DECEMBER 1968 / 60c

AIR FORCE

and SPACE DIGEST

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

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The Air Force A-7D ranges farther and loiters longer than any other single-engine tactical jet

To Forward Air Controllers: You want a single-engine attack airplane that can cover troops for hours. One that can range farther with a heavier weapons load. The A-7D is the one. It's the best thing that ever happened to a FAC.

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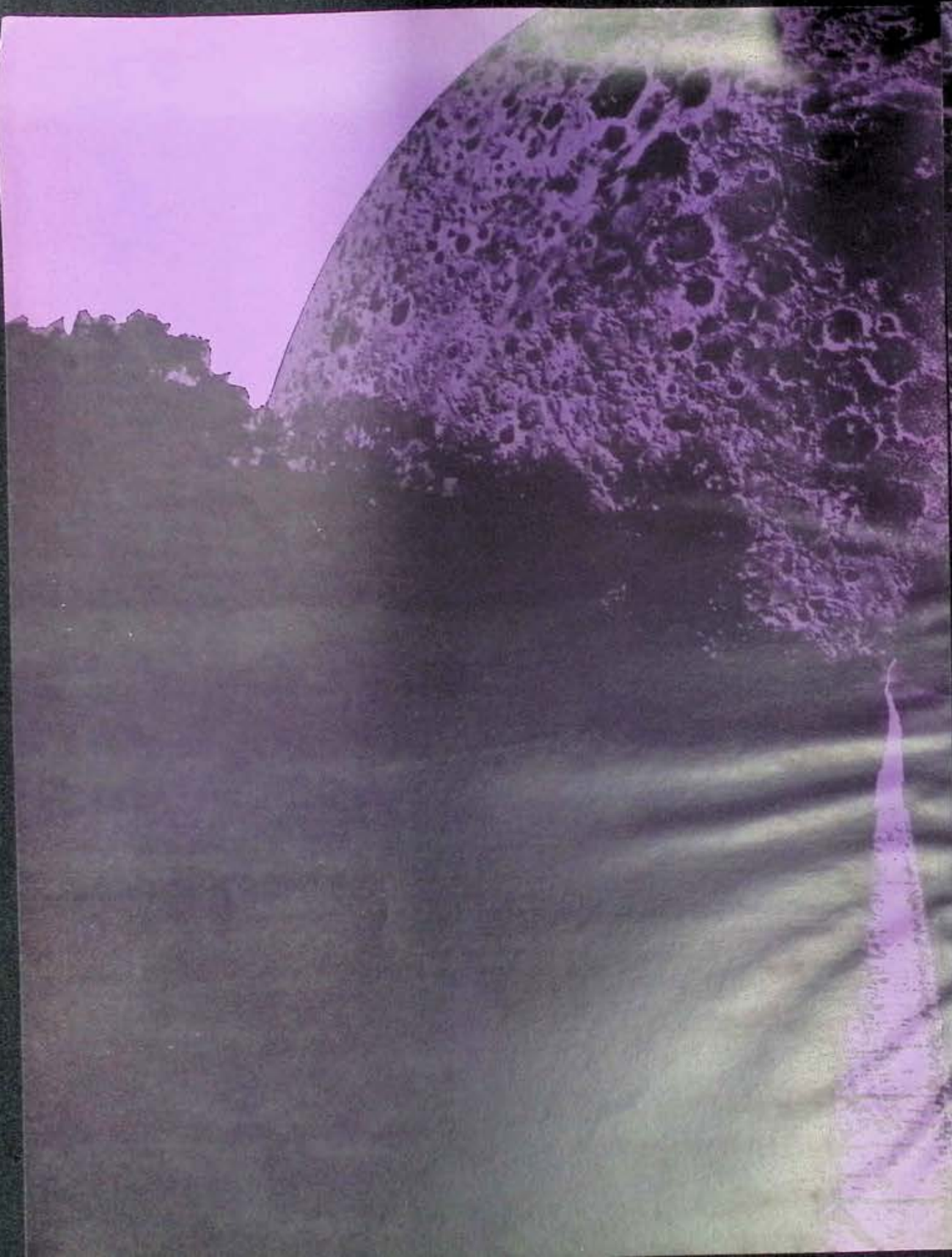

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O. R. Kirby,
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AIR FORCE and SPACE DIGEST

The Magazine of Aerospace Power
Published by the Air Force Association

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We're taking all the fun out of getting lost at sea.

Sea captains spend a lot of their time trying to figure out where they are.

Especially when it's been cloudy for days — no sun to shoot at noon, no stars at dusk.

Even the most experienced captains sometimes feel the thrill of being lost.

The spoilsport U.S. Navy is about to take most of the excitement out of navigation with a system called Omega.

There will soon be eight Omega stations spaced around the globe (four have already been built) that will cover the earth with low-frequency radio waves. Ships will have receivers on the bridge that will compare the signals from three or four stations and tell the captain where he is, within a mile or two.

Simple as that.

Omega won't just belong to the Navy. It will be used by everybody, everywhere. Passenger liners, tankers, fishing boats, yachts. Any vessel with an inexpensive Omega receiver on the bridge.

We make the Omega receivers. We developed the shipboard Omega receiver for the Navy, and we're now manufacturing them for the first installations in the fleet. Eventually all the Navy's seagoing vessels will be equipped with Omega receivers. Thousands more will go aboard ships of all nations.

Airplanes will have Omega too. We've almost finished developing an airborne receiver.

Before long there'll be Omega street signs all over the earth. That may sound like the end of romantic adventure, but to a navigator it's simply the end.

That's why it's called Omega.

NORTHROP

We also build airplanes.

An Editorial

NATO Faces a Critical Year

By Claude Witze

SENIOR EDITOR, AIR FORCE/SPACE DIGEST

WITH Christmas just around the corner, it may appear unseemly to point with alarm. And before pointing with alarm at this season, it is possible to point with some pride. The carols in the background, heralds of the Prince of Peace, are in tune with the anniversary of the North Atlantic Treaty Organization, which will be twenty years old in 1969. NATO has kept the peace, despite strains and stresses, and without it all Western Europe probably would be an armed Communist camp today.

The treaty signed twenty years ago gives member nations the right to withdraw from the alliance in 1969. This fact is well known in Moscow, and spokesmen in that capital have been saying, time and again in the past few years, that the Soviet goal is to see NATO torn apart in the New Year. There is no doubt the Communists have been working toward this goal and that they view NATO as a menace to their ambitions.

Calling attention to this unpleasant fact may not be popular right now, but it is essential. Americans, with the best reasons in the world, have been transfixed by the war in Vietnam. This is so true that most of us, even the most dovish doves, have paid little attention to what is happening in Europe and its environs. True, the rape of Czechoslovakia created a ripple, but it was not the kind of wave that rocked any boats, including the political ones.

At this writing, the NATO Ministerial Council is meeting in Brussels, and there is much discussion about how firm a posture it should show in reaction to the Russian adventure in Prague. It is too early now to know what answer will come out of this meeting, but we hope it will be based on an understanding of Communist capabilities, not a guess about Communist intentions. Intentions can be changed at the whim of a Kremlin bureaucrat. Capabilities can be conceived, developed, and turned into threats only over a period of years.

Gen. Lyman L. Lemnitzer, Supreme Allied Commander, Europe (SACEUR), says that the recent invasion of Czechoslovakia and the massive maneuvers of the Warsaw Pact forces in Eastern Europe demonstrate the ability of the Soviet bloc to strike with little or no warning. Year after year, these powers have been introducing new and more modern weapons, while their defense budgets have increased. Their soldiers are required to serve terms that put new meaning into their training and combat capability.

General Lemnitzer says the Warsaw powers now comprise "the most formidable conventional armed forces in the world today." He adds that the Soviets have in Central Europe "the largest—and most readily usable—combat force fielded by the Kremlin since World War II." He reports further that the Czechoslovakian exercise demonstrated an "almost classical pattern of a military deployment." Also, it moved large and responsive Soviet forces further west than they have been in years, with an extensive logistic backup to keep them combat ready. It is a posture, on the borders of NATO, that has not been achieved since 1945.

At the same time, in case you have missed it, Russia has steadily increased her naval strength in the Mediterranean, which is NATO's southern flank. She now has more than fifty ships in a sea formerly, indeed recently, considered more or less a private lake for military vessels of the Western powers. Now, effective November 21, NATO has activated a new Maritime Air Forces Mediterranean at Naples. This command will include American, British, and Italian patrol planes, operating out of bases along the northern shore of the sea. Their mission will be to watch the Russians. It is a surveillance task that can be switched to fill combat requirements if necessary.

Russian naval activity in the Mediterranean and the Czechoslovakian development have, in effect, changed the balance of power in Central Europe. Of course, the defection of France, which has withdrawn its forces from under NATO command, has not helped. Nor has the US tendency to withdraw and try to demonstrate, with an exercise like Big Lift in 1963, that we can get there "fustest with the mostest." The truth is that Big Lift moved personnel only, to mate up with equipment already on the scene.

As the Air Force has contended, ever since the days of the Finletter Report at least, there is no substitute for a force-in-being. NATO needs one on the spot, properly manned, trained, and equipped, ready to fight in hours—not in weeks or months. Our NATO allies, as well as the United States, must face up to this if freedom is to survive in Western Europe.

It is not a happy holiday message, but 1969 can be the critical year when NATO combat units will have to prove their deterrent value. The reason, pointed out in a Brussels speech by Senator Henry M. Jackson, is that the Russian rape of Czechoslovakia has "consciously and deliberately laid the basis for political pressures, blackmail, and possible adventures elsewhere."

Peace on Earth will never come cheap, so long as such a large portion of the world does not heed the word from Bethlehem.—END

Payload: 12 tons.

You're looking at the heaviest-lift helicopter available.

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AIRMAIL

Systems Analysis

Gentlemen: With regard to "Anyone for Coexistence?" [by Claude Witze, "Airpower in the News," October issue], I feel constrained to offer a few observations with regard to the function of systems analysis. That this technique may be used to assist in reaching a decision cannot be faulted. Unfortunately, a weakness lies in the development of this adjunct to decision making; that is, in its formulation. Conceivably, it would seem possible to believe so strongly in a specific thesis that all objectivity could be driven from the analysis. It is a fact, however, that within a given set of parameters, where the inputs that drive the analysis are identified, the study output can be substantially controlled.

While it cannot be denied that systems analysis can be a highly valuable tool to aid the decision-maker, in reality, where parochial or financial interests are closely related to the study, it is believable that those interests could influence the development of the analysis and its subsequent findings. It is here personal integrity might be subject to severe pressures.

Systems analysis, like the commander's estimate of the situation, should be but one element in the decision-making process. In the final analysis it is professional experience and judgment that must prevail if the best decision possible is to be reached.

COL. PETER E. BOYES
Myrtle Beach AFB, S. C.

8th TBS Thumbnail History

Gentlemen: I recently had the pleasure of reading your September issue "The 18th Annual Air Force Almanac." I found, however, one discrepancy which I bring to your attention.

In your description of the B-57 aircraft in the bomber section of your "Gallery of USAF Weapons," you stated that the 13th Tactical Bombardment Squadron was the single operational squadron flying the B-57 in Southeast Asia. Actually, the 13th TBS was deactivated earlier this year. Its sister squadron, the 8th Tactical Bombardment Squadron, known as the "Liberty Squadron," is the squadron which is continuing to fly these aircraft in Southeast Asia. The squadron flies the B-57B, C, and E.

The members of the squadron, both past and present, are quite proud not only of its present role in the Republic of Vietnam but also of its heritage.

The 8th Bomb Squadron, the oldest squadron in the Air Force, was organized in May 1917, at Kelly Field, Tex. Since that time, the squadron has been on continuous active duty, serving in World War I, World War II, Korea, and Vietnam.

Late in 1917, the squadron sailed for the battlefronts of Europe where, during World War I, they flew 3,900 operational hours. For their participation in the "Great War," the squadron received five squadron streamers and earned an official commendation from the Allied Expeditionary Forces. During this time, the 8th earned the nickname "Liberty Squadron," derived in part from the American Liberty engine that powered their DH-4s.

In the 1920s and '30s the 8th patrolled the Mexican border, experimented with new planes, set new endurance and speed records, carried the US mail, and, perhaps most difficult of all, remained alive and part of the forgotten air arm. Many future generals received their early training with the 8th during this period—men like Gen. Nathan Twining and Gen. James Doolittle.

Three months after America entered World War II, the 8th was on its way to Australia to once again get in on the ground floor of a war. Flying A-20s, A-30s, and B-52s, the men of the 8th fought their way through the Pacific islands to Okinawa.

At the end of the war, the 8th moved to Japan, where it remained until the outbreak of the Korean conflict. The squadron flew the first (June 26, 1950) and the last (June 27, 1953) bombing missions of that "police action." They and their sister squadrons in the 3d Bombardment Wing were the famed "Night Intruders," who dropped forty percent of all bomb tonnage unloosed by Fifth Air Force units in Korea.

In October 1954, the 8th came home to Johnson Air Base, Japan, where they received their first B-57 light bomber in 1956. In November 1960, the squadron moved to Yokota Air Base and rotated to Kunson, Korea.

After the Gulf of Tonkin incident, the 8th was sent TDY to Clark Air Base, Republic of the Philippines, and was permanently assigned there in April 1964. At 1630 hours, on August 5, 1964, the Clark Air Base siren sounded the alert which sent the squadron to Bien Hoa Air Base, Vietnam. The combat missions flown by the 8th on February 19, 1965, were the first jet combat missions flown in Vietnam. The 8th has continued its historic traditions in operations from Bien Hoa, Tan Son Nhut, Da Nang, and presently from Phan Rang Air Base.

With fifty years of flying, the 8th Bomb Squadron has won twenty-seven battle streamers, five Presidential Unit Citations, and a firm niche in US aviation history.

CAPT. JOEL T. CHAMPION
Dayton, Ohio

• *Our September issue blooper about the 13th Tactical Bombardment Squadron was corrected by a letter from Maj. Ernest L. Carlton, which appeared in the November "Airmail" column. However, we thought our readers would find Captain Champion's thumbnail history of the 8th TBS of interest, as we did.*—THE EDITORS

Still in the Action

Gentlemen: While reading through the September '68 issue . . . I noticed a statement that I feel does a great injustice to the officers and men of my squadron.

In the "Gallery of USAF Weapons" section, Mr. Allan R. Scholin said "RF-101 reconnaissance aircraft in Southeast Asia no longer fly missions over North Vietnam." Having just landed from my 42d mission over North Vietnam [*This letter was written before the bombing halt.—Ed.*], I couldn't help but wonder where Mr. Scholin got his information.

To set the record straight, my pilots [flew] several missions every day over North Vietnam, with outstanding mission results. During their year's stay with the squadron,

(Continued on page 13)

When all hell breaks loose, who cares about prop pitch and RPM?

We do.

When it's time to hightail it out of a tight spot, the North American OV-10A's fixed shaft T76 engines respond instantly at the touch of a single control. As the pilot advances the power lever, the prop blade pitch, engine fuel flow, and RPM are automatically adjusted to give maximum power, freeing the pilot to devote full attention to the mission.

The Garrett-AiResearch T76 military turboprop, mated with North American's SLPMS (Single Lever Power Management System), makes this coordination possible. It brings a new measure of pilot effectiveness and engine performance to combat aircraft.

Contact us for the full story on the performance facts and specifications of our rugged, reliable T76 turboprops.

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Garrett is one of The Signal Companies

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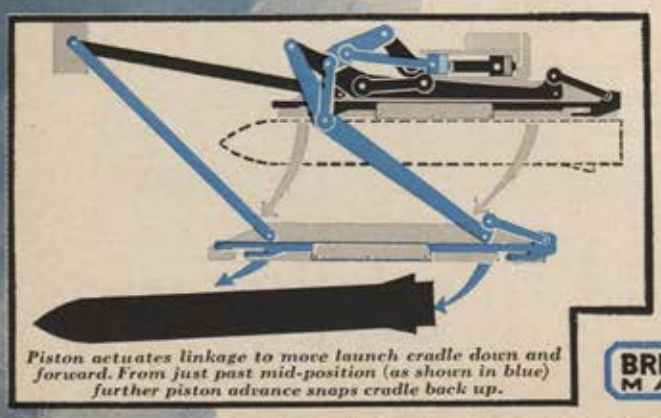
Advanced Manned Strategic Bomber or Attack Aircraft to mate with new state-of-the-art Stores Launcher



Piston actuates linkage to move launch cradle down and forward. From just past mid-position (as shown in blue) further piston advance snaps cradle back up.

Aircraft such as these aren't designed yet—but the Breeze Launcher is . . . and it will put missiles safely into flight at Mach 4. Cartridge-powered, close-carried, ingenious, this Launcher is a state-of-the-art advance over its well-proven forerunners. It provides lighter reaction loads, smooth acceleration, detachment before missile ignition, and instant retraction.

These compact units can solve oppressive problems for designers of the AMSB, or AAA. If you are one, call or write for detailed information!

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each pilot [flew] 100 missions over the North in addition to many over the South. All of the flights [were] in direct support of our country's efforts in Southeast Asia.

We are all quite proud of the accomplishments of the "Old Bird," and feel that she should be given her just recognition. I, therefore, extend an invitation to your magazine to take a first-hand look at the operations of the officers and men of the only "Voodoo" Squadron in Southeast Asia.

LT. COL. ALFRED C. SIMMONS
Commander
Det. 1, 45th Tactical Recon Sqdn. (PACAF)
APO, San Francisco

A-20 Search

Gentlemen: Could any of your knowledgeable readers tell me whether there is in existence anywhere in the United States a World War II Douglas A-20, known to the RAF as the Boston or Havoc?

I would be most grateful for any information.

HUMPHREY WYNN
Editorial Department
FLIGHT International
Dorset House
Stamford St.
London, SE 1, England

AAC Cadet

Gentlemen: As a last resort, in the hopes that there might be someone whose memory goes back that far, I would like to ask if there is anyone who knows of a book, published in the late 1920s, about the author's experience as an aviation cadet in the Army Air Corps, and of his subsequently being stationed at Langley Field with a bomber squadron at the time General Billy Mitchell was there?

I have nothing else to go on but these bare facts. If anyone can give me any fragments of information on sources that might be consulted or books written then about the Army Air Corps in the terms described above, it would be appreciated.

DR. HOLMAN W. JENKINS
Kingsborough Community College
The City University of New York
Oriental Blvd., Manhattan Beach
Brooklyn, N. Y. 11235

UNIT REUNION

91st, 303d, and 305th Bomb Groups

An international reunion of former members of the 91st Bomb Group (H), the 303d Bomb Group, and the 305th Bomb Group is scheduled to be held in London, England, on June 15, 1969. For air and land arrangements those who wish to attend should write to

Robert E. Gerstemeier
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Lansdale, Pa. 19446

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I certify that the statements made by me above are correct and complete. *(Signature of editor, publisher, business manager, or owner.)*

/s/ James H. Straubel
JAMES H. STRAUBEL
Publisher

Show and Tell

The game is data display and conversion–and Kearfott is "it"!

The control panels and analog/digital converters we supply to the Autonetics Division of North American Rockwell are being integrated by them into the Advanced Avionics System for the F111D and the FB111.

This game is not for fun: the success of the mission and the life of the crew may depend on the ability to quickly understand the information made available by the system's sensors and central computer complex.

Our panels are the interface between the pilots and the computer complex. They provide the means for the pilot to "talk" to the computers and for the computers to "talk" back.

The other interface, through our microelectronic analog and digital converters, permits a dialog between machines talking in the analog domain and the digital computer complex.

If your game calls for man-machine and machine-machine interface, why not call on the leaders who wrote the rule book in the first place. You can never tell how much we can help you until we show you. Write today to: Kearfott Products Division, General Precision Systems Inc., 1150 McBride Avenue, Little Falls, N.J. 07424 for our new brochures describing our control/display and conversion equipment.

For the F111D

The Navigation Data Entry Panel is the primary manual input to the central computer complex and to the Inertial Navigation Set of the Advanced Avionic System.

Navigation Data Display Panel provides for the display of Navigational and weapon delivery data and for the means of selecting the data desired.

Flight Data Display Panel displays flight endurance (time-to-go) and maximum values for load factors and for airspeed as related to stress.

Avionics Test Panel provides the means to select and display the results of built-in tests of the equipment in terms of function and mode.

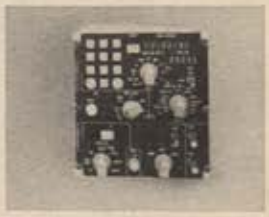
The Maintenance Control Unit routes self-test information to elements of the Advanced Avionic System and permanently records failures of Line Replaceable Units on paper tape for the convenience of the ground crew.

These hand held Designation Control Units permit the pilots to position cursors and introduce cursor position data into the computer complex.

The solid state analog-to-digital converter with multiplexed input-output is programmable in terms of variable sample and up-date rates and permits simultaneous processing of serial and non-serial instructions.

For the FB111

Navigational Display Unit displays navigational, weapon delivery and operational status.



Provides overall system power control and the means for entering and recalling data and for the display of the data. It also selects and controls the operational modes of the system.

Like the analog to digital converter for the F111D, a similar unit for the FB111 handles the communication between the advanced avionic system and the other avionics aboard the FB111 aircraft.

GENERAL PRECISION SYSTEMS INC.

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By Claude Witze
SENIOR EDITOR, AIR FORCE/SPACE DIGEST

What Kind of Mandate?

WASHINGTON, D.C., NOVEMBER 13

It would be easy to join in the chant of post-election dissectors and declare that the narrow margin of Richard Nixon's victory at the polls a week ago is highly significant. Actually, his margin hardly differs from that enjoyed by John F. Kennedy in 1960, a year when there was a good deal less said about the new President lacking a "clear mandate."

The editorial writers are pointing out that the Democratic Party has retained control of both houses of Congress and that the nation faces a period of "divided government" while it struggles with the war in Vietnam, the crisis in the cities, and racial tensions.

In the first place, few of these autopsies say anything about the more than nine million citizens who voted for George Wallace, the spoiler in the race. Preelection polls indicated that if his supporters, be they Southern rednecks or factory workers of the industrial North, had not had Wallace to vote for, they still would have gone to the polls. And, given the choice of Mr. Nixon or Hubert Humphrey, part of these normally Democratic voters would have voted Republican.

It seems fair, then, to submit that the 1968 election, if it provided an uncertain mandate under the rules of the game, at the same time provided a blessing to the American two-party system. It has been clear, at least since the Democratic convention in Chicago, that the great division in this country, if there is one, is not between doves and hawks, racists and integrationists, or Democrats and Republicans. The division is between the middle class and its detractors. The middle class voted for Nixon or Wallace, according to their druthers. They voted against the incumbents, and against the malcontents in the incumbent camp. It is not without significance that the Washington *Post*, considered a liberal voice in the Capital, used a cartoon depicting Eugene McCarthy as a little man, a stature he acquired at least by the time of the Chicago convention if he did not have it before.

Another interesting part of the election outcome that tends to support this thesis is that the South did not support Mr. Humphrey. Only Texas is in his column. If Mr.

(Continued on following page)

Over sherry at the White House, President-elect Nixon is welcomed by the man he will replace. The Republican, who will move in on January 20, is expected to make some big changes in the operation of his staff, putting greater responsibility on his Cabinet officers and curtailing the role enjoyed in the past few years by strong assistants.

Wallace had not been on the ballot, it is possible that the GOP would have had a near-clean sweep in the South. On the other hand, some of the Northern industrial states, such as Ohio, Illinois, or New Jersey—which were squeakers for Nixon—might have given their electoral votes to Mr. Humphrey. So, even without Wallace, the election would have been a close one.

Now for the problem in Congress. Is there one?

Without going into a detailed review of Mr. Nixon's already-declared preferences that came out of his campaign effort and somber pronouncements of the Republican National Committee, it would seem that many members on the majority side in the House and Senate have no serious quarrel with the new President. Certainly on issues involving national security, both Congress and Mr. Nixon are searingly critical of the retiring Administration.

There is no evidence that the 91st Congress will have views on defense or the political, social, and economic issues before the country that will differ much from those of the 90th Congress. One published study shows that the views of the new members correspond closely with those of the men they replace. For example, the new House of Representatives will have exactly the same attitude as the old one on the subject of US involvement in foreign military commitments, such as Vietnam. The study, reported by *Congressional Quarterly*, revealed that about 250 House members strongly favor US involvement abroad, with the remaining 185 members split fairly evenly between moderates and isolationists. It is unlikely that President Nixon will find this uncomfortable.

Neither will he be upset, it would seem, by the report that proponents of strong civil-rights legislation have lost about a dozen votes in the House. The middle-of-the-road group on this issue and the list of members opposed to further civil-rights laws each gained about six votes. The study placed about 190 members in the pro-civil-rights camp, about 110 members in the middle group, and 135 members in the conservative group. On the law-and-order issue, the new House is found to have seventy-five members classed as hard-core liberals, about a hundred and ten in the middle group and a hundred and thirty-five classified as conservatives. Advocates of increased federal aid to cities apparently lost about ten votes. It would not appear that President Nixon would find this House much more difficult to live with than did his predecessor.

There was no nose count on issues of national defense, but the new President is on record as favoring increased strategic power. He wants to "negotiate from strength," a phrase he could have borrowed from Clark Clifford, the present Secretary of Defense, or from the chairmen of Armed Services committees on either side of Capitol Hill. The President-elect also shares the conviction of many members of Congress and the armed forces that the Pentagon has been overcentralized in the past eight years and that the Defense Department's own staff has been expanded beyond the limit that should have been set for economy and efficiency.

One change that is expected will bring cheers from most military policy-makers. That will be the revival of the National Security Council as a basic policy-maker, a group that will put down on paper a specific statement to guide the Defense Department and the armed forces as well as the rest of the government. Gen. Nathan F. Twining, USAF, who served as Chairman of the Joint Chiefs of Staff from 1957 to 1960, has written that the document "became the basis for political-military planning for the coming year," when he had the job. He said it "provided essential guidelines to ensure a cohesive national effort in political, economic, and military affairs." There has been no National Security document since 1961. In these past few years, policies have been "gleaned," the General says, "from fragmented statements of high-placed public officials, from testimony before the Congress, and from an interpretation of the specific actions which were taken by the Administration." The idea, incidentally, did not originate with the Eisenhower Administration during Mr. Nixon's last tour of duty in Washington. It was inaugurated by Harry Truman, and subsequent Republican Administrations found it an essential tool.

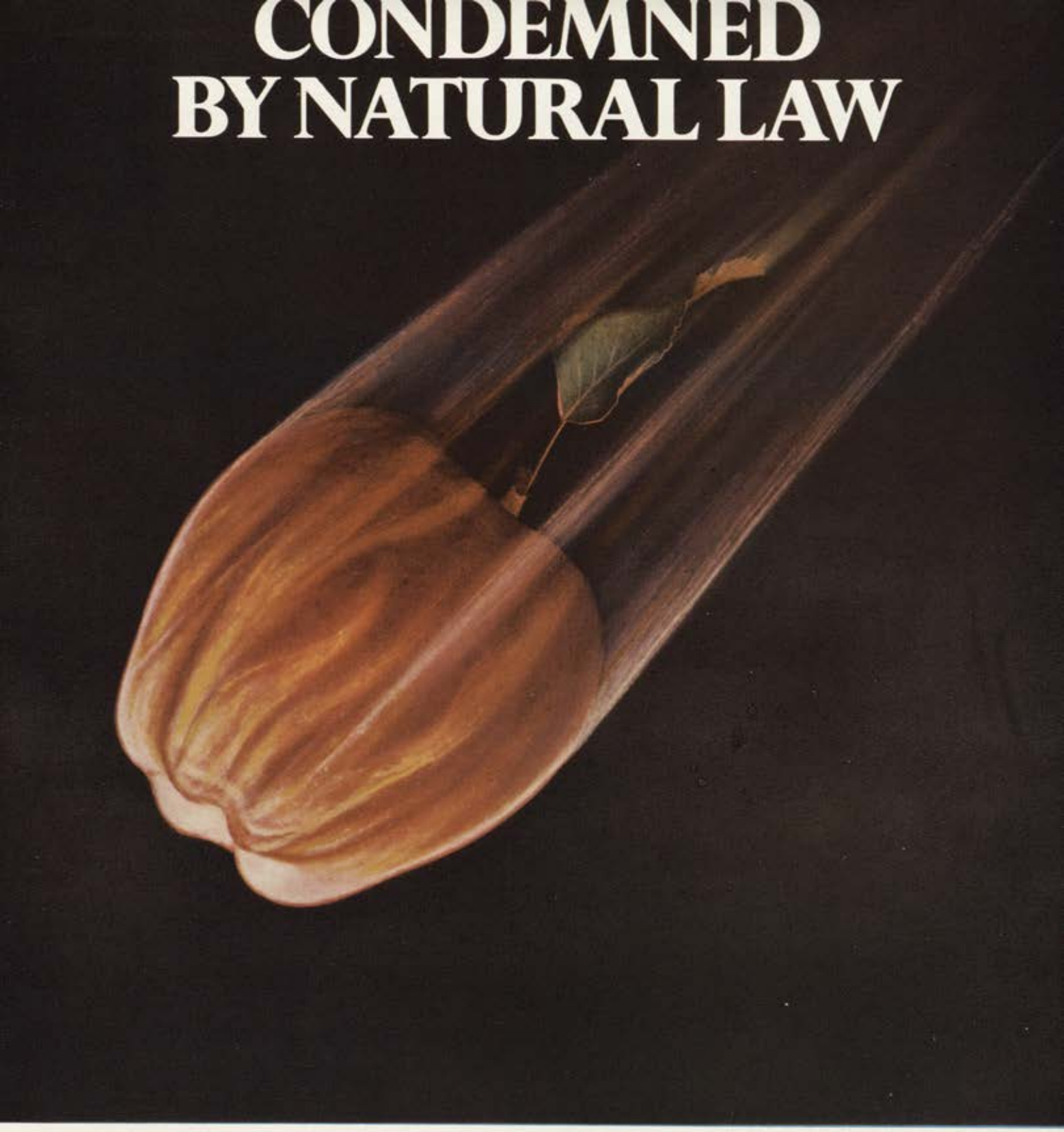
Mr. Nixon has pledged, as recently as in a speech about ten days before the election, that he will try to reach "meaningful arms-control agreements" with our potential enemies. He then suggested that the "Open-Skies" proposal, an Eisenhower-generated program for reconnaissance from space to patrol the armaments of every nation, may be revived.

"One of our major goals," he said, "must be to convince the Soviet Union that its obsession with secrecy does not bring security."

(Continued on page 19)

Mr. Nixon, flanked by CIA chief Richard Helms and Gen. Earle Wheeler, is briefed in the Cabinet Room by Mr. Johnson. Left to right, the President is aided by Walt W. Rostow, his special assistant; Secretary of State Dean Rusk; and Defense Secretary Clifford.

CONDEMNED BY NATURAL LAW



If Newton's apple had fallen from 100 miles up, it would have been doomed to disintegration. So would a vehicle entering Earth's abrasive atmosphere at tremendous velocity.

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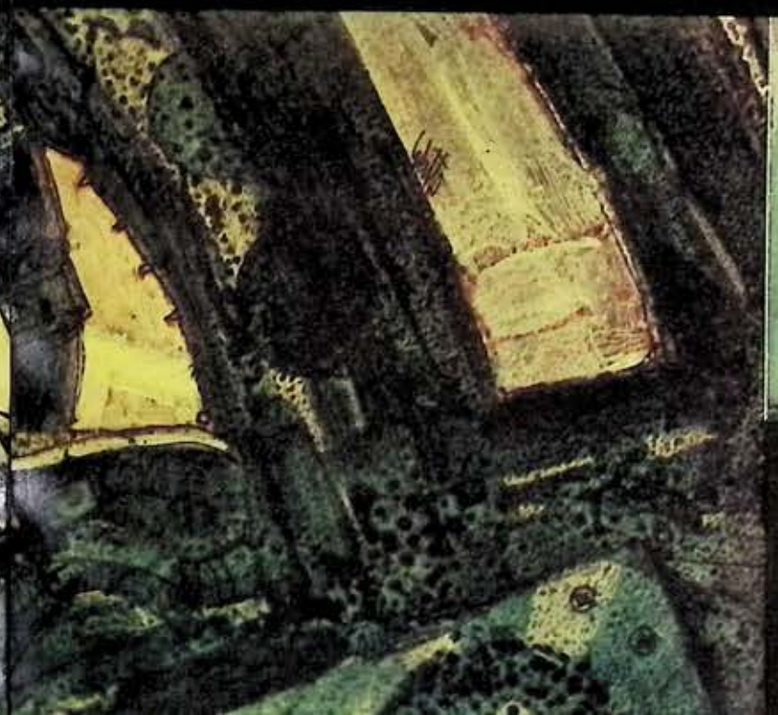

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Mr. Nixon will move into the White House with the budget for the fiscal year starting next July 1 already bearing the firm imprint of the Johnson Administration. The first real Nixon budget will be that of Fiscal 1971. By that time, a number of new projects presumably will be under way, broken loose by a determined Congress and slowly shifting emphasis in a Pentagon now headed by Secretary Clifford.

In summary, the prospect for a harmonious government is at least as promising as that for a "divided government." Mr. Nixon is quoted as having "heard the voices of the broad and vital center." He senses that "the center is under vital attack" and "must be held at all costs." The election returns indicate he has support for this observation among the public and in Congress.

Who Is on the End of the Limb?

The halt in American bombing of North Vietnam now is thirteen days old. The doves who were generating the most pressure for this step, and worked the hardest to make it a political issue, have been silent for these thirteen days. But last night, the Administration lost its cool. A nearly exasperated Secretary of Defense, obviously speaking with authority of the White House, actually threatened his allies in Saigon.

Red-faced and pounding the podium for emphasis, Clark M. Clifford said the Johnson Administration is prepared to negotiate on its own with Hanoi if the Saigon government boycotts the Paris peace talks. Of equal importance is the fact that President-elect Nixon came away from a White House meeting twenty-four hours earlier to disclose that the Johnson Administration, in this case Mr. Clifford, speaks for the new Administration as well as the present one.

Progress on the peace talks, the President-elect said, can be made only "if the parties on the other side realize that the current Administration is setting forth policies that will be carried forward by the next Administration." He saw the same advantages, over the interim period, for other matters involving foreign policy, which he says cannot afford a gap of two months without action. It was the first concrete evidence that the Nixon regime will practice bipartisanship in the field of foreign relations.

Mr. Clifford's outburst means that the United States now is ready to get tough with Saigon. Undoubtedly, Mr. Nixon knew this was coming and gave it his approval. The reason is not difficult to find. President Nguyen Van Thieu, probably convinced that the Nixon Administration will be more stern with his Communist foes than the present war-weary US government, invited the President-elect to Saigon for what was described as "an on-the-spot assessment of the war and the situation."

The bid was refused, and it was announced that Mr. Nixon will make no trips out of the country unless he is asked to do so by President Johnson. The interpretation placed on these developments can and does vary. To some, it is a confirmation of George Wallace's charge that there is "not a dime's worth of difference between the major political parties." To others, we are witnessing the practice of high-grade statesmanship.

There is little mention of the fact that Lyndon Johnson kept himself out of the Presidential race this year, and at least one of the reasons was that he wanted complete freedom to end this war, if possible, before he moves from the White House. Whatever selfish reasons he may have had and his hopes for a spot in history, he put his basic formula in the famous San Antonio speech of September 1967. As carried to Paris by envoys Averell Harriman and Cyrus Vance, it said simply that the President could not maintain a cessation of the bombing unless he could prove it was a step toward peace. Once halted, it could not stay halted if the demilitarized zone were abused and South Vietnamese cities attacked. The Paris talks started in May, but it was not until October 27 that Hanoi accepted the US terms, and that date is cited by White House spokesmen as the real turning point.

Just prior to the acceptance there had been many meetings with President Thieu, and Ambassador Ellsworth Bunker reported at one point that he had "concurrence" from the Saigon chief. Later, questions were raised about who the participants would be at the peace conference and how they would sit around the table. At this writing, this still appears to be the issue.

Defense Secretary Clifford, in his heated scolding, said he would not speculate on what it was that caused Saigon to change its mind, but "we should make every reasonable effort to demonstrate to Saigon why it should come in and join the talks. At the same time, if they choose not to, I believe the President has the responsibility of proceeding with the talks."

So far as Mr. Nixon is concerned, he was briefed, along with Hubert Humphrey and George Wallace, before the President's speech of October 31. They were told a "snag" had developed in Saigon. Despite this, Mr. Clifford said later, "I believe the President was absolutely right in not giving Saigon a veto on the plan."

The Nixon participation, if it can be called that, continued at the White House this week when he spent more than an hour in the Cabinet Room with the President; Mr. Clifford; Secretary of State Dean Rusk; Gen. Earle G. Wheeler, Chairman of the Joint Chiefs of Staff; Richard Helms, Director of Central Intelligence; and Walt W. Rostow, special assistant to the President on foreign affairs.

It was after this meeting that the President-elect promised to carry on with Johnson policies in the area of foreign affairs. He said the White House discussions were "candid and forthright," but he did not disclose what has been said about the apparent impasse with Saigon.

Press reports from Saigon indicate that the nation's fractionated political, religious, social, and economic makeup is contributing, as usual, to the government's difficulties. President Thieu has been cheered for his firm stand against participating in the peace talks, but it has not been clear who was cheering and why. The Buddhists are known to be doves; the Catholics, as ever, are strongly anti-Communist. The general spirit of nationalism is such that many Vietnamese would resent having anything but the front seat at negotiations. On the other hand, at least one report says that South Vietnam lacks confidence in its own ability to negotiate in what is referred to as the "world spotlight."

The general inability of the Saigon government to take prompt, decisive action to meet critical problems is well known to most Americans who have served a tour of duty in that country. No doubt it also is known to Mr. Nixon and his advisers, who will take over full responsibility after January 20.

