do much to bring mankind closer together.

The Technological Gap

One of the major problems is the vast difference in scale of space effort between our two continents. Monsieur Delorme has mentioned that the NASA space program is some thirty times the total European program, but if we include US military space the ratio is 40 to 1. Even excluding the entire Apollo program, the residual US program is twenty times the European effort. This accounts for the wide technological gap between the US and Europe, which inevitably makes cooperation a very one-sided affair, at least in the early stages.

What is really lacking in Europe is practical experience of orbited hardware and the feedback which such experience can provide, both in system design and in development and selection of reliable space-proved components. This means that the European space effort must be concen-

trated on carefully chosen projects and not dissipated on unnecessary duplication or excessive competition within Europe. We have achieved considerable coordination of effort in the formation of ELDO and ESRO, and the mutual consultations which have taken place at government level within the European Committee for Satellite Communications. In the absence of an over-all space authority of the kind suggested by Monsieur Delorme, European industry has taken the lead in recommending suitable cooperative programs through the medium of Eurospace.

If space work had no significance beyond satisfying a consumer need this might be the logical solution, and it must sometimes be painful to American industrial observers to watch us in Europe going over much the same ground and developing equipment on our own account which could be obtained as a run-off from American programs and hardly be missed. Satellite communications is certainly an example of a consumer activity, but I have already explained why we consider European industry needs to be brought into full partnership in that activity. Other space activities are financed by governments, and one of the major arguments for such expenditure of public funds is to advance industrial technology. European funds will not be forthcoming for space programs based entirely on American equipment. However, the generous arrangements for American assistance, particularly in the sounding rocket and launcher field, have enabled European and other national programs to get off the ground. As these programs begin to expand under European initiative they will create markets for American equipment not yet attainable in Europe.

The wide technological gap will ensure that there will always be a demand for US equipment and know-how to supplement Europe's own efforts. This is evidently true now in the area of components since the European program has not expanded sufficiently to justify extensive investment by component manufacturers in the development and quality control of reliable space components. If it is true that the greatest European market for US industry will result from encouragement and expansion of European programs, this argues against restrictive US policies in regard to sale of space know-how. The number of licenses already negotiated indicates that US industry is already largely convinced on this point.

This depends on what form it takes and in short whether it inhibits European development. Certainly, US assistance has helped to get the

whole program under way. However, we need to examine this gift horse. The difference in scale between the US and European programs makes us particularly sensitive on this question. For example, an effort by the United States to dispose of some of its spare equipment in the European market could appear to be a wholesale dumping process, inhibiting European native development. A fair analogy for what is desired is the relation between a good parent and a clever child. The European industry requires advice and guidance based on the greater US experience but not at the expense of its native character and individual creativity. Like enterprising children, too, we shall insist on learning by making mistakes. In short, what Europe requires is the benefit of American experience in technology and methods, but it needs to develop its own native projects. We would appreciate American advice on this selection but duplication of American efforts is not an argument against our choice since we have to tread similar paths to obtain our own experience.

Coordination and Security

ELDO and ESRO have already been mentioned, as well as the efforts to avoid duplication in the communications satellite field. Effective coordination involves a balance between protecting the design rights of individual companies while avoiding unnecessary duplication. At least it can be said that European governments have tied their policies to a European collaboration on space.

The national difference in patent laws and design right agreements could be a stumbling block to effective collaboration and, in the interest of international collaboration, Eurospace has been carrying out intensive studies of this problem.

Although space work itself is largely unclassified, the security problem is a real one when developments take place in the same factories as classified defense projects, and when techniques or equipment are common to both. If security measures came to affect space equipment which is of key importance to the European space effort and which seems of dubious relevance to defense, it must be admitted that suspicion would begin to arise in Europe of US motives.

It is to be hoped that in the future, as in the past, the interpretation of security regulations in the United States will not be so rigid as to inhibit European space developments without real necessity. The danger of this attitude in the communica-

tions satellite arises because the US military authorities are bound to adopt and make use of the same advanced communications media. This could inhibit the efforts of the US government and the Comsat Corp. to cooperate in the international development of global civil communications systems, and seriously affect the progress of European industry in this field of technology.

In making these points, it would be churlish not to recognize the enlightened attitude generally adopted by the US security authorities in the past to international collaboration on space activities.

Summing Up

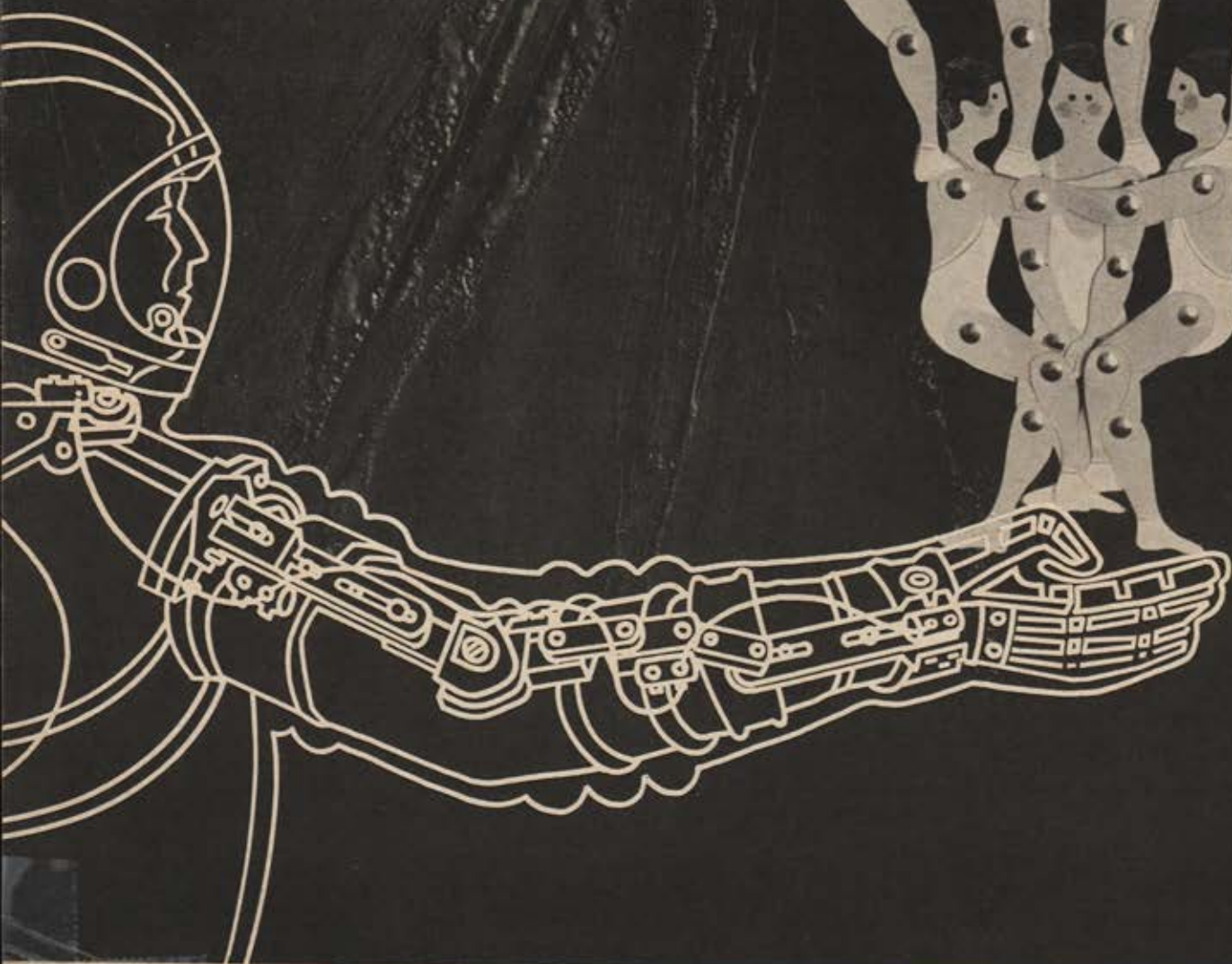
There is already very extensive collaboration between the US and Europe both at government and industrial levels ranging over a wide field of space activities. Further collaboration is restricted by the very small size and lack of definition of the European space program considered as a whole.

While from a short-sighted view it might appear to be in the interest of the US to restrict European space capability in order to scoop the market, this view is based on a fallacy. The market will never develop to sizable proportions unless the European program has European identity, because otherwise the necessary support of taxpayers will not be forthcoming. At present, such European programs are only being made possible by US assistance in the form of launchers, components, and technological collaboration in a whole range of licenses and other agreements. It is suggested, however, that the greatest need of Europe is assistance in space technology rather than the wholesale adoption of American projects and systems.

