

AIR FORCE

and **SPACE DIGEST**

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



KHRUSHCHEV



MAO TSE-TUNG



HO CHI-MINH



CASTRO

WHAT COUNTERINSURGENCY IS ALL ABOUT

See page 46

*"If you know yourself and know your enemy,
You need not fear the results of a hundred battles.
If you know yourself but not your enemy,
For every victory gained, you will suffer one defeat."*

—Sun Tzu, The Art of War,
Sixth Century, B.C.



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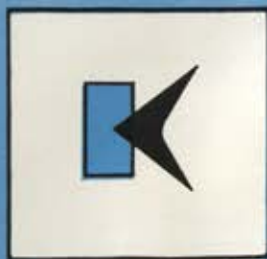
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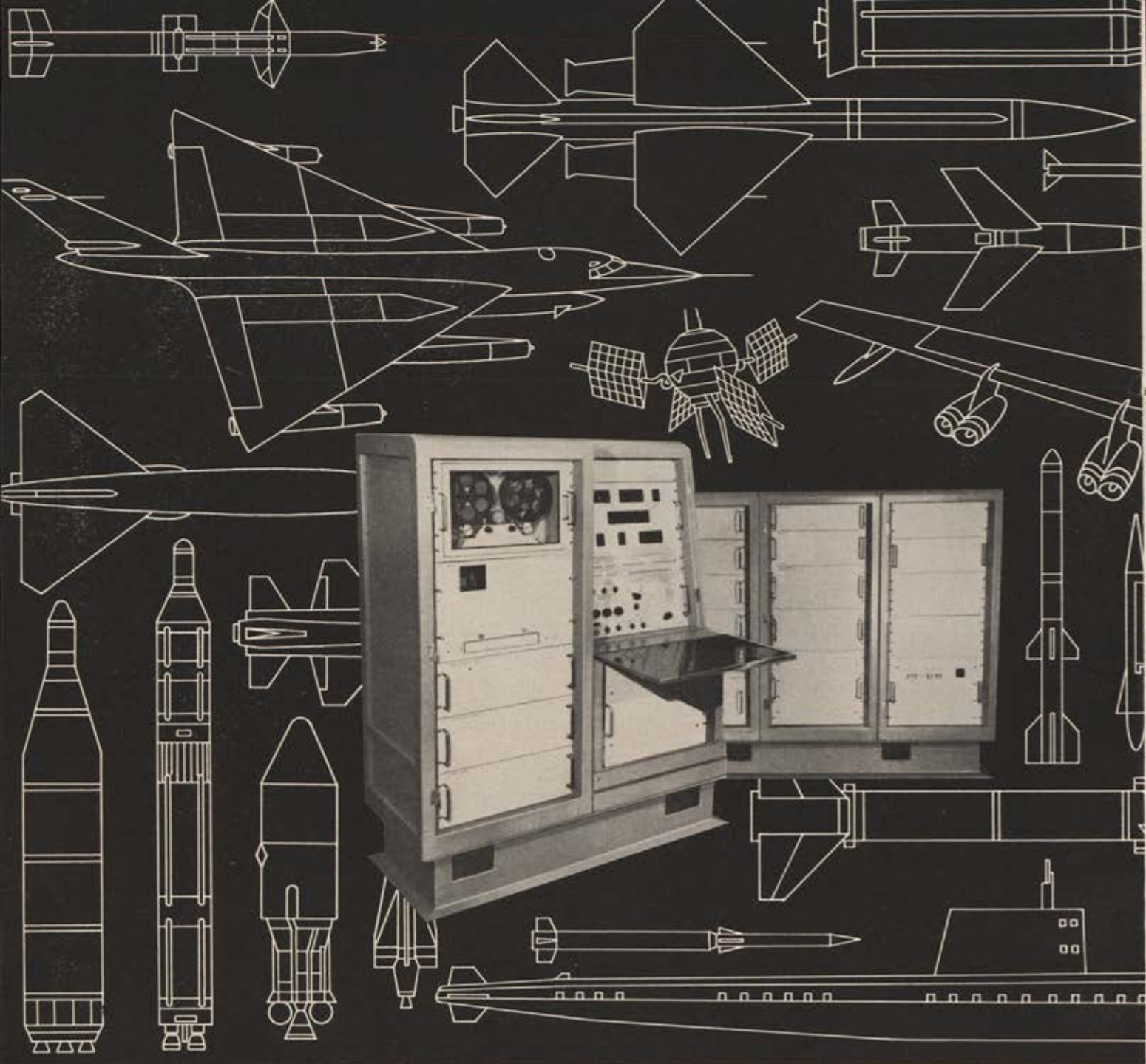
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MASTERMIND OF CHECKOUT

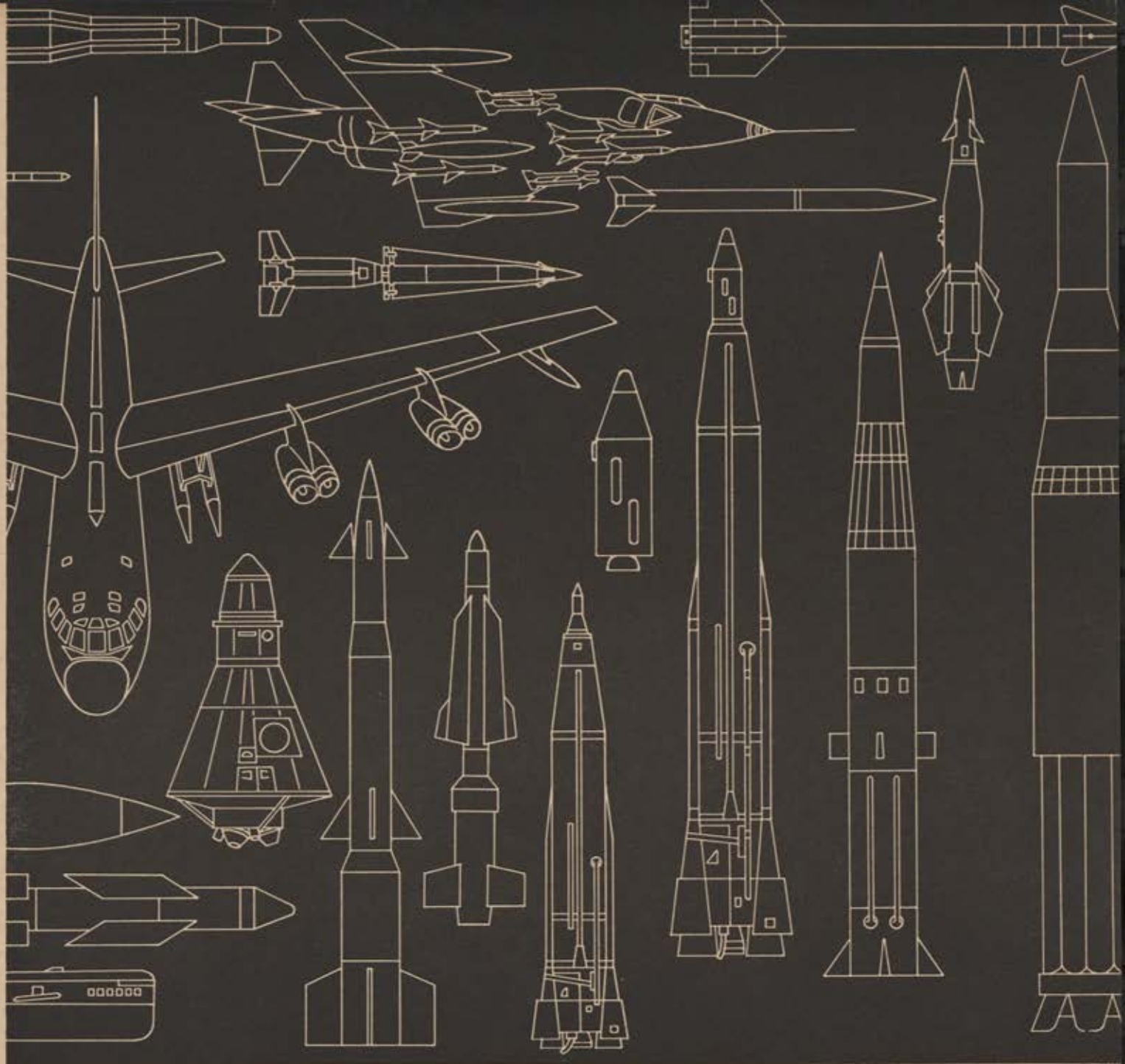
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Eclipse-Pioneer Division



**WHERE IDEAS
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THE FUTURE**

Scientific predictions indicate that solar activity will be at a minimum between July, 1964 and July, 1965. This has been designated as the International Year of the Quiet Sun, and during it a world-wide magnetic survey will take place.

□ The Douglas Space Physics and Planetary Sciences Group is studying scientific experiments to be performed on satellite and space probe missions during this period. Instruments to be used will be among the following: magnetometers; ionization chambers; G-M detectors; scintillators; solid state detectors; and spectrometers. □ The present Douglas Antarctica Riometer Station program for the study of cosmic rays will continue through this "Quiet Sun" period and

THE YEAR OF THE QUIET SUN ...AND WHAT DOUGLAS IS DOING ABOUT IT

will provide important data relative to solar cosmic ray and auroral events and the geomagnetic K-index. Douglas was invited to participate with the National Science Foundation in this program.



Preparation for the Year of the Quiet Sun world scientific survey is one of more than 500 research projects that are under way at Douglas. Some of these relate to the solution of problems on programs of today and tomorrow. Others range through development and research programs whose effects may not be evident until ten or twenty years in the future.

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AIR FORCE



The Magazine of Aerospace Power
Published by the Air Force Association



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SPACE DIGEST

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Are we so fascinated with the question of escalation and so convinced that using our nuclear power, should deterrence fail, would doom the planet, that we are in danger of weakening our nuclear capability as a vital factor in giving the Soviets pause if war comes?

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MANAGEMENT — 'The Pacing Factor'

By John F. Loosbrock

EDITOR, AIR FORCE/SPACE DIGEST

IN EARLY May, the air on California's lovely Monterey Peninsula is clear and cool. The world-famous golf courses of Pebble Beach and Cypress Point are lushly green and inviting. The worries and frustrations of a world gone awry seem out of place in that magnificent setting.

That the charms of Monterey and Carmel can be resistible when the proper motivation is provided was proved on the spot when 130 top executives of defense industry and key officers of the Air Force Systems Command sat down together for four days—May 2-5—at the Naval Postgraduate School in Monterey. The occasion was a conference sponsored by the Command on the subject of management—specifically management of the complex and serious business of researching, developing, producing, and procuring the military hardware on which the future security of this nation and its friends and allies of the free world so heavily depend.

It was a working, not a listening, conference. Five seminars directed their attention to five major areas—planning, source selection, procurement, financial management, and systems management.

Gripes were aired, sometimes with almost brutal candor. Problem areas were identified and looked at from both sides of the table with a view to solving or eliminating them. Best of all, and perhaps the most nearly tangible benefit of the conference, was the sharing of experiences and knowledge in the realization that the American taxpayer has a right to expect efficiency as well as effectiveness in the management of his resources.

Management, of course, is not new. Presumably someone managed the building of the Pyramids. Nor is military participation in management a thing of recent vintage. But it is only in the past several years, since World War II, that management per se has been recognized explicitly as a military requirement. The reason is the pressure that modern technology is applying to the military art. In opening the Monterey conference, Gen. Bernard A. Schriever, AFSC Commander, put it this way:

"Management is our theme because management is our need. Increased scientific and engineering competence will not speed up the rate of our technical progress, unless we learn to manage our resources more

wisely and efficiently. In systems acquisition today, management is the pacing factor.

"We can never get away from this basic fact. If we are going to move ahead, decisions have to be made on a timely basis. This is an essential aspect of management. But decisions are not always easy, and in today's environment the problem is complicated in several ways.

"For one thing, the number of alternatives has greatly increased. Ten or fifteen years ago, we had perhaps a dozen ways of performing a specific mission. Today we may have more than a hundred alternatives. Furthermore, many proposed systems will be only in the conceptual stages. We will be continually pushing the state of the art. As a result, we are faced with a greater number of unknown factors, longer lead times, and higher costs.

"Modern techniques can help us cope with some of these difficulties, and we are making increased use of computers and electronic data-processing as management tools. But this does not automatically solve our problems. In the first place, management techniques do not produce certainty; they only give varying degrees of probability. And the outcome of any technique, no matter how advanced, can never be more accurate than the input.

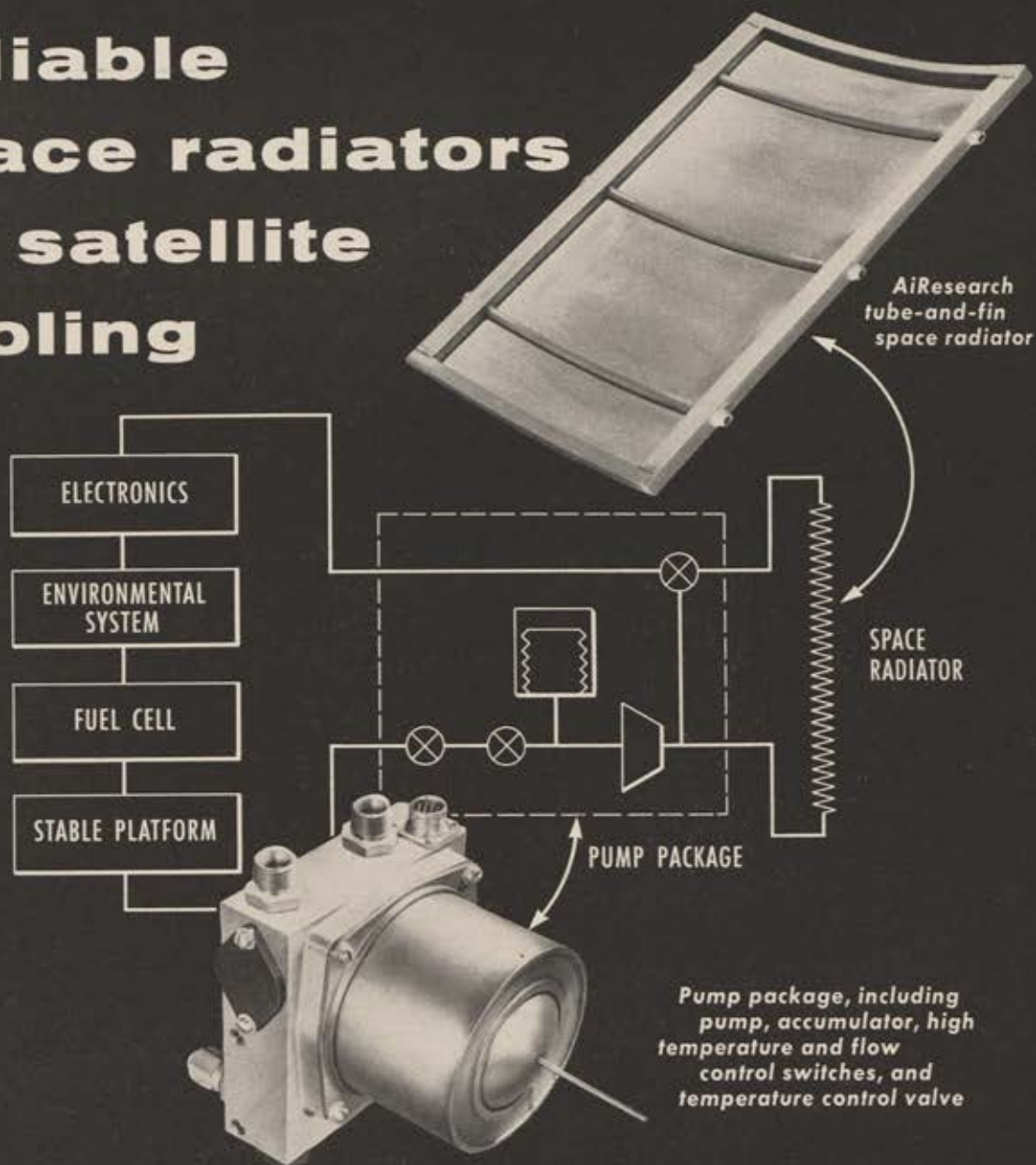
"A second source of difficulty is that decision-making cannot be delegated to a set of machines. The hard choices have to be made by men. The choices are not made any easier by the fact that our decisions may have a direct bearing on national survival. Where such far-reaching consequences are involved, we must decide solely on the basis of the best interest of the nation.

"This means at least two things. It means that the military cannot manage in a vacuum. We must always consider the total picture. Secondly, it means that our goals and priorities must be formulated objectively. It is not easy for any of us to maintain real objectivity. The specifications, the statistics, the flow charts may all point in one direction, but when you crank in the human factor you sometimes get unexpected results."

If Monterey is any indication, the human factor General Schriever was talking about is of uncommonly high quality, on both the military and the industrial sides of the management table.—END

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It is outer space.

Already, man has taken the first steps into space. And in the coming years he will reach farther and farther into space, traveling thousands of miles, living for days and weeks and even months in an alien environment.

The success of these journeys is one of the greatest challenges in the history of American industry. It has given the word "reliability" a depth of meaning it has never known before.

Indeed, the reliability demands for space travel are staggering. To assure a 99.9%



chance of return, a space traveler must have equipment whose mean-time-between-failures is 1000 times the expected length of the flight. This means that on an 8½-month trip to Mars the vehicle would have to be built to last more than 700 years.

Certainly no one is more aware of these immense reliability requirements than the engineers and scientists of the aerospace industry. Time after time they are called on to assure reliability in systems that have not even been designed. And time after time the desired reliability has been there when needed.

These unrelenting efforts by the aerospace industry are helping the Free World's astronauts in their conquest of outer space. They are helping the loneliest men on the loneliest job in the world today.

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AIRMAIL

Accurate and Useful

Gentlemen: Thank you very much for sending me an advance copy of *Air Force/Space Digest* which included an article on STRIKE ["STRIKE: Our Newest Unified Command," by Allan R. Scholin, May '62 issue].

I think that Mr. Scholin has prepared a very accurate and useful article. In spite of the publicity the US STRIKE Command has received to date, I find that there are many, both in and out of the services, who do not have a clear understanding of the purposes and missions of this command. Your article will be very helpful in clarifying this in the minds of any who read it. I hope that many do.

GEN. PAUL D. ADAMS
Commander in Chief
Hq., US STRIKE Command
MacDill AFB, Fla.

Quick Work

Gentlemen: ... Congratulations on your two recent, very timely features "Dyna-Soar Plus Titan III" [February '62] and "Aerospace Plane: Answer to Rocketing Costs" [May '62], by J. S. Butz, Jr.

For a monthly to beat the weeklies, that is really something!

KENNETH W. GATLAND, Editor
Spaceflight, Publication of the
British Interplanetary Society
New Malden
Surrey, England

Shades of '44

Gentlemen: On August 26, 1944, during a bombing attack on the Opel plant at Bischofsheim near Mainz, seven American flyers, including four officers and three noncommissioned officers, had to bail out. Two men, a lieutenant and a technical sergeant, were injured, possibly when they struck the ground. At the risk of my life, I, a member of the SS armed forces, saved the flyers from an angry crowd of foreign factory workers and others.

I have no further information on the men but hope that some reader might be able to help me locate them after these many years.

WILLI OTTO
Fuchssteig 28, bei Fr. Fotsch
Kelsterbach bei Frankfurt a.M.
Germany

Gentlemen: I am trying to locate my World War II fellow crew members of B-17 airplane number 42-107135. We were all transferred from Kearney, Neb., to overseas destination on Movement Orders, Heavy Bombardment Crew Number FF-400-CJ-117, dated April 9, 1944.

The crew members were: Pilot, 2d Lt. Hjalmer D. Stenseth; Copilot, F/O Harold A. Ostrander, Jr.; Navigator, 2d Lt. Charles A. Bauer; Engineer, Sgt. Richard W. Nelson; Radio Operator, Sgt. Franklin N. Cable; Gunners, Sgts. William A. Clayton, William D. Sweeton, Charles F. Griffin, and James C. Carpenter.

I realize the difficulty in trying to locate people after such a lapse of time, but any information as to their whereabouts would be appreciated.

JAMES F. O'BRIEN
Finance Officer
UNRWA
Damascus, Syria

Pride in the Air Force

Gentlemen: The article "A Lieutenant Looks at an Air Force Career," in your April '62 issue, is just so much more sour grapes. Time was when a man became an officer because he had the desire to serve and the ability to lead. Lieutenant White infers that today's officer, in the formative years of his career, has to be coddled and pampered.

I also am a first lieutenant with over five years of service. I don't have the "job security" of a Regular commission. I was nonrated for three years before going to navigation school and am now a qualified navigator-radar bombardier. I'm also married. I cannot appreciate Lieutenant White's concern over supervising people who make more than I do. I couldn't care less. If I wanted money I wouldn't be in the Air Force.

On page 95 of the same issue you have the comment, "Anything worth doing is worth doing for money." This is apparently Lieutenant White's outlook even though he says, "I do not look upon the Air Force as competing with industry for salaries." He devotes approximately one-fourth of his article to the inadequacy of Air Force pay

and allowances—now and in the future. My wife and I have no problems with today's Air Force officer's pay scale.

The Air Force's information program is quite adequate. If a man doesn't know what he's getting into after four years of college ROTC (or OTS training), then he's just plain thick. If he can't adjust to new environments, then he's not as mature as his age might indicate. Lastly, if he enters the Air Force with a "What's in it for me?" attitude he'd be better off not to bother.

There isn't a scale to measure the sum total of what the Air Force gives. For example, the pride of a job well done, the responsibility of an officer, travel, training, security, but most important serving your country in one of its finest organizations.

The Lieutenant Whites ought to quit comparing relative values and get down to the work at hand—building for peace.

1ST LT. MARSHALL P. KLINE
Mather AFB, Calif.

UNIT REUNIONS

11th Bombardment Group (H) Association

The reunion of the Association will be held in Toledo, Ohio, on August 2, 3, 4, and 5, 1962. Let's hear from anyone interested in attending.

Contact:
James G. Harwood
Secretary-Treasurer
1910 W. Bataan St.
Dayton 20, Ohio

414th Bomb Sqdn., 97th Bombardment Group

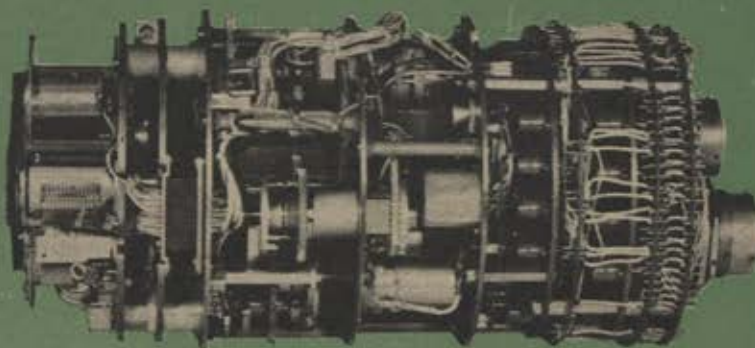
The biannual reunion will be held August 17, 18, and 19, 1962, at the Hotel Manger, Cleveland, Ohio. This is in commemoration of the 414th's first bombing mission, August 17, 1942, over Rouen, France.

Contact:
Charles A. Merlo
7335 Neckel St.
Dearborn, Mich.

452d Bombardment Group (H) Association

World War II members of the 452d are urged to contact:

Maj. Francis L. Ball
8102 Barbara St.
Omaha 24, Neb.



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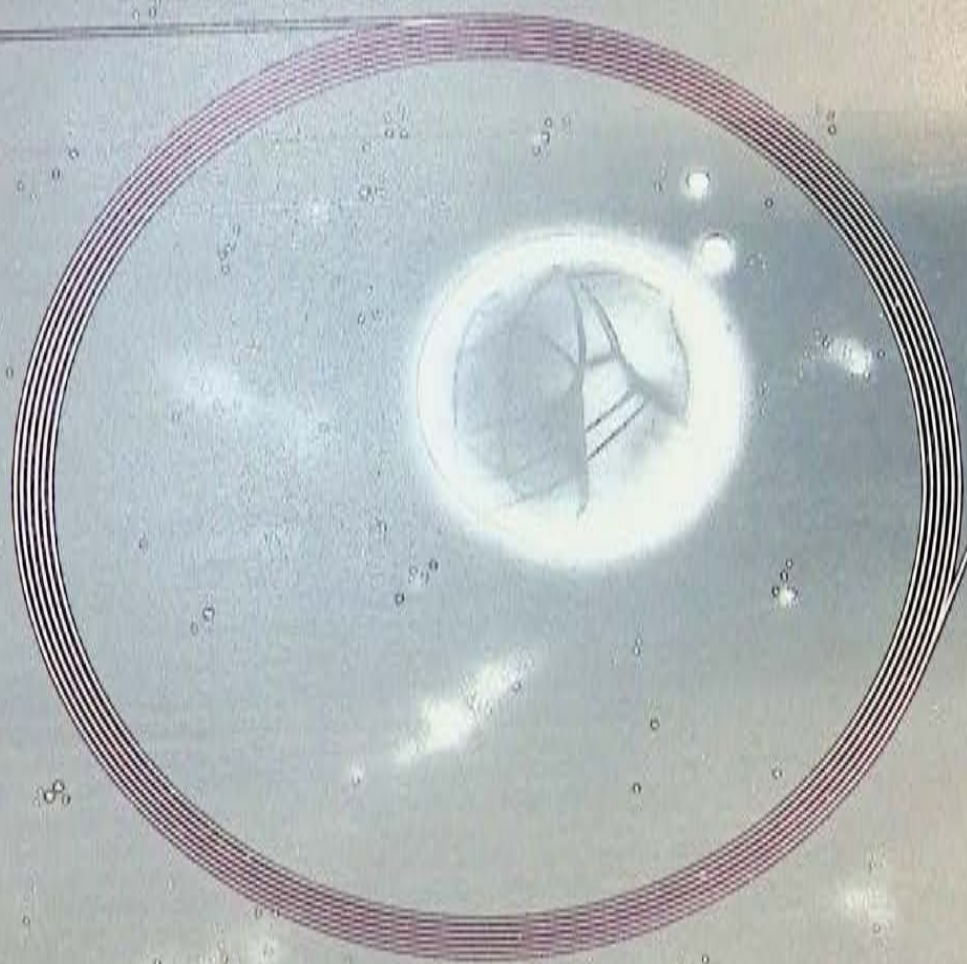


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WHAT'S NEW WITH RED AIRPOWER

TITOV'S VISIT

Soviet Air Force Maj. Gherman Titov, Russia's second Cosmonaut, who holds the current spaceflight record of seventeen circuits of the earth, orbited throughout the US in May, met high government leaders, appeared on many TV programs, and toured several cities. Ostensibly, his visit was to present a paper describing his orbital experiences to a meeting of COSPAR, the Committee on Space Research, set up by the International Council of Scientific Unions to continue the cooperative scientific activities.

Titov did not reveal any major new data concerning his flight. But several points worth noting were made either by him or those in his party which included Antoli Blagonravov, who has been prominent in artillery and rocket development since the 1930s and apparently is the technical leader of the Soviet space program; Vasili V. Parin, Director of the Institute of Normal and Pathological Physiology in Moscow and a space medicine leader in Russia; and Nikolai Kamanin, lieutenant general of aviation who has been described as the "mentor" of the Cosmonauts.

In typical Soviet fashion the new information raises as many questions as it answers, and the exact nature of Titov's flight remains as much a mystery as ever. The new information includes the following points:

- Titov's vehicle, the Vostok II, will be used again on another spaceflight. Titov made this very clear in his discussions with the press. Reusability, a very desirable quality especially for military use, implies structurally conservative design and an easy landing with low impact loads. Otherwise refurbishment between flights would have to include virtually a total disassembly of the vehicle to check for minute structural damage.

- The reentry and landing mode attributed to the Vostok II by the Soviets is somewhat at variance with the reusability claim. It is said that the spacecraft split into two pieces (the forward pilot's capsule and the instrument section on the rear) as soon as the retrorockets were fired. After the capsule reentered the atmosphere and was slowed down to subsonic speed, the Cosmonaut was ejected in a small seat-type capsule and descended by parachute. Titov also said that he could see the reentry capsule below him during part of the descent, and he landed only a short distance from it.

Titov never mentioned the rear instrument section which included the ring wing and the retrorockets. Presumably after separating in orbit at more than 100 miles' altitude, this section would not have landed near Titov and the pilot's capsule. Possibly Titov was not including this section when he said the Vostok II would be reused.

- Titov indicated that the vehicle carried above the crowd by a MIL-6 helicopter at the Soviet Air Force Day last July was an accurate mockup of the Vostok I and a true replica of its external configuration (see *Am Force*, March '62, page 36).

- The forward part of Vostok II apparently was covered with an ablation heat shield. Titov said he left the covers to the three portholes in his vehicle open during the reentry, "... though violating somewhat the regulation which demands closure of the portholes during descent." He said further that this action rewarded him with, "... a highly impressive picture of a purple flame outboard. The portholes began to turn yellow, and the glass acquired a thin coating."

Titov also spoke of small streams and globules of molten "steel" passing the portholes. The use of the word steel could very likely be attributed to the ineptness of Titov's interpreter whose ignorance of colloquial English, much less technical English, seemed to be part of the Soviet plan. This description indicates that the silicon-base material probably was used as the ablation shield. Silicon materials tend to flow as they absorb heat by melting and vaporizing. Phenolic resins—the other major class of ablation materials—pass directly from the solid to the gaseous state and a char layer is formed on the heated surface.

The use of an ablation heat shield on the very large Vostok vehicles (total internal volume of about 2,500 cubic feet) would certainly make sense. US specialists reported as long ago as 1959 that ablation shields had a weight advantage of more than forty to one over heat-sink heat shields. A somewhat smaller weight advantage was claimed over cooled structure.

- Titov's statements indicate that more than a dozen Cosmonauts have been trained.—END



AIRPOWER in the news



By Claude Witze

SENIOR EDITOR, AIR FORCE/SPACE DIGEST

Is Defense Industry a Public Utility?

WASHINGTON, D. C.

William M. Allen, who is President of the Boeing Company, last month told an Air Force Systems Command conference that he had managed to define his biggest challenge. It is: Should the government use private industry to design, develop, and build its weapon systems?

He went on to say that this question had not been answered with finality years ago, except in a form of lip service that is becoming fainter and fainter in the early 1960s. He was able to cite the conduct of both the legislative and executive branches of the government to prove that they do not always appear to understand what will make the system work.

It is true that the Defense Department has mapped a



William M. Allen,
President
of the
Boeing Company.

new procurement campaign that will emphasize incentives, which means profit for those who deserve it and penalties for those who don't, and sterner competition. The Department has indicated it will try to persuade the Renegotiation Board that there is a difference between incentives and excess profits that should be recognized in its deliberations.

Offsetting this are such disturbing things as the kind of unorthodox arithmetic used by the Staff of the Permanent Subcommittee on Investigations of the Senate Committee on Government Operations, reported in this space last month. In that case, contractors with systems management responsibility were portrayed as having made an unconscionable profit when it was measured against their in-plant effort, with no credit for what they did to make subcontracting possible and successful.

Even as Mr. Allen was speaking at the AFSC management conference in Monterey, Calif., the executive branch of the government had endorsed and was circulating a study of research-and-development contracting compiled by the Bureau of the Budget. Approved by the President and carrying the signature of Defense Secretary Robert S. McNamara as one of the authors, this document makes the

observation that "research-and-development-oriented industries have come to the fore—such as those dealing in aircraft, rockets, electronics, and atomic energy." There was no observation that this trend has been fostered in an early effort to meet what Mr. Allen calls his biggest challenge—the determination to use private industry to design, develop, and build weapon systems.

The Budget Bureau goes on to report that many of these "newer industries" rely heavily on government sales. It cites figures from 1958 to show that Beech Aircraft did sixty-seven percent of its business with the military services and the Martin Company 99.2 percent. Then, there is this observation:

"The present situation . . . is one in which a large group of economically significant and technologically advanced industries depend for their existence and growth not on the open competitive market of traditional economic theory, but on sales only to the United States government."

Here the executive branch is saying, loud and clear, that our most vital and advanced defense industries are not competitive. It is not unreasonable to deduce that the authors and endorsers of the report look upon defense industry as public utilities, like the electric light and power companies. This will come as a shock to Mr. Allen, for example, who has been fighting for business for many years with talent and reliability without knowing he had a franchise.

It also will be news to Beech and Martin. At this writing Beech, it is reported, will build ailerons for the USAF C-141 transport under subcontract to Lockheed. Beech was selected, according to the press, from seventeen bidders, each looked upon by Beech as a competitor. In the same way, Lockheed Missiles and Space Co. has recently been awarded a \$180 million government contract for the design, development, and assembly of RIFT (Reactor-in-Flight Test), after competition with the Martin Co. and General Dynamics. An unlisted number of other firms were eliminated from the RIFT race before these three were chosen to submit proposals to the National Aeronautics and Space Administration. No number of reports from the Bureau of the Budget, approved at the White House and signed by the Defense Secretary and the NASA Administrator, will change that outlook.

Not speaking for all the industry but presumably for a substantial part of it, Mr. Allen has rejected the idea that he heads a noncompetitive public utility and said in a loud voice that the government should encourage competition. He is in favor of competition and says it is one of the things that helps private industry in its consistent record of outshining government arsenals in the design and production of weapons.

The annual report of the Boeing Company, builders of such systems as the B-17, B-29, B-50, B-47, B-52, KC-135, Bomarc, and commercial 707 and 720, is available to any reporter, congressional investigator, or staff man in the executive departments. The report for 1961 says Boeing has a Military Aircraft Systems Division that has put much of its effort "toward a competition for . . . the TFX." It says

(Continued on page 17)



How to track a twister

When a tornado rips through the Midwest, how does the U. S. Dept. of Commerce Weather Bureau keep weather stations informed? With Weatherfax, the "picture-writing" communications pioneered by Western Union.

Good weather and bad, every day of the year, weather maps are plotted from local reports and Tiros telecasts. Then they're beamed in graphic form through the Weatherfax system to 660 weather stations in 350 cities. Daily, 57,600 maps flow to the armed forces, commercial airlines, truckers, and to farmers who outwit the weather at planting and harvest time.