For this reason, the Nixon Administration's apparent granting of a blank check to the Johnson Administration cannot itself be taken at face value. Between now and January 20 the entire affair could take any number of new directions. Mr. Nixon and his Secretary of State, whoever it may be, will not be hungering for alternatives. Meanwhile, the new President has, in effect, left Mr. Johnson alone with the problem.—END

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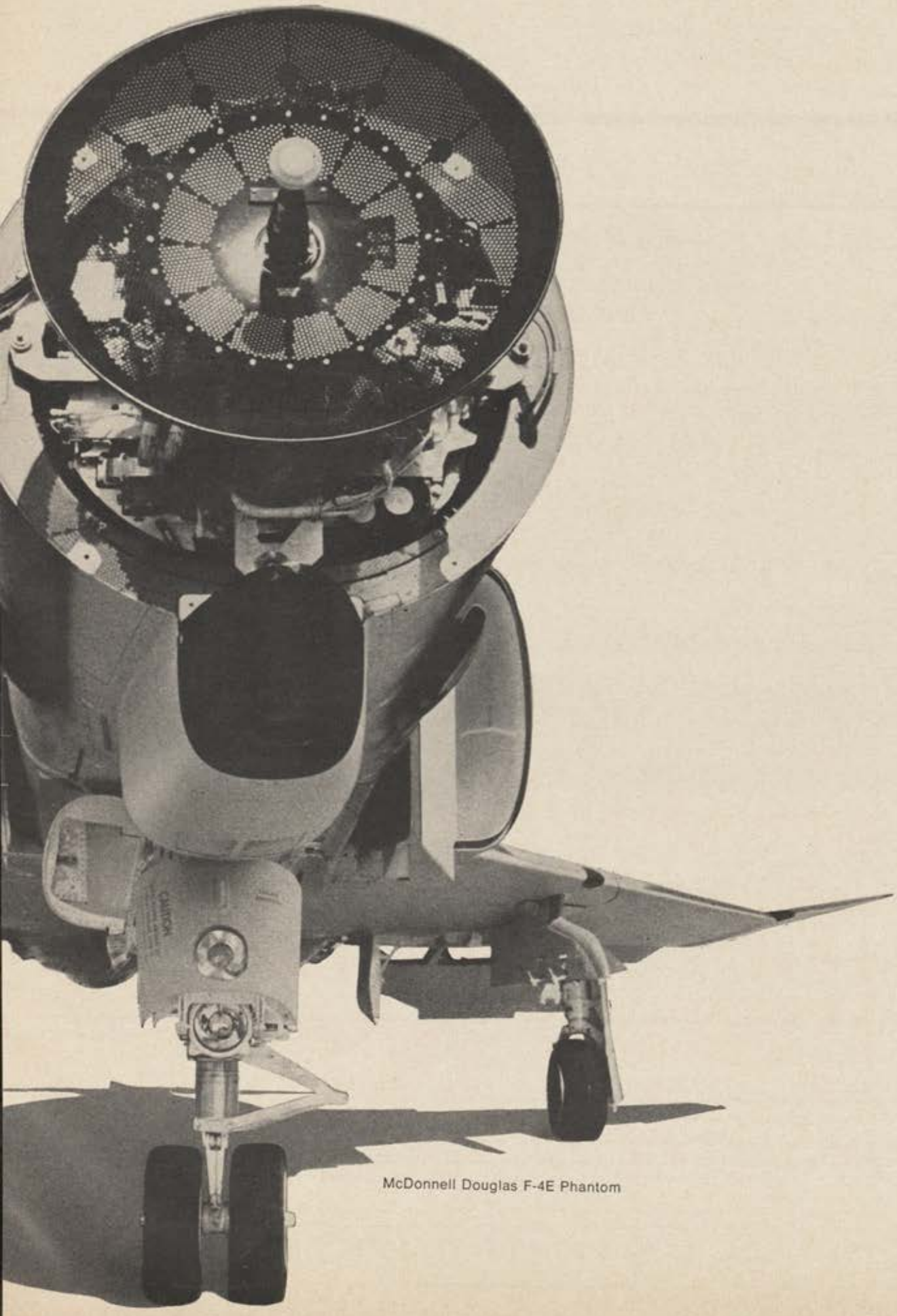


McDonnell Douglas F-4E Phantom

TI Radar Guides New A-7 Close-Support Aircraft in Low-Level Flight

Sneak Punch

America's newest light-attack aircraft, the A-7 Corsair II, employs advanced-design radar to sneak up on targets by hugging the ground at near-sonic speeds. The new plane, manufactured by Ling-Temco-Vought, Inc., penetrates enemy defenses – hits and runs – before it can be detected.

This low-level navigation and pinpoint weapon delivery is made possible through use of a unique multimode radar subsystem developed by Texas Instruments Incorporated. The TI radar provides both lateral information and elevation commands required for "under the fence" penetration.

Ground-mapping capability of the radar provides important navigation data that allows the A-7 pilot to select carefully the most desirable route to and from a target. Once the aircraft nears its target, the radar indicator is switched to conventional TV display to aid in weapon delivery. In all, the A-7 radar subsystem can present to the pilot five different types of displays that assist him in navigation, weapon delivery and low-altitude flight.

Advanced avionics give the A-7 a day or night flight capability. It's TI-built radar is the latest in a family of multimode sensors designed for military aircraft including the Phantom II, C-130 Hercules and F-111.

TEXAS INSTRUMENTS
INCORPORATED

AEROSPACE WORLD

WASHINGTON, D. C., Nov. 18

The effect of Richard M. Nixon's election on the future and direction of the US aerospace and defense effort can at this time only be discussed in light of the general principles to which the incoming Administration is pledged.

Overriding is the firm commitment by the President-elect to a "clear-cut" superiority in place of what he termed "the peculiar unprecedented doctrine called parity" in terms of the US strategic posture.

A strong clue to the next President's thinking on the place and role of defense within the broad framework of geopolitical priorities is in this recent statement:

"I believe that the creditability of our nuclear deterrent and our hopes for détente with the Soviet Union are inextricably linked together. In a time of explosive technological change, our efforts to modernize and balance our offensive and defensive forces cannot slacken without gravely impairing world stability and prospects for genuine peace."

It would seem safe then to assume that in order to be able to "negotiate from strength" and to move the national defense from its present state of being "too close to peril point," the next Administration will have to be willing to foot the cost of attaining strategic superiority.

The same conclusion can be drawn from a statement made by the President-elect earlier this year that the ratio between the US and the USSR in deliverable nuclear power had slipped from six or seven to one at the end of the Eisenhower Administration to only two and one-half to one in 1968, with the prospect in sight of the Soviet Union overtaking this country. Mr. Nixon added: "We must restore at least a part of the strategic advantage we once held—not because we want power, but, in the world as it is, we need power if we are to be secure."

The impact of the coming Administration's avowed goal of strategic superiority on such programs as AMSA and advanced ICBMs as yet is not clear. However, widespread speculation that these programs will experience an acceleration under the Nixon Administration would seem to be plausible.

As yet not discernible are the next Administration's views on federal funding of nonmilitary aerospace undertakings, especially the pending SST program, development of a commercial V/STOL system, and creation of a coordinated airport/airways system. While informed officials in Washington do not expect a slowdown in these programs over the next four years, they do not rule out such a change in tactics as creation of public corporations, underwritten by the government, to assume the role presently played by the government directly.

☆

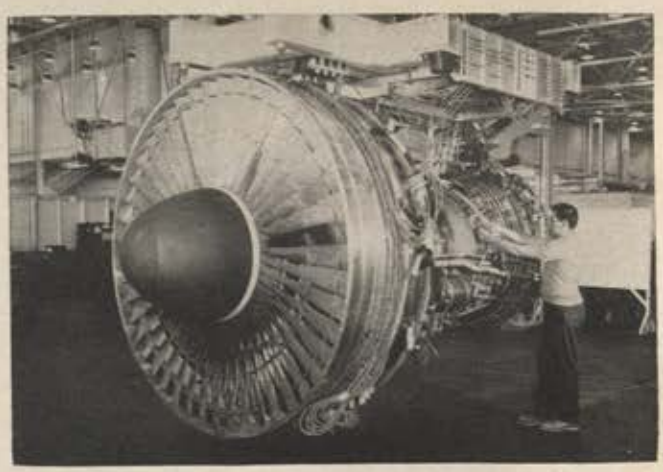
Gen. Howell M. Estes, Jr., commander of the Military Airlift Command (MAC), piloted the Air Force's giant new airlifter, the C-5 Galaxy, during a recent test flight lasting an hour and fifteen minutes. After putting the world's largest aircraft through its paces in the twelfth test flight since its maiden flight in June, General Estes said: "I think the handling qualities of the airplane are absolutely remarkable for this early in the program. Over-all it feels extremely stable . . . and handles very solidly, either coming in on approach or just flying through normal ma-

(Continued on following page)

Gen. Howell M. Estes, Jr., first pilot other than Lockheed and USAF test crews to fly the mammoth C-5 Galaxy, has called handling qualities of the world's largest airplane "absolutely remarkable" for this early in the program. General Estes' Military Airlift Command is the C-5's principal user.

For Apollo-8 astronauts, left to right, Frank Borman, James Lovell, and William Anders—shown at Cape Kennedy, Fla., during mission test run—the 1968 Christmas season will be memorable. They are scheduled for December 21 circumlunar flight, which, if all goes well, will take them into lunar orbit for ten circuits, then back to ocean recovery. Borman and Lovell are space veterans.

General Electric CF6 turbofan engine, principal powerplant of the DC-10, produced in excess of 42,000 pounds of thrust during a recent test run, more than five percent higher than the 40,000 pounds guaranteed for production engine. The engine is a derivative of C-5's powerplant.



Pratt & Whitney's 45,500-pound-of-thrust JT9D engine gives the DC-10 a range of 4,720 miles with payload of 60,555 pounds (up to 284 passengers plus baggage) at cruise speed of Mach .82. Cruise thrust at 35,000 feet is 9,260 pounds. Specific fuel consumption is a high .614.

neuvers. The pressure on the controls is very light. The Lockheed-Georgia Co. management is to be complimented on the progress in the Galaxy program."

The first C-5 will be delivered to MAC in June 1969. Fifty-eight C-5s are on order, with an option for another fifty-seven. Lockheed-Georgia predicts it eventually will sell over 200 military versions.

☆

Pratt & Whitney Aircraft Division of United Aircraft Corp. has entered the airbus (tri-engined superjet) competition, the most hectic and potentially lucrative contest in commercial aviation. Northwest Airlines announced it had ordered fourteen McDonnell Douglas DC-10 P&W-powered trijets and opted for an additional fourteen. The DC-10, as initially announced and ordered by United Airlines and American Airlines, uses GE engines designated CF6. The engine is a commercial derivative of the TF39 powerplant of the C-5 Galaxy. Rolls-Royce Ltd. is building the engines for the Lockheed L-1011, the other entry in the airbus race.

Known as the Series 20, the Pratt & Whitney-powered DC-10 is an intercontinental jetliner that competes directly with the four-engine Boeing 747. Both aircraft employ P&W's JT9D engines with a thrust output of 45,500 pounds.

Finally, McDonnell Douglas has announced yet another version of its DC-10, the "dash 30" model that is to employ an advanced version of the GE CF6 engine capable of producing 45,600 pounds of thrust, compared to 40,000 pounds for the first version of the CF6. Range of the DC-10 intercontinental models is 4,900 miles with a payload of 270 passengers and their luggage.

☆

On October 21, at the fifth annual meeting of the American Institute of Aeronautics and Astronautics in Philadelphia, the Boeing Co. announced additional details about redesign of the SST, including abandonment of the variable-sweep wing approach. (*See also November '68 AF/SD, page 89.*)

In a paper presented by J. M. Swihart of Boeing's engineering staff, the company announced plans to be presented to the FAA on January 15 for a fixed-wing design, about 280 feet long, with a wingspan of 141 feet eight inches, a wing sweep angle of fifty degrees and vertical tail tip height of fifty feet above the ground. In planform the new design, designated 2707-300, resembles the F-4 supersonic fighter. Its range with a full payload of 234 passengers will be in excess of the New York–Paris distance, according to the Boeing spokesman.

The actual production aircraft may increase passenger capacity to 300 along with an increase in range. The design is said to offer low-speed performance characteristics comparable to a variable-sweep-wing design without the latter's high structural weight. The

(Continued on page 28)

Current redesign effort of the United States supersonic transport (SST) has narrowed to one configuration, which Boeing Co. plans to submit to FAA's SST Program Office by January 15, 1969. Resembling the F-4 supersonic fighter in planform, the 2707 dash 300 design employs a fixed-wing configuration having a 50-degree sweep angle, a separate tail section, and high-lift devices.

INVOLVEMENT

F-105 Thunderchief

F-84F Thunderstreak

P-47 Thunderbolt

At Republic it means developing the next air superiority aircraft

The next Air Force air-to-air fighter must outfly and outfight anything that may fly against it.

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And we have the combat experience to make it pay off. From Republic, new thunder for the Air Force.

FAIRCHILD HILLER
REPUBLIC AVIATION DIVISION

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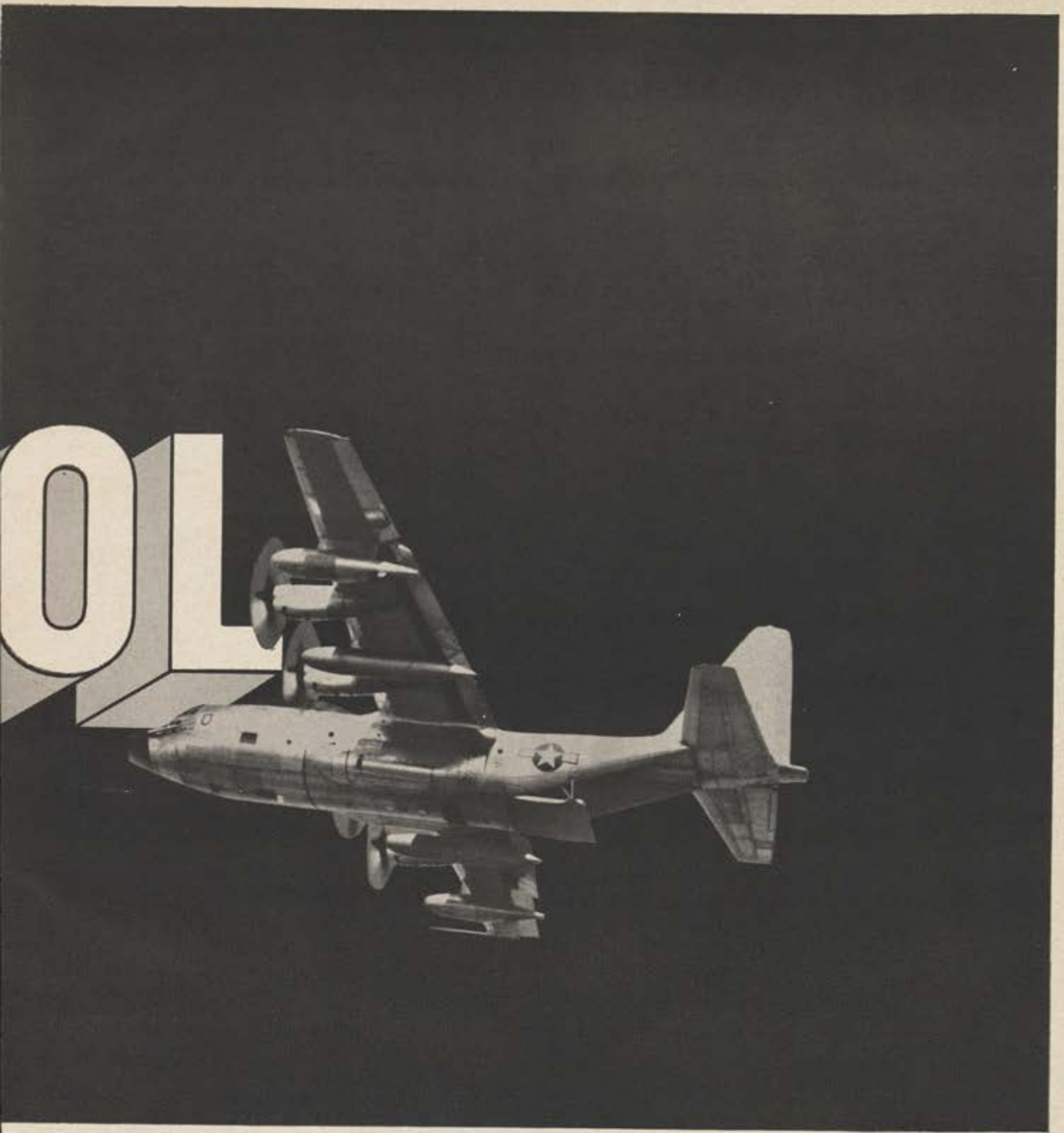
It may take 8 years to develop the first LIT. But the Air Force has Interim LIT capability now—because our CH-53 VTOL Transport and STOL-type transports are in Air Force inventory now.

Working as a V/STOL system, these aircraft surpass all specifications for the Light Intra-Theatre Transport (LIT) in speed, payload, vertical capabilities and radius of operation. And, with



tomorrow...these aircraft can do today.

in-flight refueling of the CH-53, the range of this LIT team is virtually unlimited.

So though the Air Force may have to wait for LIT in a single system, they can have it today by combining aircraft already in USAF inventory.

Sikorsky Aircraft DIVISION OF UNITED AIRCRAFT CORPORATION

STRATFORD, CONNECTICUT

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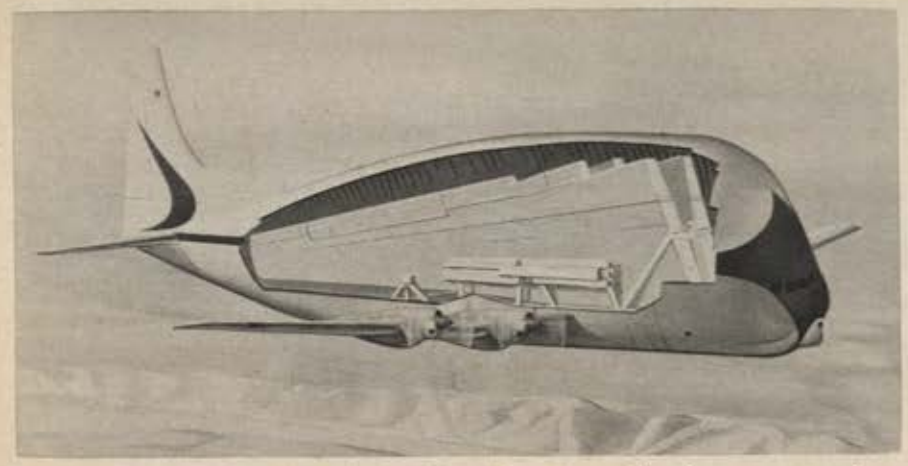

Super Guppy, operated by Aerospace Lines, Inc., was selected to transport wings for the new Lockheed-California Co.'s L-1011 superjet from Avco Corp.'s fabrication facility in Nashville, Tenn., to the assembly site in Palmdale, Calif. The twenty-five-foot diameter of the Super Guppy's cargo compartment makes it possible to transport the entire twenty-ton wing set in a nearly assembled form.

company also said that "the conventional aft tail allows the use of leading and trailing edge flaps, which produce approach handling qualities similar to subsonic jets the airline pilot will have been flying. The wing and tail combination also produces good stability in all other flight regimes."

While the moderate sweep angle (compared to about sixty degrees with the British-French Concorde and Lockheed's SST) includes a higher wave drag at supersonic speed than the variable-sweep-wing configuration, the over-all lower structural weight inherent in the new approach does not result in loss of range or reduced performance, according to Boeing.

Boeing plans to keep to its original intent of building the SST (from titanium alloy including titanium honeycomb) to obtain Mach 2.7 cruise speed capability. H. W. Withington, Boeing's SST Program Director, explained that during the redesign effort the company had taken another look at an aluminum SST but decided against that approach because it provides for only "Mach 1.9 or Mach 2.0, not even Mach 2.2 speeds."

First flight of the SST prototype now is envisioned for the first half of 1972, or three and a half years behind the Concorde, currently expected to fly in the first half of 1969.

☆

Favorable ruling by the Civil Aeronautics Board in a current case involving the merger of Johnson Flying Service with Executive Jet Aviation, Inc., of Columbus, Ohio, headed by O. F. Lassiter (Brig. Gen., USAF, Ret.), could have direct impact on the future of the L-500, commercial cargo version of the C-5 Galaxy. Backed officially by US Steel and Burlington Industries, Executive Jet Aviation is seeking to obtain Johnson Flying Service's presently unused cargo license in order to operate five or more L-500s.

Lockheed-Georgia Co., the giant aircraft's producer, now expects a go-ahead on the L-500 some time next year. Senior Lockheed officials repeatedly have stated that because of the military airplane's existence the number of orders required to move ahead on the commercial cargo plane is relatively small. Conceivably Executive Jet's order for five L-500s, along with commitments the company is believed to have been given by other carriers, could expedite the program. Milton Shapiro, in charge of the CAB hearings, told AF/SD he expected a final ruling in the first half of 1969.

☆

Seventh Air Force announced in Saigon last month the pullback of the F-111A fighter-bomber contingent (five aircraft) that previously had been based in Thailand. The announcement stated: "Since their temporary tour has ended and because of a requirement to reinforce the wing carry-through structure, the aircraft are scheduled to return to the US for reassignment to Nellis AFB, Nev."

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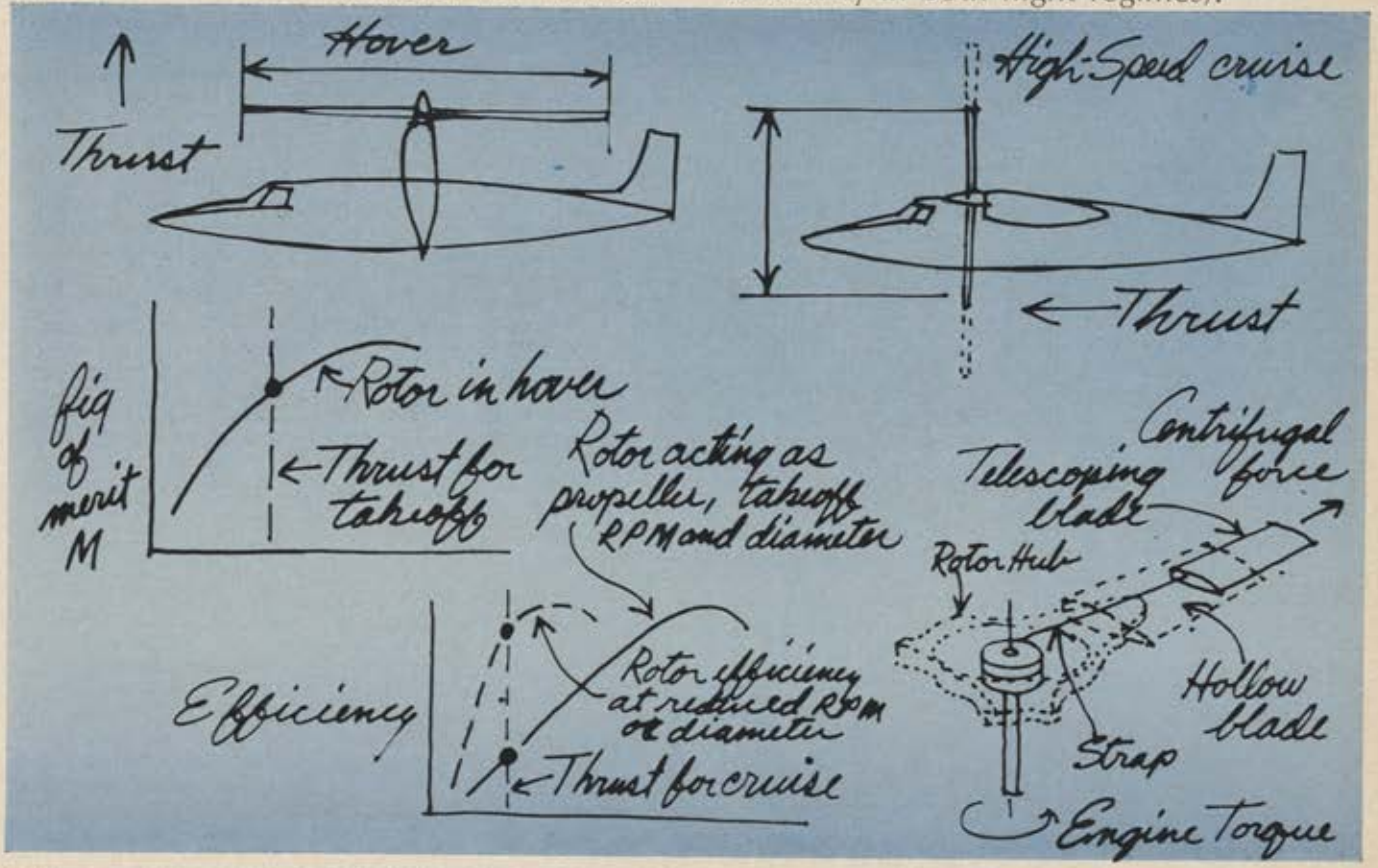
INDEX TO ADVERTISERS

TOMORROW'S BREAKTHROUGHS STARTED YESTERDAY...WITH BELL'S R&D

BELL'S VARIABLE DIAMETER ROTOR

In test today for the next generation VTOL transport is Bell's variable-diameter rotor system — full rotor diameter for vertical takeoff and landing, reduced diameter for high-speed airplane flight (gives maximum efficiency in both flight regimes).



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There isn't a tougher proving ground than Vietnam. Or a tougher assignment than getting right down among the trees on aerial scouting missions.

So how is the Army's new OH-6A Cayuse standing up? Here's what the pilots and mechanics say, and they're the ones who know:

"Tail rotor blades were damaged in close-in action when they hit some trees. Trailing edges on the outboard ends were split open. Outboard tips of the blades were also split open on the blade faces. The pilot flew this Cayuse 1½ hours afterwards. He said he felt nothing wrong with the tail rotor assembly—and no vibrations at all."

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"In one Cayuse, bullets penetrated fuel cells, seat bracket, engine-to-main-transmission shaft, cargo-compartment upper window, lower fuselage, engine-compartment doors, tail section, tail rotor control rod, engine armor. Flew one hour after damage and returned. No problems."

We at Hughes believe it's the kind of machine the men who fly it deserve. The Cayuse, built by Hughes Tool Company, Culver City, California.

Hughes Helicopters

Excellent nighttime surveillance and gunfire control is being achieved by the battleship USS *New Jersey* off the Vietnamese coast, through use of a low light level television (LLLTV) camera mounted on Dash-type drone helicopters. Six Dash vehicles now are being operated from the *New Jersey* to provide almost continuous surveillance of coastal waters and roads within range of the battleship's sixteen-inch guns.

During the first weeks of operation many trucks and sampans were destroyed during the night, before the North Vietnamese and Viet Cong realized that the appearance of a Dash usually was the prelude to highly accurate gunfire. Now, the enemy usually moves men and vehicles off the main roads, trails, and waterways while a Dash is patrolling the area.

The ITT television camera carried aboard the Dash can acquire a truck from a distance of three miles under overcast starlight conditions, defined as two orders of magnitude less illumination than quarter moon. Under this condition, the camera's operator at a remote station can positively identify the truck at a range of one mile. The next LLLTV generation is said to be much more effective.

☆

The prototype of an unusually heavy, but also unusually inexpensive rocket engine was unveiled by TRW Inc., at the recent AIAA meeting in Philadelphia. According to company predictions, this storable-propellant, pressure-fed rocket could orbit payloads for about $100 per pound compared to $500 to $1,000 per pound for the best current boosters.

TRW already has completed a major company-sponsored research program to confirm the basic design of the new engine, dubbed "Big Ben." Ten engines ranging from 25,000 to 250,000 pounds of thrust have been fired successfully. The one on page 32 is in the 50,000-pound class.

(Continued on following page)

NEW BOOKS IN BRIEF

Bridge in the Sky, The Story of the Berlin Airlift, by Frank Donovan. A great deal of emphasis is given to the human interest side of the operation, to thoughtful contributions by individuals and the personal expressions of gratitude they earned. The actual political maneuvers that made the airlift necessary are more thoroughly documented in other sources. McKay, N. Y. 209 pages. $5.95.

The Brink, by Dan Gallery. One of our nuclear sub commanders discovers the Russians have a new and lethal tracking capability. The world totters on the brink of World War III. In his latest novel, retired Admiral Gallery tells a thumping good yarn, which is in the style of Mark Rascovich's *The Bedford Incident* and abrim with details of life aboard a Polaris sub. Doubleday, N. Y. 317 pages. $4.95.

Liftoff! The Story of America's Spaceport, by L. B. Taylor, Jr. The historic moments at Cape Kennedy, which was still practically a swamp two decades ago, and many humorous incidents are reviewed here in a readable style. A detailed account of the thrill of early successes, of tension and tragedy, and optimism for future projects. With photos. Dutton, N. Y. 319 pages. $7.50.

Man's Conquest of Space, by William R. Shelton. Rather than detailed verbal descriptions or explanations of theory, this book interprets man's space venture with over 200 impressive photographs and paintings, most in color. May be ordered from the National Geographic Society, Dept. 100, Washington, D. C. 20036. 200 pages. $4.25.

The Strength of Government, by McGeorge Bundy. In the view of the president of the Ford Foundation and assistant to Presidents Kennedy and Johnson, the solution to the domestic problems facing this country is a strong central government coupled with increased participation and involvement on the part of its citizens. A forthright approach to a controversial question. Harvard University Press, Cambridge, Mass. 133 pages. $3.75.

Tail-End Charlie, by Jim Harris. From his World War II diary, the author reconstructs the adventures of each of twenty-five missions of a B-17 bombing crew over Germany. Members of this crew from the 8th Air Force always seem to be in suspense and danger. Carlton Press, N. Y. $3.

This Is Communist China, ed. by Robert Trumbull. Two years ago a staff of journalists from a major Japanese newspaper took an extended fact-finding tour in China to augment the scarce Western knowledge of Mao's cultural revolution. The editor who compiled this information has been the New York *Times* Far East editor for twenty-five years. McKay, N. Y. 274 pages. $5.95.

A Time of War, A Time of Peace, by Sen. George McGovern. In several previous speeches and in selections written especially for this book, the Senator from South Dakota offers timely insights into foreign and domestic questions on America's security, economy, and social ills. Random House, N. Y. 203 pages. $5.95. Also in paperback.

Winged Rocketry, by Maj. James C. Sparks, USAF (Ret.). In addition to a synopsis of the history of rocket planes, beginning with ancient Chinese contraptions, the author projects future spacecraft capable of being piloted to and from orbit. With photos. Dodd, Mead, N. Y. 184 pages. $4.50.

—MARIA T. ESTEVEZ

TRW Inc.'s recently unveiled rocket engine is expected to cut cost of orbiting payloads to as low as ten percent of present costs. The new engine has been tested in ten versions.

The major innovation in the new TRW design is "shipyard," or "pipe shop" manufacture. The thrust chamber and nozzle are heavy sections of widely used 4130 steel. Common steel bolts hold the major sections together, and alignment is made with a two-pound hammer.

A single coaxial injector, similar to that developed by TRW for the Apollo Lunar Module descent rocket, is the critical element in the engine and provides a significant throttling capability. In tests to date it has not been possible to induce combustion instability.

NASA has awarded TRW a $150,000 contract to continue this development effort, and the Air Force is negotiating with the company to provide additional support. The engine is a prime contender for the USAF's low-cost "big dumb booster" next generation of launch vehicles.

☆

Latest addition to the staff of AF/SD is William P. Schlitz, whose title is News Editor. He is a former copy editor at American Aviation Publications and has long experience in the *Wall Street Journal's* Washington Bureau. A graduate of University College, St. Johns University, Brooklyn, he served in the US Army with the 11th Airborne Division.

The other new name on this month's masthead is that of Yoshi Yamamoto, who was recently named Regional Advertising Manager for AF/SD and its companion publication, *Aerospace International*. Mr. Yamamoto's office is in Tokyo.—END

If you're looking for a new plant site, try the nearest ghetto.

IBM did.

IBM leased an old warehouse in the center of Brooklyn's Bedford-Stuyvesant slums, and is converting it into a computer cable factory. Hiring starts soon, with the slum residents getting first choice.

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More on 'The Strategic Balance'

The following communication was received from a highly knowledgeable and experienced strategic planner who, for reasons that will become obvious, cannot be identified.—THE EDITORS

The article "How the Strategic Balance Is Shifting—1961-1972," by Dr. James H. McBride, in the October issue of AF/SD, is well done. However, the author's discussion of offensive and defensive forces as related to "Assured Destruction" and "Damage Limitation," and his position relative to the vulnerability of Minuteman if the Soviets develop a MIRV system, deserve a reply.

The terms "assured destruction" and "damage limitation," and their definitions, were originated primarily to solve an analytical problem. Assured destruction is measured in terms of enemy fatalities. Damage limitation is measured in terms of US lives saved. Thus, "people" become a common measure for use in evaluating one system vs. another. A second point is that former Secretary McNamara equated assured destruction to deterrence. Secretary Brown discussed the fallacy of this proposition at length in his article in your September issue ["The US Strategic Policy—Deterrence Without Destabilization"].

Dr. McBride has associated strategic offensive forces with assured destruction and defensive forces with damage limitation. This is exactly how Mr. McNamara developed his logic that it is impractical, thus pointless, for the US to deploy a major damage-limiting force—*i.e.*, no advanced bomber defense (F-12) and no Nike X. There is a good counter to Mr. McNamara's logic if one makes two assumptions: (1) a balance of offensive and defensive forces is needed for damage limitation, and (2) a likely way for deterrence to fail would be an escalation from limited war where both the Soviets and the US exchange nuclear attacks against military targets, but withhold city attacks at least until the initial exchange is over. Let's expand this with a couple of examples:

Secretary McNamara's Logic (US defenses only):

If the US deploys a large city ABM defense against the Soviets, it will cost the US about $3 million for each Soviet reentry vehicle the US can destroy with this defense (the dollar figures are not accurate but are relatively representative). It costs the Soviets about $6 million for a small missile and about $30 million for a large missile. If the Soviets strike first with small missiles against our cities, with single reentry vehicles and no penetration aids, building a US ABM defense system is cost-effective—*i.e.*, for each $3 million we spend, we destroy $6 million worth of Soviet missiles. However, as Mr. McNamara stated, the Soviets would react to our defenses with multiple reentry vehicles and/or penetration aids. If the Soviets equip their small missiles with three reentry vehicles, the missile cost would increase to, say, $8 million, or $2.6 million per reentry vehicle. Now the cost-exchange ratio is $3 million for US vs. $2.6 million for the Soviets. If the large Soviet missile is equipped with twenty reentry vehicles, the cost of the missile goes to about $40 million, but the cost per reentry vehicle is only $2 million. The cost-exchange ratio is now $3 million for the US vs. $2 million for the Soviets. If penetration aids (which cost very little—relatively) are used by the Soviets, the cost-exchange ratio is dramatically in favor of the offense.

Counterforce Exchange Logic (assumes cities are not attacked until after the initial military exchange):

This logic assumes that both offensive forces and defensive forces contribute to damage limitation. In this scenario the US, with Minuteman III, fires one reentry vehicle at a small Soviet missile. Using the same costs for US and Soviet missiles ($8 million for small missiles), this costs the US $2.6 million, but it destroys, on the average, one-half of a Soviet missile (this is reasonable during the time period when we could have a good AMB defense). Now the Soviet missile has only one and one-half reentry vehicles left to launch against a US city for the $8 million expended. To combine these costs into a cost-exchange ratio, the US spends $2.6 million for one Minuteman reentry vehicle plus $4.5 million to destroy the remaining one and one-half Soviet reentry vehicles—a total of $7.1 million vs. the $8 million for the Soviets. Now the advantage is again in favor of the US—even with multiple reentry vehicles. If the US uses Minuteman III and defense against the large Soviet multiple reentry vehicle missile, in the same manner, the cost-exchange ratio is $30.6 for the US vs. $40 million for the Soviets.

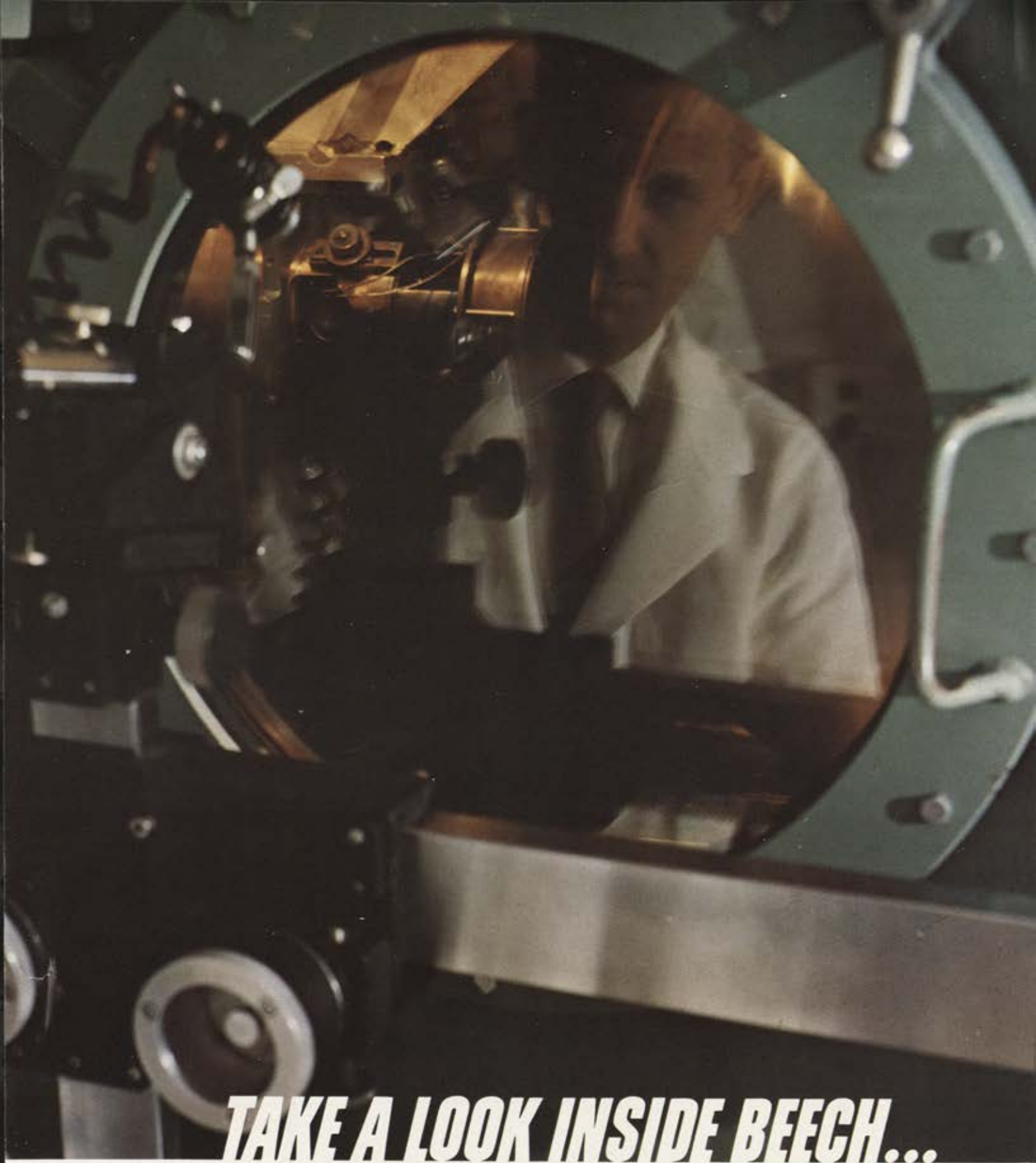
The main purpose for this rather lengthy discussion is to explain the interrelationships between offensive and defensive forces for damage limitation; to point out that it *is* useful to target Soviet missiles either in a first strike or second strike, and that there are logical scenarios where the US may not be firing at empty holes.

