OCTOBER 1962 / 50c

AIR FORCE

and SPACE DIGEST

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

THE GUARD COMES BACK . . .

Welcome home at Boston for this Sabrejet pilot, back after service in Europe with the Air National Guard's 102d Wing. The scene was duplicated across the nation this summer as the Reserve Forces finished tours made necessary by the Berlin callup.

— SEE PAGE 34

in sublimited warfare

the H43B HUSKIE

can operate in the

troopcarrier . . .

. . . support

resupply . . .

aerial ambulance

evacuation . . .

and weapons carrier

missions . . .

and it can arrive at

the hot spots by air

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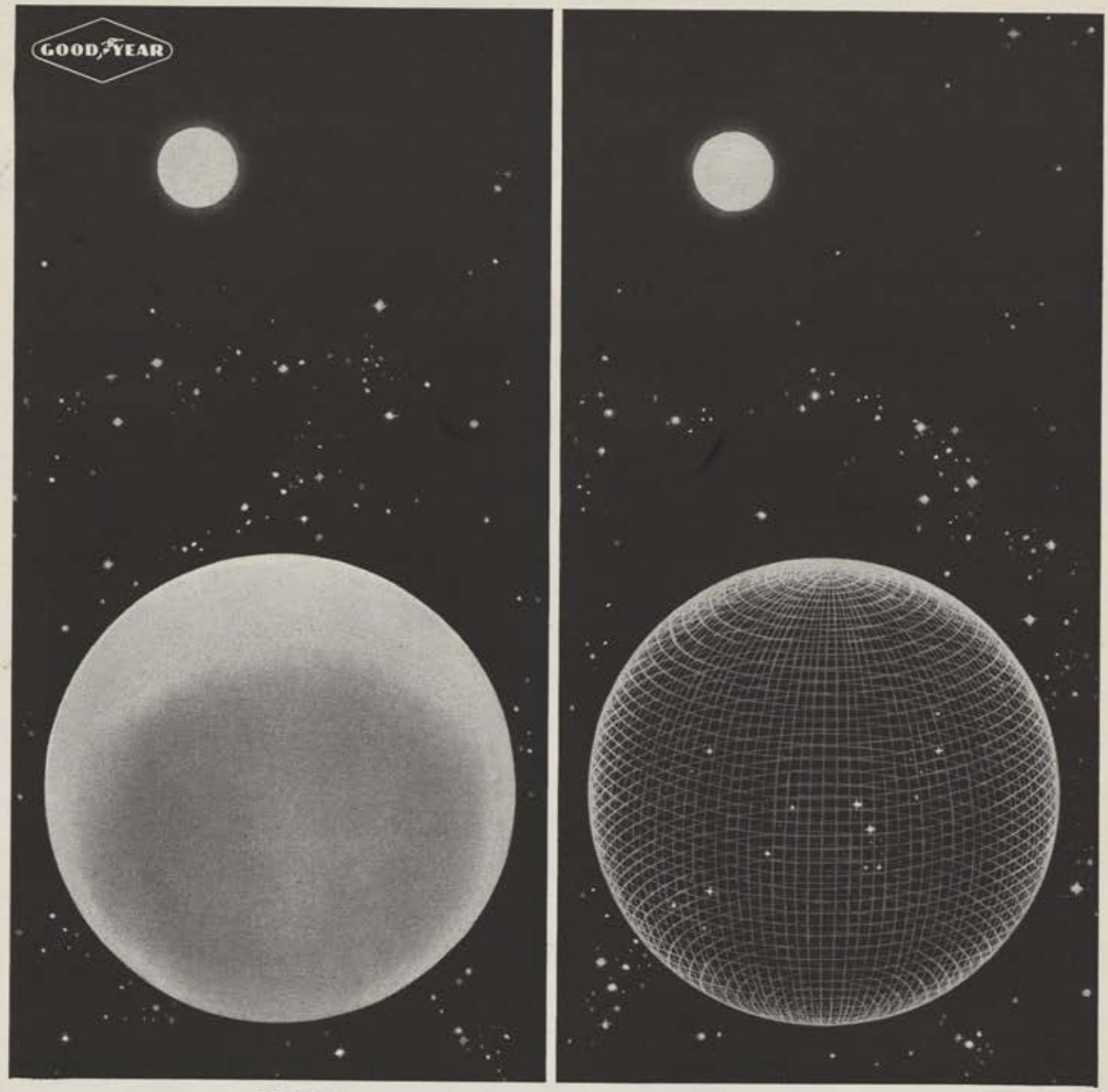

IDEA: Build a communications satellite that's solar-pressureproof, but a mirror to microwaves

It's made of an inflatable rigid wire-mesh framework covered by a photolyzable film. The idea behind it: the film molecules unhook in space and disappear. This leaves a microwave antenna virtually unperturbed by solar pressure, impervious to meteorites.

This is only one of the GAC–Goodyear Aircraft Corporation–designed large antennas and structures for erection in space from small packages. We are building antennas with dielectric lenses; structures with coated plastic films that are optically reflective but radar transparent; self-erecting flexible sponge-type structures; and packageable horn antennas. Each is typical of GAC's capabilities in land, sea, air or space defense systems.

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LAND, SEA, AIR OR SPACE ...TALENT THAT BUILDS BETTER DEFENSE SYSTEMS

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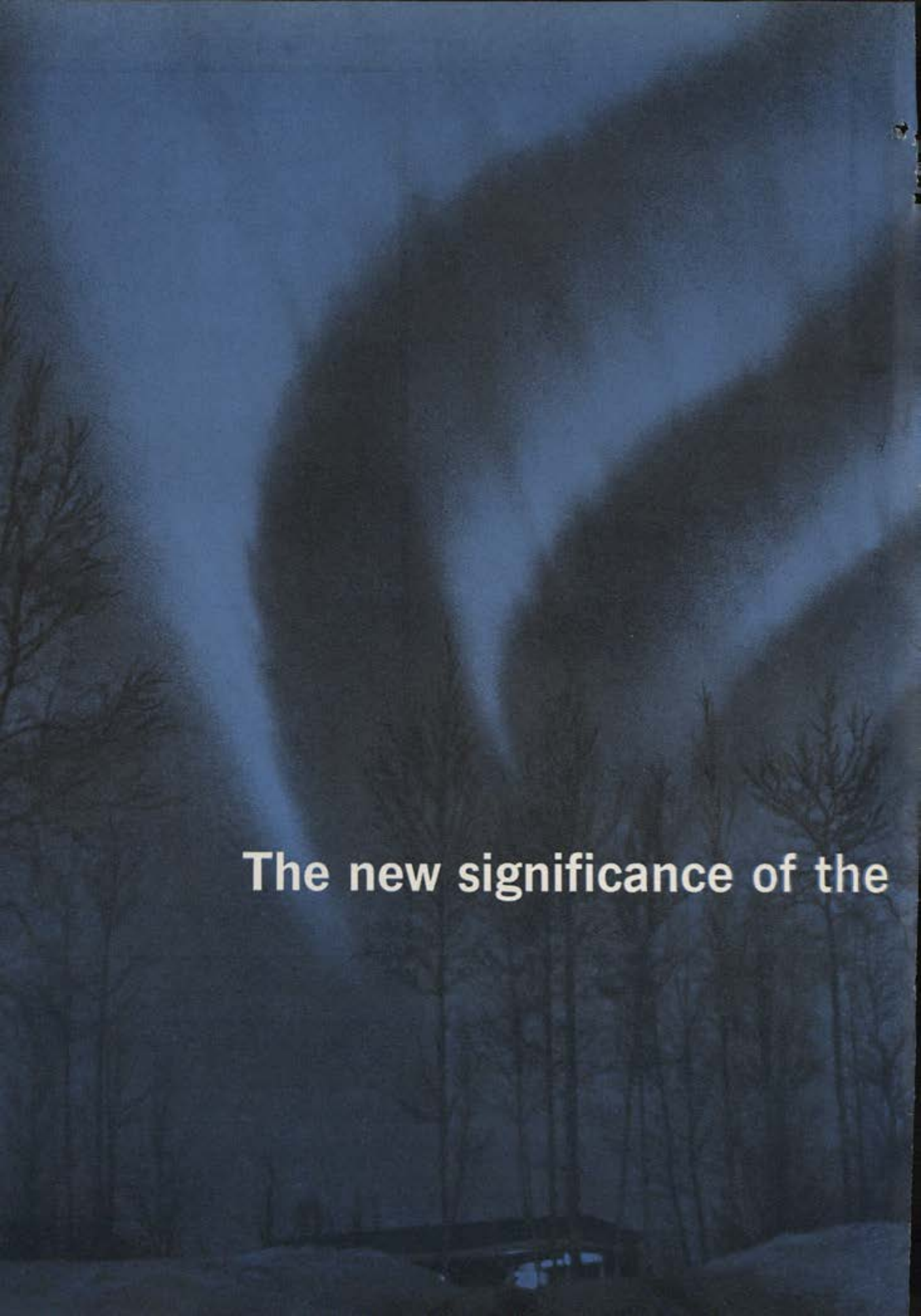
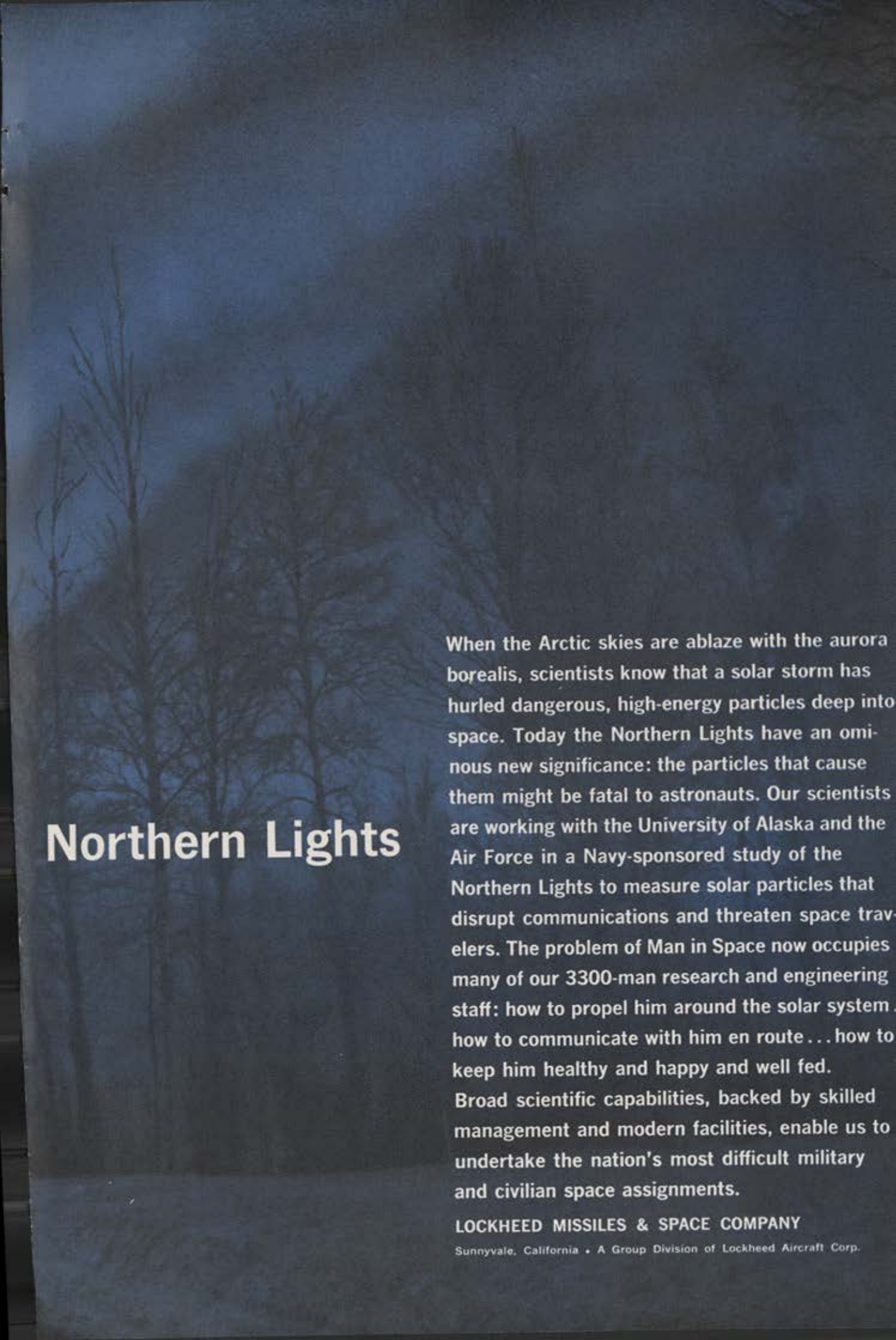

The new significance of the



Northern Lights

When the Arctic skies are ablaze with the aurora borealis, scientists know that a solar storm has hurled dangerous, high-energy particles deep into space. Today the Northern Lights have an ominous new significance: the particles that cause them might be fatal to astronauts. Our scientists are working with the University of Alaska and the Air Force in a Navy-sponsored study of the Northern Lights to measure solar particles that disrupt communications and threaten space travelers. The problem of Man in Space now occupies many of our 3300-man research and engineering staff: how to propel him around the solar system, how to communicate with him en route . . . how to keep him healthy and happy and well fed.

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Electronic News, July 30, 1962
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DEPARTMENTS

AIR FORCE

The Magazine of Aerospace Power
Published by the Air Force Association

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BPA

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Beech helps space vehicles get better mileage by turning "hot" fuel into icy slush

Slush hydrogen experiment shows vital facet of Beech's comprehensive systems management capability

At the heart of this experiment at Beech's Boulder, Colorado, space center are three double-walled vacuum jars, each inside the other. Inside the inner jar is liquid hydrogen, while the center jar contains liquid helium. The outer jar is filled with liquid nitrogen. The idea is to further reduce hydrogen temperature until it turns to icy slush.

The purpose of this experiment is to explore the feasibility of reducing hydrogen volume in order to increase space vehicle fuel loads without increasing tankage size or weight.

Applied research projects like this are common at Beech. In the past they have included valuable work on cryogenic problems, space environment, and countless other projects that have measurably advanced the state of the art.

Basic research and development is but one of an ever-expanding group of Beech space-age capabilities. Within the last year alone, the size and function of Beech space facilities has more than doubled. This constantly expanding capability complex, coupled with a highly trained and experienced staff, makes Beech a natural choice for systems management projects. Besides the experiment shown here . . .

Other Beech Capabilities In Systems Management Include:

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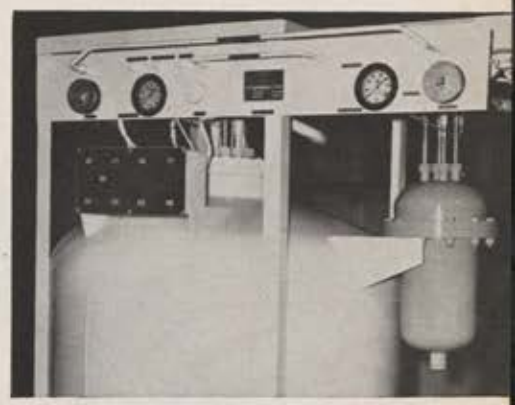
Propulsion...



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Beech Aerospace Division

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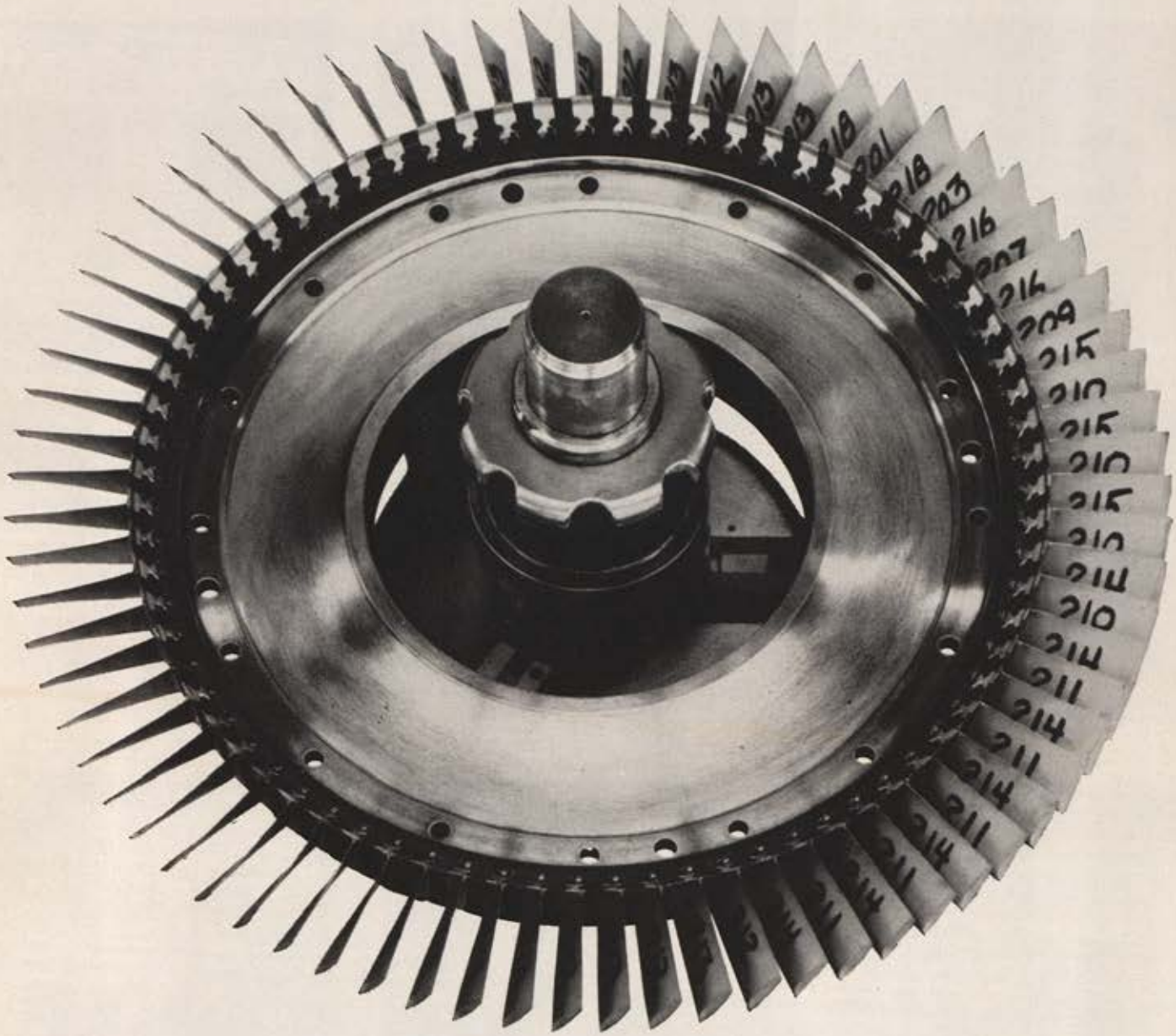


No gambling on this wheel; the stakes are too high.

One of the beautiful things about a jet engine is that it has very few moving parts. But this roulette-like wheel (one of the 80 rotors in the 4 engines on each Astrojet) is one of the parts that really moves.

On take-off, it will spin at some 9,850 revolutions per minute! Obviously, at this speed, the smoothness of the ride depends on keeping vibration down.

That's why we really go to work on these rotors when we strip down an Astrojet engine. First we take off every one of these blades (there are 6,000 of them in all on every Astrojet!).

We scrub each blade. Scrutinize it for nicking and pitting, for chafing and galling, for bending and "growing." We coat it with Magnaglo® and examine it under black light for hidden crevices. We weigh it and mark it.

Then we reassemble each rotor in three steps: By paired-off weights, by static balancing, by dynamic balancing.

Finally, when the engine is reassembled, we measure the vibration—or lack of it—while the engine goes through its test run on the block.

And this is just a small part of what we do every time we overhaul an Astrojet engine. Nice thing to think about the next time you're taking a trip.

AMERICAN AIRLINES

AMERICA'S LEADING AIRLINE

Air Force or Army General?

Gentlemen: The editorial comment on page 47 ["The Gaps in Our Aerospace Defense," by Gen. Laurence S. Kuter] of the August 1962 issue of AIR FORCE/SPACE DIGEST states: "General Gerhart's successor may well be an Army four-star, *with the basic air defense mission slipping back to the* parent *organization.*" I fail to understand what you mean by "slipping back" and "parent organization."

Do you mean that continental air defense at a future date may again become an Army mission, as it was during World War II? And is the Army the "parent organization"?

If this is what is meant, are you not then suggesting that NORAD may be scrapped at a future date?

If my interpretations are correct, I believe you have grievously muddled the waters of future aerospace defense plans for readers (such as I) who depend on your articles and analyses for their understanding of these matters. If the air defense mission "slips back" (of itself a harsh phrase) from its present Joint Chiefs of Staff to Department of the Army level, how does the Army coordinate with Canadian air defense? Or will we no longer need Canada? And does the Army also receive sole responsibility for US orbital surveillance and warning systems?

THOMAS A. STURM
Kansas City, Mo.

● *There was no intention of suggesting that NORAD be scrapped. The suggestion is that, since the selection of an Air Force general as Commander of NORAD stems largely from Air Force involvement in the air defense mission, plus the fact that it has been furnishing the lion's share of the money and forces, would it not be logical to assume that, if the Army were to furnish the bulk of each, then NORAD's next Commander would be an Army general? This is not to indicate that it* should *happen but that it* might. *The relationship with JCS and Canada presumably would continue as is.*—THE EDITORS

The Voice of Industry

Gentlemen: . . . to congratulate you on [Claude Witze's] editorial "Defense, Competition, and Free Enterprise," which appeared in the July issue of AIR FORCE/SPACE DIGEST. I think that this is a very excellent editorial and hope that it will have some effect on the powers that be.

C. HART MILLER, Pres.
The Sierracin Corp.
Burbank, Calif.

Gentlemen: Bouquets to you! Bravo, well done, and congratulations! We need editorials along the general line, which I call American, of your "Defense, Competition, and Free Enterprise.". . .

BRIG. GEN. H. FRANKLIN GREGORY, USAF (Ret.)
Assistant to Chairman
Midwestern Instruments
Tulsa, Okla.

Gentlemen: You've done it again!

I refer to the excellent piece in the June issue, by Claude Witze, entitled "Is Defense Industry a Public Utility?" It was beautifully done and I am certain that you will be getting kudos from many sources. . . .

CARLYLE H. JONES
Dir. of Public Relations
Sperry Gyroscope Co.
Great Neck, N. Y.

VTOL Program

Gentlemen: Congratulations to you and J. S. Butz, Jr., for the very excellent and informative article in your July 1962 issue titled "The Ups and Downs of Our VTOL Program." I am going to request that the editor of *Marine Corps Gazette* consider republishing it in his magazine, and I hope other military aviation magazines will follow suit. . . .

COL. J. HUNTER REINBURG, USMCR
Washington, D. C.

Gentlemen: Congratulations on your most interesting article, "The Ups and Downs of Our VTOL Program." Mr. Butz did a splendid job in up-dating the status of our country in this development program.

I would like to see more articles about this program. Perhaps it would stimulate the much-needed exodus from congested and highly vulnerable airfields to isolated VTOL sites.

CHARLES SNEAD
Danville, Va.

Rogallo Wing

Gentlemen: In the August 1962 edition of AIR FORCE/SPACE DIGEST we read with much interest the article "What's in Store for Our Gemini Astronauts?" by J. S. Butz, Jr.

Since we have a toy utilizing the Rogallo wing, under exclusive license with Mr. Rogallo, the inventor, we would be most interested in obtaining fifty copies of the magazine or reprints of this article.

ROY A. ALFORD, Pres.
Creative Incorporated
Silver Spring, Md.

From an Ex-Commando

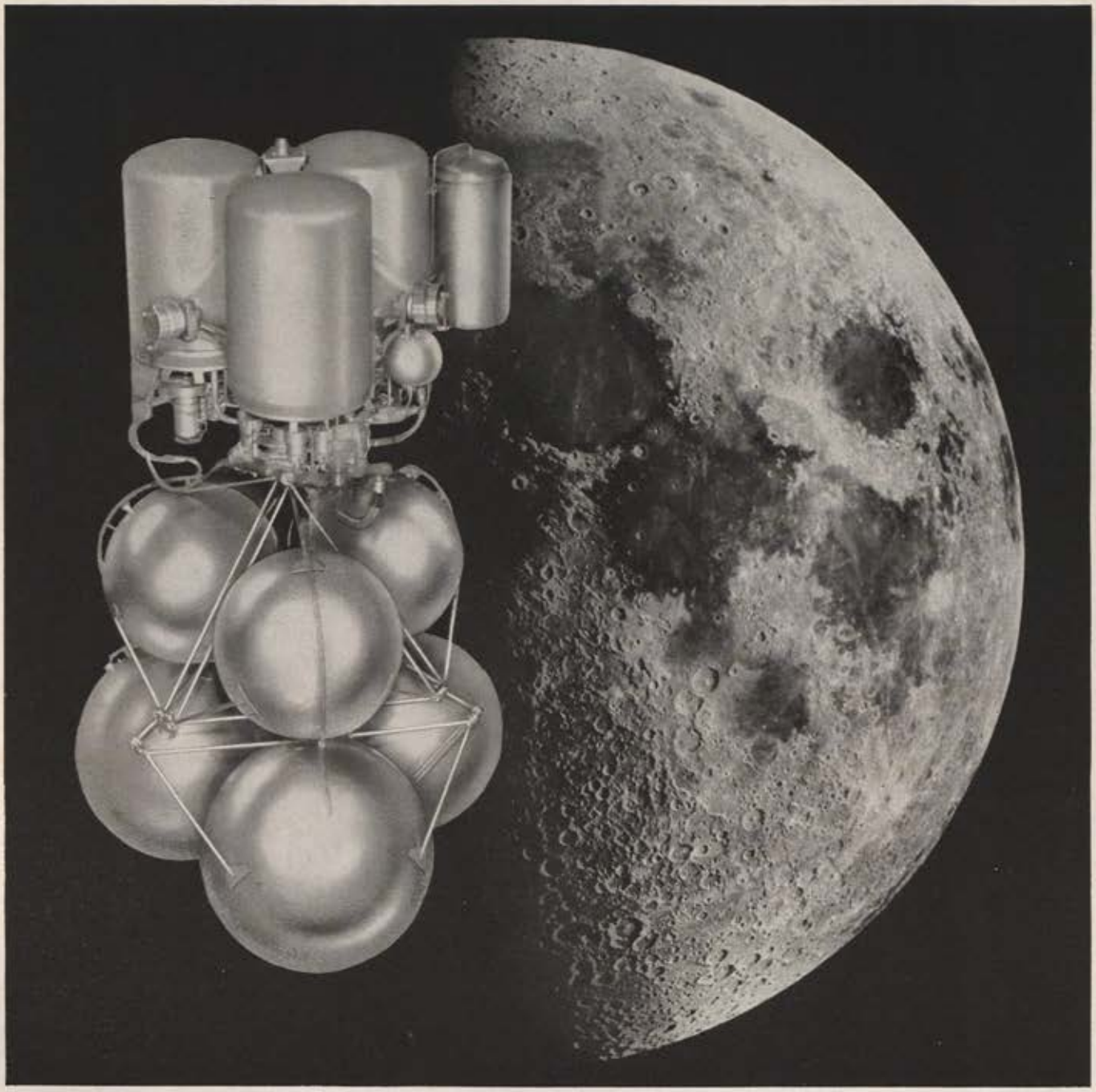
Gentlemen: I have just finished reading the August issue of AIR FORCE/SPACE DIGEST and was surprised and well pleased with the article "Air Commandos—USAF's Contribution to Counterinsurgency," by Mr. Scholin.

I was one of the original group selected by Col. Phil Cochran and Col. John R. Alison from volunteers at the Dunnellon Air Base in Ocala, Fla., in 1944. There is not much I can say or add to what Mr. Scholin has written. . . .

As outlined in the article, there were many acts of valor and to mention any one group or individual would be next to impossible. There is one man who, in my humble opinion, should be singled out. His record speaks for itself, but few realize the many hazards he went through when all others said it could not be done. I am sure Colonel Cochran will remember him and the work done by those under him. I refer to Maj. Charles G. Carter, Jr., who was Commander of the 318th Troop Carrier Squadron, 3d Air Commando Group. I understand he was killed in 1946 when his plane ran into a mountain on Hokkaido Island.