In the absence of an over-all European space authority the European industry has to take much of the initiative in promoting potential space programs on an international European scale. The American industry, through the corresponding members of Eurospace, can help and advise on associated technology and can also make useful comments on the projects proposed by Eurospace.

The opportunities for American assistance of the European space effort depend upon the adoption of such programs. It is, therefore, in the interests of both European and US industries for us to have the support of American industry in putting forward programs to our governments.

It is up to the European members of Eurospace to overcome the barriers to a true industrial collaboration with the maximum concentrated effort and the minimum of duplication.—END



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Speaking of SPACE

BY WILLIAM LEAVITT
Associate Editor, AIR FORCE/SPACE DIGEST

What About Applied Science?

WASHINGTON, D.C., MAY 12

Since Sputnik, Congress and the public have been showered with millions of words about basic research and the continuing need to replenish the store of fundamental scientific knowledge.

This important campaign has for the most part been eminently successful. Today, none but the Neanderthals object to spending money for seemingly useless, "far-out" scientific studies. The idea that today's exotic research may produce vast and important changes tomorrow has sunk in. And although there is some misguided talk of technological "plateaus," the idea has sunk in deeply.

But what about *applied* research? Has the same understanding and acceptance developed there? No, says Dr. Edward Teller, the provocative nuclear scientist from the University of California, who is so often tagged, to his annoyance, the "Father of the H-bomb."

Dr. Teller addressed himself to this question in a recent report to the House Committee on Sci-



Rep. Emilio Q. Daddario (D.-Conn.) is chairman of the House Space Committee's Subcommittee on Science, Research, and Development. The panel has held hearings at which scientific leaders have given their views on problems and prospects of science and technology in the US.



—Wide World Photos

Above is Dr. Edward Teller of the University of California. He believes that a vigorous effort to develop educational programs in applied science is a high-priority US need in a time of increasing complexity.

ence and Astronautics to which fifteen eminent scientists contributed in the aftermath of hearings before the Committee's Subcommittee on Science, Research, and Development, chaired by Representative Emilio Q. Daddario (D.-Conn.). It is an exceedingly important argument, in view of the realities around us. We live on a planet plagued by population pressures and primitivism, and unless science is intelligently, and in an enlightened democratic manner, put to work solving not only our own national problems but those of the developing areas once so remote to us, we may truly be headed for that frightening and unwelcome era where, in Matthew Arnold's phrase, "ignorant armies clash by night."

Dr. Teller divides the scientific-engineering endeavor into three categories: pure science, applied science, and engineering development.

"It is my opinion," Dr. Teller writes, "that the US effort is not sufficiently strong in the broad field of applied science. In particular, we are not placing sufficient emphasis on the education of applied scientists. I believe that a reasonably planned effort in the graduate education of applied scientists would have most beneficial consequence for our whole program. . . . Most of our federal expenditure is used to support applied science and the engineering developments based on applied science [but] at the same time most of our educational effort on the relevant graduate level goes into the support of pure science. As a result, the most massive expenditures of our government suffer from inadequate technical leadership."

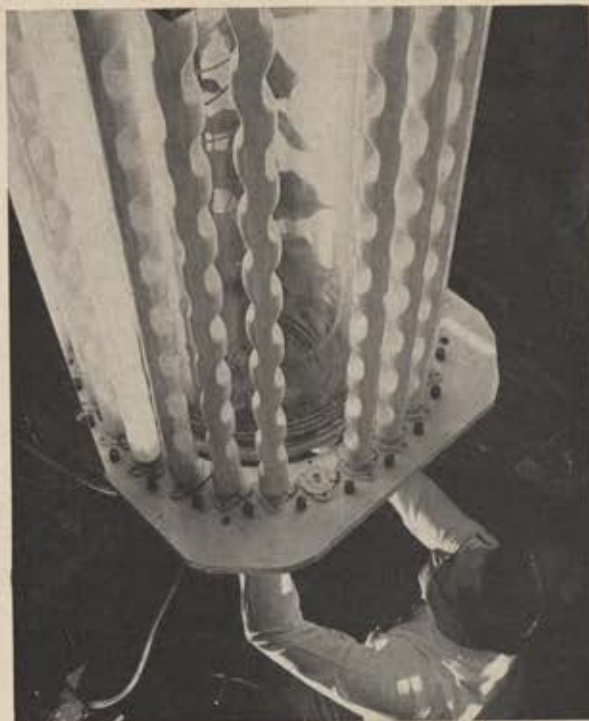
Dr. Teller points out that applied science is in an intermediate position between pure science and engineering development. Applied science has definite practical objectives, yet its practitioners cannot guarantee either their feasibility or their advisability.

"Many of the methods employed in applied science are the same as those practiced in pure science, but there are differences," the physicist writes. "A project in applied science very often requires the cooperation of experts from very different fields. This imposes a different style of work. It is also quite frequently true that applied-science projects are tied more closely to a time scale than are undertakings in pure science. However, imagination and invention play similar roles in [both] pure and applied science."

Dr. Teller goes on to describe the low esteem in which applied science is held among students at some of our most famous centers of academic excellence.

"In our educational institutions applied science may almost be described as 'no man's land,'" he comments. "Recently I interviewed twenty-four [of the] most promising students [at] the Massachusetts Institute of Technology . . . to select students for fellowships in applied science. . . . Twenty-two out of the twenty-four showed a marked preference for pure science. . . ."

"Our deficiency in applied science," he points out, "might be illustrated by referring to our space program. This program . . . has connections with engineering development, applied science, and pure science. Most of the money is spent on engineering development, but applied science is an important component, and [it] determines to a great extent how effectively the money is spent. . . . It is difficult to estimate how many fully educated 'applied scientists' are to be found in our



Sweet potatoes look good as an oxygen-supplier and nutritious food for astronauts, according to researchers at Battelle Memorial Institute, Columbus, Ohio, where the Air Force is sponsoring gas-exchange studies.

space program. My suspicion is that this number may not be sufficiently great. In a new field this may be unavoidable, but the result is that the money [in NASA] is not being spent in an optimal manner. With more emphasis on education in applied science, the time required to correct this . . . may be shortened."

Dr. Teller listed examples of successful applied science efforts that have benefited the country enormously: chemistry, where pure and applied scientists have worked together to create "a healthy and vigorous development of our chemical industries"; aeronautics, where applied science has flourished and paid great dividends; electronics, particularly its application to computers, which in turn "stimulated applied mathematics, the introduction of precise methods into new fields, and the increasing replacement of human labor by reliable and effective mechanized equipment."

But in contrast to these endeavors, Dr. Teller points out shortages in the use of applied science in such increasingly important fields as meteorology, oceanography, and nuclear engineering for peaceful purposes.

To create the supply of applied scientists needed to attack such an array of problems, Dr. Teller proposes a vigorous higher-education pro-

gram that would give applied science the academic prestige now enjoyed by pure research.

"Education in applied science," Dr. Teller writes, "should proceed at the laboratories and centers at which applied science has actually been developed, where the pioneers in applied science work, and where the best equipment is available. Here the students who should obtain Ph.D. degrees in applied science can acquire the best tradition while working in surroundings in which the primary motivation is to mold our future technology along the lines made possible by the latest advances in science.

"To give proper stature to these programs and to exercise the required controls, . . . these programs [should] be worked out in conjunction with universities. The degrees should be given by the universities, and the men who are charged with the duties of teaching and supervising the Ph.D. theses should become professors or part-time professors at the universities. The geographic separation as well as the novelty of the program will undoubtedly cause difficulties. Faculties may not easily accept applied work as similar in value to the old academic disciplines. But one should realize that in the program proposed here, there will be a requirement for the greatest possible amount of new initiative and imagination. For this particular reason such a program, once it is accepted, should fit excellently into the framework of our universities."

Pointing out the need for broadly based educational preparation for such graduate study in applied science as a kind of counterpoint to the great emphasis on pure science and engineering, Dr. Teller says that necessary general background could be provided in undergraduate programs or in the first one or two years of graduate applied science programs.

He writes: "Subjects that should be required in all cases include mathematical techniques . . . modern computing equipment . . . physical chemistry, thermodynamics and statistical mechanics, electromagnetic phenomena, and most particularly . . . the broad field of the structure of matter. . . . In addition to this background . . . the applied scientist should become an expert in at least one specialty by completing an original piece of work as his Ph.D. thesis. This is important not only in itself, but also because of the psychological fact that in many ways one specialist can better understand another specialist as long as both can fall back on a common language."