Dr. McBride makes three other points that need further discussion: (1) Land-based fixed missiles could be seriously threatened unless protected by a credible ABM system or, as a hedge, the US should develop a mobile system. A more credible approach would be as stated by Secretary McNamara, ". . . development of dual-purpose superhard silos for the Minuteman or a new land-based ICBM."

(2) Locating fixed-site ICBMs in Alaska or the Aleutian chain. There are some obvious points that detract from this idea—and it certainly isn't new. First, the cost to deploy missiles in Alaska is about double the cost in the continental US; second, it would greatly extend our command control requirements; third, they would be vulnerable to Soviet IRBMs and Soviet medium bombers without warning.

(3) Any new system should be deployed to draw counterforce fire away from the contiguous forty-eight states. This logic is difficult to counter, and the Navy has used it at great length in proposing new shipboard missiles.

However, there is a point, relative to deterrence and coercion, that should be made. Take a case where all of the US strategic forces (ICBMs and bombers) were located outside the continental US and Soviet strategic forces were located in their homeland. Who would more likely be deterred from an initial nuclear attack against strategic forces—the US or the Soviets? We could conjecture under these conditions that the US decision to attack the Soviet forces in their homeland would be much more difficult to make than a Soviet decision to attack US forces outside the US. Thus, the US could be deterred or coerced.—END



TAKE A LOOK INSIDE BEECH...

An Aerospace Capabilities Report on Beech Aircraft Corporation

This electron beam welder is a prerequisite for fabrication, to extreme tolerances, of such space age metals as titanium, inconel and maraging steel. It is symbolic of the advanced aerospace technology you'll find throughout the Beech Aircraft Corporation. Facilities, tools, men and management at Beech are tuned to the future. Their contributions are important in today's strength. Their capabilities are many. Take a look.

These Beech contributions stem from a tradition of superior performance

It all started with the first Beechcraft Model 17 "Staggerwing" biplane, designed and built from a revolutionary concept in 1932. It was far advanced in aerodynamics and engineering for its day. It was *planned* that way... and it *succeeded.* By 1936, the Model 17 so dominated the many air races of the day that a familiar (and still true) phrase was coined: "It takes a Beechcraft to beat a Beechcraft".

When World War II struck, Beech was ready to expand and mold its facilities and leadership to meet the urgent needs of America and its allies. As with so many companies, 1940 to 1945 were years of fantastic growth and accomplishment for Beech. Beech Aircraft Corporation emerged from those years with a strong organization and leadership that used the war experience as fine tooling for the further development of its capabilities.

Beech capabilities now include nearly the entire spectrum of research, development, testing and manufacture in aircraft, flight equipment, aerospace and related fields.

Tailored to meet 90% of the needs for U. S. Army utility requirements, this Beechcraft U-21A is delivered off-the-shelf. It is quickly convertible to use as a staff transport, an aerial ambulance or a high-capacity cargo carrier. The U-21A joins the Beechcraft U-8 family of aircraft that has established an outstanding record of performance for the military at home and abroad.

This Turbo-Baron, one of the latest in the extensive Beechcraft family for business, is the world's fastest light twin. Pilots around the world are still saying: "It takes a Beechcraft to beat a Beechcraft." Dealers and distributors with complete service facilities are located in 50 countries throughout the world. Beechcrafts for business include a complete line from the 2-place single-engine Musketeer III to the new 17-place Beechcraft 99 Airliner.

The U. S. Air Force Special Air Missions fleet praised this Beechcraft VC-6A for its great first year's record. The report shows a 95% ready rate and a 100% record for mission completion. Advanced engineering and design of this member of the Beechcraft family of mission support aircraft assure its future.

Almost every prime contractor in the aviation and aerospace industries has used Beech's exceptional capabilities for R&D, manufacture and testing. These capabilities are demonstrated in the work Beech performs for Lockheed's great C-141A "Starlifter." Beech builds flaps, ailerons, nose landing gear doors and wing spoilers... and provides tooling and engineering design services.

Liquid helium on the Lunar Module will be loaded by a Beech-developed and fabricated A.G.E. system, including an air transportable dewar incorporating a revolutionary, Beech-developed thermal protection system that reduces the weight-to-capacity ratio from the usual 5.8 to 1.0 down to a startling 1.9 to 1.0.

Beech proved its capabilities for A.G.E. and cryogenics management at the Gemini launch site. The entire Aerospace Ground Equipment systems for providing liquid oxygen and liquid hydrogen to the Gemini spacecraft tanks were Beech responsibilities. Representing Beech capabilities in R&D, testing and fabrication, performance is a matter of history.

Project Apollo will depend on Beech-designed, fabricated and tested cryogenic storage subsystems. Located in the Service Module, these Beech systems will supply the Command Module environmental and electrical fuel cell systems with oxygen and hydrogen.

Beech tests and qualifies what it creates! Whether a project involves electronics, fluids or metallurgy; 100 G's of acceleration or the vacuum of outer space; near absolute zero cold or transient heat to 1500° F, Beech has the facilities and the capabilities. It was Beech-craftsmen who discovered, and proved, titanium "creep", to help improve all titanium fabrication.

The only U. S. Navy target missile system managed by a single company, this AQM-37A is an example of Beech ability to perform complete weapon systems management. Beech was awarded the contract in design competition with 26 other capable aerospace manufacturers. A complete Beech family of target missile systems has been designed and produced to match all present defense training requirements. Speeds range from Mach .52 to Mach 3; altitudes from sea level to 90,000 feet. Beech is now conducting feasibility studies beyond Mach 7 and at orbital altitudes.

One out of every 14 Beechcraftsmen is an engineer with one or more degrees. Of over 2,000,000 square feet of floor area, one in nine is devoted to laboratories, engineering and tooling.

The complete systems management capabilities of Beech has been proved through a wide range of "total" assignments. Beech management accepts no limitations . . . not even those imposed by "state-of-the-art".

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The creative imagination to penetrate to the heart of a problem that didn't even exist yesterday—plus the knowledge, talent and ingenuity required for a satisfactory solution—combine to make Beech's greatest capability. We call it Beech "Imaginuity".

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Look to Beech Capabilities!

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Beech Aerospace Division

Beech Aircraft Corporation, Wichita, Kansas; Boulder, Colorado

North American's OV-10

AIR FORCE
DECEMBER, 1968

Some of the chanciest missions of the air war in Southeast Asia are those flown by the Forward Air Controllers—the FACs—who long have felt the need for a replacement for their aging and vulnerable little spotter planes, the O-1 Bird Dogs. Now coming on the scene is the OV-10 Bronco—a rugged twin-boom aircraft designed for just such missions. It promises . . .

Better Eyes and More Muscle for the FACs

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

NORTH American Rockwell's triservice, multimission OV-10A Bronco, which recently entered combat in Vietnam, is a testimonial to the best and the worst in the modern US military procurement system.

On the positive side, the Bronco must be given a high technical rating. No other conclusion is possible if one asks the most fundamental technical question, *i.e.*, "Does the aircraft satisfy the government's specifications and perform up to the company's original claims?"

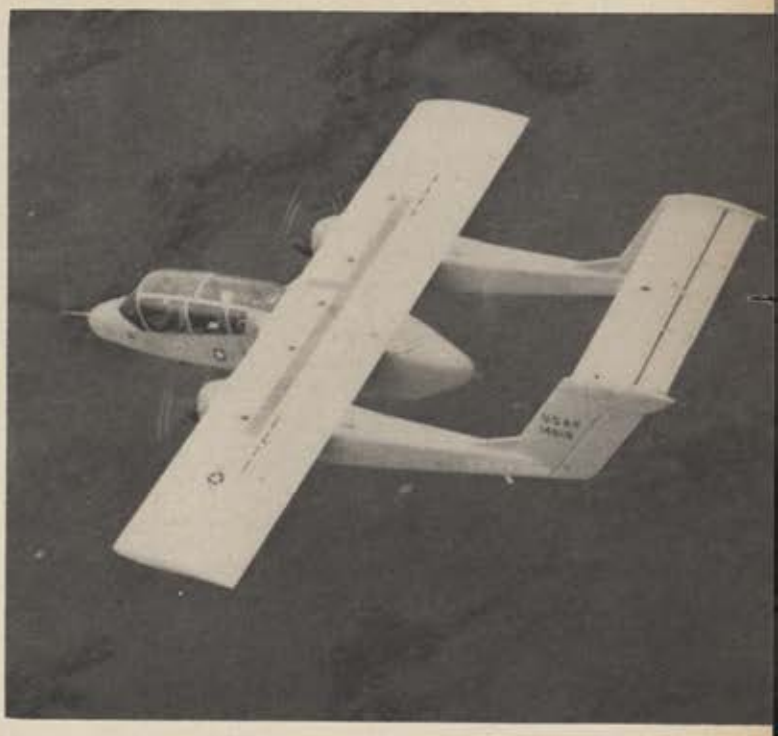
A resounding positive answer to this question has already been demonstrated. The OV-10A's capabilities have never before been available in rugged aircraft that can be operated from short, rough fields in forward combat areas. First of all, its performance is not too far behind that of World War II propeller-driven fighters. Its limiting speed (in a dive) is above 450 mph, and its maximum rate of climb is more than 2,500 feet per minute. In roll rate and turning maneuverability at low and moderate speeds the OV-10 outclasses all standard World War II fighters.

For ground attack, the Bronco's normal load is 2,000 pounds of ordnance (much more than most World War II fighters), with a loiter time of two hours around targets as much as fifty miles from base.

But most important, the aircraft has true STOL performance. At normal gross weight, it can land and take off over fifty-foot obstacles from 1,500-foot dirt strips on hot days and at high altitudes. With the close-support ordnance and fuel load described above. the takeoff distance goes up to about 1,900 feet.

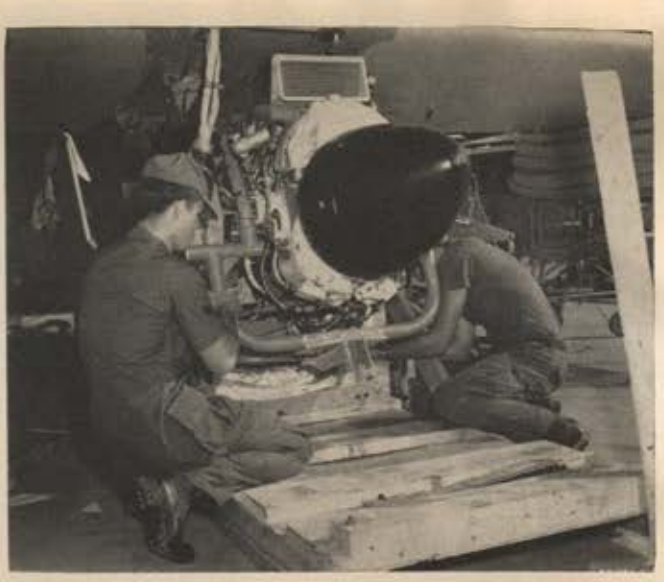
Another strong plus factor is the OV-10A's rough-field capacity, which is much greater than that of any fixed-wing aircraft of the past. The Bronco has bounced through 105-mph taxi tests on a washboard strip so rough it causes test automobiles to go out of control at only thirteen mph. OV-10 landings and

(Continued on following page)



OV-10A above cruises Vietnamese countryside looking for the Viet Cong. When peace comes, the aircraft will provide transportation in the rural areas and assist nation-builders in a variety of ways, from ambulance service to crop-spraying.

Shipment of Bronco aircraft to Air Force Forward Air Controllers in South Vietnam is well under way. One is shown above being uncrated at Bien Hoa. The Bronco now is the FAC corps' hottest aircraft and will improve efficiency.



Small size of the Garrett-AiResearch T76 is evident in this photo of one being installed on a Bronco in Vietnam. The engine produces 715 shaft hp, yet weighs only 325 lbs., and is largely responsible for the aircraft's fine performance.

Six passengers, or a cargo load exceeding 3,000 lbs., can be carried by the OV-10A when it is used as a transport. The accommodations are not oversize, however, as shown by this photo of a mechanic in the cargo compartment.

takeoffs were included in these washboard demonstrations.

The list of attractive features, successful tests, and combat verification of design is much longer and leaves no doubt that the government's stated requirements have been satisfied. North American, its subcontractors, and the military services can be well satisfied with their engineering.

Offsetting technical excellence to some extent, however, is the fact that the OV-10A program was unduly long and overmanaged in the Department of Defense. It is difficult to avoid this conclusion if one asks two fundamental management questions: (1) "Was the program responsive to a valid military requirement and was that requirement satisfied in timely fashion?" and (2) "Were engineering and management resources employed to the full potential by moving the program at the fastest possible pace consistent with good technical judgment?"

Answers to these questions obviously cannot be as precise as those relating to performance. Management efficiency is not as easy to measure as weight or speed, and there is room for broad differences of opinion.

The OV-10 Program

Nevertheless, basic facts on the timing of the program are indisputable. The military services were actively requesting aircraft of this type in the late 1950s and early 1960s. Most prominent was the Marine Corps' desire for a small, fixed-wing aircraft of "rock-bottom" price to serve primarily as an armed escort for troop-carrying helicopters. Marine specialists were convinced that small, fixed-wing airplanes could provide much more effective and much cheaper fire support for helicopter formations than the Army's helicopter gunships, which have been limited for more than a decade to very light ordnance such as .30-caliber machine guns, grenades, and small rockets. Basically, the Marines wanted to keep the price low by building against this one requirement and then adapting the airplane to other missions at a later date, if this appeared sensible.

Complications arose because other requirements of the period were similar to those of the Marines. The Air Force wanted a good STOL aircraft for counter-insurgency operations—one which could operate under very rough conditions. And it wanted a new airplane for its Forward Air Controllers (FACs) that would be much less vulnerable and cover much more ground than the venerable Cessna O-1.

Another urgent request, from the managers of the Military Assistance Program (MAP), had strong State

Department input. They wanted a small multipurpose airplane for the emerging nations.

The McNamara administration decided that all of these requirements could be combined. This decision resulted in a twin-boom airplane on which the central body was enlarged over the Marine requirement so that it also could serve as a small transport, carrying several men or about a ton and a half of cargo.

Industry Enters the Picture

Industry was formally brought into the picture in December 1963. Eleven companies were invited to bid on a LARA (Light Armed Reconnaissance Aircraft). Replies were due in March 1964 so that no company would have a chance if it hadn't been working in this general area for several years.

North American's Columbus Division won the competition. The company has met, or come in early, on the deadlines set down by DoD for development and production.

Still, in terms of satisfying the military requirements of the early 1960s, the program cannot be considered a success. Many months were consumed in generating a LARA bid package satisfactory to the Marines, USAF, and MAP. Then, after the original specifications were ready, it took four and a half years to get the airplane into combat. The Marines took it to Vietnam last July.

Two facts must bear heavily on any judgment of the top-level planning for this program. First, the airplane is relatively simple. It is not a supersonic machine that is pushing the state of the art on a number of fronts. Its designers traveled a well-known street. Literally hundreds of designs in this speed range have been developed, and a massive backlog of experience is available to draw upon.

Second, the OV-10A has been urgently needed in Vietnam. Air Force FACs, for example, have been tantalized by the prospect of moving up to the Bronco ever since they began operating the sluggish and vulnerable O-1 in substantial numbers over South Vietnam some three and a half years ago. The first promises of delivery to the FACs were made for mid-1966, but this was late by more than two years.

Marine air units in Vietnam have consistently pushed for the aircraft and have experienced the same disappointments.

Important management questions regarding multipurpose, multiservice hardware developments thus are raised. The OV-10A hasn't run into the technical troubles of the F-111, and it can be properly described as a model example of interservice cooperation, but in its way it presents just as strong an argument as the F-111 for keeping requirements and management structures simple.

The most important argument is that North American, or any other major US airframe manufacturer, could have delivered an aircraft in the OV-10A class in a year if asked. North American proved this about thirty years ago when it delivered the first flight model of an outstanding aircraft in this speed class—the P-51 Mustang—only 105 days after go-ahead.

Of course, this doesn't mean an aircraft can be fully developed in that time. But most of the major bugs could be worked out in another nine months of flight testing. Opening the production line also would take time, but it isn't stretching things to predict that it could be done in eighteen months and that a satisfactory airplane could appear in numbers two years after design go-ahead.

Keep the Specifications Simple

On a cost-effectiveness basis, this course would seem preferable to the one selected by DoD, *i.e.*, stretching out the process by about one hunderd percent and using many tens of thousands of skilled man-hours in the three services and the Office of the Secretary of Defense to monitor a development that industry already has proved it can handle. If there is ever to be a reversal of this trend toward ever-lengthening (and more costly) hardware programs, it must begin with OV-10A-type projects that are well within the technical state of the art. DoD must find a way to write simple specifications and then free industry to deliver the specified product in the shortest practical time.

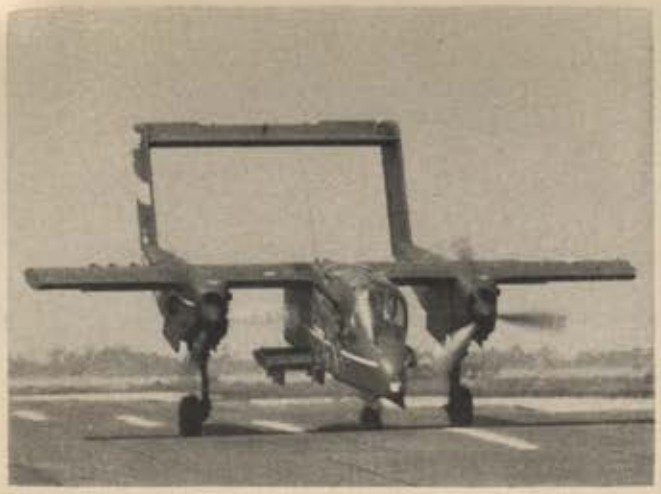
Otherwise, the present trend toward top-heavy management could easily produce a situation in the 1970s in which it would take a decade to replace the OV-10A, if that became necessary.

Another basic management question is raised by the OV-10A: "Should the separate services have any freedom to select their weapons, or should the Secretary of Defense's detailed control extend from multibillion-dollar projects down to small aircraft?"

If the services are to have any freedom in this regard, the Marine Corps certainly should be allowed to make its own choice about a small airplane. One result of the denial of this freedom was the forcing of a long hiatus in Army and Marine Corps competition in the new and critical field of battlefield protection for troop-carrying helicopters. The few OV-10s now available could prove that the Marine concepts are the most desirable.

(Continued on following page)

Basic layout of OV-10A is shown in this cutaway. Fuel tanks in the wing are self-sealing. The original configuration had 10 feet less wingspan. Service pilots are reportedly happy with the craft's exceptional maneuverability at low speeds and with the fine visibility the Bronco affords them.



First model of the OV-10A is undergoing its rough-field landing and takeoff tests above. The special washboard strip built on top of a conventional runway is believed to provide most severe rough-field test ever given to an aircraft. It sent standard autos out of control at 13 mph.

Taxi runs above 105 mph were successfully completed by the OV-10A on the washboard strip, in addition to landings and takeoffs at maximum weights. Despite its length, the aircraft's landing gear proved to be exceedingly rugged. The second model OV-10A also had no significant trouble.

The Bronco's Chronology

Development of the OV-10A officially started in October 1964 after a seven-month DoD evaluation of the design proposals that industry had been given three months to submit. North American's original contract called for delivery of seven flight-test aircraft, with the first to fly in July 1965. This design was substantially smaller than the present OV-10A, was powered by two 660-hp Garrett-AiResearch turboprops, and had a one-man crew. It met the requirement for carrying several passengers on a cramped bench behind the pilot.

The first flight was made on time, but even in July 1965 the project as originally approved was in doubt. Several new design features that would drastically alter the aircraft were being considered. Soon the crew was increased to include an observer as well as a pilot. To reduce vulnerability to small-arms fire, more than 300 pounds of armor plate were added around the pilots and engines. The protection of self-sealing tanks was increased from a single fifty-four-gallon tank to include the complete 250-gallon internal fuel load. More communications equipment was added. The basic external ordnance load jumped from 1,000 to 2,000 pounds.

All told, the empty weight of the aircraft was increased twenty-nine percent. This necessitated an enlargement of the wingspan from thirty to forty feet and the use of 715-hp engines. Even though the basic layout of the aircraft remained the same, a major redesign effort was needed.

By the third quarter of 1966, evaluation of this new design and flight testing of the original configuration had been completed. A production contract was awarded in October 1966, and the first production airplane rolled out on time at the end of June 1967. Production volume has increased to twenty per month, but the line is in the process of shutting down. The last OV-10A aircraft is scheduled to be delivered next April. By then a total of 271 will have been produced, with 157 for the USAF and 114 going to the Marines.

Engineering the Bronco

Selection of the twin-boom layout for the OV-10A was dictated by several considerations. One was to accommodate the enlarged fuselage and to ease the problem of dropping cargo and paratroops.

Even without the cargo requirement, however, the twin booms would have been used to keep single-engine flying speed as low as possible to improve STOL performance. This configuration puts the maximum tail area in the prop blast and gives the directional control necessary to complete a takeoff on one engine, if the other is lost, at about ninety-five knots speed when loaded for the normal ground-attack mission.

Structurally the Bronco was designed for fighter load factors of eight Gs, and to meet transport fatigue life specs. The result was a very rugged structure which needed only eleven pounds of strengthening members to get through its static test.

Much of the credit for the Bronco performance naturally falls to the engines, two Garrett-AiResearch turboprops, each of which produces 715 shaft horsepower and weighs 325 pounds. These engines have two centrifugal compressors and a three-stage axial-flow turbine.

An independent ignition system is provided with each engine, and they can be started either electrically or with high-pressure air.

Cargo volume in the rear of the fuselage normally is seventy-five cubic feet, but this can be increased to 110 cubic feet by taking out the observer's seat. A maximum of five paratroopers or six combat-equipped infantrymen can be accommodated in this space. Maximum cargo load is 3,200 pounds, and a variety of palletized equipments have been designed to allow the aircraft to be quickly converted for spraying, public information delivery by loudspeakers and leaflets, daylight reconnaissance, flare drop, night surveillance, and towing targets.

Basic armament load of the Bronco is four 7.62-mm machine guns, each with 500 rounds of ammunition,

mounted in the sponsons. In addition, external ordnance loads of 2,000 pounds are carried on normal close-support and interdiction missions. This ordnance includes low-drag general-purpose bombs, Snake-eye retarded bombs, fire bombs, rocket packages, Sidewinder missiles, .50-caliber and 20-mm gun pods, mines, and four types of bomblet dispensers.

A new installation of great interest probably will be tested in the near future. This is the Harvey Aluminum 106-mm airborne recoilless rifle. About twenty-five rounds of ammunition could be carried in an autoload attachment. This gun would provide the OV-10A with much more accurate and effective armament than the conventional rocket or grenade package.

Still another important armament installation is possible because of the aircraft's sizable payload. This is the turret-mounted 40-mm gun with computing sight and "all-around" firing capability that is being developed by the Army for Lockheed's AFFSS. If this sight system works as advertised—and it has in tests to date—it will revolutionize close-air support and interdiction operations. With this sight, aircraft can destroy targets without diving toward them and flying directly over them.

To engage a stationary target, the aerial gunner puts a "pip" on the target one time, and the sight will keep the gun on that target no matter how the aircraft maneuvers. To evade ground fire the pilot can change course constantly and fly in circles around an area while keeping it under continuous, accurate fire the entire time.

Vietnam Experience

So far both the Marines and the USAF are highly pleased with OV-10A performance in Vietnam. The aircraft have shown an operational readiness of better than ninety percent during the first months of operations.

The Marines have two detachments totaling more than nineteen aircraft in the field, with the first one going to work last July.

At the end of October, the USAF's Combat Bronco evaluation was completed successfully. Some 600 sorties were flown with six aircraft in this operation to pave the way for immediate distribution of some fifteen other aircraft to FACs in various parts of South Vietnam.

The maneuverability and power of the OV-10A allows the FACs to use much more imaginative search tactics than the straight and level cruise at 1,000 feet normally employed with the O-1. Now their base altitude is about 3,500 feet, out of effective range of small-arms fire from the ground. From this vantage point they can dive to inspect ground activity and use their large excess power to climb back to 3,500 feet, under the same airspeed they had at the beginning of the dive. This ability to maintain momentum allows them to conduct a continual roller-coaster style search over the countryside.

If extended maneuvering near the ground is necessary, the OV-10A again is a vast improvement over present FAC aircraft. At a speed of about 100 knots it can pull a 360-degree turn of more than two Gs and maintain altitude. This turn is so tight it could be made within the confines of most large football stadiums.

Another key advantage for the OV-10A is that it gives the FAC a rather substantial armed reconnaissance capability. For the first time, a FAC is able to attack targets of opportunity on the ground with respectable force before the strike fighters arrive.

Maintenance requirements in the field in Vietnam have been about 3.3 man-hours per flight-hour, more than ten percent below the requirement. One man has been able to refuel and rearm the aircraft in only eight minutes between FAC flights. The complexity of the aircraft compared to the O-1 has not led to combat operation problems.

All in all, the OV-10A's performance can be called outstanding. And it is not expensive as airplanes go today, for North American receives about $350,000 each (government management costs not included).

Most of the industry engineers, officers from the three services, and officials in the Office of the Secretary of Defense who contributed to the project consider it a model of interservice competition and an efficient development. Most of them say: "Don't knock the project—it's been a good one." Compared to some other programs of the 1960s, this judgment certainly seems valid.

The measuring stick is changing, however, and today's key question is: "Will the future programs continue to be managed in detail in OSD? Or will the responsibility be shifted back to the services and to industry—the user and the builder?" Time will tell—and it does.—END

Marine and Air Force versions of the OV-10A are virtually identical, with the USAF model carrying several hundred pounds of additional communications gear. A wide variety of armament packages are available, including 7.62-mm Gatling guns, rocket packs, and bombs. Standard armament load is 2,000 lbs. for close-support and interdiction missions.

The Senate's Preparedness Investigating Subcommittee, one of the most expert, busy, and objective inquiry panels on Capitol Hill, sticks its probing nose into many aspects of Pentagon business, but is most concerned about our weaponry. Do we have the right weaponry? Is there enough of it? Are the right decisions being made at the right time? The subcommittee, under the chairmanship of veteran Senator John Stennis, keeps its eye on the general welfare and the equipment of our fighting men. The Stennis subcommittee is . . .

THE SENATE'S WATCHDOG FOR DEFENSE

By Claude Witze

SENIOR EDITOR, AIR FORCE/SPACE DIGEST

PROFESSOR Samuel P. Huntington, in his scholarly book, *The Common Defense*, is critical of Congress. But he does not hesitate to cite some examples of its strength, and one of these is the "vital although not decisive role" played by—of all things—"congressional lobbying."

In the process of strategy-making, Dr. Huntington writes in his 1961 treatise on the making of national security policy, there are issues brought "to the top where they cannot be ignored by the President and other chief policy-makers." They are put at the top, often when the Executive Branch wants them at the bottom, by House and Senate committees who get their authority from the responsibility of Congress to both authorize and appropriate funds for the Department of Defense.

It must be made clear at the outset that Dr. Huntington is not concerning himself with the lobbying done *in* Congress by people from the outside. He is writing about the lobbying done *by* Congress within the councils of the government. His book is about eight years old, and the examples he gives involve now-classic issues. It was the Joint Committee on Atomic Energy that forced resolution of the decision to build the hydrogen bomb. In 1949 Congress appropriated funds for a seventy-group Air Force, and "the Administration was clearly compelled to choose between principal reliance on airpower and continued adherence to its goal of balanced forces." A few years later, the Senate voted more money for the Air Force than the Administration requested, thus pointing out that the issue, at that moment, was "sufficient" airpower vs. "superior" airpower. Funds also were increased for the Army and Marine Corps, indicating Congress did not think we were making adequate preparation for conventional war.

"Congressional challenges to policy, even when they come after the Administration position has been determined," Dr. Huntington concludes, "at least force the Administration to confront the issue again and to articulate a defense of its course."

Without slighting the work of other groups on both sides of Capitol Hill, it is the intent of this report to demonstrate that the most consistently effective job in this area, at least in the years since *The Common Defense* was written, has been done by the Preparedness Investigating Subcommittee of the Senate Committee on Armed Services.

Mr. Stennis as Chairman

The chairman in these years, starting in 1961, has been John Cornelius Stennis, a Mississippi Democrat, former circuit judge and prosecuting attorney. It is almost impossible to find anyone, on Capitol Hill or in the Pentagon, who fails to describe Mr. Stennis as judicious, careful, fair, unemotional and objective in his assignment. This esteem is shared by press observers, who have not been able to escape the observation that the subcommittee chairman is in a position where he could cash in on political advantages and cultivate an impressive coterie of power. He has not done it. When his subcommittee publishes a report—

USAF witnesses arrive for grilling by Senators. Secretary Harold Brown (left) and Chief of Staff Gen. J. P. McConnell (right) are greeted by Chairman Stennis. Witnesses spend long hours preparing to testify and come armed with many volumes of statistics. Usually they have to defend decisions, some of them made long ago by predecessors in their offices.

and the record has been impressive in the most recent 90th Congress—it is released with a brief statement from the chairman explaining why the investigation was undertaken and summarizing the recommendations. There is no crowded press conference to manufacture headlines and dominate the evening television news programs. The facts offered frequently disturb the Administration, at both the Pentagon and the White House. Only on rare occasions is there an effort at refutation.

It is not difficult to make a case for Mr. Stennis and his subcommittee as the real nemesis of the McNamara band. Hastily, it must be added that the Senator would not make this claim and probably would disown any colleague or staff member who tried to make it for him. However, informed observers can cite numerous examples supporting the Huntington view that a policy can be challenged and changed, even when it was set in the first place by as positive and competent a man as Robert S. McNamara.

"The Secretary broke his lance," one Defense Department aide says, "when he conflicted with Mr. Stennis on the issue of merging the Army National Guard and Army Reserve Forces." That was in 1965 and 1966. The proposal was disapproved by Congress in both years, and there was mandatory language in the appropriation bills to make it stick.

Other monitors, particularly those in the Air Force and the Navy, have been most impressed by the subcommittee's interest in how the war has been fought in Vietnam. At one point, in 1964, the subcommittee staff had good reason to doubt the Defense Secretary's flat assertions, made when he was on the stand, that the US role in Saigon was only advisory, and that our men were not taking part in combat. A small group of veteran pilots visited the subcommittee and underwent cross-examination. Their testimony was in sharp contrast to that offered by Mr. McNamara and his USAF Secretary, Eugene Zuckert. There was no public testimony and no public report, but, says one man who was present, "This is where we first uncovered the real magnitude of the McNamara credibility gap."

Air War in Vietnam

Then, there was the incident of August 1967, when the subcommittee held formal hearings on what had, by that time, become the air war against North Vietnam. Adm. Ulysses G. Sharp, our Commander in Chief, Pacific, was summoned from Hawaii for examination. The subcommittee's interest in his targets, how they were selected, and their import to the military effort, was known to the Administration. The night before the Admiral was scheduled to testify, the White House gave approval for strikes against sixteen new targets, including the first in the Hanoi area. They were targets that the military chiefs had had on their priority lists for many months. In its report, the subcommittee pointed to "a sharp difference" between the views of McNamara and the military witnesses. Graciously, it did not accuse the Secretary of making up his own target list without weighing military opinion. Clearly, this practice was changed. President Johnson refused an opportunity to credit the subcommittee, of which he once was chairman, with effecting the change.

A vital contribution of the subcommittee, unhailed except by the most sophisticated observers, was its independent study in 1963 of the proposed nuclear test-ban treaty. Summoning far more expert witnesses than were heard by Senator J. W. Fulbright and his Foreign Relations Committee, the Preparedness Subcommittee came up with an evaluation of the military risks involved.

Its report said the ban on atmospheric testing would prevent the US from testing the hardness of its mis-

(Continued on page 47)

WHO'S WHO ON THE SENATE PREPAREDNESS SUBCOMMITTEE

Senator Russell

Senator Stennis

Senator Symington

Senator Jackson

Senator Cannon

Senator Byrd

Senator Smith

Senator Thurmond

Senator Miller

When the 91st Congress is organized in January, it is anticipated that Senator John Stennis, Chairman of the Preparedness Investigating Subcommittee, will replace Senator Richard B. Russell as Chairman of the parent Senate Armed Services Committee. Mr. Russell will leave this vacancy for Mr. Stennis by moving himself to the chairmanship of the Senate Appropriations Committee, a seat made available by the recent retirement of Senator Carl Hayden of Arizona. There has been no decision made on who will head the subcommittee. Mr. Stennis can retain it, if he wants to, and the possibility is strong that he will.

Other members scheduled to retain their positions:

- **Stuart Symington,** first Secretary of the Air Force and a Senator since 1952. He is a proponent of new and better fighter planes for the Navy and Air Force but has frowned on the size of the research budget . . . has made several trips to Vietnam and criticized our conduct of the war . . . shows major concern over balance of payments problem . . . does not always agree with Chairman Stennis in debate.
- **Henry M. Jackson** also is Chairman of the Subcommittee on National Security and International Operations of the Senate Committee on Government Operations and Chairman of the Military Applications Subcommittee of the Joint Committee on Atomic Energy . . . he combines these responsibilities to make himself one of the best-informed Senators on questions of national security.
- **Howard W. Cannon** is a major general in the Air Force Reserve . . . he has flown the F-111A and says it will be a matchless weapon for USAF . . . charges military have had hands tied in Vietnam.
- **Robert C. Byrd** is least active member of the subcommittee, partly because he is Secretary of the Senate Democratic Conference and Floor aide of Majority Leader Mike Mansfield, a time-consuming job.
- **Margaret Chase Smith** is the senior Republican member of the subcommittee and a member of the Senate since 1948 . . . strong supporter of US stand in Vietnam, she still has indicted the Administration's record on fighting the war, calling for use of Reserves and National Guard to meet pilot shortage . . . strong defender of private shipbuilding programs . . . monitors Reserve promotion program closely . . . was one of first Senators alert to Soviet military buildup in Cuba. . . . She is a Lt. Col., USAF (Ret.).
- **Strom Thurmond** is a major general, USAR (Ret.), and member of the Board of Visitors to West Point . . . strong supporter of manned bomber, ABM, and nuclear submarine programs . . . veteran of the Normandy invasion (82d Airborne Division) and holder of many military decorations . . . favors quick victory in Vietnam.
- **Jack Miller** is another brigadier general in the Air Force Reserve . . . has been to Vietnam to study logistics and weapon and ammunition shortages . . . makes frequent speeches in the Senate and on public platforms on national security policies and the role of Congress in determining those polices . . . was one of first to challenge Pentagon assertion that the supersonic transport is not important to the military . . . believes voluntary army idea "has ring of appeal" as opposed to draft.

Subcommittee's professional staff is headed by Chief Counsel James T. Kendall (seated, center). At his left is Glenn Smith, now a consultant, and at his right, Robert M. Neal. Standing, left to right, are Stuart P. French, Samuel R. Shaw, and Ben J. Gilleas, Director of Investigations. Not present is Everett L. Harper, who recently replaced Mr. Smith as permanent staff member.

sile sites, hamper development of an antimissile system, prevent US testing of high-yield weapons already tested by Russia, and permit the Soviets to test underground in an area where the US did have the lead. The result was that the Administration, reluctantly, agreed to the imposition of four safeguards, all designed to reduce the above disadvantages and risks. The safeguards are recorded in writing, agreed to by Congress, the Joint Chiefs of Staff, and the White House. Prime monitor, making sure there is no slipup, is Senator Henry M. Jackson of Washington, a member of the Preparedness Subcommittee as well as of the Joint Committee on Atomic Energy. Each fall, Senator Jackson delivers a report on the Senate floor, carrying out the subcommittee determination to make sure safeguards are implemented.

All Hearings in Closed Session

Transcripts of Preparedness Subcommittee hearings, all held in closed session, are submitted to the Defense Department for security clearance. So are all sensitive reports. In 1965, in the midst of the row over the proposed merger of the National Guard and Reserve, the subcommittee produced a report on the readiness of US Army equipment and materiel. The Pentagon never permitted public release of this paper. It was a fully documented study, establishing the fact that none of the sixteen active Army divisions which then existed was fully combat ready.

Despite the existence of this report, Secretary McNamara later testified before the parent Senate Armed Forces Committee that the United States had sixteen Army divisions, all well equipped and "ready to go into combat." He said this was "without any qualifications whatsoever." Senator Stennis challenged this statement, and the subcommittee staff, which had already toured Europe inspecting the Seventh Army, went on with its work. It was established in 1966 that, when Mr. McNamara testified, four Army divisions in the continental United States (the 4th Infantry, the 5th Infantry, the 1st Armored, and the 2d Armored) were not combat ready. Judged against the Army's own tables of organization and equipment, the staff found that one of the divisions had only about fifty percent of its assigned strength and another about seventy percent.

In that same year, in a related part of the subcommittee's spectrum of interest, Senator Stennis predicted in a speech that there would be 350,000 to 400,000 American troops in Vietnam by the end of the year. The idea was belittled by Defense officials, but the actual number at the end of 1966 was about 390,000.

The Cost of the War

The entire question of the funding of the war in Vietnam has led to similar differences. On the basis of subcommittee studies, Senator Stennis has consistently accused the Pentagon of underestimating the cost of the war, and of supplying the troops there by draining substance from other Army combat forces. At one time, in 1967, the Senator was himself a witness before the Joint Economic Committee, which was concerned with the effect of our war costs on the general American economy.

Here, Mr. Stennis found a group concerned, as he was, with the fact that the defense budgets presented to Congress were wrong by amounts ranging from $700 million to $1.7 billion and $12.3 billion. These were the amounts sought in supplementary budgets to take up what Mr. Stennis called "the heavy, ever-increasing, unprogrammed and unfunded Vietnam expenditures." Congress, he testified, was "required to legislate and appropriate in this vacuum of facts."

Mr. Stennis was a man with experience in this area. He had complained in mid-1965 on the floor of the Senate that a peacetime budget was being used to support combat operations. He called then for a reexamination of the proposed budget for Fiscal 1966, but Secretary McNamara said this was not necessary. A month and a half later came the request for another $1.7 billion.

One Defense Department observer of all this, himself sometimes embarrassed by the revelations, still says the Preparedness Subcommittee provides the best

(Continued on following page)

Frequent trips to battlefront keep Mr. Stennis' staff up to date on military problems. Here, Messrs. French and Gilleas inspect captured enemy materiel at forward command post of the Army's 1st Air Cavalry Division, Phu Cat, Vietnam. Maj. Gen. Jack Norton is their host. Officer at right is unidentified.

platform in the capital to put the spotlight on the most important defense issues of the day. Here, the Senate germinates a force that will result in consideration of major problems in a way that sets them apart from the routine. As Dr. Huntington has suggested, this can and does result in a change of direction.