As a charter member of the Air Force Association I want to again tell you that without AIR FORCE I would be lost as to what is happening to and with my old alma mater.

WM. LEE RICE
Towson, Md.



A fuel cell for Apollo

This is a model of a fuel cell designed by Pratt & Whitney Aircraft—the company chosen to develop a fuel cell system for Apollo, America's first manned lunar craft. The Apollo spacecraft will be built for NASA by North American Aviation.

The hydrogen-oxygen cell will supply power for environmental conditioning, communication, instrumentation, and scientific equipment. In addition to generating electricity, the fuel cell will provide water for Apollo's three-man crew.

Pratt & Whitney Aircraft's fuel cell is far more efficient than conventional power systems. During tests, cells have demonstrated efficiencies of 70 to 80 per cent.

The fuel cell has a significant role in space. Moreover, it promises to be a significant power source on earth. Pratt & Whitney Aircraft is currently studying fuel cell power systems for such applications as remote-site power, vehicle propulsion, commercial power generation, and other industrial tasks.

Pratt & Whitney Aircraft

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A

EAST HARTFORD, CONN.

AIRPOWER in the news

By Claude Witze
SENIOR EDITOR, AIR FORCE/SPACE DIGEST

Congress Views with Alarm

WASHINGTON, D. C.

Congress, which has been slowly and reluctantly surrendering its prerogatives and responsibilities in the defense area for the past fifteen years, is contemplating action to reverse the trend. The proposal has been stimulated by the House Armed Services Committee, headed by Rep. Carl Vinson, a Georgia Democrat of many years' experience. Last March Mr. Vinson created a subcommittee composed of Porter Hardy, another Democrat who represents the Norfolk area of Virginia, and William H. Bates, a Massachusetts Republican. Their mission: to study "this question of the Department of Defense agencies being built up just as fast as mushrooms come out of the ground." Mr. Hardy was named chairman of the subcommittee, which was given the title of Special Subcommittee on Defense Agencies.

The defense agencies in which Mr. Vinson is so interested are five in number, but only two of them are creations of this Administration and its Defense Secretary, Robert S. McNamara. They are the Defense Intelligence Agency, now about a year old, and the Defense Supply Agency, which was set up in November of 1961. Predating these are the Defense Atomic Support Agency, which dates from 1959, and the National Security Agency, created by presidential directive in 1952. Both of these, it must be pointed out, replaced agencies already established. The first replaced the Armed Forces Special Weapons Project, formed along with establishment of the Atomic Energy Commission in 1947. The second, NSA, superseded the Armed Forces Security Agency, formed in 1949. Neither of these infringed on established roles of the military services. The fifth agency is the Defense Communications Agency, created by Defense Secretary Thomas Gates in 1960. It is the single manager for long-line, point-to-point, owned and leased communications. It has converted these networks into a single system but has not eliminated Army, Navy, and Air Force controls over other military-mission-oriented communications.

It was clear from the outset that the Hardy subcommittee would center its interest on the McNamara creations in the fields of intelligence and supply. Unspoken but obvious was the intent to demonstrate that the first eighteen months of this Administration had seen a downgrading of military influence in the Pentagon. The report could have been anticipated. Released on August 13, it said, "There has been a vastly increased centralization of decision-making, directly or indirectly, in the Office of the Secretary and a resultant diminution of the responsibilities of the military departments and the separate services."

The report has not been widely circulated but deserves the attention of the public. It is of particular import to the military and to defense industry. The Hardy subcommittee finds that the new Defense Supply Agency is independent, "that it is not part of the Office of the Secretary of Defense; that it is not within the military departments and is not a military department." The committee clearly feels that Mr. McNamara has exceeded the intent of the House of Representatives expressed in 1958, when the Committee on Armed Services said that he was to be a policy-maker and not a "fourth department." It says that Congress did intend to expand the single-manager concept for the logistics and supply of common-use items but did not anticipate a separate independent agency. It warns that the Defense Supply Agency could grow into a Service of Supply or independent logistic department and points out that the Joint Chiefs, as well as Congress, are opposed to this approach. "When supply is separated from command," the report says, "most military advisers will agree that danger threatens." It recommends that the House Committee keep a close eye on the operation.

So far as the Defense Intelligence Agency is concerned, the committee acknowledged that consideration of the idea goes back to 1960, when Secretary Gates ordered a study of the proposal. It could uncover no complaints about the operation of the intelligence agency but questions its legal justification. Said the report:

"If the Defense Intelligence Agency is a legally constituted agency, separate from the military departments, and reporting to the Secretary of Defense through the Joint Chiefs of Staff, then practically every function of the military departments can be placed in a comparable agency. There would be little left except for those few restrictions contained in the general roles and missions assigned to each of the services."

There is a potential danger, the report said. This is that "in an effort to bring about an integrated intelligence estimate, the minority views of another service may be disregarded. The adoption of a single intelligence estimate does not ensure its accuracy." The committee then cited testimony from Gen. George H. Decker, then Army Chief of Staff, and Gen. Frederic H. Smith, Jr., when he was USAF Vice Chief of Staff. The former said intelligence evaluation is a good deal like research and development in that if "you approach it from several different angles you may come up with the right answer." General Smith, now retired, said there is no doubt in his mind that "the capacity to evaluate raw data is now going to DIA, and there will not be any strong capability remaining in the individual services."

The committee said there are no new agencies planned at this time. The Defense Supply Agency, it pointed out, will take on three new functions. They are the purchase of chemical supplies and aeronautical spare parts, and the management of industrial production equipment. There was no speculation about the problems in these areas, where the armed forces have acquired special skills. The logistics involved in handling aircraft spares, for example, are intricate and highly specialized. They involve problems with which the Air Force has wrestled for many years and met with pioneering methods. These methods range all the way from automated control of central depots to serve a worldwide demand to the utilization of air transport to effect savings in the pipeline. How this know-how will

(Continued on following page)

be made available to DSA has not yet been made clear.

The committee report paid attention to a charge by Gen. Thomas D. White, former USAF Chief of Staff, that Mr. McNamara "has been creating a new general staff, largely civilian and backed up by military underlings." He made pointed reference to "many young and temporary functionaries in the various departments who encourage the downgrading of military influence on purely military matters and would welcome further steps in this direction."

Mr. Hardy looked for concrete evidence of this and found it in Harold Brown, Director of Defense Research and Engineering, who had one of the most uncomfortable days as a Capitol Hill witness. The hearing uncovered a memorandum in which Dr. Brown told the Director of the Weapons Systems Evaluation Group that his relationship with the Institute for Defense Analysis, a contractor, would have to be changed to ensure the Institute's "detached quality and objectivity." In order to do this, he said, IDA reports hereafter will be given directly to the Joint Chiefs of Staff and the Secretary of Defense. The reaction to this by the WSEG Director, Lt. Gen. William P. Ennis, of the Army, was to recommend that his own job be abolished.

The Brown memorandum, General Ennis wrote in reply, will end the relationship he has had with the civilian experts and remove his responsibility for WSEG. He said a lieutenant general no longer will be required in his job and suggested that he be replaced with a major. Challenged on the witness stand, Dr. Brown said his aim was to bring WSEG and IDA into conformity with presidential policy as expressed in the Bell Report on research and development contracting. General Ennis testified that the military men in WSEG felt that the memorandum killed their jobs. Dr. Brown admitted that he had discussed the idea with both the military and the contractor and that neither party approved.

"I don't think that any military man or any civilian endorsed this memorandum without reservations," Dr. Brown testified.

The Chairman asked: "Nobody was enthusiastic about it except you and Mr. McNamara?"

"And I am beginning to have my doubts," Dr. Brown acknowledged amid laughter. Later, under the date of August 23, he issued a new directive affirming the duties of the WSEG Director and setting up new rules of operation.

In commenting on this exchange with the thirty-four-year-old boss of defense research and engineering, the committee said it could not disregard the fact that "civilian personnel with relatively little military background are given the responsibility for the review and preparation of coordinated recommendations." It cited a memorandum from Secretary McNamara listing the men who would be responsible for proposed program change reviews, project by project. The committee was struck by the fact that such subjects as the Minuteman ICBM force level, the KC-135 tanker force, Polaris, and the advanced manned interceptor were the assigned responsibility of Dr. Alain C. Enthoven, Deputy Comptroller for Systems Analysis.

On the witness stand, Mr. McNamara quickly pointed out that the basic responsibility for these systems rests with the Service Secretaries and the Chiefs of Staff. Dr. Enthoven, he said, has the job of consolidating papers on these projects and preparing briefs of them. Dr. Enthoven is an economist and came to the Pentagon from the RAND Corporation, where he did research and study on strategic warfare.

In its report, however, the Hardy subcommittee still pointed with alarm. It said decision-making is being moved higher and higher and into the hands of few people.

"As time goes on," the report said, "with all the decisions being made at the Secretary of Defense level, lower echelons will develop a 'no-decision' or indecisive philosophy. Individuals who once made decisions will be gone and replaced by individuals who, having been raised under the new system, will never have been required to make decisions. We believe that this situation already exists, and that the testimony, or in some instances the lack of testimony, establishes this conclusion."

The report expressed fear that this kind of experience will endanger our national security in a time of crisis and said it will breed mediocrity, degrading the ability of the armed forces. In the long run, the committee says, it could lead to a single defense concept, which Congress has opposed.

As to legislation, the report suggests that the new Defense Department agencies already in existence be legalized but that Congress tighten its control in the future, so that no new ones can be established without congressional review. The subject will not be dropped. For the present, there is a busy election period around the corner, and the hearing rooms will be empty for a while. But there are sharper eyes out on Capitol Hill, and there is new interest in congressional responsibility.

The Requirement: Decisions

While Defense Department witnesses before the Hardy subcommittee and the inquiry on reserve stature conducted by Rep. H. Edward Hébert (*see "Ready Room," page 69*) appeared with an air of puzzlement about the need for these quizzes, it was becoming clearer each day that the armed forces are apprehensive. The area in which this is most evident is that of research and development.

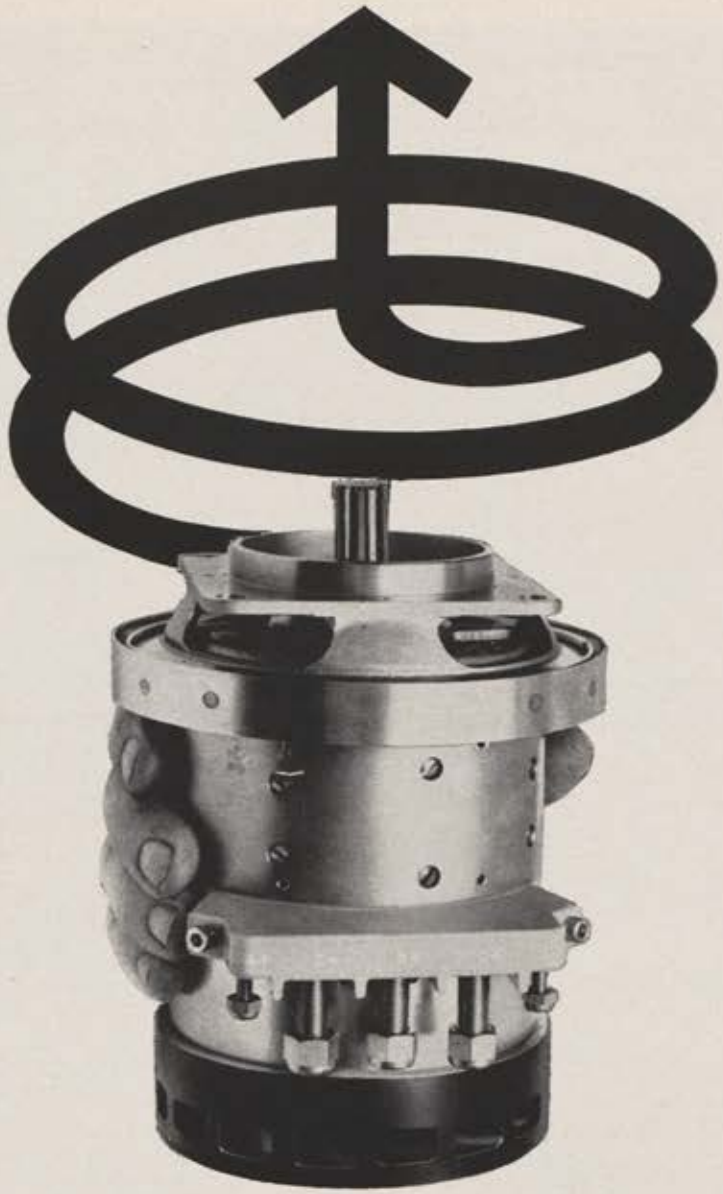
It is not necessary here to stress again the urgency for a military capability in space. Leaving space aside, which the Russians will not let us do, the fact remains that there is no modern aerospace weapon system under full development in the United States today. The last major system to get a full green light was the Douglas Skybolt air-launched ballistic missile, and even this project is being hampered by the slow release of funds.

In mid-August, the office of the Director of Defense Research and Engineering, headed by Dr. Brown, was asked by a newsman what new weapon systems have been ordered into development and/or production since January of 1961. In response to the query, the office listed, for the Air Force, the TFX USAF-Navy tactical fighter, the Mobile Medium Range Ballistic Missile (MMRBM), the Titan III booster, the C-141 Lockheed transport, and two versions of the F4H McDonnell fighter, known to USAF as the F-110.

At the time the list was compiled, the facts on these systems were as follows:

- The TFX, a requirement that appears in USAF records as far back as 1960, was in the stage of Phase I study being conducted by two contractors, Convair and Boeing. The long delay in making a final decision was on the verge of becoming an industry joke, except for the fact that it is painful for contractors to maintain capability based on nothing stronger than the prospect that DoD may decide to build the plane. To date, the Air Force appeared to have no indication of how many aircraft it might get,

(*Continued on page 15*)



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30B65	200	5.1	9.6	25

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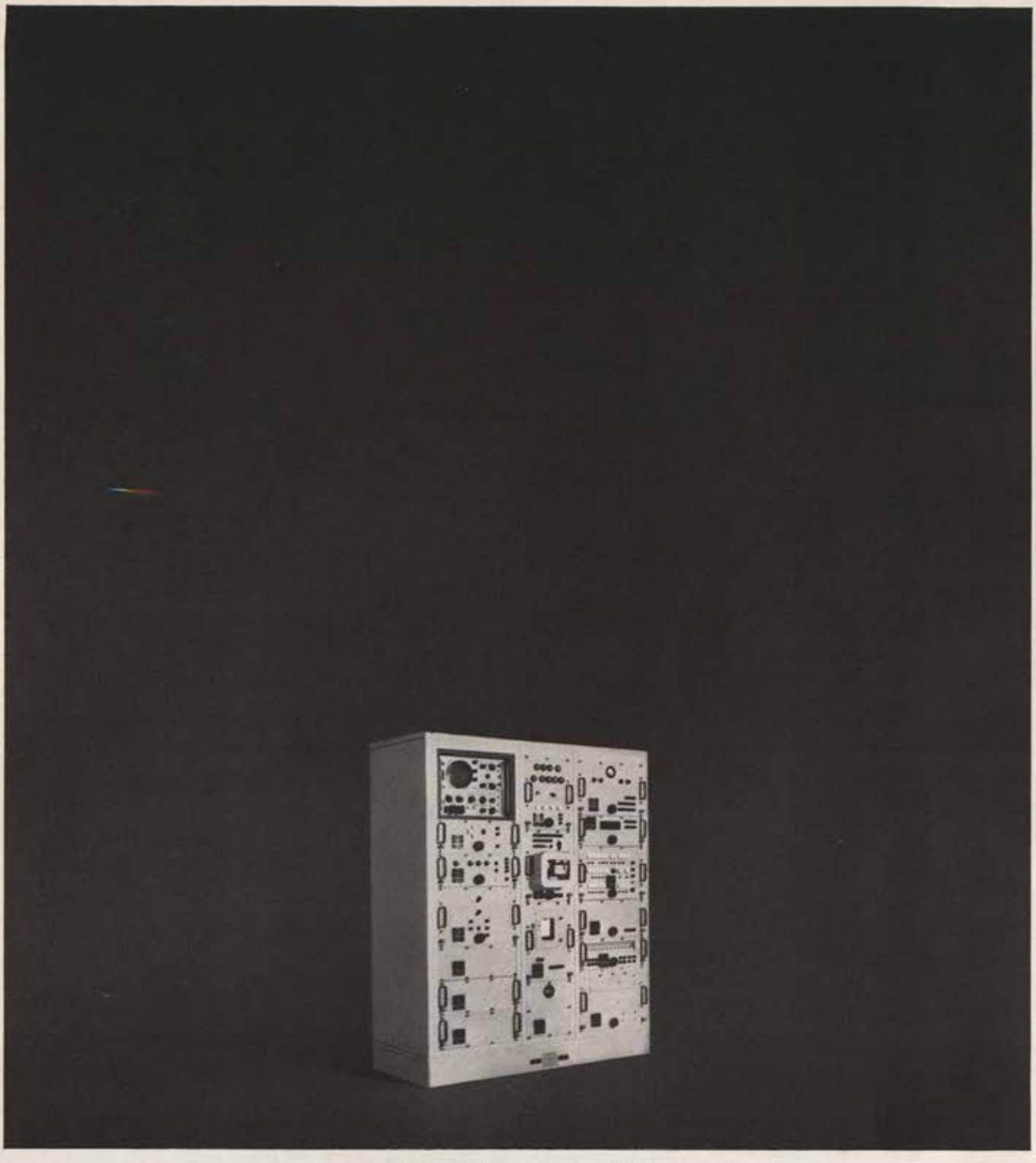

Blabbermouth

NARATE is an automatic radar test system developed for the Navy by Northrop. One of its main functions is to warn the radar operator when anything goes wrong with his equipment. But that's just the first step.

When it discovers a fault in the radar, NARATE can be programmed to find out what the trouble is, and isolate it down to the lowest removable unit. Or it can be directed to bypass the fault in order to continue the test.

NARATE has been tested at the Navy Electronics Laboratory, San Diego, for integration and compatibility with a complex air search radar. It is now installed aboard the USS Columbus for evaluation in fleet operations. Based on the proven Datico automatic test equipment concept, NARATE was developed for the Navy by the Nortronics Division of Northrop.

NORTHROP

how they would be deployed, or what arrangements should be made for training, spare parts, support equipment, or the test program.

● The MMRBM also dates back to at least 1960, perhaps earlier, as a requirement. Preliminary development plans were started early in 1961, when first mention of the project appeared in the press. There has been a great deal of speculation ever since and signs of mountains of paper passing between USAF and the Defense Department. The only authorized step is a Phase I or Program Definition study.

● An announcement was made that the Martin Company, builders of Titan I and Titan II, will be the prime contractor for Titan III. This public disclosure was made reluctantly, despite the fact that the need for a "workhorse" space booster is considered urgent. So far, it is reported that no funds have been released and that they will not be forthcoming until contracts can be finalized.

● History of the C-141 started in 1960, and a development plan for the aircraft was ready in August of that year. The development directive, in response to specific operational requirement 182, was dated November 23, 1960. That was the month in which John Kennedy was elected President. The Lockheed Aircraft Corporation was selected as the source, and the announcement of this news was made by the President from the White House in mid-March of 1961. It was the first time that a contract selection was disclosed in this manner.

● The F4H, listed by the Pentagon in response to the query, is a Navy airplane that is being adapted to USAF's purpose. The Navy prototype made its first flight in May of 1958.

In view of these facts, which can be confirmed from common reports in the daily and aviation press, it is not difficult to understand the frustrations of military men with a mission to perform. There are lessons in the news every day providing a text on the fast-moving history of our technology in the early 1960s. All of the world is aware of this, from the Massachusetts Institute of Technology to equally quiet halls in Moscow, Peiping, and Paris. It also is aware that this technology, applied, could be a factor in the survival of free men, just as it has contributed to deterrence in the past. The only requirement is for decisions.—END

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The F-104 is being built by 21 major producers, 7 engine manufacturers, 31 major electronics companies and hundreds of other suppliers in 7 countries (including the United States). Four hundred F-104s will be built this year, 1,000 next year, more than 2,000 by 1964.

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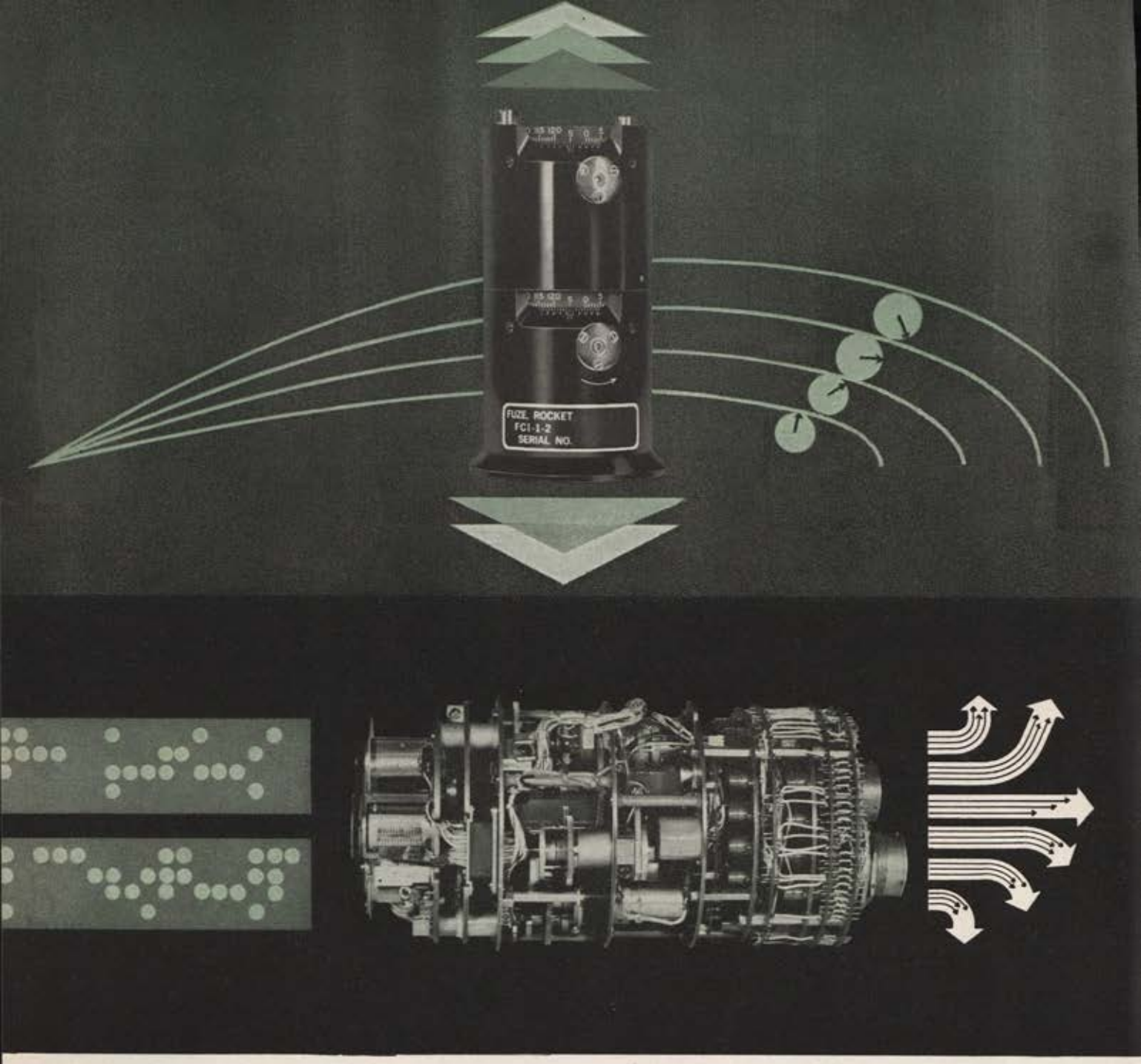

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AEROSPACE WORLD

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

At this writing, while Navy Cmdr. Walter M. Schirra, Jr., was awaiting his six-orbital Mercury mission, scheduled for September 28, world attention was focused on NASA's Mariner II satellite, which by October 1 was one-third of its way to Venus after a highly successful launch from Cape Canaveral, August 27.

Mariner II is expected to pass within about 9,000 miles of Venus on December 13 or 14. As it goes by, its radiometers will report on the planet's surface temperature and presence of water in its atmosphere. The satellite, its mission ended, will then continue in orbit around the sun.

Because of a slight takeoff roll by the Atlas-Agena-B booster vehicle, the Mariner's initial path would have missed Venus by about 250,000 miles, but on September 4 scientists of Cal Tech's Jet Propulsion Laboratory transmitted a complicated set of signals to Mariner II which caused it to correct its path by firing a rocket motor briefly to reduce its speed.

Although the earth and Venus were sixty-nine million miles apart at launch, Mariner II will travel 180 million miles before catching up with Venus in its orbit around the sun. En route, Mariner II is returning data on magnetic fields, cosmic dust, and other phenomena it encounters in space.

Though it still has a long way to go to its target, Mariner II seems destined to be the most successful of all satellite shots to date.

NASA Administrator James E. Webb reported to a congressional committee in September that the Soviets have attempted a total of six Venus shots in the past two years, of which only one —in February 1961—was propelled into a path toward Venus. But that one's radio failed long before the satellite approached its goal. Most recent Soviet failures, he said, occurred on August 25—two days before the US shot—and September 1.

Mariner II was one of only four US launchings attempted from mid-August to mid-September. The other three were classified USAF satellite attempts—a Blue Scout from Point Arguello, Calif., August 23, and two Thor-Agena combinations from Vandenberg AFB, Calif., on August 28 and September 1.

☆

U-2s are making international headlines again. The Chinese Communists reported they shot down a U-2 over eastern China, September 9, operated by a Chinese Nationalistic pilot from Formosa. It's not clear whether he was brought down by ChiCom anti-aircraft fire or its promise of $280,000 in gold for defecting to the mainland with a U-2.

This followed a Soviet protest that a USAF pilot has flown a U-2 over Russia's Sakhalin Island, just north of Japan, on August 30.

The probing of perimeters by both sides is a continuing feature of the cold war, normally conducted without public fanfare. Soviet trawlers and submarines patrol international waters just off our coasts. Soviet aircraft appear regularly on our radarscopes in Alaska.

But when it serves their propaganda interests, the Soviets readily sound off about alleged "violations" of their airspace.

It was inevitable that the USAF U-2 incident would be tied to the unfortunate flight of Francis Gary Powers in May 1960. But it appears that such comparison is not warranted.

In replying promptly to the Soviet protest issued September 4, the State Department said an "unintentional violation" of Soviet airspace might have been made by a "patrol craft" of the US Air Force, but that the US promise not to deliberately overfly Soviet territory still holds.

There was no further elaboration by the State Department, and the Pentagon said nothing.

But USAF had announced more than a year ago that it was conducting high-altitude sampling in the Pacific, employing U-2s. One purpose of that program was—and presumably still is —to collect air samples which yield useful data on Soviet nuclear tests. If the U-2 in question was engaged in

(Continued on following page)

Swift Strike II, called most realistic exercise in US history, ended August 19, in a predictable draw between Red and Blue forces, latter represented by these men of the 101st Airborne shown loading into one of the Reserve's seventy-five C-119s in the maneuvers.

such a mission, neither the State Department nor the Pentagon said so.

The timing of the Soviet protest suggests that it might have been prompted by a desire to take world news play away from the fact that the Soviets had complied with a US order issued September 2 denying them entry to West Berlin via Check Point Charlie. For, although the Kremlin said the U-2 violated its territory on August 30, its protest was not made until September 4.

US security demands that we continue all possible reconnaissance of activities along the Communist perimeter. Though USAF pilots are under strict orders to comply with the US promise not to overfly Soviet territory, it is possible that the vagaries of winds, weather, and faulty navigation may yet provide the Soviets with further propaganda ammunition.

III's first assignment may be to send the Boeing Dyna-Soar into orbital flight, scheduled for 1965.

With a first-stage thrust of more than two million pounds, Titan III will be able to place a ten-ton payload in a 100-nautical-mile orbit, or 13,000 pounds in a thousand-mile orbit. The Dyna-Soar, also shown to the public for the first time in Las Vegas, will have a maximum gross takeoff weight of 10,000 pounds.

☆

A pair of Douglas B-66 bombers are being extensively modified by Northrop to incorporate a revolutionary laminar-flow control system expected to increase range, payload, and endurance by fifty percent or more. The aircraft, developed under supervision of the Air Force Systems Command, have been redesignated X-21s. Laminar flow over the wings is achieved by compressors mounted in underwing pods which suck air into the wing interior and exhaust it out the top through long, thin slots running the length of the wings.