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CREATIVE COMMUNICATIONS

ANOTHER IN A SERIES DEPTH MANAGEMENT IN ACTION

LTV PRESIDENT JOHNSON... "A NEW BRAND OF EFFICIENCY"

Ling-Temco Electronics and Chance Vought Corporation are now consolidated into a new industrial force — Ling-Temco-Vought. Responsibilities have been realigned to add new vigor and manufacturing and R&D efforts have been reorganized to gain maximum benefit from the total resources made possible by the creation of LTV. Non-essential lines have been eliminated, markets are being carefully defined, and company procedures have been streamlined so that LTV now operates with a new brand of efficiency in product areas that range from rockets for defense and space exploration to consumer air conditioners. Responsibility for consolidating the company's 20,000

employees and great material resources rests on the shoulders of a management team headed by LTV President Gifford Johnson. A vital component in LTV management in depth, Gifford Johnson has nearly 27 years' experience as an aerospace executive. Beginning with a West Coast aircraft company in 1935, he climbed steadily from material and production manager at Chance Vought in 1950 to company president ten years later. By combining this caliber of management with proved technical competence in aerospace, electronics, communications and consumer products, LTV is making important new contributions to national defense, space exploration and domestic programs.

LING-TEMCO-VOUGHT, INC.



DALLAS, TEXAS



Boeing has kept "well in front of all competitors in the commercial jet transport field." It says Boeing's Vertol Division is waiting for the Defense Department to make a decision on the size of its order for Marine Corps helicopters, where Vertol was announced "as winner of the competition." It says there are "two other competitions" for military helicopters in which Vertol is expected to make entries. It says that Boeing "is faced with very strong competition both from British and French firms with governmental backing. This is especially important in the short- to medium-range field where French and English aircraft are directly competitive with the 727."

All of these italics have been added because they stand in sharp contrast to the Budget Bureau's conclusion that firms like Boeing "depend for their existence and growth not on the open competitive market of traditional economic theory, but on sales only to the United States government." There is no mention in the report or Mr. Allen's speech at the AFSC conference of any franchise held by the company or any other defense contractor that justifies the Budget Bureau's conclusion. In fact, BoB could learn from the Boeing report for 1961 that the firm is cautious about the future. "Substantial risks are involved in our business," the report says, "and it should be recognized that we are faced with hazards, many beyond our control."

One of these hazards might be the outlook of an administration that denies risks are involved in the defense business, but Boeing prefers to cite sudden changes in military planning and its observation that "competition for aerospace business continues strong." There is mention of foreign competition, which was recognized when the report was written, many months before the Defense Department announced it is prepared to invest \$35 million in further development of the British Hawker VTOL project, designated the P-1127. Without challenging the merits of the Hawker proposal, which were reported with awe on this page in a discussion of the Farnborough aircraft show of 1960, the fact remains that Hawker is competitive with American aircraft firms and their technological talent. If Americans lose in this competition it should be because they are inferior, never because their political administration views them as industrial outcasts or public utilities, depending for sales on a captive market.

To complete Mr. Allen's thesis it is necessary to report that he is disturbed by both legislative and executive department attitudes toward private defense industries. On Capitol Hill he discerns a tendency to espouse the "pork-barrel philosophy" in the award of military business and says that any legislator who favors this does not believe in private industry's participation in the defense effort. In the executive branch Mr. Allen again hears professions of faith in private industry but finds them blurred by an expressed distaste for profits, which he views as essential if his business is to survive. Even a public utility, with regulatory commissions nipping at its heels, is allowed to pay regular dividends, and most of them do.

Congress Grinds On

The Defense Department, as this issue of AIR FORCE/SPACE DIGEST goes to press, is having a sticky time of it before a couple of committees on Capitol Hill.

Rep. F. Edward Hébert, chairman of a House Armed Services Subcommittee that is studying the National Guard and Army Reserve situations, is inclined to frown on a program to cut four divisions from each. Defense Department witnesses argue that the Reserves should be smaller in size and divided into smaller units that will be more efficient

and mobile. Their state of training also must be improved to meet the kind of weaknesses brought to light in the recall to meet the Berlin crisis. The National Guard Association has replied that there is a deliberate effort to downgrade Reserve components and warned that state military forces will be doomed if the trend goes unchecked. There are fifty states involved, which means that most of fifty governors and their political organizations are fertilizing congressional criticism of the proposed cutback.

Chairman Hébert, jolted by a General Accounting Office report that one out of three Army Reservists was misassigned, nevertheless is on the record as saying he will press on with his inquiry "if it takes until doomsday to find out what unknown spook at the Pentagon" planned the Reserve cutback. It was clear that the Army is the service in the line of fire. Both Navy and Air Force witnesses said

Gen. Curtis E. LeMay,
Chief of Staff, USAF,
testifying before
Senate Appropriations
Subcommittee
on May 16.



—World Wide Photos

their callups were successful and that they are proud of the record set by Reservists. Over on the Senate side, the unrest was voiced by the Defense Subcommittee of the Appropriations Committee, whose chairman, Senator A. Willis Robertson, said he would favor providing funds for full Reserve strength, which is 400,000 men in the Guard and 300,000 in the Reserve. Mr. Robertson at one point baited Defense Secretary McNamara, who grew vehement probably for the first time on the Hill:

"No ex-sergeant, no thirty-six-year-old civilian, no one poorly informed or inexperienced had a damned thing to do with the development of the Reserve and National Guard program," he said.

In another area in which Mr. McNamara's judgment has been crossed by the will of Congress, the Robertson committee called to the stand Gen. Curtis E. LeMay, USAF Chief of Staff (see cut). The subject, of course, was the Air Force's RS-70 proposal. You will recall that the committee was vexed at an earlier date when it learned USAF's presentation had been edited to suit the Defense Secretary. The committee demanded the same facts on which the House had based its decision to raise the RS-70 funding for fiscal 1963 from \$171 million to \$224 million. Mr. McNamara, called to task for his interference, has reappeared before the Robertson committee to suggest that the additional funds appropriated by the House be retained in the bill. He says he now recognizes the strong congressional interest in the RS-70 and other matters and promises to continue studies now under way. He did not promise to spend the funds but there still is no doubt that Congress supports the Air Force viewpoint. This was made most

(Continued on following page)

clear when General LeMay appeared. He had no prepared presentation for the group but answered questions in his usual direct way. There was no dissent to any of his comments from the committee.

The Chief of Staff made one of his strongest points in favor of an all-out RS-70 development program when he told the committee he considers it a "low-risk" program. Supported by Gen. Bernard A. Schriever, chief of the Systems Command, he argued that all of the proposed subsystems are within the state of the art, and added that he never has seen the start of a new weapon system development program where this was more true. General Schriever commented that the RS-70's technology is far closer to the grasp of practicability than was that of ballistic missiles at the same point in the ICBM cycle. General LeMay said

A GRAVE THREAT TO OUR SECURITY

Americans discovered two of the most outstanding inventions of this century—the airplane and the liquid-fueled rocket. Yet in neither case did we realize their significance to our national security until after other nations had turned them to military purposes and directed them against us and our allies.

During World War I, American airmen flew gallantly in combat, but the planes they flew were designed in Europe.

After World War II we made detailed studies of captured V-2 rockets but the basic principles had been demonstrated by Robert Goddard in the 1920s. . . . Both Nazi Germany and Soviet Russia saw the possibility that the rocket might give them a decisive breakthrough in weapons development. . . .

There is much evidence to suggest that the Soviet Union has similar hopes in regard to space. This is a new medium for potential military operations. . . .

If the Soviets should attain a really significant breakthrough in space technology, they may be able to deny other nations access to space even for purposes of scientific research. Soviet attainment of this capability would pose a grave threat to our national security.

—GEN. BERNARD A. SCHRIEVER,
Commander, Air Force Systems Command,
at the National Meeting on Manned
Space Flight, St. Louis, Mo.

that limiting the program to the Administration's effort of \$171 million would cost more than a year in his effort to get three prototype weapon systems ready to go by 1967.

"This program has been slowed down at least four years," the Chief of Staff said. "We have delayed and delayed until there is practically no risk in it now."

In the committee record no effort was made to recall that Secretary McNamara, relying on Defense Department expertise, had said in mid-March that "it is a matter of record" that the B-70 is "a very doubtful proposition, with the weight of competent scientific, technical, and military opinion against it for many years." Mr. McNamara went on at that time to say the RS-70 version will require key elements which may lie "well beyond what can be done on the basis of present scientific knowledge. . . . It is clear that there are many very different technical problems yet to be solved—and, indeed, yet to be fully understood—before we

can have any reasonable expectation that the reconnaissance capability required by the RS-70 can actually be developed and produced within the 1967-1970 time period." And in his sharpest clash with USAF judgment: "The RS-70, as proposed by the Air Force, is very far from being ready for production or even full weapon system development."

USAF, of course, has not offered a production program or suggested that it is time to prepare one. General LeMay made this clear in his testimony. He was asked at least twice about the origin of a report that the RS-70 program will cost more than \$10 billion. Both times he replied that the figure did not originate with USAF. Members of the committee can find the reference in the twenty-first paragraph of Mr. McNamara's statement given at his press conference on March 15, 1962.

Appealing for the full \$491 million requested by USAF for RS-70 development in fiscal 1963, General Schriever told the committee that failure to provide the funds would result in at least a year's delay on a decision to go into production, if that is required for national security. Both of the generals then cited the problem at the plant of North American Aviation, where special skills have been developed by fabricators of the all-steel RS-70 aircraft. If these workers are laid off, they warned, their talent and training will dissipate. If production later is found necessary the personnel will be lost and a new training effort will be needed. General Schriever said this damage to the "industrial base" could be far more costly than the present USAF program.

General LeMay made it clear to the senators that he also has endorsed a bigger effort in the field of ballistic missiles and put his objection in the record when one committee member referred to him as a "bomber man."

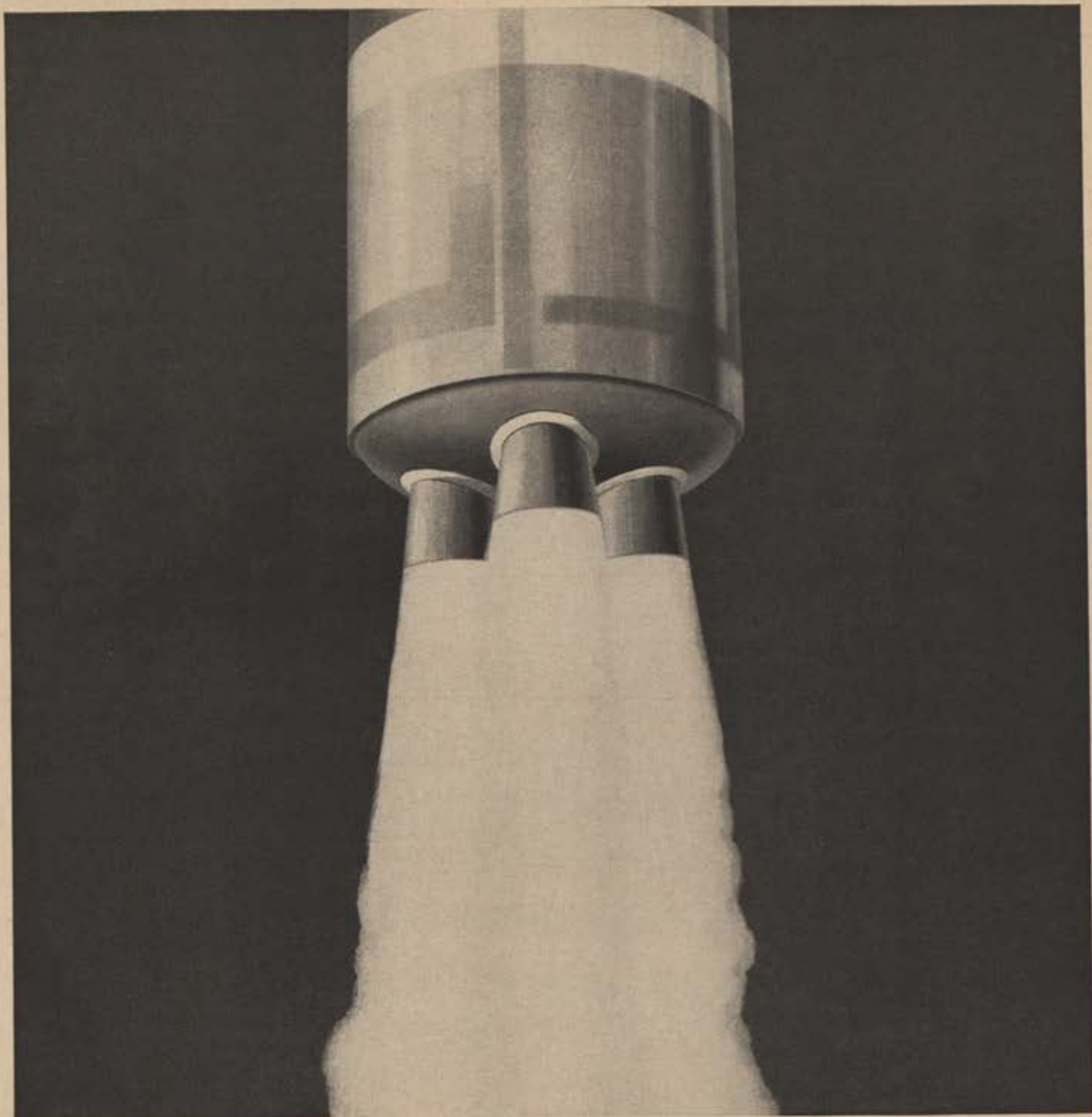
"I object to the term bomber man applied to me," he said. "I will use the most effective weapon system that will do the job. If that's kiddie cars, I'll use kiddie cars. . . ."

"My assessment of the threat is that we should build more strategic strength as soon as we can." Then, under questioning, General LeMay pointed out that the last of the B-52s will be delivered in September and warned that the trend in defense budgeting will result in loss of US superiority in this deterrent area. He gave an example of why the maintenance of manned bomber strength is essential, even in the cold war:

"Without the strategic umbrella we can't do anything. It was our strategic strength right under the gun of the enemy which enabled us to go into Lebanon without firing a shot." With new Lebanons in the making all over the world, the message was not lost on the senators.

Chairman Robertson, at the start of this exchange, made it clear for the committee record that General LeMay had been summoned by the committee. It followed that if his answers displayed some variance from the opinions of Secretary McNamara and his highly qualified experts, this was what the committee wanted to hear. Undoubtedly, all of the committee members were informed, before the meeting, that General LeMay would be the witness and that the subject would be the RS-70.

It is at least interesting, and possibly significant, that Chairman Robertson was the only Democrat to appear for the session. Regular Republican members Saltonstall, Young, Smith, Dworshak, Mundt, and Allott were present, along with Barry Goldwater, who was invited as a special guest. On Chairman Robertson's right, all seats were empty. A staff spokesman says this was coincidence, that all of the Democrats had other committee chores on the morning of May 16. The convenience of these assignments was not overlooked by the audience.—END



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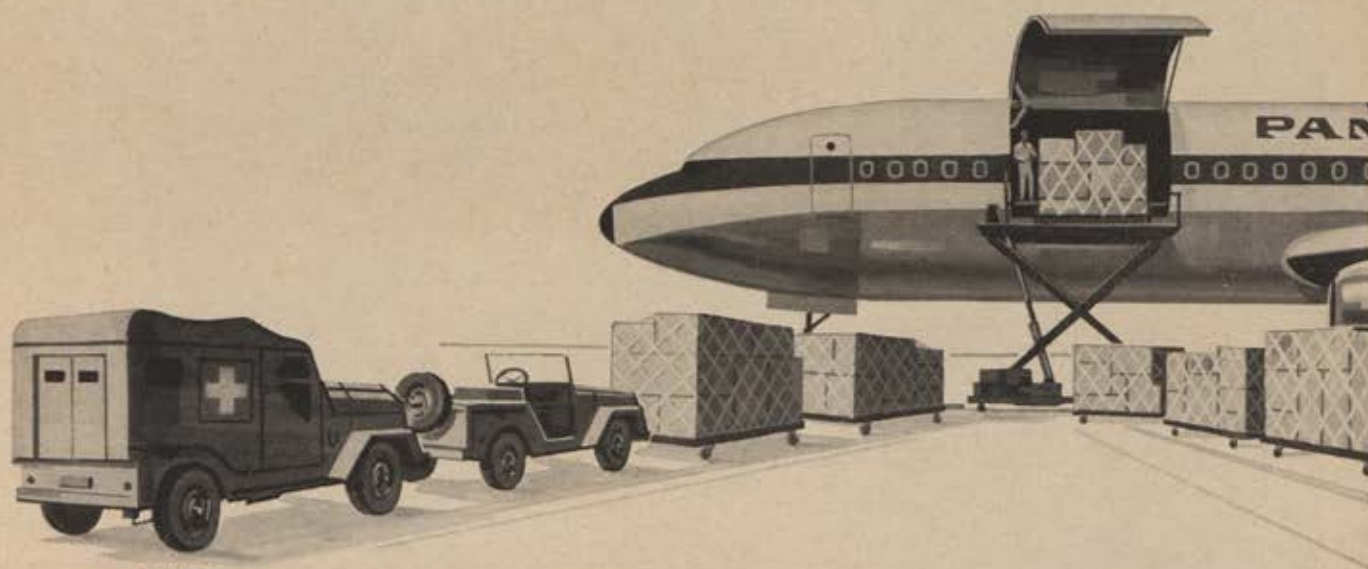
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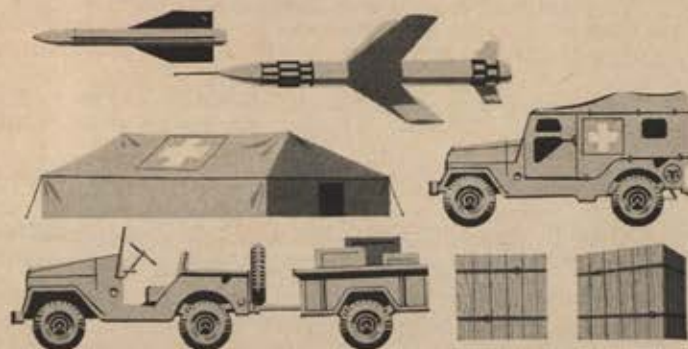
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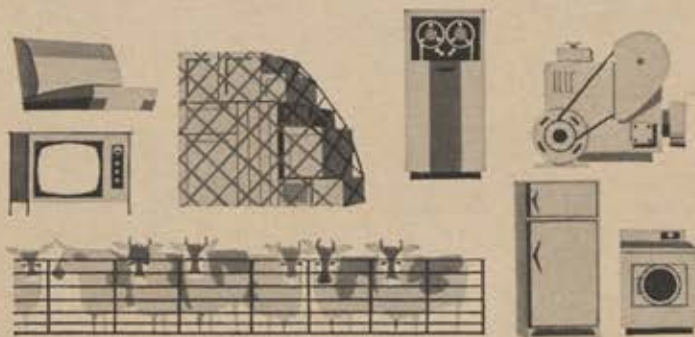
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AEROSPACE WORLD

By Allan R. Scholin

ASSOCIATE EDITOR, AIR FORCE/SPACE DIGEST

The US Air Force demonstrated its entire spectrum of manned combat capability to President Kennedy, Vice President Johnson, and other leaders of US and foreign governments in a highly concentrated four-hour show at Eglin AFB, Fla., May 4.

With the Eglin demonstration, President Kennedy has now seen all the armed forces in action. He visited Fort Bragg to witness Army capabilities last October, and the Navy and Marines performed for him along the Virginia-North Carolina coast in mid-April.

The Air Force presentation featured the greatest collection of USAF planes and airborne missiles ever assembled in one location, from the C-47 and B-26 to the F-110 and X-15. (The President saw USAF ballistic missile operations during a visit to Vandenberg AFB, Calif., in March.)

At Eglin's main base, President Kennedy toured the static displays, then watched eight SAC B-52 bomber

crews dash to their planes and take off within eight minutes, almost as fast as an ADC scramble of F-101 interceptors. He saw personnel of USAF's new Special Air Warfare Center demonstrate counterinsurgency tactics (see article on page 46.)

Then, at Range 52, after a twenty-one-photoflash salute delivered by three RB-66s, the Air Force unlimbered its guns and went to work, with a deafening pageant of firepower interspersed with sonic booms. A B-52 released a Hound Dog which found its bull's-eye far out in the Gulf of Mexico. Interceptors zoomed from ground level to close on high-flying targets with rockets and Falcon and Genie missiles. In tactical support, F-105s loosed sixteen 500-pound bombs each in dive-bomb runs, and F-100s fired live ammunition over the heads of airborne troops who had arrived minutes before by C-130s. In all the missions, no targets were missed.



—Wide World Photos

Setback for Centaur as second stage blows up shortly after launch on May 8.



—US Air Force photo

South Vietnamese Air Force Capt. Nguyen Huy Anh, holding microphone, delivers message of greeting and thanks from South Vietnam's President Diem and pledge of "no retreat" to President Kennedy, seated in car with AF Secretary Zuckert at May 4 Eglin AFB airpower demonstration. At left of Captain Anh is Col. Ben King, head of the Special Air Warfare's Center's 1st Combat Applications Group.

Afterward, the President sent congratulatory messages to Secretary of the Air Force Eugene M. Zuckert and Chief of Staff Gen. Curt LeMay, asking that they be passed along to Gen. Thomas S. Power of SAC, Gen. Walter C. Sweeney of TAC, Lt. Gen. Robert M. Lee of ADC, and Maj. Gen. Robert H. Warren of the Air Proving Ground Center at Eglin.

General LeMay added a postscript of his own to those who participated:

"Of all the air shows I have witnessed, the Eglin demonstration given for the President was by far the finest," he said. "Secretary Zuckert joins me in expressing our hearty congratulations and deep appreciation to you and your people responsible for this out-

(Continued on following page)

standing display of United States airpower."



The retirement of **Gen. Frederic H. Smith, Jr.**, USAF Vice Chief of Staff since July 1961, brings to the Air Force's number-two military spot a management expert who has helped direct the USAF logistics program for the past nine years. He is **Gen. William F. McKee**, fifty-five, Commander of the AF Logistics Command since last August and for eight years before that Vice Commander of AFLC's predecessor, the Air Materiel Command. Rated an aircraft observer, General McKee is the first nonpilot to rise to USAF four-star rank. He received the AFA's first Distinguished Management Award in 1957.

General Smith's premature retirement resulted from a blood vessel ail-



Northrop N-156, shown here in flight, will be bought by DoD for selected nations under Military Assistance Program. Powered by two GE J85-5 turbojets and able to carry 5,000 pounds externally, N-156 can fly Mach 1.4.



—British Information Services

The Department of Defense is investing \$35 million in the British-developed Hawker P-1127. It is a vertical-takeoff-and-landing strike/reconnaissance aircraft.

ment causing sustained hypertension. He will be fifty-four years old on June 30. Generals Smith and McKee were graduated in the same West Point class in 1929. General Smith went immediately into the Air Corps. General McKee was in the Coast Artillery when in 1942 he was assigned to the Air Force as an air defense officer.



Launchings... With the Scott Carpenter orbital attempt still to come as this was written, a partially successful moon shot of the Ranger IV and the spectacular failure of the long-overdue Centaur (see cut on page 23) highlighted US launchings during the past month.

The Atlas-powered Ranger IV, fired from Cape Canaveral on April 23, achieved its basic objective of hitting the moon, covering the 231,486 miles in sixty-four hours. But failure of a vital timing device prevented Ranger IV from taking close-up television pictures of the moon and ejecting an instrumented ball for a soft landing to report temperature and other data from the moon's surface.

Nevertheless, NASA officials expressed themselves as well pleased with the effort, and said they would be ready to try again before the end of the year.

The Atlas-Centaur, programed for a fifteen-minute ballistic trajectory, exploded less than a minute after blast-

off on May 8. Films and radio readings indicated that the explosion was triggered when fumes emanating from the second-stage liquid-hydrogen fuel were ignited by the Atlas exhaust.

Next Centaur attempt is now scheduled for October. Meanwhile, a House space subcommittee headed by Rep. Joseph Karth (D-Minn.), is looking into reasons for the long delays in the Centaur program, first scheduled for launch in January 1961.

In addition to the Ranger IV, three other successful satellite launchings occurred during the month. Two departed under USAF auspices from California launch sites—an Atlas-Agena on April 26 from Point Arguello and a Thor-Agena on April 28 from Vandenberg AFB. While no information was released on their objectives, they may have been placed in orbit to gather data on US nuclear tests. In the other successful launch, a US Thor-Delta propelled a satellite bearing British scientific equipment into a 200- to 600-mile orbit from Canaveral on April 26 to gather data on the ionosphere and cosmic radiation.

Meanwhile, the Soviets launched **Cosmos IV**, also on April 26, with the announced purpose of investigating radiation in space, and recovered it three days later.

Another US failure was recorded on May 10 when ANNA—a joint Army, Navy, NASA, Air Force mapping satellite using a Thor booster—plunged into the Atlantic off Canaveral after its Able-Star second stage failed to ignite.

SAC crews fired two Atlas missiles and a Titan I from Vandenberg—the (Continued on page 27)

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Gen. USAF (Ret)

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Atlases on April 27 and May 11, and the Titan on May 4.

At Canaveral, USAF suffered its second Minuteman failure on April 24, destroying the missile after forty-five seconds when it deviated from its flight plan. A second Minuteman launch on May 11 was successful.

As of May 11, USAF reported the following box scores on Atlas, Titan, Minuteman, and Thor including both satellite boosts and missile launches:

VEHICLE	SUCCESS-		FAILURE	TOTAL
	FUL	TIAL		
Atlas	88	26	15	129
Titan	39	10	4	53
Minuteman	10	1	2	13
Thor	116	13	17	146



NASA's veteran test pilot Joe Walker on April 30 flew the X-15 to a record height of 246,700 feet, just about winding up altitude tests for the X-15 project. Walker's flight was powered for eighty-two seconds and reached a top speed of 3,400 miles per hour.

Racked back against his seat by the force of acceleration, Walker had trouble reaching the power cutoff switch. "I felt as if I'd go into orbit if I didn't cut the switch," he said later. "On about the third try, I managed to reach it."

Although six previous X-15 flights have far exceeded the official world altitude record of 113,000 feet held by the USSR, only the April 30 flight was monitored by National Aeronautic Association officials who will submit it to international authorities for a new record.

Some sort of record among world record breakers must have been set by Jacqueline Cochran on April 22. As chairman of the board of NAA, Miss Cochran has been spearheading an NAA drive to regain world records for US aviation.

Flying a "normal production" Lockheed JetStar, Miss Cochran not only set a new women's nonstop straight-line distance record of 2,295 miles between New Orleans, La., and Gander, Newfoundland, with six point-to-point women's records in between, but she proceeded on to Bonn, Germany, via Shannon, London, and Paris to pick up eighteen more records.

Total elapsed time for the entire trip, including stops, was thirteen hours, forty minutes, at an over-all average speed of 484 mph. An official of the Fédération Aéronautique Internationale on board timed the flight.

USAF declared a second squadron of Titan ballistic missiles operationally ready on May 8. Like the first Titan

squadron, which went into operation April 18, the new squadron is near Lowry AFB, Colo. Total of SAC's operational missiles is now seventy-two-fifty-four Atlas, eighteen Titan.

The fifth fighter wing being added to USAF's growing tactical strength will be activated at McConnell AFB, Kan., in October. It is the 388th TF Wing, to be equipped with F-100 Supersabres. Previously announced are two wings to be set up at MacDill AFB, Fla., initially with F-84Fs drawn from Air Guard squadrons leaving active duty, later to get the McDonnell F-110; a wing of F-84Fs in Europe

need, on the part of the Air Force and of the industry which supplies it, to know more about each other's problems throughout the whole systems planning-and-acquisition cycle.

Five hard-working seminars covered the subjects of "Planning for Systems Acquisition," "Source Selection," "Procurement," "Financial Management," and "Systems Management."

Major speakers included Deputy Secretary of Defense Roswell Gilpatric; Rep. Gerald R. Ford, Jr. (R-Mich.), of the House Subcommittee on Defense Appropriations; Assistant Air Force Secretary Joseph S. Imirie; Dr.



MATS Commander, Lt. Gen. Joe Kelly, left, accepts Daedalian Trophy for having most effective accident-prevention program among major air commands during 1961. Award is made by AF Inspector General, Lt. Gen. William H. Blanchard, on May 5 at Kelly AFB, Tex.

—US Air Force photo

made up from Air Guard units which have been serving there, and an F-100 wing to be activated soon at George AFB, Calif.

Echo I, still orbiting the earth after almost two years, contributed its micro-meteorite-battered skin to a transcontinental TV broadcast late in April. MIT's Lincoln Laboratory, with equipment developed under USAF contract, successfully bounced a TV signal from its field station at Camp Parks, Calif., off Echo I, 1,000 miles above the US, to its station at Millstone Hill, Mass.



The theme "need to know" ran through the highly successful Air Force Systems Command Management Conference May 2-5 at the Naval Postgraduate School in Monterey, Calif. AFSC invited 130 top industry executives—presidents, vice presidents, board chairmen—to sit down for three days in "eyeball-to-eyeball" discussion with their Air Force opposite numbers in the systems management and procurement business.

The "need-to-know" theme does not refer to the usual problem of access to classified material but rather to the

John S. Foster, Jr., Director, Lawrence Radiation Laboratory, University of California; Gen. Bernard A. Schriever, AFSC Commander; Lt. Gen. Howell M. Estes, AFSC's Deputy Commander for Space Systems; and Maj. Gen. O. J. Ritland, Commander of AFSC's Space Systems Division.



AWARDS.... To Dr. Edward Teller, the Thomas Dresser White National Defense Award, to be given annually by the US Air Force Academy to an American citizen for outstanding contribution to the national defense of the US. Dr. Teller is the first recipient. ... To Lt. Col. William R. Payne, of SAC's 43d Bomb Wing, Carswell AFB, Tex., the Mackay Trophy for the "most meritorious flight of the year" in piloting a B-58 on the first supersonic transatlantic crossing, in May 1961 over Lindbergh's route. ... To the US Air Force, the Bendix Trophy, for a record-breaking transcontinental run, also by B-58, in March, piloted by Capt. Robert G. Sowers of Carswell AFB. Captain Sowers and his fellow crew members, Capt. Robert MacDonald, (Continued on following page)

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AEROSPACE WORLD

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navigator, and Capt. John T. Walton, defensive systems officer, each received miniature Bendix Trophies. . . . To Capt. Paul R. Baker, Shaw AFB, S. C., the Kolligian Trophy for "an outstanding feat of airmanship," in landing his F-101 safely after hitting a large bird which smashed his windshield, temporarily blinding him and resulting in severe facial cuts. . . . To the Military Air Transport Service, the Daedalian Trophy for Flight Safety, for the most effective aircraft accident-prevention program among major commands in 1961. . . . To Brig. Gen. Frank P. Lahm (Ret.), a special citation from the USAF Chief of Staff honoring him as the nation's first military pilot, presented at the Daedalians' national convention at Kelly AFB, Tex., in May. . . . To James V. Bernardo, NASA's director of educational programs, the Frank G. Brewer Trophy to "an individual or organization which contributes most to the development of air youth in the field of education and training." . . . To Mikhail L. Mil, Russian helicopter designer, the first Igor I. Sikorsky International Trophy for outstanding achievement in the advancement of the helicopter art. . . . To the Fédération Aéronautique Internationale, the Edward Warner Award for "outstanding contributions to the development of international civil aviation." The award commemorates Dr. Edward Warner, president of the ICAO Council from 1945 to 1957. . . . To Civil Air Patrol Cadet James R. Aaron, China Lake, Calif., CAP's Bronze Medal of Valor, for "distinguished and conspicuous heroic action" in helping to save the life of his pilot after their plane crashed in the California Sierras. . . . To SAC's Zaragosa, Spain, Air Base and MATS's Donaldson AFB, S. C., the Hennessy Trophy, for excellence in management, preparation, and serving of food USAF-wide. . . . The Arnold Air Society, at its annual meeting in April, presented its Gen. H. H. Arnold Trophy to Maj. Bob White of the X-15 project; the Gen. Hoyt Vandenberg Trophy to the National Broadcasting Company; the Gen. Muir S. Fairchild Trophy to North American Aviation, and the Paul T. Jones Trophy to Dr. Edward C. Welsh, executive secretary, National Aeronautics and Space Council, for major contributions to aviation.



STAFF CHANGES. . . . Brig. Gen. Chester W. Cecil, Jr., from DCS/Administration and Logistics, Hq. PACAF, to Comptroller, Hq. AFLC, Wright-Patterson AFB, Ohio, effective July 1. . . . Brig. Gen. Thomas R. Ford, from Commander, 41st Air Division, to Commander, 6100th



Dr. Launor F. Carter, Research Director of System Development Corp., is new Chief Scientist of USAF.

Support Wing, PACAF. . . . Brig. Gen. Travis M. Hetherington, from DCS/Plans and Operations, to DCS/Administration and Logistics, Hq. PACAF. . . . Brig. Gen. Andrew J. Kinney, from Chief, Plans Branch, Plans and Policy Division, SHAPE, to Director of Development Planning, DCS/Research and Technology, Hq. USAF. . . . Brig. Gen. John B. McPherson, from Commander, 823d Air Division, SAC, Homestead AFB, Fla., to Commander, 810th Air Division, SAC, Minot AFB, N. D., effective July 23.

Maj. Gen. Walter I. Miller, from DCS/Comptroller, to Assistant to Commander in Chief, Hq. USAF. . . . Maj. Gen. Richard M. Montgomery, from Assistant Vice CofS, Hq. USAF, to Commander, 823d Air Division, SAC, Homestead AFB, Fla. . . . Maj. Gen. Thomas E. Moore, from Commander, Sheppard Technical Training Center, ATC, Sheppard AFB, Tex., to Assistant Vice CofS, Hq. USAF. . . . Brig. Gen. Gilbert L. Pritchard, from Commander, New York Air Defense Sector, ADC (NORAD), McGuire AFB, N. J., to Commander, USAF Special Air Warfare Center, TAC, Eglin AFB, Fla. . . . Brig. Gen. Paul T. Preuss, from Assistant Administrator, Office of Plans and Requirements, FAA, Washington, D. C., to Commander, Detachment 4, 4608th Support Squadron, ADC, L. G. Hanscom Field, Bedford, Mass. . . . Maj. Gen. Osmond J. Ritland, from Commander, Space Systems Division, AFSC, Inglewood, Calif., to Deputy to the Commander for Manned Space Flight, Hq. AFSC, Andrews AFB, Washington, D. C.