The Heritage from Truman

The Preparedness Subcommittee, by straining history a little, could find its roots in the first congressional investigation on record, which was a House probe into a disastrous military expedition against the Indians in 1792. A more plausible beginning was during World War II, when Harry S. Truman, then a Senator from Missouri, headed the Senate's Special Committee to Investigate the National Defense Program. It was one of several committees that concentrated on the war efforts of the Executive Branch and remains the only one that left a record of effectiveness and contributed heavily to the prestige and later political success of its chairman.

It may be that Lyndon B. Johnson was not blind to that record in the summer of 1950, when he offered a resolution to the Senate Armed Services Committee proposing the establishment of a subcommittee to exercise "continuous watchfulness" over "all policies, programs, activities, operations, facilities, requirements, and practices of the Department of Defense, the Armed Services, and other agencies. . . ."

Senator Johnson, then a senior member of the Armed Services Committee, said the new subcommittee should "function somewhat as the Truman Committee did" and went so far as to say "its work should receive priority over most of the work of the [full Armed Services] Committee."

As Mr. Johnson saw it in 1950, the nation was in the midst of a national emergency—the Korean War was a month old when he spoke—and World War III might be near. Among the benefits to be gained from his plan, he said, were the elimination of other "indiscriminate investigations," the spotlighting of particular defense problems, economy in the appearances required of military and defense leaders, the education of the full committee, and savings in lives, money, and effort.

It was Mr. Johnson who set down some basic rules at the first meeting of the subcommittee after it was formed, and he was named chairman. He turned his back on headline-hunting and partisanship. He did not want the group to become a "Monday morning quarterback club, second-guessing battlefront strategy." He demanded frankness and impartiality.

The expenses of the subcommittee at that time, for the 81st Congress, were set in the Johnson resolution at $25,000. When the subcommittee's life was extended for the 82d Congress, this ceiling was lifted to $190,000. Current annual expenses run in the neighborhood of $175,000 a year.

A new resolution is required to continue the subcommittee with the opening of each Congress. This pattern was broken for the period 1953 to 1955, when the Republicans organized the Senate and Leverett Saltonstall of Massachusetts was chairman of the parent Armed Services Committee. He operated by appointing seven special subcommittees to investigate specific problems—aircraft procurement, ammunition shortages, stockpiling, and such items as a tin plant in Texas and the domestic watch industry—but the Democratic pattern was restored in 1955 and Lyndon Johnson took up the job again, to hold until he became Vice President in 1961.

The shift of Mr. Johnson from the legislative to the Executive Branch was accompanied by far more than a shift of the chairmanship to Senator Stennis. It was during his second hitch as head of the subcommittee

Captured enemy weapons and supplies are put on display for Preparedness Investigating Subcommittee staff at Phu Cat. Notice shells, wire, medical supplies, and weapons. All staff members are Senate employees, appointed by Chairman Stennis. All are lawyers, except Samuel Shaw, who is a retired brigadier general of the US Marine Corps.

that Lyndon Johnson, nurturing new ambitions that looked to the other end of Pennsylvania Avenue, was blessed by the Russians with the launching of Sputnik.

The First Space Age Hearings

On the morning of November 25, 1957, the Preparedness Investigating Subcommittee met in Room 318 of the Senate Office Building to launch its first elaborate investigation. The subject was our satellite and missile program, the final transcript of which filled more than 2,300 printed pages. The hearings ran until near the end of January 1958.

The first witness was Dr. Edward Teller, and before the sessions concluded the subcommittee had heard from most of America's leading experts in the young technologies involved in the space and missile programs. Testimony was received from men in the military, pure science, industry, and government.

In the background, as the subcommittee met, the Eisenhower Administration had a report on the US military position prepared by an advisory committee headed by the late H. Rowan Gaither. The White House, in a letter to Mr. Johnson, refused to release the Gaither Committee report, although there had been press reports that the document portrayed the US to be in grave danger—exposed, according to the Washington *Post*, "to an almost immediate threat from the missile-bristling Soviet Union."

Even without official Gaither documentation, Johnson declared that Russia led the US in the development of ICBMs, in the total number of submarines, and that it was "rapidly closing the gap in manned airpower." There are many observers who believe that the 1960 "missile-gap" campaign issue, which helped elect the Kennedy-Johnson ticket and brought Robert S. McNamara to the Pentagon, had its basic origins in the 1957-1958 hearings of the Preparedness Subcommittee.

A sidelight that illustrates the kind of platform provided for subcommittee witnesses cropped up in January of 1968, when Lt. Gen. James M. Gavin, then chief of Army research and development, announced his decision to retire. Chairman Johnson immediately called the General back to the stand, where less than a month earlier he had criticized the missile program. This time, General Gavin declared that he had been told, ten days after that hearing, that he "no longer was being considered for promotion and assignment to a more responsible position." He said he was going to quit because if he stayed he would be expected to defend the Army budget and, "I don't believe in next year's budget." The Administration, disturbed by the Gavin testimony, sent Army Secretary Wilber M. Brucker before the subcommittee, where he said he had offered the General two means of attaining four-star rank but both had been rejected.

The Subcommittee's Staff

The staff of the subcommittee, in the days when Lyndon Johnson was chairman, had not contributed a great deal to the Senator's own power structure on Capitol Hill until he launched the inquiry into the missile and satellite programs. For this job Mr. Johnson enlisted, as Chief Special Counsel, Edwin L. Weisl, a prominent New York lawyer and Democrat. Today Mr. Weisl is a Democratic Committeeman from New York. All during the Johnson Administration he retained his close friendship with the President and was generally reputed to be the chief listening post for the White House as the Robert Kennedy organization built Democratic strength in the Empire State.

From his law firm, Mr. Weisl brought with him an-

(Continued on following page)

Staff members French and Gilleas sometimes go to sea, as here with Admiral Hyman Rickover aboard the *Hammerhead* for trial run of Navy's new atomic-powered submarine.

other attorney to serve the subcommittee as special counsel. His name was Cyrus R. Vance. Mr. Johnson's admiration for Mr. Vance has been one of the most enduring in the President's political history, where it has been easy for apparent intimates to fall out of favor. At the start of the Kennedy Administration Cyrus Vance went to the Pentagon as General Counsel to the Defense Department. After a year and a half he became Secretary of the Army. From this job he moved on to become Deputy Secretary of Defense. For stated reasons of health, he finally resigned from this job, but has continued to serve the Johnson Administration, currently in its negotiations with the North Vietnamese in Paris.

An Assistant Special Counsel for the subcommittee on this 1957-1958 staff was Mr. Weisl's son, Edwin L. Weisl, Jr. In the Johnson Administration that closes business on January 20 next, the younger Weisl has been serving as an Assistant Attorney General in the Justice Department.

Another counsel added to the subcommittee staff for the 1957-1958 sessions was Solis Horwitz. He has served under Mr. McNamara as an Assistant Secretary of Defense (Administration) and carried key responsibilities when the Pentagon was organizing its battle against critics of the TFX (F-111) airplane proposal on Capitol Hill.

'The Menace of the Cold War'

Under the chairmanship of Senator Stennis, the first inquiry with major impact was started early in 1962, fathered by an Armed Services Committee resolution asking it "to study and appraise the use of military personnel and facilities, to arouse the public to the menace of the cold war, and to inform and educate armed services personnel on the nature and menace of the cold war."

This hearing, which was spread out over five months, can be cited to show that men in uniform can use the subcommittee platform to spread their opinions on the public record, but that the Senators do not have to accept those opinions, and sometimes do not.

Commonly called the "muzzling" probe, it provided the first opportunity for Secretary McNamara to face up to a provocative issue, and one that had roused stern senatorial opinions. At the time, Senator Strom Thurmond was not a member of the subcommittee, but he launched the inquiry and was permitted to join the panel, because he had demanded the probe. The Senator, himself an Army Reserve general, charged that the Administration was trying to prevent military officers from speaking out on communism.

This grew out of the reprimand given to Maj. Gen. Edwin A. Walker, then commander of a division in Germany, following charges that he provided biased political indoctrination for his troops, attempted to influence their voting in 1960, and made derogatory statements about public officials. Senators William Fulbright and Barry Goldwater got into the argument, on opposite sides, and Secretary McNamara was called to account by the Senate Armed Services Committee. In the subcommittee hearings that followed, a long list of witnesses, in uniform and out, recounted their experiences with speeches, how they were written, reviewed, censored, and delivered. Many pages were recorded of criticism of Pentagon policies and how they were carried out.

Over it all, Senator Stennis presided coolly and fairly. When it was over, the subcommittee report urged "unwavering adherence" to the principle of civilian control of the military. It approved the review of speeches of military personnel in principle, but found fault with the way it was being done. It said the military has a responsibility to instill belief in democracy and an awareness of the dangers of communism, but criticized some of the programs used in this effort.

This majority report was not signed by Senator Thurmond, who filed his own lengthy opinion.

In recent years the subcommittee, as the rest of the Senate and the nation, has focused much of its time on the war in Vietnam and the general status of our military strength in the Army, Navy, and Air Force. The scope of this interest is shown in the tabulation of hearings and reports on pages 52 and 53.

Key Reports for USAF

To USAF, key reports were those of the past three years on tactical air, air operations in Southeast Asia, the air war against North Vietnam, military pilot training, and this year's studies of both strategic and tactical airpower.

The impact of these reports was felt on the floor of the Senate in early October when the Fiscal 1969 Defense Appropriations Budget was up for debate, and it

will continue to be felt in the 91st Congress, taking office in January.

Witnesses on the subject of strategic power included Gen. Earle G. Wheeler, Chairman of the Joint Chiefs of Staff; Dr. John S. Foster, Jr., Director of Defense Research and Engineering; Dr. Alain C. Enthoven, Assistant Secretary of Defense for Systems Analysis; Harold Brown, Secretary of the Air Force; Gen. John P. McConnell, USAF Chief of Staff; Gen Joseph J. Nazzaro, Commander in Chief of SAC; Gen. James Ferguson, Commander of the Systems Command; Adm. Thomas H. Moorer, Chief of Naval Operations; and Gen. Harold K. Johnson, Army Chief of Staff.

The printed record of the questions and answers covers 380 pages. It covers every possible detail about our strategic systems—in operation, in development, or known only in concept. From the hearings, the subcommittee concluded that the United States should develop and deploy a new long-range advanced manned strategic bomber (AMSA) and accelerate development work that could lead to an advanced ICBM.

Of particular interest in the transcript is the examination of Dr. Enthoven, who was asked a good many questions about the real and final influence of his systems analysis on the decision to build or not build a new weapon system. Out of this, the subcommittee concluded that "the basic decisions in the strategic and other military fields, except the one dealing with research and development, are drafted and prepared in the Systems Analysis office. These control the military budget, force planning, and procurement. It is apparent that the Assistant Secretary for Systems Analysis does, in fact, have a very important and decisive role in the entire planning and decision-making process."

Then, the subcommittee evaluated its discovery:

"Analysis and cost-effectiveness studies certainly have their proper place in the over-all process. Such analyses and studies, however, are only as valid as the assumptions upon which these are based, and these assumptions are based substantially on individual judgment and experience.

"We believe that military experience and expertise should be given proper consideration in all of these assumptions and hope that Systems Analysis will not be permitted to become a roadblock to the introduction of new and needed strategic systems into the operational inventory."

The report concluded by saying there is no issue about civilian control vs. military control. The question, the subcommittee says, is what is best for the country?

Findings on Tactical Air

On the subject of tactical air, the subcommittee made a similar finding. In early 1968, it reported, a tactical aircraft reduction was proposed in a document called the "Record of Decision Draft Presidential Memorandum." While it was in draft form, the services were given thirty days to take exception to the contents. They worked hard on this assignment, presented a reclama, and were rewarded with "few significant changes."

"Our national security can ill afford to have professional judgments of military officials given inadequate weight by their civilian superiors. If reductions are imposed for cost and other nonmilitary considerations, then this reasoning should be clearly expressed as the basis for such reductions so that the Congress can appropriately evaluate the departmental recommendations," the subcommittee said.

The report then pointed out that the Secretary of Defense favored twenty-three wings in USAF's Tactical Air Command. The Secretary of the Air Force thought twenty-four were necessary, and the Chief of Staff said "a substantially higher wing level" was required.

For these and other reasons, the subcommittee urged development of a new air-superiority system, the USAF tactical fighter (FX), and the Navy's VFX. After a look at our experience with the F-111 program, it concluded that each service should develop its own airframe. It also called for more accurate predictions on the Soviet inventory of tactical aircraft.

It is no secret in the Pentagon that when Mr. McNamara became Defense Secretary it was his initial intention to abolish the offices maintained by the Army, Navy and Air Force to carry on liaison with the House and Senate. He did, in fact, give orders calling for his own Assistant for Legislative Affairs to take over all congressional activity for the Department.

"That was before the time," says one veteran of that office, "that Mr. McNamara began to understand the function of Congress."

Before long, it was realized that the military men posted on Capitol Hill fill an essential role in helping both Senators and Representatives meet the demands

(Continued on following page)

Chairman John C. Stennis has never served in uniform. He has been in the Senate since 1947, where he went to represent Mississippi after ten years as a circuit judge.

of their constituents and the demands of their office. As Mr. McNamara's own people got more involved with congressional staffs, and learned more about their own requirement, the pressure to shut off the Army, Navy, and Air Force efforts was stopped.

At the same time, despite early experiences with the Stennis subcommittee, there was reluctance in the Defense Department to "come clean" and reveal all the facts, as demanded by the subcommittee staff. This problem probably was not overcome entirely at any time, but one giant step was made in 1967 when the subcommittee investigated the subject of Military Pilot Training, Requirements, and Inventories.

The staff says it had documentation showing there was a substantial "aviator deficit." This was known to the military departments. Yet, said the final report, "several witnesses who appeared before us failed to face up to the facts and were better calculated more to obscure than to inform." Then, there was a review of this complaint, citing the Army, Navy, Marine

PREPAREDNESS INVESTIGATING SUBCOMMITTEE

The Subcommittee was created on July 17, 1950, under the name of Preparedness Subcommittee, but was renamed the Preparedness Investigating Subcommittee in 1952. The following documents have been issued since its inception. (H) is the notation for Hearings, and (R) for Reports. In the case of hearing documents, only the date of the first day of the hearing is given even though the hearing itself may include testimony taken on a number of subsequent days. Other hearings held and reports drafted which were not issued because of security considerations are not included in this listing.

1950

September 5, Surplus Property Rubber (#1) (R)
September 5, Lackland Air Force Base, Tex. (R)
November 20, Surplus Property Rubber (#2) (R)
November 27, Agricultural Products and the Mobilization Program (R)
December 27, Nickel (R)

1951

February 7, Port of Orange, Tex. (H)
February 12, Tin (R)
February 13, Alaskan Task Force (R)
April 7, Port of Orange, Tex. (R)
April 16, Military Indoctrination Centers (R)
April—Fort Jackson, S. C. (R)
Camp Chaffee, Ark. (R)
Fort Leonard Wood, Mo. (R)
Marine Corps Recruit Depot, San Diego, Calif. (R)
May 7, Fort Ord, Calif. (R)
May 7, Naval Training Center, Newport, R.I. (R)
May 7, Naval Training Center, Great Lakes, Ill. (R)
May 7, Sampson Air Force Base, Geneva, N. Y. (R)
May 21, Marine Corps Recruit Depot, Parris Island, S. C. (R)
May 21, Camp Roberts, Calif. (R)
May 21, Fort Dix, N. J. (R)
May 21, Fort Knox, Ky. (R)
June 1, Sheppard Air Force Base, Tex. (R)
June 1, Naval Training Center, San Diego, Calif. (R)
June 1, Fort Riley, Kan. (R)
June 1, Camp Breckinridge, Ky. (R)
June 11, Manpower Utilization at Military Indoctrination Centers (R)
July 5, Tungsten (R)
July 19, Substandard Ho[illegible] and Rent Gouging of Milita Personnel (#1) (R)
July 24, Stockpiling of Tin and Rubber (H)
August 28, Stockpiling of Cotton (H)
September 4, Rubber (#3) (R)
September 5, Civil Defense Program (R)
September 24, Substandard Housing and Rent Gouging of Military Personnel (#2) (R)
October 5, Rent Gouging and Substandard Housing of Military Personnel (H)
October 22, Illegal Gambling Activities near Keesler Air Force Base, Miss. (H)
October 25, Conditions at Six Navy and Marine Corps Training Centers (R)
Submarine Base, New London, Conn.
Amphibious Base, Norfolk, Va.
Marine Corps Air Station, Quantico, Va.
Marine Corps Air Station, El Toro, Calif.
Camp LeJeune, N. C.
Camp Pendleton, Calif.
November 11, Standardization of Specifications and Inspections of Agricultural Commodities (R)
November 13, Administrative Top-Heaviness of Our Armed Forces (R)
November 29, Defense Mobilization (R)
December 7, Conditions at Six Air Force Training Centers (R)
Langley AFB, Va.
Carswell AFB, Tex.
Lowry AFB, Colo.
Mather AFB, Calif.
March AFB, Calif.
Keesler AFB, Miss.
December 21, Conditions at Eight Army Training Centers (R)
Camp Atterbury, Ind.
Fort Belvoir, Va.
Fort Devens, Mass.
Camp Edwards, Mass.
Camp Kilmer, N. J.
Fort Lewis, Wash.
Camp McCoy, Wis.
Camp Rucker, Ala.

1952

January 11, Hiring for Work at Overseas Bases, Part 1 (H)
January 24, Manpower Utilization (Special Reference to IV Fs) (H)
February 1, Hiring for Work at Overseas Bases, Part 2 (H)
March 18, Hiring for Work at Overseas Bases, Part 3 (H)
April 12, Illegal Gambling Activities near Keesler AFB, Miss. (R)
April 16, Incentive Pay and Overseas Allowances (H)
April 17, Munitions Board (R)
May 28, Bernard Baruch Testimony, "Only Strength Will Win the Peace" (H)
June 17, Adequacy of Our Airpower (R)
July 7, Utilization of Manpower by Our Armed Forces (R)
July 2, Portland International Airport (H)
July 16, Supplemental Report on Tin (#2) (R)
August 18, Moroccan Air Base Construction (#1) (R)
August 28, Aircraft Procurement (R)

1953

February 19, Moroccan Air Base Construction (#2) (R)
April 1, Ammunition Shortages in the Armed Services (H)
May 23, Ammunition Shortages in the Armed Services (#1) (R)
June 2, Aircraft Procurement (H)
August 10, Ammunition Shortages in the Armed Services (#2) (R)
August 12, Ammunition Shortages in the Armed Services (#3) (R)
November 2, Implementation of Title IV of National Security Act, Part 1 (H)

1954

January 15, Implementation of Title IV of National Security Act (R)
January 29, Status of Reserve and National Guard Forces (R)
March 29, Implementation of Title IV of National Security Act, Part 2 (H)
May 20, Report on European Trip (R)
June 30, Essentiality of Domestic Horological Industry (H)
July 23, Watch and Clock Industry (R)
August 4, Annual Report (R)

1955

September 12, Corporate Profits of Airframe Manufacturers (R)
October 10, Concentration of Defense Contracts (R)
October 19, Procurement of Aircraft Passenger Seats (R)
November 4, F3H Development and Procurement (#1) (R)

1956

January 9, Cost of Overestimating Military Requirements (R)
March 14, Sale of Surplus Military Property (R)
March 24, Remuneration of Officers and Directors of Airframe Manufacturers (R)
April 23, F3H Development and Procurement (#2) (R)
July 2, Concurrent Buying and Selling of Military Equipment (R)

Corps and Air Force. And the subcommittee warned:

"Candor and frankness should be the hallmarks of testimony of Defense witnesses when appearing before the Congress. Veiling and masking the facts and issues has little justification and usually is brought to light to the embarrassment of the witnesses and the resentment of the Congress. . . . We were unfavorably impressed with testimony in executive session which obscured the pilot shortages behind a screen of semantic and statistical sleight of hand."

It is possible to apply Dr. Huntington's standards to this sort of edict from the Preparedness Investigating Subcommittee and conclude that it is "lobbying" with great merit. Indeed, it brings issues "to the top" where, as the professor said, they cannot be ignored by the chief policy-makers. It does not pretend to provide all the answers, but it does provide a way to ask the embarrassing questions. Under our form of government, this serves a very vital function indeed. —END

CHRONOLOGY OF HEARINGS AND REPORTS

1957

February 5, Proposed Closing of Government-Owned Ordnance Plants (H)
February 18, Purchase of Tanks by Department of the Army (R)
April 29, Proposed Closing of Government-Owned Ordnance Plants (R)
May 13, Nickel (R)
May 20, Conflicts of Interest in the Armed Services (R)
September 9, Attempted Sale of New Tires as Surplus (R)
November 25, Inquiry into Satellite and Missile Programs, Part 1 (H)

1958

January 6, Inquiry into Satellite and Missile Programs, Part 2 (H)
February 26, Inquiry into Satellite and Missile Programs, Part 3 (H)

1959

January 29, Missile and Space Activities (H)
March 11, Major Defense Matters, Part 1 (H)
May 20, Major Defense Matters, Part 2 (H)
June 16, Closing of Naval Ammunition Depot, Hingham, Mass. (R)
June 22, Closing of Overhaul and Repair Department, Corpus Christi, Tex. (R)
September 21, Promotion of Reserve Officers to General and Flag Ranks (R)
October 8, Administration of Custodial Services Contracts, Fort Sill, Okla. (R)
Disestablishment of Naval Supply Depot, Scotia, N. Y. (R)

1960

February 2, Missiles, Space and Other Major Defense Matters (H)
April 25, Participation of Reserve General and Flag Officers After Promotion (R)
May 2, Operation of Stock Funds in the Military Establishment (R)
June 24, Army Modernization (R)
June 29, The B-58 Program (R)
June 30, Military Family Housing (Wherry) (R)
July 8, The B-70 Program (R)
August 31, Overtime Payments, NAS, Jacksonville, Fla. (R)

1961

March 10, Capehart Military Family Housing (H)
May 3, Collapse of Texas Tower No. 4 (H)
June 9, Military Family Housing (Capehart) (R)
June 15, Collapse of Texas Tower No. 4 (R)
October 2, The M-14 Rifle Program (R)

1962

January 23, Cold War Education and Speech Review, Part 1 (H)
February 1, Cold War Education and Speech Review, Part 2 (H)
March 2, Construction Costs of Atlas and Titan Missile Sites (H)
March 8, Cold War Education and Speech Review, Part 3 (H)
March 25, Collapse of Texas Tower No. 4, Command Responsibility (R)
April 4, Cold War Education and Speech Review, Part 4 (H)
April 16, Cold War Education and Speech Review, Part 5 (H)
May 16, Cold War Education and Speech Review, Part 6 (H)
June 7, Cold War Education and Speech Review, Part 7 (H)
Cold War Education and Speech Review, Index (H)
September 17, Arms Control and Disarmament (H)
October 19, Cold War Education and Speech Review (R)

1963

May 7, Nuclear Test Ban Treaty, Part 1 (H)
May 9, Cuban Military Buildup (R)
June 12, Award of X-22 R&D Contract (H)
August 12, Nuclear Test Ban Treaty, Part 2 (H)
September 9, Nuclear Test Ban Treaty Report (R)

1964

January 31, Award of X-22 R&D Contract (R)
July 8, Explosions of Atlas Missiles (H)

1965

March 1, Proposal to Realign Army Reserve and National Guard, Part 1 (H)
March 25, Proposal to Realign Army Reserve and National Guard, Part 2 (H)
May 13, US Army Readiness (H)

1966

January 26, Status of Ammunition and Airmunitions (H)
March 23, Readiness Status of Army Reserve Components (H)
March 25, Combat Readiness of Four Army Divisions (R)
- 4th Infantry Division
- 5th Infantry Division (Mechanized)
- 1st Armored Division
- 2d Armored Division

May 3, US Army Combat Readiness (H)
May 9, Air Force Tactical Air Operations and Readiness (H)
May 13, Readiness Status of Army Reserve Components (R)
May 31, Government-Owned Communications Facilities in Alaska (H)
June 18, Combat Readiness of Three Divisions (R)
- 82d Airborne Division
- 101st Airborne Division
- 2d Marine Division

July 15, Air Force Tactical Air Operations and Readiness (R)
August 25, Worldwide Military Commitments, Part 1 (H)

1967

February 21, Worldwide Military Commitments, Part 2 (H)
March 22, The US Army in South Vietnam (R)
March 22, Air Force Tactical Air Operations in Southeast Asia (R)
March 29, Airlift and Sealift to South Vietnam (R)
March 31, Situation in South Vietnam regarding (R)
- Enemy Threat
- Free World Forces other than US
- Revolutionary Development Program
- Economy of South Vietnam

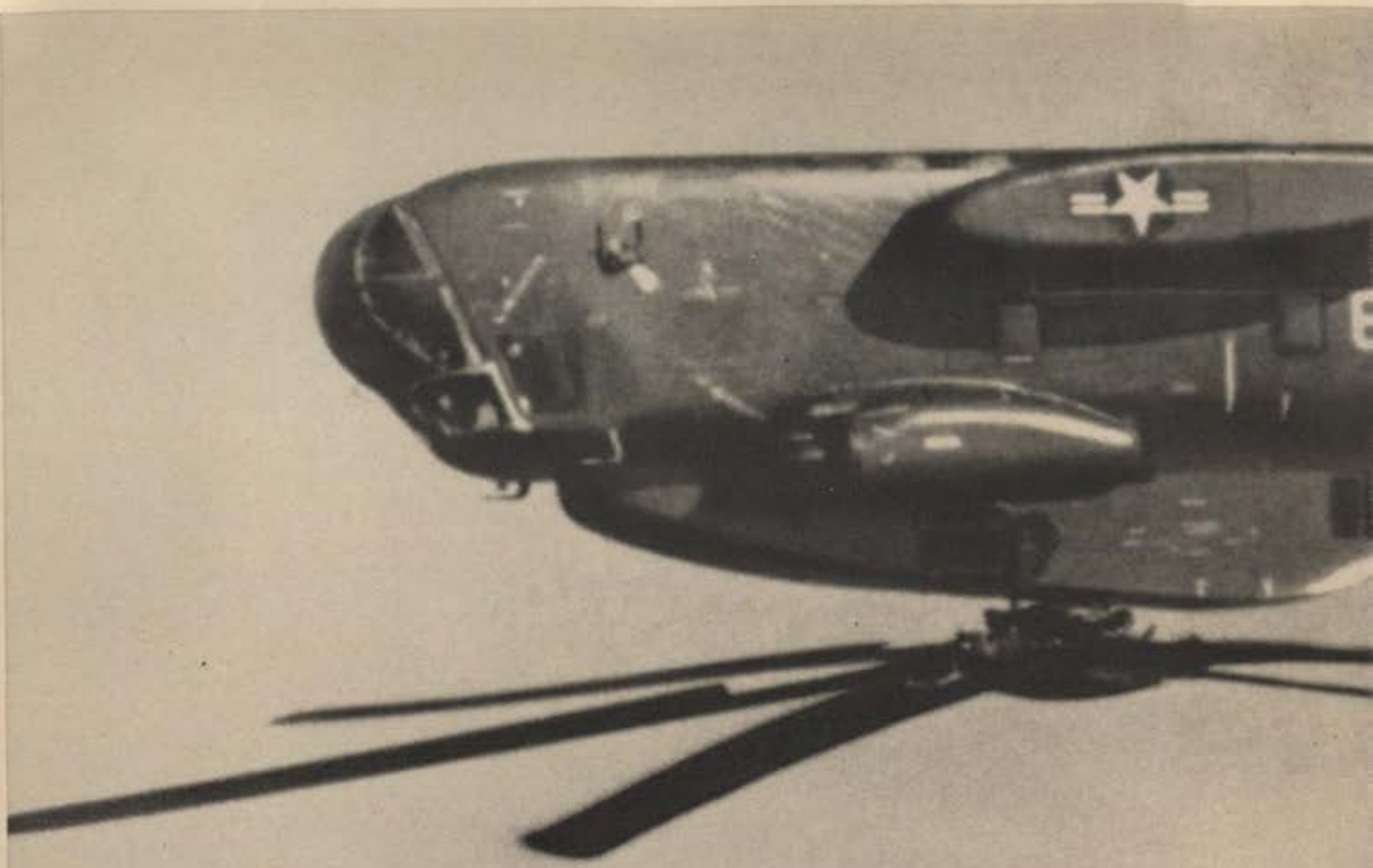
April 5, Army Rifle Procurement and Distribution Program (H)
April 6, The US Navy and Marine Corps in Southeast Asia (R)
April 10, Combat Readiness of US Atlantic Fleet (R)
April 24, Military Pilot Training, Requirements and Inventories (H)
May 31, Army Rifle Procurement and Distribution Program (R)
August 9, Air War Against North Vietnam, Part 1 (H)
August 16, Air War Against North Vietnam, Part 2 (H)
August 22, Air War Against North Vietnam, Part 3 (H)
August 25, Air War Against North Vietnam, Part 4 (H)
August 28, Air War Against North Vietnam, Part 5 (H)
August 31, Summary Report on the Air War Against North Vietnam (R)
September 11, Military Pilot Training, Requirements and Inventories (R)

1968

March 13, US Submarine Program (H)
April 23, Status of US Strategic Power, Part 1 (H)
April 26, Combat Readiness of Three Army National Guard Brigades (R)
- 49th Infantry Brigade
- 67th Infantry Brigade
- 69th Infantry Brigade

April 30, Status of US Strategic Power, Part 2 (H)
May 3, Combat Readiness of Army and Marine Corps Divisions (R)
- 1st Armored Division
- 2d Armored Division
- 5th Infantry Division (Mechanized)
- 82d Airborne Division
- 2d Marine Division
- 5th Marine Division

May 14, US Tactical Airpower Program (H)
June 6, Additional Procurement of M-16 Rifles (H)
September 2, Additional Procurement of M-16 Rifles (R)
September 23, US Submarine Program (R)
September 27, Status of US Strategic Power (R)
October 4, US Tactical Airpower Program (R)



The picture isn't upside down.

It's our CH-53A. And on October 23, 1968, Marine Corps and Sikorsky test pilots flew the helicopter through 5 rolls and 5 loops at altitudes ranging from 1,000 to 1,500 feet.

Why the aerial acrobatics? To enhance its usefulness in service by proving that, in addition to being the free world's biggest and fastest helicopter, the CH-53A is as maneuverable as helicopters only

The helicopter is.

one-tenth its size. And more maneuverable than comparable-size fixed wing transports...an important feature for safety, survivability and getting in and out of confined areas.

Sikorsky Aircraft
STRATFORD, CONNECTICUT
DIVISION OF UNITED AIRCRAFT CORPORATION

The Pentagon's dynamic Director of Defense Research and Engineering outlines the broad role played by research and engineering in attaining the margin of military superiority necessary to the nation's survival. He denies the view that defense R&D is on a technological plateau and asserts that in all general areas vital to security the US is technologically in the lead . . .

R&D: National Security's

By John S. Foster, Jr.

DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING

RESEARCH and development is truly the leading edge of our national security. I propose to show this to you from two points of view: first, what R&D in the past has meant for national security; and second, what defense R&D today means for tomorrow. I then will indicate a few of the questions and typical problems that emerge in presenting our R&D request to the Congress. And finally, I will mention some of the lessons for R&D that we are learning in Vietnam.

Today the nation's defense rests in large measure upon the products of R&D during the past twenty years. For example, our Minuteman force depends upon large solid-propellant technology, inertial guidance, and nuclear-weapons technology. Our Polaris submarines depend upon nuclear-reactor technology and inertial-navigation technology. Our strategic bomber force depends upon aerodynamic, jet engine, materials, and electronics technologies. Our GIs are the best equipped in the world—from shoes to food, from medical care to supporting firepower. Our satellite communications allow sophisticated, timely command and control. The lists are familiar, long, and impressive.

Dr. John S. Foster, Jr., Director of Defense Research and Engineering.

Why do we have these capabilities? Simply because the US must have, and continue to possess, the margin of over-all military safety and technological superiority necessary to deter a major war with our potential enemies. There are, of course, those who question the adequacy of our capability in particular areas. But there are few, if any, informed persons anywhere who doubt the over-all strength, breadth, and sophistication of our military power. Again, let me emphasize, our power today depends upon the advanced technology developed in the past.

Today's R&D Is Tomorrow's Defense

In turn, our research and development today is establishing the basis for tomorrow's defense capabilities. Let me illustrate what this means.

First, let's look at some of the major programs entering new stages just this year. The Sentinel missile defense is beginning the final stages of development and initial deployment. An entirely new strategic air defense will be started. We are developing the capability for several warheads on each of our Minuteman and Polaris missiles, and, if desired, each warhead can be sent to a separate target. A new "superhard" silo will enter advanced development so that we will have an option for much greater survivability if the Soviet Union achieves greater accuracy in its missile force. New and different fighter aircraft for the Air Force and Navy will be started for the demanding mission of tactical air superiority in environments such as that over North Vietnam—and we are also starting a new carrier-based aircraft for antisubmarine attack. New attack nuclear submarines are

The author, Dr. Foster, was head of the Lawrence Radiation Laboratory, University of California at Berkeley, before assuming his present post in 1965. A noted weapons development specialist and physicist, he was with the Laboratory from 1948-1965. This article is based on Dr. Foster's remarks at a meeting of the Air Force Association's Iron Gate Chapter in New York City in September.

Leading Edge

being started. The Manned Orbiting Laboratory program will be in a period of peak activity. Satellite technology will be pushed to enlarge our communications and information-handling capabilities. Many advanced equipments for tactical warfare will reach the final stages of development, including new helicopters, the C-5A transport aircraft, the Main Battle Tank, and new air-to-ground weapons having much greater effectiveness.

We also have under way a remarkable range of activity in the underlying fields and technologies of defense R&D. The work includes research in solid-state physics that will enlarge our computer capabilities; in environmental sciences that will improve our skills in predicting the weather on a worldwide basis; in the technologies of undersea warfare that will increase our capability to find and defeat enemy submarines; in new sensor systems that will expand the ability to find and hit targets under all weather and around the clock; in the technologies of advanced penetration aids for our missile and bomber forces so that no enemy defense could prevent a sufficient number of our attack forces from reaching their targets; in the technologies of satellite communications so that local and international decision-makers are well informed; in the technologies of hydrofoils and V/STOL aircraft (perhaps even in combination) that could revolutionize many land, amphibious, and air-sea operations; and in the techniques of high reliability that can provide lifetimes for electronic equipment so long that they will operate without maintenance for years, leading to enormous financial savings.

Some say defense R&D is on a technological plateau. That is nonsense. If you sat in my office and saw the spirit and creativity of those involved in defense R&D, you would know there is no technological plateau. Defense R&D has relentlessly pushed the state of the art in virtually every area of science, technology, and military equipment.

Some say the US is slipping behind the Russians. I say that's an interesting observation, but prove it; and I see *no* substantial evidence that US defense R&D is behind any country's where and when it counts. From time to time the Soviet Union—and, in fact, other major industrialized nations—move ahead in one narrow area or another. But in all broad areas vital to our security, the US is technologically in the lead, and must remain so.

Meeting Future Challenges

To have met the challenges in the past required great resources in trained people, facilities, and funds. To meet the future challenges will also require a large commitment. Defense R&D includes thousands of projects, a few requiring hundreds of millions of dollars each year, and many requiring tens of thousands. The total R&D funding requested this year is about $8 billion. This is roughly ten percent of the

(Continued on following page)

Among advanced equipment undergoing development is the Air Force's giant C-5 transport, currently being put through a series of test flights ***(see also page 23).***

To spur the improvement of military communications and information-handling, the Defense Department is pushing satellite technology. An experimental tactical communications satellite (rear) dwarfs several earlier models.

budget for the Department of Defense. It is about half of the federal R&D effort, and about a third of our total national R&D activity.

When we present our program and budget to the Congress, we face—as we should—many questions. The required funding is large, and national security is at stake. These questions fall into two categories: continuing debates on major program objectives and decisions; and specific questions on particular projects or activities. I want to illustrate each of these to indicate the nature of our interaction with Congress.

Aside from its budgetary power, Congress plays an important part in military R&D. It is a challenge to present a program to the Congress. On the one hand, we have to be certain that our technical judgment can stand the light of exposure to the country's best technical experts, all of whom are available to the Congress. On the other hand, the program, when viewed from the vantage point of the Congress, is judged on the basis of whether it is sensible, coherent, adequate, and compatible with the national security situation as reflected in the public's understanding and the most recent events. Congressmen often have an unerring sense of what's important, and ask the most penetrating questions in lay terms.

Let's first discuss the continuing debates about major program decisions. By major program decisions I mean the problems of developing alternatives, analyzing them in detail, and making choices about our most critical weapon systems. These are the systems that may enter the inventory in a few years and remain in the inventory for ten to twenty years. Examples are the Sentinel ballistic missile defense, an advanced manned strategic aircraft (AMSA), a new missile, or a new fighter aircraft.

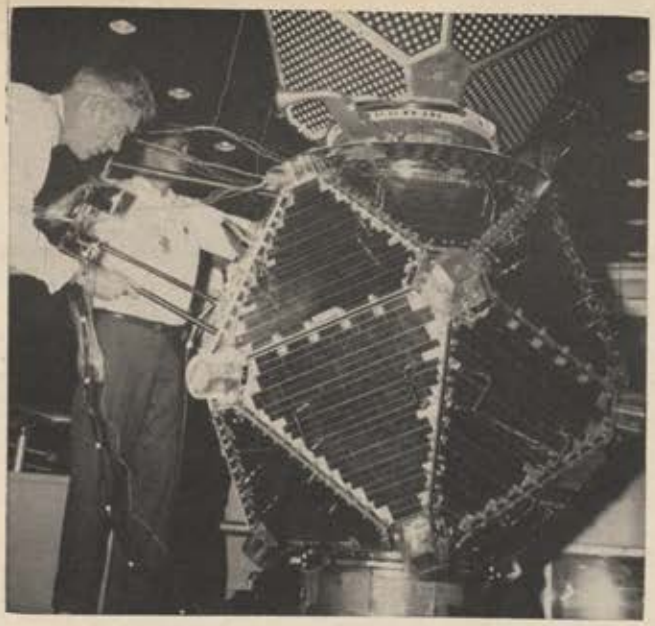
In formulating and analyzing these programs, and discussing them with Congress, there is always room for debate. For every argument there is a counter-argument. Some assertions, when presented with the force of fact, can be quite persuasive, even though possibly misleading. And so our problem is compounded not merely by the technical, military, and economic complexity of the issues, but perhaps more by the need to structure and make explicit a complete set of considerations. As McGeorge Bundy said in another context: "What has made debate so easy, and action so hard . . . is that the debater can defend the propositions he likes from a great pile of evidence in which there is plenty to support every view. In our actions, however, we have to live with the whole."