John Stack will receive 1962 Wright Brothers Memorial Trophy for significant service to flight in thirty-four-years' service with NACA and NASA.

Board which shows condition of 10,000 defense communications circuits simultaneously is operated by TSgt. D. L. Clark, NCOIC of new NORAD-ADC communications outage and restoration section at Ent AFB, Colo. Facility locates and corrects flaws in circuits stretching over sixteen million line miles of NORAD sites in continental US and Canada, and BMEWS net from Alaska to England.

The Titan III launch vehicle—contract for which was awarded to the Martin Company by the Department of Defense late in August—will develop "close to three times the capability of the largest thrust demonstrated by the Soviets to date," Secretary of Defense Robert S. McNamara declared on August 21.

A model of the Titan III was unveiled to the public for the first time at AFA's National Convention in Las Vegas, Nev., September 20.

DoD has allocated $204 million for Titan III in the current fiscal year.

First vehicle to be developed from the outset as a space booster, Titan

Air Defense Command SAGE radar equipment at Sundance, Wyo., is being powered by nuclear energy in a six-months test initiated last month by the Atomic Energy Commission. The nuclear plant, which will operate for two years on sixty-five pounds of nuclear fuel, furnishes 1,000 kilowatts of power. Comparable heat and power from fuel oil would require 2.2 million gallons. If the test is successful, the Air Force may use similar reactors at other remote locations where the cost of bringing in conventional fuel often exceeds the cost of the fuel itself.

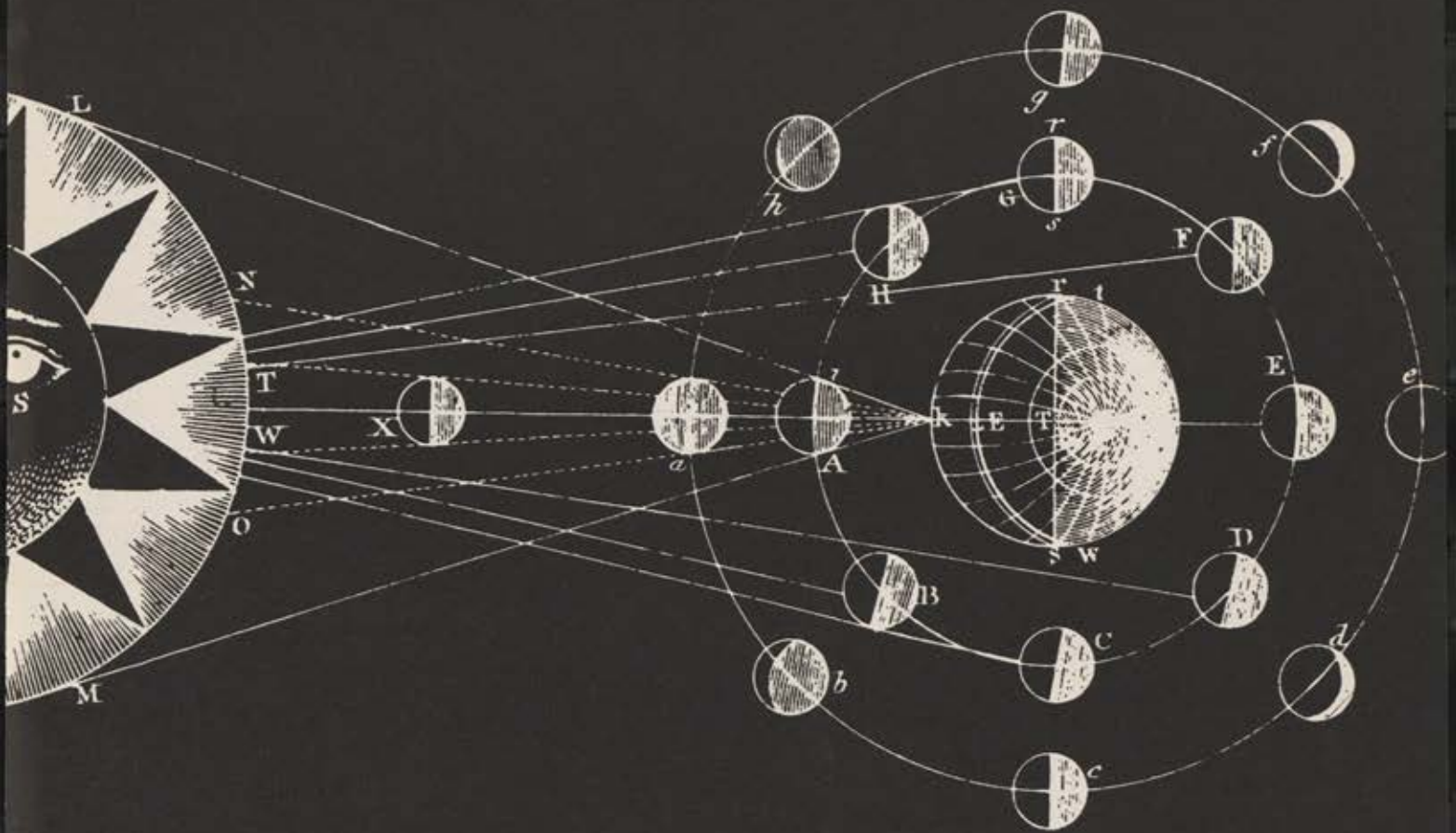
October 1 was the target date for establishing a basic research laboratory at the US Air Force Academy. First to be set up at a military academy, the laboratory will give outstanding cadets a head start in research and development work, and will make use of scientific talents of Academy faculty members in collaborating with scientists of USAF's Office of Aerospace Research on vital Air Force projects.

Civil aircraft which, in an emergency, choose to land at military airfields will have to pay the costs of any damage or assistance rendered, the Defense Department has advised. DoD emphasized it will not deny the use of a military field to any aircraft in trouble. But costs incurred for fire and crash control and rescue, movement and storage of aircraft, damage to the runway, lights, or navigational aids, or for spreading foam on the runway, will be charged to the airline or civilian pilot. More ominously, DoD said it would use whatever means are necessary to move damaged aircraft promptly off its runways. These measures, it said, are necessary to minimize interference with military operations.

The federal civil defense program is lagging again. Moved into the Defense Department a year ago under Assistant Secretary Steuart L. Pittman to give it more emphasis, it showed a little vitality for a while. But the Administration's request for $695 million to run the program in fiscal year 1963 has been chopped by a House appro-

(Continued on page 23)

The Sun, Earth, and phases of the Moon
— from a 17th century engraving



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—Wide World photos

National Air Museum is acquiring historic aircraft for display in Washington, D. C. Walter Male, left, restoration chief, discusses plans for FDR's *Sacred Cow*, first presidential aircraft, with the Museum Director Philip S. Hopkins.

priations subcommittee to $75 million with little protest from either the Pentagon or the White House. The funds will help to complete marking suitable shelters in existing buildings, but money to help communities establish shelters in public buildings has been eliminated.

☆

AWARDS—To **John Stack,** Republic vice president, who spent thirty-four years with NASA and its predecessor, NACA, the **Wright Brothers Memorial Trophy,** for "significant public service of enduring value to the advancement of all forms of flight." The trophy will be awarded at the Wright memorial dinner in Washington, December 17. . . . To Navy **Cmdr. Alan B. Shepard,** first US Astronaut, and Marine **Lt. Col. R. G. Robinson,** the **DeLaVaulz Medal**—Shepard for achieving 615,300 feet in his nonorbital Mercury flight, Robinson for setting a closed-course speed mark of 1,606.5 mph in the McDonnell F4C. . . . To **Vern Haugland,** Associated Press aviation space editor; **Mrs. Frances Nolde,** pioneer aviatrix; and **Ernest Schweizer,** a sailplane designer and builder, **Paul Tissandier Diplomas** in recognition of their work in promoting private and sports aviation. . . . To **Mrs. Constance Wolf,** the first **Montgolfier Diploma,** for setting fifteen balloon flight records in 1961. The DeLaVaulz, Tissandier, and Montgolfier awards were to be made by the Fédération Aéronautique Internationale at its Athens, Greece, meeting September 28. . . . To **James E. Webb,** NASA Administrator, the **McCurdy Medal,** honoring NASA for "outstanding contributions to the world in the field of science," awarded at the Canadian International Air Show, Toronto, August 31. It was accepted for Mr. Webb by **Albert J. Evans,** NASA chief of propulsion

(Continued on following page)

—Wide World photos

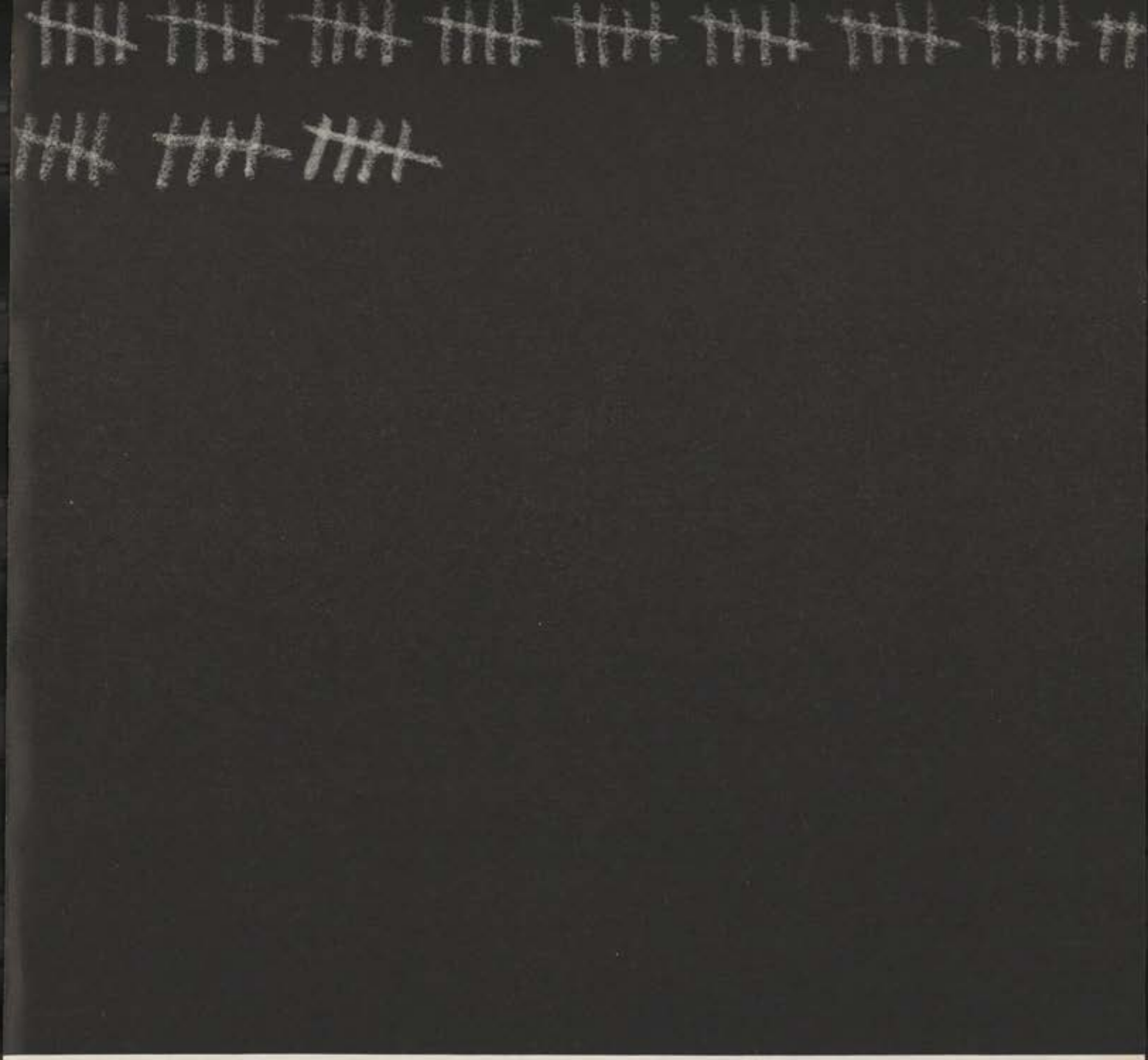
***Vin Fiz*, piloted by Cal Rodgers in 1911, was first plane to cross the US. Now it hangs in the Museum, alongside Wiley Post's *Winnie Mae*, and others.**

and vehicle projects. . . . To **Eugene W. Elliott,** assistant chief engineer of Chicago Aerial Industries, Inc., the **General George W. Goddard Award** for "outstanding individual contributions to aerospace photo-optical instrumentation engineering." . . . To **1st Lt. Gail Liberty,** USAF nurse of Sheppard AFB, Tex., the **Women's National Pistol Championship,** at Camp Perry, Ohio. Lieutenant Liberty is expected to represent the US at the world shooting championships in Cairo, Egypt, this month.

☆

STAFF CHANGES. . . . Brig. Gen. Roger M. Crow, from Deputy Commander, 1st Strategic Aerospace Division, SAC, Vandenberg AFB, Calif., to Commander, 821st Strategic Aerospace Div., SAC, Ellsworth AFB, S. D. . . . **Brig. Gen. Allman T. Culbertson,** from Vice Commander, ASD, AFSC, Wright-Patterson AFB, Ohio, to Deputy Commander, Hq. APGC, AFSC, Eglin AFB, Fla. . . . **Lt. Gen. Hunter Harris, Jr.,** from Commander, 8th AF, Westover AFB, Mass., to Vice Commander in Chief, Hq. SAC, Offutt AFB, Neb. . . . **Brig. Gen. Arthur W. Kellond,** from Commander, 6920th Security Wing, to Commander, Pacific Security Region, USAFSS. . . . **Gen. John P. McConnell,** from Vice Commander in Chief, Hq. SAC, Offutt AFB, Neb., to Deputy Commander in Chief, US European Command. . . . **Lt. Gen. Joseph J. Nazzaro,** from Deputy Commander, 15th AF, March AFB, Calif., to Commander, 8th AF, Westover AFB, Mass. . . . **Brig. Gen. Walter B. Putnam,** from Deputy Director of Personnel Planning, DCS/P, Hq. USAF, to Assistant Chief of Staff, Plans, J-5, US Military Assistance Command, Hq. PACAF. . . . **Brig. Gen. Robert P. Taylor,** from Deputy Chief of AF Chaplains, to Chief of AF Chaplains, DCS/Personnel, Hq. USAF. . . . **Maj. Gen. Charles B. Westover,** from Assistant DCS/Operations, Hq. USAF, to Vice Commander, Hq. TAC, Langley AFB, Va. . . . **Maj. Gen. Delmar E. Wilson,** from Commander, 821st Strategic Aerospace Division, SAC, Ellsworth AFB, S. D., to Deputy Commander, 15th AF, March AFB, Calif. . . . **Brig. Gen. William W. Wisman,** from Chief, Control Division, Directorate of Operations, Hq. SAC, Offutt AFB, Neb., to Commander of the 819th Strategic Aerospace Division, SAC, Dyess AFB, Tex.

RETIRED. . . . Maj. Gen. Daniel E. **Hooks,** Brig. Gen. James R. **McNitt,** Maj. Gen. Walter I. **Miller.**—END



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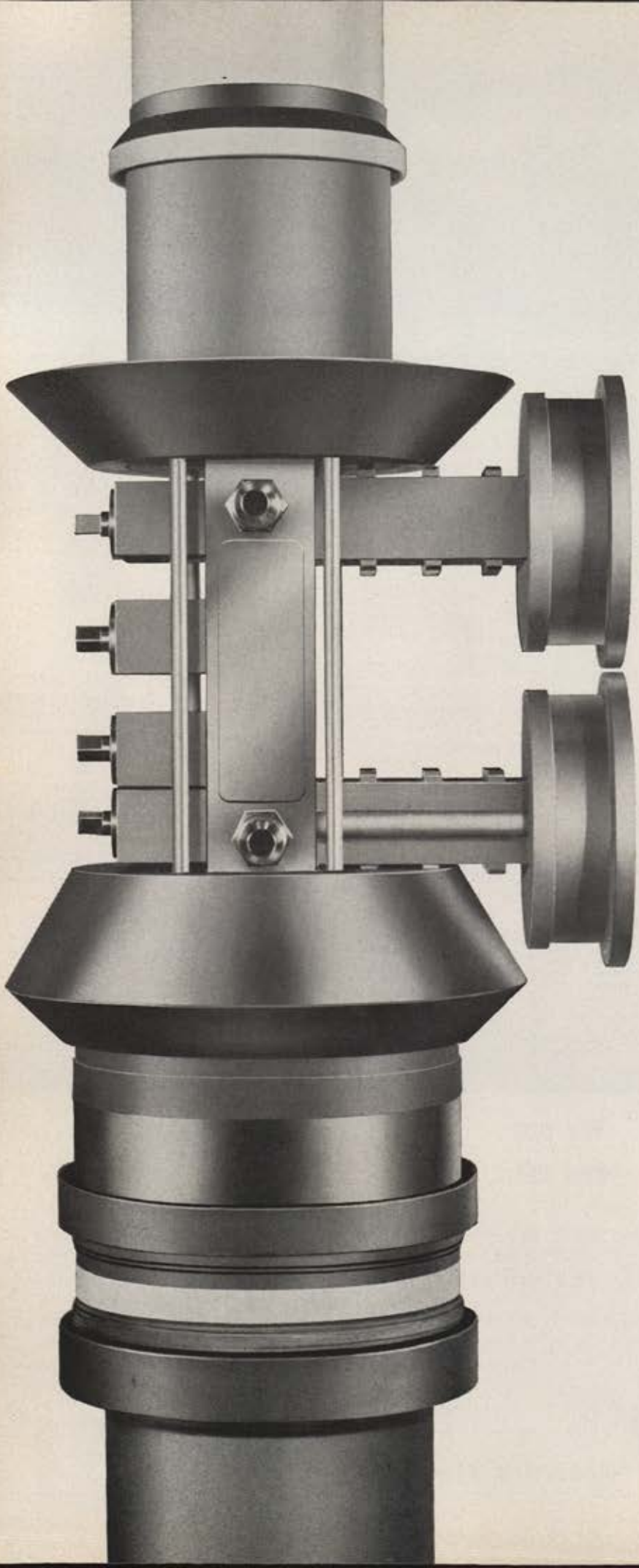

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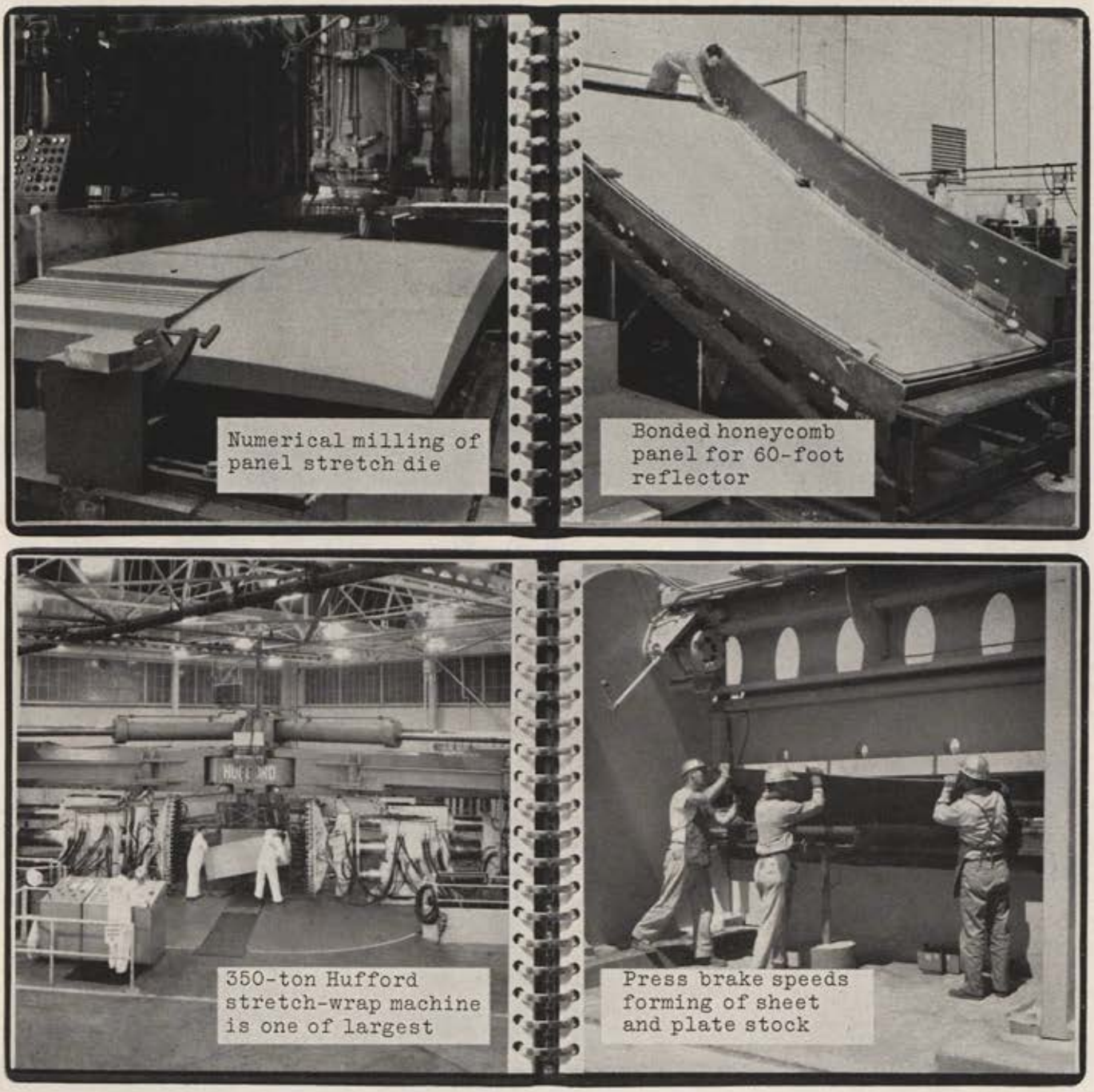

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AIR FORCE
OCTOBER 1962

The logic of counterforce demands acceptance of its *sine qua non*—the ability to locate, seek out, and destroy enemy forces wherever and in whatever manner they may be deployed. Thus, if a justified requirement for a military space program exists, it is imbedded in the Administration's own accepted strategy . . .

History and Mr. McNamara

By John F. Loosbrock
EDITOR, AIR FORCE/SPACE DIGEST

ONE OF the puzzling aspects of this Administration is the curious ambivalence it exhibits in its approach to defense matters. Here we find an odd mixture, an inconsistent amalgam of boldness and conservatism. No one conceivably can accuse Robert McNamara, the Secretary of Defense, of timidity in organizational matters. He has taken on, simultaneously and thus far with success, the generals and admirals in the Pentagon and his numerous critics in the press and on Capitol Hill. Without attempting to assess in this discussion the wisdom of his organizational decisions, the fact remains that he has taken many bold ones and thus far has made them stick.

In strategic conceptual matters, the Secretary likewise has failed to indicate any desire to win a popularity contest. As we pointed out in these pages last month, his lucid and forceful promulgation of a counterforce strategy for the United States is an act both of courage and imagination.

For these and other reasons it is difficult to fathom his apparent acceptance of what amounts to hidebound conservatism—almost reaction—in the critical field of military technology.

Mr. McNamara is a pragmatist, and we hardly think that he consciously measures his actions against what historians of the future may have to say about him, any more than he appears to worry about the almost daily cold showers of criticism from Capitol Hill. President Kennedy has a strong sense of history, however, as exhibited long ago in his book, *Why England Slept,* and we wish he would engender a bit of it in his Defense Secretary.

For history is a cruel judge, as one of Mr. McNamara's predecessors, the hapless Louis Johnson, can testify. Who can forget Mr. Johnson's fatuous pronouncements about cutting fat and not muscle when the fiscal year 1951 budget was being debated? As a sample, take this excerpt from a Johnson speech, made in April 1950:

"We shall win the struggle to rally humanity for freedom, not by any matching of man for man, gun for gun, tank for tank, or plane for plane; not by playing our opponents' game and wrecking our economy through spending ourselves into a depression; and not by giving up our cherished democratic institutions for reactionary militaristic experiments in the regimentation of society. We shall win by proving ourselves qualitatively stronger, in ingenuity, in spirit, and in muscle, than any who may contemplate to challenge us."

Two and a half months later a Pentagon wag was able to say, "Louis Johnson said we were able to fight the Russians. He didn't say anything about being ready to fight the North Koreans." And Mr. Johnson's assessment at that time that anything higher than a $13 billion defense budget would bankrupt the country has indicated that his fiscal wisdom was on a par with his military judgment.

Another of Mr. McNamara's predecessors, Charles E. Wilson, also was noted for his preoccupation with budgetary matters, but in the historical sense his Achilles heel is likely to be his attitude toward research. He termed it, as we recall, "What you do when you don't know what you're doing." However, even Mr. Wilson, or his regime at least, could be persuaded as to the application of technology, and it must be admitted that the intercontinental ballistic missile program, the last big weapon system program to get overriding national priority, received that priority during Mr. Wilson's tenure. But it is his ostrich-like attitude toward science that is likely to be remembered—and with a snicker.

Washington is a fickle town, and fame is fleeting indeed. But Mr. McNamara's stock started high, and by and large it has remained high. Even his congressional critics—and they are getting more numerous and more vocal—do not fault his managerial ability. Indeed, it is one of his characteristics that they tend to view with implicit alarm.

Mr. McNamara is noted for the mathematical re-

lentlessness of his logic. This is what makes his attitude toward advanced military technology generally, and toward the military mission in space specifically, so inexplicable. As previously noted, he has accepted conceptually the doctrine of counterforce, that, in his own words:

"The US has come to the conclusion that, to the extent feasible, basic military strategy in a possible general nuclear war should be approached in much the same way that more conventional military operations have been regarded in the past. That is to say, principal military objectives, in the event of a nuclear war stemming from a major attack on the alliance, should be the destruction of the enemy's military forces, not of his population."

But the logic of counterforce demands also acceptance of its *sine qua non*—the ability to locate, seek out, and destroy enemy forces wherever and in whatever manner they may be deployed.

Conceptually, then, once Mr. McNamara accepts counterforce, logic inevitably should lead him toward acceptance of the overwhelming significance of the military space mission. For, without a military space capability, the United States could be impotent against Soviet power transferred into orbit from which it would be able to operate with impunity. The US would renounce also, and leave to the Soviet monopoly, all opportunity to investigate and develop the new, sophisticated, and possibly more selective weapon systems which exploitation of military space technology promises. Thus, if a justified requirement for a military space program exists, it is imbedded in the Administration's own accepted strategy.

This, it appears to us, is the flaw in Mr. McNamara's logic, the chink in his armor of realism, his bête noir in the historical sense.

The question remains, of course, as to why this contradiction? Why do logic and boldness appear to be replaced in this particular context by illogic and timidity?

Two considerations, in our view, insert themselves.

The first is the essential conservatism of Mr. McNamara's technical advisers, Dr. Harold Brown and his staff in the Directorate of Defense Research and Engineering. Their philosophy lacks the bluntness of Mr. Wilson's discredited "fly-before-you-buy" approach. It is more technical and certainly more suave in the reasons advanced for not doing things. But, with all that, it is just as "can't do" in attitude.

Dr. Brown's approach asks for what it knows it cannot get—specific requirements, precise justifications, on-the-nose predictions—then limits or even withholds funds on the grounds of no justified requirement. The approach is analogous to that of strangling a man, all the while assuring him kindly that you will let him go as soon as he catches his breath.

This situation is anomalous in itself. We remember when the lack of scientific capability in the government decision-making machinery appeared to be the primary brake on technological progress. We remember when the scientists were bolder than the generals and the politicians, when a scientific committee (the so-called Teapot Committee, headed by the late and great mathematician, John von Neumann) pulled the Eisenhower Administration, kicking and screaming, into the missile age by the committee's wholehearted endorsement and urging of a risky but technically feasible ballistic missile program.

Now the thrust has been reversed. Having won their fight for government acceptance of their counsel and guidance, the scientists figuratively have moved to the suburbs. They are busy collecting status symbols to prove their respectability, which in bureaucratic circles is proved best by saying "no" a good deal oftener than one says "yes."