Dr. Teller's proposal is a tall order, a fact he



Technicians from NASA Marshall Space Flight Center, Ala., and Hayes International Co., Huntsville, Ala., wearing Apollo-type space suits, test mockup of Lunar Mobile Lab (MOLAB) at Lockheed plant in Sunnyvale, Calif. MOLAB would allow two-week moon survey.

recognizes. But he makes some suggestions as to how it can be implemented.

Among his ideas:

- Using government laboratories for educational purposes, in cooperation with universities. Funds ranging from a fraction of one percent to a few percent of each laboratory's budget could be earmarked for such programs. The National Science Foundation could help finance such efforts.

- Joint applied science educational programs involving industrial laboratories and universities, with government offering matching fund grants to universities to set up such programs.

- Federal tax benefits designed to stimulate capital expenditures for applied science educational facilities.

- Continuing federal financial support of graduate students in applied science. Dr. Teller acknowledges that such support is available. "In principle," he says, "no new measures are needed, [but we need to] keep track of the fraction of graduate fellowships that support applied science, and to seek continually the best ways to recruit and support talented students in applied science."

"The United States possesses the fundamental skills from which a vigorous development of applied science can proceed," Dr. Teller concludes. "These skills, however, are separated from our educational process and . . . are not . . . organized . . . to satisfy the growing demands for young applied scientists. We have to tackle this . . . problem to make sure that we maintain, and in some areas, regain . . . leadership in pioneering . . . future technology."—END

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Restricted by a post-World War II peace treaty to minimal military forces, and limited by the realities of budgets and a geopolitical position that requires a convincing stance of neutrality in the Cold War, Finland has developed an air arm that is modestly equipped but manned with dedication and a determination to preserve the nation's freedom . . .

AIR FORCE

JUNE, 1965

Between East and West —Finland's Air Force

By Stefan Geisenheyner

AIR FORCE/SPACE DIGEST EDITOR FOR EUROPE

WEDGED between the Asiatic East and the European West lies Finland, after Iceland the most northerly country in the world. It is a land of unending forests, thousands of lakes, and the mid-night sun.

The introduction of Christianity in Finland in the twelfth and thirteenth centuries created a governmental union with Sweden which was to last 600 years. During this period, Finland developed a democratic political system. During the Napoleonic era, in 1809, the country was incorporated into the Russian empire. A century later, in 1917, Finland broke its ties with Russia and became a sovereign state. But with half of its land border—almost 800 miles—facing the USSR, Finland has had little real opportunity to enjoy independence.



Maj. Gen. R. Turkki, Commander of the Finnish Air Force (Ilmavoimat), wears the white fur cap which is the rank insignia of a commanding officer. With headquarters in Helsinki, Turkki commands sixty combat aircraft, 3,000 men.

In World War II they twice fought the Russians, first in 1939-40 when they held out for almost four months against heavy odds, again in 1941 when the Soviets attacked without warning. Then the Finns joined with Germany, but surrendered to the USSR in 1944.

According to the Paris peace treaty of 1947, Finland's armed forces are restricted to internal operations and to the local defense of frontiers. Consequently, the Finnish Army, including frontier troops and anti-aircraft artillery, is limited to 34,400 men; the Navy to 4,500 men and a tonnage of 1,000 tons; and the Air Force, including reserves, to sixty combat aircraft and 3,000 men. The present strength of Finnish Defense Forces is even less than permitted by the treaty. The treaty also forbids Finland to possess, construct, or experiment with atomic weapons, guided missiles, sea mines or torpedoes of noncontact type, manned torpedoes, submarines or other submersible craft, motor torpedo boats, or specialized types of assault craft. The Air Force is forbidden to possess any bomber aircraft.

The Commander in Chief of the Defense Forces is the President of the Republic. Since 1956 this has been Dr. Urho Kekkonen. Immediately subordinate to him is the Commanding General of the Defense Forces, General of the Infantry, J. S. Sibelius. The highest administrative authority rests with the Ministry of Defense. In peacetime, the Defense Services are comprised of the General Staff; the Army, Navy, and Air Force; reserves; military training units and special military institutions; depots, hospitals, and dispensaries; and military tribunals.

The Finnish Air Force, or Ilmavoimat, is commanded by Maj. Gen. R. Turkki with headquarters in Helsinki. Since the war, the Air Force has been concerned primarily with training, transport, and communications duties. It comprises the Air War School, the Central Flying School at Kauhava, the Central Air Force Depot at Tampere, an Air Force Signal Battalion at Luonetjärvi, and three operational wings. The latter are the Häme Wing under Col. A. Huhtala at Luonetjärvi, the Carelia Wing under Col. Lauri Pekuri at



Swedish SAAB 91D Safir is used by Finnish AF as a primary trainer. During the eleven months of beginning flight training at Central Flying School, Kauhava, young pilots are required to fly approximately 100 hours in Safirs and CM 170 Magisters. Ilmavoimat has thirty-five Safirs.

Kuopio in Savo, and the Satkunta Wing under Lt. Col. Alpo Hirvonen at Pori on the west coast. The last unit is responsible for proficiency and pilot training, for which French Potez CM. 170 Magister jet trainers are used.

The flying personnel of Ilmavoimat start their careers with a short basic military training period. The flying training begins at Central Flying School at Kauhava and continues for eleven months, during which time approximately 100 hours in SAAB 91 Safirs and CM. 170 Magisters are flown. For advanced training, the young pilots are posted to an operational wing. While the NCOs on flying status are trained in basic science at an NCO school, the young pilot officers receive their training for two and a half years at the Cadet School in Helsinki and at the Air War School at Kauhava. During the second half of the course, at Kauhava, about 150-200 hours in Safirs and Magisters must be flown, including a program for instrument and night flying, gunnery missions, and aerobatic flight.

Air staff officers spend two years at the Staff College, which is divided into general and technical branches. At the age of thirty, officers with the rank of captain may choose between the branches.

The Air Force is backed up by an experienced aviation industry centering around the aircraft factory Valmet OY, a division of the Finnish State Metal Works. Valmet OY is part of the Tampere Industry

Complex which consists of the aircraft factory at Tampere as the central unit, and the Kuorevesi Factory which performs aircraft repairs. The Linnavuori Factory at Siuro, near Tampere, in the main, repairs and overhauls engines.

During the war years, the Valmet OY factory built several types of aircraft including the famous British bomber, Bristol Blenheim IV, under license, and a single-seat fighter, the Myrsky (Storm). Sixty-one Myrsky fighters had been built when production was stopped by the Allied Control Commission, and a more ad-

(Continued on page 81)



British Bristol Blenheim bomber, built in Finland during World War II, carries swastikas, insignia of Air Force until after the war. It was good-luck symbol of von Rosen family, which donated first aircraft to Finland in 1918.

Fifty-two CM. 170 Magisters were purchased by Ilmavoimat from Valmet OY aircraft factory in 1964. Another eighteen Magisters, delivered earlier by its French manufacturer, Potez/Air Fouga, were assembled from imported components until Valmet OY acquired manufacturing license in 1958.



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vanced fighter, the Pyörremyrsky (Whirlwind), underwent tests. The plant manufactured the Dutch Fokker D.XXI fighter under license until 1944.

After the war, a Finnish-designed two-seat advanced trainer called the Vihuri was produced. The prototype VH-I flew for the first time in 1951. The first series of thirty Vihuri was built in a slightly modified form, designated VH-II, and first flew in August 1953. A second modified series, the Vihuri VH-III, was completed and delivered during the latter half of 1956. All three types have since been retired from service and have been replaced by Swedish SAAB 91 Safir primary trainers, thirty-five of which are in service today.

In 1958, the manufacturing license for the CM. 170 Magister trainer was acquired from Potez. A total of fifty-two Magisters were ordered from Valmet OY and were delivered by the end of 1964. The first few Magisters were assembled from imported components, but the remainder were manufactured entirely in Finland, except for their jet engines and certain items of equipment. Eighteen CM. 170s were built in France by Potez, bringing the total Magisters flown by the Finnish Air Force to seventy. The Magisters are armed and can be used in combat missions for close air support operations.

Two Ilyushin IL-28s (the NATO code-name is Mascot), flown in the USSR as attack bomber and reconnaissance aircraft, serve in the target-towing role. A

number of helicopters are used, including four Polish SM-1s and two Russian Mil Mi-4s. Eighteen Agusta-Bell 204B helicopters have been ordered. Four Douglas C-47 Dakotas and two British Pembroke C-53s are flown as transports and one DHC-2 Beaver (U-6A) is operated for communications and liaison. Until recently, several Bristol Blenheim IVs were employed for aerial photography.