Use of Development Concept Paper

Recently we have established a new discipline—yes, I think discipline is an apt word—that is helpful in our own decision-making as well as in our discussions with Congress on these critical R&D efforts. For roughly 100 selected major development programs—costing usually at least tens of millions of dollars—we prepare a single document, called a Development Concept Paper, for the Secretary of Defense to control the directions of each program and the investment appropriate to meet the defense need.

The concept paper begins by highlighting the issues. It next assesses the military threat or "the problem," and then gives the options for development, production, and deployment, in the short and long term, to cope with the problem. It states the pros and cons, the risks and consequences, of each option. The document must be written so that the head of each organization having a role in assessing the project (usually the Secretary of the military departments and the appropriate officials in the Office of the Secretary of Defense) agrees that the document represents his views adequately, and that all other views in the paper are relevant and substantive. Each of the signers recommends a course of action. Personalities are kept out of the documents—only on the final signature page are the recommendations of each organization shown. Based on the objective analysis in the paper, containing all of the agreed-upon facts and the "best arguments," the Secretary of Defense makes his decision.

One significant detail about these papers: They are limited to twenty pages, which means both that top



Space technology contributes to defense. These are nuclear-detection satellites that help police the nuclear test ban.

Sprint test firings are part of the continuing research and development effort by DoD to develop an antiballistic missile system in the event a decision is made to deploy such a system in the future to ensure national security.

management does use them, and that a premium is placed on the discipline of cutting through complexity to reach a clear, succinct, logical statement of the essential facts and issues.

We review these major programs at least once a year—always when preparing the budget for the following year. Equally important, they are reviewed when explicitly established "thresholds" (for cost, schedule, or performance) are "breached." Thus the paper lives through the life of each project, providing a historical record of the major issues and options considered in decisions by the Secretary of Defense.

After we complete these papers, we have a coherent appreciation for all of the pros and cons of the issues regarding the programs. Thus, we can make a firm decision. Just as important, we can explain the entire basis for decisions to the Congress, knowing and showing the arguments on both sides of every key issue.

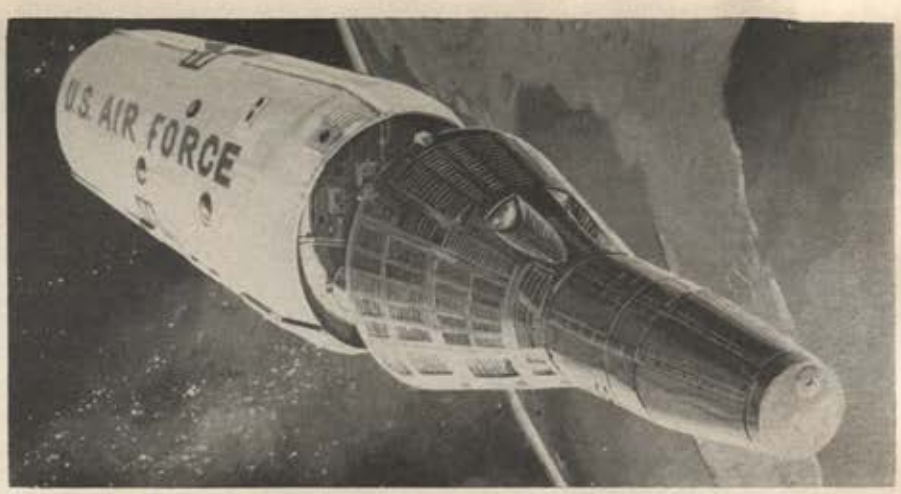
The Wide Variety of Studies

Other R&D questions from the Congress this year ranged from a concern about the disturbances on university campuses to an inquiry about the geographical distribution of research funds. But much discussion, and some criticism, centered on a small group of studies.

One study was titled "Upper Limits to Safety for Primaquine in Sensitive Italians." Typical questions were: Is this medical research relevant to Department of Defense needs? Why should it be done in Italy? Who are these "sensitive" Italians? All are good questions. So let me explain. In the presence of a certain enzyme deficiency, standard antimalaria drugs may cause an unusually large destruction of red blood cells. Italians, like many relatively dark-complexioned people, tend to have this deficiency and also are especially sensitive to the antimalaria drugs. Clearly, because the armed forces include men and women who have this deficiency, and who may contract malaria in the course of their military duty abroad, the Department of Defense has a clear operational interest in this problem. This research—totaling about $50,000—was designed to develop quantitative clinical information on the treatment of malaria in persons having the enzyme deficiency. The work was carried out in Italy because the Institute for Medical Pathology in Genoa has a strong research capability in this field and because Italians (or Sardinians) are one important population for study. I believe we should examine this kind of problem, whether or not the effort's title sounds obscure to a nonspecialist.

A second research effort that was questioned was called "Cold Adaptation of Korean Women Divers." Once again, questions. Why does the Department of Defense spend the taxpayers' money studying Korean women? Why do we worry about cold adaptation?

(Continued on following page)



The Manned Orbiting Laboratory is cited by Dr. Foster as one major program that is to receive intensive R&D attention in the future. MOL, to be deployed in the 1970s, is viewed as the spearhead of the operational use of military crews in space. Considerable developmental work on the MOL has already been done.

Again, let me explain. This is a part of our continuing program of research on the mechanisms of human tolerance and adjustment to cold. Cold water immersion is particularly relevant to the Navy's swimming and diving operations for the Deep Submergence Program, and to improved rescue operations for Air Force and Navy pilots forced to bail out at sea. Certain Korean and Japanese women earn their living by diving in shallow seas for food. In their work they tolerate long exposures to water as cold as fifty degrees F.—this is the most severe cold exposure that humans are known to endure voluntarily. The research —supported by the Navy and Air Force at about $25,000—is focused on understanding the Koreans' adaptability so that we can improve underwater operations such as submarine rescue and object retrieval. Again, it seems to me such an effort is quite relevant and important to defense capabilities.

I have two points in dwelling on these studies. First, when we carry out budget reviews on R&D—internally and particularly with the Congress—we touch on every field of science and every area of operational needs, sometimes in great detail. My second point is that whenever you hear about defense R&D funds being spent on a study apparently unrelated to national security, please recall that there is usually much more to the project than its short title might suggest.

The R&D Lessons of Vietnam

Before concluding, I should discuss briefly some of the R&D lessons we are learning in Vietnam, and a few of the R&D programs we are emphasizing to try to make sure these lessons are learned and applied fully.

Let me mention just three broad lessons. First, we did not plan realistically to equip and train the forces of South Vietnam to counter their insurgency and defeat the border attacks to which they have been subjected. Second, US forces must learn and, I believe, are learning, how to cope with limited wars in cheaper, more efficient ways. Third, critical elements of our forces remain vulnerable to relatively simple enemy equipment and tactics. These lessons form a clear challenge to the US defense R&D community—and will be relevant to any future trouble spots in remote areas where US interests were involved.

These lessons and others have led to considerable R&D. The US scientific and engineering communities, industry, and the Defense laboratories have shown their ability to react effectively and quickly to many specialized requests from the Vietnam Command. For example, during 1967 we sent more than 100 new kinds of equipment to the theater in test quantities to determine their operational suitability, and we actually introduced operationally approximately 120 new or modified equipments. In the period after 1965, the R&D budget for Vietnam went from a few tens of millions of dollars to a current level in excess of $800 million. Almost all of the R&D currently driven by the urgency of the war is applicable to our general tactical warfare needs.

What have been the "payoffs" of our R&D related to the conflict in Southeast Asia? We have accelerated programs in night vision, sensor technology, electronic warfare, air defense countermeasures, new conventional ordnance, high-accuracy weapons, and real-time reconnaissance. Perhaps above all, we have relearned the fundamental lesson of just how difficult and important it is to be able to find and hit the enemy. In Vietnam, this fundamental problem is the toughest.

We have also begun to learn some of the broader lessons of waging a limited war. One is that a conventional military effort, while important, is not necessarily the fundamental ingredient of a long-term settlement of the kinds of problems in Southeast Asia. The R&D demands of the pacification program—hamlet security and the entire nation-strengthening process —are now understood more clearly and recognized as central.

In the final analysis, the goals of defense R&D are the goals of national security. We must use our brains to explore the unknown, learn what is feasible, and assess our alternatives. We must have the heart to recognize the nation's goal is peace, and work for it. Yet we must have the guts to face the need for tough actions, and take them as required. Research and development is the leading edge of our national security —it provides the means to sustain flexible military power for the defense of freedom.—END

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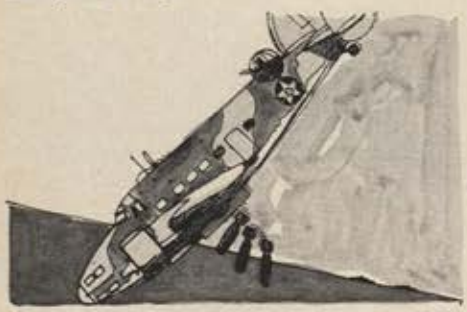
Diary of

Since 1940 a total of 18 Lockheed aircraft have worn the markings of the U.S. Air Force and its predecessor, the Army Air Corps. As our country's defense needs have changed and as new mission requirements have evolved, Lockheed has responded with a wide variety of combat aircraft, airlifters, trainers and reconnaissance planes.

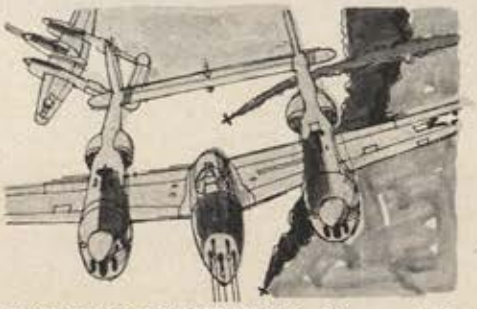
Here are a number of the Lockheed aircraft that have served the Air Force and Army Air Corps over the last three decades:

1940



THE A-29 HUDSON. Before the U.S. entered World War II, this medium reconnaissance bomber's uncanny survivability in combat earned it the unofficial R.A.F. nickname of "Old Boomerang." The Hudson was the first Lockheed aircraft to serve in the U.S. Army Air Corps.

1941

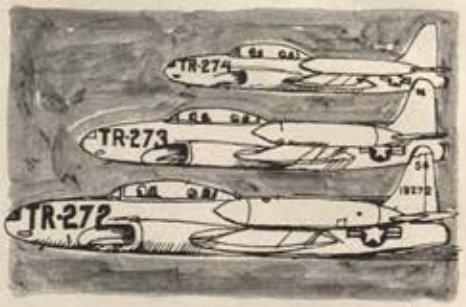


THE P-38 LIGHTNING. The world's first 400-mile-per-hour plus fighter. Produced throughout the war years, this quick and deadly high-altitude pursuit plane became anathema to Axis pilots in all combat theaters. Well over 9,000 Army Air Corps Lightnings saw action in World War II.

1945

THE P-80 SHOOTING STAR. This first operational U.S. jet was in production as the war ended. Its designation was changed to F-80 in 1947 when a reorganization of the services resulted in the emergence of the Air Force as we know it today. Then, in November of 1950, in the skies over northwest Korea, an Air Force F-80 Shooting Star earned a place in the annals of aerial warfare by emerging victorious from the world's first all-jet air battle.

1948



THE T-33 JET TRAINER. To this day still operational, the T-Bird has been an aerial schoolhouse for an entire generation of U.S. airmen and the airmen of many allied countries.

1950

THE RC-121 SUPER CONSTELLATION WARNING STAR. A descendant of the C-69 Constellation Transport of World War II and cousin to the Air Force C-121 Super Constellation Transport, the RC-121 served as a radar picket in this country's original early warning network. RC-121s are still serving today's Air Defense Command.

defense

1956

THE C-130 HERCULES. From initial delivery to the present day, this tactical airlifter has been a mainstay of the modern tactical Air Force. The versatile C-130s have functioned as cargo and personnel carriers, as in-flight refueling tankers, and as air-sea rescue and recovery aircraft. The short-field capability of the end-loading Herky Birds has proven to be logistically invaluable in Vietnam.

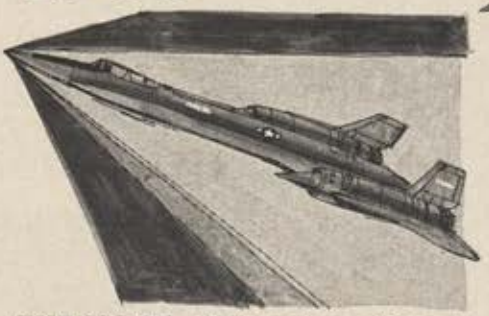
1956

THE F-104 STARFIGHTER. When the wraps came off the F-104, the Air Force had the world's first Mach 2 fighter—an aircraft twice as fast as any previous U.S. combat aircraft. At one point the F-104 held four world's speed and altitude records. Lockheed designers foresaw that the only ultimate limitation on the Starfighter's speed was the thermal barrier.

1962

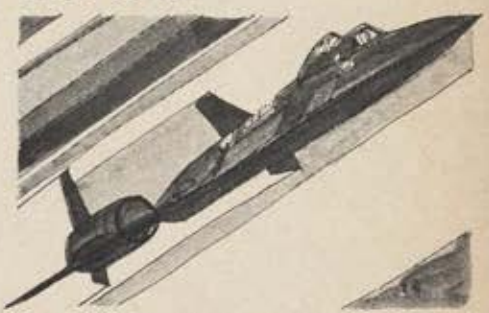
THE C-141 STARLIFTER. Lockheed's response to Air Force needs for a long-range, high-speed strategic airlifter, the C-141 currently specializes in conveying high-priority war materials to our troops in Southeast Asia. After disgorging their vital cargo in Vietnam, the sleek StarLifters of the Military Airlift Command are quickly converted to flying hospitals to rush seriously wounded personnel back to the States.

1963



THE YF-12A. Designed to withstand the temperatures generated by air friction in tri-sonic flight, this incredible experimental fighter glows with heat as it approaches top speed. In a single day, an Air Force YF-12A set nine separate performance records. It proved capable of sustaining altitudes in excess of 80,000 feet and speeds in excess of 2,000 miles per hour.

1965



THE SR-71. The world's first operational Mach 3 aircraft, SR-71s are in service with the Strategic Air Command of the U.S. Air Force.

1968

THE C-5 GALAXY. When the mammoth C-5 lifted off on its maiden flight in June, it signaled a new era in Air Force airlift capability. Almost as long as a football field, this unprecedented leviathan will shoulder payloads of 110 tons at cruising speeds exceeding 500 miles per hour. Answering the Air Force's need for a totally new type of strategic logistical system, Lockheed's C-5 Galaxy is the latest product of a working partnership which has spanned almost three decades.

The ability to understand present mission requirements and anticipate future ones, coupled with proven innovative and technological capabilities, enables Lockheed to respond to the needs of the U.S. Air Force in a changing world.

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As the current year—and with it a political era—fades into history, the US strategic posture, especially with regard to USAF's domain, can be assessed as only "reasonably good." But attached to this diagnosis of the aerospace health of the nation is the clear-cut proviso that, to maintain the present standing relative to potential threats, a number of programs need to be pursued with speed and vigor. Here, USAF's Deputy Chief of Staff for R&D, in an exclusive interview, outlines . . .

How USAF Is Looking Toward the Future

By Edgar E. Ulsamer

ASSOCIATE EDITOR, AIR FORCE/SPACE DIGEST

THE US strategic posture, at the end of 1968, is "reasonably good," and, in spite of the Vietnam War effort, "fundamental R&D tasks" necessary to meet future strategic defense needs "have been performed." But without the R&D budget restraints imposed by the Southeast Asian conflict, it "would have been possible to go further and faster in advancing and refining our strategic position." These are the views of Lt. Gen. Joseph R. Holzapple, USAF Deputy Chief of Staff for Research and Development.

But the Air Force's R&D chief attached a strong caveat to this relatively optimistic prognosis: In order to maintain the present strategic posture, a number of pressing Air Force programs need to be implemented or continued at presently scheduled levels.

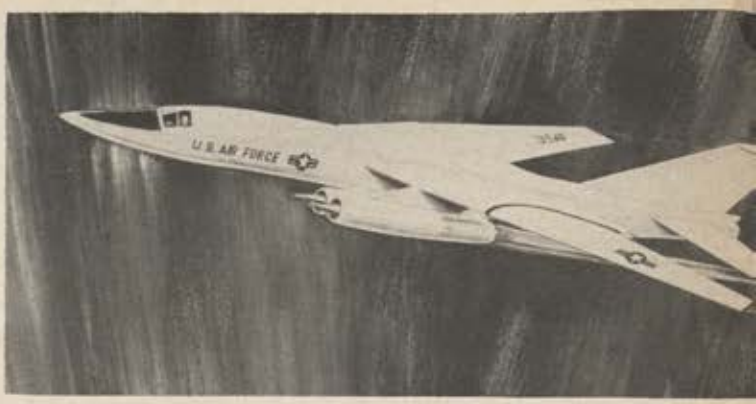
By contrast, General Holzapple, in an interview with AF/SD, saw "problems" relative to the nation's tactical airpower status, especially in terms of numerical strength. A flareup elsewhere in the world requiring an intensity of tactical air effort similar to that mounted in Southeast Asia would "stretch our reserves and capabilities very hard and beyond a point which I consider comfortable," he said.

Premising his evaluation of the offensive segment of the US strategic posture on the mix of steadily improving ICBMs and Polaris-type missiles, as well as a "significant" bomber force, General Holzapple stressed that work on Minuteman III, ABRES (Advanced Ballistic Reentry Systems), and the MIRV (Multiple Independently Targeted Reentry Vehicles) concept is being pursued hard and is "progressing well." The Air Force, he said, in addition is "looking well beyond current Minuteman technology in efforts to develop more advanced multiple reentry ICBMs with larger boosters to increase throw weight."

In phase with these efforts, General Holzapple said, are development plans to improve the accuracy of missile guidance systems, both for the Minuteman family and for possible larger missiles (such as Weapon System 120A) and to increase their "survivability" by protecting them against radiation effects produced by the detonation of nuclear warheads. The penetration survivability of ICBMs is being enhanced further, he said, by use of special materials to protect the warhead itself against damaging energy emissions (such as heat and X-rays) from enemy ABMs. Prelaunch survivability, according to General Holzapple, will be

Lt. Gen. Joseph R. Holzapple became Deputy Chief of Staff for Research and Development September 1, 1966, following a two-year assignment as Director of the Weapons Systems Evaluation Group for Director of Defense Research and Engineering. He held other R&D posts previously.

New manned strategic bomber (AMSA) is a USAF high-priority project but has been delayed by DoD's Systems Analysis.



As it is now envisioned, AMSA would be an advanced supersonic aircraft capable of high "on-deck" penetration speeds.

improved through use of the hard rock silos under development for the Minuteman III but also capable of accommodating more advanced missiles.

Also, the computer capability underlying the ICBM system is being expanded by the Air Force to permit faster and more flexible reprogramming. Over-all, emphasis in the strategic offensive sector has been directed at improving survivability and penetration capability, and is typified by the Minuteman's "growth program."

The AMSA Question

According to Defense Department officials, the Systems Analysis office of the Department of Defense remains unconvinced concerning the requirement for a new manned strategic bomber (AMSA) in the late 1970s on the basis of the so-called National Intelligence Estimate (which seeks to define and evaluate the probability and nature of future threats). The Defense Department's Directorate of Research and Engineering (DDR&E), the Joint Chiefs of Staff, and the Air Force, as well as Systems Analysis, nevertheless are making progress toward a compromise solution concerning AMSA. Key elements of the AMSA problem are its acquisition cost, including R&D, of about $10 billion, and a lead time of about eight years from contract definition to initial operational capability.

Furthermore, the Department of Defense still sees AMSA only in the context of a single-purpose, assured-destruction role, whereas the Air Force, applying the B-52 lesson of Vietnam, views AMSA also in terms of conventional war needs. These factors, coupled with the absence of a "provable threat," have resulted in repeated postponement of contract definition. On the other hand, contract definition has been urged repeatedly and unequivocally by the Joint Chiefs of Staff as well as by both the Secretary and the Chief of Staff of the Air Force.

The Air Force rationale for AMSA pivots on the belief that such a manned system is essential for a proper strategic mix and that it is a cost-effective replacement for the aging, dwindling B-52 fleet and the FB-111, an interim airplane whose full-scale deployment might be blocked by Congress.

General Holzapple said current efforts regarding AMSA attempt to reconcile the absence of a provable threat eight or more years hence with the fact that "unless you start sometime you are never going to get AMSA." This, he said, requires a program that accomplishes "the beginning of the development phase; that is, a much more precise determination of the specific technological chores involved and much of the preliminary development work." This, General Holzapple predicted, would bring the program to a point where "you could actually achieve initial operational capability within four and a half or five years from the moment the go-ahead decision is made, instead of the eight years we face now. What we hope to achieve by this is, in effect, an insurance policy that would cost some money but not as much as the full development of the total system.

"We are hopeful that we will be able to start such a program soon and as a result have the option to develop AMSA with a much shorter lead time than is the case now." He added that "personally I cannot, in the foreseeable future, envision a situation where a manned strategic system is not essential."

In addition to the primary AMSA controversy, there is also the as yet unresolved question of whether AMSA should be a supersonic or subsonic aircraft. DoD's Systems Analysis office is of the opinion that, if AMSA were indeed necessary, a subsonic capability is all that is called for. This is premised on a cost-effectiveness consideration involving AMSA only in a single-purpose nuclear mission where high attrition rates are considered acceptable.

The Air Force's counterargument is that in case of a nonnuclear role, requiring, of course, repetitive sorties, the increased survivability and productivity resulting from supersonic capability would pay for the increased development and production costs many times over. Under such circumstances even a one percent survivability increase could be "cost-effective." Stating that he felt "sure that the flexibility of supersonic performance is well worth the higher price," General Holzapple emphasized, "tactics rely on change and innovation, challenge and response. To develop such a system at great cost and not have the flexibility provided by supersonic capability might well turn out to be a very shortsighted approach."

Complementing AMSA will be several weapon systems currently under close Air Force study or development, according to General Holzapple. Paramount

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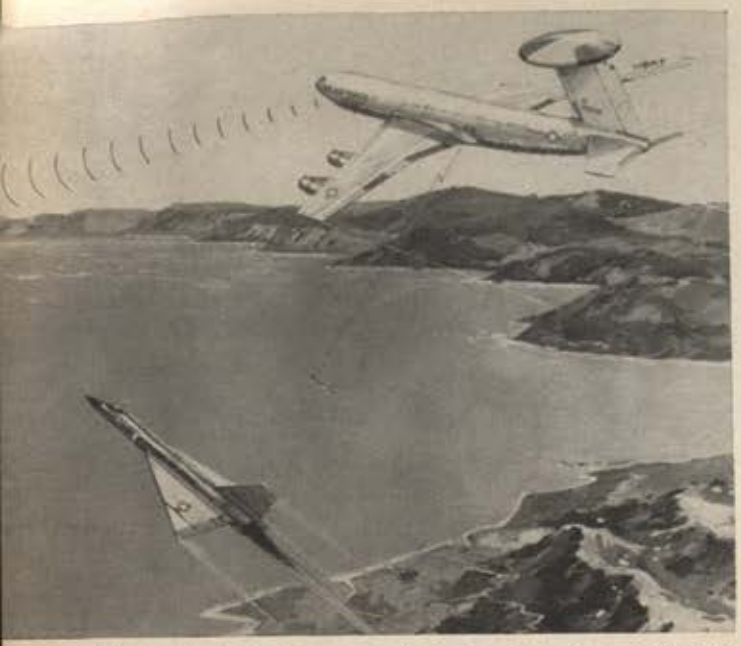

Key to the defensive strategic system is an interceptor (an F-106 or F-12) with "look-down–shoot-down" capability, combined with the Airborne Warning and Control System.

is the Short Range Attack Missile (SRAM) currently under development by the Boeing Co. for deployment in the B-52 and the FB-111. While most of its parameters are classified, SRAM will give the bomber force a "standoff" capability, meaning the launching bomber remains outside the air defense perimeter of the target areas. This presumably means a range in excess of 100 miles.

Other bomber-oriented weapons that the Air Force is "looking at very hard," according to General Holzapple, include bomber defense missiles, decoys to facilitate penetration, and several other techniques currently in an exploratory stage.

AMSA, as envisioned by Air Force planners at this time, would differ from the B-52 (the product of late 1940s and early 1950s technology) in a number of areas: It would feature improved cube space (interior volume) and good payload capability, yet weigh less than the B-52 (maximum gross takeoff weight 488,000 pounds). Interior volume is vital because about half the available space would be used up by penetration aids. AMSA also would present a substantially lower radar reflection than the B-52 and would be capable of high speed at low altitudes, possibly in the low supersonic regime, as compared to 350 knots "on the deck" for the B-52.

Various wing designs, coupled with such other design features as advanced high-lift devices, are being considered to give AMSA shorter takeoff and landing capability than the B-52, while a special landing gear would furnish austere field capability. Both features would permit wide dispersal and reduced vulnerability for the aircraft, as would AMSA's advanced operational self-sufficiency and self-test characteristics. Overall, of course, AMSA would offer the myriad advantages of being based on a state of the art some twenty years ahead of that of the B-52. While the proposed supersonic speed of AMSA has not been revealed specifically, Air Force planners indicate that it could achieve between Mach 2 and Mach 3 and will take advantage of titanium technology where beneficial.

A possible AMSA feature, currently under consideration, according to Air Force planners, is the so-called supercritical wing, developed to a high degree of sophistication by the National Aeronautics and Space Administration. Simply stated, this concept permits an increase in long-range, economical cruise speed from the Mach 0.8 region to the Mach 0.9 region by delaying airflow separation through proper shaping of the airfoil.

The currently proposed detailed design phase of the AMSA program would involve design competitions by two avionics, two engine, and two airframe manufacturers, to be narrowed to one each in the final evaluation phase.

Defensive Strategic Systems

The Air Force, according to General Holzapple, is "advocating a substantial increase in our air defense capability, involving a package program" consisting of OTH (over-the-horizon backscatter radar detection system), AWACS (Airborne Warning and Control System), and a modern interceptor/missile system with "look-down–shoot-down" capability.

At this time, he said, most of "our air defense equipment is oriented toward high-flying bombers and as a result our radar is 'looking up' when, in fact, the other side must be presumed to be doing the same things

(Continued on page 68)

Working in concert with over-the-horizon backscatter radar detection system (OTH), AWACS would furnish a substantial increase in US air defense capability and help prevent low-level attacks by an aggressor.

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F-106, first flown in 1956, offers the least expensive and fastest route, through modernization, to efficient interceptor system, but mix of F-106s and F-12s is the better alternative.

we are: achieving a high probability of penetration by coming in low, in the high-noise ground clutter."

The Air Force air defense package would furnish surveillance of the low-level environment and direct the interceptor toward the hostile penetrator.

The interceptor radar system would be capable of acquiring and tracking targets against the ground clutter. The same techniques would be applied to its missiles which would make the actual "kill" by "shooting down" at the target.

Critically important to the air defense package is the makeup of the interceptor force. The F-106, first flown in 1956, would be "modernized" for this role because, as General Holzapple put it, "it is certainly the least expensive way. You take something that you already have and give it this look-down capability quickly and economically." "Of course," he added, "this doesn't mean that the F-106 is best under all conditions. As a matter of fact, you can make a good case for the [Mach 3 plus] F-12 or a completely new design. But this runs up costs." Air Force analyses to date, he said, indicate that a mix of F-12s and F-106s "would certainly be better than just the F-106 by itself."

Tactical Weapon Systems

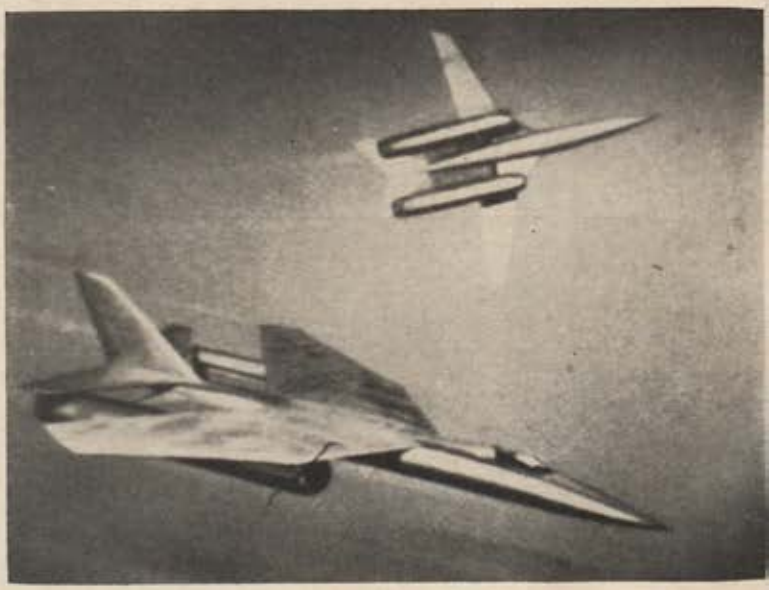
The pivot for the successful employment of tactical airpower obviously is air superiority. With the Soviet Union having developed eighteen new fighter prototypes, including the Mach 3 Foxbat, since the F-4 (the principal US fighter) was designed, Soviet air-to-air capability, according to testimony before Congress by Air Force leaders, is "a most serious threat." Air Force Chief of Staff Gen. J. P. McConnell told Congress that it was "imperative that we proceed as fast as possible" with development of a new fighter aircraft, and the Senate Armed Services Preparedness Investigating Subcommittee rated this "vital and urgent."

At first designated the FX and now called the ZF-15A, the new fighter program is clearly one that has the highest Air Force priority and is well along in development, with basic concept formulation completed. Prototype engines are under development by both General Electric and Pratt & Whitney. The current source selection effort was launched with RFPs (requests for proposal) to eight airframe manufacturers on September 30, 1968.

Contracts were awarded to Westinghouse and Hughes on November 5, 1968, for the ZF-15A's radar system. As a result, General Holzapple predicted, "around the first of the year [1969], selection of two or more airframe contractors for further contract definition work" will take place and "eventually" one contractor in each category will be selected for actual construction of the Air Force's next air superiority fighter. The present schedule, he said, calls for first flight of the ZF-15A in 1972 and initial operational capability by the mid-1970s.

The ZF-15A, "as we have proposed it—and hope to develop it—will be able to cope with anything that we can see the Soviets coming up with," according to General Holzapple. He did not expect a design compromise concerning the ZF-15A through a commonality requirement with the Navy's next new fighter aircraft (the VFX), saying that this matter had been resolved satisfactorily and that "the Navy plane is really quite a different aircraft."

Considerable effort is being expended in parallel development programs of an advanced gun for the ZF-15A, most likely of 25-mm caliber, possibly utilizing so-called caseless ammunition. This means the propellant functions as the casing to eliminate the spent cartridge problem, according to General Holzapple. He added that another parallel development effort in support of the ZF-15A involves a new short-range, air-to-air missile. It is for close-in attacks where present generation air-to-air missiles, most meant primarily to cope with high-flying bombers, lack structural integrity to with-



ZF-15A, formerly known as the FX, is another high-priority weapon system necessary for future air superiority.

stand the high G-forces needed for high-speed maneuvers, he said.

The over-all view of the ZF-15A is that of a totally uncompromised single-seat fighter, in the 40,000-pound weight class, of worldwide self-deployed ferry range and with full bad-weather capability. A two-seat trainer version is also under consideration. A titanium alloy airframe and variable-sweep wing design or a fixed wing with high-lift devices currently are under consideration. Procurement may be under a total package concept, with the airframe manufacturer bearing total system responsibility. Maneuverability, acceleration, and climb rate are considered more important than sheer cruise speed.

The ZF-15A powerplants, two advanced-technology turbofan engines with afterburner in the 25,000-pound-of-thrust range, are to give the aircraft a very high power-to-weight ratio to permit unequaled closing, climb, evasion, and other maneuver capabilities. Engine technology is to draw heavily on propulsion research conducted in conjunction with AMSA and V/STOL aircraft.

The ZF-15A's advanced radar detection system is to be capable of giving the pilot sufficient time to maneuver into the most advantageous attack position against enemy aircraft. Air Force planners point out, almost charily, that the ZF-15A, despite its uncompromised single-purpose orientation, will automatically include a "substantial air-to-ground" capability.

The AX and LIT Programs

Much of the close air support in the 1970 time period and beyond, if the Air Force has its way, will be furnished by a single-seat, twin-turboprop design bearing the designation AX. It would be a relatively inexpensive (about $1 million), heavily shielded aircraft that can provide effective aerial firepower in support of ground units engaged in close combat. The AX program, according to General Holzapple, is not clouded by the question of "whether it is needed, but rather by doubts over how soon."

Light Intratheater Transport (LIT) is to replace C-123s and C-7s and augment, with efficient STOL or V/STOL design, the C-130 now performing the tactical airlift mission.

In terms of timing, he said, "One of the big considerations is how the program impacts on the annual budgets over which it would extend, especially how it can be reconciled with the cost of whatever other programs are to be launched." One delaying factor, obviously, is the fact that the AX is to fill a tactical air spectrum currently covered in piecemeal fashion by existing aircraft. Close air support is being furnished presently by a range of aircraft from the A-1 to the F-4 and including the A-37, the F-100, F-105, and the new A-7D. The AX, in the view of Air Force planners, will be able to perform ground support in a permissive

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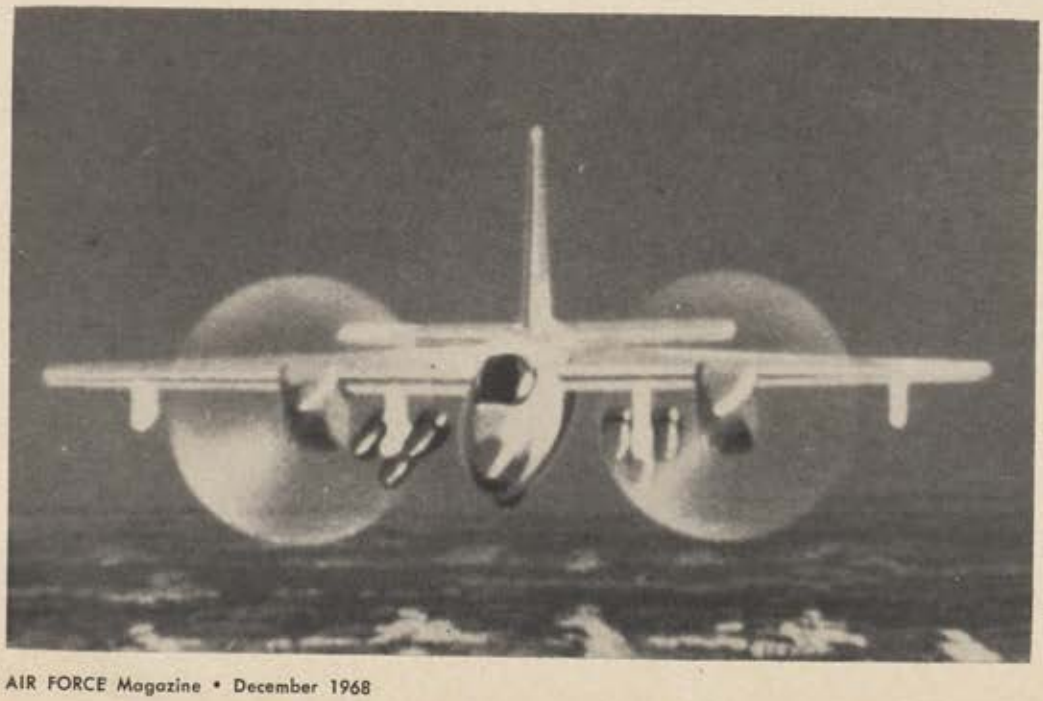

Single-seat, twin-turboprop aircraft, costing approximately $1 million and known as the AX, is to provide effective aerial firepower in support of ground troops engaged in close combat in the 1970 time period. AX is to have speed of more than 400 knots, heavy armor, a large payload, and will definitely have STOL capability.

Flyoff between STOL LIT and V/STOL LIT may be desirable to establish through an actual demonstration the relative advantages and reliabilities of these two approaches.

air environment "quickly, cheaply, and effectively." This is to be accomplished by virtue of its speed of more than 400 knots, heavy armor, large payload, STOL capability with takeoff in less than 1,000 feet when necessary, and optimized armament. It is to have worldwide self-deployable capability.

At this writing, the Air Staff was reviewing the concept formulation draft proposal for the Light Intratheater Transport (LIT). (*See "LIT—Flexible Airlift for the Front Lines," July '68 AF/SD.*) The Air Force, according to General Holzapple, "feels strongly that there is a high-priority requirement for LIT which is to replace the C-123s and C-7s and augment the C-130s." If the present schedule can be maintained, LIT contract definition may take place early in 1969.

For the time being, the aircraft's size, according to General Holzapple, is not yet agreed upon. While a larger aircraft, approaching the C-130, would offer at least theoretically improved cost-effectiveness, its cost and complexity, in view of the V/STOL or STOL requirement, also would be markedly increased over a smaller design. Concerning the tradeoffs between STOL and V/STOL capability, General Holzapple felt that "if contract definition indicates high risk to achieve a VTOL capability in the LIT, a decision might be made to follow a prototype approach to reduce the risk." V/STOL is a performance feature that is currently being considered "very seriously" by the Air Force. Such an approach, he said, would permit development of the Light Intratheater Transport without undue risk, while permitting full exploitation of the technological potential.

New Materials

Whatever the mission or specific technology of future weapon systems, materials represent a crucial pacing factor. For that reason and because of the "fantastic" potential inherent in this R&D area, the Air Force is spending considerable effort and money on materials research, according to General Holzapple.

He singled out boron fibers and carbon phenolics as among the most promising advanced lightweight high-strength composites which "someday will furnish very dramatic payoffs" and revolutionize aerospace systems. "For the time being," he pointed out, however, "we don't know all the answers yet by any means. We don't know in what form they will emerge and to what kind of matrix they will be tied."

But, he emphasized, there isn't "any question that downstream, not in the next generation [of aerospace systems] but perhaps two generations from now, we will see dramatic advances as a result of the new materials technology we are currently working on."

Prototype Demonstration vs. Study Approach

Aerospace and defense technology historically has been characterized by two divergent approaches: prototype construction with all the attendant costs for the sake of "verification" of a given technology, as opposed to the less costly but less reliable study approach. General Holzapple pointed out that the Air Force at this time prefers to weigh each decision on its individual merits, with "the state of the art and the technical risk determining whether the prototype approach is warranted."

As for the possibility that the pendulum recently might have swung too far toward the study approach to the detriment of proving out advanced technologies, General Holzapple said in some instances this was the case. Further, the pitfalls attached to the study approach often are the fact that "you may discover [when production starts] that it costs a great deal more and takes a great deal more time than you had been led to believe."