As Senior Editor Claude Witze points out (on page 12 of this issue) there is no modern aerospace weapon system under full development in the United States today, a situation as alarming as it is indicative of the less-than-positive influence of the scientists in the Pentagon. "Play it safe" is the watchword, and it inevitably begins to pervade all levels of defense activity.

In addition to the conservative scientific advice he receives, Mr. McNamara's attitude on military space programs perhaps can be accounted for in terms of the inability of the Administration itself to grasp the nettle of military confrontation of the Soviet bloc.

In a classic inversion of Louis Johnson's position vis-à-vis the North Korean, there sometimes appears to be a great deal more interest in achieving a capability to beat the North Vietnamese than in competing with the Soviets in the more meaningful, and potentially more decisive, arena of space. The Administration inherited from its predecessor a national commitment to preservation of space for peaceful purposes, and it has been reluctant to change this position overtly. There have been cautious pronouncements that the term "peaceful" can include achieving the means of keeping the peace in and from space. And there have been admissions that the Defense Department, being busy with other things, has neglected the military possibilities of space, together with promises to do better. But there have been no ringing assertions of the national will, no rallying of public opinion, no tangible evidence of accelerated military space programs, or even of an unequivocal acceptance of the military space requirement.

It may be that Mr. McNamara is aware of this great gap in the means of implementing his own strategic plan. It must be apparent to him that space is actually a most attractive arena for deterrence and even for potential conflict, because potential conflict is implicit in deterrence. He must know that achievement of a unilateral Soviet military space capability would mean that the option of selecting the time, the place, and the level of conflict would pass to the Soviets. He must appreciate the brutal candor expressed in Defense Minister Malinovsky's congratulatory telegram to Cosmonauts Nikolayev and Popovich: "Let our foes know what technology and what militancy are in the possession of Soviet power." He must realize that a Soviet capability to deny near-space activity to the United States would remove hope for a rational US defense policy and push deterrence back to the "spasm retaliation" posture which would doom our cities—and Soviet cities as well, for whatever useless consolation that thought may bring.

We have great confidence in Mr. McNamara's logic. We hope it asserts itself as regards the military space requirement. History is cruel, as we have said, and no man would wish to risk being adjudged by it as the Louis Johnson of space.—End

Last fall, about 27,000 Air National Guardsmen and Air Force Reservists left their homes and families as the Reserve Forces mobilized to meet the growing crisis in Berlin. Many of the men went to Europe, serving in tactical units in Germany, France, and Spain. This summer the called-up Reserve Forces were returned to civilian life. Here's the story of the redeployment of one of the Air Guard wings . . .

THE GUARD COMES BACK

Relatives and friends wait at Boston's Logan International Airport for new MATS C-135 to arrive from Europe with support personnel of the returning 102d Wing on unit's redeployment.

By 1st Lt. Michael V. Miller, USAF

PHOTOS BY TSGT. RICHARD MANNING, USAF (MATS)

AT PRECISELY 8:58 a.m. last July 21, the shadowy figures of four jet fighters pierced the gray haze above Boston's Logan International Airport, and a crowd of New Englanders, gathered to await them, looked up anxiously and cheered.

In a tight, low-level formation, the sweptwing fighters—F-86H Sabrejets—roared over the historic landmarks of the city they had left nearly nine months before for duty overseas on the borders of the cold war.

Across a busy boulevard from Logan International in front of a yellow stone building, the crowd of parents, wives, children, and sweethearts laughed and cried. Boston's 101st Tactical Fighter Squadron, of the Air National Guard's 102d Wing, was coming home from France.

The jets peeled off in one, two, three, four order and circled in for the long-awaited landing. Out of the lead plane stepped Maj. James R. Ramsay, Jr., 101st Commander, to be greeted by his wife and two sons.

At forty-five-minute intervals, more F-86s with green shamrocks on nose and tail arrived over Boston in formations of four. Meanwhile, F-86s of the 102d Wing's other two tactical fighter squadrons were being welcomed at their home stations, the 131st at Westfield, Mass., and the 138th at Syracuse, N. Y.

Across the nation, in Birmingham, Knoxville, St. Louis, in South Carolina, New Jersey, and New York, other federalized Air Guard and Air Reserve units regrouped after their redeployment from Germany, Spain, and France. And in more than a dozen other states from New Hampshire to California, squadrons which had served just as valuably in the United States under the Tactical Air Command and Military Air Transport Service prepared to return to civilian life.

Operation High Top was a heartwarming success. Like Stair Step—the swift deployment of eleven tactical fighter and tactical reconnaissance squadrons to Europe last fall—High Top brought them back, without a hitch. Once again, TAC, MATS, USAFE, and supporting commands had pooled thousands of man-hours to write the success story.

But this time things were different. Tension over Berlin and sadness over leaving homes and families gripped last year's deployment. Now the men were homebound, proud of their accomplishments. And MATS, beefed up over the past several months with a fleet of new C-135 jet transports, brought the 10,000 ground-support personnel back from Europe twice as fast.

As the man on top of the redeployment, TAC's Com-

Members of 101st Squadron, in last days in France, sightsee in Vosges Mountains near Phalsbourg in northeastern France.

Airmen of the 101st Squadron, wearing their Shamrock blazers, stop off in a French shop in Sarrebourg to buy gifts to take back home.

SSgt. Mike Buscanera helps Maj. James R. Ramsay, Jr., 101st Squadron Commander, into antiexposure suit before take-off.

mander Gen. Walter C. Sweeney, Jr., called it "an altogether fitting and proper climax to the success attained by these organizations in Europe the past several months in meeting the grave responsibility of preserving world freedom. The fact that this mission was accomplished without accident or serious incident attests to the professional skill of the aircrews and support personnel who participated," said the TAC Commander.

Back in Boston, as he climbed out of his F-86, Capt. John T. Olson, 101st Operations Officer, said calmly, "It was a no-sweat operation."

The script called for a four-day redeployment beginning July 17 with stops at Prestwick, Scotland; Keflavik, Iceland; Sondrestrom, Greenland; Goose Bay, Labrador; and Loring, Me., reaching Boston on Friday, July 20. On Monday, July 16, the day before the redeployment, Phalsbourg, the base in northeastern France where the 102d Wing had been based during its overseas tour, was blanketed with low clouds and rain. Air Guard F-84Fs and RF-84Fs from other units were already in Prestwick, but a low ceiling in Keflavik threatened to hold them there the next day. If so, it would delay the departure of the 101st.

But at 6:00 a.m. Tuesday the USAFE command post flashed the "go" sign to the 102d Wing at Phalsbourg. First squadron to leap off was the 101st, meeting take-off time practically to the second.

Led by Major Ramsay, the Sabrejets zoomed over the 615 nautical miles from Phalsbourg to Prestwick in an hour and forty minutes. The following day, supported by rescue and navigational planes, they flew the two-hour, 740 miles to Keflavik, Iceland, refueled quickly, and flew another 740 miles to Sondrestrom. Halfway home, the pilots were right with the timetable.

But in Sondrestrom they met with disappointment. Goose was flat on its back with bad weather. For a full day, the 101st, joined now by the 131st and 138th, waited impatiently for the weather to break. Fair weather on this leg was essential, for from Sondrestrom to Goose Bay there were no rescue ships or alternate landing points—nothing but arctic ice. Arrival at Boston was a day late, but the delay only heightened the anticipation. And the arrival itself was no letdown.

Brig. Gen. Charles W. Sweeney, Commander of the 102d Tactical Fighter Wing, told his men simply: "Thanks for a great job. You have a three-day pass."

"I hope everyone realizes the service you have rendered," said Massachusetts Governor John A. Volpe,

(Continued on following page)

Dublin Lord Mayor Robert Briscoe, left center, receives Maj. James Ramsay and delegation from the 101st Squadron at his home. Members of the 101st Squadron presented the Mayor a plaque honoring the memory of a former Squadron Commander.

shaking hands with every officer and airman. "I know what my wife says when I'm away from home for just one night."

The full story of the 101st Tactical Fighter Squadron, like the other federalized units, is one of more than airplanes, flying hours, and crossing oceans. The 101st is an outfit with *esprit de corps* and what Major Ramsay terms "a real sincerity of purpose." It is basically a group of civilians from all walks of life who left their jobs, schools, and families to point their F-86s right down the Berlin corridor.

The 101st is composed largely of men who have fulfilled their normal military obligation but remained in the Air National Guard. Its pilots all have from three to twenty years of flying experience.

Major Ramsay is a banking executive who flew P-38s in combat over France in World War II; Captain Olson, a West Point graduate with a MIT master's degree in aeronautical engineering; Capt. Dick Kenny, TWA airline captain; Capt. Alan Graham and 1st Lts. Ted Mansfield and Russ Schweickert, former Air Force F-100 pilots; 1st Lt. Bob Boardman, Harvard graduate student and former SAC bomber copilot; 1st Lt. Jim McQuarrie, ex-Navy enlisted man; and 1st Lt. Paul C. Gay, a Boston lawyer, to name only a few.

In the enlisted ranks are men like SMSgts. Bob Ciampa and Nick Colagiovanni, Stalag 17 prisoners in World War II; MSgt. Arthur (Red) O'Gorman, first sergeant and a National Guardsman since 1930; MSgt. Hank Whelan, manager of a New England parking lot chain; TSgt. Bill Burke, veteran of Inchon in Korea; SSgt. John Sheppard, office equipment salesman; and A1C Albert W. Croft, Jr., Air Force veteran who joined the 101st when he heard it was going overseas.

"There's a little thing called pride that made this outfit go," said TSgt. Paul Judge. "It's just a tiny little word. You can't see it, but it's always there."

Off duty in France, officers and airmen of the 101st wore handsome Navy blue blazers with the shamrock emblem on the left chest. They adopted their own squadron drink and initiated other touches that may grow into squadron traditions.

The shamrock insignia—most appropriate in Boston—was adopted in respect for a former 101st Commander, Lt. Col. Joseph W. Mahoney, killed three years ago in a crash.

Irish-American Colonel Mahoney had often told his men about Ireland. In June, a delegation from the 101st climbed on a C-47 in Phalsbourg and flew off to Dublin to present Lord Mayor Robert Briscoe with a plaque in Colonel Mahoney's memory. The Lord Mayor, the Irish Air Force, and the people of Dublin gave them the reception of a lifetime.

For the Shamrocks, the duty in France was an exhibit of combat-ready posture, an experience in a different way of life, and an exercise in international good will.

Phalsbourg is a tiny town of 3,000 people, nestled in a valley among the green hillsides of Alsace-Lorraine. Into this setting last year moved the 101st and other squadrons of the 102d Wing. Phalsbourg Air Base had been closed for a year. Sheep grazed off the ends of the runways, seemingly oblivious to the roar made by the jets.

Initially, there was a shortage of equipment: a handful of telephones and vehicles for 2,500 men. "I slept on the floor of a hangar for the first three nights," said Lieutenant Gay. Spare parts for the airplanes were hard to come by.

Weather was foreboding. Pilots flew indoctrination flights with minimums that would have kept them grounded in Boston. For the first eleven weeks, no one saw the sun.

"But the more hardships we met, the better job everyone seemed to do," said A2C Edward S. Heard, who missed his senior year at Harvard while he served as an aircraft mechanic with the 101st.

In the government housing areas around Phalsbourg, some wives and children who arrived almost as soon as the Guardsmen slept on canvas cots, ate off boxes, sat on crates, and considered themselves fortunate just to be with their husbands and fathers.

"The people here (France) are actually very friendly," said SMSgt. Bob Ciampa, "but they expect you to make the first move." Living next door to a Frenchman named Salvatorre, Bob and SMSgt. Nick Colagiovanni made the first move. From then on Salvatorre's children were daily visitors to their house.

"Salvatorre had never seen anyone pitch horseshoes," said Bob. "We showed him how, and a week later he was throwing nothing but ringers."

When the 101st was mobilized, 1st Lt. Kenneth Brooks was a pilot for Northeast Airlines, living in Needham, Mass. The recall changed his life. Ken fell in love with Emilienne N. Steibel, a striking, jet-haired French girl. They were married in the base chapel on June 2, and Lieutenant Brooks volunteered for extended active duty in order to remain in Europe.

Lt. Col. Norman C. LaForest, 102d Wing executive officer, met with another emotional experience. One night when he went to the Heitz Hotel near Phalsbourg for dinner, the hostess, Madame Heitz, took one look at him and exclaimed, "Your name is LaForest. You've been here before."

Colonel LaForest had indeed been there before. Shot down on a supply-drop mission in late 1944, Colonel LaForest belly-landed his C-47 into a valley behind German lines. He climbed out moments before the airplane exploded and set out to reach the French underground. His first contact was Madame Heitz.

Eighteen years later, Madame Heitz recounted to Colonel LaForest how she had fed him, washed his clothes, hidden him in the same hotel where forty-five German soldiers were living, and turned him over to other members of the underground. After five days of riding ox-carts and hay wagons, Colonel LaForest reached Allied lines.

"At the time, she wouldn't tell me who she was or where I was," said Colonel LaForest. "I never knew until I came back to Phalsbourg and happened to walk into her hotel."

(Continued on following page)

THE TRANSPORTS SERVED TOO

Another aspect of the Reserve Forces recall was the contribution of the Guard and Reserve transport squadrons . . .

Trio of C-97s from Air Guard's 146th Transport Wing fly over Los Angeles.

The Air Guard's tactical fighter and reconnaissance squadrons, whose story is told here in terms primarily of the 102d Tactical Fighter Wing, were joined on active duty in the Berlin crisis by five Air Force Reserve C-124 squadrons and six Air Guard C-97 units.

The Globemaster units were under the Reserve's 435th Wing, Homestead AFB, Fla., and the 442d Wing, Richards-Gebaur AFB, Mo. Guard Stratofreighter squadrons were assigned to the 133d Wing, Minneapolis-St. Paul, Minn., and the 146th Wing, Van Nuys, Calif.

Neither the C-124 nor C-97 squadrons were operationally ready when they entered on active duty. The Guard acquired its first Stratofreighters in 1960, the Reserve its C-124s early in 1961. Thus the first objective upon recall was to gain crew proficiency. They did this with such energy and skill that both were ready for operational assignments by January 1962.

The Reserve's Globemasters operated tirelessly on TAC cargo missions, and participated in a dozen or more joint Army-Air Force exercises, airlanding heavy equipment and supplies.

Guard C-97s, meanwhile, joined the MATS fleet, the 133d Wing working primarily with the Eastern Transport Air Force (EASTAF) at McGuire AFB, N.J., while the 146th Wing operated under WESTAF from Travis AFB, Calif.

Indicative of the scope of their activities, on one day early in the year, seventeen of the 146th Wing's twenty-four Stratofreighters were out of the country—in Puerto Rico, Alaska, Germany, Newfoundland, the Azores, Bermuda, Hawaii, Okinawa, Taiwan, the Philippines, Wake Island, Guam, and Southeast Asia.

In an otherwise highly critical report on the recall program, the Hébert subcommittee (*see "Ready Room"*) praised the Air Reserve Forces.

President Kennedy hailed the "outstanding contribution to the cause of freedom" of all Air Reserve Forces units in a message to Secretary of the Air Force Eugene M. Zuckert.

The Commander in Chief wrote:

"I would like to express my appreciation for the outstanding performance of the Air Reserve Forces mobilized during the past year.

"The swift and accident-free deployment to Europe of several hundred jet-fighter aircraft of the Air National Guard within days after mobilization, followed almost immediately by full combat-alert posture, was a convincing demonstration of the 'Ready Now' status of the Air Reserve Forces. The quick augmentation of our forces in Europe was a powerful factor in preserving the peace during this period of crisis. In addition, the substantial Reserve Forces backup to the Tactical Air Command and the Military Air Transport Service, contributed by the mobilized units that remained in the United States, added materially to our total deterrent power.

"I am mindful of the personal sacrifices made by these Reservists during this period, including significant reductions in personal income and, in thousands of cases, prolonged separations from their homes and families.

"The Air Force is to be congratulated for the outstanding contribution to the cause of freedom made by its Reserve Forces during this critical time."—End

The Bostonians thus helped to perpetuate Phalsbourg Air Base's nickname—"The Friendliest Base in France." The French responded, taking an active interest in the base.

On Armed Forces Day, more than 30,000 turned out from the small towns and hillsides of Alsace-Lorraine to swarm over the base. The base had arranged for the French Anchor Pils brewery band to play. Parading for the visitors, airmen found it all but impossible to march to the music of the brewers. The oomp-pah-pah beat was too much.

Europe felt the presence of the men from Boston in places other than France. When 1st Lt. Ted Mansfield found his Sabrejet failing on a radar-defense test mission over Spain, he turned the F-86 toward some mountains and bailed out. Ted parachuted safely into a field near a small village. Spaniards who came to his rescue hailed Ted like a hero from outer space. Said the lieutenant, "You'd have thought it was the biggest thing to happen there since the Spanish Civil War."

A2C John J. Franovich fought through the mountain of required paperwork to travel behind the Iron Curtain and visit relatives in Yugoslavia. His parents immigrated to the Boston area from Yugoslavia thirty years ago.

Berlin itself was the common denominator to the experiences of virtually all Air Guardsmen and Air Reservists in Europe. Col. R. E. McLaughlin, Phalsbourg Base Commander, estimated that a majority of the 2,500-man 102d went to Berlin at least once. When the runways were closed for repairs, the Wing sent all pilots of the 101st, 131st, and 138th Squadrons to Berlin on a "Why We Are Here" visit. The Wing also encouraged week-end trips to Berlin for the airmen.

Some typical comments from members of the 101st:

Capt. Maurice (Mo) Powers, intelligence officer: "When you see the serious problem in Berlin, it explains things you never understood before. I think the Berlin example is one reason the Stair Step forces didn't complain."

A1C Bialas: "It was an important personal experience for me. It answered the question, Why are we here? In East Berlin people look to see if anyone is watching before they wave at you. I stood on the West Berlin side and saw bars on the windows across the border, and an old woman looking out from the third floor crying."

On his visit to Berlin, A1C Ronnie Butler stood on the border and politely argued politics with an East German Vopo. "I pointed out the futility of the utter serfdom of communism, evidenced by the contrast between East and West Berlin," said Ronnie. "The Vopo finally ended the discussion by admitting he wasn't at liberty to express his views."

On Bastille Day, the 102d Wing bade its official farewell to France. A delegation of 400 officers and airmen paraded through the town square to the music of the Phalsbourg fire department band.

In a ceremony at city hall, a plaque from the 102d Wing's General Sweeney was presented to the mayor of Phalsbourg. The plaque bore a significant message for the forces mobilized for the Berlin crisis. It said the mobilization was "representative of an ancient tradition shared by France and America alike: that patriotic citizens will rally eternally to the Republic when Liberté, Egalité, and Fraternité are menaced by despotism."

Among the units mobilized for the Berlin crisis, there were a lot of men like Major Ramsay, Captain Olson, Sergeant Ciampa, Airman Bialas, and the rest of the Shamrocks from Boston. Their experiences and accomplishments were similar and equally significant.

South Carolina's 157th Fighter-Interceptor Squadron made friends quickly in Spain by aiding families left homeless by severe floods. At Toul-Rosieres AB, France, headquarters for St. Louis 131st Tactical Fighter Squadron, the Armed Forces Day show drew more than 40,000. Stories were similar in Chambley, Chaumont, Dreux, and Etain.

And in Ramstein, Germany, Tennessee's 151st FIS of Knoxville flew its eighteen F-104 Starfighters 835 hours in one month, an Air Force record for F-104s and a USAFE record for all types of single-engine jet aircraft.

In the United States, the other ANG tactical fighter and tactical reconnaissance squadrons also made a name for themselves. Those squadrons achieved an advanced state of combat-readiness, underwent intensive training and participated in numerous maneuvers.

More significant was the contribution to maintaining the peace. If war had flared, the Air Guard pilots had the airplanes, the weapons, and knew their assigned targets. At the conclusion of the recall period, Berlin remained a center of tension, but the show of force and professional skill by the 27,000 Air Guardsmen and Air Reservists in TAC, MATS, and USAFE had silenced many Communist threats.

Assessing the recall, General LeMay said: "The quality of Air National Guard participation and the safe return so capably supported by all personnel will long be remembered as a truly professional job, accomplished by a team of which I am justly proud."

Said Maj. Jim Ramsay, leader of Boston's 101st Flying Shamrocks: "It took some positive citizenship for most of my men to join the Air National Guard in the first place. We have accomplished some very positive results."—END

The author, 1st Lt. Michael V. Miller, was called to active duty last year as a member of the Tennessee Air Guard's 151st Fighter-Interceptor Squadron of Knoxville. During the ten-month recall period, he was assigned to the Office of Information at Hq. TAC, Langley, AFB, Va. He holds a master's degree in journalism from Northwestern University. Now back in civilian life, Mr. Miller is a reporter for the Knoxville News-Sentinel.

One of the hazards to manned spaceflight is "weather"—a new kind of weather, quite different from the disturbances that have plagued flyers inside the earth's atmospheric envelope for a half-century. Space "weather" is characterized by the perils of solar wind . . . galactic cosmic rays . . . Van Allen radiation . . . solar flares. Before the first manned missions to deep space, we need to know a good deal more about . . .

WEATHER IN SPACE

Unsettled today, Warmer tomorrow?

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

WEATHER has plagued manned flight from its beginning, and manned spaceflight is proving no exception.

But it's a new kind of "weather," and a new breed of "weatherman" is needed to cope with it.

Unfortunately, as of now, it looks as though the space weathermen are going to have their problems, just as do their atmospheric colleagues. The chances are better than even that any astronauts flying to the moon in the 1967 to 1970 period will run into some kind of weather.

Weather in space bears little resemblance to familiar weather patterns on earth. In the near void, high vacuum of space there are no pressure forces which can buffet or shake a spacecraft. In space there are only a few positively and negatively charged particles, or pieces of atoms, per cubic foot. There are only about eight pounds of matter in a volume the size of the earth. Yet these particles, and the mechanisms by which they move and are positioned, create a weather in space which currently is beyond specific explanation and is an acknowledged but undefinable hazard to manned spaceflight.

A wide variety of opinions about the seriousness of this hazard have been expressed. On the pessimistic side, some believe that there is no way for man to escape an encounter with harmful particles on multi-day flights several thousands of miles from the earth. Consequently, several hundred to several thousand pounds of shielding per man are seen as a requirement for the safety of astronauts in lengthy flights beyond the Van Allen belts of trapped radiation around the earth.

Other space weathermen are much more optimistic. They believe that it will be possible, in a few years, to predict accurately the occurrence of "calms," when there are few high-energy particles in space and man will be able to travel in complete safety. They also predict that the structure and equipment in a spacecraft can be arranged to provide all the shielding a man would need unless he were caught in the worst kind of "storm" in space, the kind that is known to occur very rarely.

As the science of space weather stands now, neither view can be either proved or disproved. Much more information will be needed before anyone can describe with confidence the biological hazards of particles in space and the weather mechanisms—either in space or the earth's atmosphere, for that matter. The US space program is designed to provide, during the next few years, many thousands of times more observations from satellites and on the earth than have ever been made in the past. Hopefully, these measurements will

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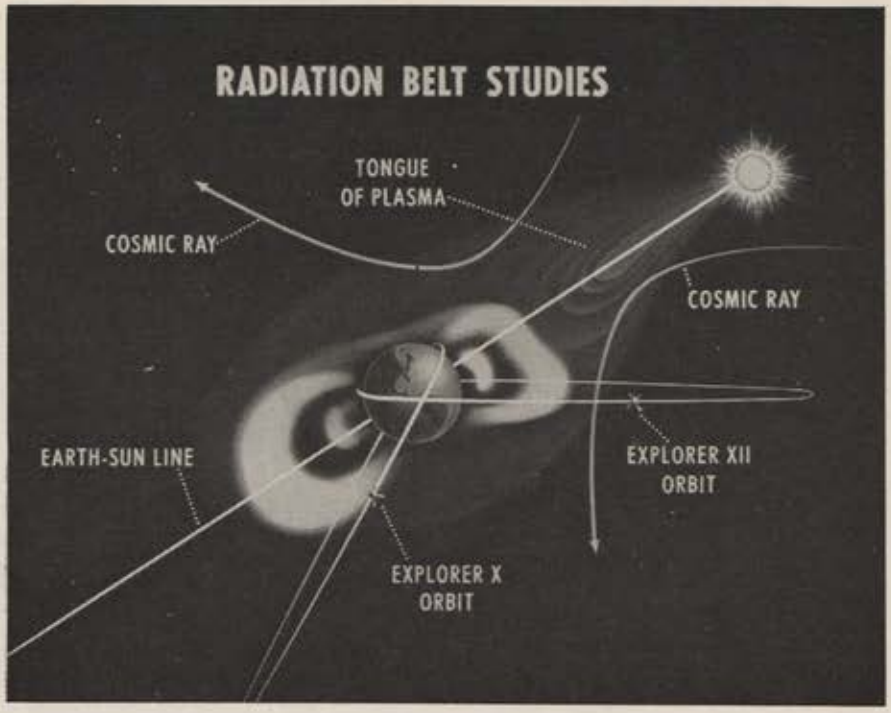


Graphic representation of a solar storm enveloping the earth is given in this NASA drawing. The plasma tongue, or beam, from the sun generates a strong magnetic field which accompanies it through space. This field deflects cosmic rays and can shield the earth from other solar particles for hours and sometimes days. Current knowledge of solar storms, imperfect as it is, is vastly superior to that available before 1957, thanks to information from satellites, such as Explorer X and Explorer XII.

dispel the doubt that now exists about the situation before 1967, the earliest date on which the Apollo vehicle may begin its trip to the moon.

In the meantime, the Apollo vehicle is being designed along optimistic lines, with only slight personnel shielding beyond that provided by the spacecraft structure and its internal equipment. If this design premise proves incorrect, it might be necessary to add many pounds of shielding weight to the Apollo command module which carries the crew. Adding a large amount of weight is a serious matter. It could wash out the whole Apollo design. Each pound of weight added to the command module—the reentry vehicle that will return to earth—means that 300 to 600 pounds must be added to the total weight of the entire vehicle at takeoff from earth. The exact amount of added weight will depend on the type of flight plan, *e.g.*, earth rendezvous, rendezvous around the moon, etc. A large shielding weight requirement could force the use of larger boosters or the adoption of a multivehicle rendezvous plan.

Therefore, the effort to describe accurately space weather and the shielding necessary to protect man from it has a very high priority.

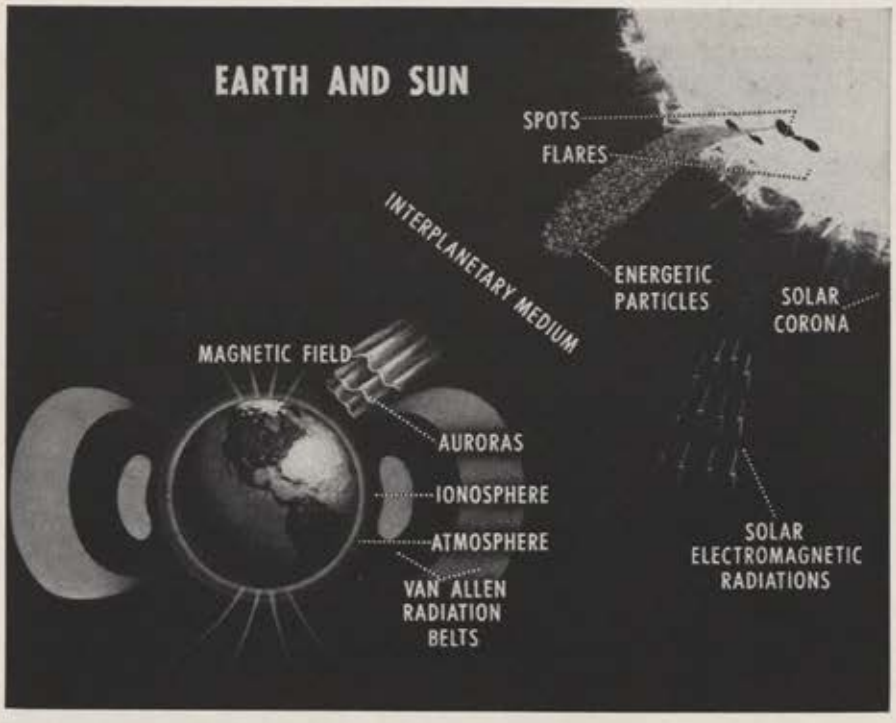
Essentially, the physicists, astrophysicists, and mathematicians who are pooling their talents to become the first space weathermen are concerned with a branch of the relatively new science of magnetohydrodynamics, which deals with the motion of electrically conducting fluids and gases. The particles in space are electrically charged, and even though they form an extremely thin gas they will conduct sizable electric currents. The passage of these currents through the gas creates magnetic fields, just as does the passage of a current through a wire. The charged particles that make up the gas can be deflected by one of these magnetic fields and forced to take a new motion and a new path. As particles are deflected, the local gas density changes, which in turn changes the electrical conductivity of the gas. The conductivity changes alter the magnetic field, which changes the motion of the particles, and so on in endless succession.