Maj. Gen. James E. Roberts, from Deputy for Personnel, Hq. TAC, Langley AFB, Va., to Commander, Sheppard Technical Training Center, ATC, Sheppard AFB, Tex. . . . Brig. Gen. Arthur G. Salisbury, from Commander, Detachment 4, 4608th Support Squadron, ADC, L. G. Hanscom Field, Bedford, Mass., to Commander, New York Air Defense Sector, ADC (NORAD), McGuire AFB, N. J. . . . Maj. Gen. Henry R. Sullivan, Jr., from DCS/Operations, Allied AF Central Europe, to Chief, Plans Branch, Plans and Policy Division, SHAPE. . . . Maj. Gen. James F. Whisenand, from DCS/Plans, Hq. AFSC, Andrews AFB, Washington, D. C., to Assistant DCS/Research and Technology, Hq. USAF. . . . Brig. Gen. Clair L. Wood, from DCS/Personnel, Hq. ATC, Randolph AFB, Tex., to Commander, 1001st Air Base Wing, Headquarters Command, Andrews AFB, Washington, D. C., effective July 23.—END



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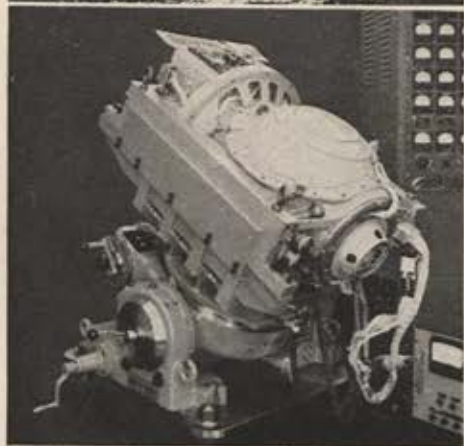
for the astronaut...

Turning theory into hardware

Technological breakthroughs are almost an everyday occurrence in electronics. Everywhere we see many new scientific discoveries being turned to the service of man.

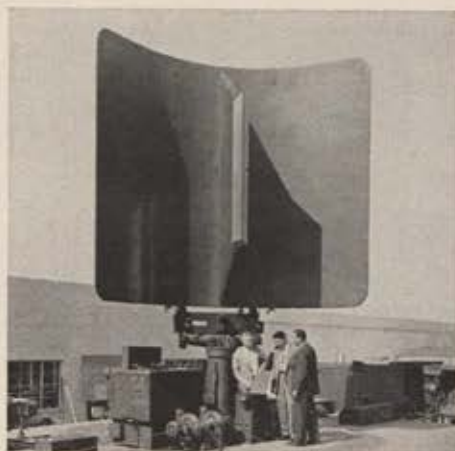
Hughes is one of those companies whose obligation is not only to form these theories, but also to visualize how they might be applied. And then to make that application—both in man's defense and in the betterment of his life.

Today, Hughes technology is being applied in over 500 projects, programs and studies.



Polaris missile brain

Through the application of its advanced manufacturing technology, Hughes is now a prime contractor in inertial guidance systems (illustrated above) for the U.S. Navy's Polaris missile. It is one of the world's mightiest, most reliable forces for freedom.



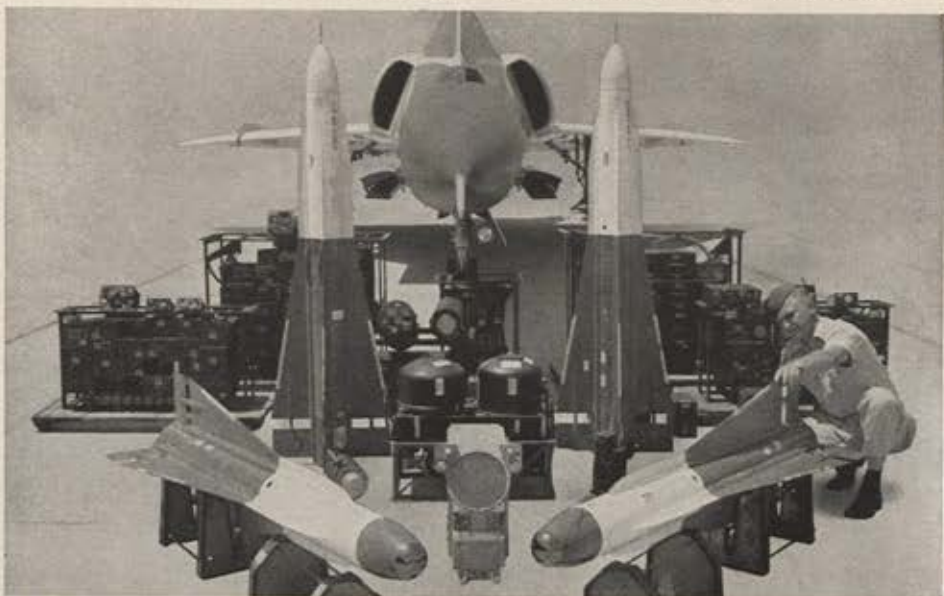
"No-rock" radar

Aware of the limitations of conventional radar which must "rock" to position its beams, Hughes pioneered a technology where the beams are positioned electronically. Based on land or aboard ships, this antenna gives 3-dimensional information—range, bearing and altitude—on hundreds of targets. Even more advanced Hughes antennas, which search hundreds of miles of sky, are now on operational duty.



Satellite "switchboard"

Soon, NASA is scheduled to launch the first communications satellite capable of being remotely spin stabilized and positioned in a 22,300 mile-high synchronous orbit. Just three similar Syncom satellites could relay the telephone, TV, telegraph and radio-photo messages of 130 nations. Hughes—developed and built for NASA, this Syncom system could add a new dimension to man's communication with his neighbors.



Modern Falconry

In the late 1940s, airborne electronics was in its infancy. Yet, in a few years, U.S. Air Force jets were equipped with Hughes advanced weapons control systems armed to fire Falcon missiles. Together (and vastly improved) they have become our most potent air defense weapon. Hughes—the leading builder—has delivered thousands of control systems and well over 30,000 infrared and radar-guided Falcons.

at Hughes

A few are shown to illustrate: Completely new technologies which are creating new devices... Major improvements in existing technologies... Advanced manufacturing technologies which produce more reliable hardware for duty in this world—and out of it.

More than 5,000 Hughes engineers help create the theories. More than 20,000 other skilled Hughes people help translate their work into practical hardware. Together they are helping create a new world with electronics.



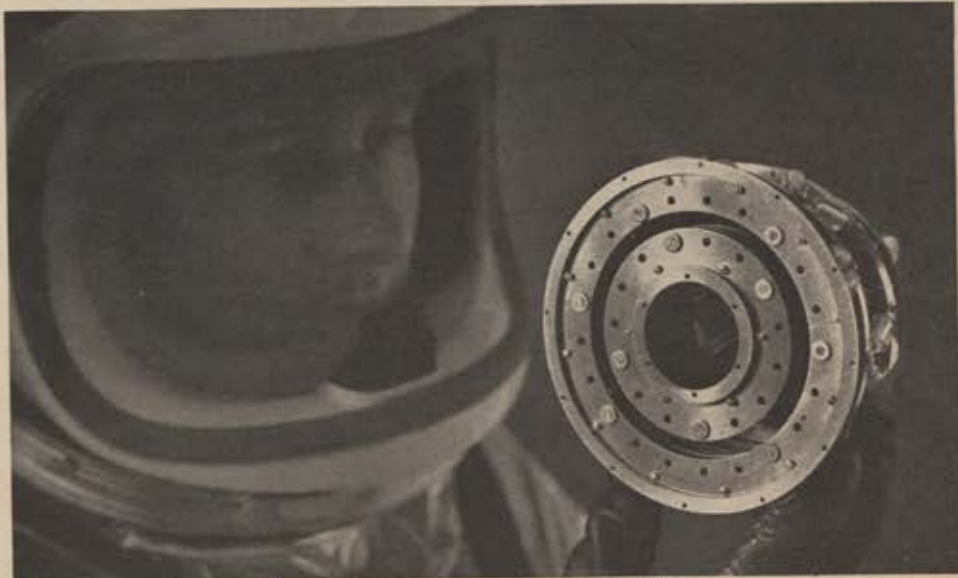
Boxed air defense systems go anywhere

Air-lifted by helicopter to inaccessible areas, Hughes new "packaged" air defense control systems can be ready for operation in minutes. The "helihuts" contain a highly miniaturized "operations central" plus communications networks for battlefield control of U.S. Army and Marine Nike and Hawk missile batteries.

Creating a new world with electronics

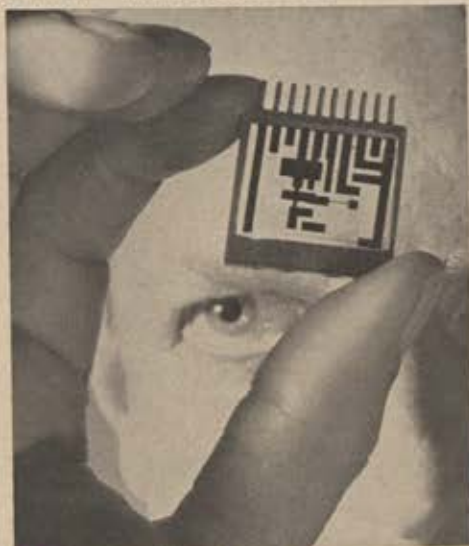
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Ion engines for deep-space probes

Hughes research into the theory of electrical propulsion has led to development of ion engines which are called the "ultimate" source of power for deep space trips. Built for NASA, Hughes cesium-powered ion engines have been "test-flown" in space-simulating vacuum chambers—and are scheduled for actual test in space within the year.



Microelectronics

Heat, vibration, overweight—these are the enemies of common electronic circuits. One example of Hughes micro-miniaturization technology puts a complete circuit on a thin film. Lighter, cooler and more reliable, it can withstand the most rugged usage in supersonic airborne systems.



Missile checker

Today's checkout systems must provide the "preventive medicine" that keeps our missiles in constant readiness. Result of Hughes advanced computer technology, D-PAT (Drum—Programmed Automatic Tester) has a built-in "intelligence" of 1 million bits of information. This capability is now in the U.S. Air Force's VATE program to check and evaluate ICBM missiles—in less time, with greater accuracy, at less cost.



We're putting all space under one roof at Northrop

Northrop has long been vigorously dedicated to the investigation of space, with a wide range of active programs and advanced research facilities distributed throughout its several divisions. Now all these varied space activities have been brought together under one management as Northrop Space Laboratories.

Through this realignment, each space program will be assured of getting the maximum concentration of scientific,

technical, and managerial talent. Moreover, all programs will be backed up by the experience, capabilities, and manufacturing facilities of the entire Northrop Corporation.

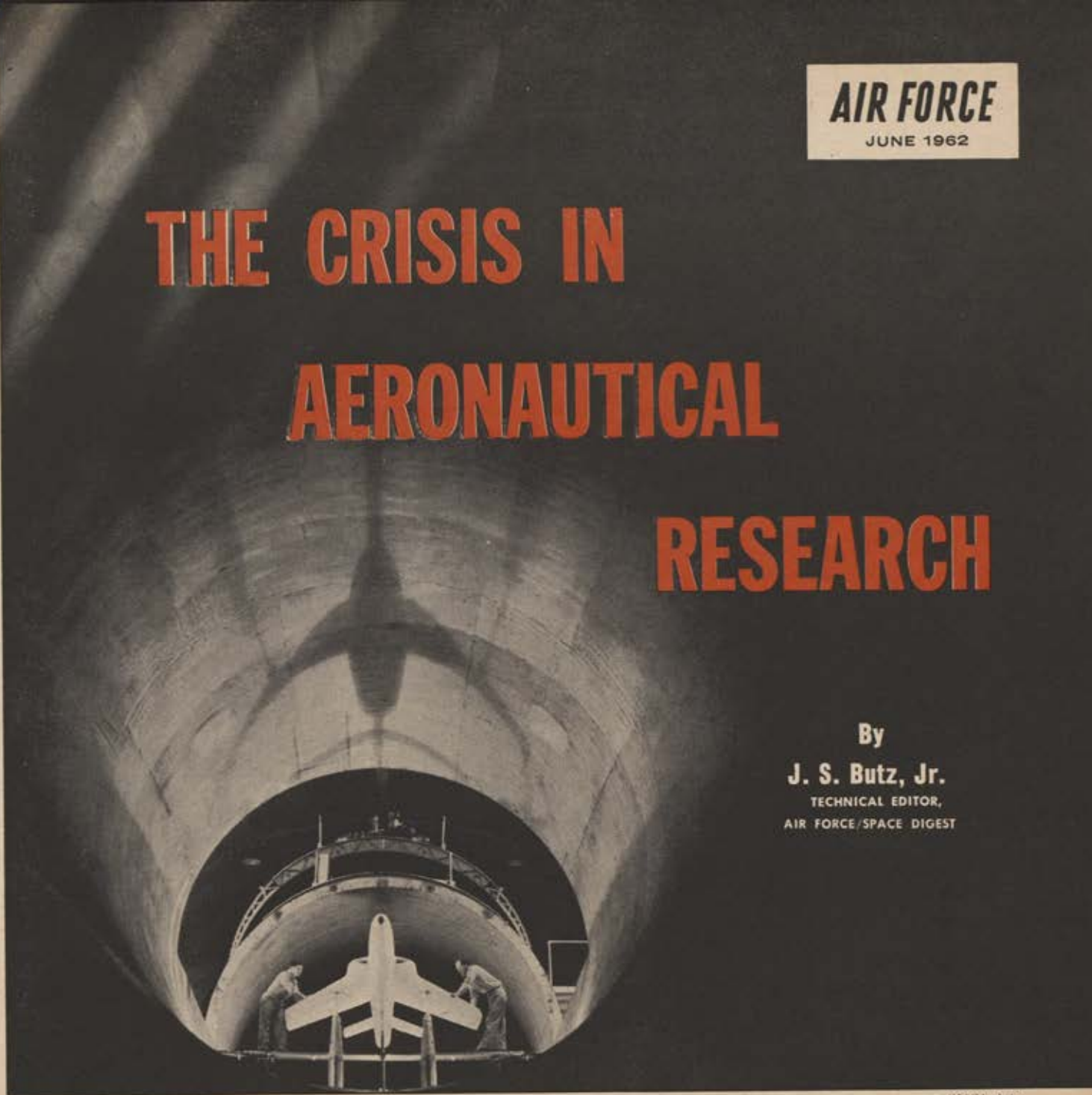
Northrop Space Laboratories will be located in Hawthorne, California, where new, completely equipped research facilities are now under construction.

NORTHROP

THE CRISIS IN AERONAUTICAL RESEARCH

By

J. S. Butz, Jr.

 TECHNICAL EDITOR,
AIR FORCE/SPACE DIGEST


Shadow out of the past. The photo above was taken some years ago in one of NACA's giant wind tunnels at Langley Field during the heyday of aeronautical research. Now NASA is drastically cutting its budget for this kind of research.

THERE is ample evidence to support the contention that the Russians, and possibly the British, are surpassing us in [aeronautics]. . . . There is a general belief in the aviation industry that the national preoccupation with space developments has all but halted any advance in the theory and technology of aerodynamic flight. . . . We should make a substantial effort to correct this situation, possibly by getting some of NASA's aeronautical and aerodynamic experts back into the field of advanced aircraft research and development."

So read the report on US space activities, prepared for President-elect Kennedy in late 1960 by an *ad-hoc* committee headed by Dr. Jerome B. Wiesner.

During the past eighteen months, as Dr. Wiesner

has moved on to become the President's Scientific Adviser, little has happened to change this assessment of aeronautical research. In fact, the situation has deteriorated, with support for advanced aviation in all speed ranges continuing on the downgrade.

The reduction in support persists despite the fact that the opportunities in aviation today are greater than ever before. Two representative and expert opinions are those of Professor Courtland Perkins, of Princeton University, a former Chief Scientist of the Air Force and a close aviation adviser to the Army, and Mr. Ira H. Abbott, recently retired Director of Advanced Research Programs for NASA.

Concerning all types of aircraft operating between
(Continued on following page)

sea level and 70,000 feet at forward speeds from zero miles per hour to Mach 3 or 4, Professor Perkins has said, "Many people think that this area is completely worked over and nothing more would be gained [by further research], but I can assure you that such is not the case, and there are great gains to be achieved if we just set about achieving them."

Before his retirement, Mr. Abbott told a congressional committee: "Far from believing that aeronautics has achieved adulthood, we believe that it stands on the threshold of its most rapid advancement, which will make all previous aeronautical progress seem slow. We are determined to do our part to support this progress by providing the critical research information and advanced facilities necessary. . . ."

In the face of such predictions and promises it is difficult to understand why the news in aeronautics is so bad in the three areas that most affect advanced research and growing technology. These are:

- **Advanced Projects.** There are plenty of aircraft development projects in progress or about to start which draw heavily on research information that was mostly gathered in the late 1950s. These projects include the C-141 strategic transport, the triservice VTOL transport, the Army's light observation helicopter, and the new Mach 3 TFX fighter for which the contractor selection was scheduled before this magazine will be delivered. However, there are no new advanced research projects in being or scheduled to provide the basic data for the next generation of aircraft and the bright future of lower costs and greater aircraft versatility foreseen by Professor Perkins and Mr. Abbott.

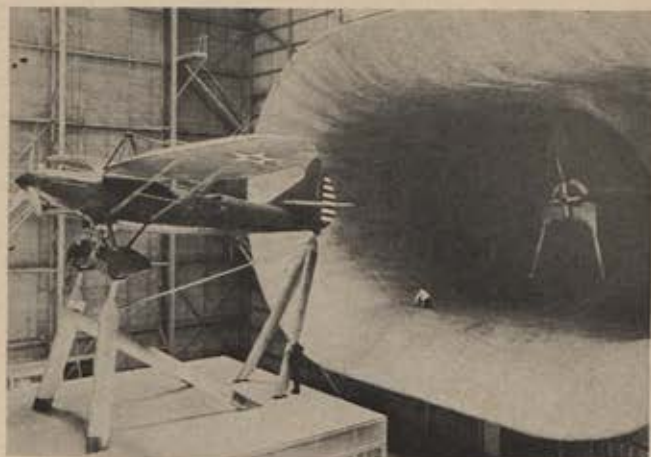
- **Budget.** The amount of money being spent on aeronautical research is dropping, especially in terms of real purchasing power. There is little evidence to indicate that the US now maintains the type of broad base research program once provided by the old National Advisory Committee for Aeronautics (NACA).

- **Personnel.** Experienced personnel are transferring from aeronautical research en masse. And Professor Perkins says that aeronautics is, "... almost a ghost town as far as young engineers are concerned."

The latest blow is what appears to be a NASA decision to stop or drastically slow down its development of high-speed research aircraft. The X-15 follow-on, the orbital research airplane described in the last two issues of *AIR FORCE/SPACE DIGEST* (April, page 48 and May, page 42), is on the skids as far as NASA support is concerned.

Excitement built up in aviation circles after the NASA budget hearings in March when the agency indicated that it would undertake to build a hypersonic cruise airplane to succeed the X-15. It was intended that eventually the new research aircraft would accelerate itself into orbit. It would serve as a prototype for the Aerospace Plane, a one-stage, recoverable booster which will be the connecting link between aircraft and space vehicles.

NASA's intentions about the new research airplane were reiterated at a press conference in mid-April. Dr. Hugh Dryden, Deputy NASA Administrator, and



—NACA photo

NACA's research preeminence may be attributed to its excellent test facilities. This full-scale wind tunnel of the early '30s helped pave the way for 400-mph aircraft. Now NASA is closing many facilities, not building new ones.

John Stack, then Director of Aeronautical Research for NASA, outlined a new series of experiments for the X-15 and discussed the development of the orbital research airplane.

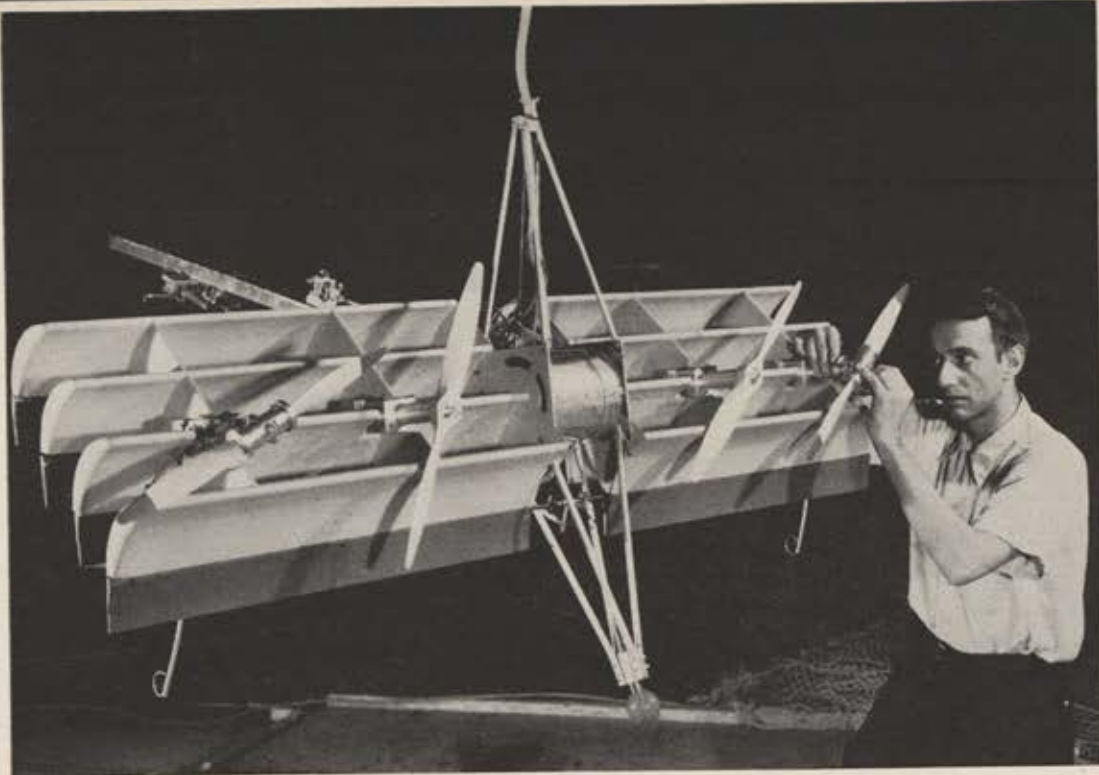
Since that time something has gone awry. Mr. Stack has resigned his NASA post to become a vice president and the top technical official for Republic Aviation Corp. It is logical to assume that differences over research policies contributed to his resignation, especially since industry sources indicate that NASA is not following the original schedule for the orbital research airplane. It had been planned to contract for extensive industry design studies during the next fiscal year, with a development contractor to be selected to start work at the beginning of FY '64.

It is generally believed in industry that NASA is having second thoughts about the cost of the new research airplane, about four times as much as the X-15. The price tag is estimated at \$1 billion over a ten-year period, in the neighborhood of two percent of the total agency budget for the same time period.

Support for this opinion is found in the fact that NASA's allocation for aeronautical research will drop from about 2.5 percent of its budget in fiscal year 1962 to 1.4 percent or so in FY '63. In absolute figures the total budget in FY '62 was about \$1.7 billion with around \$41.5 million for aeronautics. For FY '63, NASA has asked for \$3.787 billion total with about \$52.5 million for aeronautics.

The aeronautics funds are intended to contribute to research for VTOL aircraft, the supersonic transport, and the whole spectrum of flight vehicles, as well as hypersonic research aircraft. Obviously aeronautics would have to continue to receive at least two or three percent of the NASA budget if all types of aeronautical research are to be pushed. If the NASA appropriations grow as predicted to about \$5 billion a year and then level off, aviation would then be getting \$100 to \$150 million a year.

Of course NASA's budget actions do not provide the complete picture. Many segments of US industry and several government agencies continue to have



Learning what won't work and why is an important and painstaking part of aeronautical research. The cascade of wings at the left wasn't practical for VTOL aircraft, but it did show some ways to improve internal turning vanes in ducts.

—NACA photo

high stakes in aviation research. The military services, the Federal Aviation Agency, the manufacturers, and other organizations contribute to the total effort. But as presently constituted these groups are basically operational and are largely "mission-oriented."

NASA is the only agency charged with the responsibility of the "preservation of the United States as a leader in aeronautical and space science and technology" (National Aeronautics and Space Act of 1958). As NASA was built on a foundation of NACA facilities and personnel, it is uniquely equipped to assume this aeronautical responsibility.

Therefore, NASA's budget and its estimate of the condition of aeronautical research are key elements in judging the future prospects for aviation.

It is well known that the top leaders in NASA disagreed with the Wiesner Report's comments on the insufficiency of aeronautical research. They have taken the position that the research barrel is filled with more unused information than at any time in history. In their opinion this seems to demonstrate that the operating agencies are not as interested in developing new aircraft as they once were. The logical conclusion to such arguments is that further research is not needed and that the program should be slowed down.

Those who disagree point to the TFX and the supersonic transport as good examples of projects which are reaching to the bottom of the technology barrel. Both will have to be much more versatile than any supersonic aircraft now flying. Both designs are being built on a technical foundation laid by research activities in the late 1950s. The technical keys to their success are the variable-sweep wing, new types of turbofan engines, and high-temperature structures which will allow supersonic cruise speeds compared to only supersonic dash speeds for today's aircraft.

If these aircraft are not to be the last of their class, continued research is needed to lay the foundation for future generations.

The frontier in aeronautics today does not lie ahead only to higher speeds and altitudes and to a hypersonic cruise capability. It spreads in many directions.

An excellent example is the possibility of closing the so-called VTOL cost gap. Professor Perkins, for one, believes that there is a very good chance of building VTOL aircraft which are just about as economical and efficient as conventional airplanes. This important goal will be reached when the weight of the extra engines and fuel needed for vertical takeoff and landing is lowered to the point where it equals the landing-gear weight on a conventional airplane.

It is impossible to overemphasize the importance of such economical VTOL aircraft. They would free aviation from dependence upon airfields and open up an infinite number of new commercial opportunities. In the underdeveloped nations such aircraft could bring a transportation revolution that decades of road building couldn't duplicate.

Over the long run it looks as though the biggest block to US attainment of many possible aeronautical goals will be the lack of proper personnel. As pointed out by Professor Perkins the minimal support for aeronautics is simply not attracting enough young engineers into the field. He adds that, "... our space and missile programs are rightfully of major interest to all of us. My point here is that if we use our technical talent more efficiently, we will have enough young men to advance the very important potentials that exist in [aeronautics]."

Of equal importance is the current heavy drain on experienced research personnel needed for teachers as much as anything. The departure of John Stack to industry is not an isolated case, although it seems to be one of the most important. Mr. Stack has spent thirty-four years with the NACA and NASA. He began working on supersonic research in the 1930s and was co-winner of the Collier Trophy for conceiving the X-1 and the highly successful US research aircraft program now apparently terminating with the X-15. He was awarded a second Collier Trophy, along with the group of engineers he supervised, for designing the first successful transonic wind tunnel. He was the leader of the research on the variable-sweep wing that is now at-

(Continued on following page)

tracting worldwide attention, to name but a few of his achievements.

Few other engineers who made their reputations in aeronautical research are still in the field. It is reported by some technical leaders at NASA's Langley Research Center in Virginia that about twelve to fifteen experienced group engineers are still working on aeronautical problems there. The situation is not much different at the Ames Research Center in California, the only other NASA facility with aviation responsibilities. The hundreds of other experienced research engineers and scientists once engaged in aeronautical work at Langley and Ames have been reassigned to space work.

An even stranger situation exists at NASA's Lewis Research Center in Ohio, which was a world leader in air-breathing engine research until about 1959. In a widely criticized move NASA, then under T. Keith Glennan, dropped all research on air-breathers and concentrated on rockets. NASA explained that past research had provided all the information needed in the foreseeable future.

This move has forced industry and the operating agencies of the government more deeply into engine research. And many US authorities today believe that the British engine industry has taken a lead in the important field of VTOL engines. A recent sign that this opinion has some validity is the investment of \$35 million by the Department of Defense in the Hawker P-1127 VTOL fighter and its Bristol-Siddeley Pegasus turbofan engine.

Quite naturally there is talk of action to revive aeronautical research. Three points generally are made in such discussions, the first concerning fundamental government policy, the second and third having to do with the two main technical areas involved—hypersonic flight and flight at supersonic and subsonic speeds. The comments run as follows:

- The fundamental government policy regarding aviation research, which proved so successful in the 1930s, '40s, and '50s by the NACA, should not be abandoned. To paraphrase the 1961 Horizon Report to President Kennedy on National Aviation Goals, the federal government still has responsibility for an adequately funded, prudently managed, continually updated research-and-development program which is essential to the maintenance of US world leadership in aviation.

- The ability to cruise at hypersonic speeds is of great importance to the space program. It is the key to winged recoverable boosters which can lower materially the cost of launching material into space. Therefore, there is little doubt that some US agency will develop this capability.

Of course the Air Force is intensely interested in hypersonic cruise and in increasing the speeds and altitudes at which its vehicles can operate. Accordingly a sizable portion of the USAF research budget in the past few years has been spent on one-stage orbital airplanes or the Aerospace Plane.

Another government group has great interest in recoverable boosters, although it apparently hasn't yet

decided whether it will try to develop them in the one- or two-stage variety. This group is at the Marshall Space Flight Center at Huntsville, Ala. It is headed by Dr. Wernher von Braun and it has the responsibility for developing NASA boosters. The Von Braun group is well aware that winged hypersonic cruise flight is vital to the construction of low-cost boosters which eventually will replace the Saturn and Nova rockets. Presumably, the Huntsville group will be able to get money for hypersonic cruise vehicles if they call them boosters instead of research airplanes.

The Air Force-Army controversy over Jupiter and Thor and the monumental duplication of development effort that caused it, is still an unfortunate memory. There is little doubt that everyone connected with US space activities hopes that the top leadership in the government will head off any such recurrence by setting a wise policy regarding the development of hypersonic cruise vehicles.

- Research at supersonic and subsonic speeds is a completely different question. Commercial operations in these areas are expanding greatly while military activity is on the downgrade. It is unrealistic to expect that the military will continue to fund large subsonic and supersonic research programs which will help make commercial progress possible. Under the current scheme of things NASA has virtually sole responsibility for conducting the necessary research.

Many critics of the present aeronautical research situation, who believe that NASA is not doing the job right, talk of new arrangements within the government. In commenting on NASA's attention to aviation, the Wiesner Report stated, "Possibly after careful investigation, the Space Council would prefer to stimulate this work [aeronautical research] by nongovernmental arrangements, or by placing it entirely in another agency."

The Horizon Report stated, "There is no question that aeronautics is running a poor second to space technology . . . within NASA. . . . Some shift toward a more centralized coordination of civil aviation research and development in the United States appears needed."

The Federal Aviation Agency has the general responsibility for fostering the development of and improvement of civil aircraft and their systems. Under both the Eisenhower and Kennedy Administrations it has taken the lead in the development of a commercial supersonic transport. The FAA is cooperating strongly in the development of new subsonic military aircraft with the view to making them compatible with civil needs if possible. This program has been quite successful to date. A number of critics believe that the FAA should be given the research responsibility also. Others believe that the National Advisory Committee for Aeronautics should be recreated and allowed to take over from NASA the personnel and facilities needed to get started again.

In any event the clamor for a change in aeronautical research is rising to a higher pitch, and it seems that some changes will be made, possibly in the next year.

—END

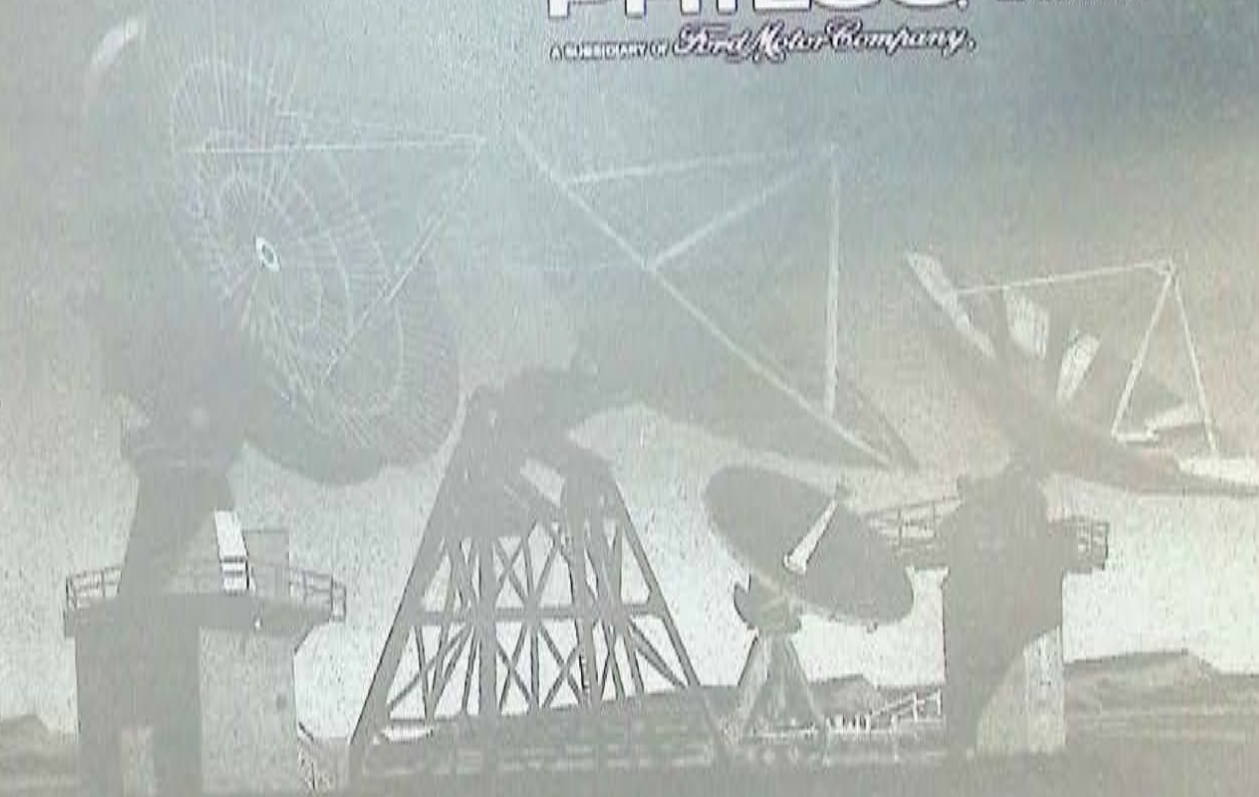
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Analyzing Soviet pressures on the US, a thoughtful observer, summing up our predicament, comments: "We are . . . doubly imperiled by the strong, attractive web of our own ideological outlook. We have concluded not only that the Communist menace is essentially nonmilitary, but also that in the very nature of our system and its outlook we prefer to test our system against Communist challenges in a nonmilitary arena." Is this wise? he asks . . .