He cited the C-5 as an example of a system that probably would not have benefited from a prototype program: "To have two or three contractors develop different prototypes probably would have amounted to a waste of time and money. The product we wanted was well enough known and within the state of the art; we knew that we could go to any qualified contractor and have him build us a good, reliable transport."

On the other hand, systems whose complexity and underlying advanced technology do not warrant such confidence, he said, suggest themselves for the prototype approach. He listed as examples certain elements of the Airborne Warning and Control System "where we intend to build bread-board models to demonstrate to our own satisfaction that a given technique really works. That way we can ascertain that certain components, which are the key to the over-all system, will give us a workable AWACS." In the case of LIT, another advanced-technology system, he said, a flyoff between the competing designs may also prove worthwhile.

This flexible approach, coupled with the range of weapon systems enumerated by General Holzapple, he said, permits the Air Force, at the end of 1968, to "look toward the future with justified and reasonable confidence," as far as the R&D sector is concerned. —End

THE SPACE AGE IN PERSPECTIVE

•Technology •Education

•Science and Public Policy

SPACE DIGEST

VOLUME 11, NUMBER 12 • DECEMBER 1968

Arms for Apollo

Astronauts will use this access arm to reach their Apollo spacecraft 320 feet up atop the Saturn V rocket. Here it is being tested at NASA-Marshall Space Flight Center at Huntsville, Alabama, with instrumentation and data acquisition systems engineering and maintenance being done by Vitro Services. Nine such arms, or umbilicals, are connected to the Apollo/Saturn V to provide power and communications during the long countdown. They are undergoing extensive testing here before shipment to the NASA-Kennedy Space Center.

Here at Huntsville, and at Eglin, Goddard, White Sands, and Guantanamo, Vitro engineers and technicians provide objective test support. Their responsibilities range from the acquisition of test data on aerospace and military systems to the management, operations and maintenance of facilities and instrumentation. And, because Vitro will not furnish production hardware on projects where we have support responsibilities, we can provide these services with arm's length objectivity. Vitro Services, Industrial Park, Fort Walton Beach, Florida 32548.

Vitro

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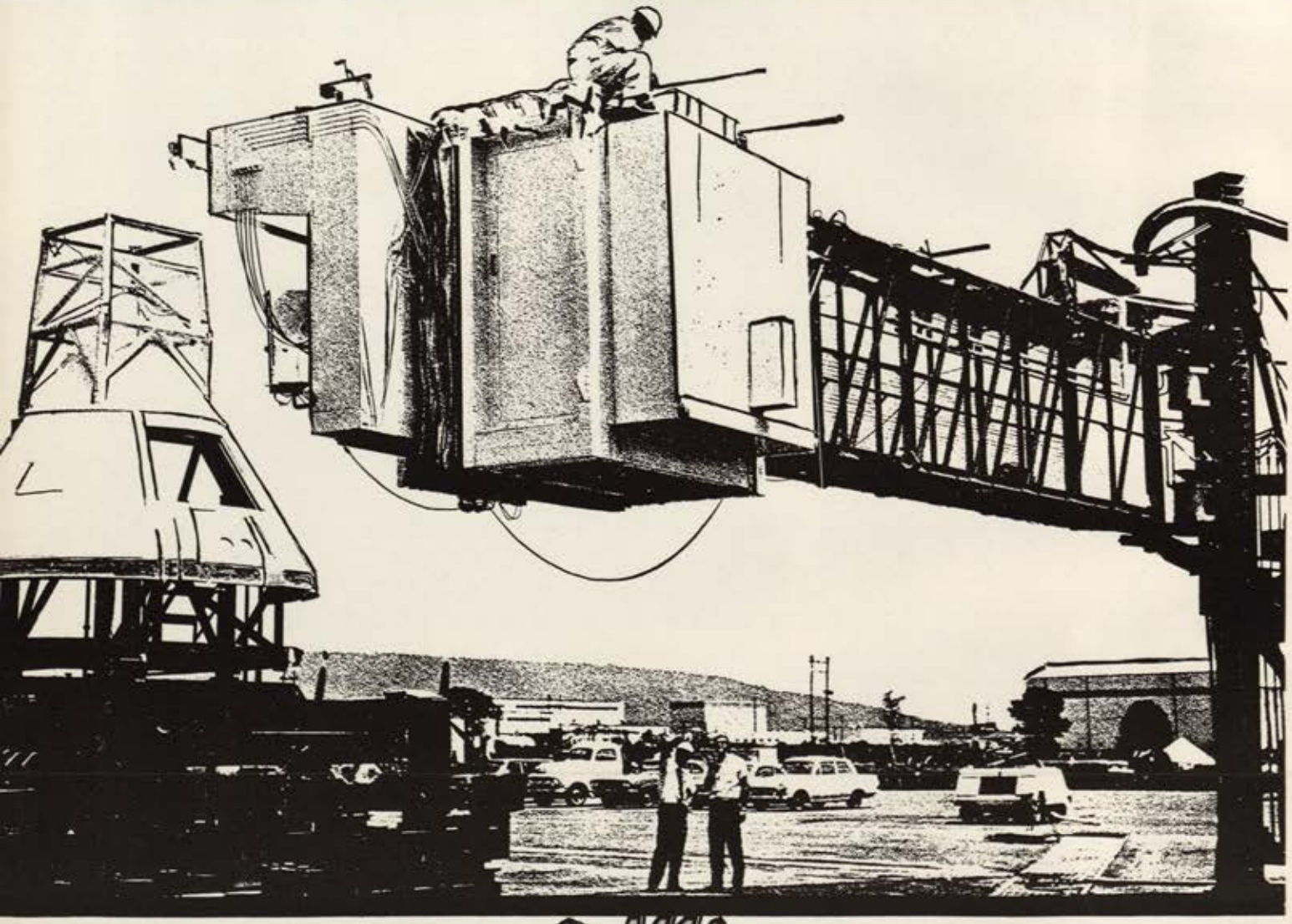


OBJECTIVITY

TEST SUPPORT

Speaking of Space

Mr. Nixon's views on the future of the space program are not clear, but he and the GOP said enough during election year on the subject to suggest that there will be a stronger voice for military space in the four years ahead as well as a search for ways to tighten up funding and management . . .

Space: Now the Nixon Years

BY WILLIAM LEAVITT

Senior Editor / Science and Education

FEW Presidential transitions have been as fraught with uncertainty as the long moment we are now entering. As numerous political commentators have noted, Richard Nixon's statements during his Presidential campaign provide few clues as to what he will really do.

The President-elect's specific views on the future of the US space program are as obscure, at the moment, as his intentions across the spectrum of national problems. Space was a very minor issue in a campaign in which the emotional issues of "law and order" and Vietnam were paramount.

But the paucity of recorded Nixon views on space need not indicate that the subject will be ignored as he enters on his Administration. The President-elect did say a little on space during election year, and what he said does give at least some small indications of what may lie ahead. It is also true that the new President is not hobbled by space policies he did not design, a fact which gives him considerable room to maneuver.

Back in May 1968, before he was the Republican candidate, Mr. Nixon provided this answer to a question submitted by a member of the National Space Club in Washington, D. C.:

"My view," Mr. Nixon said at the time, "is that where the unknown is concerned, no great nation can remain in the vanguard, can remain great unless it explores the unknown.

"Who knows," Mr. Nixon went on, "what we are going to find in space? Who knows what its military and economic values will be, whether there's life [on other planets], and so forth? Many people think so, and some disagree. But the point is that the United States must remain competitive in this field, and we must support a space program which is second to none. That's looking at it in long-term objectives."

Then came the "but."

"However," Mr. Nixon concluded, "in the year 1968, I believe that space is one of the areas that will have to be in the President's recommendations for budget-cutting. I think that what we have to do here is to concentrate on those areas that offer the greatest possibility for breakthrough; but with the immense financial crisis which currently confronts the United States, we will have to make some cuts. I would support those

At a crossroads period for the national space program, the new President's views on where we should go next and how fast are not clear. But he has the advantage of not being tied to past programs and may well stress military utility.

The epochal assignment for the Apollo-8 NASA astronaut trio, left to right, Frank Borman, James Lovell, and William Anders, is a December earth-to-moon-and-into-lunar-orbit-and-back-to-earth flight, announced by NASA last month.

cuts. But once we get this country back again on a sound basis and we can move forward with space and reclamation programs, then space should have a very high priority because no great power can afford to be second in exploring the unknown."

To even the most skillful reader-between-the-lines, this is a less than totally illuminating statement. But combined with another statement, the single paragraph in the 1968 Republican platform statement on the subject of space—a document that, in its totality, Mr. Nixon's people had a lot to do with writing—the President-elect's comment back in May does offer at least a general outline of what he may do on the space front.

The GOP platform statement said: "We regret that the [Johnson] Administration's budgetary mismanagement has forced sharp reductions in the space program. The Republican Party shares the sense of urgency manifested by the scientific community concerning the exploration of outer space. We recognize that the peaceful applications of space probes in communications, health, weather, and technological advances have been beneficial to every citizen. We regard the ability to launch and deploy advanced spacecraft as a military necessity. We deplore the failure of the Johnson-Humphrey Administration to emphasize the military uses of space for America's defense."

If one discounts the partisan qualities of the platform statement, the operative words in the GOP declaration are those having to do with military uses of space as well as the words attacking the outgoing Administration's "budgetary mismanagement" for which are blamed the cutbacks in the over-all space programs.

What it all adds up to is the likelihood that the Nixon Administration will first take a long look at the total space program, civilian and military, and then try to build a space budget that holds the line at where we are now, at least until the Vietnam War is settled. At the same time, the new Administration will be searching for areas in which civilian and military efforts might be brought closer together or even combined to save money and time and energy.

Natural candidates for such a marriage are the National Aeronautics and Space Administration's Apollo Applications Program, earth-orbiting follow-on to the Apollo moon-landing effort, and the Air Force's Manned Orbiting Laboratory (MOL) program. Both AAP and MOL originally had been designed for the late 1960s. They already are delayed until the early or perhaps mid-1970s. They are programs that have considerable commonality of purpose, and many observers of the space scene during the past couple of years have called for their merger. At the same time, AAP and MOL are based on different hardware. To merge them, which is a distinct possibility in the Nixon years ahead, could raise serious financial difficulties on the space industrial scene. How much flak the President-elect would be willing to accept on that score is an important political question.

But whether AAP and MOL are merged or not, it is probable that President Nixon will assign an even higher priority to military space development than the Johnson Administration did and that, in the coming battle for funds in an economy-minded new Administration, military space advocates will have a larger say than has been the case during the Johnson-Humphrey tenure. Interestingly enough, this kind of emphasis, combined with what will probably be a strong Nixon stress on payoff unmanned working-satellite programs on the NASA side, may well have strong appeal to the opposition Congress with which he will have to work. Congress is visibly disenchanted with the high costs of "glamour" space programs and could be expected to support policies that would stress commercial returns and military benefits from space in the 1970s. At the same time, Mr. Nixon's probable emphasis on military space developments would be in tune with his expressed views on the desirability of strategic superiority over the Soviet Union.

Despite his relative neglect of space as an issue during his campaign for nomination and election, the President-elect is by no means ignorant of the subject. To his great credit, he can accurately claim that, of the high officials in the Eisenhower Administration, he was among the few who spoke out strongly on the need for a strong US space program after Sputnik. Indeed, he cited during the 1968 campaign his declarations on the subject back in 1957 as examples of his disagreement with the Administration of which he was a part, and recalled his public differences with President Eisenhower's chief aide, Sherman Adams, who, in the aftermath of Sputnik, dismissed the Russian achievement rather frivolously.

In sum, what we can probably look for on the space front from the new President are: a generally "go-slow" approach in terms of new program starts; a search for areas where money can be saved and organization tightened, particularly in NASA, with at least the possibility of some mergers of existing NASA and military efforts; and a greater public emphasis on military space development. The specifics we will have to wait for.

Mr. Agnew in Orbit

Perhaps the most fascinating speculation about the incoming Administration, so far as space is concerned,

centers around the role of the Vice President-elect, Governor Spiro T. Agnew of Maryland.

Mr. Agnew cannot be described as a specialist on science and technology, areas he will statutorily have a good deal to do with as the incoming chairman, succeeding Vice President Humphrey, of the National Aeronautics and Space Council. The Council, since its revitalization during the Kennedy Administration, has been a valuable focal point for space policy study in the Executive Branch. Out of the Space Council came the impetus for the Apollo program, the supersonic transport program, and the draft legislation for the Communications Satellite Corp. Under Vice Presidents Johnson and Humphrey, the Council's Executive Secretary, Dr. Edward C. Welsh, an extremely articulate and candid Washington veteran, has served as an eloquent spokesman for the national space program in both its civilian and military manifestations. And to Dr. Welsh's further credit, during his tenure the Council operation was kept from succumbing to that most common of Washington tendencies, empire-building.

How the President-elect will view the Vice President-elect's role as Chairman of the Space Council will tell a good deal about what Mr. Nixon thinks of Mr. Agnew now that they together lead the national Administration. Both Vice President Johnson and Vice President Humphrey were given a good deal of head by their respective chiefs during their tenures as Space Council chairmen. Mr. Johnson entered on his Space Council job with an excellent background in aeronautics and space affairs, garnered during his senatorial service, particularly as chairman of the Senate Preparedness subcommittee and the Senate space committee. Mr. Humphrey had less specific background in the Space Council's work when he came in but, by all accounts, absorbed information at an unbelievable rate and became both expert and enthusiastic quite early in the game. Mr. Agnew, who has had his lumps during the campaign and indeed managed to become an issue himself, could have a major opportunity to show his stuff in his new job as Space Council chairman.

Systems, Cities, and the GOP

If the new Republican Administration has any opportunity to approach old problems in new ways, it is in the urban field. Mr. Nixon and his party made much during the campaign of their intention to enlist the systems-management skills and capital of private enterprise in the business of training the "hard-core" unemployed, of creating new jobs and industry in the inner-city and of encouraging black entrepreneurship in the urban ghettoes—endeavors of the sort described in the two articles that accompany this column in this issue of SPACE DIGEST.

For Vice President-elect Spiro Agnew, who himself became an issue during the Presidential campaign, there's an important new job ahead—that of statutory Chairman of the National Aeronautics and Space Council.

There is a real opportunity here. The outgoing Administration had already come to the conclusion that bureaucracy per se could not alone solve the employment and decay problems of the city. And if the GOP proceeds with its campaign pledge to create a strong business-government partnership to work toward solutions of the urban dilemma in all its manifestations, ranging from employment to replacing rat-infested habitations, it will have a strong set of arguments to hold voters in future elections.

Thus far, there has been more talk than action in this field. For one thing, as has been pointed out on these pages (*see "Systems Technology for Social Problems," by Capt. Gerald T. Rudolph, p. 79, Nov. '68 AF/SD*), not enough people actually understand what systems management really is and how difficult it is to match systematic approaches to the crazy-quilt pattern of overlapping political jurisdictions. For another thing, even now in the face of urban unrest that has afflicted the country for the past several years, the kind of motivation in the business community to get cracking on using its talents to help solve the urban crisis still is lacking in the large. As the outspoken Gen. James Gavin, onetime Army research and development chief and now chairman of the board of the Arthur D. Little Co. in Cambridge, Mass., has pointed out, only when the leaders of industry, the company presidents themselves, become personally committed, out of a combination of social conscience and enlightened self-interest (Can business survive if the cities burn?), will the movement proceed full speed.

It is a tribute to the aerospace industry that to a considerable degree it has spearheaded many of the programs that have been started.

A recent (Fall 1968) issue of *Aerospace*, the publication of the Aerospace Industries Association, listed some recent efforts in the training field by well-known aerospace firms.

"Companies in the aerospace industry," the report noted, "have been acutely aware of the plight of the hard-core unemployed, for many of their plants are in or near the major cities of the nation."

Aerospace companies have had measurable success in training and employing of people considered "hard-core" in the present parlance. One reason: The aerospace industry, when it was just the airplane industry, during World War II, learned that unskilled workers could be trained to produce the high-precision products required.

"The thrust of the [industry's] program centers on those who because of lack of education or skills have been relegated out of the potential work force," the *Aerospace* article said.

"Experience in hiring the hard-core has been good, from the standpoint of both employee and employer. This is not a make-work or charitable operation. Companies have accepted their civic responsibility in trying

The Russians are busy these days in the circumlunar business, too. This is Soviet Novosti photo of Zond-5, which in September flew unmanned in a wide arc 1,000 miles from the moon, then returned to earth via a narrow reentry corridor, a space first. Zond-5 was followed in November by Zond-6 with a similar mission. The photo shows Zond-5 at Bombay, India, harbor after splashdown and recovery by a Soviet ship.

—Novosti Press Agency

to solve unemployment in the ghetto, at the same time recognizing their accountability to their stockholders. The new employees have proved to be productive."

Aerospace reported that the industry has been quite active in the National Alliance of Businessmen (NAB), which was set up after President Johnson's Manpower Message to Congress in early 1968 in which he urged American businessmen to find permanent jobs for the hard-core unemployed.

Working with NAB, aerospace industry management people have been assisting the alliance at both the national and local levels. NAB operates in fifty of the nation's largest urban areas.

"The elite of American management," *Aerospace* reports, "has been involved in the NAB. All over the nation, executives are knocking on the doors of their corporate neighbors asking for pledges of jobs for the hard-core. Usually they are members of a team of businessmen (on loan from their companies), a metropolitan chairman of the local NAB, and a representative of the Department of Labor. In addition to locating jobs, the team works with public and private organizations to find and recruit the disadvantaged."

In addition, many aerospace firms have been urging their subcontractors to take on the hard-core jobless (there are some 40,000 subcontractors in the industry). "Letters to the subcontractors have advised them that with all other factors equal (price, delivery, date, quality, etc.) the firm hiring the hard-core jobless will be given special consideration," according to *Aerospace*.

The AIA publication listed, as examples of aerospace industry efforts to alleviate the ghetto unemployment problems, such efforts as:

• Aerojet-General Corp.'s Watts Manufacturing Co., established in the Watts area of Los Angeles. The company produces tents and wooden shipping crates and is, according to *Aerospace*, "about to turn a profit."

• Avco's printing plant (*see "How Can Business Ease the Urban Crisis?", p. 91 of this issue*), an investment worth nearly $2 million in the Roxbury ghetto section of Boston, designed to employ some 250 blacks and Puerto Ricans. The plant is expected to handle all of Avco's own printing requirements and eventually take on outside business. Beyond that, the plan is for original management to work themselves out of their jobs in three years and be replaced by former "hard-core" people. One feature: classes in remedial reading and writing, math needed for shop work, and connected subjects.

• Bendix Corp. within the last year has increased its minority-group job force from 3,353 to 4,413, despite the fact that the company's divisions and subsidiaries generally are located in areas of the country where there are relatively few blacks.

• The Boeing Co. has helped open an Employment Opportunities Center. It has helped with seminars on programs for employment of the disadvantaged. Boeing is involved in NAB and has accepted a commitment to hire and train 350 hard-core unemployed in the Seattle area during a one-year period. It also has invited high-school students from minority group areas of Seattle to visit Boeing plants, in cooperation with Seattle public schools. In the East, Boeing's Vertol division, near Philadelphia, has aided the Philadelphia Opportunities Industrialization Center, a self-help outfit. This sparked organization of a similar center in Seattle. Boeing hired many of the graduates.

• Cessna Aircraft Co. Among other efforts, Cessna has recruited graduates of Job Corps Centers and hired many people who have been trained under the Federal Manpower Development Training Act.

• Fairchild Hiller Corp. has joined a Washington, D. C., inner-city group called Model Inner City Com-

munity Organization (MICCO) to form a Washington corporation called Fairmicco, to be located in the Shaw urban-renewal area of the capital. Fairmicco, a profit-making organization, will train the jobless in woodworking, sheet metal, and electrical trades—skills applicable to products to be manufactured by Fairmicco.

• General Dynamics Corp. has a number of programs designed to alleviate urban problems. Its Electronics Division in Rochester, N. Y., has trained more than 300 hard-core people. Its Quincy, Mass., Division, working with the Department of Labor, opened a welding school to train and hire 200 hard-core unemployed on a train-while-earning basis. Its Fort Defiance, Ariz., Navajo Facility has more than 100 Navajo Indians working in electronic assembly in a plant financed by tribal funds. At its San Antonio, Tex., Facility, under auspices of the Department of Commerce, more than 150 Mexican-Americans and Negroes are working in metalworking and woodworking jobs in support of aircraft production. At its Fort Worth, Tex., Division, since 1966, more than 3,000 unskilled people have been trained and hired at company expense, many of them members of minority groups.

• Singer-General Precision operates the Breckinridge Job Corps Center in Morganfield, Ky.

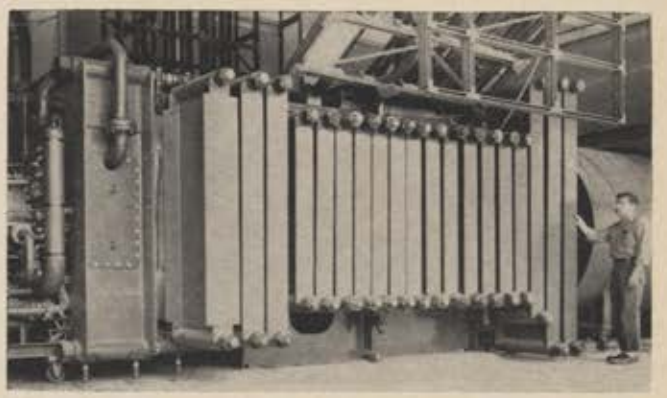
• Hughes Aircraft Co. is sponsoring a thirty-week program for training secretaries, primarily Negro girls, in what is described as "the first white-collar job in their family history." Response has been gratifying.

• Lockheed Aircraft Corp. has established a policy that calls for, in *Aerospace*'s words, "almost the most unlikely to be hired; to qualify, one had to be unemployed and a school dropout, and have an inconsistent record of working for anyone, and a yearly income of $3,000 or less."

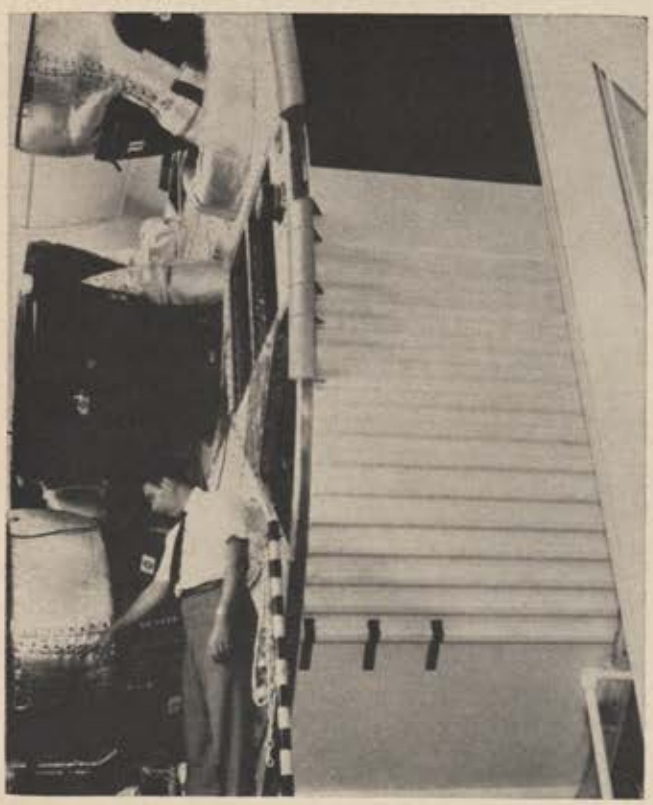
• Martin Marietta Corp. has helped spark an organization of six other large firms in an effort to alleviate hard-core unemployment, with headquarters in the Brooklyn, N. Y., Bedford-Stuyvesant ghetto area.

• McDonnell Douglas Corp.'s chairman, James S. McDonnell, is a national director of NAB. The company is running a variety of training and hiring programs for the disadvantaged.

• North American Rockwell Corp. has started a new subsidiary specifically to hire the hard-core, which



Viewed as a potential technique for large-scale power generation is MHD (magnetohydrodynamics), which takes electricity from interaction of ionized gas and magnetic fields. Avco's experimental MHD generator is at Everett, Mass.



For the kind of heat that builds up in rocketry, you need good insulation. This is the heat shield around the thrust chamber on Saturn IB. It is made of asbestos metallic cloth by Raybestos-Manhattan Corp., North Charleston, N. C.

New Westinghouse-built 130-foot radio-telescope at California Institute of Technology's Owens Valley Radio Observatory, able to detect radio wave sources beyond Milky Way galaxy, has improvements over existing systems.

will operate a manufacturing and service facility in central Los Angeles. Workers will also get elementary school training.

- Northrop Corp., in its Boeing 747 fuselage contract, has stressed hiring minority-group members. The assembly facility is near the Los Angeles Watts area.
- RCA is active in a number of programs, including assistance to self-help centers, commitment to hiring disadvantaged people, and rehabilitation of run-down housing for resale to poor families.
- Sperry Rand's Shreveport, La., plant is training some 2,000 disadvantaged people in factory work. The company also is active in Minneapolis and Omaha self-help Opportunities Industrialization centers.
- United Aircraft Corp. has funded a center in Hartford, Conn., for training and basic education for the unemployed in both factory and clerical work.
- Westinghouse Electric Corp., through its Westinghouse Learning Corp., is training foremen to understand problems to be encountered in working with hard-core people. It also concentrates on training hard-core people in basic personal skills for employment as well as providing academic remedial assistance. Westinghouse also operates Job Corps Centers and assists in operation of the Vista program.

More on Project 100,000

Back in January 1968, we wrote an article in AIR FORCE/SPACE DIGEST on the subject of Project 100,000, the Department of Defense's then-new program to accept for military service in the Army, Air Force, Navy, and Marine Corps young men who would previously not have been acceptable for a variety of reasons ranging from remediable physical defects to low test scores or poor achievement records in high school.

Project 100,000 was announced in 1967 by then-Secretary of Defense Robert S. McNamara and was implemented—with the largest quotas assigned to the Army—by the services in the months following the announcement. One of the key provisions of the new program was that young men accepted for service would not be "segregated" from their fellow soldiers, sailors, airmen, and Marines, and that they would be required to complete successfully the same training programs as their comrades. At the same time, they would receive extra training, including remedial academic courses, as required. The program's ground rules were written so that even the instructor dealing directly with the recruits would not know which young men were Project 100,000 people. Only administrative people would have such information, so that they could keep track of the progress of the program. This is crucial because a key feature of the program is a plan to follow the progress and performance of Project 100,000 people through their military years and back into civilian life.

In researching the article, we visited several military bases and saw Project 100,000 in action. We heard the candid comments of training people and chatted with young men who were members of the Project 100,000 group. Neither they nor we knew which were in Project 100,000, since they were mixed with their non-100,000 fellows in keeping with the ground rules. Our impression of the program, then in its early stages, was that it was indeed an over-all success, and that the vast majority of Project 100,000 people were managing to get through their training and would be assigned to units where they would be able to function well as military personnel. That impression has been borne out by Secretary of Defense Clark Clifford's recent public statements on the subject (*see AF/SD, Nov. '68 issue*).

All this is not to say that Project 100,000 is either the perfect or even the easiest solution to the problems of the disadvantaged. The problems of the disadvantaged are after all a national responsibility and not the prime mission of the Defense Department or the services. It is rather to suggest that, in the large, Project 100,000 has been a success and that not only the young men participating but the services too have benefited from the program. The young men of Project 100,000 have had the chance to show their ability to absorb training and do a wide range of military jobs. They have been able to prove to themselves their untapped skills and motivation.This is a personal asset that cannot be assigned a value, since it is priceless to themselves and to society. And the services, which at least to some degree grumbled at having to take on what seemed to many a "welfare" or "social-purpose" mission, have learned a lot of new things about training methods that in the long run will be useful to them.

Having said all this, we're happy to report on just one piece of Project 100,000 that grew out of publication of our Project 100,000 article in AIR FORCE/SPACE DIGEST.

After the article was published, we received a letter from a military family stationed overseas. They had a son who wanted to join the Air Force but whose educational achievements did not seem to qualify him. Did we think the young man might qualify for Project 100,000? the letter asked. We passed the letter on to the Pentagon. Some wheels were turned, and after some months the young man was admitted to the Air Force.

A few weeks ago, we received a letter from the same family. They have graciously given us permission to quote from it. The letter tells more about the rightness and usefulness of Project 100,000 than all the words we wrote back in January:

"By all means use [our] story in any way you see fit," the family wrote. "Yes, we, too, would like more people to know about such a step, a giant step, it seems to us, in educating *all* young people in the United States to their full potential.

"Our son is now in a sixty-five-day Comprehensive Reading portion or squadron of basic training and seems extremely satisfied. [He] even seems enthusiastic about the fact that his reading seems to be improving each day and we believe [he] feels that this extra training is simply an integrated, helpful part of basic training rather than feeling that he is being held back or being made to feel different in any way from the other airmen. This we know from your original article is an important factor in training these young people. Thank you for your concern and help."

A letter like that makes being a writer the best job in the world.—END

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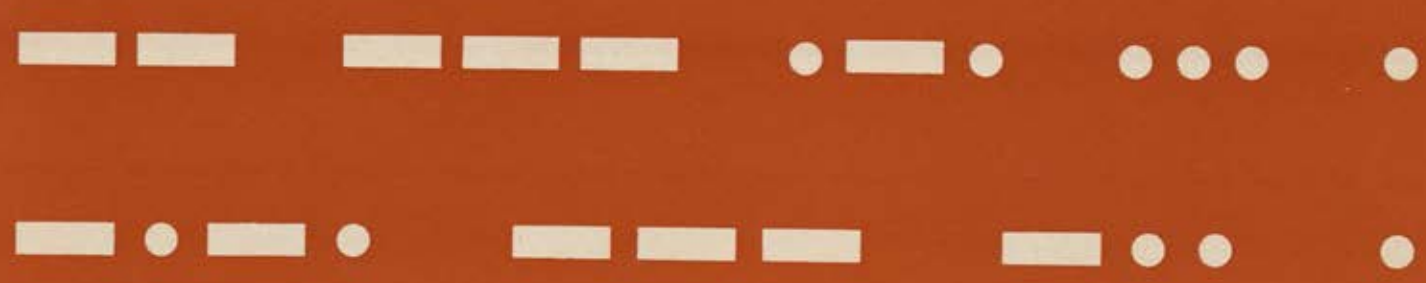

can go a long way...

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Sparked by the indefatigable efforts of a black clergyman, who believes passionately that with proper training in high-technology skills the disadvantaged can enter the business mainstream, a group of Negro activists, with the cooperation of General Electric's Missile and Space Division in Philadelphia, has successfully launched a new and exciting aerospace business . . .

PAE of Philadelphia
BLACK ENTERPRISE IN AEROSPACE

BY JUDY AND JERRY DAWSON

Rev. Leon Sullivan of Philadelphia sparked creation of Progress Aerospace Enterprises in the belief that blacks are fully capable of learning high-technology skills and of running complex businesses. PAE venture is proving his case.

"There is nothing . . .
More difficult to take over,
More precarious to conduct,
Or more uncertain in its success
Than to undertake the development of a new order of things."
Niccolo Machiavelli (1469-1527)

THE impatience of one group of black Americans with their own inability to move rapidly into the mainstream of the American social and economic order took a new and positive twist this past summer. An unusual alliance of concerned black Baptists and one of the nation's most sophisticated aerospace operations, General Electric's Missile and Space Division, has created the Philadelphia-based Progress Aerospace Enterprises, Inc. (PAE), a fledgling electronics and mechanical hardware fabricating company owned and operated by Negroes. The PAE story should lay to rest once and for all any notion that black Americans are not yet ready for involvement in today's highly competitive and technological world, best exemplified by the aerospace industry.

PAE is the brainchild of the indefatigable Rev. Leon Sullivan, a forty-five-year-old Negro minister of Philadelphia's Zion Baptist Church. Reverend Sullivan, a towering 6'5", distinguished himself ten years ago by masterminding an all-out consumer boycott against twenty-nine lily-white Philadelphia merchants in an effort to gain more jobs for Negroes. The entire Negro

PAE officially began operations in June 1968 at 2000 Windrim Avenue in Philadelphia ghetto, using space previously occupied by a precision products firm. Getting the new plant ready has been no easy task. It needed everything from a paint job to a completely new electrical power system. Renovation is still under way, while at the same time employee training and production proceed. By August, PAE had made delivery on its first job.

community joined in his aggressive "selective-patronage" campaign. The economic pinch on the merchants was too much, and jobs for blacks began to open. But these new opportunities for Negroes turned into a paradox. Reverend Sullivan soon saw that when business and industrial jobs were made available, there weren't enough Negroes qualified to take advantage of them. "My militancy had to take a new direction," he confessed.

"Integration without preparation is frustration."

Rev. Leon Sullivan

That new direction was to be the start in 1962 of what became a nationwide self-help program. Reverend Sullivan began making the rounds of local industry. He was armed with a master plan for a self-help training center for disadvantaged, unemployed, and underemployed persons, mostly from Philadelphia's black ghettoes. Business, industry, and the Philadelphia Chamber of Commerce responded warmly to the idea, offering their resources and support. As a result, the first Opportunities Industrialization Center (OIC) was dedicated in January of 1964 in an abandoned, rat-infested former police station in a North Philadelphia slum, leased from the city for $1 a year. The building, a total wreck, was transformed by Reverend Sullivan—with the help of anonymous donations, contributions from his parishioners, and the work of carpenters, plumbers, electricians, and painters—into an airy, cheerful, modern vocational school, offering courses in sheet-metal working, power sewing-machine and machine-tool operations, food service, teletyping, retailing, and many more skills.

Three other OICs have since been established in Philadelphia, and the OIC concept has expanded through Reverend Sullivan's growing organization to seventy other cities across the country. In just four years, 5,500 of Philadelphia's hard-core disadvantaged persons—many of them illiterate and on public relief—have learned how to read and write, have improved their speech and dress, acquired skills, and have been placed in jobs.

But the speed with which these training centers enabled more and more black Americans to move from the periphery into the economic mainstream did not entirely satisfy Reverend Sullivan. He needed to prove in a dramatic, convincing way that Negroes could not only make it in the down-to-earth workaday world of retailing and light industry, but that they could develop high-technology skills, too. Reverend Sullivan looked to the aerospace industry.

"Successful Negro management of a business as sophisticated as aerospace will show that it can work in any business."

Charles Dates
Relations Manager
GE Missile and Space Div.

On April 18, 1968, Reverend Sullivan called Mark Morton, vice president and general manager of General Electric's huge Missile and Space Div. (MSD) at Valley

PAE people receive training over periods up to six weeks in various skills applicable to the aerospace business. While PAE is a competitive aerospace firm, it also carries on founder Sullivan's prime purpose: the development of skills for careers.

Forge, Pa., and arranged to meet him for breakfast. Reverend Sullivan had done business with GE before. Six years ago, when OIC was just a vision, GE had been one of the first companies to volunteer the loan of equipment and qualified instructors. This time, Reverend Sullivan had another large order, and over coffee and toast that April morning, he asked Morton what he would need to start an aerospace company. Morton was accustomed to Reverend Sullivan's way of doing things by giant steps, but he was nevertheless somewhat startled. He thought about it for a moment, then said he would have the answer in a week.

And he did. He assigned his staff, under the direction of Otto Klima, MSD reentry general manager, to the monumental task of building on paper a theoretical aerospace company. Floor space requirements, capital funding needs, management skills, personnel, equipment, and work-flow—all were carefully cataloged into a concise management briefing. Just as he promised, Morton and his staff presented the "company" in a briefing to Reverend Sullivan the next week.

The clergyman listened attentively, satisfied that the establishment of a corporation such as he had in mind was feasible. "But where do I get a guy to run it? And what must he know?" asked Sullivan. "All you have to do is give me the qualifications and *I'll* find the man."

Morton said he'd have the answer in a few days and immediately put his staff to work compiling the qualifications that an aerospace company manager should possess. Helping in this staff work was a thirty-nine-year-old black GE production manager, Benjamin W. Sallard.

> *"When Reverend Sullivan is after something, he'll press . . . and, eventually, he'll get it."*
>
> *Ben Sallard*
> *General Manager*
> *PAE*

In May, shortly after Sullivan received the GE staff report, Sallard was invited by Reverend Sullivan to visit with him at his home. Sallard assumed that Sullivan wanted to discuss further details of his planned aerospace enterprise.

When he arrived at Sullivan's home, he found he was not the only guest. A small group of black businessmen was gathered there, all of them keenly interested in Sallard. After the usual amenities, the conversation focused on the management requirements of a successful industry. Sallard's opinion was sought repeatedly. It was not until later, Sallard reflects, that he realized that he had just been interviewed for the top job in the nation's first black-managed aerospace industry.

So Reverend Sullivan had found his man. But Ben Sallard had for twelve years been building a career with General Electric, where he had started as a production

wireman and had progressed through a series of increasingly responsible managerial jobs. It was a good life. Only two months before, Sallard had been promoted to production-control manager and he had no idea of leaving GE.

His intentions changed. With a little friendly persuasion from the clergyman who "gets what he wants," Sallard on June 7 left GE. And on June 10 he was general manager of his own corporation. On that date, Progress Aerospace Enterprises, Inc., boasted a staff of one, its general manager. It had no money, no plant, no equipment, no employees.

Ben Sallard set out to correct these minor deficiencies. In a makeshift office in the basement of his home, he began constructing the management organization he'd need to get PAE off the ground. Able men were needed and Sallard drew on his twelve-year association with GE to fill his key managerial slots.

> *"PAE must succeed; it's already taken a half-dozen of our best people, and the ones Reverend Sullivan couldn't hire are working for PAE as consultants!"*
>
> *Mark Morton*
> *Vice President and General Manager*
> *GE Missile and Space Div.*

The men Sallard chose for his staff were qualified indeed; each had an average of sixteen years of staff and supervisory experience. The first man to join Sallard was Madison Allen, former USAF auditor and finance subsection manager of the Air Force Manned Orbiting Laboratory program at GE. He became manager of business operations. Carl Ashe was supervisor of the quality assurance calibration lab at GE. He became PAE's manager of quality assurance. Manager of electronic operations is Brinkley Blackwell, former purchasing supervisor and graduate of GE's management-training program, with experience in GE's reentry systems' electronics shop. A fifteen-year personnel specialist at GE, Frisby Euell, took over as manager of personnel and training. John Riche, production manager; Kenneth James, manager of mechanical operations; and Norman Griffin, facilities manager, rounded out the team.

Several other GE MSD employees, optimistic about the future of the new company, joined the new firm. One of them, Ken Fleetwood, was among the first white men to be hired by Sallard. PAE's purchasing agent, he joined Sallard because PAE offers "excitement and promise."