Another complicating fact is that the earth lies on the outer fringes of the sun's atmosphere of heated gases, which is believed to extend beyond Mars but not to Jupiter. The earth not only receives massive thermal radiation from the sun, it is constantly bathed by clouds of low-energy solar particles. It is also within range of the flares or explosions on the sun which shoot out great clouds of plasma (gas containing both positively and negatively charged particles) more than 100 million miles into space. The nearness of the sun causes it to dominate the weather in space near the earth just as it does the weather in the earth's atmospheric gases.

Four major types of charged particles are of interest in studying interplanetary space. These are:

- **The Solar Wind.** This is low-energy plasma continuously emitted by the sun. It forms a background gas near the earth with a density of perhaps 100 particles per cubic inch, under normal conditions. It sustains a magnetic field about one-ten-thousandth as strong as the earth's. The solar wind generally moves outward from the sun, and it distorts the earth's distant magnetic field. Therefore, it slows the movement and changes the course of particles reaching the earth from outside the solar system. Present estimates of the strength of the solar wind are much lower than they were a few years ago, so that some scientists are now calling it the solar "breeze." The solar wind is of no danger to humans.

- **Galactic Cosmic Radiation.** This often is referred to as primary cosmic rays. It consists primarily of protons (the nuclei of hydrogen atoms) which are accelerated to extremely high energies and speeds by unknown mechanisms outside the solar system. They



Some of the major features of space weather are illustrated in the drawing at left. The solar spots and flares which are the visible signal for the release of energetic particles are shown in the upper right corner. When the particles arrive at the earth they create auroras, communication blackouts, compress the earth's magnetic field, alter the composition of the Van Allen radiation belts, and start many types of ionospheric disturbances.

arrive in the vicinity of the earth from all directions. Their effect on man at sea level is negligible because the atmosphere is equivalent to a shield of water more than thirty feet thick. In deep space, galactic radiation still won't appreciably affect man, despite its great energy, because relatively few of these particles pass through interplanetary space. Some NASA sources estimate that even an unshielded man could stay safely in space for a year if galactic radiation were all he had to endure. However, for long trips, such as one to Mars, some sort of shielding from galactic radiation probably will be necessary.

• **Van Allen Radiation.** Particles of high energy and high intensity (large numbers) are trapped in the earth's magnetic field and probably in the fields of other planets as well. The origin of the two major belts of trapped radiation about the earth are somewhat uncertain. It is believed that most particles in the outer belt originate at the sun, while the protons and electrons in the inner belt are created primarily by cosmic-ray interactions in the high atmosphere. Enough is known about the radiation in these belts to make it clear that very large amounts of shielding would be required to protect crews who travel in them for even a matter of hours. Consequently, relatively low-altitude manned satellites will have to stay below the inner belt, which extends down to about 300 miles altitude at the equator under normal conditions. As has been proved recently, man can bring the belt to an even lower altitude with large nuclear explosions in space.

Manned vehicles going to the moon or into very high earth orbits will avoid the radiation belts to a great extent by passing quickly through their weaker portions, near the poles.

• **Solar Flare Radiation.** This is the most important radiation hazard for man. If shielding must be added to the Apollo vehicle it will be to protect against the large numbers of high-energy protons emitted by the sun during some solar flares. Today's uncertainty about the radiation danger in space exists because relatively little data is available on flares, and the information that has been gathered shows that they are extremely complicated events which vary over wide ranges of frequency of occurrence, size, intensity, and duration.

A correlation has been shown between flares and sunspots. All flares are associated with sunspot groups, but all sunspot groups do not produce flares. Only four percent or less of the flares that can be seen optically direct protons to the vicinity of the earth. This has led to the theory that flares send out long tongues or beams of plasma from the sun and that a given body in space, such as the earth, will lie in the path of only a small percentage of them.

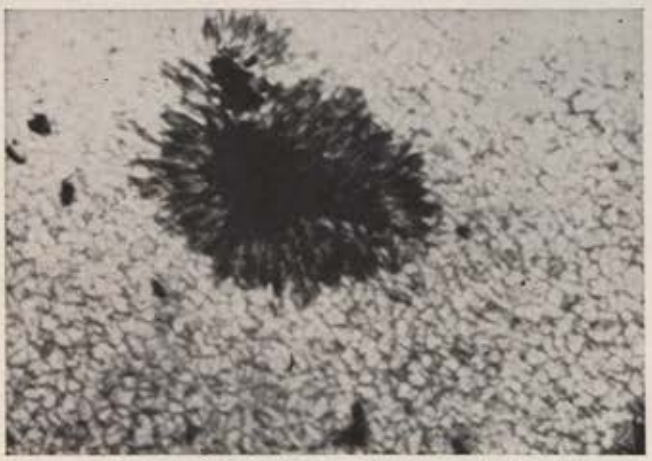
The frequency of both sunspots and flares varies over an eleven-year cycle from a solar minimum, in which as few as fifteen or twenty flares a year might he observed, to a period of maximum activity, in which more than three thousand solar flares a year can be seen. The flares are classified by a rough system in which a class-one flare is relatively small, a class-three flare is a major solar storm, and a three-plus flare is a gigantic event. There have never been more than seven class-three-plus flares recorded in a single year, even in the most active solar periods. Usually about eighty-five percent of the flares are class one.

To date there have never been more than fifteen flares recorded during solar maximum years which directed *substantial* proton beams toward the earth. During quiet years there usually are no such proton showers.

One of the most thoroughly studied solar-storm periods, consisting of two major flares, occurred from March 30 to April 1, 1960. The Pioneer V and Ex-

(Continued on following page)

This major solar flare, extending out into space more than half the distance from the earth to the moon, was photographed at the Mount Wilson-Palomar Observatories of the California Institute of Technology. Dot at lower right is the earth to scale.



Close-up picture of a sunspot, above, was taken through a 12-inch refracting telescope carried aboard the Stratoscope I balloon operated by Princeton University, the Office of Naval Research, and the National Science Foundation. The irregular white spots are short-life turbulence.

This pattern is a sunspot field photographed in white light. This type of photo enlargement reveals the lines of force around the spot. It is possible to predict the occurrence of a solar flare with fair accuracy, by observing the growth of sunspots, but better prediction methods are needed.

plorer VII vehicles were in space at the time, and their paths were widely separated, so they could record the phenomena both near the earth and out to three million miles. As the storm began, a giant flare was observed optically on the sun. About one day later a cloud of plasma moving at about 1,000 miles per second reached the earth. Observations on the earth's surface were typical—a magnetic storm occurred, the earth's magnetic field was compressed, and there were upper atmospheric and electromagnetic disturbances, such as auroras and communication blackouts.

On April 1 a second major flare was observed. This flare, like the previous one, ejected a cloud of plasma toward the earth. However, this flare also produced a burst of very-high-energy particles that traveled at almost cosmic-ray speed. These particles reached the earth about one hour after the flare eruption began. It is theorized that these solar cosmic particles traveled along the lines of force in the magnetic field frozen in the plasma cloud from the first flare, which still stretched from the sun to the earth. In addition to forming an express channel for particles from the sun, the plasma clouds and their strong magnetic fields can act to shield the earth from further high-energy solar particles and from galactic cosmic radiation.

To date there have been very few opportunities such as that offered by Pioneer V and Explorer VII to observe the effects of major solar storms in space as well as on the ground. The chances will be much better in the future. The US already has launched the first of a highly sophisticated group of 400-pound-plus Orbiting Solar Observatories—the OSO satellites. While the first OSO hasn't yet observed any proton showers from the sun, Dr. John Lindsey of NASA has given a good indication of its importance. The OSO has taken more than 60,000 minutes of good data on solar activity, while in all past sounding-rocket experiments using similar equipment only about fifteen minutes of data had been accumulated.

One of the major goals of solar research is to find a means of predicting precisely when a proton outburst will be directed at the earth and how intense that outburst will be. K. A. Anderson of NASA has developed a method for predicting proton events two or three days in advance. This method, based on detailed

observations of sunspot growth, is believed to be about ninety percent accurate. This is considerably lower than the reliability goal of the various major systems in the Apollo vehicle and its booster, but it is pretty good in comparison with weather predicting in the atmosphere. The US Weather Bureau is usually about eighty-five to eighty-seven percent accurate in predicting rain twenty-four hours in advance. Three days ahead, its predictions are only sixty-five percent accurate.

Several other proton-shower-prediction schemes are in various stages of development, but neither these nor Anderson's method can be tested exhaustively until solar activity picks up again in three or four years.

Three other major problems face the designers of the Apollo spacecraft and other vehicles that will travel in deep space. First, the total radiation energy expected in the vicinity of the earth and its variation with time must be known before an adequate shield can be designed. Much more data must be available before this can be done. Second, radiation doses must be calculated for men in spacecraft during particle bombardments of various intensities, energies, and time variations. The solution of this problem depends not only upon the answer to the first problem discussed above, but it is also influenced strongly by the secondary radiation created when protons react with the spaceship's construction materials. Many questions concerning the secondary radiation from a proton bombardment remain to be answered. This is a major job of the Apollo project.

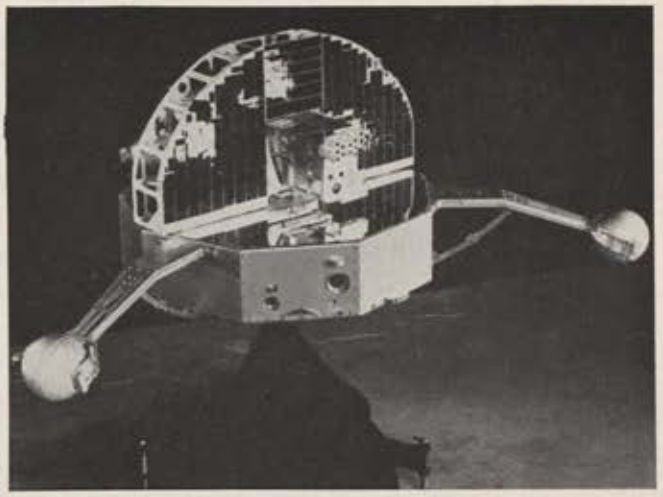
Another question in this area is directed at the biologists, who are still deciding just what effects the various types of primary and secondary radiation will have on man. There is no agreement as to just how deep the different particles will penetrate or what their biological effects may be.

All calculations of radiation doses for astronauts made today involve a sizable number of assumptions. These assumptions have to be replaced by positive information.

The third major shield design problem is the determination of just how much radiation astronauts should receive. This is the highest kind of policy question.

Someone must decide just how much space weather to protect the astronauts against. It is hopeless to talk of protecting them against all eventualities and the largest of the known solar-proton storms. This would more than double the weight of the Apollo reentry vehicle.

Even though the Apollo vehicle is being designed with an admittedly optimistic approach, some preparations for simple shielding are being made. For instance, the possibility of giving the astronauts double-wall pressure suits is being considered. These suits could be pumped full of drinking water, which is a very good proton shield, in the event of a major proton event. Larger types of "mummy-case" shields are also being considered if more protection is desired. Collapsible mummy cases would be pumped full of liquids that contain more hydrogen than water and



Orbiting Solar Observatories, OSO satellites, are the most sophisticated solar study vehicles in use by the United States. One is now in orbit, and OSOs will be orbited on a two-a-year schedule until 1966 when more sophisticated equipment will be ready. OSOs weigh about 440 pounds.

are more effective as proton shields. Finally, solid-shielding materials could be added to the sides of the vehicle, but the weight of these would probably wreck current Apollo mission plans.

Several expert opinions of the ultimate solution of the general shielding problem are presented below to illustrate the unsettled nature of the current situation.

In March 1962, Trutz Foelsche of NASA's Langley Laboratory wrote the following: "These [proton] encounter probabilities for short-time excursions [flights into deep space] are considered too high to be ignored and, as long as no reliable prediction criteria are found, an amount of shielding is recommended that reduces the dose accumulated in two or three events to tolerable limits even for expeditions of only ten to fourteen days' duration in space. . . . According to these preliminary estimates the radiation problem in space appears to be more serious than was suspected even five years ago. . . . If supplemental shielding is provided by appropriate positioning of equipment and supplies, the necessary additive weight for individual shielding should hardly surpass twenty-five percent of the space vehicle weight. . . ."

Less than a year ago, D. I. Dugas of the RAND Corporation wrote: "Manned spaceflights that are planned for the intermediate period [1967-1971] of maximum solar activity will be penalized by extra shield requirements or greater risk for the crew."

A group in a major aerospace company, using the same material as the investigators above, reached much more optimistic conclusions. Apparently most of the Apollo project leaders are in close agreement with the ideas expressed in this contractor report. The report reads as follows: ". . . the chance of encountering lethal doses due to solar-flare radiation is small, less than a few percent a week. . . . Data on the safety records of operational military aircraft indicate . . . [that this] risk is comparable, on an actual flying-time basis [168 man-flying hours per week], with the solar-flare proton hazard to missions in space. . . . Further, the other missions' risks—guidance and propulsion system failures, etc.—may dominate the total picture of hazards in spaceflight."—END

US scientists, increasingly involved in national policy either as government advisers or as private proponents of public policies they believe ought to be adopted, are essentially human beings. Their political counsel cannot be considered Olympian, but must be examined in the cold light of logic. For in the world of politics, away from the facts of the laboratory, they think—as do the rest of us—with passion . . .

SCIENTISTS, POLITICS, AND THE BOMB

By Herman S. Wolk

. . . The emergence of scientists into the mainstream of American political life is one of the great events of American history.

—*Robert Gilpin*, American Scientists and Nuclear Weapons Policy, *Princeton, 1962.*

SIX days after the atomic bomb had been released over Hiroshima, the United States government made public a general administrative and technical history of the secret atomic bomb project. Prepared by Dr. Henry D. Smyth of Princeton University, the report emphasized that the questions posed by the new atomic age were "not technical questions; they are political and social questions, and the answer given to them may affect all mankind for generations. . . ." (quoted in Richard G. Hewlett and Oscar E. Anderson, Jr., *The New World 1939/1946*, Pennsylvania State University Press, 1962, xi). Events of the past seventeen years have proved Dr. Smyth's observation.

The years since Hiroshima have been cataclysmic ones. The world has witnessed the inception of the cold war, the Berlin Airlift, the triumph of Chinese communism, the Korean conflict, the transition from the atomic to the hydrogen age, the death of Stalin, the Hungarian Revolution, and the dawn of the space age, along with a new era of weapons technology. Most serious students of mankind agree, however, that central to the world situation today are two overpowering elements: the cold war between communism and freedom, and the stark weapons reality of the thermonuclear era. It has been the convergence of these two forces that has propelled the scientist to the center of the national and world stages.

The reasons why the scientist finds himself in a peculiarly unique position in American democratic society are not difficult to find. The most obvious and important is that he has made possible the great advances into the cosmos and has provided the United States with the tools of strategic deterrence in the age of the cold war. Thus, he is at once respected and admired for his intelligence, specialized knowledge and training, and for his leadership in a realm of crucial significance to our survival. But this is only the side of the equation that has its roots in the scientific revolution; the other side is political and is a result of the eternal truth about man as a political animal.

Because men do not work and exist in a vacuum, the advances made by scientists thrust them into the maelstrom of human events and forces. The discovery of atomic fission three months after Munich; the danger that the Nazis were ahead of the democracies in building an atomic weapon; the now-famous letter signed by Dr. Albert Einstein on August 2, 1939, and addressed to President Franklin Roosevelt; and finally, the decision to build the bomb—these events contained powerful political implications. The work accomplished by scientists on the Manhattan Project in behalf of the US and the Western democracies culminated in the mushroom clouds over Hiroshima and Nagasaki and brought the Pacific war to its fateful conclusion.

- **Scientists have made possible the great advance into the microcosmos and macrocosmos, the world of the atom and deep space.**
- **Having done so, and feeling responsibility for mankind's future in a new and dangerous era, they have entered the political arena as advisers and advocates.**
- **They have divided into two main camps: those who are convinced that continuance of the arms competition will doom our planet and those who believe the nuclear risk must be taken for the sake of US deterrence.**
- **The first camp has campaigned hard for US-Soviet nuclear test cessation, disarmament, and arms control, and has given the Russians the benefit of the doubt at times.**
- **The second camp has demanded iron-clad guarantees in US-Soviet negotiations, and has proclaimed its suspicion of Soviet duplicity.**
- **Both main camps have claimed scientific documentation of their positions—but in fact their positions have been, unavoidably, passionately political.**

In retrospect, however, this was neither a beginning nor an end. It was not the start of world tranquility nor the end of bloodshed and tension.

For many scientists, it was a period of agony. While their work had played so important a part in wartime and conferred upon them prominence and power, they were restless and uneasy because of the use made of their scientific research. Dr. J. Robert Oppenheimer declared that ". . . the physicists have known sin and this is a knowledge which they cannot lose." Guilt and anger were feelings not unknown to some of the scientists. Dr. Norbert Wiener of the Massachusetts Institute of Technology refused an Air Force request in 1946 for a reprint of a paper relating to guided missile technology. Deep feelings brought scientists together in attempts to find common ground and solve mutual problems of social responsibility and moral ethics. The Federation of Atomic Scientists and later the Federation of American Scientists were founded; in 1950 a smaller group entered the pacifist Society for Social Responsibility; and in Chicago, publication of the *Bulletin of the Atomic Scientists* was begun.

The scientists had entered the "techno-political age." The meaning of the new term became more clearly defined in the controversy accompanying the decision to build the hydrogen bomb. The report of the General Advisory Committee to President Truman against a crash program on the hydrogen bomb aggravated the split between those scientists who felt the bomb should be built and those who argued that a negative decision would mirror the US desire to end the arms race. Subsequently, the revocation of Oppenheimer's security clearance by the Atomic Energy Commission and the growing debate within the scientific community over disarmament, arms control, and a nuclear test ban agreement further divided the scientists.

This cleavage has continued—and indeed has accelerated in some aspects—to the present day. Before considering the highly charged problems of the present and future, it is pertinent to ask: What have we learned from the past? The following points suggest themselves:

- American scientists *agree* that the primary goal today is that the US and the free world continue to live in freedom, that the world be spared a thermonuclear war, and that scientists continue to pursue pure research, free from constraint.
- Scientists can make large contributions to US national policy formulation.
- As a human being, the scientist holds political views as varied and impassioned as other Americans.
- The scientist has no peculiar gifts which endow him with special political insight.

(Continued on following page)

• Rapport and understanding must exist between the scientist and the politician for the benefit of national security.

• It is impossible—and undesirable—to separate scientific and political elements from the great and crucial problems of today.

• There must be greater awareness of the political context within which scientific advice is given.

• It is as dangerous to generalize about scientists as it is to attempt to categorize the military, journalists, or any other profession.

Within the context of these points, it can be seen that the full-fledged entry of scientists into politics has been on two levels: First, as advisers to the federal government or in ancillary roles as requested by the government; and secondly, as individuals or in groups lobbying for a specific point of view or legislation. The seventeen years since the US entered the atomic age have clearly shown that no matter what point of view scientists espouse, they have expressed themselves sincerely and passionately if not always effectively and wisely.

Scientists have made valuable contributions to national security in the laboratory and within the high advisory councils of government.

It has become clear, however, that in many cases scientific opinion—while honestly held—has been based upon political judgment. The now-classic example has become the negotiations with the Soviet Union on a test-ban agreement involving two eminent and highly respected scientists—Dr. Hans Bethe and Dr. Edward Teller. Bethe argued in an article in *The Atlantic* ("The Case for Ending Nuclear Tests," August 1960) almost exactly one year before the Russians broke the nuclear test moratorium that the Soviets were conducting at Geneva what he considered to be "honest negotiations." It must be remembered that Bethe's point of view was expressed following Dr. Albert Latter's discovery of the decoupling theory which showed that it would be possible to muffle or decouple low-yield blasts underground in large holes without being detected by current methods and equipment. Thus, with international controversy raging over the "big-hole" theory, Bethe posed *the* question: "Can we really assume that the Russians would go to the trouble of negotiating a test cessation treaty just in order to turn around the next day and violate it?" His own reply, based upon having participated in the talks at Geneva with Soviet scientists, was that "I believe that they are sincere in wanting the test-cessation agreement and do not intend to cheat on it."

Bethe's position—apart from scientific opinion on the big-hole theory which was unanimous in stating that it would be possible to decouple underground test explosions—rested on the political judgment that we could trust the Soviets. He felt that the risks involved were outweighed by political advantages. To Edward Teller, the risks were in fact far too great. It was, and remains, his position that "an inclusive treaty could be neither policed nor enforced. It would place the United States in the untenable position of basing our national security upon Russian truthfulness" (Edward Teller, *The Legacy of Hiroshima*, Doubleday, 1962, p. 205). Thus, the battle was joined.

Unfortunately, arguments advanced by adherents of these two major protagonists have not always been free from emotionalism, bias, and sensationalism. And again, it must be observed that many of these polemics found their rationale in political assumptions. While attacking Teller for "factual error and emotionalism," eight scientists (Jay Orear, William F. Schreiber, Gerald Holton, Salvadore E. Luria, Edwin E. Salpeter, Philip Morrison, Matthew Meselson, and Bernard T. Feld) assailed him in terms such as "madness," "incinerate your hometown," "self-deception," and "arrant nonsense." To this group, Teller's position was "preposterous" and an "escape to an insane world" ("An Answer to Teller," *Saturday Evening Post*, April 14, 1962). These scientists, following Dr. Erich Fromm, emphasized that too much of the arms-control dialogue rested on what is *possible* rather than probable. And yet, they declared: ". . . We see that the real danger is neither inadequate weapons nor unpreparedness to survive, but the *possible* triggering of nuclear war by self-deception, miscalculation, or accident." And further, "the start of . . . a massive shelter program *might* well trigger nuclear war" (emphasis supplied).

Recently, several studies (including books by Teller, Lewis Strauss, and Gen. Leslie Groves) and movements by scientists themselves have pointed to even more political activity by segments of the scientific community. Also, the Kennedy Administration has clearly indicated its intention of bringing more scientists into government. In addition, the Congress of Scientists on Survival held its first national conference on June 17, 1962, and attempted to devise a program for survival in the nuclear age. According to Washington *Post* reporter Howard Simons: ". . . All attempts to define the basic aims of the organization or to pass substantive resolutions on a wide range of challenges met with emotional debate and counterdebate" (Washington *Post*, June 18, 1962).

At the same time, Dr. Leo Szilard, an eminent atomic scientist who convinced Einstein that he should write the letter which resulted in the formation of the US atomic-bomb program, has proposed a lobby which would bring scholars and scientists to Washington. In an attack on US national policy and majority opinion, Szilard stated that people brought to Washington by the lobby should "have sufficient passion for the truth to give the truth a chance to prevail." While a number of US senators possessed insight into the world situation and were concerned about it, "mostly they lack the courage of their convictions," according to Szilard. It was his opinion that since "in Washington, wisdom has no chance to prevail at this point," what was desperately required was "the sweet voice of reason" (Leo Szilard, "Are We on the Road to War?" *Bulletin of the Atomic Scientists*, April 1962).

Possessed of a fertile imagination, Szilard had earlier proposed—in the form of fiction, but with seriousness, irony, and some sarcasm—a system of "mined cities," whereby fifteen large American and Russian cities

(Continued on page 48)

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would be mined with underground hydrogen bombs. Fortresses located under American cities would be manned by Russians and vice versa ("The Mined Cities," *BAS*, December 1961). Scientists' activity in behalf of peace movements—sometimes bordering on the pacifistic—is a direct result of guilt feeling over the use of the bomb and a sincere, idealistic drive to find a way out of the "arms dilemma." Dr. James R. Killian, Jr., has suggested an eleven-point program for putting science to work for peace. He stresses international activities, "primarily peaceful and benign . . . managed by nonpolitical, private, scientific organizations." To Killian, science and peace are inseparable and call for world scientists and engineers "to deploy themselves for peace" (*BAS*, March 1962). Similar peace programs are based on the assumption that international scientific activity can always be counted upon to be nonpolitical.

While political activity and debate by scientists has increased, the government continues its efforts to give science a wider role in policy formulation. The State Department, in July 1962, began a reorganization of its scientific activities designed to incorporate the Office of the Science Advisor into the mainstream of department policy-making. The change, according to State, reflected the growing importance of science in foreign policy which received great impetus coincident with the orbiting of Sputnik I on October 4, 1957. C. P. Snow, the English novelist with a wide background in government, science, and the academic world, recently called for greater numbers of scientists in all levels of government. Snow feels that scientists are "future directed," possessing foresight that our kind of "existential society" badly lacks (C. P. Snow, *Science and Government*, Harvard, 1961, pp 80-84).

While we may agree with Snow that more scientists are required in government to counter the pull toward a *status quo* existential society, it would be a serious mistake to suppose that this would solve all our problems. A balance must be maintained. We must be careful not to overweight the scientific.

These many events, ideas, and words point in one direction: The scientist in general, and the nuclear scientist in particular, has come of age politically. We have noted that while scientists often base their opinions and advice on a combination of scientific-political factors, their political acumen and wisdom are not necessarily superior to those of nonscientists. Although Mr. U. Thant, Acting UN Secretary General, insisted that scientists objecting to US atmospheric tests had "no axe to grind" (New York *Times*, June 6, 1962), evidence indicates that, while scientists should be listened to and respected for their opinions on politics and international affairs, their insights here are not necessarily any more correct than yours or mine.

Despite divisiveness in the scientific world—not all of it undesirable by any means—it would be misleading to rigidly attempt to categorize scientists on every issue. For example, Teller and Szilard—worlds apart on many crucial contemporary questions—agree that mutual deterrence is doomed to failure. Teller feels that mutual deterrence is unworkable and "will fail because the policy does not consider the very different aims of the United States and the Soviet Union" (*The Legacy of Hiroshima*, p. 233). Szilard declares that continued testing, the arms race, and deterrence are leading us to war "and that our chances of getting through the next ten years without war are slim" (*BAS*, April 1962).

One of the ironies of Teller's position is that although he is accused of being a bomb rattler, his position that we should not retaliate even once we have certain unequivocal information that enemy bombs are on the way, is even more extreme than many of those who attack his views (see *The Legacy of Hiroshima*, pp 262-263).

However, Szilard and Teller—reflecting in general the two camps of scientific thought—hold markedly different philosophies on the meaning and direction of nuclear-weapons technology. Szilard states categorically that war is inevitable. Teller holds that "the only absolute likely to defeat us is fear, the persuasion that we cannot escape." To Edward Teller, "the human race, at the end of our century and beyond, will still be here" (*The Legacy of Hiroshima*, pp 238, 308).

The question, therefore, is not so much the control of the physical universe as it is the wisdom of the human being as a political animal. We cannot impede technical progress nor can we turn the clock back to what is mistakenly referred to as the uncomplicated "good old days." One thing we may be sure of, despite the cassandras—it most certainly is not inevitable that planet earth will be incinerated by nuclear war. Those who give us the choice of complete disarmament or all-out thermonuclear war are as guilty of rampant oversimplification as those who envision the choice as either surrender or hitting first with everything we have.

Both viewpoints are products of the mind that fit "the facts" of the contemporary world to rigidly held conclusions, myths, and dogmatisms. The future belongs to those of another persuasion—the people who believe that man was given the power of reasoning to accept challenge, to solve his recurrent problems, and to build a better world in which freedom remains the essential rationale for living.—END

Herman S. Wolk, a historian at Strategic Air Command headquarters, Offutt AFB, Neb., will be familiar to readers of AIR FORCE/SPACE DIGEST *as author of "Deterrence Under Fire," and "The Case Against Our Armed Forces," which appeared in the March '62 and December '61 issues of this magazine. A native of Springfield, Mass., who has taught history in the public schools and worked in the Armed Forces Information and Education program, Mr. Wolk holds degrees from American International College, Springfield, Mass., and has done work toward his Ph.D. at the University of Washington. He recently finished work on a book on strategic weapons.*

THE SPACE AGE IN PERSPECTIVE

SPACE DIGEST

VOLUME 5, NUMBER 10 • OCTOBER 1962

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A distinguished legislator warns that our present space program provides little assurance of US development of military space capabilities. Senator Cannon urges that we extend the deterrent formula into aerospace and lists important priorities in achieving space-age superiority . . .