American Fears of the Soviet Union

By Ross N. Berkes

This article appeared originally in the May 1962 issue of *Current History*, Vol. 42, No. 249, pages 287 ff. It is reprinted here by permission of the publisher.

IT SHOULD be stressed at the outset, and again at the end, that the Western world—and the United States in particular—has a great deal to be alarmed at, even frightened by, as it faces challenges from the centers of Communist power. There are legitimate fears, both real and urgent, to be pressed home. International communism does constitute a menace to our way of life and to our national security—the greatest menace we have had in history.

It borders on the tragic, however, that recognizing the menace seems increasingly the function of patriot-
(Continued on following page)



ism rather than the product of probing questions. It is no longer enough to say that Soviet behavior is not easy to explain. More important, only because it is more governing, such explanations would be unwise. There is, in the words of Erich Fromm, considerable "paranoid thinking" regarding the Soviet Union in the United States. All of which is merely to register the shallow but telling point that the paranoids are right—now, if not at all times or forever—but probably for the wrong reasons.

But let us go straight to the kernel of the menace. The Soviet Union is alarming because it has now achieved a capacity to counter our nuclear deterrent with deterrents in kind: effective long-range-missile delivery systems. Whether theirs, ours, or both systems are comparatively vulnerable or invulnerable are matters of considerable importance, but such issues are overshadowed by what nearly all students of Soviet behavior presently conclude to be the ruling élite's interpretation of the consequences flowing from this Soviet achievement. In essence, they seem to conclude that by countering our threat of nuclear war, the Soviet Union has regained maneuverability and the privilege of indulging in enterprises of boldness.

More recent Soviet efforts to interpret or define "peaceful coexistence," such as the Moscow Declaration in December 1960 of the World Conference of Communist Parties, have clearly stressed the futility of war between the Great Powers, and a desire to avoid the atomic conflict Russia apparently believes would ensue from such a clash. Indeed, much of its present difficulty with its ally, Communist China, seems to rest precisely on its less adventuresome attitude regarding the threat of nuclear war and the consequence of direct engagement with the military forces of the West. It is here that we might best place Marshal Malinovsky's well advertised "Warning to the West" presented with such deliberate care to the Twenty-Second Communist Congress, Moscow, on October 24, 1961. Boasting of

Russia's creation of a strategic rocket force, and of a bountiful surplus of rockets of various types and purposes, the Marshal added that "at present there are in the rocket troops about 1,800 subunits with a rating of 'excellent,' and these are great masters of their craft, masters of hitting without a miss any point of the globe."

Marshal Malinovsky also said other things, some of considerably less credibility, such as his simple announcement that "the problem of destroying rockets in flight has also been successfully solved." It is not unlikely that the Marshal was trying patiently to advise and to educate, rather than merely to preen or to boast, just as Khrushchev himself has invoked with considerable repetitiveness his observation about recent, revolutionary changes in "the balance of forces." Perhaps they were anxious to make clear to the obtuse anti-Communist world that the American Century—short as it was—is over, and that the sooner this was realized by all, the greater the hope that nuclear war would not develop.

Here rests Louis Halle's analogy of the chess-player outlook of Soviet diplomacy. Only a fool or an ignoramus would threaten nuclear war, or perhaps any war, against a power capable of retaliating in kind, and while the USSR may be unable to do much about the possible prevalence of American fools, it is going to do its best to deliver us from ignorance. While we, from our side, might find little of interest in such didacticism, we should concede that one of the great problems of world peace is and will remain the persistent rigidity of official attitudes and outlooks.

Nuclear Chess

It may be idle, but it seems worth pondering in this connection, that the interesting aspect of Khrushchev's rocket statements regarding Cuba was not so much his
(Continued on page 43)

A CHEERLESS CHALLENGE

Despite the admittedly important ideological struggles between the West and communism, we must understand that their *military* challenge to us is of primary significance because:

- The Soviets now believe that by countering our nuclear threat, they have regained maneuverability and the privilege of indulging in bold enterprises.
- Such enterprises are aggressively adventuresome. They seem tailored not to strike at the heart of Western security, but rather to
- Stir the caldrons of strife around the world, which is really the Soviet definition of "peaceful coexistence."

But, some Americans, wishfully thinking, see Soviet recognition of nuclear war's problems as a path to cooperation and peaceful coexistence and competition as we understand those terms. They do not see that:

- In actuality, the Soviet counterdeterrent has exacerbated the Soviet military threat to the US because the Soviets are willing and anxious to take advantage of instability.
- Hence, we must review our confidence that nonmilitary aid is able to meet the "revolution of rising expectations," and face the fact that the Red military challenge, in an era of instability, could be decisive against us if we are not prepared to meet it.

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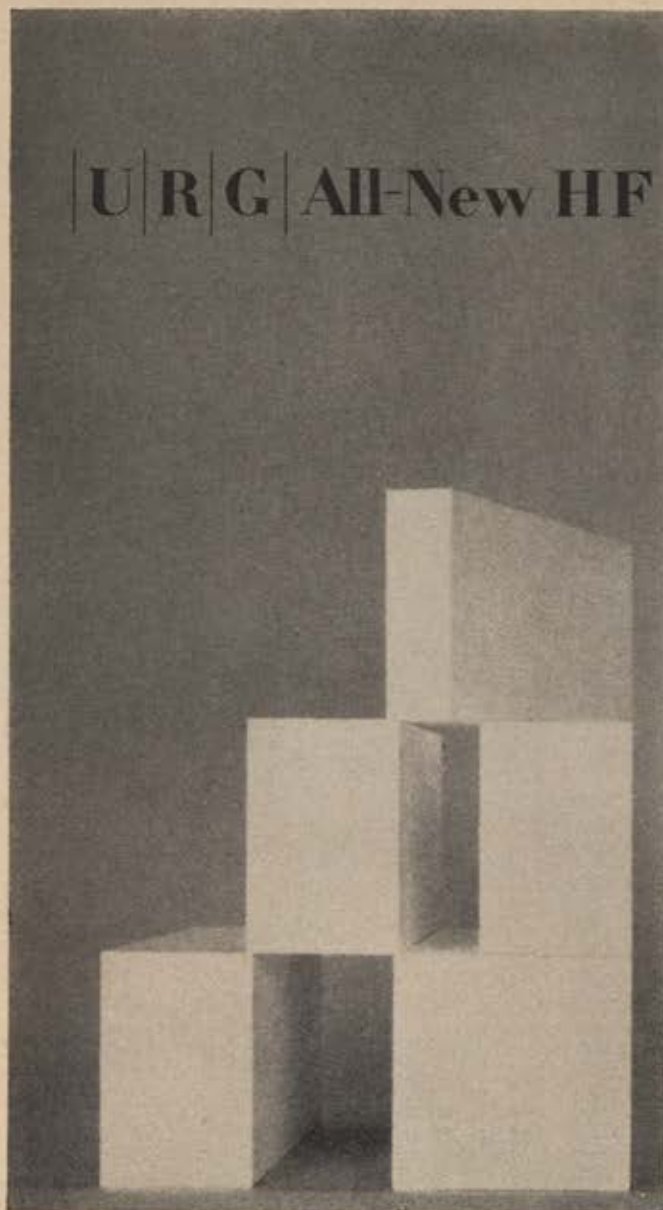


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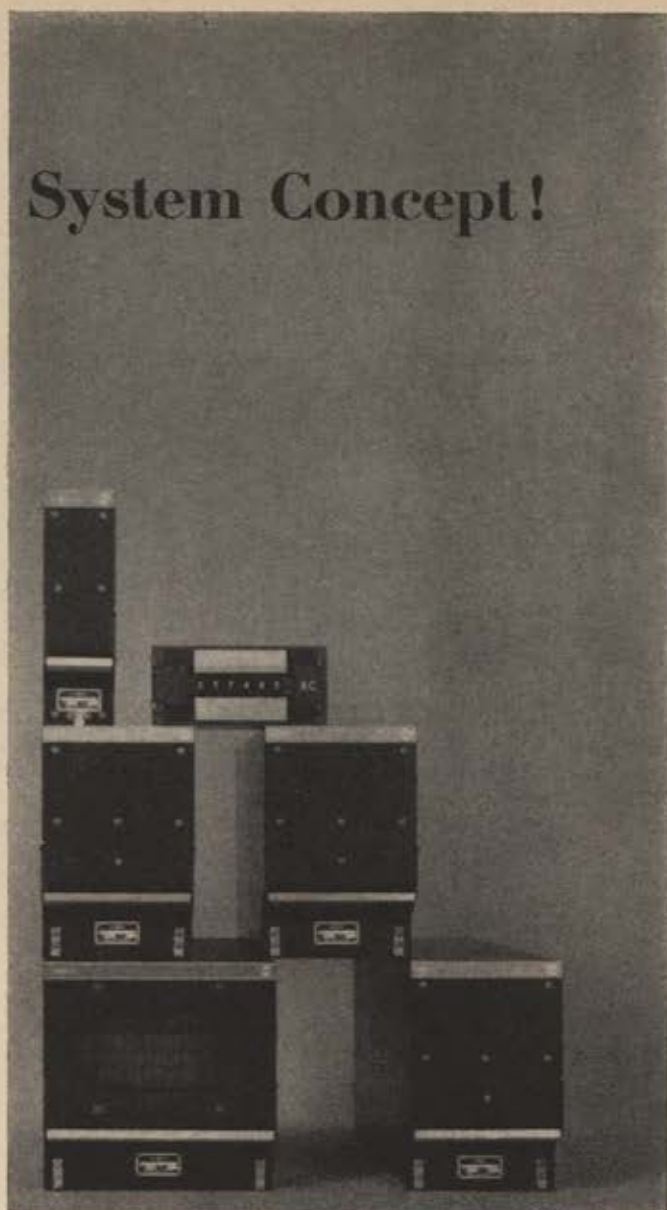
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threat in July 1960 to employ rockets should the United States try to intervene against Castro, but his later acknowledgment that he invoked the rockets primarily in their symbolic meaning. Considering the careful, studied position on nuclear war which has evolved during Khrushchev's regime, it seems clear that its avoidance is a major objective of Soviet policy. There would seem no reason for Khrushchev to have modified his threat, once uttered, except in deference to his own self-acknowledgment of its foolishness. And about the only reason he would have concluded it to be foolish would be his recognition that it could lead him into the folly of initiating nuclear war. One should not simply dismiss as an old wives' tale Mme. Khrushchev's remark to a delegation of disarmament enthusiasts in October 1961 that "we know that any nuclear war will destroy us all. Therefore we are not building any shelters from bombs or fallout."

What has been said up to this point is simply to observe the probability that one of the feedback consequences of the Soviet effort to build a counterdeterrent to the American system of deterrence—leading to what is so familiarly described in the literature as the "balance of terror"—has been a self-intimidation over the consequences of atomic war. If, however, this is Point "A" in the alphabet of a balance-of-terror world, "B" would seem to emerge from the mutuality of interest in avoiding a nuclear holocaust: an arms-control agreement increasing the protection of each from the temptations, miscalculations, and other pressures of the other. But "B" has not emerged, nor is there much prospect of its doing so, for the Soviet Union apparently has concluded that "A" can do as much for "B" as "B" can do for itself—by tacit understanding and without the troublesome accouterments demanded by "B." Indeed, it should be seriously doubted whether to this day the Soviet Union has ever taken the slightest interest in disarmament proposals, qua disarmament proposals, or has found them of any merit whatsoever except as a potent and useful instrument of political warfare, or as a trap to waylay unwary American military power.

It may well become the irony—perhaps the tragic irony—of the age of nuclear deterrence that the Soviet Union has deduced that the second main consequence of its own arrival as a counterdeterrent power is that the West now has to be more cautious in its response to the aggressive moves of international communism. The ultimate result of the balance of terror, while in one important sense most sobering and restraining, has been to encourage the Soviet Union to take more risks, to be more aggressively adventuresome with respect to opportunities that do not strike at the heart of Western power and security.

All of this has permitted even the more cautious men of the Kremlin to stir with greater zest and enthusiasm the caldrons of revolution and civil strife throughout the underdeveloped world. This, according to Richard Lowenthal in a recent article in *Encounter*, is what the Soviet Union means by "peaceful coexistence." While implying the prevention of war between sovereign states, and ruling out nuclear or thermo-

nuclear war, "it cannot and should not prevent civil wars or 'just wars of liberation' arising from popular insurrections, which are inevitable as long as imperialism exists." Or, to continue with Lowenthal's telling interpretation of Soviet reasoning, "on the contrary, 'peaceful coexistence' is justified as creating the most favorable conditions for the development of such revolutionary wars."¹

The Real Threat

There is very little of greater importance to be said to the people of the non-Communist world, particularly to Americans, about the real—as against the imagined—threat of the Soviet Union in these days of the balance of terror than to clarify the implications of Russia's erection of a counterdeterrent to American atomic-power and missile-delivery systems. In part, at least, the threat derives from the tendency on the part of significant groups of Americans to assume that since leadership in the Soviet Union has finally gotten around to recognizing the horrors of nuclear war, and since there has emerged a general consensus that the Soviet Union is convinced of the necessity of avoiding such a war, then a cooperative era of constructive peaceful coexistence is ready for launching and awaits only the removal of bigoted anti-Communists from positions of influence in the United States. One might have reservations about the usefulness, if not the intentions, of bigoted anti-Communists, but the drama of their behavior has tended to obstruct a clearer recognition of the logic of Soviet behavior.

There is, as briefly alluded to before, an added incentive moving the Soviet Union toward a more actively disruptive role in world affairs, having to do with its present quarrels with Communist China. Philip Mosely has noted that the "Sino-Soviet rivalry may be placing stronger pressures and setting more urgent deadlines for a Moscow-sponsored expansion of communism." And as Mosely observed: "Far from handicapping Soviet ambitions in Southeast Asia, the contest between Moscow and Peking may lead Khrushchev to take greater risks than in the past in order to demonstrate that this policy of graduated risks is both more fruitful and less dangerous than Peking's emphasis on all-out 'revolutionary zeal.'"²

It is reassuring to note that there is considerable alertness in official American circles as to the nature of the Soviet threat as indicated above, and to the current Khrushchevian interpretation of the "liberation-war" theory that it embodies. A major policy speech made in Chicago on February 17, 1962, by United States Defense Secretary Robert McNamara was specifically directed to this interpretation and to the meaning for the United States of the ensuing Soviet threat.

(Continued on following page)

¹ Richard Lowenthal, "The Dangerous Year," *Encounter*, June 1961, p. 62.

² Philip E. Mosely, "Khrushchev's Party Congress," *Foreign Affairs*, January 1962, p. 194.

US Policy Shift

Secretary McNamara revealed an unusual interest in Khrushchev's speech at the meeting of the Soviet Communist Party Organizations on January 6, 1961, even to the point of remarking that the "liberation-war" theory in that speech "might well be one of the most important policy declarations in the '60s by any world leader." In full consonance with the interpretation presented by Lowenthal, Mosely, and others, McNamara noted Khrushchev's position that a major war in the nuclear age has become too dangerous to be "the midwife to revolution." McNamara added that the "Russians wanted to keep the threat of nuclear war alive as a means of intimidation and blackmail to discourage the free world from resisting communism in 'wars of liberation.'"

All of this, of course, was prefatory to the announcement that there had been a shift in military thinking in the United States, a shift toward building up non-nuclear forces that would provide flexibility and, as the Secretary put it, a "wider range of practical alternatives." What we were doing, in sum, was reacting to the recognition of an urgent need to be able to respond—militarily—in the "twilight zone" between combat and political subversion. As a recent important article in the *Marine Corps Gazette* suggested, events in Southeast Asia, in Africa, and in the Caribbean seem to bear out the prediction that the 1960s "may be the decade of the guerrilla." Subsequent evidence of a considerable—if unspecified—commitment of American military support in South Vietnam was the first indication of any effort to implement the new policy, just as Vietnam has undoubtedly been one of the first pressing examples of the need for such a new policy.

It will be difficult, nonetheless, for the United States to adjust to the new situation, and not least because we have been conditioned to see the Soviet threat as having passed from the military sphere into the economic, propaganda, and political spheres. In the minds of responsive Americans, the challenge of "peaceful coexistence" has largely become a kind of competitiveness. Short of a major technological breakthrough in military matters, first the check of atomic superiority and then the checkmate of nuclear parity, led Americans to view the Communist menace in terms of real but nonmilitary offensives. These remain real enough, but their significance has perhaps already been overshadowed by the return of an insidious military threat. With the launching of so many new nations, underdeveloped, unviable, insecure, and yet ambitious, this will increasingly become the age not only of the balance of terror, but also of instability. Instability spells opportunity for international communism, and the Khrushchevian interpretation of opportunity will be to support, covertly but actively, local war.

This is not an appealing premise because it concludes that the prime threat of international communism is neither philosophic (ideological) or economic (material), but military. The Soviet Union, for all its competence as a nuclear and nonnuclear power, is not likely to mount an aggressive war against the

United States; it surely has too much respect for American military power. But by its counterdeterrent it has recreated the terms under which force can be invoked to take advantage of instability, and even to push it along. These terms include the presumption that the West has an added reluctance to meet the challenge of local war out of fear that it would not remain local or nonnuclear.

To this bleak point must be added the predicament of our built-in reluctance even to acknowledge the military challenge, let alone to face it. The threat of nuclear war has dominated our concept of the resort to force, and has led us to conclude that the Soviet Union—however otherwise vicious or mischievous—shares our hesitancy to resort to military means. If this is not enough to cause concern, one should also note that we are by nature and ideological bent inclined to cheer the arrival of the "revolution of rising expectations" among the predominant majority, the underdeveloped nations of the world. We might also reflect on the advice of not a few of our more frank experts to the effect that its most dangerous facet is that the revolution will simply fail to satisfy these expectations.

It tends to sound almost defeatist, but it should nonetheless be suggested that for large and important parts of the world neither democracy, economic aid, technical assistance, alliances, nor much else can for the while compete with the population explosion. A great deal can and must be done in these categories, and in large measure by us, but in the circumstances of increasing population pressure, political instability, and economic dependence, our aid will not always meet the challenge of international communism—particularly an international communism armed with the Khrushchevian theory of liberation war.

We are, I think, doubly imperiled by the strong, attractive web of our own ideological outlook. We have concluded not only that the Communist menace is essentially nonmilitary, but also that in the very nature of our system and its outlook, we prefer to test our system against Communist challenges in a nonmilitary arena.

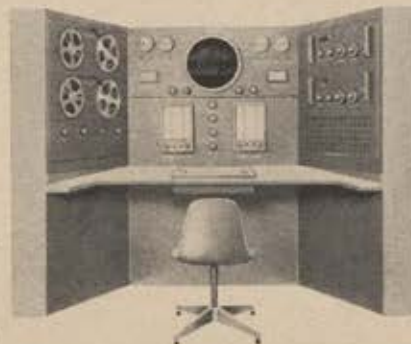
This is the time for a reassessment and for a new realism in our appreciation of the Soviet menace. It is not enough to identify international communism as an all-enveloping menace, exhausting our energies, our patience, and even our interest. Nor can we permit our ideological inclinations to dismiss the military challenge as superficial. Of course it is superficial—but it may also be decisive. We have reason to fear the Soviet Union. We also have some reason to fear that despite the perceptiveness of our government, we may find ourselves overly reluctant to identify in time the sound and fundamental reasons for our alarm.—END

Mr. Berkes is a contributing editor of Current History, in which this article originally appeared and from which it is reprinted with permission, as well as Director of the School of International Relations at the University of Southern California. He has taught at the US Naval Intelligence School in Washington and, during his sabbatical leave in 1955-56, studied British foreign policy at the Royal Institute of International Affairs, London.

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An old word gets new meaning as "COIN" becomes USAF's designation for its growing counterinsurgency tactical air capability. The Air Force prepares for its expanding role in an era when the Communists are emphasizing "wars of liberation"—their term for armed subversion and guerrilla warfare. President Kennedy had a look at the new Special Air Warfare Center and the 1st Air Commando Group last month. Their mission: to teach our distant allies how to put down Communist aggression during the "decade of the guerrilla." Meanwhile USAF sharpens its skills for:

- ★ Close air support.
- ★ Fast deployment of ground forces.
- ★ Interdiction raids against guerrillas.
- ★ Low-level drop techniques for airborne commandos and cargo.

USAF Polishes Its New COIN

By Claude Witze

SENIOR EDITOR, AIR FORCE/SPACE DIGEST

Here are samples of some of the firepower capability President Kennedy saw last month at Eglin AFB, Fla., demonstration. At right, Republic F-105D unleashes salvo of air-to-ground rockets. Below, Napalm attack wipes out "enemy" communications.





THE USAF effort for President Kennedy's early-May visit to Eglin AFB, Fla., was billed as a firepower demonstration and, indeed, included the strafing, bombing, and scramble exercises that have gone into that kind of show for many years. Yet presidential interest and the headlines, such as there were, centered on a new and different kind of Air Force readiness that features jungle fighters equipped for the most part with aircraft of World War II vintage.

Mr. Kennedy had his initial look at the 1st Air Commando Group and the 1st Combat Applications Group of the new Special Air Warfare Center, set up at this base in response to his own requirement for improved counterinsurgency tactical air capability. In USAF's ever-growing jargon, counterinsurgency now is desig-

nated COIN. There is no firm COIN doctrine and no final definition of COIN requirements. The Air Commando operation is only a year old and already has been getting its feet wet in the jungles of South Vietnam, where tactics and techniques are being tested and improved. But there is a long road ahead on which the traditional USAF talents, backed by science and American industry, must be tested and proven.

Within a week after the President's visit at Eglin there was fast-growing evidence that the United States is plunging into heavier and heavier commitments in Southeast Asia, determined to ensure the credibility of our power in that part of the world. The trend of events, particularly the apparent reversal of Russia's intentions of agreeing on a neutral Laos plus the situation in South Vietnam, lend almost critical importance to USAF's efforts in the area of COIN warfare.

Formal announcement that USAF had established the Special Air Warfare Center was made in late April with prime emphasis on the fact that Air Commandos are being trained to *instruct*. Their mission is to help other people fight their own war, not to fight it for them. If this mission has an official origin it could lie in a speech made by Nikita Khrushchev in January of 1961. The Soviet Premier at that time divided wars into three categories: world wars, local wars, and wars of liberation. He said Russia rejects local wars and world wars as impracticable but endorses wars of liberation and said the Reds will continue to help people engaged in this kind of conflict.

Premier Khrushchev did not say openly that nuclear-armed airpower suffices to deter the outbreak of a major

(Continued on page 49)



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USAF's Chief of Staff, Gen. Curtis LeMay, was host to his Commander in Chief, President Kennedy, at Eglin AFB for a demonstration of airpower capabilities. Chief Executive showed prime interest in activity of new Air Commandos.

conflict, but that fact remains. The emphasis that is being placed on COIN is no bid on our part for relaxation of the deterrent, although such relaxation would be a welcome dividend for Nikita.

USAF has made it clear that its COIN capability is being developed and must be developed over and above its traditional strategic power, which must continue if the United States is to retain its freedom to cooperate with nations under Communist pressure in COIN warfare.

The Special Air Warfare Center, assigned to the Tactical Air Command, is headed by Brig. Gen. Gilbert L. Pritchard. His Air Commandos take their name from the Air Commando groups which fought in the China-Burma-India theater and in the Pacific in World War II, where they supported behind-the-lines fighting by Allied guerrilla forces.

The new Commandos of 1962 are being trained at Eglin in Florida and at Stead Air Force Base in Nevada. They are prepared to instruct allied forces in the field in all kinds of airborne operations. This includes low-level drop techniques for personnel and cargo, close air support for day and night operations, fast deployment of ground forces, and reconnaissance, including the use of flares and other devices to uncover guerrilla movements in darkness. Other techniques include the use of special weapons to cut off retreats, interdiction raids, raids on supply dumps, and psychological warfare.

At the Eglin demonstration Mr. Kennedy saw B-26 light bombers fitted with weapons for support of Commando operations, ancient C-47 and C-46 transports, L-28 and T-28 aircraft fitted for bush missions. On review, the USAF combat unit displayed rugged new uniforms of dark jungle green with wide-brimmed campaign hats of the type made famous by Australian and New Zealand troopers. All of the Commandos learn survival techniques at Stead. They also are taught the skills of hand-to-hand combat. Many take the US Army jump course for paratroopers.

In equipment, training, and organization the Commandos are concentrating on the unique peculiarities of COIN warfare. COIN is an internal effort to put down an undeclared war, a rebellion in the bush. It differs from other types of limited war in that a state of war is not acknowledged between two recognized governments, and at least one faction is subversive in nature. COIN, in addition, involves a type of combat that can't be won by the usual techniques of air warfare. The essentials are high mobility, quick reaction, good reconnaissance—all under difficult conditions of terrain and visibility. The strategic objective, in most cases, is not to destroy a military target in the usual sense but to win support from a civilian populace that is easily intimidated, sometimes capricious in loyalty, always subject to attack by error because guerrillas dress and behave like peasants.



COIN warfare bosses are (left) Gen. Walter C. Sweeney, Jr., Tactical Air Command Commander; Brig. Gen. Gilbert L. Pritchard, Commander of the Special Air Warfare Center located at Eglin AFB, Fla.; and Col. Benjamin H. King, designated the Commander of the 1st Air Commando Group.

In addition, the fight against guerrillas is complicated by poor communications. In most cases, there are no roads. Peasant villages have no direct way of reporting or learning of guerrilla actions, a fact that has led the US to order 500,000 radio sets for distribution in South Vietnam alone. At Eglin the President saw demonstrated one device to alleviate this situation when a C-47, equipped with external loud-speakers, circled his reviewing stand at low speed, broadcasting a message of the type that would be used to instruct villagers in a remote bush area.

There are few things about insurgent warfare that favor the use of airpower, but one of them is that jungle rebels are not equipped with ack-ack or interception capability, so that air superiority is practically assured. On the other hand, the targets are fleeting, hard to locate, and are not subject to pattern bombing attacks. The aircraft require accurate weapons and good marksmanship, and they must be capable of loitering for long periods at low altitudes.

These are some of the reasons why COIN warfare is highly specialized. USAF recognizes these unique factors. They are the absence of enemy airpower, the enemy's relatively crude armament, and the fast-moving nature of the targets. In addition, these wars usually take place in relatively undeveloped nations, and US policy is that we do not provide forces to fight, offering only equipment and instruction in its use. It

(Continued on following page)



Air Commandos travel light. Combat team here stands by parachutes and gear the men would carry for airdrop starting action against guerrillas. B-26 light bomber, standard in days of World War II, has special weapons. Below, C-123 will be loaded with jeep and variety of radio equipment.



Combat control team of 1st Air Commando Group crouches in grass on training exercise. Manning field radio is TSgt. Joseph G. Orr, Jr., of Baltimore. SSgt. Clifford H. Larimer of Bloomington, Ind., scans area for signs of enemy. Similar forces already are in training in South Vietnam.



follows that the equipment must be simple and highly reliable, as far as possible from the complexity of modern weapons for more conventional warfare. In COIN warfare reconnaissance and assault airlift become more important than the delivery of munitions. Most of the wars run for many years. In Indochina, Malaya, and Algeria they lasted from eight to ten years. In Malaya, according to British military experts, it required 6,500 hours of patrol or ambush time to see a single Red terrorist. Of those finally spotted, only one out of ten was killed or captured.

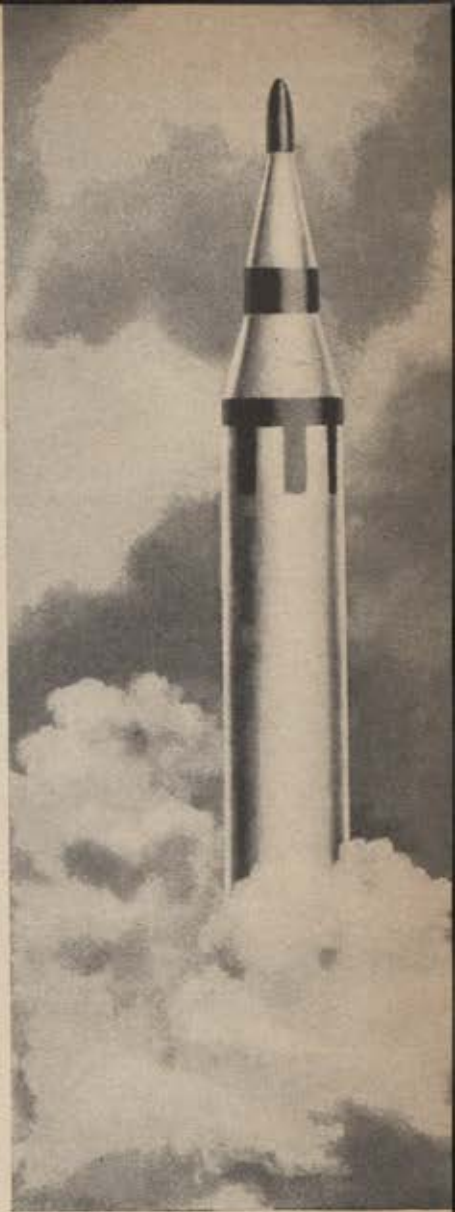
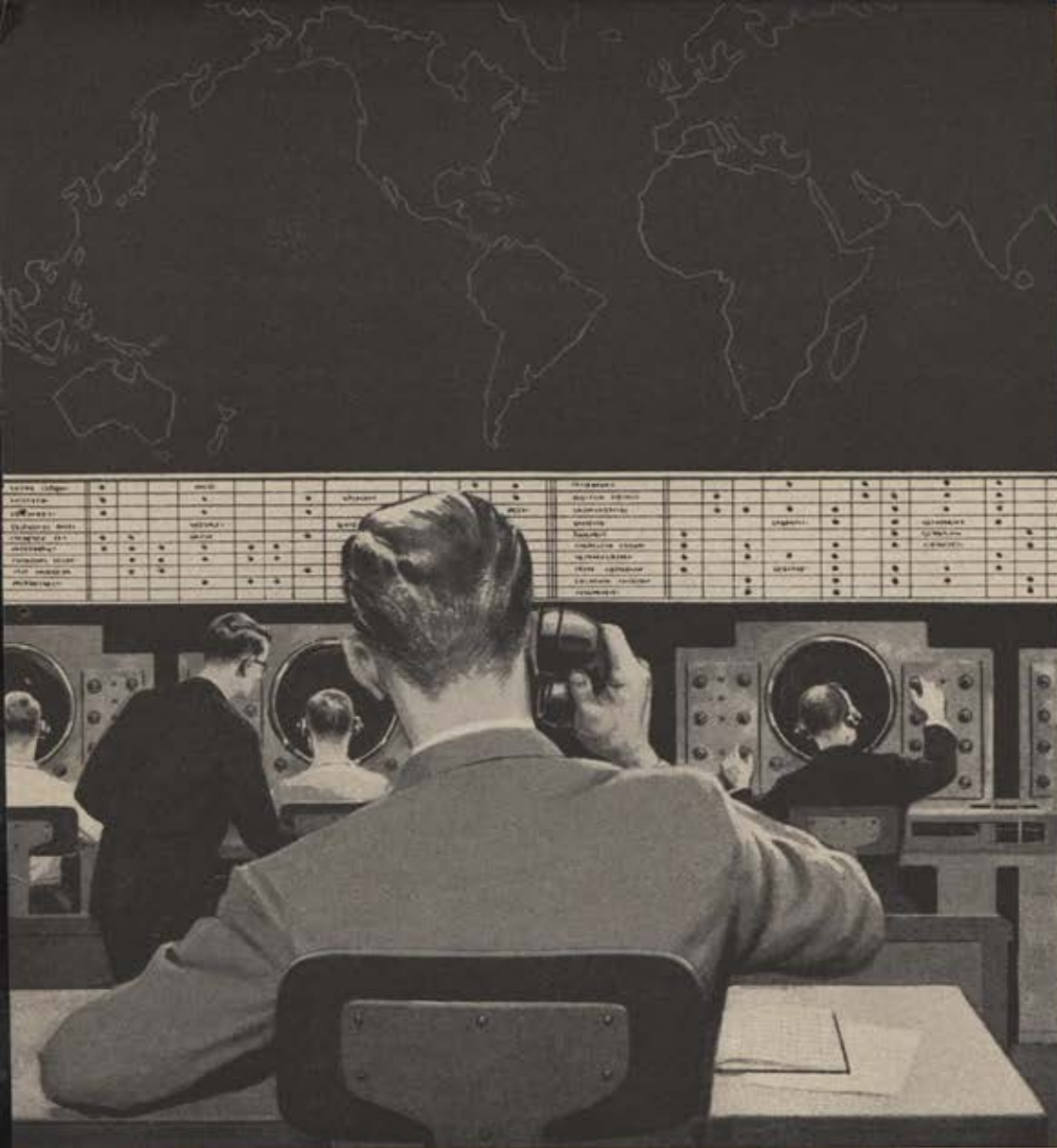
One of the functions of the 1st Combat Applications Group is to generate ideas and requirements for improved equipment for COIN warfare. Leaning heavily on reports from such areas as South Vietnam, where the first Air Commandos already are on the job, this group will utilize both USAF and Army capabilities in the research-and-development area. The communications problem is high on its list of priorities. Cheap transmitters are needed to sound the alarm when quick reaction forces are needed. Light ground-to-air radios—they should weigh not more than thirty pounds—are essential for control. So far V/STOL aircraft are not available, but COIN puts new urgency on their rapid development. Two-place aircraft are favored because eyes are better than cameras for finding the target and hitting it. Two engines will be equally popular with the Commandos, and propellers are preferable to conventional jets, which fly too high and too fast.

Air Commandos are working against the USAF trend in training as well as equipment. There are no specialists in the corps. There are no cooks, air police, drivers, or ordnance and aircraft maintenance personnel. Cross training has become a specialty, and each man is prepared to do a variety of jobs. This adds to flexibility and cuts down substantially on the logistics problem.

There are 900 men in the Commando groups but the force will grow to about 5,000 in another year as more USAF volunteers take training at the Special Warfare Center. Air Commandos have been in South Vietnam since last October but only in small numbers, giving instruction to native COIN forces in the use of T-28, B-26, and C-47 aircraft.

USAF does not believe that COIN wars can be won by airpower and airpower alone. It does believe COIN wars can be lost *without* airpower. The challenge for the Air Commandos of 1962 is like that which faced Air Commandos in the C-B-I two decades ago. The problems are in the areas of concepts, doctrine, tactics, and hardware. It is significant that USAF is again engaged in an activity with so many unknowns, in which nobody has defied the value of military experience or suggested that all the possibilities can be fed into a computing machine.—END

AIR FORCE/SPACE DIGEST's special report on guerrilla warfare and what we're doing to counter the threat continues on page 53, where AF Col. Wilfred J. Smith reviews a group of five current books on this increasingly important subject.