In his hiring practices, Sallard emphasizes the lack of a color barrier. "This is not a segregated firm," he explained, adding with unintended irony that "if a white man is more qualified than a black man for a given job, the white man will get it." PAE staff members and employees are hired on merit and ability. The incentive is not just the PAE challenge. Sallard realized he had to attract his manpower with competitive salaries.

> *"The colored man is entering the aerospace industry and joining the others who are going to the moon."*
>
> *Rev. Leon Sullivan*
> *June 26, 1968*

On June 26, just ten weeks after his meeting with Morton, Reverend Sullivan told 400 people gathered in the basement gymnasium of the Zion Baptist Church, on Philadelphia's North Broad Street, that for the first time anywhere, black people were founding an aerospace company. With the beginning of this ambitious project, he said he was hopeful that "colored people in other communities may develop an industrial project of their own."

Ben Sallard, PAE's general manager, right, briefs USAF plant representative at GE's Missile and Space Division, Col. Clifford Taylor, on PAE plant plans. With Colonel Taylor and Mr. Sallard are, left to right, Mark Morton, GE MSD vice president and general manager; Reverend Sullivan; and Otto Klima, GE's reentry systems general manager. PAE, still so young, had impressive display at recent trade show.

And by that day in June, PAE already had its work cut out for it. General Manager Morton had announced that GE would be PAE's first customer with an award of $2,575,000 in contracts over eighteen months for electronic calibration, receiving inspection services, and fabrication of electronic components. The GE contracts, covering items for both USAF and NASA, would include wiring, harness fabrication, cross-wire resistance welding, and plastics encapsulation of electronic components. Final quality inspection would be made by a PAE inspector, GE vendor surveillance men, and, when appropriate, USAF.

"Establishment of Negro business in the ghetto areas of the nation is a necessity."
Rev. Leon Sullivan

A loan from the First Pennsylvania Banking and Trust Co. provided initial working capital. Meanwhile, Reverend Sullivan and Ben Sallard scouted around for a plant site. Working with a General Electric team on the question of the physical layout they would need, the pair met with local realtors to determine what was available.

Twenty sites throughout the city could have filled the bill. But one possibility in particular appealed to Reverend Sullivan. It was the vacant fourth floor of a building in his own neighborhood; there, transportation for workers and trainees would be no problem. To establish the plant anywhere but in or adjacent to the ghetto would be inconsistent with the need.

So in late June PAE officially began operations at 2000 Windrim Avenue, in 36,000 square feet of space previously occupied by a precision products firm. The place needed paint and polish, a new plant layout, and a completely new electrical power system. Sophisticated equipment had to be procured. USAF Col. Clifford Taylor, plant representative (AFPRO) at the GE Missile and Space Div., helped line up excess government equipment and machinery. One source of equipment was DIPEC (Defense Industrial Plant Equipment Center), in Atchison, Kan.

Transforming a vacant floor into an aerospace factory has been no small task. Sufficient electrical power to run industrial lathes, drill presses, and other heavy machinery is necessary. Provision had to be made for a cafeteria, training department, laboratory, production-control offices, test area, staff offices, and conference rooms. That work is still progressing, but Sallard is optimistic that PAE will be at full speed by December 31.

In the meantime, production, training, and plant preparation are going on side by side. By August 20 PAE had completed delivery on its first contract items: terminal boxes for use in NASA's biosatellite program.

Eventually, PAE employees will be pursuing thirteen manufacturing disciplines, ranging from the most elementary—materials handling and packing—to more technical electronics work unique to the aerospace industry. At this writing there are forty-eight full-time production workers/instructors, and forty hard-core unemployed in training. In two years, PAE plans to have 150 to 200 employees on its payroll.

"Our best public relations man is the successful trainee who goes back to the ghetto, meets his buddies standing on the corner, and shows them the money in his pocket, earned with his newly acquired skills."
Ben Sallard

PAE's purpose is twofold: manufacturing and training. Of the two, training will probably have the most far-reaching implications.

Through the National Alliance of Businessmen, PAE was awarded a $522,462 contract with the US Depart-

The community has a definite stake in PAE. It has many shareholders in the new enterprise. And, when announcement of the new company was made in late June, hundreds of citizens came by to hear Reverend Sullivan describe PAE and what it would be doing. Part of the day's activities was a show of aerospace hardware.

Looking forward to the near future, Ben Sallard directs renovation of PAE's 36,000 square feet. Area will house facilities for manufacturing and testing of sophisticated aerospace products. Also planned are training, office, cafeteria, conference areas.

PAE Personnel and Training Manager Frisby Euell, center, goes over some intricacies of aerospace precision work with PAE trainees. One of PAE's most important achievements has been negotiation of a sizable contract with the National Alliance of Businessmen to train 100 people.

ment of Labor to train 100 hard-core unemployed workers for the aerospace industry. Minimum requirements for a prospective trainee are that he must be trainable to an eighth-grade reading level and be willing to learn. According to Sallard, most hard-core unemployed can meet these requirements.

Where does the trainee come from? He is likely to come directly out of the ghetto. But he must first be certified "hard-core" by either the Pennsylvania State Employment Service or the Philadelphia Economic Development Corp. He is then tested by a consultant firm to determine the direction of his potential.

Before he is certified by PAE at full-skill rate, the trainee must complete all four phases of his chosen curriculum. These range from a total period of one month (for materials handling) to thirty weeks (for instrumentation technician). He begins at the PAE site, learning preliminary reading, shop math, factory familiarization, and economics. Then he attends an orientation course, if necessary, for a tough four to ten weeks of electronics fabrication training at GE's Manufacturing Reliability Training Center. After a period of on-the-job training back at PAE, he is finally certified—qualified in all respects to meet the standards of his particular trade. Throughout, his salary may have risen from $1.92 at the start to as much as $4.00 an hour.

Ben Sallard takes an active interest in each one of his trainees. "It's no game; it's real," he tells them. In a short time, he has already seen the benefits of the project. Where there were "unemployables" a few months ago, now there are fully qualified, motivated, and self-assured technicians.

The firm's blueprints provide for a future mechanical training facility. In addition to the trainees recommended for this PAE program, GE, which now has no such facility, has agreed to pay for the mechanical training of its own people at PAE.

> *"We expect PAE to do as well as GE in this area. But don't expect any favors from the Air Force. The aerospace industry is highly competitive."*
>
> *Col. Clifford Taylor*
> *USAF Plant Representative*
> *GE Missile and Space Div.*

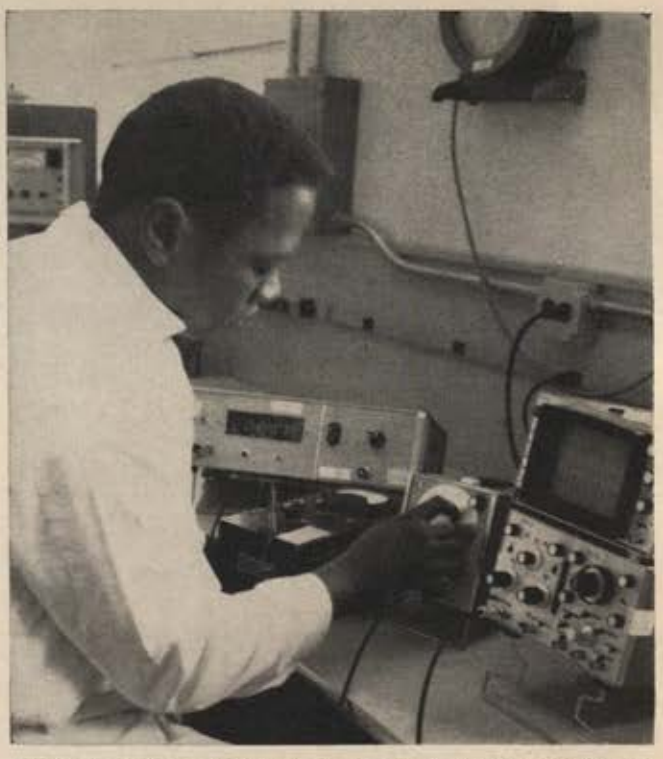
With more than $3 million worth of manufacturing and training contracts to sustain it, PAE is out to line up more business. Invitations to bid on electronics contracts are priced out, and final bids drawn up. PAE can't actually bid yet, because it's not ready to take on more work. But contract "war games" are run anyway for the day when PAE will be competing on its own with the giants of the industry.

Reverend Sullivan said in June, "It is our intention to become a prime competitor in the field of aero-

space." PAE wants to become known not only for its high-quality products, but also for the skill of its highly trained technicians. Other aerospace companies will eventually be able to take advantage of PAE's training program. "Our most satisfying achievement would be for the major aerospace companies, such as Philco, Lockheed, RCA, and GE, to raid our personnel and steal us blind!" exclaims Madison Allen.

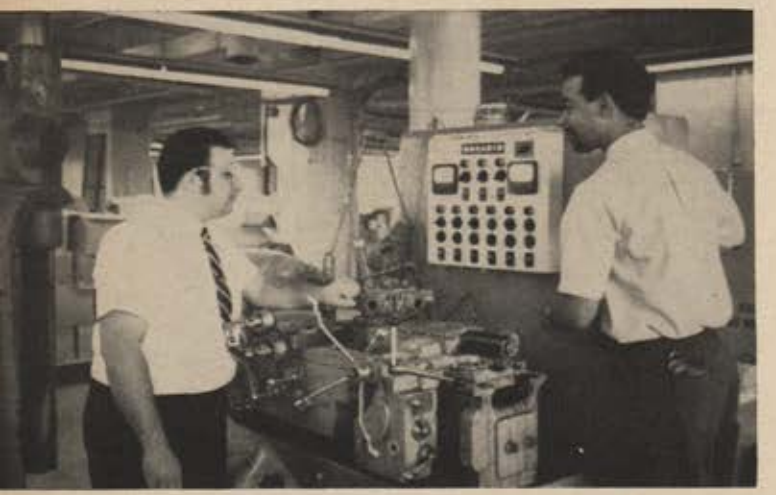
> *"PAE will be a profitable business . . . but a portion of the profits will be rolled back to the community, providing scholarships and training to the people in the ghetto."*
>
> *Madison Allen*
> *Business Operations Manager*
> *PAE*

Stock in PAE was offered to the public in October, and the hope is that the number of investors will eventually reach 4,000. Profits realized from the company will flow back to the investors as dividends, to the community in the form of educational programs, and to the employees of the profit-producing enterprise. Reverend Sullivan hopes that these profits will soon provide "no fewer than 1,000 colored boys and girls with college scholarships of at least $1,000 each."



A PAE worker gets close to the scope. As Reverend Sullivan suggests, his people intend to join the ride to the moon.

PAE's production manager, John Riche, right, talks equipment with General Electric's Mark Morton, Charles Dates.



To run an aerospace manufacturing operation you need equipment. Mechanical operations manager Ken James is checking new Monarch lathe with planner Romeo Alessio.

If PAE works, the ghetto will never be the same. The pride and respectability that have been missing for generations will have found their way back into the black man's spirit. Reverend Sullivan's pragmatic spiritual guidance behind Ben Sallard's small team of dedicated and competent managers is demonstrating that at least some of the answers to America's pressing social problems may be in sight. The equipment currently manufactured by PAE may not be destined for the moon, but its manufacture could prove to be the first step to an even loftier goal—making this world a better place in which to live.—END

> *"We don't want charity. We just want the opportunity to prove that we can make that spaceship like anybody else."*
>
> *Rev. Leon Sullivan*

The authors of this article, Mr. and Mrs. Dawson, live in Wilmington, Del., where Mr. Dawson, a former US Naval officer, is employed by Hercules, Inc., in advertising and public relations. Mrs. Dawson is a former staff member of AIR FORCE/SPACE DIGEST *and was the author of "The Air War in the Middle East" in our August '67 issue.*

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Although they are not panaceas, the systems techniques that have made possible our achievements in aerospace can help mightily in the solutions of some of our most pressing social problems, says the head of one major aerospace company's efforts in that field . . .

How Can Business Ease the Urban Crisis?

BY JOHN B. KELLEY

WITH the splashdown and recovery of the Apollo spacecraft and its three-man crew, the world witnessed the successful completion of a highly sophisticated systems-engineering project. Except for colds, loose food flying around in weightlessness, and some of Wally Schirra's choice comments to ground controllers, almost everything went according to plan—all systems were "go."

America's dream of exploring the unknown of outer space comes closer to becoming a reality, thanks to systems engineering. Without systems engineering, we would be still reading about it in Buck Rogers stories. We've been able to convert science fiction into science fact.

And it is good that we look beyond our planet . . . because when we take a close look at what's happening on earth, particularly in our cities, it seems, at times, that the only sane thing to do is to launch off somewhere to start again fresh. But the sober realities of our cities, such as inferior education, housing, medical care, job opportunities, crime prevention, and others, demand our attention, concern, and solutions right now. If we can use systems engineering to help solve the problems of exploring outer space, perhaps we can use this modern-age tool to improve life in our cities.

As an officer of a corporation engaged extensively in providing solutions to national social and economic problems, I have had the opportunity to direct the application of systems-engineering techniques in organizing and maintaining Job Corps Centers, urban skills centers, educational programs for Indians, and a viable printing business [in Roxbury, Mass.] that is employing and making craftsmen and women out of the hard-core unemployed. In short, we have put to use Avco's systems-engineering expertise, developed from solving aerospace problems, in solving human problems.

Obviously Avco is not alone in this effort—but part of a large industrial community made up of such firms as Aerojet-General, North American Rockwell, GE, Litton, and Raytheon—to name a few, which has elected to apply its systems-engineering talents to some of our nation's most crucial problems.

Business has both the responsibility and the opportunity to use its skills to help alleviate the urban crisis, in the view of John B. Kelley, who heads the Avco Economic Systems Corp., engaged in just such efforts.

What Is Systems Engineering?

At its most elemental level, systems engineering is nothing more than logical, common-sense planning, similar to the kind of planning you use in your own business. However, at the other end of the scale, it becomes a highly sophisticated method by which various resources are applied to analyze and solve extremely complex problems. At this level, systems engineering utilizes input-output techniques, linear and nonlinear programming, cost-effectiveness, mathematical models, feedback theory, and other advanced techniques. The modern computer, which is capable of rapid storage and manipulation of large amounts of data, makes possible the use of these techniques.

The men who make systems engineering work are both superorganizers and idea brokers. In an urban application the systems engineer must know how to use such diverse skills as psychology, anthropology, sociology, law, architecture, and so on. The systems engineer gathers all relevant data from these sources and converts this information into mathematical models—

which are highly concentrated and workable representations of a larger situation such as a city.

To put it more simply—it is possible to convert many aspects of a city's life into a structure composed of numbers—which can be manipulated by a computer, to see how a decision affecting one factor of a city, such as added police protection, will affect not only the police department but other urban factors, such as public housing, sanitation, fire protection, budgets, and long-range policy planning.

While space does not permit me to go into detail on various phases of systems-engineering procedure, let me say that one of the major goals of the systems-engineering process is first to devise several good solutions to any given problem—and then to keep narrowing this field through analysis and testing until the best possible solution is developed. In short, it's a complex weeding-out process to find the best method of doing a job; saving money; improving housing, education, health, welfare; handling crime reports, auto registrations, tax returns; or countless other tasks.

Once a system is installed, it must be watched closely to determine modifications and adjustments. One of the major problems with a new system is to keep it up to date with our changing times. Rapid change in our society can make even the best-devised system obsolete not long after its christening. If the people who plan and run it fail to make the system responsive to new situations, new problems, and new opportunities—then all the money and effort was spent in vain.

The Potential Benefits

Systems engineering can provide a city with a number of significant benefits:

- It is an excellent decision-making tool, eliminating a lot of guesswork as to what will happen to the total or various parts of a city if a particular action is taken.
- It identifies specific problems, after discovering problem areas that would otherwise be difficult or impossible to spot.
- It usually provides the best solution to a problem out of a series of excellent possibilities that have gone through a hard mill of analysis and testing.

Systems engineering can be used in the renewal of our mature cities, new-town development, the model-cities program, metropolitan government, and in the consolidation of small rural communities, to name but a few comprehensive applications.

The company that provides systems-engineering services offers local government the capability to study and solve some of its most pressing problems. It allows a private company to manage execution and completion of urban programs on a contract basis. So, from the point of view of a supplier, profits can be made out of bringing private industry talent and resources, through systems engineering, to bear on our city's social and economic problems. But, beyond the profit motive, American industry has no other option but to help correct the physical and spiritual decay of our cities and help make them into places of peace, prosperity, and progress.

The Problems Are Difficult

The application of systems engineering to the urban environment is not without its problems. And some of them appear quite difficult. To date, no private industry-local government partnership has taken on a city in its totality. This means that, at this point, we don't know if systems engineering can work on a city in all its far-reaching complexity. We can make assumptions, one way or the other, but we really don't know. Most of the systems-engineering projects have been too small, too brief, and underfinanced. In order to find out what systems engineering can do in the city, we need a long-term heavy commitment of funds. *Fortune* magazine cited a number of valid reasons why it has been difficult to obtain this necessary large-scale commitment [*see also "Systems Technology for Social Problems: Problems and Prospects," by Capt. Gerald T. Rudolph, p. 79, Nov. '68 AF/SD*]. *Fortune* cited the Vietnam War fund drain, a lack of comprehension on the part of politicians, shifts and vagaries of administration, national apathy and antipathy to long-range planning, jealousies of professional and special-interest groups, and the fragmentation of federal, state, and local governments.

Also, in attempting to set up a total city system there are many human problems, which are almost impossible to convert into mere numbers. A city is made up of all kinds of people, each with his own individual problems, aspirations, and need to contribute.

When we speak of a city, we sometimes tend to forget that its influence transcends mere geographical

One of Avco Economic Systems Corp.'s most widely known efforts on the urban scene is its printing business in Roxbury, Mass., an inner-city black ghetto in Boston. More than 200 Roxbury residents are now working in Avco's Roxbury printing plant in a variety of skilled jobs such as compositors, offset cameramen, pressmen, platemakers, and binders. At right, a group of trainees learns the intricacies of offset press operations.

Another of Avco's efforts has been in the operation of Job Corps Centers. This trio, at the Avco-run Poland Springs, Me., center is learning veterinary-aide work.

boundaries, but spreads, in all directions, into the suburbs and beyond. The dynamics of city life involves a mutual exchange of goods and services, money, people, and ideas that crisscross city, town, state, and even international borders at computer-like speed.

Some of these difficulties, in applying systems engineering to the total city, will be resolved in time; others will continue because they involve one of the most insoluble elements in existence, human nature. But *despite* these difficulties and the high cost of large-scale programs, we must invest in and sell systems engineering for what it is: one of the best available tools for helping our cities come out of their mire and onto solid ground. . . .

Using the Tool

We must now ask ourselves how we can work with this most valuable and effective organization in making our systems-engineering talents available to the various levels of government. I would like to contribute the following suggestions:

- That the local Chambers of Commerce become acquainted with the potential and real problem areas in their respective communities which could benefit from the systems-engineering approach.
- That the National Chamber of Commerce provide its locals with appropriate advice, assistance, and information so that the difficulty in selling systems to influential laymen is minimized.
- That the National Chamber of Commerce make these needs known to suppliers of systems-engineering services.
- That suppliers provide the National Chamber of Commerce and its local groups with appropriate advice, assistance, and information concerning systems engineering.
- That suppliers, in partnership with the Chamber and its locals, conduct educational programs, or workshops, or seminars on systems-engineering concepts directed to urban problems for community leaders.
- That the National Chamber of Commerce exert its influence on the various agencies, departments, and branches of the federal government for the purpose of funding large-scale systems-engineering projects—for example, a total systems approach for an entire city, or model-city program.
- That suppliers and the Chamber of Commerce engage in a national public-relations program that will articulate our urban problems and ways in which systems engineering can help to solve them.
- Lastly, in view of the scale of the urban problem, I suggest that suppliers of systems-engineering sources look for complementary areas where they might pool their resources and work together on large programs.

A Creative Partnership

The creative use of such a partnership would give business a greater opportunity to apply its talents and resources for the purpose of lessening urban apathy and narrowing the gap between what people want from a city and what they now have.

The local Chamber of Commerce is in the best position to know the needs of its community—and the National Chamber of Commerce, through this committee and through its federation affiliates, is that vital force which can so effectively bring all groups together to work on specific systems-engineering programs.

Philosophers and historians tell us that cities gave birth to and nourish human civilization. Since cities form the base for our civilization, it is apparent that what we have built for so many decades is about to crumble down around our ears. First of all, I think it is hopeful that we are admitting the reality of our present state of affairs and attempting to apply viable solutions —so that we can move ahead even more. While systems engineering is not the end-all to our many diverse urban dilemmas, it is, nevertheless, an important enough tool for considering complex urban problems and organizing their solutions so that without it our urban civilization might indeed be racing toward a speedy demise. —END

John B. Kelley is president of Avco Economic Systems Corp., Washington, D. C., a wholly owned subsidiary of Avco Corp., organized in 1966 to work on socio-economic problems in four main fields—education and training, information science, economic analysis, and systems management. A career Air Force officer who worked in procurement for most of his twenty active-duty years, Mr. Kelley has served in the White House as a consultant and as staff assistant to the President. He holds degrees from the University of Maryland and the George Washington University. The above article is adapted from Mr. Kelley's address to the Urban Affairs Committee of the US Chamber of Commerce in Washington, October 28, 1968.

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A Separate Operating Agency

The Air Reserve Personnel Center

Through an unfortunate oversight, the report from the Air Reserve Personnel Center, Denver, Colo., was omitted from the September 1968 "Almanac Issue" of AIR FORCE/SPACE DIGEST. *ARPC was formerly part of Continental Air Command, and on August 1 of this year, when CONAC was reorganized and many of its functions taken over by the new Hq. Air Force Reserve (AFRES), ARPC became a Separate Operating Agency. Here is the report that should have appeared in the September issue. We regret the omission.*—THE EDITORS

AN OLD organization with a new status joined the ranks of USAF's separate operating agencies last summer and now is performing its important mission with Reserve Forces management systems. The Air Reserve Personnel Center (ARPC), located in Denver, Colo., formerly part of the now-abolished Continental Air Command, became a separate operating agency on August 1 and continues to be charged with personnel administration of the Air Reserve Forces and, when necessary, with mobilization of the Reserves.

The half million Air Force Reservists and Air National Guardsmen who are not on active duty comprise the "manpower bank" of the Air Force. These men total about half the active-duty strength of today's Air Force, and this makes ARPC the largest individual Air Force element in terms of numbers of people administered.

Twice during 1968 the Center assisted in recall actions. In January of this year, after the seizure of the *Pueblo* by North Koreans, 14,000 members of the Air Reserve Forces were ordered to active duty. A second mobilization in May involved another 2,000 members. In each case, ARPC followed preplanned procedures to carry out the mobilization orders from Hq. USAF.

Several other times in recent years the Center has been called upon to mobilize large numbers of Reserve personnel during national emergencies, such as during the Berlin buildup of 1961 and the Cuban missile crisis of 1962.

To provide a mobilization capability, ARPC takes these kinds of personnel actions: assignment and reassignment, classification, promotion, discharge, and retirement. Medical records are maintained to assure that each Reservist is physically fit for duty, and training records indicate his participation and skills.

Col. Leland A. Walker, Jr., took command of the Air Reserve Personnel Center (then called the Air Reserve Records Center) in September 1964. A former Deputy Director of Manpower and Organization at Hq. USAF, he has also served in TAC and ATC. He served in the Pacific in WW II and saw action in the first hours of the Korean War.

The Air Reserve Personnel Center is the largest source of officers for the active Air Force. Many officers now on active duty have received their commissions from the Center. Each year about 5,000 officers are commissioned and ordered to active duty through the Air Force Reserve Officer Training Corps. Cadets entering advanced AFROTC programs in colleges throughout the country must enlist in the Air Force Reserve, and their military careers become an ARPC responsibility. The Center compiles their military records, assigns them to training schools or to first duty stations, issues commissioning and active-duty orders.

Other resources for the manpower bank come from direct appointments of professional people such as doctors, nurses, chaplains, and lawyers; officer training

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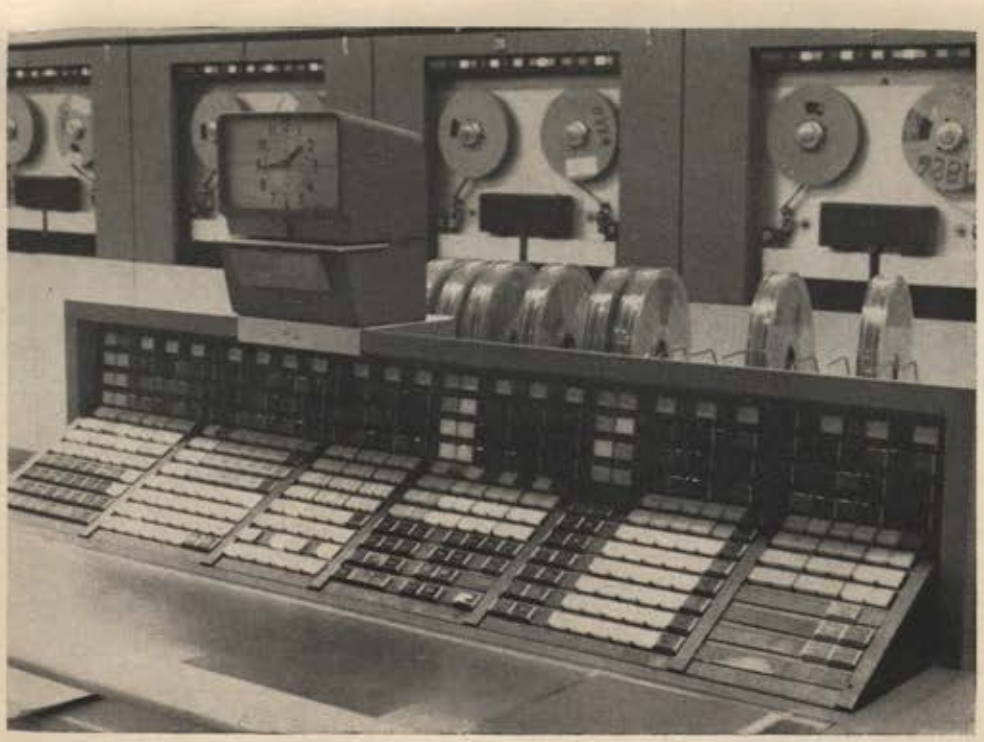


These two RCA 501 computers handle the daily accounting and reporting of personnel data from the Air Force Reserve and the Air National Guard. As well as keeping such records current and accurate, the computer system provides rapid access to information necessary for troop mobilization. The system is the same as that used by the active Air Force.

school graduates; and certain Reserve airmen through the outstanding-airman commissioning program. These categories provide about 4,000 officers each year for the active Air Force.

Airmen enter the Air Force Reserve through enlistment or transfer from the active Air Force and other military services. However, the greatest source of both officers and airmen comes from those released from active duty. Airmen are transferred to the Reserve after four years' service to complete their six-year obligation under the Universal Military Training and Service Act. Officers who elect to return to civilian status after completion of their initial active-duty tours are released from active duty and reassigned to ARPC.

All of these Air Force Reservists are gained to Reserve strength and added to the ARPC inventory. Their master personnel records are screened for completeness and accuracy, and essential information is extracted and recorded on magnetic tape in the ARPC computer system.

The Center is responsible for processing all mechanized data generated by, for, and between personnel activities associated with the Air Reserve Forces Personnel Data System (ARF-PDS). It is a parallel system to that of the active Air Force so that if a mobilization occurs, essential data will be available in the proper format.

New personnel data for the system can be supplied

When recall is necessary, an initial screening by the computer will quickly supply information from Reservists' records, which are updated annually through survey forms. Here, Col. Leland A. Walker, Jr., left, ARPC Commander, discusses mobilization procedures with Charles D. Falk, chief of the Center's Data Processing Division. Recall operations were assisted by the Center twice in 1968.

Another job of the Center is conducting promotion selection boards, which consider 13,000 Air Force Reserve and Air National Guard officers annually for higher grades.

This is one of twelve aisles in the ARPC file bank that contain the master personnel records of each Reservist. Computers store only the essential facts from each file.

by many sources. Information on officers and airmen being released from active duty and assigned to the Air Force is received via DoD's worldwide Automatic Digital Network (AUTODIN). Information on mobilization augmentees is sent to ARPC by 255 active-duty Air Force Consolidated Base Personnel Offices (CBPOs). Items on unit-assigned Reservists are submitted by thirteen Reserve and eighty-eight active-duty CBPOs and by the Consolidated Reserve Personnel Office at ARPC.

The ARPC computer gives rapid access to information required for management of personnel resources and allows ARPC to produce rosters and reports required by higher headquarters. For the Air National Guard, ARPC provides computer support for the Personnel Data System. The data bank, which is maintained on the ARPC computer, is updated from transactions submitted by ANG CBPOs. ARPC produces management products as required for NGB and the various State Adjutants General. ARPC also convenes selection boards for ANG officers being considered mandatorily for promotion, and upon mobilization, provides fillers for ANG units, if authorized and required.

To assure that all information is current and accurate, constant updating is required. Through survey forms, records of Reservists assigned to ARPC are updated annually to verify changes in addresses, marital status, number of dependents, additional training or education, current occupation and employer, physical condition, and other data that might affect the individual's status or availability for recall.

Classification actions assure that each Reservist is assigned to a job compatible with his qualifications and that he can use his skill immediately if ordered to active duty in a national emergency. Assignment actions allow Reservists to participate in unit training and to fill vacancies in Reserve units. Other types of participation monitored by ARPC include classroom training in Air Reserve Squadrons or correspondence courses through the Extension Course Institute (ECI). Points earned for participation are recorded by ARPC and credited toward retirement pay.

Promotions for the Air Force Reserve are a Center responsibility. ARPC conducts promotion selection boards which consider 13,000 officers annually for promotion to higher grades. Approximately 2,000 disposition boards and boards of inquiry are conducted each year at the Center. Staffed by ARPC officers, these boards determine whether a Reservist should be retained, basing their decision on such factors as physical condition or derogatory information. Reservists no longer qualified in their skills are also considered for discharge.

All of the personnel actions performed at the Center have one purpose: to be prepared for mobilization at all times. ARPC must be able to effect rapid mobilization in an emergency, providing a trained and ready resource to respond to the nation's needs. All the reporting, recording, screening, identifying, updating, and training are keyed to this eventuality. National security and ultimate survival could depend on the Center's ability to react swiftly.

On notification from Hq. USAF that certain units are being mobilized, ARPC takes action in accordance with existing mobilization instructions, following preplanned procedures. Personnel records are forwarded to the gaining active-duty command and the Military Personnel Center. Personnel data are provided to higher headquarters. Reinforcement actions may be taken to fill vacancies in mobilized units. Levies are matched against available resources, orders are published, and the mobilization action is confirmed and validated manually. Then orders go to individuals.

Automation provides the speed and accuracy necessary for present-day mobilizations. The computer system and automated methods enable ARPC to accomplish in hours personnel actions that formerly required days. At electronic speeds, the computer can extract, from data recorded on magnetic tape, information regarding individuals with needed qualifications.

All the functions and operations at the Air Reserve Personnel Center provide service for the Air Force Reservist no matter where he may be. More important, they assure that the Air Force will always have a "manpower bank" of Reserve Forces to augment the active forces when and if they are needed.—END

LETTER FROM LOS ANGELES

By Irving Stone

WEST COAST EDITOR, AIR FORCE/SPACE DIGEST

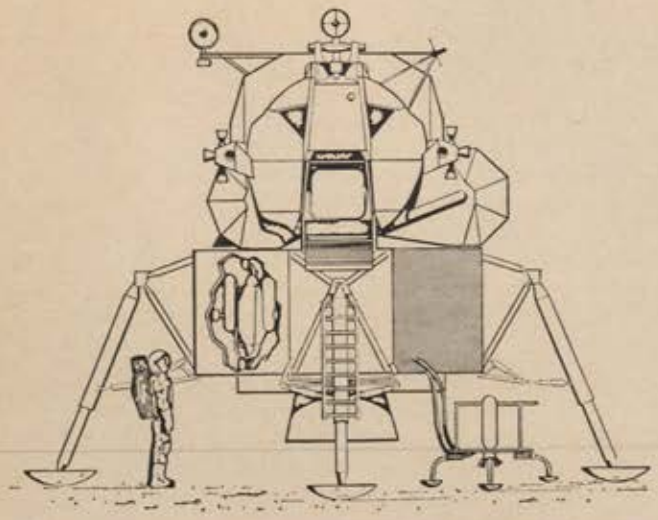
Lunar Flyer Gets Under Way

The success of the Apollo-7 earth-orbiting mission, the first manned spaceflight with the Apollo vehicle, spotlights another critical effort—to provide a one-man "lunar flyer" for extended exploration of the generally rough, cratered, and jagged terrain of the moon.

Although landing men on the moon by a module dispatched from a lunar-orbiting Apollo will itself be a momentous and spectacular feat, it will be anticlimactic if suitable mobility isn't provided to afford the opportunity for astronauts to use the landing point as a base from which to reconnoiter a substantial area of scientifically interesting but hostile terrain for surface mapping, sampling, or planting of experiments.

The lunar flyer, able to operate vertically and horizontally, would provide more rewarding lunar mobility than a roving surface vehicle and certainly more than what a pressure-suited astronaut could do on foot. Such a vehicle could provide access to locations on a crater wall, the top of a central crater peak, or areas beyond the crater rim, and also be able to cross difficult terrain and, if necessary, rescue disabled roving vehicles or another lunar flyer. After early Apollo flights, the flyers could be delivered to the lunar surface as part of an unmanned payload. The latter delivery method would make it necessary for the lunar flyer to be able to stay in inactive storage on the moon for as much as three months.

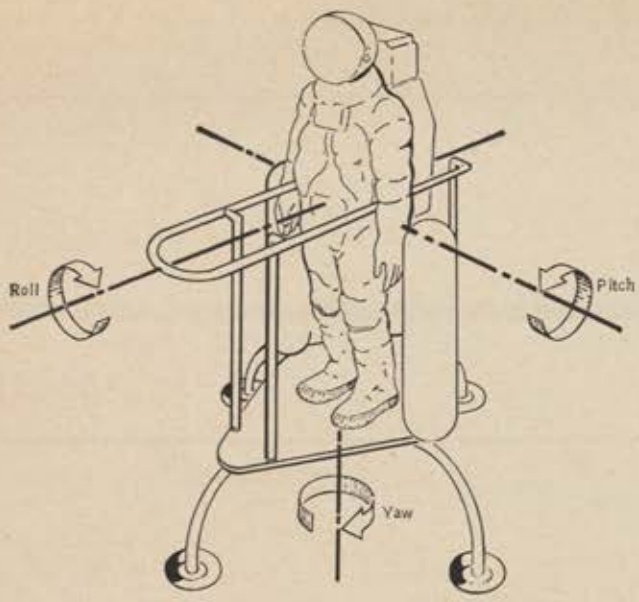
Proposals for a six-month study to optimize the design and develop system specifications for a one-man lunar flyer have been submitted by industry to the National Aeronautics and Space Administration's Manned Spacecraft Center at Houston, Tex. NASA is considering awarding two competitive study efforts, each funded for about $250,000. Included in the task of defining the lunar flyer will be the development of a preliminary plan outlining the steps required for development, test, and fabrication of the vehicle and to qualify the system for lunar-surface operation.



Artist's sketch shows lunar flyer packed in left-side compartment of lunar module. The astronaut would take flyer to the surface, then move it to right-side position where it would be fueled using residual propellant drained from the lunar module's descent stage. In practice, the refueling hose would be long enough to allow the lunar flyer to be gassed up at a reasonable distance from the lunar module so that the astronaut could take off in the flyer at a safe distance from the lunar module. The module's ascent stage for mother-ship rendezvous is atop the descent stage.

Simplicity and light weight will be keynote design factors for the lunar flyer. Only mandatory equipment will be incorporated in the design. No automatic controls are expected to be included. The vehicle probably would be designed to be capable of operation for several weeks, including the ability to perform at least thirty sorties. The basic lunar flyer would have the following characteristics:

- A dry weight of between 150 and 180 pounds. The vehicle would be stowed in the Apollo lunar module descent stage. After the landing of the lunar module, the lunar flyer would be deployable to the lunar surface and could be prepared for flight by a single astronaut.
- The residual propellants in the lunar module descent stage would be used to fuel the lunar flyer. This would simplify logistics and save weight.
- The payload capability for the lunar flyer would be 370 pounds, which, in addition to the astronaut-operator, could be made up of cargo or a second pressure-suited astronaut. However, the study would consider the performance capability of a lunar flyer with a range of payloads beginning with fifty pounds and increasing generally in fifty-pound increments up to 370 pounds.
- The minimum operating distance for the lunar flyer carrying a 100-pound payload and providing for one intermediate stop would be some sixteen miles—an eight-mile radius. But in addition to optimum-performance trajectories, various less-than-optimum, slow-speed, and low-altitude flight conditions will be studied, since it's probable that the lunar flyer would take off and fly short distances close to the ground for some missions.
- The vehicle propulsion system would be operated continuously from liftoff to landing.
- Control of the lunar flyer's rocket motor thrust vector could be by either mechanical or kinesthetic means (platform tilting by movement of the body), but it's unlikely that the kinesthetic control approach would be adopted for a vehicle weighing as much as 150 to 180 pounds. Methods of rocket thrust vector (directional) control could include such means as pivoting thrusters, differential throttling, and pulsed thrusters. Reliability would be the governing factor.
- Continuous voice communications would be required between the flyer and the lunar module, where it's assumed the second astronaut would remain with the second lunar flyer as a standby while the first lunar flyer was out on a terrain mission. Communications would be provided by transceivers carried on the astronaut's portable life-support system (backpack).
- Navigation of the lunar flyer would be by line-of-sight, dead-reckoning, and by a portable homing device.
- Both lunar flyer vehicles would be fueled at the start of all sorties. The last sortie would be limited to walk-back



This is a simplified concept for a one-man lunar flyer, showing control axes. While an operational version would emphasize simplicity, there would be enough design sophistication to allow incorporation of controls and rocket thrusters. There would also have to be provision for cargo-carrying and accommodation of a disabled crew member.

distance from the lunar module. And the range of all but the last sortie would be limited to the rescue-range capability of the second, standby flyer. All sorties would be planned to allow for a ten percent fuel reserve.

There may be a tough problem in gauging the quantity of propellant during a sortie, since it's fairly certain that no electrical gauging would be used. A solution could be the use of fiber optics to gauge the propellant level. Thus, when the gauging end of the fiber tube is covered, the eyepiece would remain dark. But when the gauging end of the fiber tube was above the fuel level, the eyepiece would show light. Obviously, there would have to be sight gauges on the lunar flyer's propellant tanks so that crews could keep track of the fueling from the lunar module residual fuel supply.