Needed: A Space-Age Platform for US Strength

BY HOWARD W. CANNON
United States Senator from Nevada

UNFORTUNATELY the present direction of our national efforts in space gives little or no assurance that attention is truly directed to the development of our military capabilities. In contrast, we should ask: What military capabilities should we be seeking to develop in the space medium? We should analyze the adequacy of scope and urgency of our military space endeavors. Clearly, we ought to have an energetic development program under way, adequately supported with funds, to find means to defend ourselves against attacks that could come from hostile orbiting space vehicles. To the best of my knowledge no defense whatever exists at this time against any military attack that might be made from the space region, even though such attacks are within the present capability of the Soviet Union. But as always in questions of national defense and national security, more than purely defensive means are necessary, for it is axiomatic to military strategy for a nation to be able to exploit the offensive and force the enemy into a defensive posture. There appears to be no indication that this elementary concept should be changed in its space application. The military forces of the United States must be able to exploit space in every way by which their military missions can be more effectively performed. This means that military vehicles of many types—both manned and unmanned—should be able to operate actively as well as passively, thus enabling offensive as well as defensive military capability in space.

One might be tempted to believe that the primarily scientific type of space exploration now being executed by the United States would provide sufficient and timely answers to the military needs in space. This is by no means true. As a very simple example, it is quite acceptable to delay the launching of a scientific space vehicle while awaiting improved weather conditions, or while making exhaustively careful checkouts of the space vehicle. But the true military type of space vehicle must be ready at all times to respond immediately to threats or aggressive action. It must, therefore, be developed along significantly different lines than its scientific parallel and possess different characteristics. Further, the kinds of equipment needed for a scientific expedition to the moon are totally different from the equipment needed to intercept and destroy a hostile satellite. The latter is a military mission involving a combination of responsiveness, military personnel, tactics, techniques, and space weapons having unique characteristics not required in the civil space program. Military tasks frequently require routine and repetitive operations and, therefore, low costs, high reliability, and, if possible, reusability. Military tasks require quick reaction, positive control, and the ability to operate in a combat environment. In space, they will require the ability to maneuver in orbit and upon reentry, to accomplish a conventional landing, to be refurbished for reuse, and to incorporate weapons. These factors have significantly different and far more stringent implications than those which are acceptable for scientific, commercial, or prestige missions in a friendly or nonhostile environment.

For more than a decade, our US military forces have been the principal deterrent to global war. Why? Because they were better able to perform their mission in any medium and to do it better than the forces of any potential global aggressor. On the surface of the earth, in the air envelope, and on and under the seas of the world our forces have been superior. Continuing peace has been the result. Is this a formula we should now abandon in space by default, by inaction?

If we do not wish to abandon that successful formula, we must ensure provisions to be militar-

ily superior in space. Can this realistically be accomplished by having ready no more than a base of scientific knowledge upon which a structure of military capability can be built only after the need becomes apparent? Not in an age when the time required to execute a devastating attack through space is measured in minutes. We cannot build a military defense in minutes. Therefore, are the actions necessary to develop military capabilities in space to be delayed or in any way inhibited? Should this nation continue to devote billions for a space research program that has inadequate or tardy application to national security? If so, we could become the best-informed nation on space science to be destroyed by hostile military capabilities of the Soviets who are capitalizing on our diligent but time-consuming scientific search.

What should be done about this situation? In reviewing testimony given by military authorities to the Congress, I see adequate evidence that the military services recognize that they have military missions to perform in space and could move rapidly toward a capability actually to perform them. On the other hand, I see no evidence that there is a national, authoritative intent to accelerate the earliest practicable development of urgently needed military capabilities. Where, for example, is the necessary project to develop a means of intercepting, inspecting, and destroying, if necessary, hostile satellites that could bear supermegaton bombs down upon us? I understand that such a development program, though advocated by the military services, has been specifically delayed by civilian officials of the Defense Department. Above all, where is the development program that will exploit the operational capability of military men in space, rather than merely exploit them as the heroic tools of science? Where are those many development programs which would enable the US military forces to operate in space so as to ensure the safety of the country and provide support for our international policies?

In my opinion, we have gone seriously far beyond the time when we must recognize the need for the establishment of a national military space posture. We must formulate and announce a US declaration not only of "space for peace" but should include "space for ensuring national security." Clear announcement of this intent would remove the inhibitions under which the Department of Defense is now laboring and allow them to identify and establish the necessary broad goals within which the military can develop both near-term space systems and the technology for the future. In comparison to the currently approved multibillion dollar, ten-year program of our civilian space effort to get to the moon, I see no clear-cut objectives for security forces in space. We cannot progress if we continue to follow a double-negative philosophy—a philosophy which indicates on the one hand that "since there are no clear military requirements, there is no justification for expenditure across a broad technological front," but on the other hand that "since technology does not demonstrate full feasibility of weapon system development, such development is not warranted."

I am concerned over the failure of our military space programs to keep pace with both technology and security requirements. In this respect, it is my understanding that we do not today have any approved space weapon systems under operational developments that will enable the US to destroy hostile satellites over the free world and to protect our very heavy investment in peaceful, scientific, and commercial operations in space. While I do not presume to know in detail what our defense operational posture should be, I believe that the following are in general the minimum essential required defense capabilities:

- **First:** to conduct near-space operations using manned maneuverable vehicles capable of self-defense and having the capability of conducting offensive, defensive, and passive support missions.

For example: Dyna-Soar [X-20]. While specifically a test bed, this project is critically important to the attainment of effective manned military capabilities in space.

Such a vehicle is needed to demonstrate the feasibility of rapid launch capability, maneuverability in space, maneuverability during reentry, precision recovery with conventional landing, reuse, and the ability to incorporate weapons.

- **Second:** develop a standard National Space Launch System in support of military requirements with application to the civilian requirements of our over-all national space effort. This I understand we are now initiating; however, it is essential that we exercise a greater sense of urgency and not delay the program with excessive study.

For example: Titan III. Approve and accelerate the recommended Titan III development which will fill the payload gap in the 5,000- to 30,000-pound-payload range which exists between the present Atlas-Agena and the projected Saturn C-1 capabilities.

This performance will meet the requirements of the orbital Dyna-Soar mission without restraints and with adequate safety margin. It will provide

the basis of advanced technology required by the Air Force and support of its development responsibilities to NASA in the conduct of the very large solid-booster program.

• **Third:** to conduct near-space operations using unmanned satellites with the capability of performing military communications missions.

For example: Lightweight, multiple-launch active satellites can be used, until such time as more sophisticated systems become available, to provide essential continuity of command and control and to preserve the intelligence communications channels required to support the exercise of command. The elements of command include the President; the Secretary of Defense and the JCS; the unified and specified commanders in their permanent, mobile, or alternate command posts; and commanders having custodial and final weapon-delivery control, including army forces, ground, naval, and air task forces. The requirements for secure communications are vital and are separate and distinct from commercial applications, whatever common foundation of technology must be drawn upon.

• **Fourth:** to establish and operate greatly improved earth-based installations for tracking and controlling friendly vehicles and for the detection and tracking of potentially unfriendly vehicles.

For example: Space Detection and Tracking System (SPADATS) needs to be expanded and brought up to a greater operational capability to keep pace with the expanding space programs worldwide.

• **Fifth:** to establish and operate in-space facilities for applied research and development testing.

For example: A Military Orbital Development System for the purpose of providing an orbital space test station whereby space vehicle components and subsystems may be tested in the actual space environment, which cannot be fully duplicated on earth. The training and performance of in-space supply, maintenance, crew rotation, and rescue missions can also be integrated through the use of the orbital test station.

• **Sixth:** to conduct in-space bioastronautics experiments through the employment of an orbital space satellite.

For example: The military's Bioastronautics Orbital Space Satellite program, designed for the determination of the feasibility of extended manned military operations in space through exposure of selected biological payloads to the space environment, needs to be pursued as soon as possible. This will enable us to better understand and cope with the effects of long-term weightlessness, radiation, and isolation.

I am fully aware that all of the required defense capabilities cannot be attained either simultaneously or within the present technology. However, where technology does permit, the necessary military space systems must be developed on a priority basis. Where technology must be advanced, vigorous basic research, applied research, and advanced technology programs must be conducted, drawing upon the full resources of science and industry to ensure that the full potential of military space systems is realized as soon as possible.

The principle objective of these actions is the gaining of time—time that will permit all of us to make added and continued efforts to reduce the aggressiveness of the Soviets and to remove the insulation of the Russian people from the rest of the world; time to conclude appropriate agreements whereby our two nations may mutually undertake cooperative space projects and to seek other areas of common interests; and lastly, time to develop an atmosphere of international good will and trust which may someday, preferably within the United Nations, provide the political basis for more permanent peaceful relations between nations.

The emergence of the nuclear bomb and the ballistic missile has completely disrupted the balance between time, space, and destructive power. However, through the establishment of a strong military space deterrent force we can provide an improved climate of security and stability in which to pursue our ideals and goals in the critical issues of disarmament, arms control, space cooperation, and others that face us. While we must recognize and continue to strive for these essential goals, we must also provide an adequate foundation of strength for our political will and resolution. This foundation for the future can only be provided by an appropriate and timely extension of our military deterrence into space.—END

Elected from Nevada to the US Senate in 1958 as a Democrat, Senator Cannon is a member of Senate Committees on Aeronautical and Space Sciences and Armed Services. A World War II decorated air veteran, he is a brigadier general in the Air Force Reserve. The Senator was a major participant in last month's AFA Convention. The above article is condensed from a widely quoted speech delivered on the floor of the Senate by Senator Cannon, August 20.

SPACE DENIAL

—An Amplification

Exchanges between a SPACE DIGEST *author and two critics*

DR. ALTON FRYE'S article, "Breaking the Cold-War Stalemate: A Proposal" (SPACE DIGEST, July '61), in which he suggested the US deny Soviet access to space pending proof of the peacefulness of Soviet space missions, has elicited much comment. Following are excerpts from two significant responses to Dr. Frye's article and his replies:

• • •

● . . . DR. FRYE PROPOSES that "if the Soviets refuse to provide reasonable guarantees of their good faith in the exploitation of outer space, then we should do our utmost to deny them any access at all to the area." Couched in these terms, I submit that this is equivalent to suggesting that the United States should be permitted to —or indeed, is obligated to—destroy Soviet ships on the high seas. I believe that the legal constraint against interference with shipping on the high seas is a principle to which the United States would choose to adhere.

The proposal is far more acceptable where it is phrased such that the USSR should be denied access, not to space per se, but to space from which the continental United States could be attacked. Rather than an unwarranted assumption of sovereign rights in all of outer space, the argument then is more clearly in terms of justifiable self-defense. The principle of protection of territorial integrity was recognized by the Soviet in the U-2 and RB-47 cases.

But even though legal justification may be found, other factors must be considered. For example, the author dismisses an enormous question by concluding that it is unlikely that the Soviet would respond by launching a nuclear attack against the United States. What of other forms of reaction? Contrary to Dr. Frye's belief, I think that the Soviet would feel compelled to react in kind, regardless of the extent of US overtures for cooperation. Even if no military reaction is undertaken, the pursuit of this policy by the United States could be exploited to great lengths for propaganda purposes by the USSR. A first strike of this kind could easily be portrayed as overt aggression.

It is hardly realistic to assume that the Soviets would agree that "after all, we are not threatening a direct assault on the Russian homeland or other vital interest. . . ."

GEORGE KENT
Scientific Analysis Corp.,
Concord, Mass.

DR. FRYE RESPONDS:

My article contained a number of net political assessments which are obviously subject to debate and I welcome Mr. Kent's observations. The law of the sea *may* be a valuable analogy for a legal order in outer space, and I would in no way wish to suggest that the US should disrupt the existing legal regime on the high seas. There is, however, no guarantee that rules and practices which have proven effective on the seas will be extended to the new ocean of space.

Unlike the historical context which permitted and encouraged the growth of traditional international law, the magnitude of contemporary dangers to national and international security and the fantastically accelerated tempo of technological advance do not allow us the luxury of an evolutionary approach to the law of outer space. The unique circumstances of our age demand formal, enforceable arrangements to govern access to and activities in outer space. . . .

I agree with Mr. Kent that legal considerations, although relevant, are less important in this case than the political factors. The article indicated my conclusion that the Soviets would be too realistic to offer utterly disproportionate military response (*e.g.*, a total nuclear attack on the United States) to interception of their satellites. Any propaganda advantage the Russians might gain from the situation could hardly outweigh the substantial increase in global security which I believe would result from the proposed American initiative.

I question whether we can ever hope to attain "good will and a true spirit of cooperation" between the cold-war antagonists until we overcome the suspicions and hostilities which underlie their present hostility toward one another. The fundamental purpose of my discussion was, in the final analysis, to promote the exchange of certain minimal information which would help stabilize the present arms environment by restricting deployment of weapon systems in outer space and which would eliminate some of the awesome uncertainty now beclouding East-West relations. I remain convinced that, in the pursuit of such an urgent goal, we must not overlook the political utility of an effective interception system.

● . . . DUE TO THE DIFFERENT configuration of the American military posture vis-à-vis that of the Soviet Union, and the considerable variation in the openness of the two societies, would not a mutual denial of satellite capability be much more of a detriment to the United States than to Russia, and hence a circumstance to be carefully avoided? This would seem particularly so in regard to reconnaissance satellites used to pierce Soviet secrecy in quest of intelligence information, communications satellites serving as links in the military command and control networks, navigational satellites required for the accurate positioning of various components of weapons delivery systems, and mapping satellites employed to gather precise targeting data. Dr. Frye might respond that it should be possible for the US to have its cake and eat it too. Extending the remark, Dr. Frye could cite the suggestion made by Robert Strausz-Hupé *et al* that, should the American taxpayers choose to underwrite the effort, the Soviet Union could literally be priced out of the arms market. Ignoring the risks attendant with propelling the current arms walk into a real race, a person could logically suggest that one policy which such financial resolve could open up might be the simultaneous expansion of American satellite capability, even in the face of determined Soviet degradation attempts, and the denial of space access to the Russians. Whether the American people would be willing to support the required tax burden for such a venture is difficult to predict.

Dr. Frye's apparent suggestion that the US can place the Soviet Union in a clear-cut either/or situation—either they accept American inspection demands or they will be denied access to space—may be a misleading simplification. The point here is that it may be one thing to undertake the denial of satellite capability to the Soviets and quite another matter to deny them access to space beyond the relatively narrow area surrounding the earth in which earth satellites normally operate. The violence required to accomplish the first objective would likely take place above the earth and often above American territory, or at least not over Soviet territory. As Dr. Frye mentioned, the destructive acts committed above American soil might be expected to be justified in some manner as legal action against international trespass. The violence required to prevent Soviet space probes to the moon, or to other bodies located deeper in space, would appear to require either the destruction of launching facilities in the Soviet Union or the destruction or deflection of booster vehicles above Soviet soil. Destruction of Soviet satellites over American territory, or other non-Soviet territory, could be expected to be carried on with moderate risk of precipitating more than reciprocal violence directed at comparable American satellites. The destruction or deflection of Soviet booster vehicles above Soviet territory, or the destruction of Soviet launching facilities, must be viewed as a provocative venture involving high risk of an ensuing escalation to greater violence. A further consideration regarding the latter type of action would be the difficulties which such activity would create between the US and its allies and the neutrals. . . .

Even if the United States should settle on only a satellite denial policy, refraining from interference with space probes, the policy could be ineffective. Should the Soviet long-run intentions be directed primarily at the moon and deeper space probes . . . an American satellite denial capability might come too late to serve a useful coercive purpose. The point here is that by the time the US had developed the capability for destroying Soviet satellites, the Russians might have advanced to a position where a large part of the earth satellite program would have served its primary purpose. . . . In order to assert effective coercion the US would, in these circumstances, need to attack the deep-space Soviet activity. Some of the disadvantages of this type of denial policy have been mentioned.

The legality of Dr. Frye's proposal, and this dimension may continue to constitute an important facet of American foreign policy, is shadowy. As mentioned above, one may be able to make a reasonable legal case for destroying alien satellites above one's territory. To justify legally the destruction of another's satellite which is not over one's territory or, worse, to prevent a nation voyaging into space would seem to be extremely difficult. . . .

There is some basis for believing that the most urgent reason for the speedy development of an American capability for satellite denial is the possible emergence of a Soviet capability to place large nuclear weapons into earth orbits. Such a weapon system might hold chilling possibilities. Donald Brennan has suggested that the most disturbing of these is the use of orbital bombs in a countervalue attack. He stated that the explosion of a several-hundred-megaton bomb at 150 miles above the earth would be likely to incinerate large portions of a continent. In addition to the thermal effects of such a weapon there might be substantial disruption of communication and radar activity, for relatively short periods of time, in the general vicinity of the explosion. . . .

If the Soviets do indeed have the ability to construct and operate large orbital bombs, then the development of an American capability for destruction of such weapons appears mandatory. If for no other reason, it appears mandatory because the American people will probably view the presence of such weapons over their communities as absolutely intolerable. . . .

Perhaps Dr. Frye's proposal ". . . if the Soviets refuse to provide reasonable guarantees of their good faith in the exploitation of outer space, then we should do our utmost to deny them any access at all to the area" should be diluted in the following fashion: We approach the Soviets with the proposition that they join in conserving money and manpower and decreasing world tension by pledging that further development of orbital bombs, satellite inspection systems, and systems designed to deny space capabilities be terminated. As a guarantee of the pledge, ground inspection would be permitted to the extent necessary. Failure to agree would result in an expanded American effort to develop satellite inspection techniques and the coupling thereto of a satellite destruction capability.

In assessing the likely acceptability of such a proposal, one must consider the probable acceptance of what would, in effect, amount to both changes in, and preservation of, the *status quo*. In regard to the former, ground inspection would be a change in the *status quo* which the Russians have repeatedly characterized as being a ruse for American intelligence activities. However, if they were faced with the probability of aerial inspection of their satellites, the Soviets might change their minds. Ground inspection would also mean that the Kennedy Administration-enforced secrecy upon American military satellite programs would be pulled aside for Soviet inspectors. Both sides would have to accept the discontinuance of whatever AICBM systems are now undergoing research and development. In the US such possible programs as BAMBI, pellet distribution, and laser beam deflection would be prevented. The *status quo* would be preserved in the sense that intelligence gathering, mapping, navigational, and communication satellites would continue. Since the US seems to rely more upon such satellites than does the Soviet Union, the former would appear to gain more from their continued existence, perhaps at the expense of the latter.

If the consequences of the proposal as diluted are unacceptable to the United States and the Soviet Union, as they well may be, the United States would seem well advised to continue its work upon the development of a satellite inspection system and add thereto a satellite destruction capability. The only prerequisite would seem to be reliable knowledge that the Soviets are developing orbital bombs, satellite inspection systems, or space denial systems . . .

ROBERT M. LAWRENCE
The Hudson Institute
Harmon-on-Hudson, N. Y.

DR. FRYE RESPONDS:

. . . You have raised, in a most insightful manner, several of the principal difficulties which one must consider in evaluating the strategy outlined in the article and which my brief discussion did not fully explore. Let me preface my response by simply noting the fundamental premise upon which my proposal is based: In a world of rapidly accelerating risks for all nations, we should ponder whether, by accepting somewhat greater risks at this stage of the contest, we can prevent the tempo of violence from attaining that level of frenzy which will be totally beyond anyone's control. The value of the goal—an effective arms control system which first stabilizes and then reduces the dangers to

all members of the international order—certainly makes it worth our while to study such alternatives.

I am encouraged to learn that on many points our thinking overlaps and I feel that the modified plan which you have described would be eminently useful. However, our estimates differ in a number of respects. . . .

In view of the potential high utility of various satellite systems for the US, one is strongly tempted to conclude that the advantages of mutual satellite interception would lie with the closed society. But this conclusion does not in my judgment, take adequate account of the enormous political value which the Soviet Union attaches to its space program. As Arnold Horelick of the RAND Corporation has brilliantly demonstrated, political exploitation of the Russian space effort is a central element in the Kremlin's total strategy for the cold war. The Soviet Union's accomplishments in outer space signaled more than revolutionary progress in a single realm of technology. They immediately brought into question America's long-standing superiority in science and technology and seriously undermined confidence in Western military supremacy. Having reaped such a harvest of political gains and enhanced prestige, and with the expectation of similar profits from comparable performances in the future. Soviet leaders would not, I believe, share the view that their advantage would lie in mutual deprivation of satellite operations. It is the Soviets' appraisal of the relative costs and advantages which I expect to produce a more reasonable attitude on their part and a greater willingness to cooperate in the minimal degrees which I have specified (prior announcement of all space launchings, international inspection of all payloads, and international observation of all launchings).

In short, I doubt that *the Soviets* would believe they were really benefiting from a stalemate which would prevent them from operating in space. Even should a standoff develop, I think a good case can be made that the US is likely to enjoy a net increment to its national security through retention of the *status quo*. It is very debatable whether the benefits which this country would reap from the proposed satellite systems (in particular, the "opening up" of the Russian heartland by means of reconnaissance satellites) would match the multiplication of dangers inherent in the large-scale deployment of space-based weapons by the Soviet Union.

You have quite properly called attention to the distinction between interception of earth satellites and interception of other space probes. For some time to come, the greatest military threats will probably involve operations in near-space. Should we be able to keep track of weapons functioning from deep space, our warning time should be proportionately greater and we should have relatively more time in which to mount an appropriate response. Accordingly, the most urgent need is for an earth satellite interception capability, preferably one which could also neutralize weapons which were approaching the earth after originally being stationed farther out in space. My basic concern in the article was, in fact, a satisfactory defensive system for the regions near the earth.

I think you have overlooked a technical characteristic of space probes which would make them equally vulnerable to legitimate interception. Many such missions will no doubt begin from a parking orbit around the earth. For example, both the [Russian and US efforts to probe Venus were launched from] earth orbit. Although the technology is extremely fluid, prospects are for continued dependence on parking maneuvers. . . . During this phase of their missions, space probes are subject to the same charge of trespass which applies to other earth satellites, and my original argument for the legitimacy of interception should hold. I do not anticipate that interception would take place above Soviet territory, and so the level of violence should remain tolerable.

The issue of legitimacy becomes truly difficult, it seems to me, in the cases of probes launched directly (which, as I have said, should be relatively rare) and of earth satellites in equatorial or near-equatorial orbits (*e.g.*, synchronous satellites) which do not pass over American territory. Depending on the known or assumed menacing character of the vehicles, we might draw on the anology of the American "security zones" which extended hundreds of miles into international waters during the second World War and claim that overriding interests of national defense justified their interception beyond the accepted areas of national sovereignty. This would hardly appeal to our sense of propriety in international relations, however, and I hesitate to endorse such a course of action at the present time. It is conceivable, of course, that equatorial satellites launched from Soviet territory would violate American territorial jurisdiction prior to executing the "dogleg" necessary to inject them into their planned orbits. They would then be legally subject to attack during the initial phases of their flights.

The legitimacy of our interception activities is of understandable importance to us since, after all, genuine respect for legal processes and institutions is one of the features which distinguishes us from our competitors. It is also one of our chief assets in the ideological struggle with the Soviet bloc, and I would never wish to weaken the American posture by indiscriminately throwing over the practices which we have traditionally revered. For these reasons I am not prepared to extend the argument beyond defense of territorial integrity. Relying on this principle alone, I believe we could interrupt a sufficient percentage of Soviet space operations to accomplish the purposes set forth in the article.

It is my judgment, based on some familiarity with the various systems now being investigated, that a vigorous effort can give us an operational and moderately effective interception capability for use against vehicles orbiting near the earth much sooner than is commonly thought. Even should this relative optimism prove ill-founded and a longer period of development be necessary, the technical factors which I have mentioned (*e.g.*, parking orbits) make it unlikely that the changing nature of the Soviet space program would render a workable interceptor ineffective by the time it was installed. A large proportion of space missions—especially on the ominous military activities with which we are concerned —will continue to involve orbits of the earth.

The alternative proposal which you have devised seems to me to mesh rather well with my argument, and I would favor its adoption as a hopeful preliminary step. It is possible that your plan, operating at a considerably less intense "threat-level" than mine, could achieve our common goal, a reasonable degree of international inspection of space vehicles to ensure the peaceful nature of activities in outer space. Should an approach to the Soviets along the lines you have described turn out to be successful, then my proposal would be unnecessary. I certainly agree that, as an initial effort, we would do well to pursue such a policy. I do not think we should suspend full-scale research on interception devices unless and until we had firm assurances that such a plan would be accepted by the Soviet Union.

If the Soviets remain adamant in their refusal to provide acceptable evidence of their good faith, then I believe my original concept has much to recommend it. —END

As the Administration, on the international scene, struggles to avoid a spiral of the arms race into space, the adequacy of military space programs has stirred controversy on Capitol Hill and is blossoming forth as a 1962 election issue . . .

MILITARY SPACE:

How Much Is Enough?

BY WILLIAM LEAVITT
Associate Editor, AIR FORCE/SPACE DIGEST

IS THIS country risking its very survival in the space age by "going slow" on the development of operational military space capabilities to counter potential Soviet threats or even surprise attack from the void? And how slow are we going, really?

These questions, brought into sharp focus by the twin orbitings in August of Red Cosmonauts Nikolayev and Popovich, have heated the otherwise dull dialogue on Capitol Hill, put the Defense Department on the defensive, and are already blossoming forth as major political issues in the November elections. They are giving the Administration a sizable headache and without a doubt have caused another round of re-reviews as to how vigorously US deterrent power ought to be extended into the aerospace.

The division of congressional views on the adequacy of US military space efforts does not follow strict party lines. But politics in an election year being what they are, Republican "outs" may be expected to extract as much political capital as possible from an issue that involves the defense of the nation. Thus far, Senator Barry Goldwater, of Arizona, leader of the Republican conservative wing, has led the GOP attack on the current US space program, calling for greater stress on military space capabilities and less reliance on defense fallout from the National Aeronautics and Space Administration's Apollo moon-landing program. Senator Goldwater is by no means alone among Republicans in his critical attitude. Senator Alexander Wiley of Wisconsin has been critical too. And the Republican National Committee has issued a broadside proclaiming military space efforts have been neglected.

Ironically, the most vigorous critical blast yet has issued from a Democrat, Nevada's Senator Howard W. Cannon (*see page 51*). Other Democrats, notably Connecticut's Thomas J. Dodd, have also taken sharp aim at the Administration's program. Senator Dodd's views are similar to those of Senator Cannon. Senator William Proxmire of Wisconsin has expressed himself primarily in terms of what he considers the profligate use of scientific talent and federal funds for a moon program which he says he thinks is important but still ought to be looked at in the light of national priorities. But he, too, raises the question of defense.

"What most people overlook is that whereas we're spending an enormous amount in the coming year—nearly $4 billion on space—none of this is for defense," Mr. Proxmire has said.

This statement is in sharp disagreement with reiterated arguments by NASA and Defense Department officials that the NASA moon program will provide defense-capability fallout.

These vigorous congressional attacks have spurred defensive replies. The most recent and widely quoted response was by the Chairman of the House Committee on Science and Astronautics, Democratic Representative George P. Miller of California.

In a September 6 speech on the House floor, Chairman Miller, whose purview is primarily NASA, denounced criticism of the space program as a "strident clamor . . . leaving the public with the impression that our national space program is wasting its substance in visionary scientific puttering while our military effort in space starves for lack of financial food and bureaucratic affection."

In biting terms, the space committee chairman taunted Senators Cannon and Goldwater as "good Air Force Reserve generals"—leaving the inference that the Air Force was selfishly sniping at the present space program. "The Defense Depart-

ment says it is not ignoring the military potential of space, but is bringing that phase along as rapidly as conditions warrant. When more should be done and *can* be done . . . I am confident it will be done," the California Democrat asserted. His own analysis of the current space program, he indicated, convinced him all basic needs, civil and military, are being met.

The space panel chairman cited figures to prove that the total military expenditure for space, to date, has been some $4.819 billion. Into that tally he fed even the old Vanguard program. In view of the fact that a policy decision was taken *not* to use military hardware for the original International Geophysical Year US satellite effort, that seems hardly to qualify as a military space expenditure. Naval personnel and funds may have been used for Vanguard rocket development, but it is really reaching to factor it into the military space expenditure total.