There is only one fully operational fighter squadron in service today—HLeLv 21 at Luonetjärvi, about 150 miles north of Helsinki. The squadron is equipped with the single-seat lightweight British fighter Gnat Mk 1, for which the initial order was placed with the Folland Division of Hawker Siddeley in November 1956. Twelve aircraft were ordered and were delivered at intervals between July 1958 and early 1960. A license for their manufacture in Finland was acquired in 1957, but no series production has been undertaken. Two of the Gnats are equipped as reconnaissance fighters with three Vinthen 70-mm. cameras in the nose. The Gnat Mk 1 may also be used as a fighter-bomber. It has two 30-mm. Aden cannon in the air intake fairings—one on each side of the fuselage—with 115 rounds per gun. Provision has been made for underwing mounting of two 500-pound bombs or twelve unguided rockets. With two fifty-nine imperial gallon slipper tanks, a maximum range of 1,150 miles is reached.

(Continued on following page)



Target tug Ilyushin IL-28 is one of two such aircraft flown by the Finnish Air Force. The Ilyushin is flown in the USSR as an attack bomber and reconnaissance plane.



Soviet Mil Mi-4 helicopters are employed by Ilmavoimat for utility operation. Also in use are four Polish SM-1 helicopters. Eighteen Agusta-Bell 204Bs are on order.



Single-seat, lightweight British fighter, Gnat Mk 1, is in service with the only fully operational fighter squadron in Finland, the HLeLv 21, based north of Helsinki.

Twelve British Gnat Mk 1s have been acquired by the Finnish Air Force. License for local manufacture was obtained from Hawker Siddeley in 1957 but no series production has been undertaken. The one squadron using the Gnat as fighter and recon aircraft has achieved a high standard of operational readiness.



A high standard of operational readiness has been achieved with the Finnish Gnat. Pilots of the 21st Squadron like the excellent rate of climb, general lightness, and good response to controls. Pilots coming to the squadron have at least 250 to 300 flying hours to their credit, about 100 on Magisters. An additional fifty to 100 flying hours in the Gnat are considered necessary to bring pilots up to the standard required in techniques of ground attack, weapon handling, and navigation. Particular attention is paid to radio navigation and accurate map reading—an important consideration when flying over a country which has 70,000 lakes.

During the winter months, the squadron operates regularly at temperatures around minus twenty degrees Centigrade (-4° Fahrenheit) and sometimes as low as minus thirty degrees Centigrade (-22° F.). Because of these temperature extremes, care has to be taken in landing and taxiing on the hard, frozen runways and perimeter tracks. The brake chute is not normally used in landing, and touching down with any appreciable crosswind requires a deft touch with the controls. Moreover, the heat from the jet exhaust melts the top surface of snow, which freezes again, turning the runway into a solid smooth surface of ice. Airframe, power unit, and instruments must be exceptionally reliable, and first-class serviceability is essential because the number of operational aircraft is relatively small. Minor airframe and engine inspections are carried out by the squadron's technical personnel. Major overhauls are carried out at Valmet OY's aircraft factory.

A second squadron, HLeLv 31, is about to become operational with the Russian MIG-21 (Fishbed-B) day, point-defense fighter. The MIG-21 is a simple, relatively light fighter which achieves a high performance on a low-powered engine by carrying the bare minimum of armament and emphasizing low drag at the cost of some structural problems. Pilots assigned to fly this interceptor receive their training at a base of the Red Air Force in the Soviet Union, where East Indian pilots also are trained. Additionally, HLeLv 31 operates four MIG-15UTIs as transition trainers.

Pilots claim that the MIG-21 is exceptionally easy
(Continued on page 85)



The Gnat Mk 1 is flown during winter months in temperatures as low as -4° to -22° F. Landing in such weather, on snow and ice, requires a deft touch at the controls, reliable instruments, and first-class aircraft serviceability.



Two Russian MIG-21s in flight with Finnish Air Force markings on noses and tails. Symbol of Lynx on the tails of the fighters is the traditional wartime emblem of the Finnish fighter squadron 31, which is flying the new MIGs.

THE 7 $\frac{1}{2}$ POUND JUNGLE KILLER



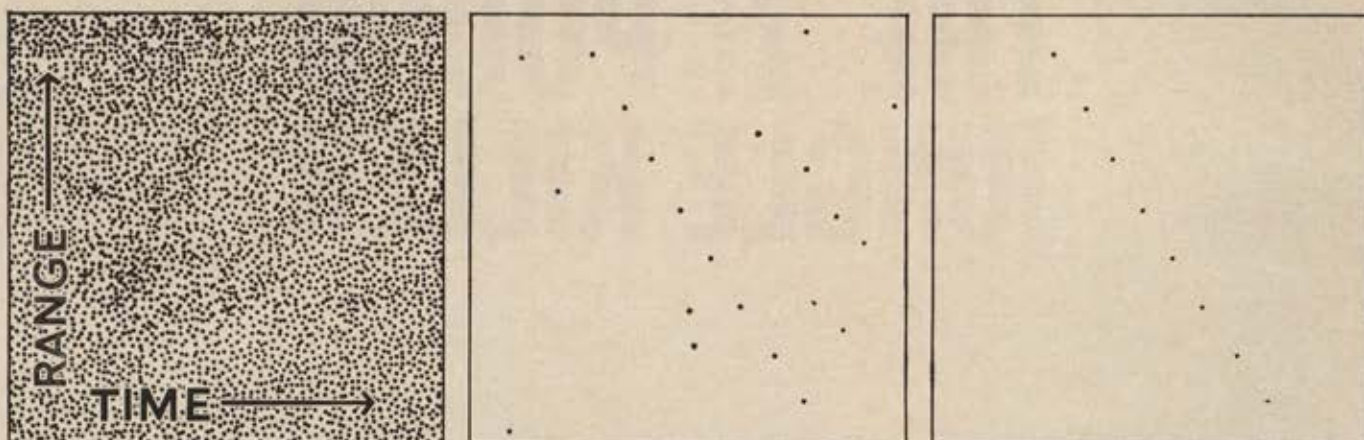
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(NOISE & space target) (noise & SPACE TARGET) (SPACE TARGET)



Charts show real-time elimination by computers of noise from radar range data: left, raw data; middle, first stage of filtering; right, noise-free space target trajectory.

Space objects can be tracked by sending radar pulses and observing reflections. But such reflections are accompanied by thousands of "noise" signals from the sky and from the radar receiver itself—especially when the threshold of detection is set low enough to pick up very small or very distant objects. For accurate tracking it is essential, of course, to distinguish reliably between the target signals and the noise.

A new data processing system developed at Bell Telephone Laboratories performs this separation of "real" signals from "noise" signals, and does it in "real time." A human being performing the calculations depicted above would require three weeks.

A computer compares the received pulses following each transmitted pulse with those following the next succeeding transmitted pulse. Those received pulses of the first train which have corresponding pulses in the succeeding train are then retained; the others are rejected. Such correlated data result in the information shown in the middle chart.

Next, another computer compares

the correlated data resulting from the transmitted pulses constituting one "look" at a given section of the sky with the correlated data on subsequent "looks" for the same section of the sky (although enlarged somewhat to allow for motion of the space object), again checking for correlation and when none is found rejecting the data. The third chart shows the resultant noise-free data of a space target moving through the sky.

For this military project, engineers at Bell Laboratories, working closely with engineers of the Univac Division of Sperry Rand Corporation, designed and programmed the computers. Because of the demanding requirements of reliability and speed, they developed for it new high-performance semiconductor and magnetic memory components. The two groups combined talents with engineers of the Western Electric Co., the manufacturing unit of the Bell System, to build prototype computers.

This type of coordinated performance is typical of the Bell System's ability to contribute from its broad technical competence to the strengthening of the nation's defense.



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This Russian MIG-21, a day, point-defense jet fighter, will be in service with Squadron HLeLv 31, soon to become opera-

tional. Pilots claim that it is easy to handle, highly maneuverable, achieves high performance on low-powered engine.

to handle and is highly maneuverable. Its powerplant is a Mk R37F axial-flow turbojet rated at 9,500 pounds static thrust dry and 13,000 pounds static thrust with afterburner. The engine lacks any antisurge device, offers poor throttle response, and possesses an overhaul life of approximately 100 hours only. The first MIG-21s were delivered in April 1963 at Rissala Airport, Kuopio, in Eastern Finland. The Finnish MIG-21 version has pylons for two Atoll infrared homing missiles, one under each wing. The ports for the 30-mm. cannon have been faired over, however. A radar-ranging device is housed in a small intake diffuser cone. Contrary to all speculations made before it appeared on this side of the Iron Curtain, the MIG-21 has proven to be nothing but a small clear-weather interceptor, which might well be regarded as the poor man's F-104A.