COMMAND AND CONTROL

The nation's deterrent posture is based on a tightly controlled retaliatory force capable of immediate action through the proper commands. The survivability of the command and control structure and the security of its communications are vital elements in overall national defense.

The design of such a command and control system demands consideration of the politico-military structure, and of the deployment and use of a wide variety of weapon systems of overwhelming power. To this must be added a proven capability in modern electronic technology.

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Engineers or scientists interested in these vital and challenging areas are invited to contact Mr. W. F. O'Melia, Raytheon Company, Missile and Space Division, Bedford, Massachusetts.

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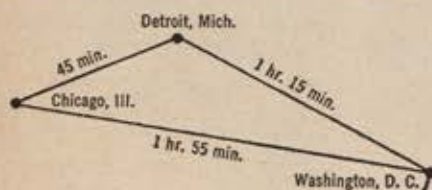


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"If you know yourself and know your enemy,
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If you know yourself but not your enemy,
For every victory gained, you will suffer one defeat."

—Sun Tzu, *The Art of War*
Sixth Century, B.C.

GUERRILLA-WAR BOOKSHELF

ON GUERRILLA WARFARE, by Mao Tse-tung; translated and with an introduction by Brig. Gen. Samuel B. Griffith, USMC (Ret.) (Frederick A. Praeger, Inc., N. Y., 1961, 114 pp., \$4.50).

COMMUNIST REVOLUTIONARY WARFARE: THE VIETMINH IN INDOCHINA, by George K. Tanham (Frederick A. Praeger, Inc., N. Y., 1961, 157 pp., \$5).

ON GUERRILLA WARFARE, by Che Guevara, with an introduction by Maj. Harries-Clichy Peterson, USMCR (Frederick A. Praeger, Inc., N. Y., 1961, 85 pp., \$3.95).

GUERRILLAS IN THE 1960's, by Peter Paret and John W. Shy (Frederick A. Praeger, Inc., N. Y., 1962, 72 pp., \$3.50).

GUERRILLA COMMUNISM IN MALAYA, by Lucian W. Pye (Princeton University Press, Princeton, N. J., 1956, 363 pp., \$6).



The "Praeger Package" plus Pye. These five books, reviewed below, are valuable in following the injunction of the ancient Chinese sage Sun Tzu to "know your enemy."

By Col. Wilfred J. Smith, USAF

FOR ANYONE with an urge to learn more about guerrilla warfare, these five books are recommended reading. All together, they occupy only four and a half inches of shelf space, and each book represents a classic in the literature of the cold war.

Two of the authors, Mao Tse-tung and Che Guevara, are both theoretical and practical experts in the field. Authors Tanham, Pye, Paret, and Shy derived their expertise from firsthand study of guerrilla warfare. All of them social scientists, they present their findings with clinical objectivity, and their conclusions all point to the absolute necessity of knowing more about ourselves and more about the little men who fight in mountains, swamps, and jungles.

Mao Tse-tung, *On Guerrilla Warfare*, is a succinct treatment of the subject in only seventy-four pages of text. A four-part introduction by translator Brig. Gen. Samuel B. Griffith, USMC (Ret.), provides a setting every reader will appreciate. In plain language,

General Griffith outlines a problem that neither the military man nor his civilian counterpart can ignore. All must conclude that guerrilla warfare is a force to be reckoned with. In doing so, the role of Mao Tse-tung assumes a position of dominating importance.

There is nothing in his outward appearance to mark Mao as a man of distinction. He is inclined to pudginess, his complexion is of the pasty color so typical of a liver patient, and his ill-fitting clothes accentuate the rotundity of his figure. However, Mao is possessed of keen intellectual powers and has a capacity for intuitive judgment that is truly phenomenal. That he is an enigma to the West is mainly attributable to the fact that he is an oriental who understands his cultural heritage and has craftily exploited his background in winning the support of millions of his fellow countrymen.

Mao unblushingly acknowledges the debt he owes
(Continued on following page)

to Sun Tzu, who wrote the earliest known treatise on the *Art of War* in the sixth century B. C. But while Mao has unquestionably taken his cue from Sun Tzu, he has recast the philosophy of the ancient sage into a way of life designed to advance communism in battles still unfought in the cold war.

For Mao, in the period of the 1920s, communism provided an ideology to which he could wholeheartedly subscribe, but it lacked, for an oriental, the "all-inclusiveness" which Marx and Lenin had proclaimed. To Mao, the formula of communism was too Western to be literally adaptable to oriental peoples. Of it he once wrote:

"If we copy them [the Soviets] and apply their teachings mechanically and allow no change whatever, it will be like whittling down the feet to fit the shoes, and we will be defeated."

Lacking a proletariat, Mao saw the potential significance of building a revolution on an agrarian base. Completely a realist, he recognized that millions of peasants could be regimented into a force which, in Asia, in Africa, in Latin America, and in the Middle East, could give world communism a leverage that would be able to match the contribution of the proletariat in Western countries.

Furthermore, Mao saw guerrilla warfare as a practical necessity. Individually, a peasant was a military nonentity, but when once indoctrinated and politically motivated, collectively they constituted a force to be reckoned with. The old Chinese expression, *i-jou, ke'-kang* (elasticity overcomes hardness) provides Mao with a fundamental idea for using peasants effectively as guerrilla fighters. His philosophy for their use is aptly expressed in the following maxim:

"When the enemy advances, I retreat;
When the enemy retreats, I advance;
When the enemy sleeps, I harass him;
When the enemy is exhausted, I defeat him."

"What," asks Mao, "is basic guerrilla strategy?" To which he replies:

"Guerrilla strategy must be based primarily on alertness, mobility, and attack. It must be adjusted to the enemy situation, the terrain, the existing lines of communication, the relative strengths, the weather, and the situation of the people.

"In guerrilla warfare, select the tactic of seeming to come from the east and attacking from the west; avoid the solid, attack the hollow, attack, withdraw, deliver a lightning blow, seek a lightning decision. When guerrillas engage a stronger enemy, they withdraw when he advances, harass him when he stops, strike him when he is weary, pursue him when he withdraws. In guerrilla strategy, the enemy's rear, flanks, and other vulnerable spots are his vital points, and there he must be harassed, attacked, dispersed, exhausted, and annihilated."

For Mao, "the situation of the people" is always of vital concern. They are a necessary ingredient to suc-

cessful guerrilla operations. As Mao so colorfully expresses his views:

"The people are water
And the guerrillas fish who swim in the water,
If the temperature of the water is favorable,
The fish swim happily and proliferate."

There is an important connection between a friendly population and a guerrilla force. Seemingly, a combination of impoverished peasants and lightly armed guerrillas don't constitute too formidable a threat to a well equipped force trained in orthodox military tactics. However, Mao expresses a tactic which has already proved its effectiveness in China, Indochina, Algeria, and Cuba. In his words:

"... Guerrillas may be compared to innumerable gnats, which, by biting a giant both in front and rear, ultimately exhaust him. They make themselves as unendurable as a group of small and hateful devils, and as they grow and attain gigantic proportions, they will find that their victim is not only exhausted but practically perishing."

Mao comments caustically on the inability of professional military men to understand the real significance of guerrilla warfare. He believes that the political aspect of partisan operations is something which a military man cannot appreciate because military men are not politically minded. In the same vein, he favors recruitment of guerrillas from the people and foresees that national forces can later be organized from veteran, battle-tested groups of guerrillas.

But the most somber note of all is contained in Mao's prediction in 1937 that "the guerrilla campaigns ... in China today are a page in history that has no precedent. Their influence will be confined not solely to China ... but will be worldwide."

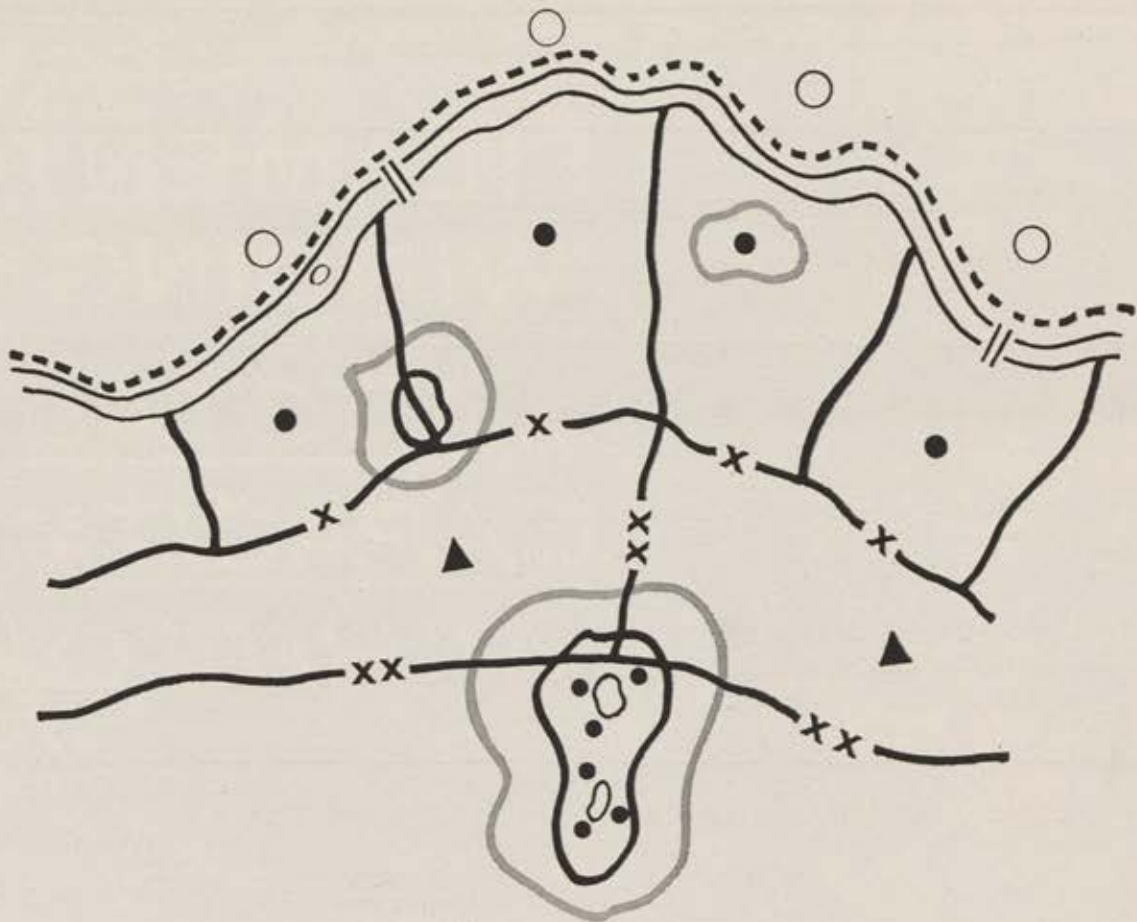
George K. Tanham graphically tells the story of how Communist guerrillas, trained in accordance with the doctrines of Mao, fought the French in Indochina.

The tale he tells is one of tragic failure which no amount of French heroism could redeem. French leaders, both military and civilian, were woefully ignorant of the foe they faced. To them it was inconceivable, first that natives would fight, and that, if they did, they could ever match a modern force equipped to fight on land, sea, and also in the air.

But French civil administrators failed to recognize the growing strength of nationalism and discounted Ho Chi-Minh as a political nonentity. French military leaders were equally naïve in thinking that a strategy so effective in North African deserts could succeed in the swamps, mountains, and jungles of Indochina.

Until 1951 France waged a positional war against an enemy which struck, as Mao expressed it, "with the fluidity of water and the ease of the blowing wind." Ambuscades, raids, sabotage, and occasional attacks against some isolated fort exhausted French resources. It was exasperating to review the damage and painful to note the rising tally of casualties inflicted by a phan-

(Continued on page 57)



ADVANCED TACTICAL SYSTEMS...AN URGENT REQUIREMENT

Guerilla skirmishes and brush-fire conflicts have repeatedly been thrust upon us and will in all likelihood continue to be. To cope with these situations and at the same time avoid escalation, we urgently require more advanced tactical systems. We require more efficient, portable ground assault weapons. We require low-cost aerial reconnaissance and tactical aircraft ground support systems. We require practical battlefield information processing systems for tactical command and control. We require the simulation systems that will train men in deployment, maneuvers, and the uses of electronic intelligence.

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tom foe who refused to stand and fight. It was frustrating to pursue a foe who disappeared into a maze of underground tunnels or sought refuge in caves cunningly dug in river banks and which were entered below the water level.

But regardless of how well the little men may fight, their leadership is only human. General Giap made a decision in 1951 that the Vietminh could confront the French in pitched battles, and his judgment resulted in a series of sharp setbacks which seriously impaired the morale of the native guerrillas.

Reverting to tactics more in keeping with the teachings of Mao, the Vietminh maintained a steady pressure on the enemy and stepped up guerrilla recruitment in the villages.

To the French, 1953 seemed a year of promise and Dien Bien Phu a place of destiny. French generals were elated over a chance to engage the Vietminh in a decisive battle, and Dien Bien Phu was selected as a likely site. But the best laid plans of the General Staff in Saigon were based on sketchy intelligence which underestimated the forces available to Giap, the quantity and quality of Red Chinese assistance, and the logistical volume of what antlike columns of native coolies could deliver.

The French paid for their folly at Dien Bien Phu, and the valor of their men could never counterbalance the blunders of the General Staff. French casualties, including prisoners, totaled 12,000 men and represented a loss of only six percent of the total expeditionary force. But while France had merely lost a battle, the political consequences were decisive. France in 1954 ceased to be a power in Southeast Asia.

In the concluding chapter of the Tanham book, Anne M. Jonas discusses events following the 1954 Geneva cease-fire agreement. She reports that General Giap has, in seven years, organized a battle-ready regular force, supported by trained reserves and numerous guerrilla groups. The latter are stationed on the frontier and make forays into neighboring countries across poorly demarcated boundary lines. There, they fan the embers of unrest and organize Communist cells aimed at overthrowing existing governments in South Vietnam, Laos, and ultimately throughout all of Southeast Asia.

In his description of how Castro's guerrillas overthrew the Batista government, Che Guevara selected the same title as Mao Tse-tung for his book. But the similarity of the two books goes far beyond the common sharing of the simple title, *On Guerrilla Warfare*. Every page that Guevara writes bears witness to the fact that the Cuban revolt was modeled in accordance with the master blueprint of Mao Tse-tung. Recruitment, training, tactics, heavy stress on winning popular support, the value of terrain, and the establishment of base areas are subjects which Guevara treats with such fidelity that much of his book impresses the reader as being only a slightly smudged carbon copy of Mao's earlier teachings.

It is difficult to find much in Guevara's writing which makes a startling contribution to the theory of guerrilla warfare. His elaboration of tactic, which he care-

fully diagrams and poetically labels "The Minuet," is a not too imaginative rendition of a timeworn tactic used on numerous occasions in both China and Indochina. On analysis, it is basically nothing more or less than a modified version of the "Segmented Worm" in which Chinese guerrillas attacked, retreated, feinted, then attacked in order to disperse the enemy and make each segment more vulnerable to destruction. But if Guevara has added little to the science and art of guerrilla tactics, he can be credited with something of an innovation by the use which he made of urban guerrillas. Castro was aided by a tightly disciplined band of urban followers which, while never numerous, conducted acts of sabotage against targets as selected by members of the Guerrilla High Command.

But the real significance of Guevara's book is not contained in a recitation of tactics which Mao has already treated in more sophisticated terms. It lies in the fact that Guevara has provided his Latin American compatriots with a "do-it-yourself" primer for revolution. He is always conscious of his larger audience, and their responsiveness to his words is evidenced by the fact that 50,000 copies of his Spanish-language text were sold almost before the ink was dry.

Guevara, while a charlatan, unquestionably possesses a sense of flamboyant showmanship which Latin Americans both understand and appreciate. Drunk with the heady wine of success, Guevara denounces Yankee Imperialism and boasts that Cuba has pointed the way to a rebirth of popular freedom which patriotic guerrilla uprisings can achieve.

One curious feature of Guevara's book is particularly worthy of note. At the outset, the author calls attention to three fundamental conclusions which the Cuban revolution makes with respect to armed revolution in the Americas. They are:

- Popular forces can win against an army.
- One does not necessarily have to wait for a revolutionary situation to arise; it can be created.
- In the underdeveloped countries of the Americas, rural areas are the best battlefields for revolution.

The second point gives a clear indication that Castro "nationalism" was only a convenient cloak to hide the truly Communist leanings of its leaders. Communists since the days of Karl Marx have expressed their faith in the "inevitability of history" but have also advocated that it is usually possible to expedite the course of events by nudging them along. Only time will reveal the success which Communists enjoy in creating "patriotic" revolutions in Latin America, but there can be no doubt of the confidence they have in guerrilla warfare as a means for achieving their objectives.

The fourth book in what is often referred to as the "Praeger Package," which carries the title, *Guerrillas in the 1960's*, was written by two Princeton professors, Peter Paret and John W. Shy. In a total of only sixty-six pages of text, the authors waste no words in coming to grips with fundamental problems. For them, the guerrilla movement is a threat that democratic societies must comprehend in the context of the cold war. The ability of communism to energize guerrilla activities

(Continued on following page)

gives a character to modern guerrilla warfare which it never enjoyed before in history.

To a considerable degree, the authors see the success of Communist-dominated movements as the result of a closely integrated relationship between political and military objectives. The peasantry is imbued with the necessity to support military actions in order to enjoy a greater share in political and economic benefits. Conversely, the guerrilla is never permitted to forget that he fights to gain tangible objectives, expressed in the currency of political and social betterment.

The authors display their keen understanding of both guerrilla strengths and weaknesses. They note that guerrilla leaders are forced to maintain a constant string of successes or be confronted with serious impairment of group morale and combat effectiveness.

One point in the book can be expected to be a topic which will engender heated debates. It involves the question of whether regular troops can be effectively trained to cope with guerrilla tactics. That the question is ever raised is enough to raise the blood pressure of many professional soldiers, and the fact that professors have the temerity to even suggest that the qualifications of a trained soldier may prove a handicap in counter guerrilla actions is felt by some to be unpardonable.

But regardless of the popularity of their views, most readers will agree that the authors have grasped some prickly nettles with the courage of sincere convictions.

In the treatment given to the problem of counter guerrillaism, its scope is seen as transcending the task of merely eliminating guerrillas in combat. More important, as they see it, is to reconvert the society to an acceptance of new values and new administrative leadership. The statement of the requirement is easy, but its accomplishment is fraught with a multitude of difficulties, some of them still only partially identifiable.

But regardless of all else, the guerrilla problem bears a definite relationship to American foreign policy, for the remaining years of the '60s at least. Farsighted programs for the eradication of conditions which contribute to the use of guerrilla movements must go hand in hand with new and more imaginative planning to counter the military effectiveness of guerrilla fighting. It is understood that Messrs. Paret and Shy are busily engaged in writing another volume to supplement the very substantial contribution they have already made. It is safe to assume that the product of their research will be welcomed by many thousands of readers who share a common interest in expanding their knowledge of guerrilla warfare.

Lucian W. Pye, in writing on *Guerrilla Communism in Malaya*, will attract a smaller and more professional audience than the broad group of general readers who find the Praeger Package to their liking.

Professor Pye, also of Princeton, has not addressed himself to a general description of guerrilla activity in Malaya. Instead, he focuses his attention on the social and political implications which a trained scholar can derive from firsthand contacts with scores of little people whose lives were directly influenced by the role they played in Communist guerrilla organizations.

In presenting his findings, the reader can expect that the author will marshal his facts and formulate his conclusions according to the best traditions of a sociologist. For those who lack an interest in the methodology of the trained devotee of the social sciences, the book will in all probability be regarded as grossly lacking in appeal.

But while the general reader is duly warned that Professor Pye's writing is professionally objective in its style, there are many who will find that it satisfies a requirement of long standing. This reviewer regards the contribution of Professor Pye as a unique attempt which probes deeply into the social ethos of communism in Asia.

The treatment which the author gives to the introduction of Marxism on the Asiatic scene and the accommodations which it made with indigenous beliefs long established in the area is skillfully accomplished. In a sense, it tends to be at least remotely reminiscent of the entry of Buddhism into a society which already possessed a pantheon of its own. Whereas it was true that Buddhism gained a foothold by capitalizing on vacuums, similarly modern communism has flourished among youthful Asians who have become disillusioned with their cultural heritage.

To such communism offered a challenge which they interpreted as a means to achieve a more meaningful and satisfying existence. In Malaya, this group was predominantly composed of Chinese who were insecure in the place which they occupied in the local society and culturally divorced from the traditions of their ancestors.

This, according to Pye, accounted for the appeal which led thousands to endure the harsh privations of guerrilla existence in Malayan jungles. The evidence from scores of case histories pointed to the fact that the more powerful motivations had a social rather than an economic base. In concluding his book, the author reports that the breakdown of old cultures and their inability to command the respect of youth won more converts to communism than pressures caused by even the most squalid conditions of poverty.

In conclusion, it is reasonable to assume that Communist-supported guerrilla wars will continue to pose problems to the West. In the coming years, the advice of Sun Tzu will still be valid. We must *know* the enemy!—END

The reviewer, Colonel Smith, is now on duty with USAF in the Pentagon. He was born and completed his high-school education in China, then attended the University of Michigan where he earned B.A. and M.A. degrees and his Ph.D. in Far Eastern history. Before World War II he was a Professor of History at Hillsdale College in Michigan and Ohio University, Athens, Ohio. After Pearl Harbor he served briefly in the Middle East and in 1942 was transferred to serve under Gen. Claire Chennault, then commanding the China Air Task Force, predecessor of the Fourteenth Air Force. In the next 3½ years Colonel Smith organized and headed an Intelligence Collecting Unit for Fourteenth AF and later the OSS. After the war Colonel Smith accepted a Regular commission in 1947. Much of his leisure time is spent studying the literature of guerrilla warfare.

THE SPACE AGE IN PERSPECTIVE



SPACE

DIGEST

VOLUME 5, NUMBER 6

• JUNE 1962

Anyone for the Moon?

By John D. Williams61

Although we may some day look back on our moon effort as a Kitty Hawk-class affair, we will also see it as a harbinger of great events. It will have involved a great investment in research paying off in new knowledge, will speak well for our society, and perhaps will add to man's faith in himself.

Wandering Worlds

By John W. Macvey68

Fascinating freaks, the little planetoids orbiting the sun in paths that sometimes veer "close" to earth, present little foreseeable danger to us by way of collision. But might they be useful some day as natural sites for cosmic observatories?

Opportunities for Asteroidal Crime—A Book Review

By John C. Hogan70

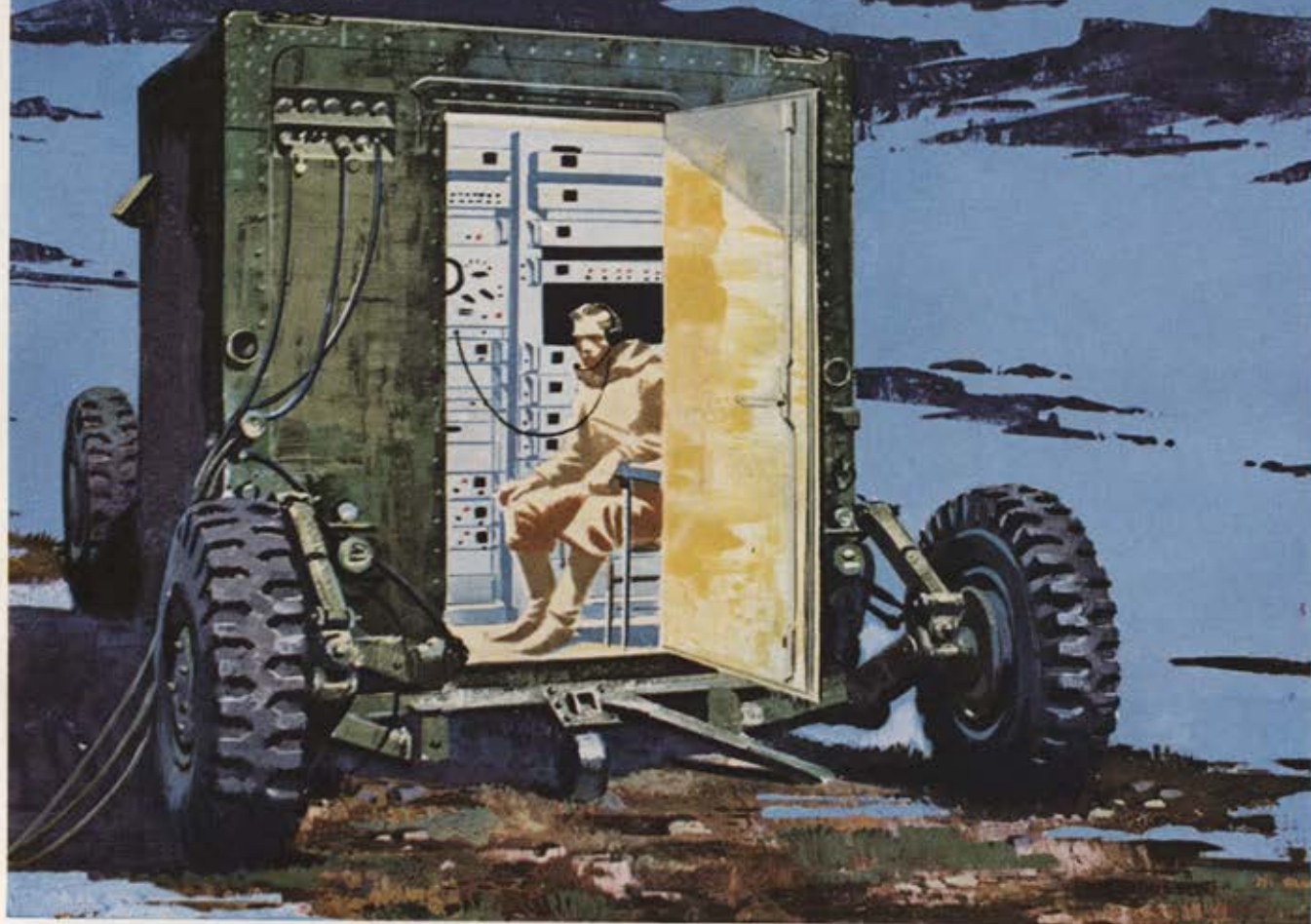
Can it be that Professor Moriarty, evil genius of the nineteenth century and arch-foe of Sherlock Holmes, is posthumously aiding today's Soviet space effort? Available evidence suggests this doleful possibility. The Western world badly needs a copy of the Professor's book reviewed here.

Speaking of Space

By William Leavitt72

A sense of humor plus the determination not to be taken in are vital in our dealings with the Martians, *i.e.*, Major Titov and company, when they deign to visit. The Cosmonaut has come and gone; meanwhile our own astronautical show must go on.

Data for defense...
from wherever it's needed



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Even though we may look back some day and consider that the moon expedition was a Kitty-Hawk-class affair, we will also recognize it as a harbinger of great events, because it will have been a sizable investment in research—which pays off at a high rate in new knowledge. Also the feat will speak well for our society and its pattern of organization and, significantly, perhaps increase man's faith in himself. These are among the good reasons to answer yes to the question . . .

ANYONE FOR THE MOON?

BY JOHN D. WILLIAMS



THE United States will outfit an expedition to the moon, the President announces. Hopefully, man's first. The few who act as though they hear the man seem astonished that one with power, brains, and devotion to human well-being can have such a notion, for they could compile a yard-long list of problems without raising their eyes to the heavens. Even our intellectuals are nonplused, for once, and given to wistful glances at the money.

I shall sketch the thesis that an expedition to the moon is a fairly good idea, in a day when good ideas are elusive. Of course, as a goal, a three-man party to the moon is short-term and on-the-cheap compared to, say, a thousand-man expedition to Mars, or, better, a reconnaissance in force to Proxima Centauri. Therefore the reader should be aware that I regard the lunar expedition as a Kitty-Hawk-class affair, but a harbinger of profound events.

About the cost. Estimates of the cost of a voyage to the moon range from \$10 to \$40 billion. Since I would advocate the mission at either price, I may as well accept the apparent burden of the \$40 billion. Parts of the argument would improve if the price tag were \$400 billion.

Most of us have simple notions about large expenditures for such projects—not to disparage, for none are more simple than mine. For instance, to some this project is like a scheme to put \$40 billion in orbit; and so much bullion would require a 36,000-ton spaceship. Moreover, they do not expect the ship to come back, though this is an essential feature of the plan. But one may argue that the ship is more likely to contain thirty-six tons of aluminum than 36,000 tons of gold, so if we can get it at wholesale, the irreplaceable treasure aboard will be worth about \$20,000—which we expect to recover. At the risk of heart failure among economists, I ask, which of these simple views is nearer reality?

I need a long aside here on taxation and its role, but there is not time for it. However, I note that most of us know just enough to wince when taxes rise, and to smile when they do not. This is the economic equivalent of Pavlov's dog. The economists have not instructed us how to think about it more usefully, I suppose because they know too much. Being free of that burden, I would enjoy developing the theme that it is reasonable to smile more often than we do when taxes rise, and to frown more often than we do when they do not.

Let us suppose the lunar project runs ten years

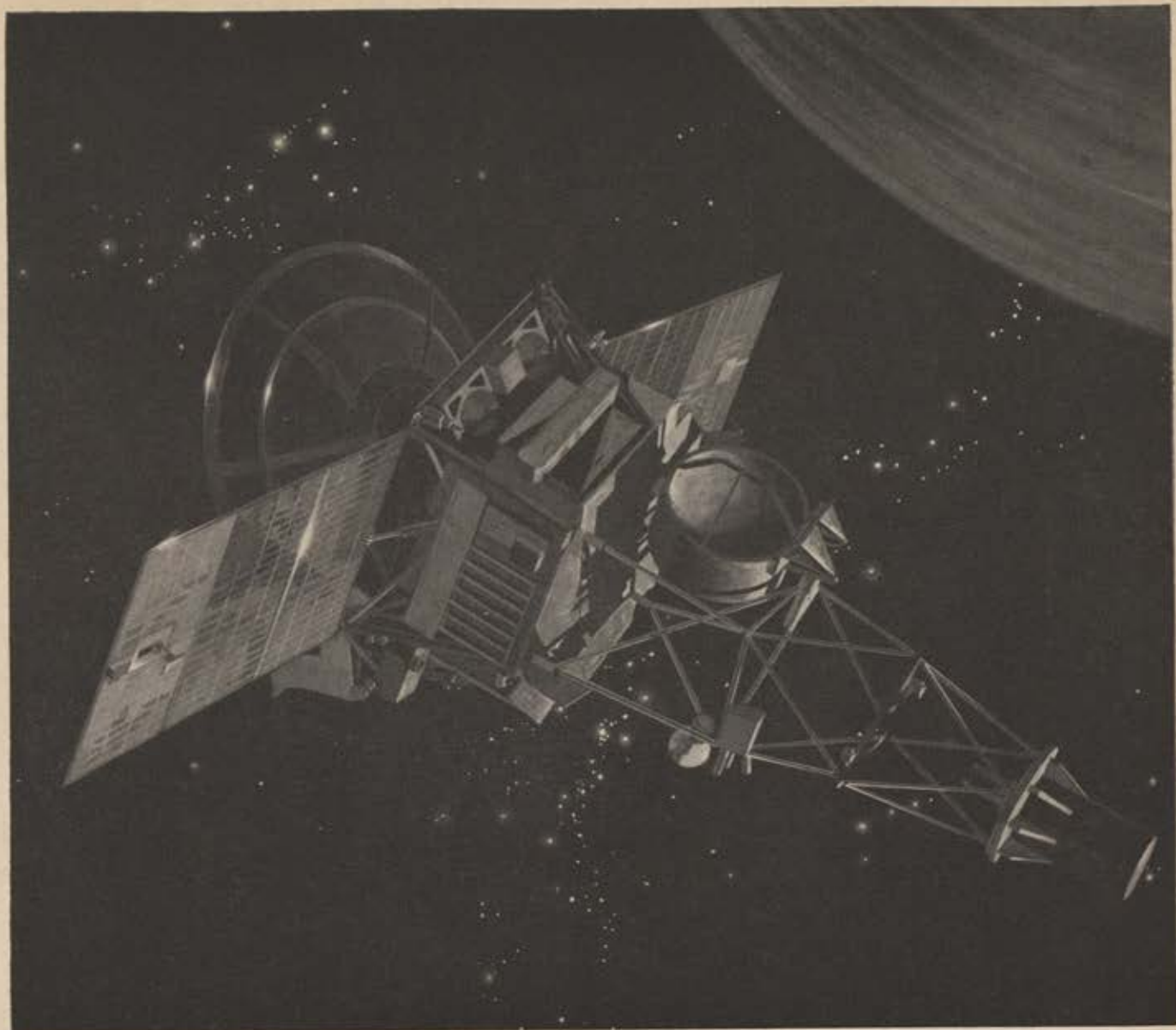
at an annual rate of \$4 billion. Since the national income is \$400 billion, it could be funded by a penny tax on each income dollar. Net receipts of the federal government exceed \$90 billion, so \$4 billion is not a drastic change.

If the fund were disbursed in bills soaked in molasses, licking the fingers would quickly become a national trait. A lot of people would handle these bills, because the principal use of money is to pay people, and we do not pay individuals very much. Money would flash out from the Treasury to a few prime contractors, then to hundreds of subcontractors, then to thousands of vendors. An organization touched by the flash would have perhaps 100, or perhaps 100,000, workers, the income producers for a three-times-larger crowd, the families. The families would immediately disburse most of the income to their creditors—the grocers, the mortgage holders, the automobile dealers, and the doctors; who would say "Thanks," or "Thank Heavens!," and send it to *their* creditors.

This is a tremendous activity if money changes hands very often. For instance, if the Treasury disburses only to six creditors on the first payday, each of them to six new faces on the second payday, and so on, there will be sixty million payees on the tenth payday—every family in America could be represented, though that is not likely. Money does, in fact, change hands often, so the diffusion of these marked bills through the country is very fast. We can get a clue to the speed by comparing bank clearings for a year with demand deposits—our checking accounts: the ratio is about twenty to one. The number of times money really changes hands may be less than this, because bank clearings include some obscure financial rites, but the notion that money changes hands often should not offend the intuition of those paid twice a month, one clean jump ahead of the bailiff.

So the government collects money for the moon and shoots it out through the economy in marked bills. A few months later they are in the hands of millions. Including mine, I hope, and I will give it to Sears, say. What has happened? If nothing, it would have been neater to give it to Sears in the first place.