In his speech, Mr. Miller talked of semantic confusion and accused space-program critics of that shortcoming, but a careful reading of his text suggests it was the Chairman who was troubled with semantics. In one section of his speech, he minimized the Vostok III and IV achievement, saying the Soviet feat did not signify a weapon in being (which no one had suggested). A few paragraphs later, he acknowledged that we must not "overlook the fact that the Soviets have now demonstrated two important capabilities—*one*, that they have sufficient launch facilities and rocket reliability to launch two manned spacecraft within a short time; *two*, that they have the ability to time launches with great precision." He added: "These capabilities are an important step toward the development of the rendezvous and docking techniques which will be of great value in achieving many advanced objectives in space exploration, some of which may have *potential military value*" [*our italics*].

In a recent and far-less-noticed speech in Washington not long after Vostok III and IV, Dr. Arthur Kantrowitz of the Avco Corporation also addressed himself to the significance of the recent Red feat. He pointed out, far more logically, that even if the Russians are still using their same old superbooster and haven't got a more powerful one in business yet, they are still probably not far from the capability of linking up space station components in near-orbit.

With legislative battle joined, where does the Administration stand in the face of demands that the military be given at least equal partnership in the growing space enterprise—for reasons of national security?

On the edge of a precipice, is probably the most accurate answer. Uppermost in the Administration's mind seems to be a potentially horrific future featured by Russian and American bombs circling in orbit, further unnerving an already neurotic world.

Under the stresses of Vostokmanship, the Administration will apparently follow an ambivalent course:

- Moderately increase militarily significant space programs (Dyna-Soar or X-20, Samos, military test station, Satellite Inspector efforts may possibly be upped in priority and pace).
- At the same time attempt to convince the Soviets of the dangers of a space arms race in the hope the Russians will eschew the expense and mutual risks involved.

The most significant policy statement in this vein was the September 5 speech of Deputy Defense Secretary Roswell L. Gilpatric to an industry-university audience at South Bend, Ind.

"The US believes," the Deputy Secretary said with White House blessing, "that it is highly desirable for its own security and for the security of the world that the arms race should not be extended into outer space, and we are seeking in every feasible way to achieve that purpose. Today there is no doubt that either the US or the Soviet Union could place thermonuclear weapons in orbit, but such an action is just not a rational military strategy for either side for the foreseeable future.

"We have no program to place any weapons of mass destruction into orbit. An arms race in space will not contribute to our security. I can think of no greater stimulus for a Soviet thermonuclear arms effort in space than a US commitment to such a program. This we will not do.

"At the same time that we are pursuing cooperative scientific efforts in space through the United Nations and otherwise, we will of course take such steps as are necessary to defend ourselves and our allies, if the Soviet Union forces us to do so. This is in accordance with the inalienable right of self-defense confirmed in the United Nations charter."

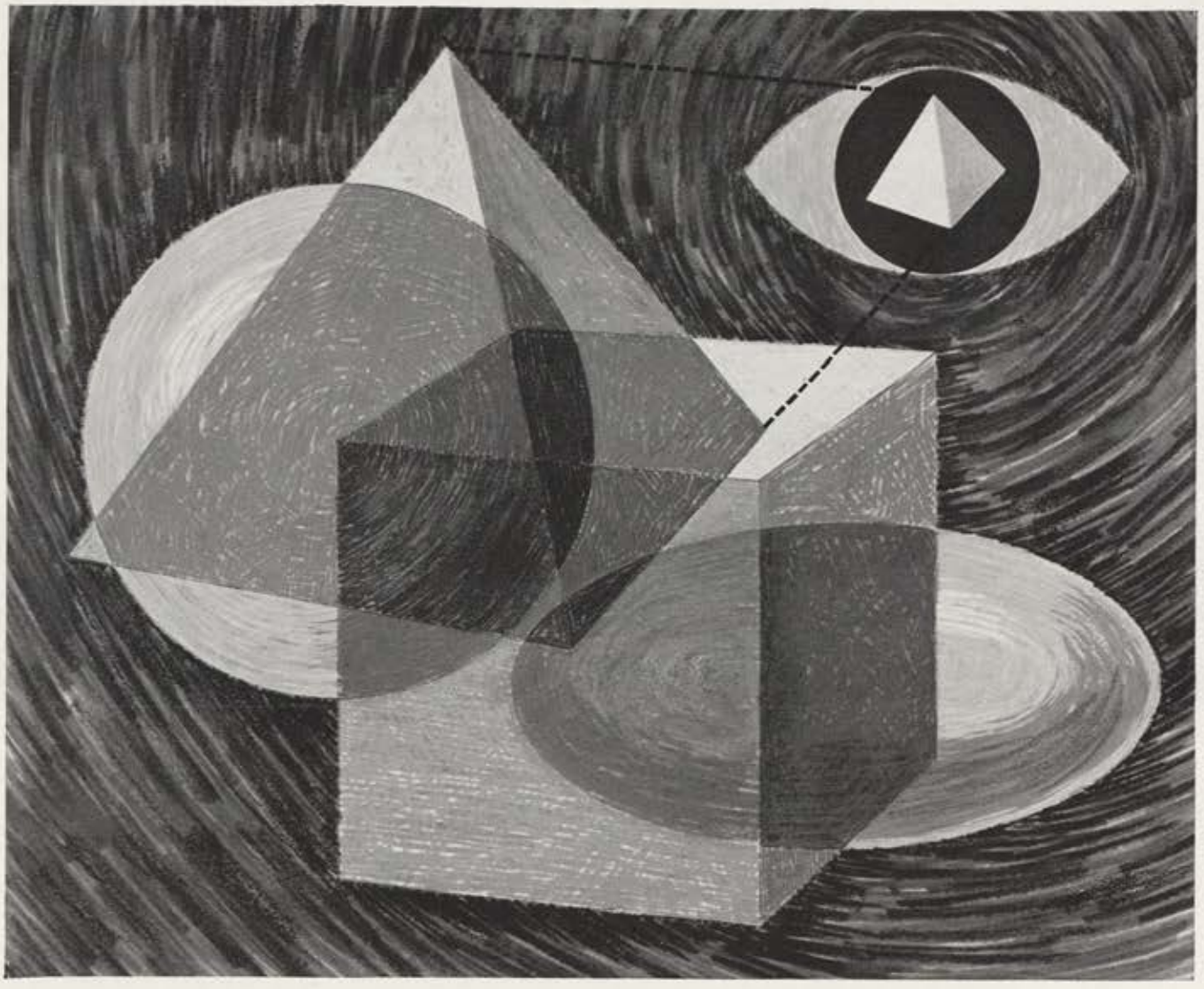
In his focusing on bombs in orbit, Mr. Gilpatric omitted mention of other possible space weaponry—but this was understandable. He was talking to Russians more than to Americans.

The future has never been more uncertain. —END

THE NEW GENERATION OF JUDGMENT MACHINES

...AND WHAT DOUGLAS IS DOING ABOUT THEM

There is a critical need in defense and space work for automatic equipment that can go where a man cannot and perform decision functions that up to now only a man could handle. □ To meet this requirement, a new type of computer has been developed in the laboratories of Astropower, a Douglas subsidiary. Called an "Optical Decision Filter", it can recognize and classify three dimensional objects regardless of their size and orientation with respect to the viewing lens. □ The capabilities demonstrated by this Astropower unit give it great potential for application in many defense, space and electronic fields, including the following: photographic analysis; radar signature analysis; ballistic missile decoy discrimination; and starfield (or other pattern) recognition.



This step ahead in the computer field is typical of the advanced thinking which is now taking place in the more than 500 R&D programs under way at Douglas and its Astropower subsidiary. Objective is world leadership under the severe conditions that will prevail in tomorrow's technology.

DOUGLAS

The enemy will not wait for a sunny day.

If he should strike, the blow will come when and where it suits him. In weather conditions he chooses.
We must be able to punch back fast. In nuclear, guerrilla or conventional conflict. In clear skies or black storm. Anywhere. Any time.
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AIR FORCE
OCTOBER 1962

Not only on top-security SAC bases, such as Castle AFB, Calif., shown here, but at isolated missile and radar sites, sentry dogs have proved a vital adjunct to Air Policemen. Here dogs and their AP handlers of 93d AP Squadron parade past B-52.

Even today's electronic marvels cannot match a dog's ability to spot a saboteur or thief. On lonely missile and radar sites, and many USAF bases, trained dogs serve as eyes and ears—and a potent weapon—for USAF Air Policemen, on constant alert against intruders . . .

SENTRY DUTY IS FOR THE DOGS

By Lt. Col. C. V. Glines, USAF

IN THE black stillness of a cold western night, Airman First Class Jack Stephens walked his post on the flying line at one of SAC's B-52 bases. His partner, a German shepherd dog named Pete, walked silently at his side on a short leash. Suddenly Pete stopped dead and cocked his head to one side.

"Hear something, Pete?" Stephens whispered.

The answer was obvious. Pete strained on his leash, hackles raised, and Stephens let him ease forward slowly. Peering through the blackness, Stephens could see the figure of a man crouching down under a bomber's belly.

"Halt! Who goes there?" Stephens shouted.

There was no answer. Instead, the figure broke into a run.

"Get him!" Stephens shouted to Pete as he let the dog go.

With a low throaty growl, Pete leaped forward like an arrow. He quickly covered the distance and jumped on the intruder, jaws tearing at the man's clothing. After a moment, the man stopped struggling, and Stephens ordered Pete away.

Fortunately for the intruder—a well-padded fellow Air Policeman—this encounter with Stephens and his partner was only a routine SAC penetration test of its security forces. If it had been the real thing, the intruder could literally have been ripped to shreds.

In spite of modern-day gimmickry and electronic marvels, today's Air Force has found that nothing so far invented can match the sentry dog's ability to scent a human intruder under low-visibility conditions when an intruder could neither be seen nor heard by another human. Air Force bases in more than a dozen countries now enjoy a greater measure of protection against sabotage or other kinds of intrusion through the expanding use of expertly trained sentry dogs. As more missile sites are activated, the demand for dogs has become so acute that there is actually a shortage.

Dogs have been used by military forces for centuries. The Greeks and Romans used huge mastiffs for guard duty as well as for attacking on the field of battle. During World War I, dogs saw service with German, French, and Belgian forces; but it wasn't until after the United States entered the second World War that American forces seriously considered their use. With the rapid expansion of industrial plants and military installations, the potential damage that might be caused by saboteurs and enemy aliens mounted constantly, and precautionary measures had to be taken. A group of dog breeders and fanciers formed an organization known as "Dogs for Defense" to stimulate interest in the use of dogs for scouting duty, messenger service, sentry

(Continued on following page)

An "agitator," center, earns his day's pay as the object of attention of canine trainees in a SAC program at Barksdale AFB, La. Such agitation training teaches the dogs to regard everyone other than their handlers as an enemy.

SAC A2C Theodore Newton gives his German shepherd partner King the order to "Hold that man!" before loosing the dog on a simulated intruder in a SAC exercise. The dog will obey no one but his AP master.

A sentry dog and his handler share many things—from a cold drink of water to the responsibility for guarding million-dollar aircraft. Shown here are Air Policeman Franklin Plott and his dog, Lowey, at Turner AFB, Ga.

SENTRY DUTY IS FOR THE DOGS—CONTINUED

work, and for sled duty in the Arctic. The Army officially adopted the idea with the formation of the War Dog Program, unofficially known as the "K-9 Corps," and more than 20,000 dogs were "recruited."

While all the dogs didn't work out as well as the Army had hoped, some became famous for their exploits. The ability of dogs to locate enemy bivouacs, patrols, and ambushes in the South Pacific helped our troops achieve tactical surprise. The most famous dog of the war, Chips, received the Silver Star and the Purple Heart for his gallantry, but both awards later were revoked as being contrary to Army policy.

The Air Force first officially used sentry dogs during Korea for guarding forward airstrips and to prevent pilferage of supplies. In 1955, largely because of USAF's deep concern for the security of its forces while on the ground and the protection of the coming missile sites, a number of sentry dogs were procured and trained for use on Stateside installations. By 1958, the Air Force had enlarged its requirements for dogs to such an extent that the USAF Sentry Dog Training Center was established at Lackland AFB, Tex., and the Air Force was given the job of training dogs for both the Army and Air Force. In its first three years of operation, the center turned out more than 1,225 trained man/dog security teams.

The "recruitment" of sentry dogs —still the Army's job—is as serious a business as the procurement of men for the services. Dogs must be pure-bred German shepherds, one to three years of age, with a minimum height at the shoulders of twenty-three inches. They can be any color but must weigh at least sixty pounds and, of course, be in good health. Dogs of either sex are acceptable, but females must have been spayed at least ninety days before "enlistment." Personality-wise, each dog accepted must have the typical German shepherd characteristics of alertness, aggressiveness, and vigor. Noise- or gunshy dogs cannot be accepted.

When an owner has applied to the Army's Animal Procurement Office at Lackland and received permission to ship his dog, he is sent a special shipping crate and instructions. On arrival at Lackland, each dog is given exhaustive physical and mental tests by Air Force veterinarians to determine its suitability for training. As one handler put it, "We ask our 'recruits' to do everything except sign their names on the payroll, and those that can't hack the tests are sent home—fast."

If a dog can pass his exams, he is "sworn in," given a serial number which is tattooed on his left ear or flank, and has a service record started. His owner is paid (prices can run as high as $150 each), and the dog becomes official Air Force property.

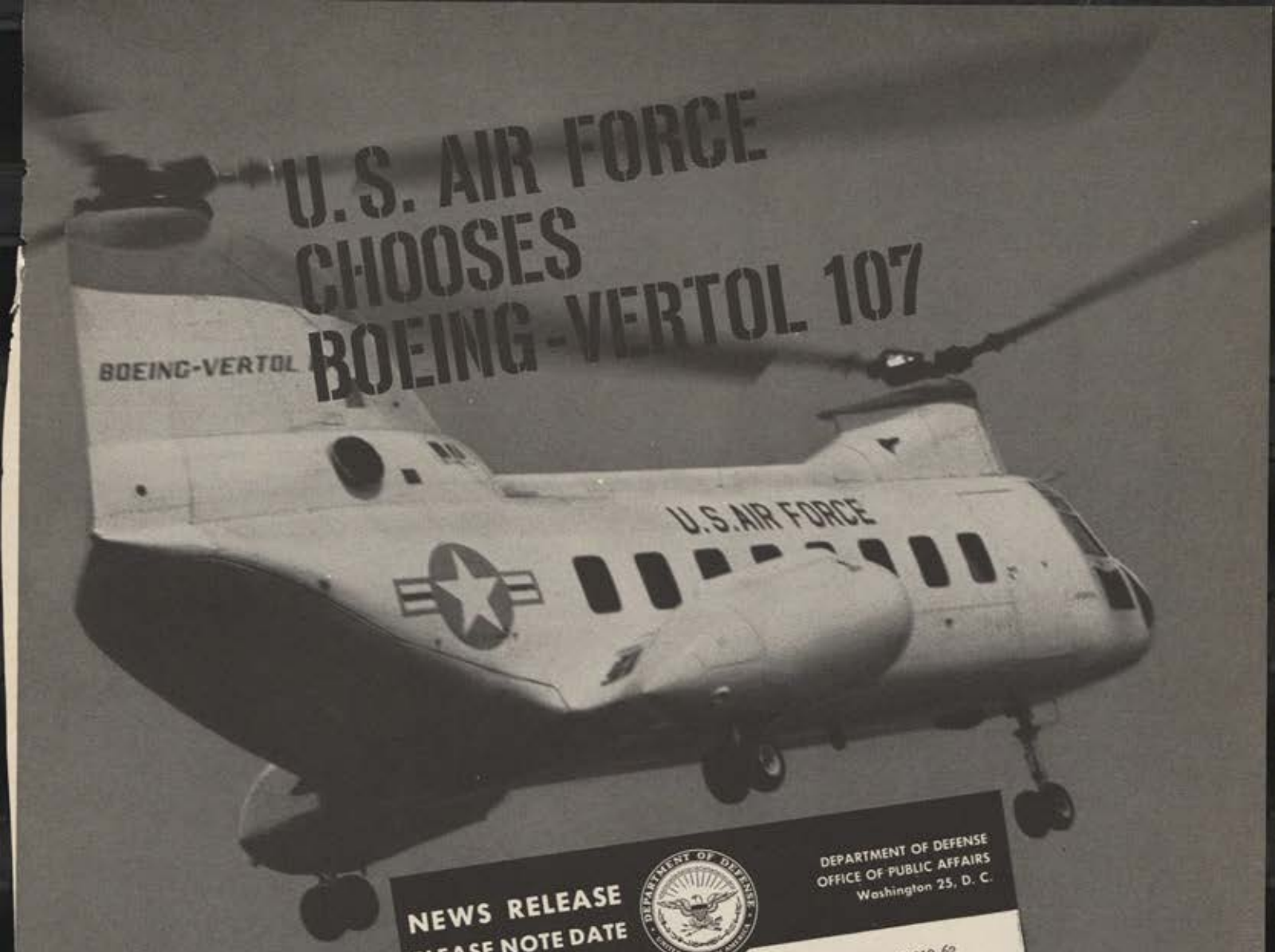
At the same time that a dog is being "enlisted," a potential dog handler is selected from among Air Policeman volunteers. Men and dogs are assigned to train together, and both go through an eight-week course at the center. Handlers are given immediate responsibility for their dogs which means the same as it did in the days of cavalry and horse-drawn artillery—they must be sure that their partners are fed, watered, exercised, and groomed each day.

From the beginning of the training period, the dog's instinctive companionship for man is deliberately fostered. But there is a difference. The comradeship is purposely channeled into love for one man and only one—his handler. The handler is the single person who can give his dog orders or make friends with him. If this were not so, the animal would be useless as a sentry.

Unlike humans, a dog's world is chiefly one of sounds and odors. His nose and ears tell him far more than ours, yet his vision is inferior and he depends less on it. Paradoxically, a dog's sensitivity to movement is so superior that a man standing 100 yards from a dog may move his hand ever so slightly and the dog can detect this movement.

It is the sense of smell that is one of the primary reasons why dogs are used in sentry work. Their keenness so surpasses a human's that it is impossible for us to conceive of the vast range of odors and the delicate differences in chemical shadings that dogs can detect. Re-

(Continued on page 65)



U.S. AIR FORCE CHOOSES BOEING-VERTOL 107

NEWS RELEASE
PLEASE NOTE DATE

DEPARTMENT OF DEFENSE
OFFICE OF PUBLIC AFFAIRS
Washington 25, D. C.

June 4, 1962

NO 912-62
OXford 75131

IMMEDIATE RELEASE

BOEING-VERTOL TO BUILD
AF LONG RANGE HELICOPTER

Boeing-Vertol has been selected by the Air Force to build a long-range helicopter capable of carrying a payload of at least 5,000 pounds for 200 nautical miles or 2,400 pounds for 700 miles.

The Vertol 107 helicopter selected, now in production for civil use, will require only slight modifications by the Air Force to satisfy its Specific Operational Requirement (190), which calls for a long-range support helicopter. The SOR 190 also specifies that the helicopter be capable of carrying 25 troops or 15 litter patients and two attendants.

The design of the 107 combines multi-engine power and reliability, high speed, straight-in rear ramp loading, water landing and all-weather capability. The 107 adapts with ease to practically any type of mission, from troop or VIP transport to missile site support, air rescue and security patrol. The same basic aircraft is on order for the U.S. Marine Corps, Royal Canadian Air Force, Royal Swedish Navy and Air Force. Airline versions have been delivered to New York Airways and the Kawasaki Aircraft Company of Japan.

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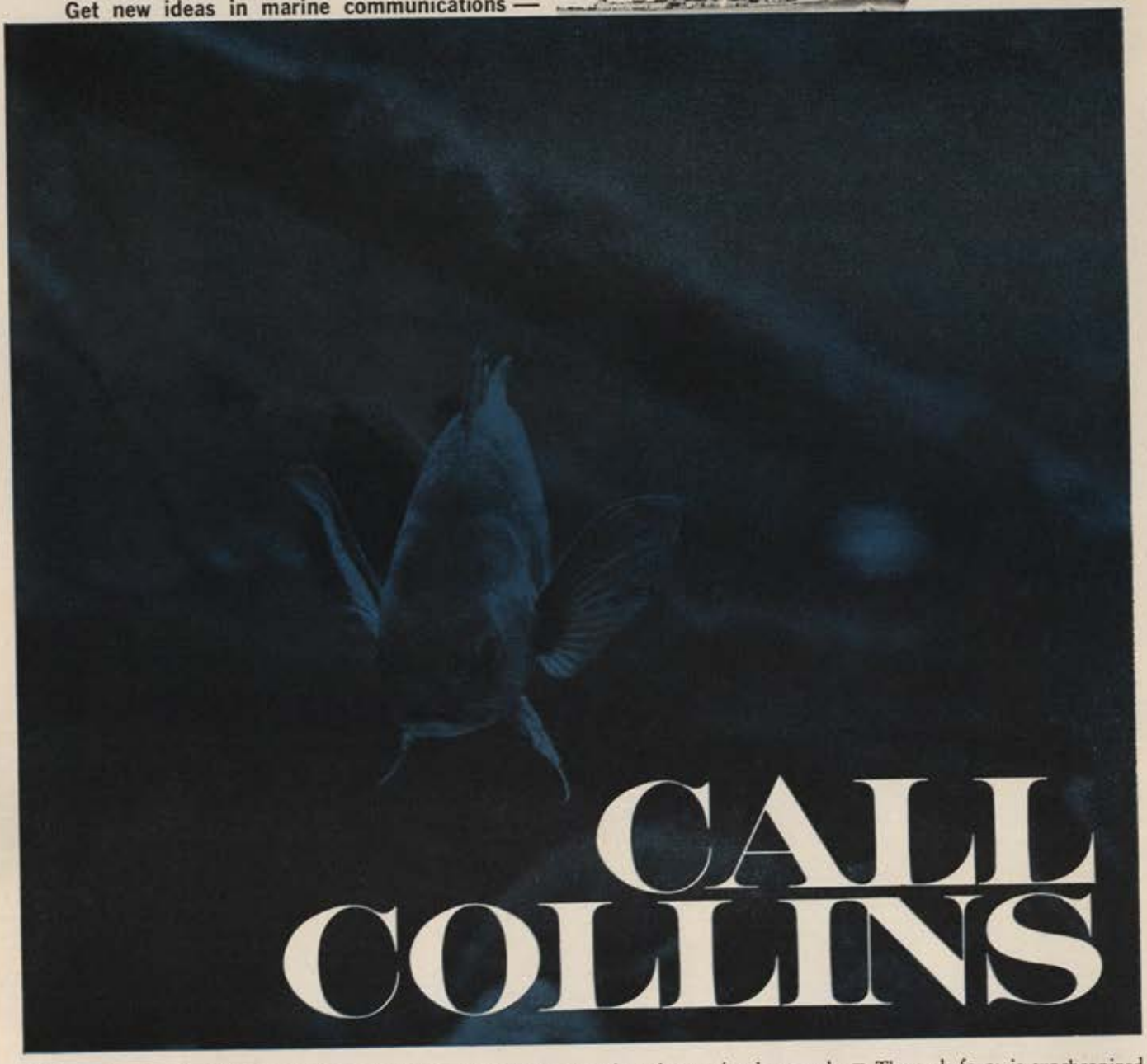


Today, all units of a Navy task force can react to a combat situation almost simultaneously. □ The task force is synchronized by a high-speed information network called the Naval Tactical Data System (NTDS). The system is linked together by Collins data transmission and SSB radio equipment. □ NTDS gathers combat information from sonar and radar throughout the task force. Data is transmitted to the nearest of several task force computer centers. There it's processed into an up-to-the-minute *total* tactical picture and relayed to the Task Force Commander and all unit commanders. □ Collins also has developed an airborne version of NTDS and a number of special-purpose voice and data communication systems for ships and Fleet aircraft. Collins Loran C receiving systems are providing information for navigation, cable laying and repair, ASW and other applications where continuous position fixing is vital. □ Collins marine system specialists may have already answered an important question you're facing now. Why not get in touch immediately with this outstanding source for ideas, equipment and installation service? Call Collins Radio Company... ADams 5-2331 in Dallas, Texas.

COLLINS

SENTRY DUTY IS FOR THE DOGS — CONTINUED

cent studies indicate that some dogs can detect the odor of a human outdoors for as much as two weeks after the person has left the scene.

The training of sentry dogs at the Lackland center is purposely kept uncomplicated. Appealing to the German shepherd's natural ability to learn rapidly and well, certain basic principles are applied as soon as a dog and handler are matched. The handler learns, first of all, that he must maintain firm control over his dog at all times and, above all, must never lose his temper or become impatient. Dogs, by nature, are anxious to please and respond remarkably to rewards and words of praise. Lack of praise and a stern "No!" are usually enough punishment for minor slips in the learning process. However, if a dog reacts defiantly to a command or signal, the punishment must fit the crime, but the most severe reaction from a handler will be a sharp jerk on the leash or a twist in the choke chain. Under no circumstances are the animals struck or whipped.

During the training period, each handler spends about two hours per day with his dog. At the beginning, the dog is taught to obey such voice commands as "Sit," "Stay," "Heel," and "Down." As his proficiency increases, he is given more complex commands by both voice and signal and then is taught to be suspicious and wary of strangers. He is teased and agitated by someone not his handler until he fights back and soon becomes enraged at the mere approach of a stranger. Wearing thickly padded clothing with a heavy protective sleeve to give the dog something to get his teeth into, the agitator allows the dog to attack him viciously. To build up a dog's confidence at this point, the agitator backs away and acts frightened each time the dog bites him. Never does a handler agitate his own dog because the objective of the training is to instill the idea that every human being except his partner is an enemy.

As the training progresses for both man and dog, it becomes more realistic. Next step is pursuit of a running agitator who will drop firecrackers or fire blank ammunition as he runs. The dog is let loose at the command "Get him!" and runs his quarry down. He learns that the noise will not hurt him and that he has nothing to fear. When he has "apprehended" the agitator, the handler will command "Out!" and the dog ceases the attack to stand by while his master frisks the suspect. Other training includes obstacle courses, escorting apprehended intruders, searching in grassy areas, and patrolling.

"The major ingredient for successful dog training," says Lt. Col. Frederick Weil, veterinarian assigned to monitor the sentry dog program for the Director of Security and Law Enforcement, "is the relationship built up between dog and man. It is the handler who gives the dog confidence in his ability by the proper amount of reward and encouragement. The dog learns to obey because he

(Continued on following page)

SENTRY DUTY IS FOR THE DOGS

CONTINUED

wants, above anything else, to make his handler happy. When a sincere mutual affection is built up between man and dog, this team works together beautifully. Each knows that the other will do his part in case of real danger. It is this relationship that pays off when an intruder tries to break into one of our missile complexes or a thief attempts to pilfer a warehouse."

When the eight-week course is over, the man/dog teams are assigned to their new duty stations, but their training together never ceases. They spend at least two hours together every day exercising, grooming, and running through a routine of obedience "to reinforce the learning process."

If, for any reason, a team must be broken up, as when the Air Policeman is discharged at the end of his hitch, a new master is not assigned to the dog right away. The dog is "relieved from duty" and allowed to adjust slowly to a new handler. According to dog psychologists, the loss of his buddy is just as much of a shock to a dog's psyche as it would be for two humans who had a deep attachment for each other to be permanently separated. But the yearning for usefulness and a human companion is so deeply rooted that the dog will soon be eager to adjust to, and work for, a new master.

Thus far, it has been traditional for the Air Force to train its dogs to a degree of aggressiveness that makes it unsafe to get near them even under the control of their handlers. However, this concept of training may change in the future. "Although we have no reported cases of innocent people being injured by them," Brig. Gen. Robert F. Burnham, Director of Security and Law Enforcement, said recently, "we are evaluating our training to see if excessive aggressiveness is really needed. The only deterrent some people seem to recognize is the viciousness of the dog, but we think it possible that this type of dog may not be best for use in the States. We are comparing our training methods with those of the Washington, D. C., Metropolitan Police Dog Training School and find that they develop a dog less aggressive than ours, and more manageable and obedient off leash. This kind of dog might be used more effectively with walking patrols around isolated base warehouse areas."

Why has the Air Force decided on the German shepherd as the standard breed for sentry dogs?