Prior to purchasing the MIG-21, the Finnish government endeavored to obtain the SAAB J35 Draken from neighboring Sweden, but their efforts were unsuccessful due to the numerous US-supplied components of this Swedish fighter, which were subject to "no-resale" restrictions. Negotiations with Dassault of France for the purchase of a limited quantity of Mirage III fighters also failed.

The MIG-21 was undoubtedly offered to Finland at a price no Western company could match. (The aircraft supplied to India are reportedly delivered at a unit price of about \$733,600.) In view of the small Finnish defense budget and the Finnish-Soviet economic relations, such a bargain was no doubt extremely attractive. Therefore, the Finnish Air Force ordered a total of twenty-one MIG-21s, most of which were delivered by the end of 1964.

Never since the inception of the Finnish Air Force has a standard type of aircraft been operated in great numbers, the main reason obviously being one of economics. The Finnish government could approve only a small sum for buying new aircraft. Being dependent on international trade situations and economic agreements, the money was granted in a specified currency, thus determining where the aircraft was to be bought.

The Finnish government is gradually beginning to appreciate the importance of giving Ilmavoimat the



For training new pilots and transitioning their present pilots into the new MIGs, the Finnish Air Force is using this MIG-15UTI advanced two-seat jet training aircraft. This one belongs to the soon-to-be-operational HLeLv 31.

possibility to plan on a long-term basis with its own budget. Due to its geographical location and political and military limitations, Finland must have a number of lightweight multipurpose fighters for tactical operation, like the versatile Northrop F-5, and some support aircraft of the COIN type for limited warfare.

Finland's armed forces are well-trained and the geographical peculiarities of the small nation are conducive to guerrilla-type warfare. This makes an attack on Finland a difficult and unpromising venture. The role which a relatively small but up-to-date Air Force can play under such combat conditions remains to be seen, as no precedent is known.—END

Last September, Stefan Geisenheyner joined AIR FORCE/SPACE DIGEST as Editor for Europe. He works out of Wiesbaden, Germany, for AF/SD and for the new AF/SD INTERNATIONAL. He was formerly Editor in Chief of Flugwelt, the leading West German aerospace magazine, and has contributed to AF/SD previously with an article on the Swedish Air Force (November '64). His regular "Letter from Europe" column is on page 20 of this issue.

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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.

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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	

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6-65



THE BULLETIN BOARD

News and Comment about Air Force People...

By Jackson V. Rambeau

AFA DIRECTOR OF MILITARY AND INDUSTRIAL RELATIONS

The Pay Bill Fight Begins

The House Armed Services Committee was scheduled to take up the Rivers military pay bill about the first of June, immediately after completing work on the military construction bill.

Since the bill, drafted by the Committee Chairman, Rep. L. Mendel Rivers of South Carolina, has already been endorsed by almost all of the Committee members, speedy Committee approval is expected. That is an important step, but only the first which the bill faces in its progress toward enactment. It may find tougher going in the Appropriations Committees of the House and Senate, which must squeeze the money to pay for it out of President Johnson's budget, already strained to cover a number of Great Society projects.

At this writing, the White House had not yet released details of the report on federal pay prepared for the President by a group headed by Marion B. Folsom. It is said to contain recommendations for pay raises totaling about five percent for military personnel with more than two years' service. In comparison, Mr. Rivers' bill calls for raises averaging almost eleven percent, including hefty increases for the men with two years or under.

As noted in this magazine's editorial last month, AFA favors the Rivers proposal because it would bring military pay more closely into line with civilian pay, and it would provide the first pay raise since 1952 to men with less than two years' service.

Meanwhile, the Armed Services Subcommittee, headed by Rep. F. Edward Hébert of Louisiana, which has been exploring the Army National Guard and Reserve merger, was expected to wind up its hearings with an appearance by Secretary of Defense Robert S. McNamara in mid-May. The Subcommittee was reported likely to approve his plan if Secretary McNamara were to admit that some congressional help was necessary to effect his changes. At this writing, that was still a big if.

Civilian Council Shows Results

A bill to grant federal civilian employees allowances for shipment of household goods on government change of station orders comparable to that of their military counterparts has been introduced in Congress by Representative Rivers.

The proposal, originally suggested by AFA's Civilian Personal Council, was submitted to Mr. Rivers by Jess Larson, AFA President.

The bill is particularly pertinent today to the large number of civilian employees facing transfer as a result of extensive base closings, but if it is passed it will be permanent, and another step toward equalizing pay and benefits of military and civilian personnel. This is one area where the military is far better off than the Civil Service employees.

Meanwhile, the Civilian Council, which met late in April

Gen. John P. McConnell, USAF Chief of Staff, awards the Legion of Merit (Degree of Commander) to Gen. Shigeru Ura, Chief of Staff of Japanese Air Self Defense Forces, in recent Pentagon ceremony. During General Ura's visit to the US, he toured several USAF installations.



under its new Chairman, Lyle S. Garlock, took steps to clear up a misunderstanding which could seriously affect USAF's research-and-development programs. The misunderstanding arose over a directive issued by the Bureau of the Budget expressing President Johnson's concern over increases in civilian positions at Grade GS-14 and above and, in effect, freezing promotions in those grades. Almost half of all USAF civilian personnel in that category are scientists and engineers in the Air Force Systems Command and the Office of Aerospace Research. Many are young men and women brought into the government at salaries lower than they could command in industry, with the understanding that they would be advanced to higher grades as they demonstrated their capabilities. The promotion freeze had already prompted some to leave the government.

The Council invited Mr. William Hooper of the President's Office of Science and Technology to discuss the problem. Mr. Hooper admitted the order has had an adverse effect on government research programs, but added that the President had not intended to freeze all promotions, but to assure that agency heads personally okayed each promotion to the higher grades. Accordingly, at the Council's suggestion, AFA President Jess Larson has written the Director of the Budget Bureau asking that he clarify his directive so that promotions for merit can be resumed.

Short Fuze

The Defense Department has amended its directive of January 16, 1965, which requires that Ready Reservists classed as key federal employees must be transferred to the Standby Reserve with no further opportunity for earning retirement points or promotion credit.

DoD reopened the door ever so slightly to permit such employees to earn retirement points and promotion credit on a voluntary basis without pay, but only if they were



Gen. Curtis E. LeMay, former USAF Chief of Staff, left, accepts \$1,000 check on behalf of Falcon Foundation as first annual donation for scholarship award in his honor presented by Lear Siegler, Inc., through its Chairman, John G. Brooks. Foundation provides prep school aid to prospective USAFA Cadets.

shifted from Ready to Standby Reserve between January 16 and June 30, 1965.

Credit for securing the amendment goes to Rep. L. Mendel Rivers (D.-S. C.), Chairman of the House Armed Services Committee, who had written in a letter to Mr. Cyrus R. Vance, Deputy Secretary of Defense, that "if any individual achieves any success in industry, government, or elsewhere he can only anticipate, as a reward, that he will be placed in the Standby Reserve, which is tantamount to discharge from the Reserve under your directive."

In reply, Mr. Vance announced that the January 16 directive was being amended to permit three categories of Standby Reserve personnel to participate voluntarily for promotion and retirement points: (1) those with a remaining service obligation, (2) those with eighteen but less than twenty years' service for retirement, (3) those transferred from the Ready to the Standby Reserve between January 16 and June 30, 1965. But, he added, "persons transferred to the Standby Reserve after June 30, 1965, will not be permitted to participate in Reserve training for promotion and retirement points unless they qualify under 1 or 2 above."

The amendment takes care of members of Congress and key staff personnel who were singled out by Secretary of Defense McNamara last December for transfer to the Standby Reserve. But what about those Ready Reservists in the federal government who haven't yet been told whether they're considered key personnel or who hope someday to be promoted into key positions, and those in private industry who may one day be asked to give up their Ready Reserve status to accept a key job? Under the terms of the Vance amendment, they have only until June 30 to decide if their civilian job prospects warrant shifting now to the Standby Reserve to protect their stake in Reserve retirement.

Airmen's Council Actions

The serious study of an "up or out" promotion system for airmen based on length of service, comparable to that for officers, was endorsed by the AFA Airmen's Council when the group met in Washington, D. C., May 3. The Air Force has been asked to make such a study.

The Council, with a heavy business schedule and under its new chairman, CMSgt. Chester F. Decowski, USAF (Ret.), also recommended that AFA support the enactment of a cold-war education bill, made three recommendations concerning enlisted retirement, and called for a revision in existing limitations on shipment of household goods for men in the middle grades.