If we are looking for dramatic events, we see that nothing has happened. There is no solid-gold spaceship about to blow up, nor any other way that our wealth is streaming off into the void. It is not a feasible way for the nation to go broke. The important effects are subtle and indirect, small and numerous. Some are transitory, others cumu-



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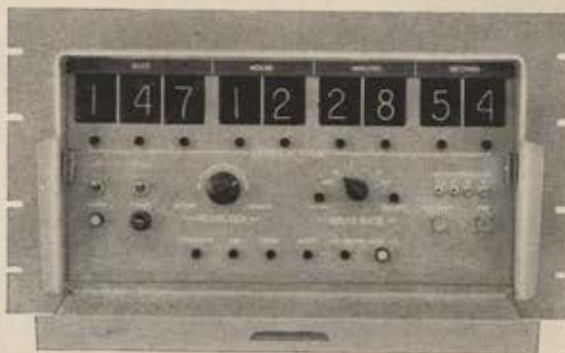
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lative; some are desirable, others not. I cannot discuss them all, for lack of time and because I do not perceive and understand them all, but, generally, those I see appear compatible with the kind of world—not the moon—I think I would like to live in; which is why I favor the project.

An expedition to the moon is not a stunt, such as going over Niagara Falls in a barrel. To do it in style implies the prior occurrence of a great intellectual achievement: gaps in knowledge in a thousand fields—practically all you can name from algebra to zymology—have been filled, and enough of the whole has been focused on the expedition to get it off the ground. The knowledge and focusing are quite imperfect, and so is the expedition, but it is quite a thing for the least precocious of animals to have done. It implies a powerful, effective, and broad social organization.

This was the meaning of Sputnik. The peoples who have more modest societies would have been impressed if that ship had borne an American flag, but they were shocked that it was Russian; for here was clear proof that there really is behind the Iron Curtain a social organization capable of great feats; and not just grubby ones. The shock was less for us, because we have had such an organization for some time; moreover, our intellectual basket cases thought it was a cheap stunt. Other peoples may reason: The Russians do remarkable things after forty years, so doubtless we can too; but perhaps we must use the Russian system. Thus one benefit of superior performance is prestige. This is a civilized way to influence men's minds. It is a real, directional force, although, like gravity, you cannot touch it.

The money could be spent on more obviously practical projects: to build B-52 bombers, or nuclear submarines, or highways, or dams, or schools, or hospitals, or to support commodity prices. These projects differ, among themselves and from the lunar project, in more ways than one. One distinction is that we know how to do them. They may be necessary, or useful, or desirable, but they no longer pose serious intellectual challenges. The lunar project excels in this, for it has a strong element of research. Because it so excels, its ultimate consequences are likely to exceed the others in practical utility.

If we want a great flood of specified things such as safety pins and refrigerators and bridges, we invest in steel plants. Similarly, if we want a great flood of new things, we invest in research. It is easier to absorb this fact whole than in detail, for research, like a steel plant, does not satisfy

our immediate needs. As a rolling mill may frustrate one who wants a safety pin, a research activity may baffle one who wants anything. He will be revolted by seemingly pointless endeavor for which he has no more affinity than for eating beetles. He will be appalled by the failure rate, for the breakage of ideas in research is high—and necessary, because ideas, good and bad, are look-alikes at birth, and the bad outnumber the good. Because the good idea that survives is valuable, knowledge is a superlative high-risk, high-gain investment. While it is difficult to assess explicitly the economic gains of knowledge, scattered efforts to do so indicate they range, roughly, from half to twice the original investment, annually.

Funds for a difficult project funnel through research facilities to an unusual degree before they spread to the economy generally. Research facilities are thus stressed, and respond with changes in pace, emphasis, and growth. The market mechanism begins to work: The facilities bid for the talented, strays are collected, and because of interest, excitement, and increased salaries, the sources of talent are affected. However, the incubation period is long: typically, seven years of college and graduate work for those whom the schools have given the fundamentals with which to begin—respect for intellectual effort and some competence in reading, writing, and arithmetic. Therefore the stress must be long. We should seek and welcome stresses that induce intellectual development.

It is easy to miss this entire point, if bemused by the thought that it is silly for organizations operating with public funds to bid up the price for the talented and so increase the cost of the services the government already enjoys. But this is the heart mechanism of the free-enterprise system, here operating to increase the highly trained, which is not so silly. We can afford the cost increases, but we cannot afford to be confused about the benefit.

I claim that the lunar project is a deep stimulus to knowledge, which is the best compound-interest investment we know for economic growth. That is a sufficient reason to support the project. And as the Senator once said to a too-helpful friend of mine, "Young man, one good reason is enough." However, like my friend but lacking the Senator's guidance, I have an itch to go deeper, for I think there is something more profound than economic growth hidden here. It remains to be seen whether I can probe it without butchering it.

Our times are notable for raging tides of hu-

manity, of expectations, and of technology. These forces may not tear apart civilization, given enough miracles. The pragmatic approach to miracles is knowledge.

I touched on the topic of prestige. The counterpart of prestige abroad is pride at home. Pride in the project can be shared by the most diverse: the Republican, the Catholic, the patriot, the cab driver, the mathematician, the conscientious objector, the school boy, and the guest at Alcatraz. It offends the principles and mores of almost no one. It might do more.

Man's unique quest for meaning and purpose of life has led him to a desolate region. The supernatural pillars of classical religions are crumbling, which seems to jeopardize the superstructures of ethics; so as man loses his old visions, his guides to behavior fade. The secular faith of the patriot, God-fearing or not, shrinks as the world shrinks. As the absolutes of Church and State are thus compromised, man feels malaise. I wonder whether he can, in these circumstances, make do with some faith in himself. His knowledge and power would be envied by most of the gods he has bowed to. If he assumed forthright responsibility for his life and world, commensurate with his growing knowledge and power, he might construct a salubrious environment, with an amiable philosophic base. He might cope with famine, pestilence, and war; with fear of God, devil, or man; with poverty of goods or thoughts; with slavery of body or mind. He might explore and contemplate the universe, and discover some profound meanings not now in sight. He might improve his mind—literally—to do all this better. Of course he might fail in some or all, for while he has the conventional attributes of the gods, he certainly lacks experience in the role.

The deliberate pursuit of intellectual excellence, of knowledge, understanding, and wisdom, emphasizes the characteristic of man that I think would stand out to a visitor from abroad—Proxima Centauri, say—*i.e.*, his ability to learn. He learned as an individual. Then he learned to share knowledge with his physical group; then to draw on the intellectual capital of past generations; then to share with his contemporary group. And all future generations may draw on him. While his personal prowess as a thinker is outstanding, this cumulative power of thought of the species is a fantastic event. To find another event of this rank, we may have to go back to the appearance of life on this planet.

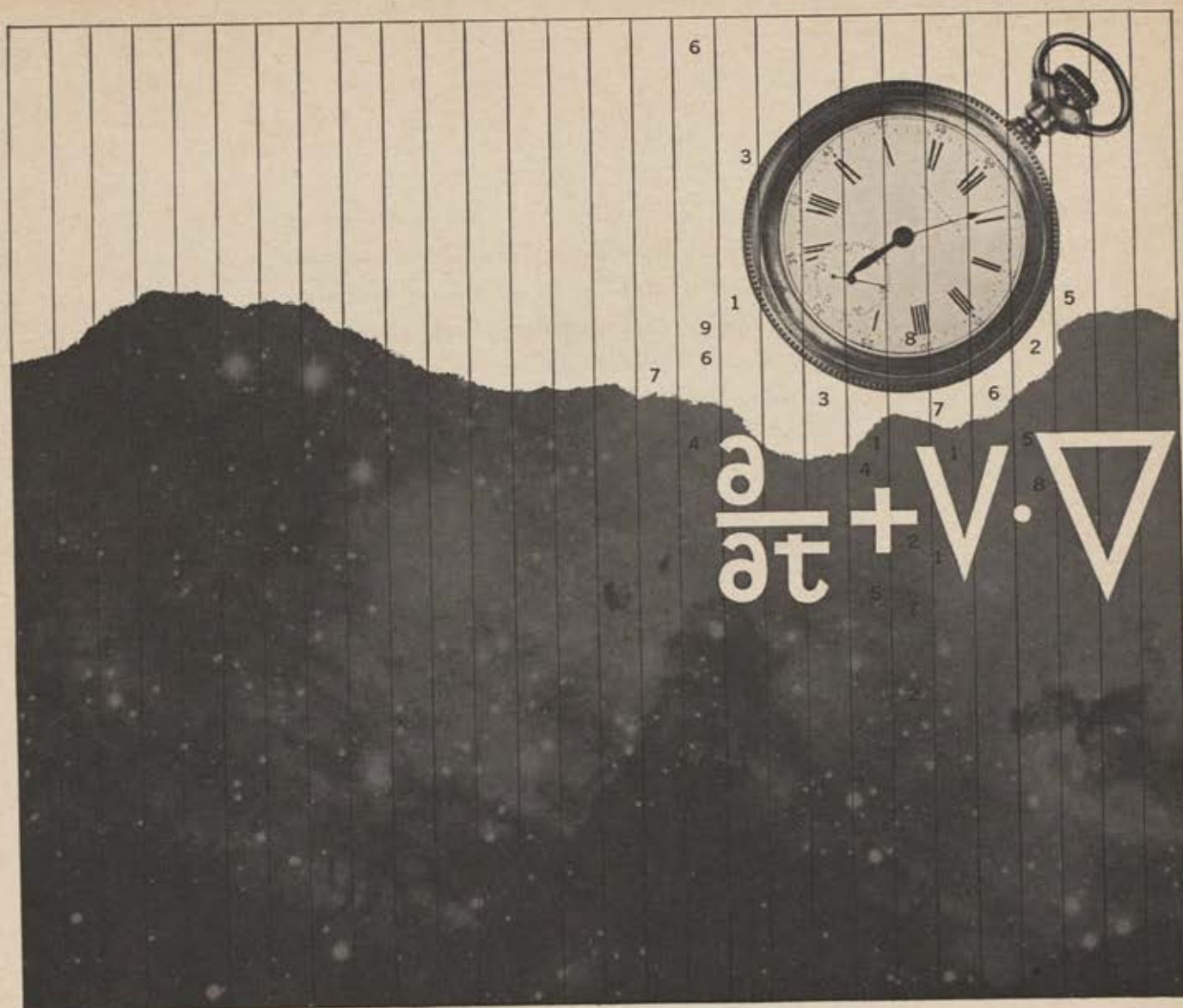
This development provides a practical realization of the quest for immortality. The modern student who learns the meaning of language; of zero, one, and the other integers; of Archimedes' Principle and Newton's Laws; and so on, ad infinitum, gives testimony that the men who created these things still live. As the intellectual heirs of the past, it seems fitting that we regard it as high moral purpose to contribute some thoughts to the future. Surely a thought is more spiritual than a gene.

It can be argued with force that the lunar project is not likely to produce the benefits I seek. It could fail for subtle reasons, but its conspicuous weakness is that it is not really ambitious. While it will doubtless turn out to be distressingly difficult, the prognosis is that the mission will, in fact, be accomplished, perhaps in nearer to five than to ten years, and perhaps by the Russians before the Americans—someone has remarked that we may have to fight our way to the moon. Now, goals must be in front, not in back; and this one will soon be in back. There it cannot provide the long stress needed to develop our intellectual resources. If it is put in back by the Russians, we will be frustrated as well as goalless. On the other hand, if the goal were more ambitious, say to explore the solar system, or beyond, our activities in the next decade would be little affected, but our attitudes would be greatly affected. We would not run out of goals. And we would not be shattered if the Russians beat us on the first short leg. Moreover, we would be less likely to be beaten on the next leg.

Thus the lunar project looks anemic. But it is at least compatible with grander views. It is stimulating, benign, and large enough to be noticed amongst the competition. . . . Whatever else we do for our mutual benefit and for posterity, I believe the lunar project should surely be included.—END



A member of the Research Council, RAND Corporation, Santa Monica, Calif., Mr. Williams is a mathematician who has worked in the national security field since 1940. His principal unclassified publications are in the fields of astronomy and mathematics. The above article was originally presented as a paper to the Princeton University Conference in October 1961. All views are those of the author and should not be interpreted as reflecting official RAND views or policy or the opinions of any of RAND's research sponsors.



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Fascinating freaks, the planetoids—chunks of rock that circle the sun with the planets—travel paths that sometimes, astronomically speaking, veer close to earth. Although the likelihood of collision is remote, the possibility has fed the imaginations of science-fiction writers for years. Now it is possible to envision the use of planetoids as sites for cosmic observatories . . .

WANDERING WORLDS

ON OCTOBER 30, 1937, it is doubtful if more than a few people realized that from out of the silent vastness of interplanetary space a strange visitor was spinning rapidly in the direction of earth. This odd visitor was in fact the minor planet Hermes, and though it passed safely by at a distance of some 400,000 miles (almost twice as far as from the moon to earth) such a distance is, of course, astronomically speaking, very small indeed.

Hermes actually is little more than a chunk of rock about a mile in diameter. Nevertheless the consequences of such a body, with an esti-

mated mass of three billion tons, colliding with earth would hardly have been a cause for jubilation! The news of the approach did not become widely known until early in the following year when a few paragraphs concerning an allegedly "narrow escape" for earth appeared in the national press. On the evening of January 7, 1938, Sir Harold Spencer Jones, the then Astronomer Royal, was induced to say a few words about it over the BBC.

Somehow it had always seemed that earth was safe, inviolate, and invulnerable; that the stars were fixed and eternal, while moon and planets pursued their familiar, remote, and inalienable courses. Did there after all exist a possibility that earth might be destroyed by a swift and decisive cosmic catastrophe?

Astronomers, of course, had long known that certain of the minor planets pursued orbits that were eccentric in the extreme, and to them Hermes was merely the latest contender for the dubious honor of having made the closest known approach to earth. The vast majority of the minor planets go their peaceful ways around the sun in orbits between Mars and Jupiter. There are, however, several notable exceptions. One of the most interesting, apart from Hermes, is Icarus, discovered in 1950, which at aphelion travels beyond the orbit of Mars but at perihelion swings

By John W. Macvey



to within nineteen million miles of the sun, actually *within* the orbit of Mercury. To remark that this little body must suffer fantastic extremes of heat and cold would indeed be a triumph of understatement. There was a time last century when it was reasoned that within the orbit of Mercury might conceivably lie another planet which was appropriately (and hopefully) named Vulcan. Such a planet would, of course, have suffered on its sunlit side the most searing and withering heat. It now seems extremely unlikely that such a planet exists, but during its brief sojourn within the orbit of Mercury, poor little Icarus must indeed suffer all that had hitherto been supposed of Vulcan.

Another extraordinary planetoid is Hidalgo whose orbit carries it from within the orbit of Mars to a point not far distant from that of Saturn. Other notable wanderers and "earth-grazers" worthy of mention are:

NAME	DISCOVERER	CLOSEST PROXIMITY TO EARTH	SIZE
Amor	Delparte	10 million miles	Approx. 3 miles in diameter
Apollo	Reinmuth	6.5 million miles	Approx. 1 mile in diameter
Adonis	Delparte	1.3 million miles	Less than ½ mile in diameter

Referring again to the planetoid Hermes it is cogent at this point to note that this particular "jaywalker" of the solar system can actually come within 220,000 miles of this planet—closer than the moon itself!

Do then any of these tiny bodies constitute a threat to earth? While a collision with a body such as Hermes or Icarus might not be as total or

as terrifyingly final as has been portrayed in H. G. Wells's famous story *The Star*, or in the film *When Worlds Collide*, it could nevertheless result in very considerable devastation; the more so if the impact took place near a large city or other highly populated area. Fortunately for our peace of mind, however, the prospects of such an encounter are very small. Even were the orbits of earth and an eccentric minor planet to intersect, the chances of both bodies arriving at the same position and at the same instant of time are exceedingly remote. Moreover the planes of the orbits of earth and of such bodies generally differ, and the effect might be likened more to one railway line crossing another via a bridge, than of two tracks intersecting on the same level.

It might be asked what value, if any, these small peculiarly eccentric bodies could have in the broad field of astronautics. Certainly the coming development of interplanetary travel might eventually enable us to have a closer look at these "wandering worlds," and the case of the "sun-grazing" Icarus might just conceivably raise the possibility of a small unmanned solar observatory being created on it to telemeter data back to earth during its period of close approach.

The chances of any space vehicle coming into collision with one of these objects are remote, and in any case their orbits are predictable.

Otherwise the planetoids remain as fascinating freaks. As more and more man-made space probes swing in strange orbits across the solar system, however, it is interesting to reflect that from time immemorial these tiny worlds have been doing just that very thing!—END



John W. Macvey, a leading British amateur lunar specialist, was the author of "Three Theories on the Craters of the Moon," which appeared in *SPACE DIGEST* in January 1961. The above article is reprinted here with permission of Spaceflight, the publication of the British Interplanetary Society. It originally appeared in their March 1962 issue.

Has Professor Moriarty, the evil genius of the nineteenth century and the nemesis of Sherlock Holmes, become, posthumously, an ally of the Soviet space effort? It seems likely, based on what little is known of a long-missing scientific treatise the Professor wrote about 1900. The Western world badly needs a copy of the book reviewed below . . .

OPPORTUNITIES FOR ASTEROIDAL

The Dynamics of an Asteroid, by Professor Moriarty (publisher unknown; date circa 1900; copies not available in the United States).

REVIEWED BY JOHN C. HOGAN



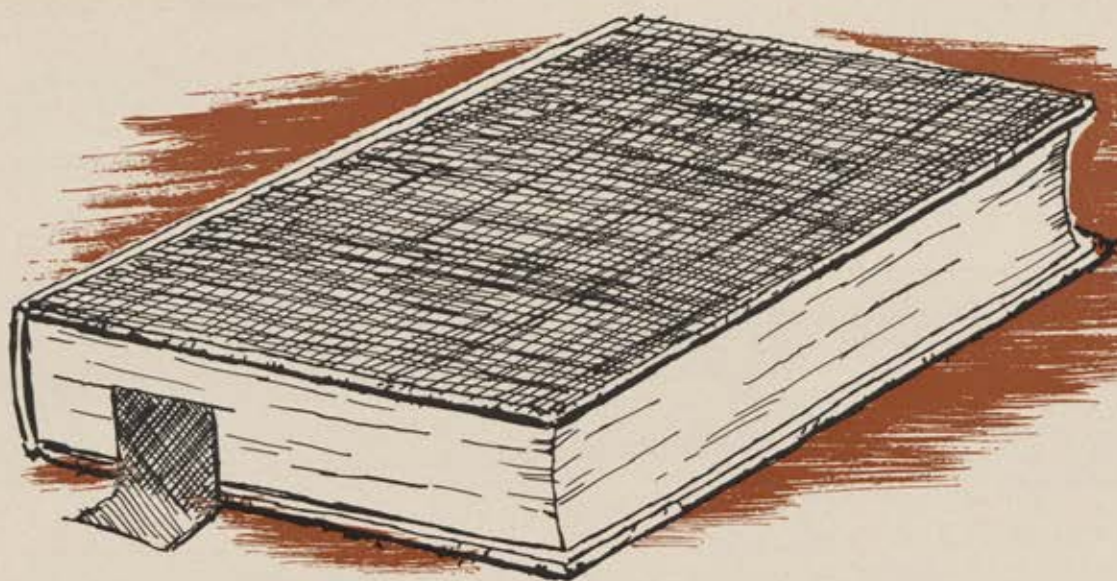
A lost tome on space science written by the late but little-lamented Professor Moriarty was mentioned in the November 1961 issue of *SPACE DIGEST* (page 94, "Speaking of Space"). All available evidence indicates that this book, entitled *The Dynamics of an Asteroid*, was the greatest scientific literary achievement of the late nineteenth century; yet no copies of it exist today in the Western world.

But there are reasons to believe that since the early 1900s the book has been known in Russia (see Harold Berman, "Sherlock Holmes in Moscow," *Harvard Law School Bulletin*, February 1960), and it is possible to suggest that the Soviet space-science program—including the launching of their first man into space—may have benefited from Moriarty's mathematical theories. Copies of the book, if any exist in scientific libraries behind the Iron Curtain, are thought certain to contain valuable data on space orbits and rocket trajectories, and for this reason the books are kept secret and unavailable to Western scientists.



Sherlock Holmes knew the book well. He once described it as "a book which ascends to such rarefied heights of pure mathematics that it is said that there was no man in the scientific press capable of criticizing it" (*The Valley of Fear*). This, of course, is hearsay evidence, but the impeccability of the source is unquestionable. Bristowe, quoting Mr. James Moriarty (believed no kin), who cites as authority the works of Smith in the USA, maintains that Professor Moriarty's book anticipated "the epoch-making discoveries attributed later to Einstein" (*The Sherlock Holmes Journal*, Winter 1960).

Such a book by Professor Moriarty under this title is catalogued at neither the British Museum in London nor at the Library of Congress in Washington, and the writer of this review has not been able to check the holdings of the libraries in Moscow, although it is doubtful if the book would be listed in the open catalogues there. Whatever we know about the book, therefore, must be carefully deduced from what has been said about



CRIME



work of Einstein.

We know, furthermore, that at age twenty-one Professor Moriarty authored a treatise *On the Binomial Theorem*, often cited in the literature, which enjoyed a certain European vogue (*The Final Problem*). This suggests that Professor Moriarty may have written other scientific works, some of which have never been published. The late John Von Neumann and Oskar Morgenstern, in their classic work on the *Theory of Games and Economic Behavior* (Princeton University Press, 1947, pp. 177-178), refer to Professor Moriarty's advanced knowledge of the theory of games, and it is clear that the Professor's work in this field considerably preceded that of these two authorities. We can therefore assert with some certi-

ty it in print in such authoritative works as *The Sherlock Holmes Journal*, *The Baker Street Journal*, and the like. Sherlock Holmes unequivocally asserts that the book deals with "pure mathematics," and later students of the subject affirm that it is associated with the great

tude that Professor Moriarty is the first man known to have applied the theory of games to crime, and the malevolent genius of the late nineteenth century was not entirely unsuccessful in his application of the theory in this connection. This is further substantiation of the Professor's learning and knowledge in the field of advanced mathematics.

The Dynamics of an Asteroid, a mathematical treatise for which the world was not yet prepared, deals—according to a recent issue of *The Baker Street Journal* ("Sherlock Holmes and Outer Space," September 1961, pp. 159-161)—with the launching of Sputniks and other earth satellites and discusses the opportunities for asteroidal crime when man finally inhabits interplanetary space bodies. One recalls Dr. Watson's description of Moriarty as the "famous scientific criminal" and also Holmes's own veiled reference in *The Final Problem* to the "higher criminal world," then centered in London under the control of Professor Moriarty.

If a copy of this important book is ever found, it will be of interest and value not only to space scientists, but also to criminologists and other law-enforcement officers who would greatly benefit from reading it. If any readers of *SPACE DIGEST* know the location of a copy of this book, they are requested to immediately notify Scotland Yard.



ABOUT THE REVIEWER: Mr. Hogan, who works for the RAND Corporation, Santa Monica, Calif., was the coauthor, with Mortimer D. Schwartz, of the article, "Comics, Common Law, and the Cosmos," appearing in the January 1961 issue of *SPACE DIGEST*. He is also a contributor to *The Baker Street Journal*.

Speaking of SPACE



BY WILLIAM LEAVITT
Associate Editor, AIR FORCE/SPACE DIGEST

The Martians

Cosmonaut Titov has come and gone, and except for the bits and pieces of technical information he revealed about his flight in Vostok II during his mid-May report to the COSPAR (Committee on Space Research, International Council of Scientific Unions) meeting here in Washington (see "What's New With Red Airpower," page 13) we are not much the wiser as to the specifics or intent of the Soviet space program. After a week of watching and listening to Major Titov at COSPAR, at the attendant press conferences, and at the NBC "Nation's Future" telecast taped in the crowded NBC Washington studio the evening of May 4, we were reminded of the acidulous comment of the New York *Post* columnist, Murray Kempton, some years ago, who likened the Russians to hypothetical Martians. If we have occasionally waxed less than totally enthusiastic about the Hollywood aura that has in the past surrounded the Mercury Astronauts, we would assert, after a few days with the Russians, that "too much, too soon" in our own camp is preferable to the near-nothing, the sense of frustration one feels when the Soviets are on the stage.

For anyone following Titov around, the only salvation was one's sense of humor. Since you know that you are going to be told virtually nothing, you tend to lean back and notice the little funny things. Among the little things was the presentation by COSPAR President, Dr. H. C. Van De Hulst, of a pair of Dutch wooden shoes to Major Titov and Colonel Glenn, who sat together on the platform of the COSPAR meeting in the State Department Auditorium. Hollander Van De Hulst proffered a wooden shoe to each of the spacemen and made a little speech about the symbolism of sharing the shoes as a hopeful prelude to future sharing of space technology information and peaceful cooperation in space exploration.

Almost as if the presentation had been scripted beforehand, Titov got the left shoe, Glenn the right one, and there was a buzz of jollity in the audience. Undoubtedly, the political division of the Dutch *klompen* was inadvertent. But for those who noticed the strange touch, it was a reminder how very far apart—despite the pious words—we really are so far as the possibilities of meaningful cooperation are concerned.

There was another strange scene that week, the press conference in the Great Hall of the National Academy of Sciences featuring Titov and Glenn. For about forty-five minutes, correspondents pressed Titov for technical information on Vostok II and for his views on peaceful cooperation, and were rewarded with marvelously evasive answers and lengthy monologues about Nikita Sergeyevich Khrushchev's disarmament proposals, described as the *sine qua non* of peaceful cooperation. Colonel Glenn's widely quoted rejoinder to Major Titov's speech on disarmament was quite eloquently put.

Toward the end of the press conference, a number of questions were put to Titov about the configuration of the Vostok. He was specifically asked about and shown a photo that accompanied J. S. Butz, Jr.'s, "What Are the Lessons of Vostok?" (see *AIR FORCE March '62*). He parried the question, saying that the picture was of an accurate mockup of the Vostok and what did the details matter—the devices worked. The high point of the press conference was an impassioned appeal to Major Titov by an Italian correspondent to tell something—anything—about the Vostok capsule and how it landed ("Surely that information isn't warlike!"). The Italian newsman was still pressing the Cosmonaut, and being refreshingly emotional about it, when he was cut off practically in mid-sentence by Dr. Richard W. Porter, of the National Academy of Sciences, who was chairing the press conference.



—Wide World Photos

Wearing COSPAR badges, US Mercury Astronaut John H. Glenn, Jr., left, and Soviet Cosmonaut Gherman Titov, right, visited the White House and chatted with President Kennedy, May 3. The Soviet spaceman reported to COSPAR on his flight, had a chance to visit New York, San Francisco, and the Seattle World's Fair.

Soon the conference was over, and this writer found himself engaged in a discussion with a colleague who complained that the press made a great error in asking specific questions of the Russians. The colleague insisted that we would all do better to ask questions that did not involve technical details. But really, that takes you right into the Soviet trap. Since to the Russians, a press conference is a sort of dialectic tool, not a way of distributing information, the only defense is offense. At least if you ask, ask, ask, and before the cameras and the world you get nothing but evasions, the "Martians" are forced to show their behavior publicly, if not their technology. How tiresome it was to listen to Major Titov telling us about the moonlit night his father went off to war, what a great thing peace is, and similar platitudes. And how amusing to hear him declare that the one item in his training that was neglected was the business of fielding questions at press conferences.

One can imagine the intense briefing he must have undergone prior to his trip to America:

BRIEFER: Now Comrade Titov, they are going to press you for technical details. They are desperate for information, and besides, they don't control that pack of brigands they call their press. Just smile and explain that technical details don't matter, that the Vostok worked as planned.

TITOV: But what about this peaceful cooperation? They're sure to want to know about that.

BRIEFER: Well, you can say you're a simple Cosmonaut and you cannot comment on political questions. No, no, why not say something about disarmament . . . ? Yes, that's much better. Say that once we get full and complete disarmament, then we can have peaceful cooperation. Yes, that's good.

TITOV: I know they're going to ask about my "seasickness" in the weightless state.

BRIEFER: No problem, Comrade, just say it's possibly peculiar to you, and the doctors are working on it. . . . By the beard of Lenin, if we ever get hold of the revisionist who let that out in the first place, we'll make him Assistant Minister of

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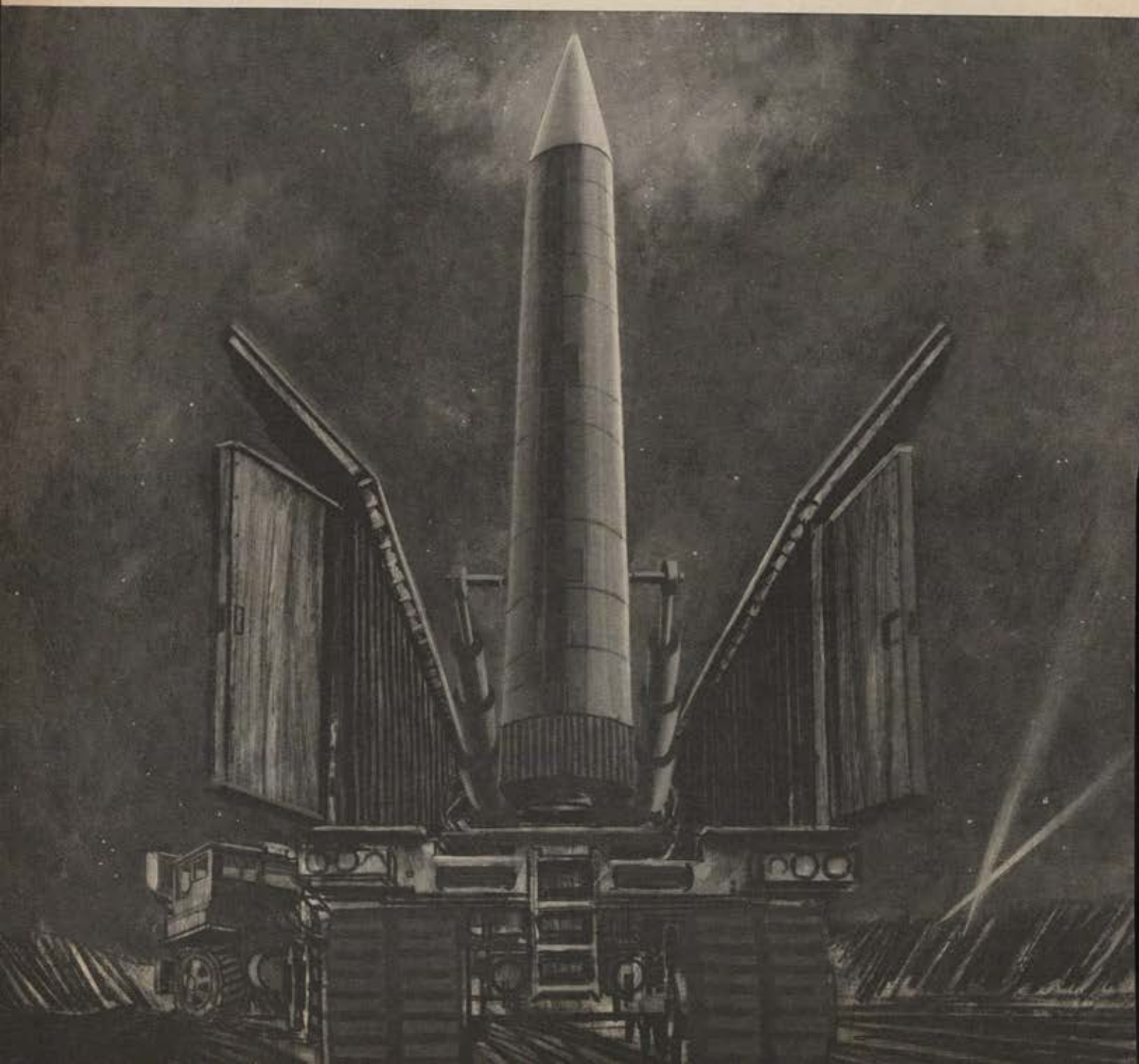


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power stations in. . . . Well, what's past is past! Etc., *ad nauseam*.

But Titov is gone, and life goes on. At this writing Mercury Astronaut Navy Lt. Cmdr. Malcolm Scott Carpenter is preparing himself for the second Mercury orbital flight. It is a mark of the rapidity with which spaceflight has been accepted as a fact of life that the preflight stories in the press have been relegated to the inside pages of the newspapers, as far inside as page seventy-one of the *New York Times*, although doubtless and deservedly the flight itself will make page one and reabsorb national attention.

As a result of the widespread criticism of the Astronauts, and more particularly their personal legal adviser, particularly in connection with the Houston house offer, there has reportedly come down from the White House itself a policy instruction that henceforth the Mercury Astronauts are to be considered and publicized as individuals, that the team concept is to be minimized. In short, there seems to be a welcome determination to restore a sense of balance to the publicity attending Project Mercury for the rest of its working life.

Presumably, the next batch of Astronauts will lead much quieter public lives, and there will be no exclusive picture magazine deals. Future Astronauts will not have to go through the philosophical agonies of studying the nature of hero-worship-and-discard, as some of them have reportedly done. Thoughtful people in the National Aeronautics and Space Administration are trying now—and now is the right time—to design sensible ground rules for the next generation of Astronauts. One



—NASA photos

Left and above, Mercury Astronaut Navy Lt. Cmdr. Malcolm Scott Carpenter, scheduled to make second American orbital flight, goes through training and simulation program. He will orbit the earth three times.

idea being bruited about is a bureau of astronauts' affairs which would presumably serve as a kind of buffer between the public and future Astronauts and enforce ground rules of taste and propriety. There is no firm plan for such a bureau at present, but the fact of the idea underscores the interest NASA is taking in avoiding past difficulties.

Meanwhile the space agency, pressed by its before-the-end-of-the-decade deadline, is saying publicly, and no one can prove it right or wrong in view of the Soviets' closed-mouthedness, that US industrial capacity may enable us to beat the Russians to the moon. NASA Administrator James E. Webb a few weeks ago told a television audience that the economy of the Soviet Union might not be able to match the effort planned by this country. Mr. Webb was quoted as saying that the Russians would probably be the first to orbit more than one man around the earth and the first to send a multimanned flight around the moon. But, he said, in terms of "all the requirements to land on the moon and return and do a scientific exploration, our total industrial capacity—the great strength of this nation—would show itself." Mr. Webb added that this country is in a "completely competitive position in that regard."