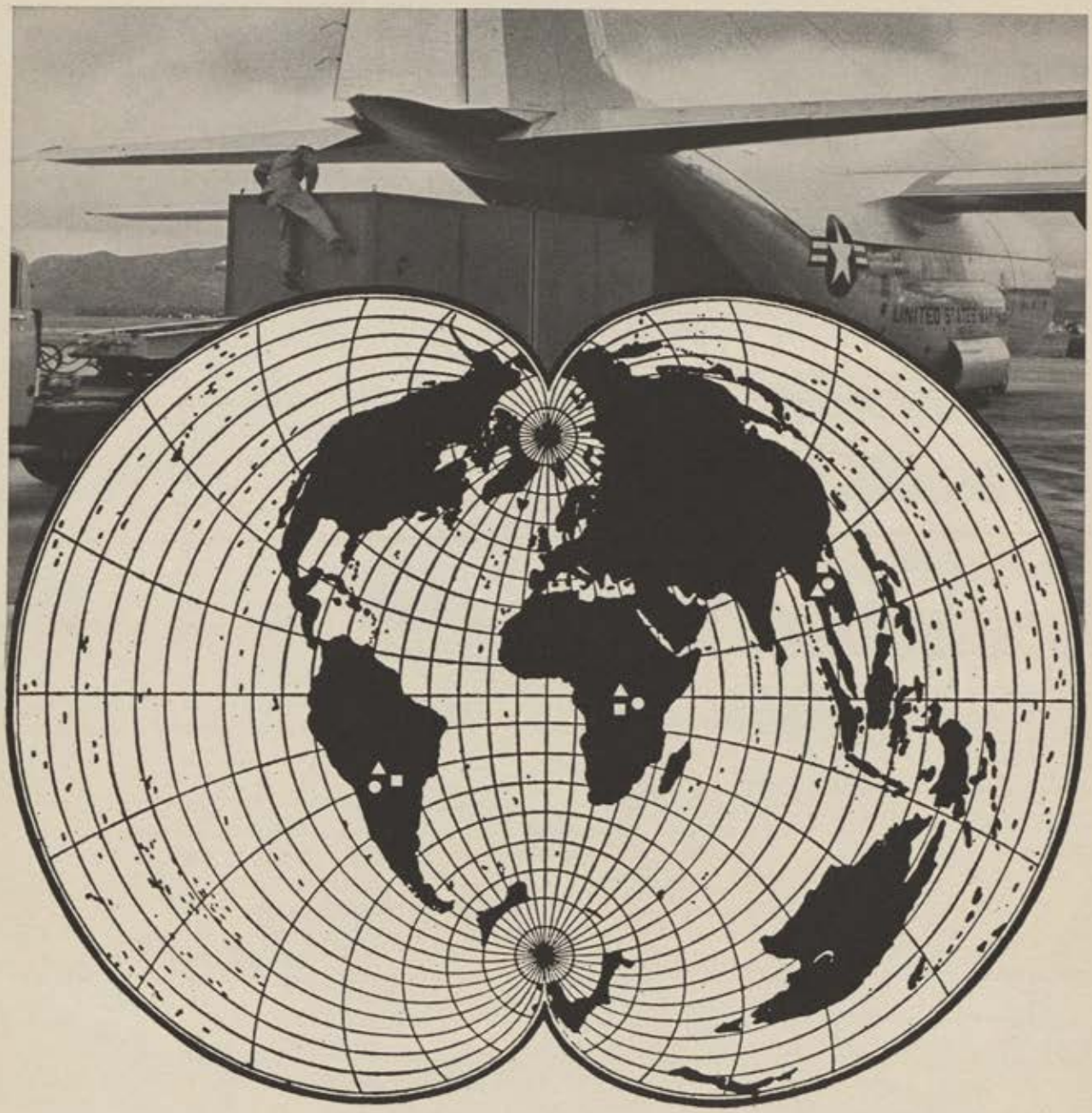
"There are many reasons," Colonel Weil said. "The more important reasons are his availability and adaptability to climatic conditions. In addition, he has other characteristics we need in a sentry dog. He has a long, tireless gait; he is a strong, agile and well-muscled dog—alert and fearless. Basically, the German shepherd is not a vicious animal, but he does have a natural distrust for strange people or unusual situations. While other breeds of dogs may have these assets, it is the German shepherd that has them most consistently and responds best to our training methods."

In these days of continuing military buildup when skilled manpower is in short supply, the potential of sentry dogs is receiving more attention than ever before, and the dogs continue to be in short supply.

Any reader interested in selling qualified animals is urged to get in touch with the US Army Animal Procurement Office, P.O. Box 52, Lackland AFB, Tex.

As one Air Force Reservist jokingly put it, "They don't want me any more now that the space age is here, but they want my dog. He gets a good home, three squares a day, and *I* get $150. Why couldn't this have been the case in 1942 when I got drafted and my dog stayed home?"—END

The author, Lt. Col. Carroll V. Glines, recently became Chief, Magazine and Book Branch, Office of Information, Hq. USAF. He is the author of several books, including Grand Old Lady, *the story of the venerable Douglas DC-3 (C-47), and is a regular contributor to* AIR FORCE/SPACE DIGEST. *A year ago, in the October 1961 issue, he wrote "Teaching the Teachers," an examination of the Academic Instructor and Allied Officer School at the Air University, and in the May 1961 issue contributed the article "Persuaders in Blue" on the AF Recruiting Service.*



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Ready Room

By Jackson V. Rambeau
AFA DIRECTOR OF MILITARY RELATIONS

AFA Calls for USAF Reserve Bureau

A new command structure for the Air Force Reserve, in the event USAF decides to eliminate the Continental Air Command, has been proposed to Secretary of the Air Force Eugene M. Zuckert by AFA's Air Reserve Council.

The Council's recommendations were prepared amid reports that USAF was planning to scrap CONAC to make available manpower spaces for higher priority missions, and turn administration of the Reserve over to gaining commands.

Brig. Gen. Dave Price, Chairman of AFA's Reserve Council, delivered the Council's recommendations to Secretary Zuckert in a letter signed by AFA President Joe Foss. The Council assumed these three alternatives were possible:

- Eliminate CONAC and transfer the administrative workload to the using commands;
- Eliminate CONAC and administer the Reserve from an Air Staff office comparable to the Air Division of the National Guard Bureau; or
- Retain CONAC with fewer manpower spaces.

In assessing these points, Price concluded that transferring Reserve administration to the gaining commands would result in "negligible" manpower savings because it would require the augmentation of many staffs "to carry out functions which are incompatible with normal day-to-day operations of the commands."

Instead, he urged adoption of the second alternative—replacing CONAC with an Air Staff office functionally comparable to the Air Division of the National Guard Bureau—because it would retain a "focal point" for the Reserve while saving several hundred manpower spaces.

As a corollary, he recommended that USAF set up a three-star Deputy Chief of Staff for Reserve Forces to supervise both the Air Division of the Guard Bureau and the new Reserve Bureau.

In any case, AFA recommended that the six Reserve regions be strengthened.

"The Air Force Reserve can best be administered by an Air Staff office," AFA said. "If this solution runs against the tide, and therefore is impractical from a political standpoint, the best solution is to continue to administer the Air Force Reserve through CONAC."

The Hebert Report

The Hébert Subcommittee of the House Armed Services Committee has severely criticized the Department of Defense for deficiencies uncovered in its lengthy investigation of Reserve Forces mobilization problems.

It noted that "perhaps the outstanding accomplishment" in the recall effort "was that of the Air National Guard in its deployment of aircraft to Europe." But this was virtually the only favorable comment in the report, and the Air Force came in for criticism elsewhere for recalling 160 Reservists individually from organized units contrary to law.

The Subcommittee's principal target was the Department of Defense. It charged that DoD permitted Reserve Forces policy matters to "rock and stumble along without any imaginative or aggressive effort to resolve them."

Key recommendations made to the Subcommittee by AFA President Joe Foss last spring all found their way into the report. These included the Reserve Forces reenlistment bonus, a plan to set up an all-volunteer Air Reserve Force by reducing the period of obligated military service, and strengthening equipment programs by having Congress consider Reserve Forces requirements along with those of the active Air Force.

On the reenlistment bonus: "The Reserve program requires some additional incentive . . . such as a reenlistment bonus or some similar device to permit the procurement and retention of vitally needed skilled and experienced enlisted personnel."

On reducing obligated service: "It is recommended that the Defense Department give . . . consideration to the desirability of reducing the total Reserve military obligation of individuals entering upon two or more years of active duty. . . . As a corollary . . . the Subcommittee believes that serious consideration must be given to exploring the practicability of placing organized Reserve training . . . on a purely voluntary basis."

—USAF photo

Col. Joseph D. Zink, back as Deputy Commander of New Jersey ANG's 108th Tactical Fighter Wing, McGuire AFB, won Legion of Merit for active-duty service as Commander, 7108th Wing, Chaumont AB, France. Maj. Gen. Albert P. Clark, USAF Director of Military Personnel, made award.

On equipping Reserve Forces: "It is the recommendation of the Subcommittee that when the full Committee next considers the annual authorization bill for missiles, aircraft, and naval vessels, that it consider the feasibility of amending existing law to require an authorization for those items of equipment which are currently in such short supply" in the Reserve Forces. This recommendation was contained in a section devoted to Army Guard and Reserve equipment shortages, but the words "aircraft and naval vessels" indicate that the Subcommittee intended it to apply across the board.

(Continued on following page)

Among other recommendations, the Subcommittee put in a strong plug for the Air Reserve Forces Policy Committee and its counterparts, suggesting that the Defense Department would be "well advised to utilize the counsel and suggestions of the various Reserve Forces Policy Boards made available to them by the Congress."

It criticized "restrictions" placed by DoD on Reserve Forces appropriations, which "prevent shifting of these funds between various Reserve training programs."

The Defense Department needs an Assistant Secretary for Reserve Affairs. Because of the "multiplicity of responsibilities" vested in the Assistant Secretary for Manpower, who oversees Reserve programs, "those responsibilities that appear less critical and urgent receive correspondingly less attention."

Reservists, too, can help improve the program, the Subcommittee declared. "There is room for improvement in the Reserve organizations by the Reservists themselves. . . . This action on the part of the Reserves is of equal importance to the action urged on the Department of Defense."

Karl Merrill, Chief of Consultant Engineering in AFLC's Directorate of Maintenance Engineering, received Exceptional Civilian Service Award for developing improved methods in USAF depot industrial operations.

Bonus, Equipping on Policy Group Agenda

The Air Reserve Forces Policy Committee will convene in Washington, October 26 for its 35th meeting, its first full meeting since the return from active duty of units mobilized in the Berlin contingency, an experience that should provide much for committee consideration.

Subjects formally placed before the committee, however, originated at major command level several months before the scheduled meeting of the full committee, with the result that few of the Reserve Forces post-mobilization problems were included in the 100-page compilation of items considered by the agenda subcommittee in August.

Several matters proposed at the agenda meeting will give the committee pegs on which to hang more current discussions and recommendations. Among them:

Recruiting and retention. The reenlistment bonus first proposed by the AFA's Airmen Council and recommended to the Hébert subcommittee by AFA President Joe Foss last spring is the subject of an extensive study prepared for the committee by the office of Assistant Chief of Staff for Reserve Forces. So many sources have since joined the bonus bandwagon that some form of reenlistment incentive seems inevitable. But the multiplicity of recommendations may prompt the committee to seek further study, possibly by a subcommittee of its own.

Related proposals include providing more basic and technical training spaces for nonprior-service personnel, a more liberal commissioning program for highly qualified airmen, and eliminating inequities between regular and Reserve Forces airmen on active duty in quarters allowances and proficiency pay.

Equipment. The Air Defense Command has joined Tactical Air Command in urging more modern equipment for Reserve Forces flying units. TAC's resolution was considered by the committee last spring, but without significant result. Now ADC recommends that ANG units using F-86s and F-89s be assigned F-102s. "In the event of mobilization," says ADC, "the combat potential of many of these units would be greatly limited with the currently assigned obsolete aircraft." ADC neglected to add, however, that there are only two ways to provide newer aircraft to the Reserve Forces—either through a buy program for USAF or the Reserve Forces, or through a reduction in units or equipping levels of the active force. Obviously, the buy program is the only acceptable solution today.

Making Use of Retired Skills

How to tap the valuable reservoir of skills available in retired Air Force personnel is the subject of the First National Conference on the Utilization of Retired Personnel, to be held in Washington, D. C., December 17, sponsored jointly by AFA and the Department of Labor.

Secretary of Labor W. Willard Wirtz and Secretary Eugene M. Zuckert of the Air Force head the list of distinguished participants.

Richard K. Donahue of President Kennedy's personal staff will present White House views on the subject, and US Civil Service Commissioner Robert E. Hampton will discuss federal employment of retired personnel.

The aircraft industry has indicated strong interest in the conference, which has been scheduled in conjunction with the Wright Brothers Memorial Dinner in Washington to ensure maximum industry participation.

Lt. Gen. William E. Hall, Chairman of AFA's Retired Personnel Council, is in charge of AFA arrangements.

An advance planning meeting on the conference was held during AFA's National Convention at Las Vegas, Nev., in September.

PARTING SHOTS . . . Col. I. G. Brown, whose promotion to B/G went to the Senate in September, has entered on duty as Assistant Chief, National Guard Bureau, for Air Guard. **Maj. Gen. Winston P. Wilson,** whom Brown succeeds in that post, continues as Bureau's Deputy Chief. The move is regarded as an indication that the capable and popular "Wimpy" Wilson will become the Bureau's first ANG Chief when **Maj. Gen. Donald W. McGowan** reaches retirement age next August. . . . **Col. Charlie Book** succeeds Brown as Executive Secretary of USAF's Air Reserve Forces Policy Committee. New Chairman of the Committee is **Maj. Gen. Charles H. DuBois,** Chief of Staff for Missouri ANG, who takes over from **Maj. Gen. Clarence A. Shoop** of California ANG. **Maj. Gen. Roy Sessums** of Louisiana is Vice Chairman and head of Reserve Committee. New members include **Brig. Gens. Bob Campbell, Edward Fry,** and **Don Strait** for ANG; **Brig. Gen. Dave Price** and **Col. Walter W. Dalton** for Reserve. Alternate members are **Cols. Gordon Doolittle** and **Philip W. Packer** for ANG, **Brig. Gen. George Wilson** and **Col. Clinton H. Moyer** for Reserve.—END

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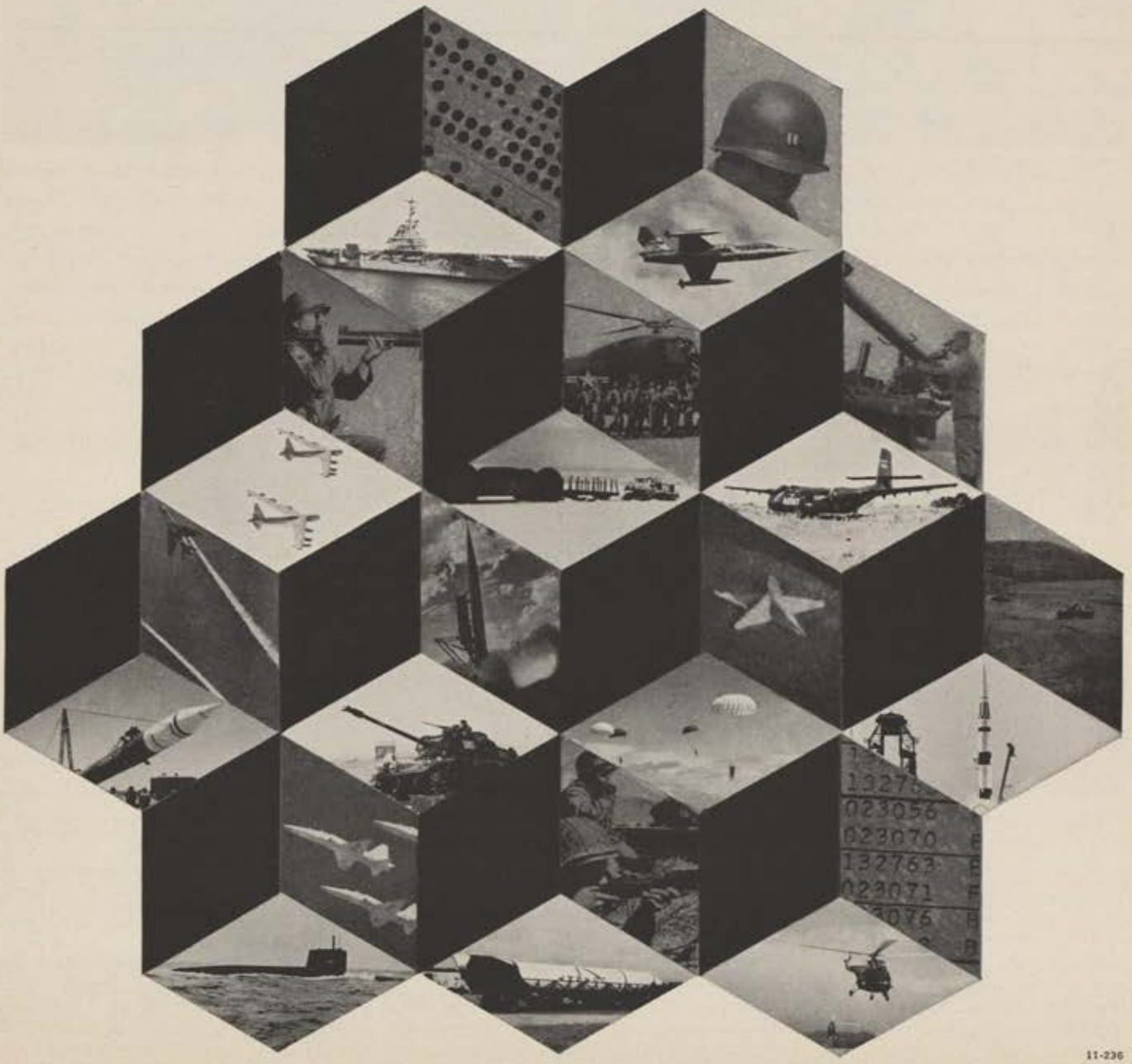

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AFA NEWS

SQUADRON OF THE MONTH

Fort Worth, Tex., Squadron Cited for outstanding programing in the community and unusual success in achieving membership goals.

Congressman Jim Wright of Fort Worth, left, named Man of the Year by AFA's Texas Wing, accepts award from Wing Commander Earle N. Parker at the Texas Wing's Convention.

The first Wing Convention ever held in Texas was "king sized" in every respect, and caused the host **Fort Worth Squadron** to challenge the other units in the state to try to top its effort, which was a feature of the week end of July 27-29. Highlights, in addition to the regular business affairs, were: An "early-bird" advance-registrants reception; an orientation briefing by **Col. Paul Maret,** Chief of Presentations, Air Force Systems Command; a tour of Carswell AFB; a "theater party" for the ladies to see the production "Fanny," as guests of **Mrs. Earle N. Parker,** wife of the Wing Commander; a major presentation by **Benjamin W. Fridge,** Special Assistant to the Air Force Secretary; a Wing Ding Reunion Ball, and a champagne brunch on "get-away" Sunday.

All in all, it was a most auspicious kick-off for AFA's newest, and potentially one of the best, Wing organizations. Parker, who lives in Fort Worth, was reelected Commander, while other officers include: **Jesse J. Walden, Jr.,** San Antonio, Vice Commander; **Joe Draper,** San Antonio, Secretary; and **Joe D. Tompkins,** Abilene, Treasurer. Distinguished visitors to the convention included **Chess Pizac,** Vice President, and **Paul Fonda,** National Committee Member, both from Washington, who attended as guests.

* * *

Officials of the **Nebraska Wing** and **Omaha Squadron** have announced an expansion of their annual program whereby scholarship funds are donated to the **University of Nebraska Aviation Education Department.** For several years the units have sponsored a number of teachers in that effort, for the express purpose of orienting instructors in advanced programs of aerospace research and development. This grant was for $1,000. Additionally, the **Aerospace Education Foundation,** AFA-affiliated educational organization, was the recipient of a similar Squadron grant.

Arthur C. Storz, Sr., presents two checks from AFA's Ak-Sar-Ben Squadron, Omaha, to Col. Elkins Read, Jr., Offutt AFB Commander. The Squadron gave $2,000 for base recreational improvements, $1,000 more to fund to build a Catholic school near the Capehart Housing area.

Apart from these grants, the Nebraska Wing presented a $2,000 check to the **Central Base Fund** at Offutt AFB to be applied toward various base recreational projects (*see cut*), and a $1,000 check to a fund for building a Catholic **elementary school** near the base's Capehart Housing area, for which a drive is now under way, with support of area educational interests.

Most of the money raised by the Wing and Squadron for these very worthwhile projects came from the annual membership campaign carried out in Omaha under the direction of **Arthur C. Storz,** member of AFA's Board of Directors for several years. To him and all the leaders of the **Ak-Sar-Ben Squadron** and the **Nebraska** Wing, we express the commenda-

(Continued on following page)

Climaxing a highly successful year, the New York Wing held its annual Convention at Rome, N. Y., breaking all past attendance records. Outgoing AFA President Joe Foss, shown here in center shaking hands with the Wing's Vice Commander, Nicholas D. Mammone, addressed the convention. Shown in the photo, from the left, include: Joseph A. Torio, Commander of the Colin P. Kelly Squadron; Mammone; Foss; Brig. Gen. Vito Castellano, member of the New York Air National Guard and AFA's N. Y. Wing Commander; and Gordon Thiel, a Past Commander of the New York Wing. The meeting greatly enhanced AFA's prestige locally.

Maj. Gen. J. S. Hardy, Commander of Keesler AFB, Miss., Technical Training Center, suggested ways to improve US education in recent talk before Mobile, Ala., Squadron. Shown with him is Fred Edwards, Commander of the Mobile Squadron.

tion of the entire Association for a unique and gratifying interest in education for the aerospace age.

• • •

The kick-off of the **California Wing's** 1962 Aerospace Design Contest was hosted by the **Santa Monica Squadron** on August 16, and more than 200 youngsters from the Bay Area turned out for it. Organizations sponsoring entrants included the **Boy's Club; Santa Monica Sea Scouts; Los Angeles Wing** of the **Polish Air Force Association;** and **Flying Tigers Explorers Squadron,** the Air Explorer Squadron sponsored for several years by the **Santa Monica AFA Unit.**

Ron McDonald, Wing Commander, and **Martin Ostrow,** Deputy Commander, represented AFA at the affair, along with **Carl C. Alford,** Los Angeles, originator of the contest several years ago. Program Chairman was **Vera Barbour Wright.** The sponsors tell us the program was a big success, because twenty-five gallons of punch and 250 hot dogs were consumed.

• • •

CROSS COUNTRY. . . . Pittsburgh Squadron members, on September 8, tossed a big blowout in honor of the members of the 112th Fighter Group, Pennsylvania Air National Guard unit which had an entry in the 1962 Ricks Memorial Trophy event, AFA-sponsored annual competition. Interesting item was the fact that it was held on a riverboat steamer. . . . Congratulations go to the brand-new "Greater Chicago Squadron," formed under the leadership of **Ray Gran** and Past Wing Commander **Bill Mathieson.** Nucleus of the unit are members of old Chicago 41, a very active group in the "old days." . . . We join Illinois Wing members in extending condolences to the family of **Alvin C. Sarnecki,** long active in the programs of Chicago Squadron 101, who died August 18.

—GUS DUDA

Behind a cake featuring astronauts, missiles, and fighter planes, leaders of the Illinois Wing's annual convention line up with their honored guests. From left to right are Ludwig H. Fahrenwald, Vice Commander, Squadron 149, arrangements chairman; Charles Wiegel, Mayor of Elmhurst, Ill., and a charter member of AFA; Maj. Gen. William K. Martin, USAF Director of Information, who gave the principal address; Dr. Robert S. Stanger, President of Elmhurst College; and William A. Mathiesen, Illinois Wing Commander. The event, held at the River Forest Country Club in Bensenville, was rated an outstanding success.

A Nonprofit Service for AFA Members

AFA Insurance Programs

These programs have been designed to meet the known needs of AFA families. They are constantly under review to provide maximum protection at minimum cost consistent with safety.

NO AMOUNT of insurance can make up for the real loss when the head of a family is disabled or dies. Nor can insurance minimize the hazards that we all accept as a normal part of our everyday lives.

But insurance can and does ward off the pinch of financial hardship when trouble strikes. An adequate insurance program provides money or goods or services when they are needed most. It is the one sure way of guaranteeing security and protection for those we love.

In recognizing these services that are rendered by insurance programs, AFA not only attempts to make them available to members but also keeps its programs under constant review, making revisions and changes as they are deemed necessary. The latest example of this never-ending review program is the new *all*-accident insurance program which has replaced the former policy covering only travel accidents. This and other programs are briefly described below.

All-Accident Insurance

This new program, available to all AFA members, offers full twenty-four-hour protection against *all* accidents except those involving crew members in aircraft accidents. It is offered in units of $5,000 up to a maximum of $50,000 and is available either singly or in the popular new family plan at unbelievably low rates.

Coverage under the family plan provides insurance for each member of the family, under one policy. Under this plan the wife of the policyholder is insured for 50% of his coverage and each child, regardless of number, is insured for 10% of his coverage.

Coverage is also provided for nonreimbursed medical expenses of over $50, up to a maximum of $500. Under the family plan each member of the family is provided this extra coverage. In addition, policyholders receive an automatic 5% increase in the face value of their policy each year (at no increase in cost) for each of the first five years of coverage.

Life Insurance

AFA Group Life Insurance is available to all active duty officers and NCOs of the first three grades. It provides a graded amount of coverage, with a top amount of $20,000, depending on age and flying status. The death benefit is increased by 50% of the policy's face value if death is caused by any kind of accident.

As an additional benefit policyholders may keep their insurance in force at the low group rate after they leave the service, provided their coverage has been in effect for more than a twelve-month period immediately prior to the date they leave the service.

Flight Pay Insurance

Guaranteed flight pay protection is available to rated personnel on active duty. Protection is guaranteed, even against pre-existing illnesses, after a policy has been in force for more than twelve consecutive months. This plan was first introduced in 1956 and since that time AFA has paid more than $1,800,000 in claims. Each month checks go to between 100 and 150 grounded flyers.

Benefits are such that a grounded policyholder receives 80% of his lost flight pay (tax free) for up to twenty-four months for groundings due to aviation accidents . . . up to twelve months for illnesses or other accidents.

AIR FORCE ASSOCIATION

Insurance Division, 1901 Penna. Ave., N.W., Washington 6, D. C.

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- ☐ All-Accident Insurance
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The Air Force Association is an independent, nonprofit airpower organization with no personal, political, or commercial axes to grind; established January 26, 1946; incorporated February 4, 1946.

Objectives

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

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Active Members: Individuals honorably discharged or retired from military service who have been members of, or either assigned or attached to, the USAF or its predecessor services, or who are currently enrolled in the Air Force Reserve or the Air National Guard, $6.00 per year.

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ML-1: WORLD'S FIRST FULLY MOBILE NUCLEAR POWER PLANT

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The ML-1 is the smallest (40 tons) and hottest (1200°F. outlet temperature) nuclear power plant ever to produce electricity, and is the only plant in which the reactor is coupled directly to closed-cycle, high-speed turbo machinery. It is gas-cooled, and fueled with BeO-UO_2.

Full responsibility for the ML-1 project was assigned by the Atomic Energy Commission to AGN under the Army Gas-Cooled Reactor Systems Program. During management of the program, AGN has gained broad experience in all phases of lightweight, gas-cooled nuclear power plant design and production. AGN management skills, high-temperature reactor technology, test experience, and project personnel also are being applied to studies of advanced ground power plants, space power systems, and nuclear ram-jets.

ML-1 is a joint project of the U. S. Atomic Energy Commission and the U. S. Army Corps of Engineers.

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PHANTOM II . . . THREE SERVICE FIGHTER

Never before has one aircraft so indelibly marked the pages of military aviation history. It is appropriate that the Phantom II will now serve three air arms of our nation.

This multiple mission fighter, designated F4H-1, is already in service as an air defense interceptor for the United States Navy. With the same designation, the Phantom II has been assigned to the United States Marines for close support and air superiority missions. Designated the F-110A and the RF-110 by the United States Air Force, this versatile aircraft is now being built to augment the tactical strike and reconnaissance capability of that service.

RECORD FLIGHTS OF THE PHANTOM II:

16 kilometer straightaway	1606 mph
3 kilometer low altitude	902 mph
100 kilometer closed course	1390 mph
500 kilometer closed course	1216 mph
Sustained altitude (level flight)	66,443 feet
Los Angeles to New York	170 minutes
Altitude	Over 100,000 feet

Time to Climb (in meters):

3,000	34.52 seconds	15,000	114.54 seconds
6,000	48.78 seconds	20,000	178.50 seconds
9,000	61.62 seconds	25,000	230.44 seconds
12,000	77.15 seconds	30,000	371.43 seconds

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