Statutory promotion, the Council decided, would be preferable to the existing system which allots promotion slots based on what are considered at the moment to be

critical career fields. The Council noted that, while USAF is now seeking to weed out airmen with twenty years' service who have not been promoted for some time, airmen in many career fields have had little or no opportunity to be promoted because the majority of promotion slots are allocated to so-called hardcore specialties. A statutory promotion system requiring that all airmen be considered by a central selection board for promotion at specific points of service would apply equally in all career fields, the Council noted. Severance pay would be awarded those eliminated before qualifying for retirement. Such a system would be similar to the Officers' Personnel Act (OPA).

A cold-war GI education bill might cost \$60 million a year, the Council was told. But, according to Charles M. Johnston, Counsel for the Senate Subcommittee on Veterans' Affairs, the World War II GI bill already has paid for itself in additional taxes paid to the government by men whose earning power was increased under its provisions. The bill now before Congress would cover individuals who served on active duty for 180 days or more since January 31, 1955, and those who earned benefits under previous laws but lost their eligibility because they chose to remain in the service. Enlisted retirees would be eligible under the new bill. The Council asked that AFA endorse its enactment.

Noting that a presidential panel is now studying the advisability of retaining twenty-year retirement, the Council



James P. Goode, Deputy for Manpower, Personnel, and Organization in Office of Secretary of the Air Force, is congratulated by Secretary Zuckert upon receiving USAF Exceptional Civilian Service Award.

urged that AFA oppose curtailment of this benefit for enlisted men, when it testifies before the panel in July. It reaffirmed support of a bill now before Congress which would give enlisted men retirement credit for time served in the Reserve Forces, as is now authorized for officers, and of pending legislation to allow military personnel to retire in the highest grade held in any service.

The Council recommended that consideration be given to alleviating hardships resulting from inequities in present airman authorizations for shipment of household goods. It suggested the basic allowance based on rank be retained, but with an additional allowance for each dependent. This is the system employed for US Foreign Service personnel.

New ROTC Programs

Plans to implement two new ROTC programs approved by Congress last fall have been announced by USAF.

It will offer scholarships this fall to 1,000 students entering their third year of Air ROTC and expects to send 2,400 men to a six-week summer camp prior to enrolling them in the new two-year advanced ROTC program.

Although the new ROTC act authorizes each service to offer four-year scholarships, the Air Force is limiting its scholarships this year to juniors who have already completed two years of basic ROTC. The number of scholarships available at each of the 186 colleges offering four-

(Continued on following page)



Lt. Gen. Thomas S. Moorman will become Superintendent of the US Air Force Academy on July 1, succeeding Maj. Gen. Robert H. Warren. General Moorman has been Vice Commander in Chief, Pacific Air Command. General Warren's new assignment is Chief of Staff, Air Force Systems Command.



Benjamin O. Davis, Jr., former Assistant Deputy Chief of Staff, Programs and Requirements, Hq. USAF, has been promoted to Lieutenant General and named Chief of Staff for US Forces in South Korea and the UN Command there. He is the son of Brig. Gen. Benjamin O. Davis, USA (Ret.), first Negro general officer in US.

year Air ROTC is based on the average number of officer graduates produced in the past five years. Screening of applicants is now in progress, and successful candidates will be notified by the Commandant of USAF ROTC by early August.

The scholarship includes college tuition, books, fees, supplies, and equipment, plus \$50 a month retainer pay. USAF is authorized to expand the program each year to a maximum of 5,500 annual scholarships by 1968. Only those enrolled in the four-year ROTC program are eligible.

Other advanced Air ROTC students, including those entering this fall under the new two-year program, will receive retainer pay of \$40 a month, but no tuition assistance.

The two-year program makes it possible for students who have two academic years remaining in either undergraduate or graduate studies to qualify for an Air Force commission. This would include students in schools offering ROTC who did not elect to enroll in their freshman and sophomore years, and transfer students from other universities and junior colleges.

For these individuals the normal two-year basic program is supplanted by a six-week training tour. Two such periods are being offered this summer—at Keesler AFB, Miss., and Maxwell AFB, Ala.—the first beginning June 13 and the second August 1. Applications are being accepted by the schools' Air Force ROTC detachments so long as sufficient time remains to process them before the start of the second six-week period.

Those attending the field training program will receive travel pay to and from the air base and military pay at the rate of \$78 a month.

Regional Security Seminars

The schedule of Regional National Security Seminars to be presented in fifteen cities between now and the spring of 1966 has just been published by the Industrial College of the Armed Forces.

Seminars will be presented by ICAF's Gray team at Terre Haute, Ind., Oct. 11-22; Duluth, Minn., Nov. 8-19; Durham, N. C., Jan. 17-28, 1966; Little Rock, Ark., Feb. 21-Mar. 4; Carbondale, Ill., Mar. 21-Apr. 1; Dallas, Tex., Apr. 25-May 6; and Helena, Mont., May 16-27.

The Blue team will conduct seminars at Oklahoma City, Okla., Oct. 4-15; LaCrosse, Wis., Nov. 1-12; Cheyenne, Wyo., Jan. 10-21, 1966; Stockton, Calif., Feb. 14-25; Salem, Ore., Mar. 14-25; Springfield, Mass., Apr. 18-29; and Pittsburgh, Pa., May 9-20.

Earlier this year, Lt. Gen. August Schomburg, ICAF Commandant, presented the Joint Service Commendation Medal to Col. Peter J. Agrafiotis, USAFR, of Manchester, N. H., for his work in organizing and serving as adminis-

trator of an ICAF seminar in his city. Colonel Agrafiotis, who holds a mobilization assignment at Hq. USAF, is the first Reservist to receive the JSCM in the ICAF extension course program.

PARTING SHOTS—US enlisted men in South Vietnam have been excused from paying federal income tax and officers there have been granted a \$200 a month exemption under an executive order issued by President Johnson declaring the area a combat zone. The order is retroactive to January 1, 1964. . . . More than 400,000 USAF personnel voted in the 1964 national election which saw a million votes cast by military men, DoD reported. USAF total was fifty-eight percent of its eligible voters, a twenty-percent gain over 1960 when 260,000 voted. Army was second in 1964 with 290,000 votes, forty-four percent of those eligible. Marine Corps showed best voting percentage, with 65.5 percent of those eligible casting ballots.

STAFF CHANGES . . . Brig. Gen. Joseph J. Cody, Jr., from C/S, AFSC, Andrews AFB, Washington, D. C., to DCS/Systems, AFSC . . . Maj. Gen. Benjamin O. Davis, Jr., from Asst. DCS/Programs and Requirements, Hq. USAF, Washington, D. C., to C/S for US Forces in South Korea and UN Cmd., Korea, and promoted to lieutenant general . . . Brig. Gen. Ernest C. Hardin, Jr., from Asst. to Cmdr., 9th AF, TAC, duty station Ft. Bragg, N. C., to Cmdr., 839th Air Div., TAC, Sewart AFB, Tenn. . . . Brig. Gen. James W. Humphreys, Jr., from Cmdr., Wilford Hall USAF Hospital, Lackland AFB, Tex., to Chief, Public Health Div., AID/VIETNAM, Central Control Cp. (Agency for Int'l Development), with duty station Department of State, Washington, D. C. . . . Brig. Gen. William B. Martensen, from Director of Materiel, 2d AF, SAC, Barksdale AFB, La., to C/S, 2d AF, SAC . . . Lt. Gen. Thomas S. Moorman, Vice CinC, PACAF, Hickam AFB, Hawaii, to Superintendent, USAF Academy, Colorado Springs, Colo., replacing Maj. Gen. Robert H. Warren . . . Brig. Gen. Luther H. Richmond, from Inspector General, USAFE, to DCS/Operations, Hq. USAFE, Wiesbaden, Germany, replacing Maj. Gen. Henry G. Thorne, Jr., named Cmdr., 17th AF, USAFE, Ramstein, Germany . . . Maj. Gen. Robert H. Warren, from Superintendent, USAF Academy, Colorado Springs, Colo., to C/S, AFSC, Andrews AFB, Washington, D. C., replacing Brig. Gen. Joseph J. Cody, Jr. . . . Brig. Gen. Prentiss D. Wynne, Jr., from Dep. ACS/Intelligence, Hq. USAF, Washington, D. C., to Chief, Air Section, Joint Brazil-US Military Commission and Chief, Air Section, MAAG, Rio de Janeiro, Brazil . . . Hq. AF Recruiting Service, moved from Wright-Patterson AFB, Ohio, to Randolph AFB, Tex.