Problems mount as the pressure increases. The Centaur boost-vehicle program, for which there had been so much hope, and which has slipped so unhappily, is being looked into by a House space committee subcommittee. In the moon program there are some serious questions being raised about direct ascent using the giant Nova booster under development. Nova is, of course, a second choice to the rendezvous-in-earth-orbit technique which has earned wide approval as the most ef-

fective approach to the moonflight. But recently, technical studies suggest that a landing from lunar orbit might be even easier to do. In the lunar-orbit method, an advanced Saturn vehicle would take the expedition directly to an orbit around the moon, and a one-man capsule would be dropped to the surface. The man would perform the quick exploration while his two colleagues circled in an orbit as low as fifty miles (lack of lunar atmosphere and drag suggests this possibility). For the return trip to earth, the Astronaut who had landed would launch himself to rendezvous with the mother ship which would then begin its journey homeward. There are technical people who think this technique would improve our chances to meet existing deadlines.

Some Poesy

We're indebted to the *Reporter Magazine* for permission to reprint the following:

RANGER IV

"April 26, 1962—The United States spacecraft *Ranger IV* crashed onto the moon today after a flight of just sixty-four hours."—*The New York Times*.

Twinkle, twinkle, little fool,
On the dark side of the moon!
Muted, man's imperfect tool
Cannot answer to his tune,
Cannot tell what now it sees
On the cruel cratered waste,
Cannot count the galaxies
Or describe the lunar taste.
There it sits, the heaven-sent,
Straddling the solitude,
Unresponsive instrument
Of a weird and weightless brood
Who will find it there some day
Glittering in some abyss,
And discover in what way
Calculations came to this.

—SEC

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Space Capsules

For an enthusiastic and nontechnical account of the US lunar effort, replete with the "hows" and "whys," plus historical background, see Jay Holmes's new book, *America on the Moon: The Enterprise of the Sixties* (Lippincott, \$4.50, 272 pp.). Although this reader would not agree with all of Mr. Holmes's conclusions—particularly his confidence that needed military space capabilities will almost automatically "fall out" from NASA research efforts—the book is a valuable contribution to the growing literature of astronautics. It

is clearly written and an eloquent argument for the national advantages to be garnered from the technological thrust that will be an inevitable concomitant of a successful American expedition to the moon. Mr. Holmes, a seasoned newsman and science writer, is a consultant for NASA.

There are two worthwhile reports on the impact of technology that have been released by the Fund for the Republic's Center for the Study of Democratic Institutions at Santa Barbara, Calif. One is Donald Michael's "Cybernation: The Silent Conquest," an exploration, and a provocative one, of possible sociological effects of automation. Mr. Michael will be familiar to *SPACE DIGEST* readers as the author of articles that have appeared on these pages. One of the earliest of the social psychology specialists to analyze the socio-political impact of the onsetting space age, he is now Director of Planning and Programs of the Peace Research Institute, Washington, D. C.

The other offering is "The Government of Science," by Carl F. Stover, Assistant to the Chairman of the Board of Editors of the *Encyclopedia Britannica*. It neatly analyzes the growing role of science and technology in government and raises questions that are already plaguing everyone who has thought about an era which increasingly features a schism between the technologically literate and illiterate. Write to the Fund for the Republic, Santa Barbara, Calif., for information on availability of these two efforts. . . . Women in science and technology? Some interesting findings are presented in a survey by Careers Inc., a Washington, D. C. job-information clearing house for



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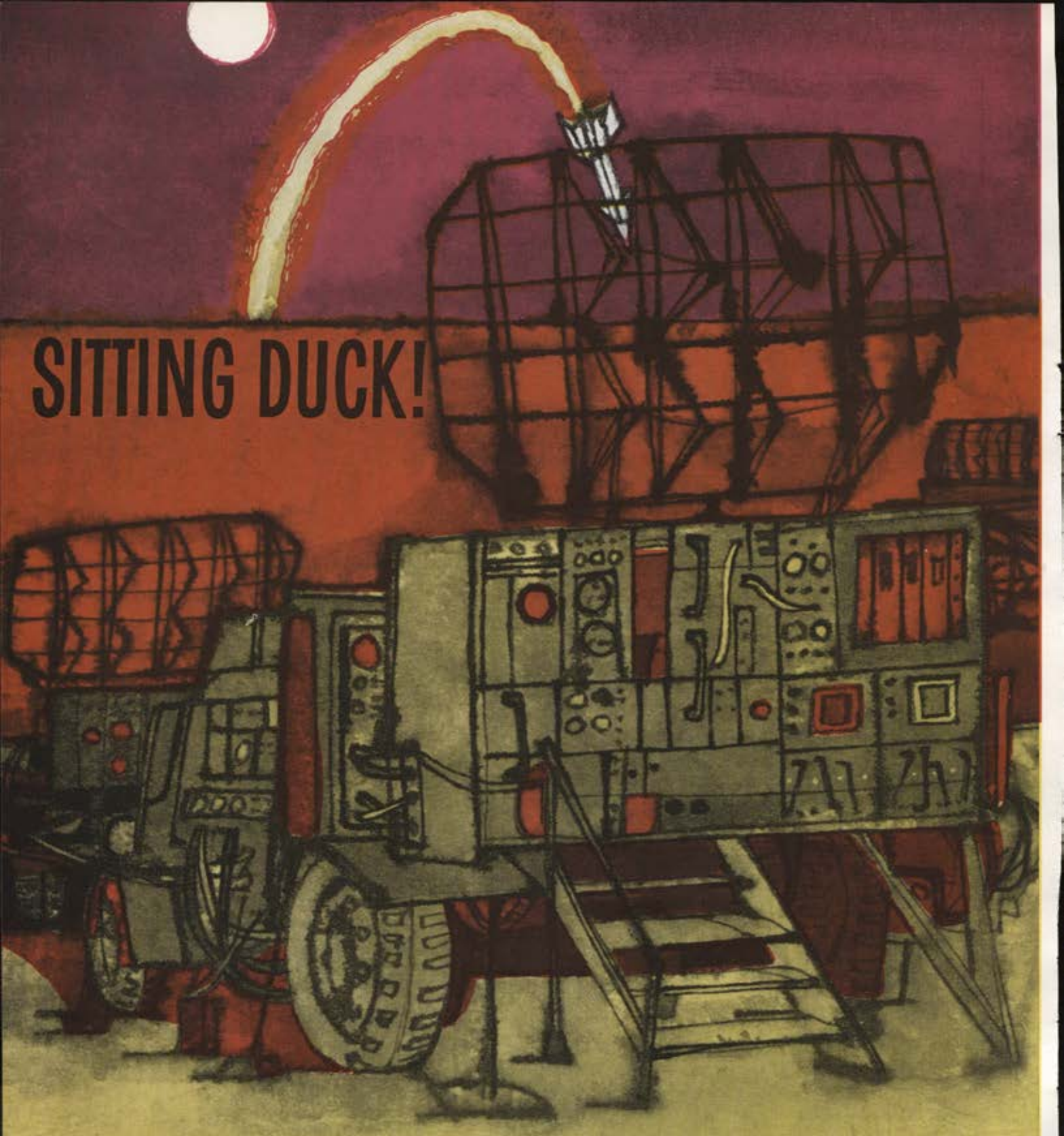
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(Artist's conception of a "sitting duck" situation that should never happen)

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SPEAKING OF SPACE

scientists and engineers. Careers' survey of personnel recruiters from thirty of the nation's largest defense contractors shows that twenty percent admit a reluctance to hire women engineers and scientists. Not all surveyed give their reasons, but among the problems listed were (1) "Upsetting to the office environment"; (2) "Difficulty in advancing women to the management level"; and (3) "Early pregnancy." Disappointingly pat answers to a question that would seem to deserve closer analysis, especially in these days of widely touted technical personnel shortages.

The Soviets are now claiming that astronautics is disproving religion. A few unchoice quotes from Radio Volga via East Berlin to the Soviet Forces in East Germany: "... Gagarin penetrated into heaven in the spaceship Vostok I. . . . Once again, and this time more concretely, the tedious religious superstition was dethroned ignominiously depicting heaven as a supernatural sphere, inaccessible to men and completely different from everything we know on earth. Accordingly, only gods and saints could fly there. . . . All these religious inventions have long ago been unmasked as antiscientific nonsense. . . . Clergymen behave as if nothing has happened." The tirade proceeds to attack the late Pope Pius XII for a statement to the International Astronautical Federation in which he praised scientific inquiry as a manifestation of human search for knowledge which he considered a Godly task. And not to miss a stroke, the broadcast takes the Almighty Himself to task for alleged inexactitude in so placing our planet that its distance from the sun is not constant. How really dreary and bigoted organized atheism is.

Italy is hoping to join the now-exclusive space club, according to a report presented by Prof. Luigi Broglio to the May meeting of COSPAR in Washington. The Italians, he said, are planning to orbit the US-Scout-boosted payloads in equatorial paths from a mobile launching platform in the Indian Ocean. They will use a modified offshore oil-drilling rig as launch platforms.

Interesting answers to interesting questions, from an interview of famed physicist Dr. Hans Bethe, by Marquette University's Donald McDonald, published by the Fund for the Republic's Center for the Study of Democratic Institutions: Q. "One of the scientists, I think it was Dr. Alvin Weinberg, the Director of the Oak Ridge National Laboratory, wrote a piece in a recent issue of the *New York Times Magazine* in which he said that there is a danger when scientists have too much money to spend. He said if scientists are too 'well fed' they tend to relax. Is this a possibility?" A. "Yes, I think this is a psychological possibility. I believe scientists can be overfed, and the consequence is that they don't think enough." Q. "I think that is what Weinberg suggested, that while money is relatively plentiful, thought is not, and there is no necessary equivalence between money and thought." A. "I will give you an example of that. It's close to my own work. I am a theoretical physicist, and so I have a lot to do with calculations. We used to do all our calculations by hand with a slide rule. Then we bought a small calculating machine, costing a few hundred dollars, which we punched on the desk. After this, we spent most of our time thinking about ways to understand the problem and to make it so simple that a very short and easy calculation would give us the result. In the process, we spent weeks and months simplifying the problem in our own minds. Nowadays people have enormous computing machines costing millions of dollars, and the customary thing is to take a theoretical physics problem and code it for the computer. You put it on the computer and let the computer give you your answer. As a result, many scientists think only of how to put the problem on the computer. They no longer think about the problem. By using mechanical devices, people are concentrating much less on a real understanding of the problem, and they lose the inspiration and suggestions for further research that came from the intimate contact with every phase of the calculations. . . ." War-gamers, please note.—END



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Have we become so fascinated with the question of escalation, so involved with the mystique of deterrence, so convinced that the use of our power—should deterrence fail—would doom our planet that we will fatally weaken our nuclear capability which is the single factor that in the last analysis can cause the enemy to pause long enough to ask himself: Wouldn't I rather be Red than dead?

ESCALATION —

Peril or Poppycock?

A SPECIAL REPORT

LIKE it or not, the future must be viewed over the unnamed battlegrounds and undedicated cemeteries of the next decade's small wars. No two people look on the outcome of these wars with the same confidence. They are not even agreed on probable times and locations. But the people of the world are almost unanimous in believing that the first use of any nuclear weapon will blot out the future with World War III. Whether this belief is justified or not is a matter worth examining.

The job of the professional military man is to try to make certain that the future does *not* contain World War III. He considers himself the custodian of the present and the guardian of the future. The civilian, however, is losing confidence in the guardian's ability to escort him safely into that future. Why? Because too many of the military guardians tell him that the decade ahead must be paid for ahead of time, not in money, but in fear: Fear of one's own, as much as of the enemy's, power. That power may get out of hand—even accidentally—and erupt into "thermonuclear holocaust."

Now we are assured that the weapons finally exist to kill us all. If worst comes to worst and we lose the race *past* World War III to the Communists, we have the means to take them down with us. We not only can but *must*, for nuclear war is uncontrollable, the argument.

(Continued on following page)

ment goes. The sophisticates call it "escalation." Escalation is what will finally do man in—they say.

Poppycock!

If the man in uniform would concern himself more with his profession—fighting a war to win—and less with the self-induced hypnosis of deterring war with a force smaller than the enemy's, the view through the glass might be a lot clearer. And his neighbor a lot more confident about the future.

The book—that is, the "Dictionary of US Military Terms for Joint Usage"—says escalation is "an increase in scope or violence of a conflict, deliberate or unpremeditated." This covers some interesting possibilities.

Escalation can be geographic, as when war crosses national borders. It can mean the unexpected involvement of an entire alliance of nations. It can mean a sudden increase in the enemy's forces, as when the Chinese unexpectedly committed themselves in Korea. And it can mean a dramatic improvement in deliverable firepower, *conventional or otherwise*. A sudden increase in the mobilization base is a form of escalation, as would be a callup of the Reserves. The introduction of the machine gun in World War I was a kind of escalation.

Nobody worries much about "conventional" escalation. It takes place at a manageable rate—one that we have had lots of experience with. If you want more conventional firepower, you add on more divisions, artillery, fighter-bombers, and bombers. Everyone knows what the time lag is and, most important, just how fast the enemy can escalate. If you were a strong industrial nation, as Germany was before World War II, you could pretty well judge what was required to win a war on the continent. But you had to ensure against a manpower escalation by other nations ganging up with the victim. A treaty with Russia and Japan was to have done the trick. It didn't and Allied escalation—slow but sure—finally overwhelmed the Nazi "Thousand-Year" Reich.

The great US warmaking machine, once it got under way, escalated the Allies (and Russia, by the way) into a superior military position. It was so superior, in fact, that we were able to price the victory out at Unconditional Surrender.

Fifty thousand warplanes, 1,400,000 bomber sorties, 2,700,000 tons of bombs dropped, a two-ocean Navy, 8,291,000 US citizens in uniform, thirty-eight allied nations (against seven), and \$380 billion spent in steel and aluminum. Hitler miscalculated, and escalation killed him. Even with the V-2 he couldn't out-escalate the Allies.

But it took us five years. There was plenty of time to make up for mistakes, and when wars are managed by human beings there are bound to be some. But the biggest mistake of all is to get in a war when you can't control the escalation. And the only sure control, as history has repeatedly shown us, is to be stronger. Quantity and quality both count if you are preparing to go the whole distance—and only such safeguards can postpone the Kremlin's decision to make the wave of the future into a tidal wave.

In spite of what we say, however, there is a conventional firepower gap between the USSR and NATO. People who want to go the conventional route to general war seldom admit—except perhaps to themselves—that the gap does exist and that it favors the enemy. They try to talk away the gap by comparing Gross National Products, and by running down the effectiveness of satellite forces, and by pretending that one US soldier is the equivalent of any ten "Rooskis," and so forth. But the gap is there so long as the soldier and his rifle are the basic means of delivering firepower—and even the theater air commander who supports the soldier sees a numerical gap that favors the world's largest tactical air force, which happens also to be Russian.

It was the intent of the original NATO plan that the
(Continued on page 85)

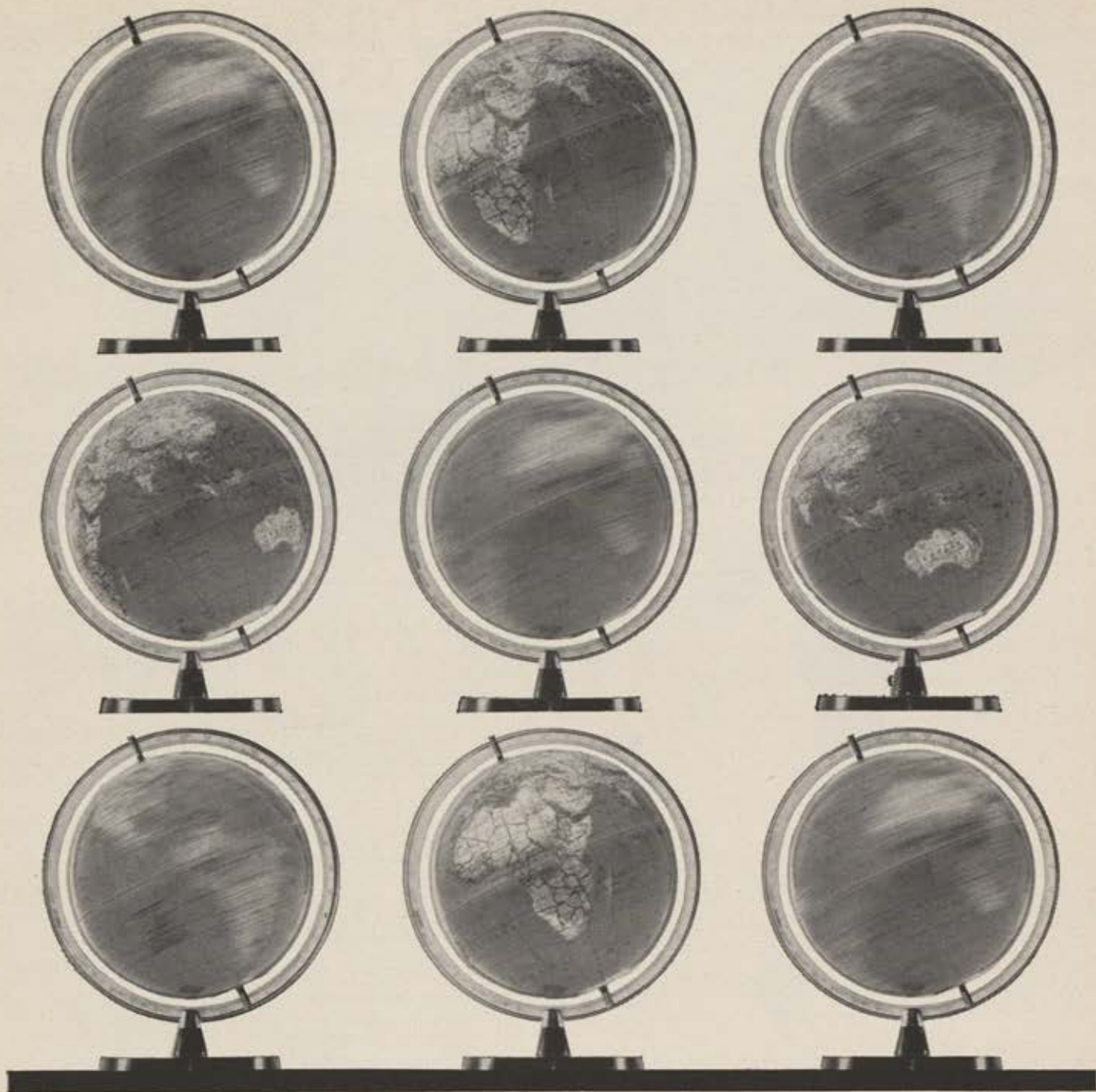
SOME FEAR-BORN FALLACIES

The current near-obsession with the control of escalation as an end in itself could have fatal results if deterrence fails. And fail it may, if the capability to win a general war is sacrificed to fears that:

- Nuclear war is uncontrollable.
- Our own power is as dangerous to the world as the enemy's.
- Unless we increase conventional power, armed clashes will have to be of nuclear and "suicidal" magnitude.

Wisdom would suggest that, should deterrence fail, the only thing that might give the enemy pause, whether his attack was conventional, nuclear, or mixed, would be the knowledge that our price for his victory would be his destruction.

This truth—which planners must study—gives new scope and meaning to deterrence. It takes deterrence right into the war situation, as part of war-winnability . . . the real business of military planners.



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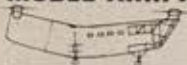
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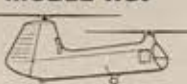
IN THE HISTORY OF THE **BOEING-VERTOL**
TANDEM ROTOR "FAMILY"

MODEL XHRPX



1945: Developed for the U.S. Navy, the XHRPX, world's first successful tandem rotor helicopter makes first flight on March 6.

MODEL HUP



1962: The Boeing-Vertol HUP plays a typically useful role in the sea operations following the space flight of Lt. Colonel John Glenn. In the accompanying photograph the helicopter is lifting the astronaut from the Destroyer U.S.S. Noa to take him to the U.S.S. Randolph. 1950: HUP is first helicopter to be flown with an automatic pilot.

MODEL H-21



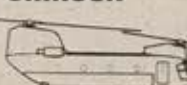
1962: Boeing-Vertol H-21 assault helicopters are assigned in large numbers by the U.S. Army to combat guerrilla war operations in South Viet Nam. 1956: The French Army puts H-21's into service in the Algerian conflict. (The more than one hundred introduced there since have produced invaluable operational data used in developing improvements and refinements in later helicopter models.)

MODEL 107



1962: Passenger airliner configuration of the 107 is certificated by the FAA... delivered to New York Airways. 1961: Military version of the 107 wins U.S. Navy competition for a marine transport helicopter.

MODEL HC-1B CHINOOK



1962: The HC-1B Chinook, America's most powerful helicopter, is in large scale production and flying; attains speeds over 150 mph with higher than normal maximum loads. 1961: First Chinook completed and ready for ground tests. 1959: Vertol Division gets go-ahead to develop a new 2-3 ton capacity transport helicopter for the U.S. Army.

VERTOL

DIVISION

MORTON

PENNSYLVANIA

BOEING

firepower gap would be filled, as soon as there was a real collision with Russia, with nuclear weapons. Tactical nuclear weapons would offset the difference in troop strength at the border and help balance out the two tactical air forces. Meanwhile SAC would put a staggering price tag on the aggression by destroying the Soviet's long-range strike forces, along with a big piece of the Soviet economy. This was the "sword-and-shield" concept. Everybody agreed it was the only sensible way. Then Russia developed a rocket with a thermonuclear warhead and, overnight, war with Russia became "thermonuclear holocaust." "Deterrence" suddenly became a more attractive word than "massive retaliation."

Mutual suicide became a reality. The only way to get out from under was to ban the bomb, or at least control it so that it couldn't get out of hand. Escalation became the topic of the day, with service bias making sure that people understood that atomics meant automatic escalation and that escalation inevitably leads to "thermonuclear holocaust."

"We're not going to want to lose, so we'll use them, and then he's not going to want to lose so he'll use them. Then *we'll* use bigger ones, and then *he'll* use bigger ones, and whoosh! there she goes... that's all she wrote."

Well, there *is* that possibility, and if your view through the glass is as dark as the average military professional's you'll see a future so harsh and dreadful that you turn away. Don't make me look at it—just keep it from happening.

How?

Here is the most popular answer. It may be the last word.

Get our own force under control first... civilian control. Harden the command circuits so it can't accidentally get set off by a radar blip from the moon. Then try to close the conventional firepower gap a little closer. Add on several more divisions. Ready the Reserves at home. The additions cost money. While we're about it, and as long as we're not going to worry about getting *past* World War III but only safely up to it, we can pare the strategic force down to a more sensible size.

So we build a good, stable deterrent (if we're lucky we'll have a really reliable arms-control agreement to check on Soviet cheating) and narrow the conventional firepower gap by a little. We've done one thing we set out to do—we've made it impossible for our side to fight a nuclear World War III. The future is really ruined if the deterrent force is used, because it is designed to make *both* futures—ours *and* the enemy's—too terrible to look at. Or so we think. *He* may think it doesn't look much worse than the 20,000,000 Russian dead in World War II.

Meanwhile, back in the USSR, there are 175 "conventional" divisions and that big tactical air force. A Soviet decision launches the long-expected pincer around Berlin. Our conventional threat doesn't even make him disperse on the battlefield. He masses troops and firepower as if Berlin were Stalingrad. If we hadn't already told him, he could tell by looking that we are fixed for war with steel and gunpowder. We don't

know what his nuclear policy is for certain, but he knows that he can escalate conventionally a great deal faster than we can. We find out the hard way what it means to be on the lower side of the firepower gap.

Three things can happen. We may be able to hold until he piles up the three-to-one ratio necessary for a real bloodletting offensive. (Without even mobilizing he has tripled our twenty divisions.) Or we may fall back, burning and blowing up everything we abandon in time-honored fashion. (We've ruined everything in front; if tactical nuclear weapons are used now they are on our Allies' soil, not his.) Or we can go the nuclear route.

We don't want to lose, do we? Is he pausing?

Wait! Back up! We made a very important trade-off up above there somewhere. We traded the assured safety of a superior nuclear strategic force for a bigger ground army and some promises about nuclear parity. If we salvo those missiles now we can't win, and millions of Americans may die needlessly. We said that to get *past* World War III we had to be prepared to lead all the way in the escalation. That means general-war superiority—one that he believes and that he believes we'll use. When he "pauses" it should be to reflect on what this is all pointing up to. If nuclear escalation leads to his defeat, why should he continue? No one wants to be completely disarmed in this world, especially with that savage Stalinistic regime and a human escalation to the East.

But if we had resisted the temptation to substitute the psychology of stable deterrence for a win-all-the-way force and had used money to improve (not just enlarge) the entire arsenal, then the Soviet decision is relatively easy at every level of aggression. The decision is easy because he realizes that every bump in the escalation ante brings him that much closer to defeat. If we face him with inferior forces the decisions are harder. How far should he push? If he can get three-fourths of what he wants cheaply, should he stop? Should he go for broke? Will he push on, or let us off the hook? Will we be satisfied to get back one-fourth of what he's already decided to take next year?

The easy decisions are made so by our demonstrated readiness to halt his offensive in its tracks and to disarm him completely if necessary. If we can go him two better and he knows this, the only end to World War III is a Soviet defeat. This is not the future he is looking for either. The goal is world dominion for communism.

If we had filled up the firepower gap in the very beginning (instead of frittering away the tactical airpower asset hauling \$13 TNT bombs), our nuclear warheads would be airbursting over satellite airfields and not those of a captured ally. He would be faced with the decision: Should he or should he not? Does he dare? Maybe. But we can go the limit, and he can't. If we're fighting to destroy or neutralize his military forces, he'll soon be down to the point of no return.

An easy decision, and one better made than not made. How many Germans died needlessly waiting for Hitler's "*Kamerad!*" from the bunker in Berlin? The choice is defeat or use up the remaining nuclear forces
(Continued on following page)

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An important American company in the military electronics and aerospace fields (1961 sales over \$300 million) is seeking a general manager for its German operations.

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ESCALATION

CONTINUED

in retaliation. Better for him to accept defeat now while the nuclear force has some value at the negotiation table. A live hostage is better than a dead one. And retaliation with an inferior force is an invitation to reprisal . . . the worst possible way to end the war. He gets "thermonuclear holocaust" but good. The decision isn't so tough after all. *He* would much rather be Red than dead.

"Thermonuclear holocaust" is a point of view. If it is a very common point of view, it's because so many highly placed military men insist that there can be no winner in a nuclear war. "Annihilation" is a common term; "mutual suicide" is another. But this is a pretty fuzzy look into the future. Military forces are created and maintained for the common defense, not for the common destruction. War is waged against enemy military forces, not against fat, soft cities. Cities are good hostages. They are full of people and treasure. Threaten them. This deters the Soviet from planning to hit our cities. And he may eventually come to the same conclusion—that a live hostage is always a good thing to have.

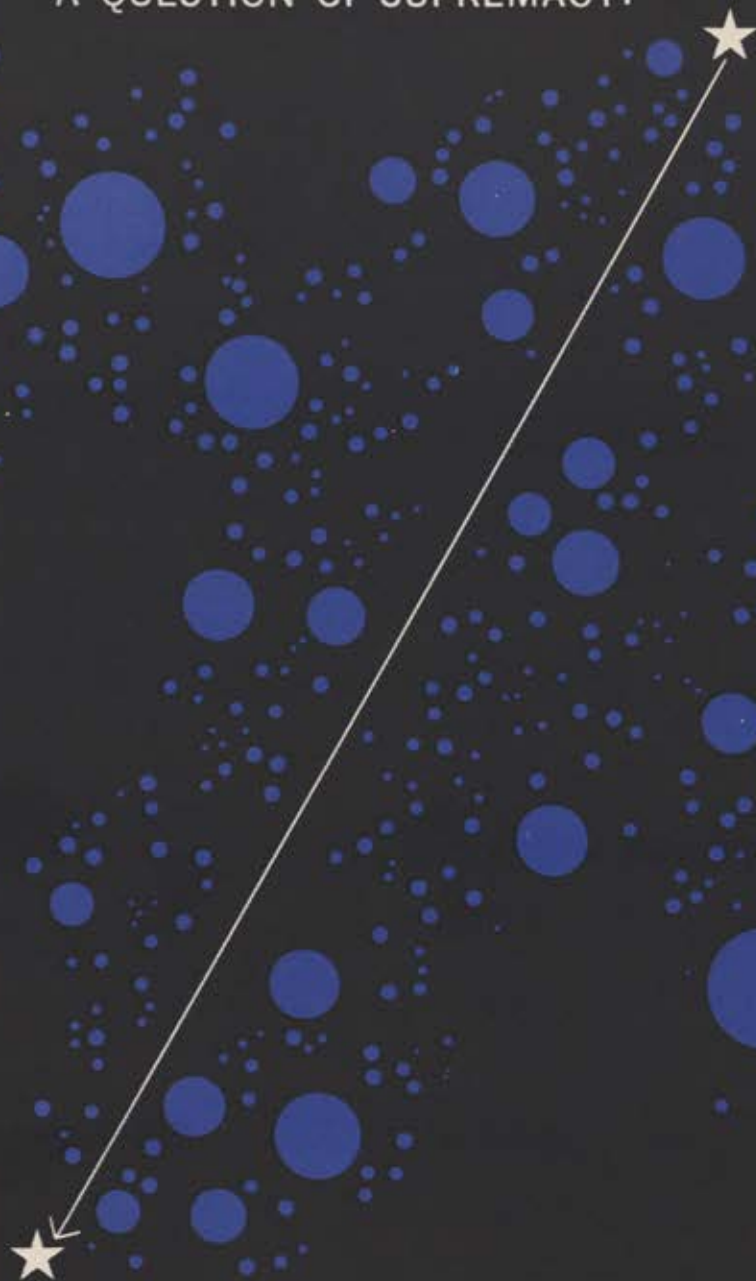
If the military guardian can get back to his own business and decide that he's going to study war again, maybe he can find better ways to fight it. Deterrence is our goal, but it is a by-product of something else. The capability to win and the resolve to use that capability as necessary. The biggest cannon in the world once belonged to the Russian Tsar. It had a bore thirty-one inches in diameter. It failed to deter Napoleon. But it begins to look as though we are going to be deterred from saving ourselves and the future by the world's biggest rockets.

If you must worry about escalation, worry lest the superior war-fighting strength of the strategic force be sapped away. Peace is ensured, not negotiated.—END



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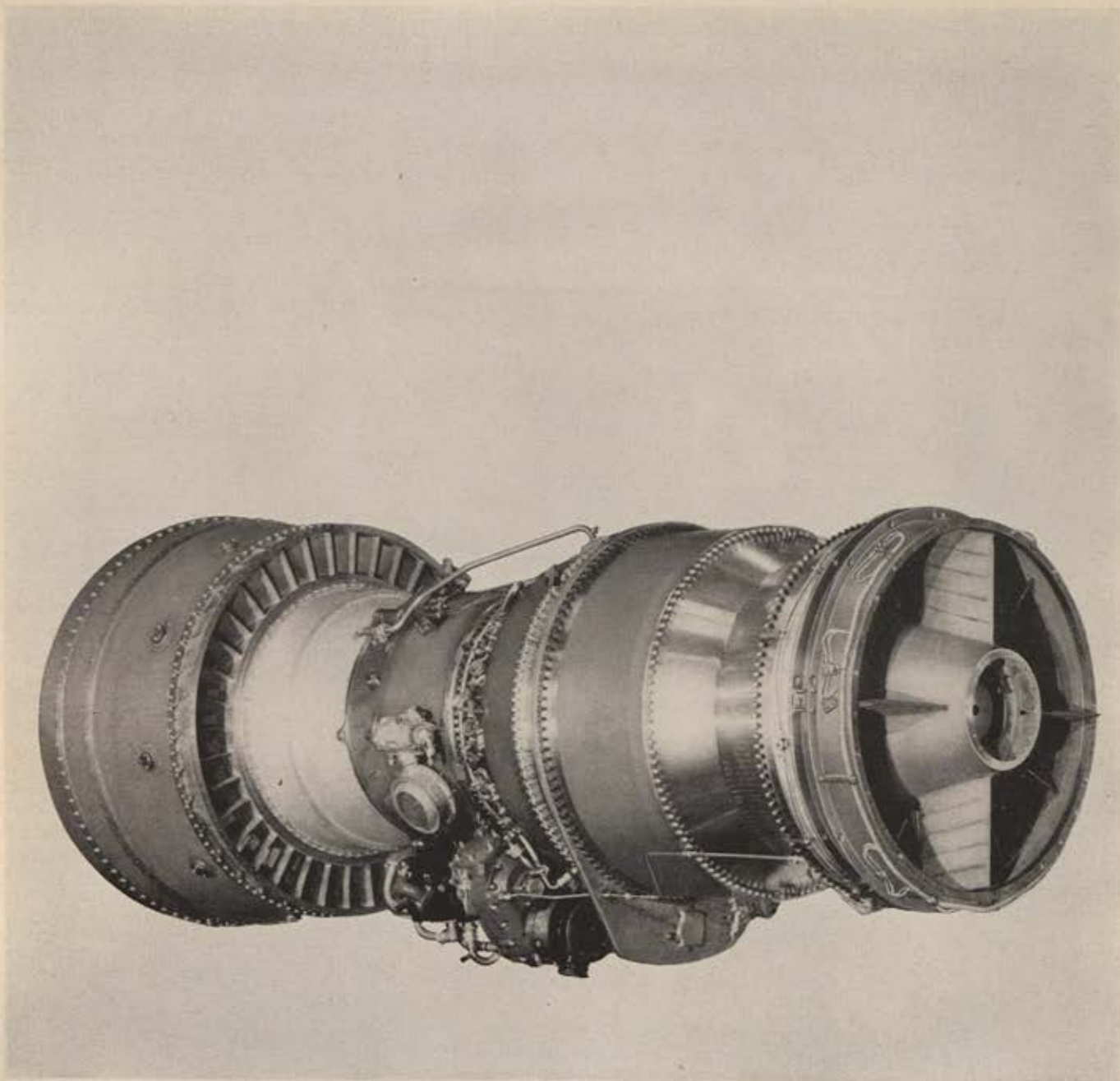


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New turbofan has 21,000 pounds thrust

When Pratt & Whitney Aircraft introduced the TF33-P-3 engine, the design was rated at 17,000 pounds thrust. As the nation's first operational turbofan, it helped the Boeing B-52H set 11 world speed and distance records.

For Boeing's four-engine C-135B, more thrust was needed. So Pratt & Whitney Aircraft produced the TF33-P-5, a growth design developing 18,000 pounds thrust.

The newest member of this expanding family is the TF33-P-7. Selected for Lockheed's new C-141 jet cargo transport, this engine is rated at 21,000 pounds thrust.