NOMINATED FOR PROMOTION . . . To major general: John L. Zoeckler.

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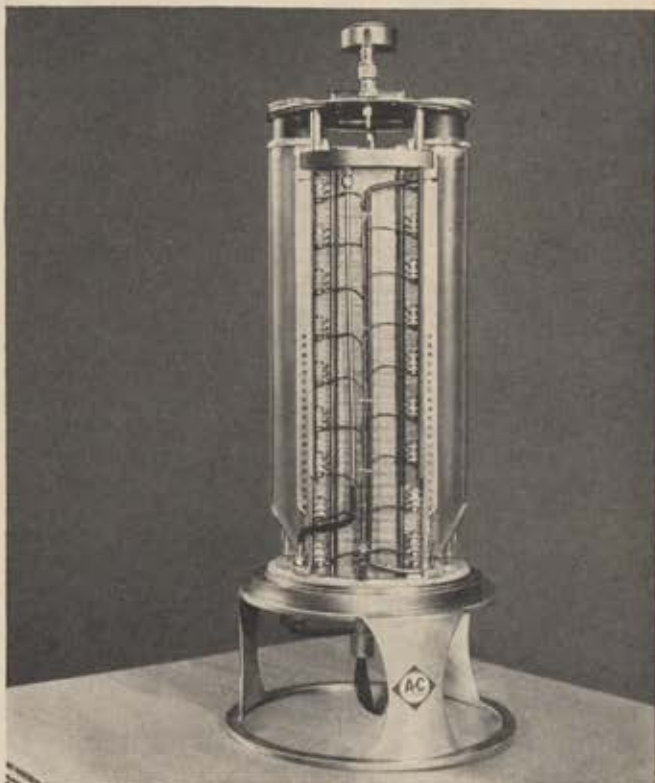
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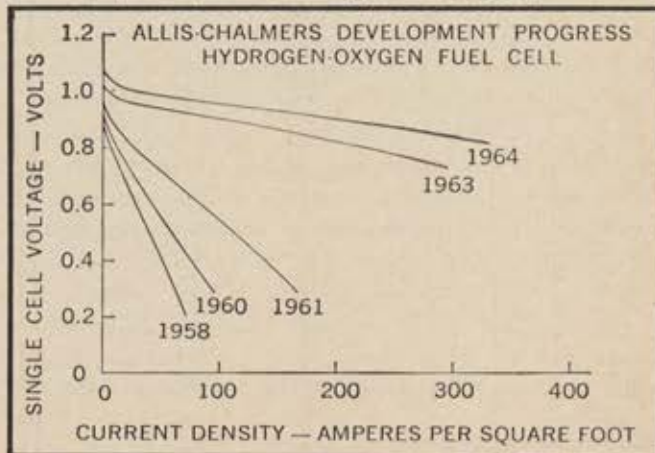
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—Gen. Curtis E. LeMay, in a letter to all Air Force personnel.

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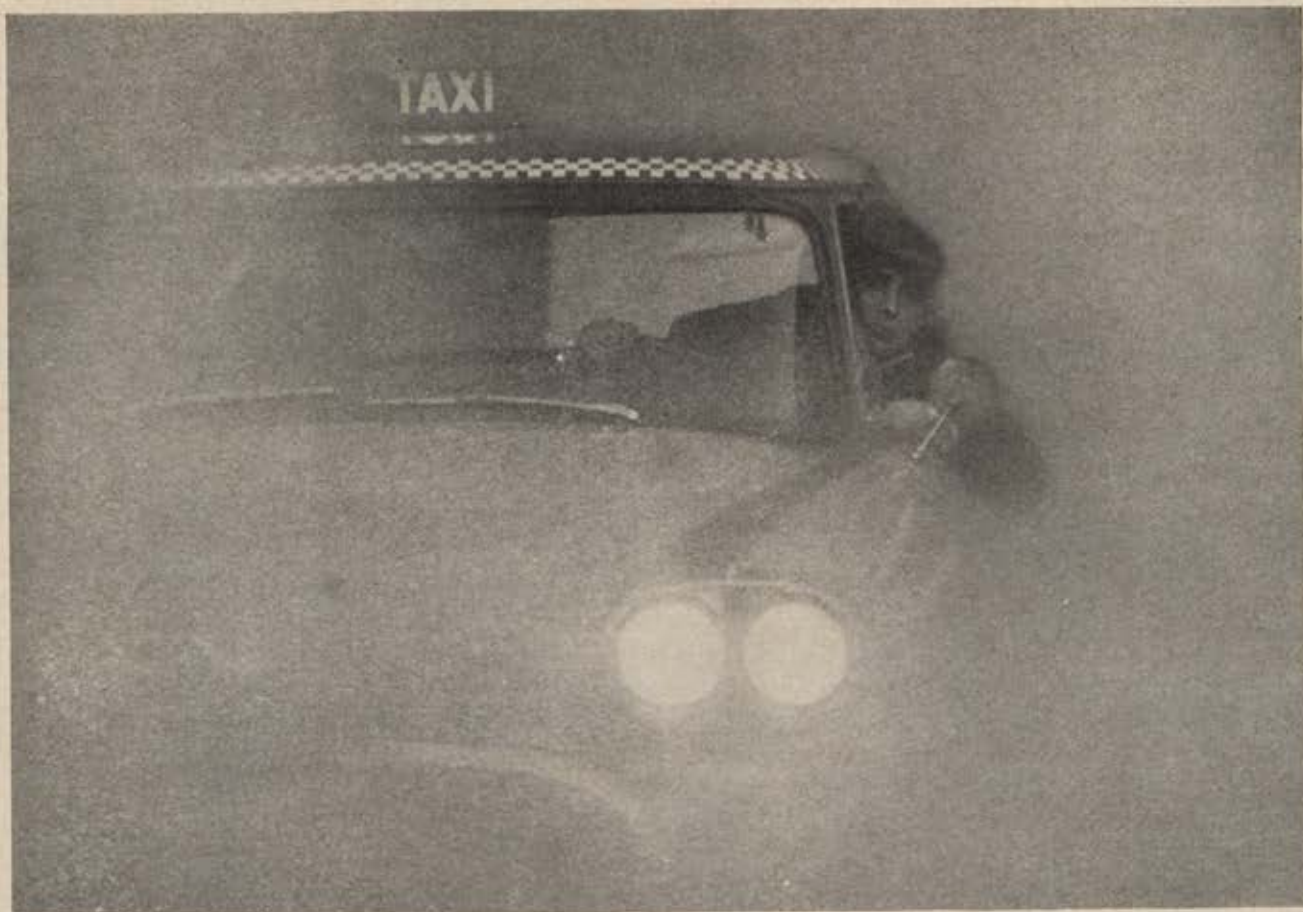
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CHAPTER OF THE MONTH

Cape Canaveral Chapter, Florida, cited for its Aerospace Education Seminar designed to dramatize for area educators the need for scientific literacy in the aerospace age.

The Cape Canaveral Chapter's Aerospace Education Seminar, held recently at the Cape Colony Inn, Cocoa Beach, Fla., had as its theme "Scientific Literacy in the Aerospace Age."

Five major areas were covered with presentations by outstanding people in their field. The high school presentation was given by Dr. B. Frank Brown, Principal of Melbourne High School and Chairman of the Aerospace Education Foundation's Advisory Committee. Dr. S. Fred Singer, Dean of the School of Environmental and Planetary Sciences of the University of Miami, gave the college-level presentation. News media were covered by Richard Lewis, Science Editor of the Chicago *Sun-Times*. Industry and government presentations were given by Dr. Leo Steg, Manager of the General Electric Space Sciences Laboratories in Philadelphia, Pa., and by Dr. Fred B. Tuttle, Deputy Director for Education at NASA headquarters in Washington, D. C.

Following these presentations, the seminar divided into five major groups for discussion of their individual topics. The next day, the seminar reconvened and heard reports from the individual discussion groups. The

reports were given by Dr. Robert Binger of the Florida Department of Education; Dr. Jerome Keuper, President of Brevard College of Engineering; George Alexander, Aviation Week's Cape Kennedy Bureau Chief; John G. Hazard, General Manager of North American Aviation's Space & Information Systems Division; and Maj. William R. Perry, USAF Education Officer at Patrick AFB.

At the opening day luncheon Lt. Col. Floyd C. Ethridge, Director of Candidate Advisory Service at the Air Force Academy, made a presentation entitled "Facing the Future." Highlight of the evening banquet was a speech on the subject "Aerospace Yesterday, Today, and Tomorrow," by Gen. W. F. McKee, USAF (Ret.), former Assistant Administrator for Management Development at NASA headquarters and recently named Administrator of the Federal Aviation Agency.

Also featured were a NASA Space-mobile presentation and a briefing and tour of the Cape Kennedy facilities.

More than 1,700 Arnold Air Society Cadets, Angels, and Professors and Assistant Professors of Aerospace Studies gathered in Washington, D. C.,

April 11-15 for the Society's Seventeenth Annual National Conclave.

AFA's National Secretary, George Hardy, was toastmaster at the opening-day luncheon at which AFA President Jess Larson was guest speaker.

At the Annual Awards Banquet on the final evening of the Conclave, Howard Markey, past AFA President, was toastmaster and Air Force Secretary Zuckert was the guest speaker.

Rep. L. Mendel Rivers (D.-S. C.), Chairman of the House Armed Services Committee, presented the Society's "Man of the Year Award" to Rep. F. Edward Hébert (D.-La.), a House Armed Services Committee member.

(Continued on following page)

Rep. F. Edward Hébert (D.-La.), right, smiles in delight after receiving the AAS "Man of the Year Award" from Rep. L. Mendel Rivers (D.-S.C.), center, as Air Force Secretary Eugene Zuckert looks on.



Susan Dreyfus, Tulane University, is crowned "Little General" by Gen. William Lindley as Cadet Don Fowler, AAS National Commander, beams approval.

Lee Cordell, former AFA Director, presents an award for the 126th Air Refueling Wing (TAC), Illinois Air Guard to its Commander, Brig. Gen. Howard Markey (see text on page 99).



Chatting at the Conclave are, from left, Brig. Gen. William Lindley, AFROTC Commandant; Gen. B. A. Schriever, Commander, AFSC; and Cadet Don Fowler, Colorado State University, AAS National Commander 1964-65.



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Looking over entries in the Aerospace Design Competition sponsored recently by AFA's California State Organization are, from left, Oz Anderson, chief judge of the competition; Marjorie Beringer, chairman of the Organization's Aerospace Education Committee; and George Balma, manager of the event.

member, for his sponsorship of the ROTC Vitalization Act of 1964. Among the other awards presented during the Conclave were the H. H. Arnold Trophy for Military Achievement to Gen. Thomas S. Power, USAF (Ret.); and the John F. Kennedy Award for Outstanding Contributions to Space Research and Development to Brig. Gen. Joseph S. Bleymaier, Deputy Commander for Manned Systems in AFSC's Space Systems Division.

In addition, the Muir S. Fairchild

Award for outstanding contributions to aerospace education went to Dr. Wayne O. Reed, US Associate Commissioner of Education; the Paul T. Johns Trophy to John F. Loosbrock, Editor of AIR FORCE/SPACE DIGEST, for his writings on aeronautics and astronautics; and a special citation of honor was presented to William Leavitt, Associate Editor of AIR FORCE/SPACE DIGEST, for his counsel and assistance with the Society's aerospace education program.

The General Hoyt S. Vandenberg Award for scientific contributions to aerospace development was presented to co-recipients—Dr. Hans-Georg Clamann, chief of the Bioastronautics Department of the USAF School of Aerospace Medicine and to Dr. Billy E. Welch, head of the Environmental Systems Department of the USAF School of Aerospace Medicine.

Angel Flight member Susan Dreyfus, a Tulane University coed, was crowned "Little General" by Brig. Gen. William C. Lindley, AFROTC Commandant (see cut on page 95). During the Conclave, Cadet Robert Wesson of Howard University, Washington, D. C., was named the AAS Commander and Diane Hunter of the University of Arizona became the new Angel Flight Commander.

Southern Methodist University will be the host squadron for the Eighteenth Annual National Conclave, which will be held in Dallas, Tex., next year.

The Arlington Chapter (Virginia) held a dinner meeting on April 27 at which Maj. Gen. Leigh Wade, USAF (Ret.), was guest speaker. General Wade, one of the pilots who in 1924 made the first round-the-world flight in four Douglas-built Army Air Corps airplanes, informally related some of his experiences during that memorable flight. To the amusement of all, Gen-

(Continued on page 99)

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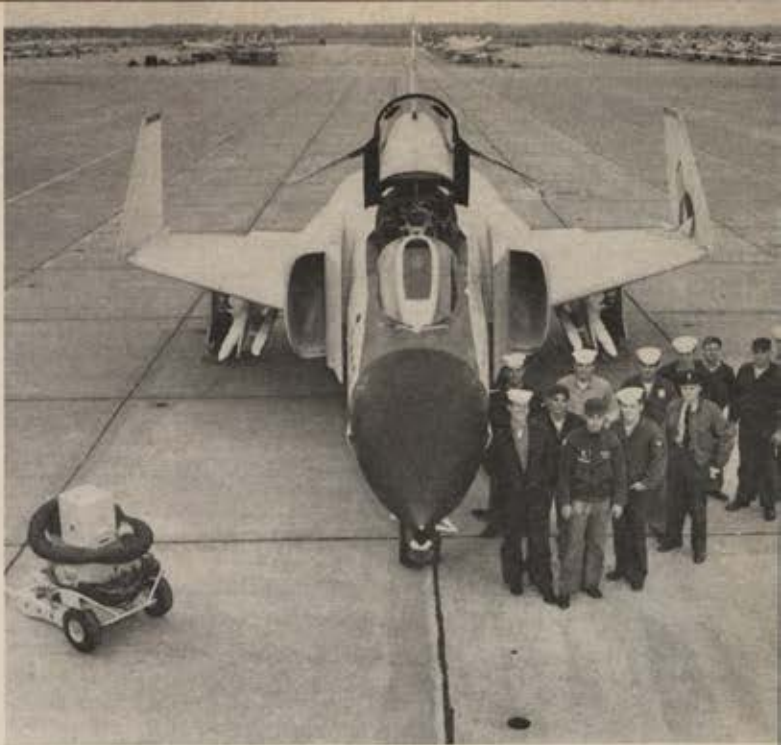
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eral Wade related some experiences which were not included in Lowell Thomas' famous book about the flight.

On April 4, AFA's Colin P. Kelly Chapter (New York) sponsored a meeting at Griffiss AFB Officers' Open Mess, which provided an opportunity for the local Air Force Academy nominees and their parents to view a film about the Academy, receive a briefing on the Academy, and have their questions answered by Academy graduates who are now stationed at Griffiss AFB.

Parents of local young men who are currently enrolled as Cadets at the Academy and parents of local graduates were also invited to the meeting.

This was the fourth consecutive year the Chapter has sponsored this event, and it is but one of the outstanding programs in a series planned to promote continued good community relations between local civic and Air Force groups and to present to the local community the need for continued support of aerospace power.

AFA's Illinois Organization held its Annual Awards Dinner on April 24 in the Assembly Hall of the Prudential Building in Chicago. More than 300 guests attended the dinner which honored the men in the Illinois Air National Guard.

John P. Henebry, past AFA President, served as Master of Ceremonies for the occasion, and the guest speaker, Maj. Gen. Winston P. Wilson, Chief of the National Guard Bureau in Washington, D. C., spoke on "Air National Guard Current Operations." General Wilson was also one of the award winners, receiving a citation for his support of last summer's Operation Ready-Go, which was the first non-stop deployment to Europe of Reserve Forces' jet aircraft.

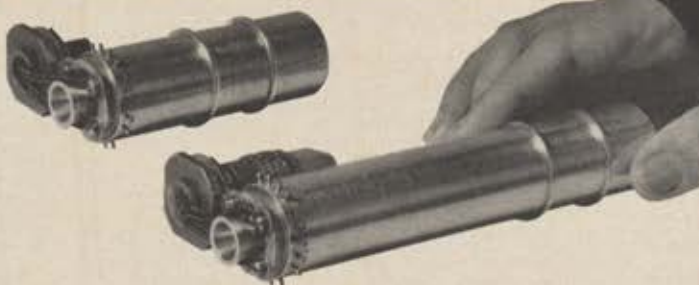
Brig. Gen. Howard Markey, past AFA President, who commands the 126th Air Refueling Wing (TAC) of the Illinois Air National Guard, accepted an award for the unit for its outstanding performance in refueling operations during the Ready-Go training mission over the Atlantic.

Other award winners were Maj. Gen. Donald J. Smith, Chief of Staff of the Illinois Air Guard, who was honored for his contributions in the modification of the KC-97 by installing jet engines in place of wing tanks and Maj. Gen. Wilson V. Newhall, former chief of the Illinois Air Guard, who was given a citation for his contribution to the effectiveness of the Illinois Air Guard.

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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.

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