Thrust growth is only one advantage

of Pratt & Whitney Aircraft turbofan design. Compared to J57 turbojet performance in transport operation, fuel consumption has been cut 15 per cent; specific weight reduced more than 20 per cent. As a result, turbofan-powered jets can lift greater payloads, operate from shorter fields, and fly farther than their turbojet counterparts.

Today, these high-performance engines power the majority of the free world's turbofan aircraft—another achievement that continues a long-standing Pratt & Whitney Aircraft tradition of world leadership in flight propulsion.

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By Jackson V. Rambeau

AFA DIRECTOR OF MILITARY RELATIONS

Troop Carrier Meet Set

It's definite that CONAC's Reserve troop carrier wings will compete in September for an as-yet-unnamed trophy to be sponsored by the Air Force Association, with the event to terminate at Las Vegas, Nev., site of AFA's 1962 Convention, on September 21. Hq. USAF recently approved Lt. Gen. Gordon Blake's request for such a competition.

Three teams from each wing will compete at Ellington AFB, Tex., in the first phase of the competition. The top crew from each wing will then move to Luke AFB, Ariz., as a staging point for the final phase—a paradrop mission over the TAC gunnery range at Indian Springs, Nev., on Friday, September 21. Planes will land at McCarran Field in Las Vegas, just before completion of the Air Guard's Ricks Trophy event. Arrival of Reserve and Guard contestants will be highlights of ceremonies dedicating McCarran's new airport facilities.

Winning troop carrier crews and Air Guard pilots will receive awards during the USAF Honors Night event in Las Vegas' Convention Center auditorium Friday night. They will also be honored guests at the Reserve Forces Reception Saturday evening.

Lessons of the Callup

The Air Force was so well pleased with the performance of its Reserve Forces on active duty in the Berlin contingency that it does not expect to make any significant changes in strength or missions, Secretary of the Air Force Eugene M. Zuckert told a House subcommittee reviewing Reserve readiness last month. The subcommittee is headed by Rep. F. Edward Hébert of Louisiana.

Ben Fridge, Mr. Zuckert's Special Assistant for Manpower, Personnel, and Reserve Forces, told the Hébert group that units must be manned at a "much higher percentage of authorized strength" if they are to attain and maintain full operational readiness. But he failed to point out where more drill pay spaces would come from.

He listed two other measures by which USAF expects to improve Reserve Forces readiness. Manning documents will be made more flexible, he said, so that USAF can fill exact personnel requirements for any contingency. More emphasis will be placed on prepositioning equipment for which units have only limited need in training but which is essential to their operations in an emergency. Over-all, however, USAF witnesses, obviously under wraps, lost a rare chance to emphasize other major problems.

In a statement prepared for the Hébert subcommittee, AFA President Joe Foss urged this four-point program to improve the Reserve Forces:

- **Forty-eight drills** as a minimum for all units. "We believe no individual in a unit can long remain ready... on fewer than forty-eight training periods annually." He urged that Congress prescribe forty-eight paid drills as a minimum for all Reserve and Guard unit personnel.

- **One hundred percent manning** in drill-pay spaces. "Management controls placed on the Reserve program by the Office of the Secretary of Defense have resulted in too much control and not enough management," Foss declared. The problem of providing enough drill-pay spaces for 100 percent unit manning "could be solved without adding a

penny to the program," he said, by allowing the Air Force flexibility in drill-pay spaces already authorized by DoD.

- **A Volunteer Reserve Force.** Foss urged that Congress shorten the period of military service obligation to four years. "Those serving four years of active duty would have no remaining obligation," he said. "However, for those with six months or less of active duty, Reserve participation requirements should be enforced." He relayed to the subcommittee a recommendation by AFA's Airmen's Council that a reenlistment bonus be paid to Reserve Forces airmen, noting that "it would be more economical to pay a reasonable reenlistment bonus... than to provide six months of active-duty training for new recruits."

- **Equipment modernization.** Much Reserve Forces equipment is of Korean vintage, he said. Some equipment recalled with units to active duty will be retained by USAF. "If a requirement exists for these units in our war plans—



USAF flying safety awards for last half of 1961 were presented at ANG Commanders' Conference to Maj. George C. McCrory, left, 146th Fighter-Interceptor Squadron, Pittsburgh, Pa., and Ted Coukoulis, 127th Tac Fighter Squadron, Wichita, Kan., by Maj. Gen. W. P. Wilson, ANG chief.

and we should be thankful we had them to recall during the Berlin crisis—some way must be found to reequip them properly and rapidly. Congress should again take the lead in an equipment-modernization program for the Air Reserve Forces." He recommended that Congress consider the needs of Air Reserve Forces when it authorizes new equipment for the active force each year.

Professionalism Is the Key

All Air Guardsmen are considered immediately available for mobilization in an emergency, Maj. Gen. Winston P. Wilson, Air National Guard Chief, told the Air Guard Commanders' Conference at Knoxville, Tenn., in April.

"Thirty-day readiness is not enough," he said. "We must be ready to respond in hours. Professionalism is the answer."

Indeed, professionalism was the theme of the Conference, stressed by all key speakers, including Lt. Gen. Robert M. Lee, ADC Commander; Maj. Gens. Raymond J. Reeves, (Continued on following page)

Vice Commander of MATS; Stanley J. Donovan, TAC's Director of Operations; Chester E. McCarty, Assistant Chief of Staff for Reserve Forces; and Perry B. Griffith, Deputy Inspector General for Safety; and Brig. Gen. John A. Rouse of PACAF, Hawaii Base Commander.

General Lee reported that fourteen Air Guard interceptor squadrons would be supplied with nuclear weapons by January 1964. As additional storage and handling facilities are built, more interceptor squadrons will be so equipped.

General Griffith announced that for the first quarter of 1962 the Air Guard's accident rate has shown an encouraging decline. Over-all Air Force rate for the period, he said, was 6.4 per 100,000 flying hours; the Air Guard is close behind with 6.6.

Col. Bob Morrell, Air Guard liaison officer at General Griffith's headquarters, explained that the ANG accident rate is actually lower than that of the Air Force in comparable types of aircraft. He said the Guard's fighter rate for the quarter was the best in ANG history, and expressed the hope that the Guard will be able to beat the over-all USAF rate this year.

USAF Flying Safety Plaques were awarded to three Air Guard squadron commanders—Majs. George C. McCrory, 146th Fighter-Interceptor Squadron, Pittsburgh, Pa.; Theodore C. Coukoulis, 127th Tactical Fighter Squadron, Wichita, Kan. (see cut); and Harold G. Holesinger, 170th Tactical Fighter Squadron, Springfield, Ill. The 170th, on active duty, won its award among active TAC squadrons.

Forty-two squadrons were cited by the National Guard Bureau for an accident-free year in 1961.

New Blood

Recruiting to fill expected vacancies in Air Guard units returning from active duty will get under way officially July 1, the date when Department of Defense starts giving back the 21,000 drill-pay spaces it withdrew when units went on active duty.

Three-fourths of new Air Guard recruits will go directly to Air Force technical training centers after completing basic training at Lackland AFB, Tex. Courses in which they'll enroll will take from two months to a year, so even those who enlist July 1 won't be back home until long after their units have returned to state status.

Recruits whose civilian jobs are readily converted to military duties, such as drivers, cooks, and clerks, will return to units after basic training.

The Air Force Reserve will also get new allotments for training nonprior service personnel, with priority going to the five C-124 squadrons coming off active duty.

Both the Guard and Reserve would, of course, prefer to sign up men with prior military service.

That prior service personnel can be attracted to join Reserve Forces units was convincingly demonstrated by the Fifth Reserve Region in a two-month campaign from mid-January to mid-March of this year.

Brig. Gen. Cecil P. Lessig, Region Commander, reported that Reserve units in his region signed up 208 officers and 1,349 enlisted men in "Operation Centurion."

Project officer for the drive was Lt. Col. Gerald A. Hart, the region's personnel director. The region not only topped its original goal of 1,000 by more than fifty percent, but Colonel Hart expects to add another 500 airmen and seventy-five officers before the end of June.

PARTING SHOTS. . . . Col. Bob Campbell, Commander of the Air Guard's 146th Air Transport Wing, Van Nuys, Calif., now on active duty with MATS, has been named

California's "Serviceman of the Year" by AFA's California Wing. Wing Commander Carson P. Sheetz termed him "the ideal example of the American citizen-soldier," and Maj. Gen. Glen R. Birchard, WESTAF Commander, commended him for achieving in the 146th "a degree of morale and performance to be envied by any military unit. . . ."

Col. I. G. Brown, Executive Secretary for the Air Reserve Forces Policy Committee, is reported to be in line for appointment by the Secretary of the Air Force as Assistant Chief, National Guard Bureau, for Air National Guard. With it may go promotion to brigadier general. . . . Brig. Gen. Bill Spruance of the Delaware ANG, seriously burned a year ago in the T-33 crash that killed Lt. Col. Dave McCallister, attended the Air Guard Commanders' Conference, just as pungent and brainy as ever. He's had twenty-five plastic-surgery operations, with more ahead.

Col. David W. Baugher, Commander of the Air Guard's 157th Tactical Control Group, Jefferson Barracks, Mo., and a member of AFA's Air Guard Council, has been elected President of the Missouri National Guard Association. . . . In seven years, CONAC's Reserve navigation training program has flown 116,000 hours in TC-47s without an air-



Col. Bob Campbell, left, Commander of Air Guard's 146th Air Transport Wing, was named "Serviceman of the Year" by California Wing of AFA. Col. I. G. Brown, right, may soon be appointed Assistant Chief for Air Guard in National Guard Bureau, under Maj. Gen. W. P. Wilson.

craft accident, Lt. Col. F. B. Whitlow, CONAC safety director, has reported. The program, which began in March 1955, now includes thirteen squadrons, under direction of Lt. Col. Sterling R. Funk of Robins AFB, Ga. . . . The D. C. Air Guard's 113th Tac Fighter Wing staged a practice alert for newsmen recently. In briefing reporters, Brig. Gen. Willard W. Millikan, Wing Commander, explained the alert was arranged to show how wing personnel "have converted from civilians to professional airmen in the performance of a vital mission."

USAF is preparing a thirty-minute documentary film on accomplishments of the Air Reserve Forces called to active duty. Tentatively titled "The Air Reserve Forces in the Berlin Contingency," it will cover the entire period from mobilization to demobilization. Film's producer is Jack Canavan of APCS. Technical adviser is Maj. Tommy Thompson of General McCarty's staff in the Pentagon. It's hoped an advance print will be ready for showing at AFA's Convention in Las Vegas in September.

Meanwhile, CONAC has produced a thirteen-minute film on Reserve missions, featuring the 442d Troop Carrier Squadron, Richards-Gebaur AFB, Mo., and the 9622d Recovery Squadron, San Diego, Calif. Raymond Burr, TV's Perry Mason, narrated the film.—END

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ADVANCE REGISTRATION

AFA's 1962 CONVENTION

THE Air Force Association Convention and Panorama annually attracts more defense, industry, and government leaders than any other aerospace gathering in the nation. The 1961 attendance summary, for example, reflects an increase in each major category over 1960.

However, no set of statistics can document the true impact of the Convention and Panorama. For example, based on the 1961 experience, our forthcoming event will see hundreds of thousands of words filed by newsmen from Las Vegas to newspapers and magazines throughout the world. Daily radio and television coverage on the national networks will bring Convention events into the homes of millions of Americans. Material discussed at the Education Seminars of the Convention will move into the classroom. Information presented at other Convention sessions—the Symposium on "Space and National Security," for example—will be featured by speakers at subsequent events. Several books will be written based upon this vast storehouse of aerospace knowledge created by the Convention. In the words of Gen. Curtis E. LeMay, Chief of Staff, United States Air Force:

"Each year the Air Force Association seems to do the impossible by having a larger and more interesting Convention. As a result of your efforts, the thousands of people who visit the exhibits and attend the meetings will come away with an increased understanding of aerospace power and greater faith in American technology. . . . Out of the Convention seminars, briefings, panels, and speeches will come a report to the nation that I feel sure will be reassuring. It will constitute a firm warning to those who threaten the peace of the world."

Below, Thunderbirds jet demonstration team in formation over Lake Mead, Nev.



THE PROGRAM

• TUESDAY, SEPTEMBER 18

- 9:00 AM AFA Committee Meetings
- 10:00 AM Convention Registration Opens
- 8:00 PM AFA Directors' Meeting

• WEDNESDAY, SEPTEMBER 19

- 8:00 AM Convention Registration Opens
- 10:00 AM 1st AFA Business Session
- 1:30 PM 2d AFA Business Session
- 3:00 PM Retired Military Personnel Seminar

• THURSDAY, SEPTEMBER 20

- 8:00 AM Convention Registration Opens
- 10:00 AM 3d AFA Business Session
- 10:00 AM Briefing: Current Tac Air Ops
- 10:00 AM Guided Tours for Educators
- 12:30 PM Aerospace Luncheon
- 2:30 PM Strategic Deterrence Symposium
- 5:00 PM 15th Anniversary Reception

• FRIDAY, SEPTEMBER 21

- 10:00 AM Airport Dedication—Finish of Ricks Flight and CONAC Troop Carrier Event
- 10:00 AM Aerospace Education Seminar
- 10:00 AM Space Briefing for Students
- 12:30 PM Air Force Anniversary Luncheon
- 2:30 PM Space Symposium
- 2:30 PM Women in Space Symposium
- 2:30 PM Reserve Forces Seminar
- 5:00 PM Reception for AF Secretary and Chief of Staff
- 6:30 PM Air Force Honors Night

• SATURDAY, SEPTEMBER 22

- 9:00 AM Air Force Firepower Demonstration
- 12:00 N Panorama Open to Public
- 3:00 PM Aerospace Education Foundation Meeting
- 5:00 PM AFA Directors' Meeting

• SUNDAY, SEPTEMBER 23

- 12:00 N Panorama Open to Public

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Las Vegas, Nevada, September 18-23

ATTENDANCE

1961 CONVENTION

PHILADELPHIA

Convention Attendance	6,157
Panorama Attendance	66,951
Registrants	4,252
Program Participants	150
News Representatives	367
United States Air Force	
Secretariat	15
General Officers	126
Colonels	419
Other Officers	663
Arnold Air Society	425
Foreign Government Representatives	45
US Government Representatives (Other Than USAF)	41
Educators	217
Industrial Companies	396
Industrial Representatives	2,923
Presidents and Board Chairmen	136
Vice Presidents	247
Executive Assistants and Consultants	79
Managers	732
Engineering Personnel	565
Purchasing, Sales, and Advertising	770
Other	394
Miscellaneous	766
Exhibiting Companies	229



ADVANCE REGISTRATION FORM FOR AFA'S 1962 CONVENTION

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 for AF Secretary and Chief of Staff, Air Force Honors Night, and
 Firepower Demonstration transportation, but not tickets to:
- ☐ Aerospace Luncheon \$ 7.50
☐ Air Force Anniversary Luncheon \$ 7.50

6-62

SEE PAGE 97 FOR HOTEL RESERVATIONS

AFA NEWS

SQUADRON OF THE MONTH

Anchorage, Alaska, Squadron Cited for distinguished support of the Air Force Association mission, through sponsorship of a highly successful Science Fair.

This month's top AFA Squadron is located in the nation's newest state. The Anchorage, Alaska, Squadron—with the full cooperation of top personnel at Elmendorf AFB and civic officials—sponsored in March the Fifth Annual Greater Anchorage Science Fair. It was a booming success with more than 500 future scientists entered, including twelve from Valdez, Alaska, the first time entrants have been received from other cities. The program was held on the Alaska Methodist University Campus, March 23-25.

Col. Ralph M. Wanderer, Jr., Elmendorf AFB Commander, served as General Chairman of the Science Fair Committee. His counterpart for AFA was Bob Reeve, AFA Squadron Commander, a pioneer bush pilot, and President of Reeve Aleutian Airways, which was responsible for bringing the Valdez entrants and their exhibits to the Fair. The event marked the first time that a four-engine aircraft had ever negotiated a landing at Valdez, and it was primarily Reeve's skill that made the feat possible.

Among the junior and senior high school students, eighty finalists were selected, of whom four were honored for exhibits in electronics, aerospace science, aerospace medicine, and aerospace power. Each received a Certificate of Achievement, and Steve C. Drew, fifteen, and Grant B. Walther, seventeen, received all-expense trips

to Seattle for the Thirteenth National Science Fair held May 2-5.

William D. Bozman, Boise, Idaho, Regional Vice President, had high praise for the efforts of the Anchorage Squadron members, the USAF personnel who were active in the project, and the extremely effective support by community leaders.

The Seventh Annual Intermountain Conference on Aerospace Education, sponsored by the Utah Wing, was a feature of the area's aerospace activities last month, highlighted by a two-day symposium in Ogden, Utah, which attracted some 400 educators and civic leaders.

Six Utah aerospace industries sent

top representatives to brief educators on their respective contributions to national security and the state economy. They were Lawrence G. Taylor, Thiol Chemical Corp.; Vinton D. Carver, Litton Industries; Dr. Morris Hudson, Otis Elevator Co.; Walter B. Sayner, Marquardt Corp.; Richard C. Tucker, Hercules Powder Co.; and J. A. Olmer, The Boeing Co.

AFA President Joe Foss spoke to the Conference on the shortage of funds for educational research and development. Dr. Donald F. Kline, Education Research Director for the F. E. Comp-ton Co., Chicago, and a key member of AFA's Aerospace Education Council, spoke at the closing "Forecast (Continued on page 97)



Grant Walther, one of two top winners in Anchorage Squadron Science Fair, explains function of his exhibit on paper chromatography to Regional V-P Bill Bozman, Boise. Walther won trip to National Science Fair in Seattle.



MSgt. William F. Morgan, center, accepts award from Austin, Tex., Squadron Commander C. T. Edwinson, right, and Secretary Wayne L. Wentworth during recent meeting. Morgan was named Outstanding Airman for SAC in 1961 and honored during the AFA Convention in Philadelphia.



During 1962 Wing Convention in Fresno, Al Oppenheim, left, former Commander of San Francisco Squadron, received a special commendation award from Carson Sheetz, center, Wing Commander. Looking on is Lt. Gen. Donald L. Putt, USAF (Ret.), President of United Technology Corp.



L-19 Observation-Utility Plane



CH-1C Rotary Wing Aircraft



U-3B Light Twin Transport

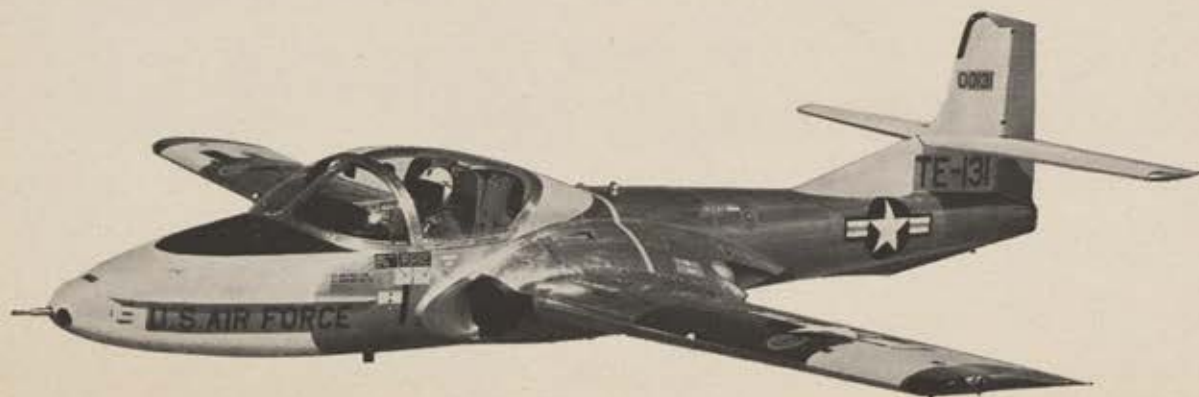
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CESSNA



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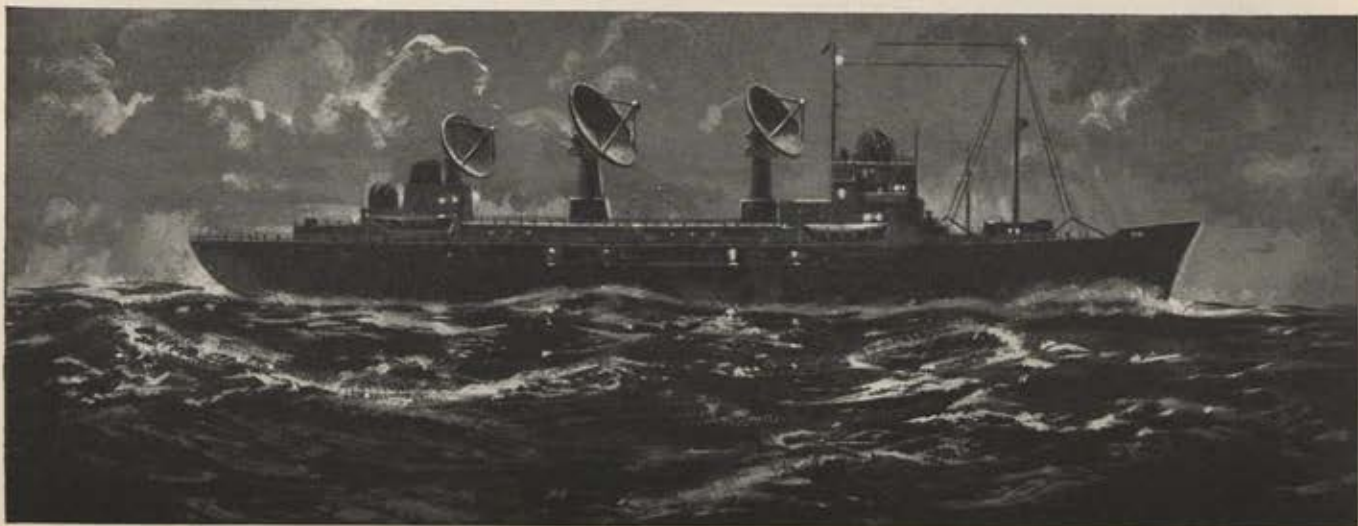
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Luncheon." He emphasized responsibilities of the nation's educators to remain abreast of constantly changing technologies.

Len Allen, Ogden broadcaster with Station KRO, served as toastmaster for the banquet at which President Joe Foss spoke, while Ray O. Mertes, Director of School and College Services, United Air Lines, performed a similar role for the Forecast Luncheon. Mr. Mertes also introduced the Conference panel of speakers.

Keith E. Nichols, Wing Commander, and Robert P. Stewart, Vice Commander, were in over-all charge of the program. Their hard-working committee chairmen included Louis Bonomo, Ray Yates, Donald Windham, Fred Hannah, and others. The Utah Wing deserves a great deal of credit for planning and staging this fine pro-

gram, which in the past has helped it to earn several AFA national awards.

CROSS COUNTRY. . . . Chess F. Pizac, formerly of St. Louis, recently moved to Washington, D. C., where he is a Vice President of the Dynallectron Corp. He is also Vice President of AFA's Midwest Region. . . . The July issue of AIR FORCE/SPACE DIGEST will furnish a roster of nominees for AFA National Office, as selected by the Nominating Committee at its meeting in Colorado Springs, May 31. The slate will be presented to the 1962 Convention delegates in Las Vegas. . . . New Jersey Wing's 1962 Convention will take place June 16 at the Empress Hotel in Asbury Park. . . . The Illinois Wing meeting is to be held June 30 at the River Forest, Ill., Country Club; and the Ohio Wing an-



Shown during Utah Education Conference (see text) are Marquardt's Walter Saynor; Brig. Gen. Earl Hedlund, Deputy Commander, Ogden Air Materiel Area; Wing Commander Keith E. Nichols; AFA President Joe Foss; and Maj. Gen. Don Coupland, long-time friend of AFA, now OAMA Commander.

nounces its Convention will be July 14-15, in the Imperial Hotel in Dayton, Ohio.

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The Communist World

Unity and Contradiction: Major Aspects of Sino-Soviet Relations, edited by Kurt London (Frederick A. Praeger, Inc., New York, N. Y., 1962, 464 pp., \$7.50).

The Sino-Soviet Conflict: 1956-1961, by Donald S. Zagoria (Princeton University Press, Princeton, N. J., 1962, 484 pp., \$8.50).

Reviewed by Anne M. Jonas

The essence of communism is conflict. Therefore, to analyze virtually any aspect of Communist policy, we must ask how this conflict manifests itself over time on various levels. There are conflicts between different factions of a single Communist party and between two or more parties within the international revolutionary movement. Ever since the Communist Manifesto of 1848, the latter have tended to be almost as acrimonious as the intraparty disputes. And finally, there is the larger, many-faceted conflict with the entire non-Communist world.

All these simultaneous conflicts tend to interact. The twists and turns in Sino-Soviet relations since the Twentieth CPSU Congress in 1956 furnish an excellent example. The two books under review understandably devote attention not only to Moscow-Peking relations. They also discuss the two powers' policies toward other Communist parties and toward the developed and underdeveloped nations of the free world. Since some of the issues under debate by the Chicoms and the Kremlin also stem from divergencies in the domestic situation of the two countries, these also are considered in both works.

In barest summary, the argument between the two principal Communist powers since 1956 has centered around three key questions:

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- What are the risk opportunity parameters of a global revolutionary strategy in the nuclear age?

- Can the USSR try to "overtake and surpass" the US in over-all military, economic, and technological growth and simultaneously remain the principal "revolutionary example" for the bloc and the newly emergent nations?

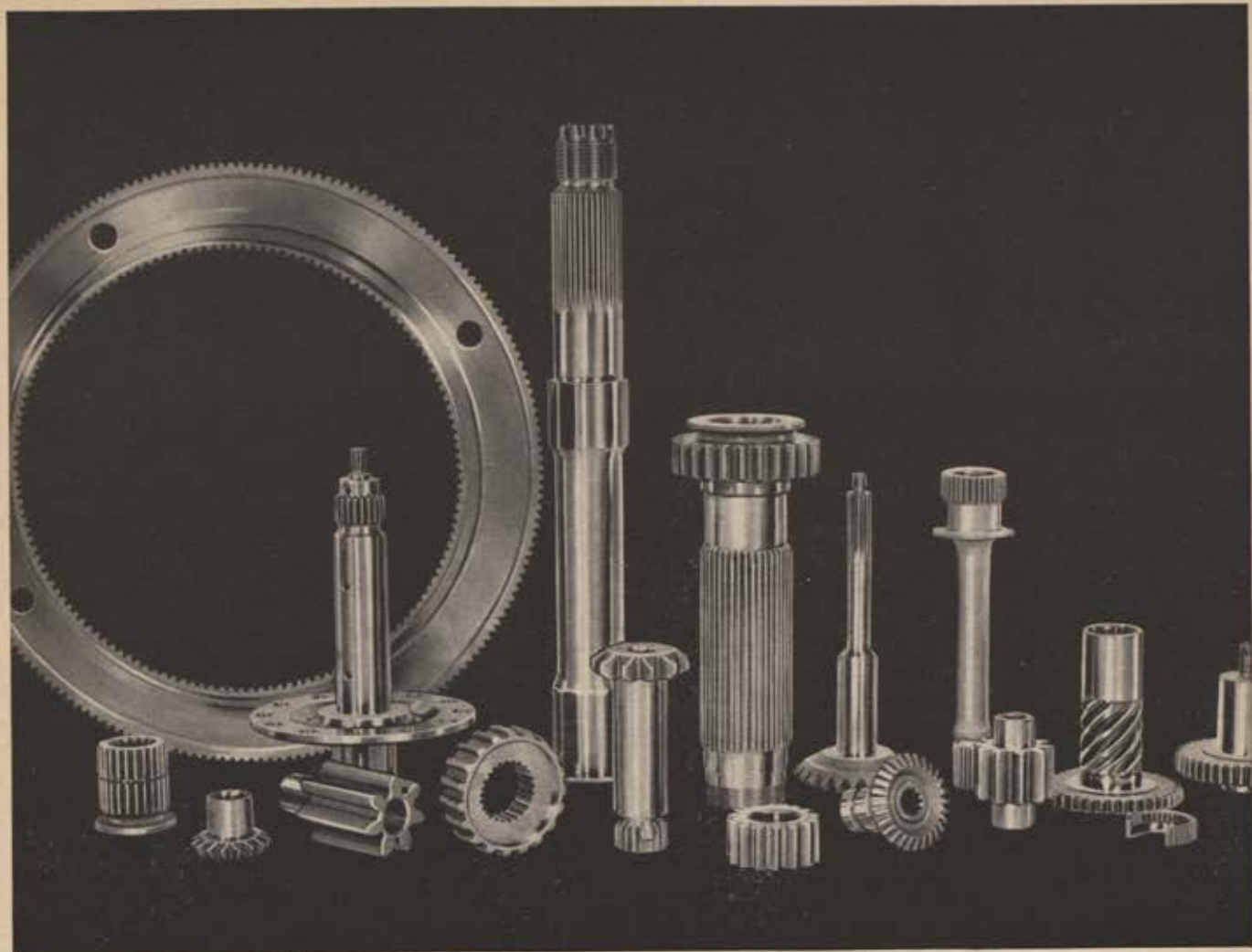
- Should a division of international revolutionary labor exist between Communist China and the USSR? If so, how are spheres of influence to be determined? How are thrusts to be timed? What tactics are to be utilized? Is it possible for the neo-Stalinism still necessary in Red China and the more subtle Soviet means of domestic persuasion to coexist?

Since the USSR and Communist China are both national entities and partners in an international revolutionary effort, they have tended to answer these questions somewhat differently. Western scholars have applied various methodologies in their attempts to assess the elements of cohesion and divergence in the Sino-Soviet conflict and their implications for free-world policy planning. Both books reviewed here contribute to this growing literature.

The excellent collection of essays edited by Kurt London grew out of a conference on Sino-Soviet affairs held in Japan in September 1960. The contributors are all recognized scholars from North and South America, Europe, Asia, and Australia. They utilize a number of approaches in cogently discussing unifying and divisive factors in the relations between Moscow and Peking. Their comparisons include attention to ideology, sociology, economics, agriculture, policies toward Afro-Asia, and other issues which are both creating conflict and necessitating its resolution.

The book makes no attempt to speculate on the likelihood of a future open Sino-Soviet split. However, the majority of contributors seem to imply tacit agreement with Zbigniew Brzezinski's position that "a situation of divergent unity can endure for a long time, with many ebbs and flows." As Kurt London points out in an epilogue, the international Communist movement has, of necessity, now become its own peculiar form of commonwealth. This more loosely organized revolutionary movement is seeking

(Continued on page 101)



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P E R F O R M A N C E N O W F O R S P A C E A G E D E M A N D S

ing to adjust important conflicts like that between Moscow and Peking within the framework of ideological and organizational polycentrism. The contributors show less agreement over whether or not the West can, or should, exploit these changes to its own advantage.

In his book, Donald S. Zagoria utilizes techniques of content analysis to trace in detail the evolution of the Sino-Soviet conflict since 1956. Although he takes into account the elements working for a continuation of "divergent unity," Zagoria seems to believe that a temporary break of party—but not state—relations between the two powers may occur in the future. However, he is careful to discount as "nothing but self-delusion" some talk in the West about a possible Soviet-US alliance. There is even less chance, he declares, "of wooing China away from the USSR."

Since a key element in the entire Sino-Soviet dispute has been a differing assessment of the East-West power balance, Zagoria argues that the West should increase its efforts to convince Moscow, Peking, and the world as a whole "that the balance of power is not shifting in the Communist favor." He feels that "success in this task may depend as much on firmer and more rapid political responses as on the development of greater military capabilities."

Both works make clear that the conflict between communism and freedom will continue to impose complex challenges to the US indefinitely, irrespective of how the subconflict between Moscow and Peking develops in the future.

ABOUT THE REVIEWER: Mrs. Jonas is a staff member of the Weapons Systems Evaluation Division, Institute for Defense Analyses, and a long-time student of Communist doctrine and policies. Her reviews have appeared previously on the pages of AIR FORCE/SPACE DIGEST.

I.F.R. HOOD



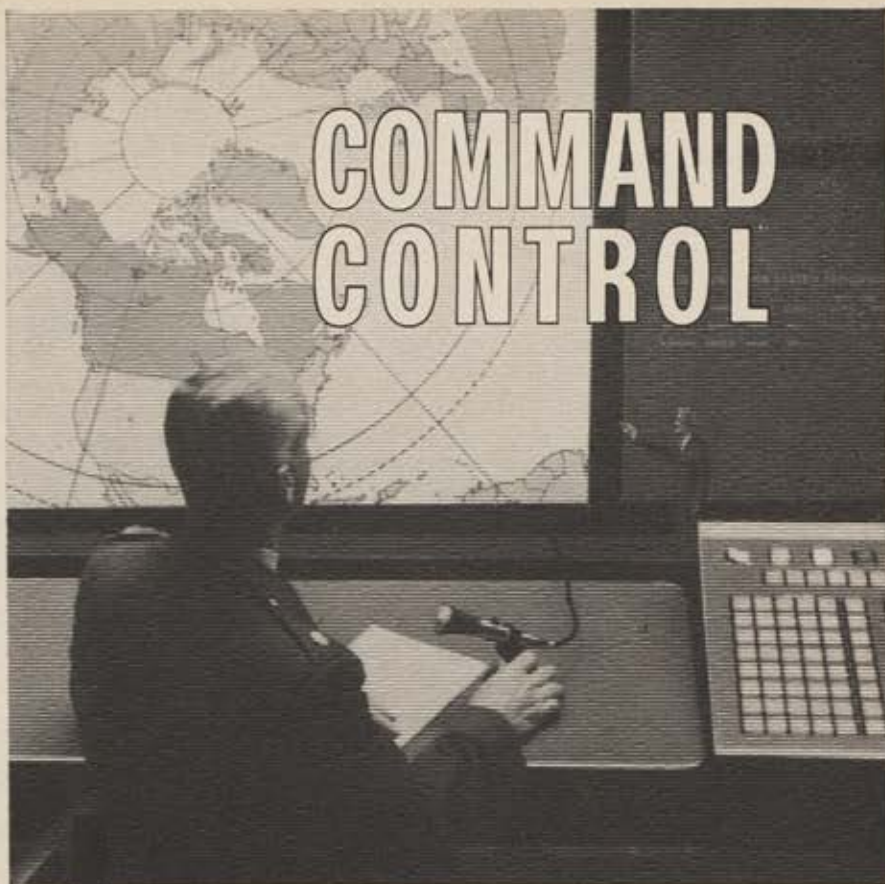
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