The propellant would be a storable-liquid type, utilizing an equal mixture of hydrazine plus unsymmetrical dimethylhydrazine as the fuel and nitrogen tetroxide as the oxidizer. A safety problem might arise if the astronaut, while transferring the residual propellant from the lunar module to the lunar flyer, spilled some of the oxidizer on his pressure suit. The liquid would freeze immediately; and, at the end of the mission, when the astronaut returned to the warm inside of the lunar module, the oxidizer could evaporate and generate enough toxic vapor to be lethal. The hydrazine mixture, in small quantities, is not expected to pose such a hazard. The fueling operation is certain to be simulated in preparatory trials to ensure a high factor of safety.

The lunar flyer probably will evolve as a simple platform with tubular superstructure to support and steady the astronaut. Propellant tanks could be supported by this tubular framework or be located below the flyer platform and surrounding rocket motors.

A tripod landing gear appears suitable because of the light weight and stability it offers. The tripod legs probably would spread, on landing, by means of joints at the platform, to introduce tension forces and promote spring-back for reducing the landing shock, which conceivably could render the flyer's equipment inoperable. Crushable leg-pads (such as on the lunar module) could not be used on the lunar flyer. The multiplicity of flights would require that the pads be damage-proof on landing.

Maximum flyer system weight would be approximately 1,220 earth pounds—180 pounds for the lunar flyer structure, 370 pounds for the astronaut, including his pressure suit and backpack, 370 pounds for payload, and 300 pounds for propellants. These 1,220 earth pounds in the moon's one-sixth gravity would be equivalent to 203 pounds.

Typical items in the flyer payload would include a camera, spectrometer (to measure wavelengths of lunar material), gravimeter (for local gravity readings), a package of maps, spring scale, a staff for supporting various instruments, sampling tools and their carrier, and a sample-return container. Sampling tools would include an aseptic sampler, which would be inserted in its capped core tube for return in the container. Other sampling tools could include a scoop, tongs, hammer, and combination unit incorporating a brush, scriber, and an inspection lens (*see p. 100*).

The specific mode of flight for the lunar flyer would probably be determined for specific missions on the lunar surface. One mode could be flight straight up for takeoff with translation at ninety degrees for forward flight. Another would be to take off at an angle, then translate into an arced trajectory to a horizontal path. This mode probably would give the lunar flyer greater range, but would require a higher altitude to attain the flight trajectory.

NASA and industry's previous preliminary investigations of lunar flying vehicles and associated equipment should form a firm basis for this currently supported lunar flyer study. The effort may lead to the development of hardware.

Aerospace Solar Observatory

The Air Force's Manned Orbiting Laboratory (MOL) program should profit from the results to be obtained with a twenty-four-inch telescope to be installed before the end of December in the Aerospace Solar Observatory located about thirty miles northwest of Los Angeles. Scheduled for operation early in 1969, the installation will put the observatory in the category of a major center for solar research.

The facility has been run since 1966 by Laboratory Operations of Aerospace Corp., El Segundo, Calif., a technical adviser to the Air Force. It is being used for studying solar magnetic fields and forecasting solar flares, a potential hazard to MOL or Apollo astronauts.

The MOL program has reached the point where all major components have been defined and specifications for the interfaces have been compiled and accepted by all the ma-

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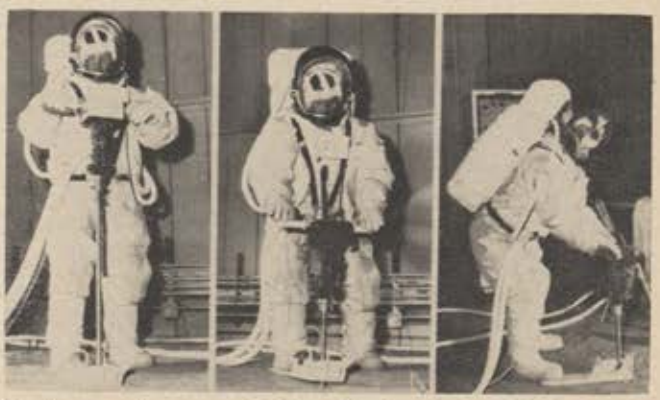
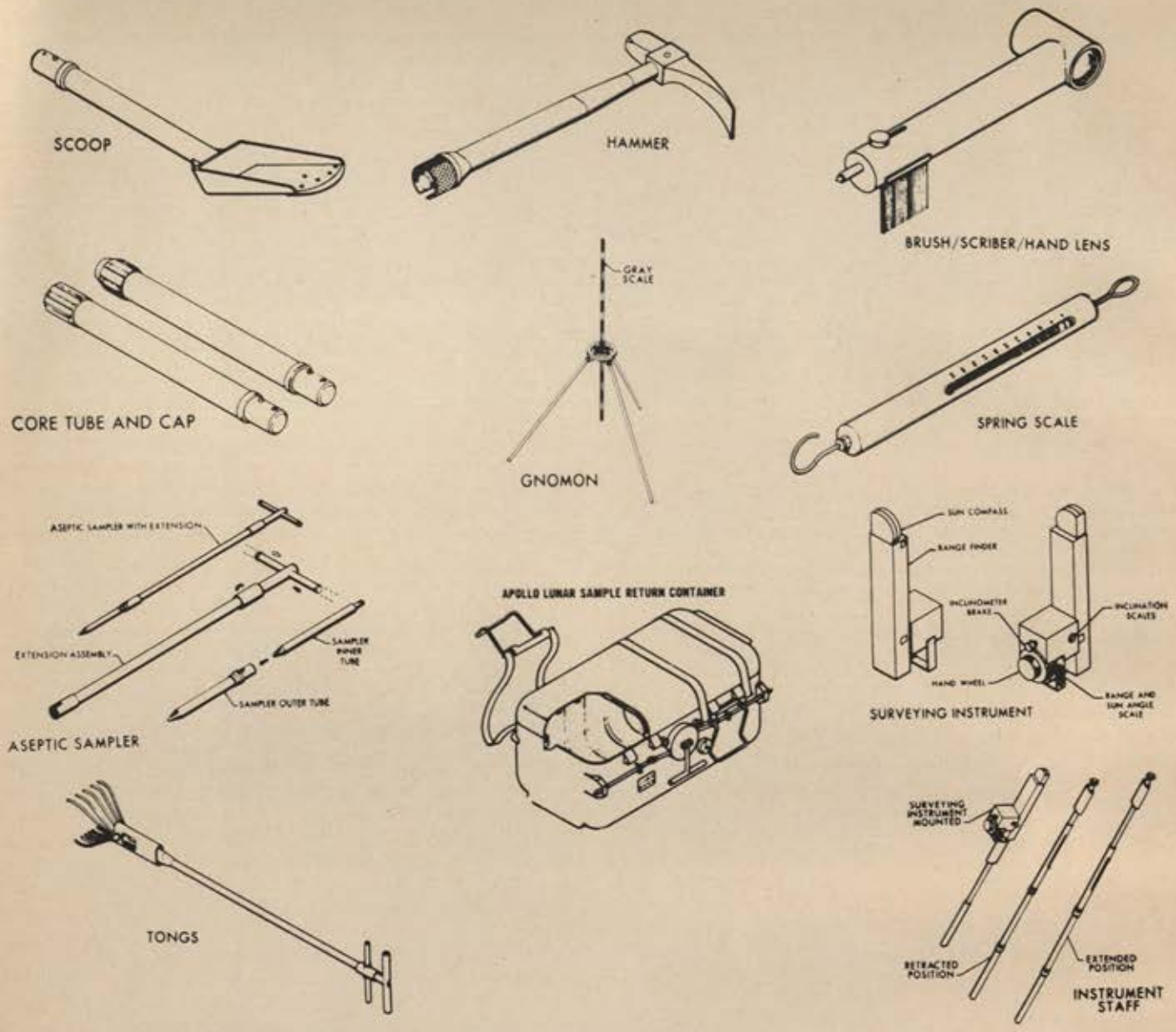


Getting to the moon is just the beginning. Tools to do useful scientific work will have to be brought along. This is one version of a lunar-surface drill, which could be used to emplace a heat probe and to get subsurface core samples.



Astronauts exploring the moon will need a variety of equipment to help them do their job. Their "tool kit" aboard the flyer might include a collection of these scientific sampling devices and a staff to support surveying equipment and camera.

jor contractors. Metal is being cut for engineering and qualification models under the development phase.

The bulk of the work at the observatory is financed with fees earned by Aerospace Corp. under Air Force contracts.

Tethered Balloons for Future Missions

Air Force Office of Aerospace Research's Cambridge Research Laboratories, Hanscom Field, Bedford, Mass., is constructing a permanent launch site at the Army's White Sands Missile Range, N. M., for tethered balloon development and tests. The facility should be fully operational next summer.

A high-altitude tethered balloon could serve as a military communications relay platform. And, equipped with sensors, it could function as an unmanned surveillance system. It's no problem to deploy a tethered balloon to an altitude of 10,000 feet, but designers are anticipating deployments of tethered vehicles to as high as 100,000 feet. Thus, over the next several years, as designs and skills improve, the tethered vehicles will be sent to successively higher altitudes from AFCRL's White Sands site.

Analysis of details associated with the 100,000-foot goal was outlined by AFCRL's Capt. Edward F. Young at the American Institute of Astronautics and Aeronautics' recent Second Aerodynamics Deceleration Systems Conference at El Centro, Calif.

It's easier to maintain a tethered balloon at 60,000 to 70,000 feet than at altitudes between 30,000 and 50,000 feet, Captain Young said, because of the strong prevailing winds found in the lower altitudes. Getting the balloon through the lower-altitude, high-wind regime is a problem to be solved.

A two-balloon system, including a natural-shape balloon and a second, blimp configuration, would be required to attain an altitude of about 100,000 feet. Development cost

Communications Satellite Corp. has ordered huge new Intelsat-4 satellite from Hughes for service in the 1970s. Satellite will be able to handle 5,000 phone calls simultaneously.

for such a dual-configuration system would run to more than $2 million.

Pacific Reentry Tests

The McDonnell Douglas Corp. has been chosen to conduct the Reentry Vehicle Test Observables (RVTO-2A) program for USAF's Space and Missile Systems Organization, San Bernardino, Calif., as part of the over-all aim to develop new ICBM reentry technology.

The flight demonstration should begin next year. The launch, with an Atlas booster, will be from Vandenberg AFB, Calif., with impact probably in the vicinity of Kwajalein.

Companies which competed with McDonnell Douglas for the program included Avco, General Dynamics/Convair, and Lockheed Missiles and Space Co.

Observation on R&D

At the recent dedication of the company-funded Orbital Mission Simulator Complex at Aerojet-General Corp.'s Azusa, Calif., facility, Dr. Alexander H. Flax, Assistant Secretary of the Air Force for Research and Development, noted that in recent years the dramatic growth in federal research and development expenditures has received growing attention from the Congress and the public. Secretary Flax observed: "Other pressing national needs such as those arising from such problems as air and water pollution, housing, transportation and education, and the stubborn pockets of poverty which still exist in our otherwise flourishing economy have made increasing demands on our national resources. These problems demand and should receive priority attention. This has led to a great deal of public and congressional questioning of not only the rate of growth of our federal research and development effort but also of the current level.

"It is paradoxical that the only conceivable solution to these problems seems to lie in the application of some of the fruits of our past progress in science and technology,

R. A. (Bob) Hoover of North American Rockwell (right) is new president of the Society of Experimental Test Pilots. Here, he receives the "gavel" of office, an aircraft control stick, from outgoing president, Col. R. L. Stephens, USAF.

but that in order to pay the bills we so often seem to be contemplating the future growth of this science and technology, which has been so important in the attainment of our present level of national strength and the development of our economy to its present high level. I believe that this apparent paradox will be resolved after a short but perhaps painful period of adjustment. . . ."

Lifting Body Powered Flight

The Air Force's experimental wingless vehicle—the Martin X-24A lifting body—was being readied for its first unpowered flight, probably in January, as the National Aeronautics and Space Administration's Northrop-built HL-10 lifting configuration entered its powered flight phase. Both aircraft are part of the joint Air Force/NASA lifting-body program being conducted at Edwards AFB, Calif., to investigate piloting problems and flight characteristics under conditions that represent the terminal portion of spaceflight from low supersonic speeds down to final approach and landing.

The first powered flight of the HL-10 planned for October 22 was aborted five minutes prior to drop from the B-52 mother ship, because a leak was indicated in the helium pressure source for the lifting body's rocket engine fuel system.

The first actual powered flight of the HL-10, conducted the next day (October 23), also didn't meet expectations. Launched from the B-52 at an altitude of 40,000 feet, the HL-10, piloted by Air Force Maj. Jerauld R. Gentry, encountered rocket powerplant difficulties. When Gentry turned on chambers one and three of the four-barreled Thiokol Chemical Corp.'s Reaction Motor Div.'s 8,000-pound-thrust XLR-11 engine, only chamber number three ignited and was fired for eighteen seconds. Gentry then turned off both these barrels and sought to ignite chambers two and four, but neither fired. Gentry jettisoned the propellant and landed at Rosamond Dry Lake near Lancaster, Calif., at 225 mph for a safe touchdown. The XLR-11 rocket engine had been used reliably in early flights of the X-15 research aircraft and before that on the X-1 and D558 configurations.

Successive powered flights of the HL-10 were to be scheduled by program planners after analysis of the engine system difficulty.

Major Gentry wasn't expected to pilot the HL-10 in its immediate follow-on powered trials, since he was to be engaged with preparations for the first unpowered flight of the X-24A.—END

THE BULLETIN BOARD

News and Comment about Air Force People . . .

By Jackson V. Rambeau

AFA DIRECTOR OF MILITARY RELATIONS

Recomputation—Is There a Chance?

All three major candidates for the Presidency went on record during the campaign as being in favor of recomputation of pay for military retirees. Now, as this is being written, on November 6, Richard M. Nixon has been elected thirty-seventh President of the United States. It seems an appropriate time to quote from the telegram that appears below, which was received from Mr. Nixon during the campaign and comments on recomputation. The telegram was addressed to AFA President Robert W. Smart.

Mr. Nixon's telegram follows:

"Because of the concern of your organization with the issue of equalization of retired military pay, I want to take this opportunity to share with you my views on this important subject. For the past several years, our retired military personnel have been unjustly treated because of the failure of the Administration and the Democratic-controlled Congress to remedy the growing disparity between active-duty and retired military pay. This unfair discrimination is wholly contrary to the long-established principle of equalizing retired pay with existing active-duty pay for the same grade or rank. It is a breach of faith for those hundreds of thousands of American patriots, who have devoted a career of service to their country and who, when they entered the service, relied upon the laws ensuring equal retirement benefits.

"The retired pay of some of our older retirees has slipped more than thirty percent behind that of their younger comrades. In a period of skyrocketing cost-of-living increases, it is an intolerable and unfair burden for our retired military.

"I intend to urge the Congress to remedy this injustice at the earliest possible time by passing legislation along the lines of that introduced by Senator Tower of Texas, Chairman of my Key Issues Committee. General Eisenhower and I worked vigorously to seek legislative relief in 1960. Now, after prolonged inaction . . . the time is at hand to do simple justice and to recognize the great contribution to our nation by those who have served their country with honor and distinction."

—Richard M. Nixon

However, in view of the fact that the Chairman of the House Armed Services Committee, Rep. Mendel Rivers (D.-S. C.), has in the past stated on the House floor that recomputation is a dead issue, and because of the resistance since 1962 of the Senate Armed Services Committee even to consider the matter, we recommend that no retiree spend any of the money he might feel entitled to under recomputation.

DoD Legislative Program for 1969

After conferring with top officials in the Department of Defense and Hq. USAF, it appears to us that little legislation for people is planned for 1969. Only three proposals are now being considered for submission to the Congress. First and most important is the Hubbell military salary system. The Hubbell package will also include a new approach to military retirement and Reserve pay.

The Cheney Award, given annually to a member of USAF for "an act of valor, extreme fortitude, or self-sacrifice in a humanitarian interest performed in conjunction with aircraft," has been presented for 1967 to AF Sgt. Duane D. Hackney, a holder of the Air Force Cross and one of the most decorated airmen to have served in Vietnam. Above, USAF Vice Chief of Staff Gen. John D. Ryan presents the award to Sergeant Hackney, who was cited for his heroic actions in risking his own life to help rescue a downed pilot near Mu Gia Pass, North Vietnam, on February 6, 1967.

Dr. Gene R. Marner, right, President of the Institute of Navigation, here presents the Institute's Superior Achievement Award to USAF Maj. Robert E. Edgell at the Institute's annual banquet, held at the US Naval Post-Graduate School, Monterey, Calif. Major Edgell was cited for performing "outstandingly" while serving as a navigator at Alaskan Air Command during 1967, and especially for his work, while on temporary duty in Greenland, in resupply sorties to radar stations and scientific expeditions on the ice cap, involving radar approaches in all kinds of weather.

Second, DoD will again press for legislation giving all the services more general or flag officers.

And, third, an attempt will be made to get legislative relief from the fiasco that has developed regarding family separation allowances.

By the time this appears, an estimated 25,000 servicemen will have been eliminated from the $30 a month family separation program because of a Comptroller General decision. The GAO has ruled if the wife lives with her or his family while the husband is overseas, the serviceman does not qualify. This is ludicrous! But Congress failed to act on a request for remedial legislation for several months during this year. Based on conversations with congressional staff members, we see no reason to believe that Congress will act favorably on this request in 1969.

Similarly, it is highly doubtful that Senator Stennis, the new Chairman of the Senate Armed Services Committee, will relent and give the services more star billets.

The Hubbell proposals are becoming more and more controversial and are not getting a warm reception on Capitol Hill. Even if this should change, there is little chance that the Hubbell package can get through both the House and Senate prior to its proposed effective date of July 1, 1969. On that date a twelve percent pay raise is expected for military personnel, and this will completely scramble the Hubbell tables. It might be that at that juncture the Congress would send the whole Hubbell effort back to the drawing board.

After extensive briefings on what is in the Hubbell active-duty package, we are convinced that it is a sound plan and should be approved.

Based on many conversations, however, we can only predict that DoD's legislative proposals dealing with personnel for 1969 will have rough sledding in Congress, and we see little chance that any of its manpower proposals will be approved as submitted.

Retired Pay Increase

Nearly 600,000 military retirees have become tentatively eligible for a cost-of-living increase in their retirement benefits of at least three percent to be effective next February 1.

The consumer price index reached 122.2 in September, a figure exactly three percent above the index of last April 1 when the retirees were given an adjustment of 3.7 percent. A flat three percent increase would give military retirees more than $70 million in additional money each year. The cost of military retirement pay exceeds $2 billion annually.

The index must reach 122.6 to trigger an adjustment for the 850,000 Civil Service civilian retirees and survivors. At the present rate of increase, that level was not to be reached until the end of November.

To guarantee the adjustment for military personnel, the index must remain at or above the 122.2 level reached in September for both October and November, and the amount of the increase will be the highest percentage rise during that ninety-day period. The same provisions apply to Civil Service retirees.

NOTICE

Each year, the Air Force Association honors the three most outstanding Civil Service employees of the Air Force. Nominations are made by the Secretary of the Air Force, the Chief of Staff, and the Major Commanders. In addition, any member of the Association may nominate individual Air Force employees whom they consider outstanding. Nominations with appropriate documentation should be sent to Hq. USAF (AFPCPLJ) not later than February 1, 1969. The names of the three selected individuals will be released sometime next March.

Outstanding Young Men Awards

Two officers and a sergeant have been nominated by the Air Force Chief of Staff to represent the Air Force in America's 1968 Ten Outstanding Young Men Awards competition, sponsored by the United States Jaycees.

Placing first among the three nominees is **Maj. James C. Harding,** Air University, Maxwell AFB, Ala., nominated for his achievements as an educator at AU and record of combat and humanitarian efforts while serving in the Republic of South Vietnam.

Capt. John B. McTasney, Air Force Academy, Colo., the second nominee, was selected for his extraordinary heroism and superb airmanship in the rescue and recovery of personnel in a hostile area in Southeast Asia.

The third nominee, **Sgt. Duane D. Hackney,** 41st Air Rescue and Reconnaissance Squadron, Hamilton AFB, Calif., was recommended for outstanding accomplishments and extraordinary heroism in the rescue and recovery of personnel in a hostile area in SEA. He is one of the most decorated personnel to have served in SEA, and first of the few enlisted men to have been awarded the Air Force Cross for valor in combat.

Mrs. Thomas P. Gerrity, widow of the late AFLC Commander, presents USAF with a plaque memorializing her husband. Accepting for the Air Force is Gen. J. P. McConnell, Chief of Staff, left, as Lt. Gen. R. G. Ruegg, DCS/Systems and Logistics, looks on. The plaque will be presented annually to an AF unit for achievement in systems and logistics management, and, for this year, has been given the 2705th Airmunitions Wing, Ogden AMA, Hill AFB, Utah.

Winners of these awards will be announced later this year, and presentations will be made at the Jaycees Awards Congress, scheduled to be held in Syracuse, N. Y., January 17-18, 1969.

Harvard Advanced Management Program

The Air Force has been invited to send five officers to the thirteen-week Harvard Advanced Management Program, beginning February 9, 1969. The course is designed for experienced executives capable of assuming greater responsibilities. The classes are composed largely of senior executives from business firms. Officers from the Army and Navy have also been invited to attend. A board at Hq. USAF selected the following colonels to attend the February '69 class: Col. Ray M. Cole, Hq. USAF (AFPDC);

(Continued on following page)

Col. Charles W. Fellows, Jr., OSD; Col. John D. Morgan, AFLC; Col. Louis O. Alder, AFSC; and Col. Earl R. Vansickle, Hq. USAF (AFODC). Alternates are Col. Earl H. Gordon, AFLC; Col. Learned W. Barry, Hq. USAF (AFAAC); and Col. Henry C. Gordon, Hq. USAF (AFRDQ).

President of AFA Moves

Robert W. Smart, Assistant to the President, Governmental Relations, North American Rockwell Corp., has been designated head of the company's Washington, D. C., office, J. L. Atwood, President and Chief Executive Officer, has announced. Mr. Smart will assume direction of all company activities and personnel in Washington early this month.

Mr. Smart was chief counsel of the Committee on Armed Services, US House of Representatives, from 1947 until he joined North American Aviation, Inc., in 1963.

Robert W. Smart, AFA's President, has been designated to head the Washington, D. C., office of his company, North American Rockwell Corp., taking on his new duties this month.

He was transferred to the new corporate headquarters soon after North American and Rockwell Standard Corp. merged last year.

Born in Crane, Mo., Mr. Smart was graduated from the University of Missouri with an A.B. degree, and received his LL.B. degree from Cumberland University, Lebanon, Tenn. He served with the US Army from August 1942 to October 1946. Commissioned in the Air Force Reserve in 1949, he retired as a brigadier general on May 31, 1967. He is currently serving his second term as National President of the Air Force Association.

G.I. Bill Pilots

Pilot training was added to the education and training benefits available to nearly 5,500,000 eligible veterans under the current post-Korean G.I. Bill. Despite a requirement that veterans must have valid private licenses or the equivalent in flight training hours and must meet medical requirements for a commercial pilot's license, the current post-Korean G.I. Bill flight training program has attracted more veteran-trainees than did the much less restrictive Korean conflict program at its peak. More than 17,000 veterans have entered flight training under the present program. Peak enrollment under the Korean conflict flight training program was reached in November 1957 when 13,007 veterans were enrolled.

Veterans attending college on a full-time basis receive monthly payments of $130 per month if unmarried; more if they have dependents. Those in flight training are reimbursed at the rate of ninety percent of the cost of their flight training, but for each $130 paid, their eligibility for educational benefits is charged one month. The $130 rate applies regardless of marital status or number of dependents. Thus, an eligible veteran who takes $100 worth of flight training during one month receives $90 from the VA; one who takes $1,000 worth of training receives $900. Payments are discontinued when the individual's educational entitlement is used up. Because eligibility for educational assistance is limited to thirty-six months, the most a veteran would normally receive for flight training under the program is $4,680.

Maj. William J. "Pete" Knight is the 1968 winner of the Harmon International Aviator's Trophy for his flights in the X-15A-2 rocket research plane, which, on October 3, 1967, he flew to a speed of 4,520 mph, exceeding his own earlier speed record.

The latest four-year college to go into professional pilot training is the Louisiana Polytechnic Institute at Ruston, La. In its first year of operation the school has enrolled 140 students and reports that the school will grow rapidly in size as more qualified instructors and facilities become available. The cost of commercial rating and instrument qualification is slightly more than $3,100 over the four-year period. A number of the students are active-duty personnel from Barksdale AFB, in Shreveport, La.

Council Meetings

During the month of November two of our Councils—the Air National Guard Council and Military Manpower Council—planned meetings in Washington. In spite of our gloomy predictions above regarding the Hubbell compensation study, both Councils will hear in detail from Admiral Hubbell his proposals regarding revisions of the retired system and a new compensation plan for Reservists and Guardsmen.

With regard to the latter, the new total salary system concept will completely eliminate what we know today as base pay. The Reserve pay system at present is tied to a day of basic pay for each drill period. There would be great resistance in DoD to giving Reservists a full day's pay for a drill period since this would increase Reserve pay by some forty percent.

Complicating the whole matter is the fact that a Reservist can get paid for two drill periods if he serves more than eight hours in any one day. Two possibilities being considered are bound to set off comments by Reservists that they are not being fairly treated.

First is to keep the system as it is for Reserves and use the basic pay tables in effect when the Hubbell plan is approved. This would set the Reservists apart from the active force, and many are opposed to this approach.

The other would be to give Reservists one day's pay under the new tables and eliminate the authority for two

drills in any one day. We will report in more detail next month on the Hubbell retiree and Reserve compensation proposals.

Parting Shots

• **Congressman Mendel Rivers,** Chairman of the House Armed Services Committee, has announced that he will introduce a bill early in the next session of Congress to establish an **Armed Forces Medical School** in the Washington area. The school would produce career medical officers for the Armed Services. In the past, DoD has always opposed such an institute, but this attitude now seems to have changed. The Medical Advisory Council of the Air Force Association has endorsed the Armed Forces Medical School and urged that it be established without delay as one means of reducing the reliance of the services on the Doctors' Draft.

• Since World War I, the total number of living war veterans has never fallen below 4,200,000. Today there are more than **22,900,000 war veterans**—more than at any time in history.

Maj. Gen. John S. Patton, AFRES, has been designated as military adviser to the Chairman of the Reserve Forces Policy Board and as executive officer and member of the Board, effective January 6. General Patton succeeds Maj. Gen. Ralph A. Palladino, USAR (Ret.).

• Nearly **7,000,000 home loans** valued at $70 billion have been made under the World War II G.I. loan program since 1944. The Veterans Administration reports that half the loans are now fully repaid.

• **First-term reenlistment rate** in the Air Force has shown a marked improvement in the first quarter of FY '69. It has risen from eighteen to **twenty-three percent.**

• **WAF enlistees** in the Air Guard will now be given basic military training. Women without any prior military service will join a basic training class scheduled to start next January at Lackland AFB, Tex. The Guard has thirty spaces in the class. Young women are enlisting in the Air Guard now that it's gone coed. They began receiving federal recognition on July 1, 1968.

• We congratulate the **National Guard Association** on its splendid convention recently held in Hot Springs, Ark. Never have we been to a convention where the business sessions were better attended by the delegates. In our view the affair was a complete success.

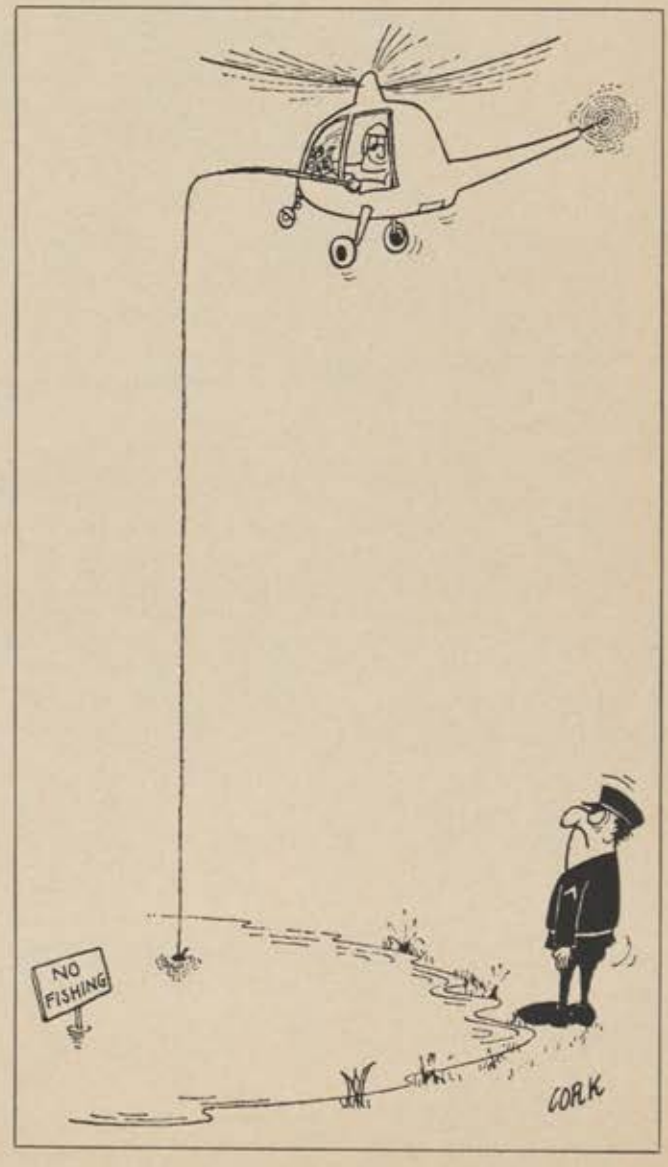
• **The Reserve Individual Augmentee Program** just hasn't been able to get off the ground. Air Force Headquarters and the Major Commands have certified a requirement for 34,512 augmentees. The latest reported manning of this requirement is 7,076. The worst shortages occur in the airmen ranks where the program is only eight percent manned. Five thousand of the 9,000 officer spaces are filled. There is considerable concern in the Pentagon regarding this situation and a number of studies are under way in the Office of the Chief of Air Force Reserve to find remedies.

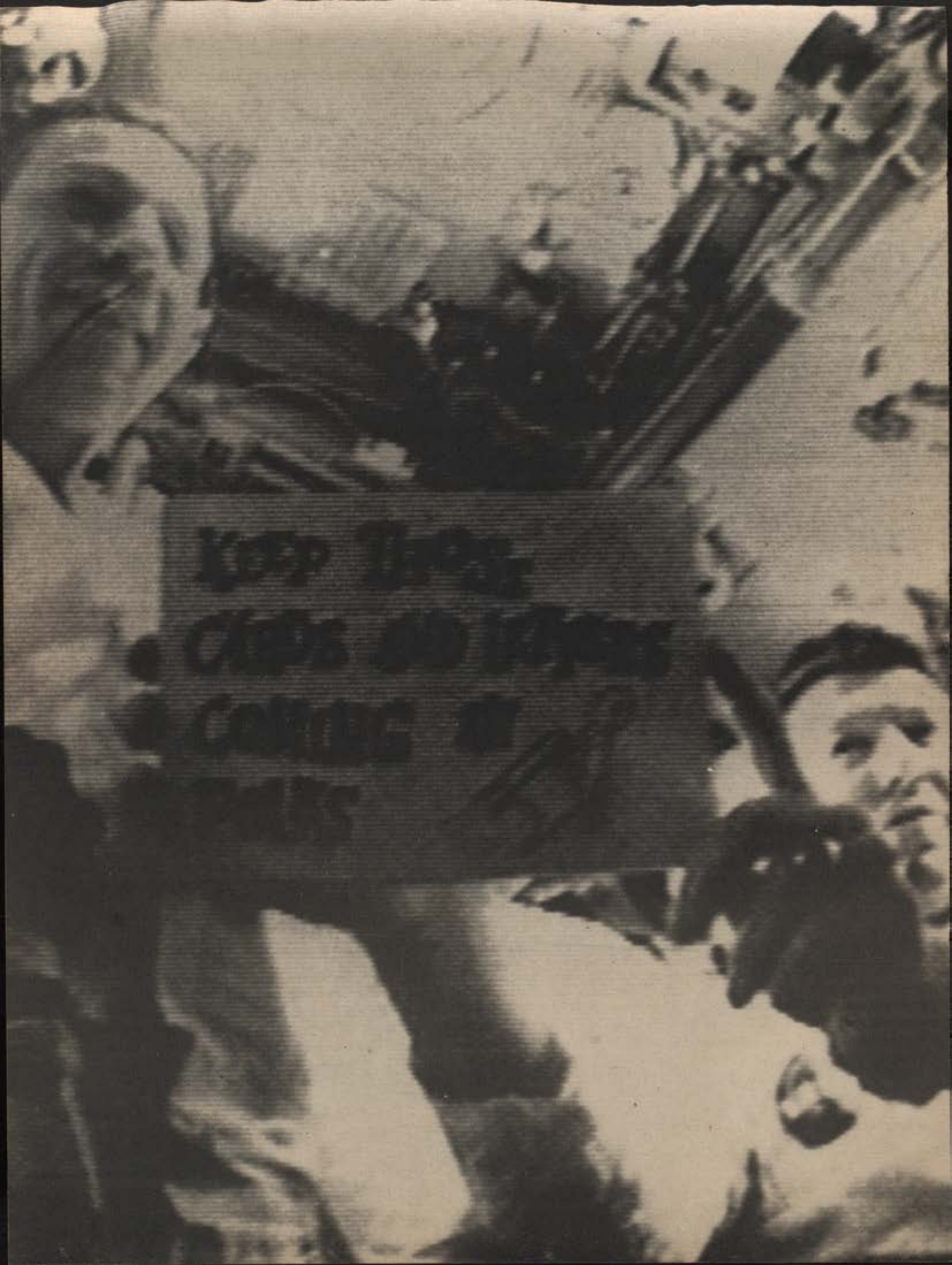
• **The 34th Aeromedical Evacuation Squadron,** formerly from Kelly AFB, Tex., and now at Yokota, Japan, has done an outstanding job supporting our Vietnam effort since being called to active duty on May 13, 1968. They have helped move more than 17,000 litter patients and 15,000 ambulatory patients in 800 flying missions.

SENIOR STAFF CHANGES

Mr. Solomon Arnovitz, from Supervisory Attorney-Advisor (Contract) to Chairman, AFLC Procurement Committee, AFLC . . . **B/G James S. Cheney,** from Staff Judge Advocate, Hq. PACAF, Hickam AFB, Hawaii, to Ass't Judge Advocate, Hq. USAF . . . **Mr. Howard L. Dimmig,** from General Engineer to Technical Advisor, Air Proving Ground Center, AFSC . . . **Mr. Donald R. Eastman,** from DCS/Research to Technical Advisor, Office of the Cmdr., Arnold Engineering Development Center, AFSC . . . **B/G James D. Kemp,** from Vice Cmdr., San Antonio Air Materiel Area, Kelly AFB, Tex., to Ass't C/S, J-3, UN Command/US Forces, Korea, and Director of US/Republic of Korea Operational Planning Staff, Korea . . . **Dr. Lynn E. Wolaver,** from Supervisory Mathematician to Director, Applied Mathematics Research Laboratory, OAR.

RETIREMENTS: B/G John B. **Wallace.**—END





The show "from the Apollo Room, high atop everything" wowed 'em in Houston and around the world.

YOU can wow 'em in Houston, too, if your message is in **AIR FORCE/SPACE DIGEST's March 1969 Convention Issue.**

Houston is where the action will be . . . And where your audience will be . . . The men who count in aerospace, led by the Secretary of the Air Force and Chief of Staff. Air Force Association's Twenty-third Annual Convention meets in Houston, home of NASA's Manned Spacecraft Center, March 18-21, 1969.

The movers and shakers of aerospace will be there, as usual. With your ad in the Convention Issue, you can count on—

- A 3,000 VIP distribution at the Convention, plus
- A special distribution to the Spacecraft Center itself
- Over and above AF/SD's regular, high quality 105,000 audited circulation, of course.

With this kind of pin-point navigation, your advertising message in the March issue will be seen by the right man in the right job, under the right circumstances.

March 1969 Convention Issue advertising closing date is January 31.

AIR FORCE
and SPACE DIGEST

THE OGDEN, UTAH, CHAPTER . . .

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

The **Alabama State AFA Convention,** held recently in Mobile, opened with a golf tournament at the Brookley AFB golf course, followed by a reception and dinner dance at the Base Officers' Club.

At the business session the next morning, **Dr. Boyd Macrory,** Dean of Curriculum for the Foreign Officers Course at the Air University, was elected President of the State AFA Organization, succeeding Arthur Ousley. Other new officers are: **E. M. Steiner,** First Vice President; **Bernard A. Reynolds,** Second Vice President; **Cecil G. Brendle,** Secretary; and **John H. Haire,** Treasurer.

After the business session, Convention delegates attended the football game between the University of Alabama and the University of Southern Mississippi.

Hugh E. Witt, Deputy for Supply and Maintenance to the Assistant Secretary of the Air Force (Installations & Logistics), was the guest of honor and featured speaker at the Convention Banquet and Awards Night. During the program, Mr. Witt presented the Air Force Legion of Merit to **Col. James L. O'Neill,** Commander, 2850th Air Base Group, Brookley AFB. State President **Arthur Ousley** presided, and **John O. Gray,** Assistant Executive Director of AFA, introduced the guest speaker. Dancing followed the banquet.

Distinguished guests included US Representative **Jack Edwards** (R.-Ala.); Mobile's **Mayor Lambert C. Mims; Brig. Gen. Jonas L. Blank,** Commandant, Air Command and Staff College; **Capt. Silas Johnson,** USN, Commander, Pensacola Naval Air Station; **Col. Paul E. Greiner,** Commander, Mobile Air Materiel Area; **Col. J. D. Sawyer,** Assistant Deputy for Operations, 33d Tactical Fighter Wing, Eglin AFB, Fla.; South Central Regional Vice President **Jack Gilstrap; Jackson Rambeau,** AFA's Director of Military Relations; and **Maurice Lien,** Assistant Director of Field Organization and Director of Information for AFA.

More than 40,000 spectators enjoyed the annual Weber County Air Fair, sponsored recently by AFA's Ogden, Utah, Chapter. A spectacular highlight was a demonstration of precision flying by USAF's Thunderbirds aerobatic team. Shown here greeting the Thunderbirds and their leader, Maj. Neil Eddins, kneeling on left, are Chapter President Raymond W. Cassell and Maj. Gen. Robert H. McCutcheon, Commander, Ogden Air Materiel Area, Hill AFB (kneeling, second and third from left, respectively). Distinguished guests included Sen. Wallace F. Bennett, Utah Gov. Calvin Rampton, and Ogden Mayor Bart Wolthuis.

The program for the ladies included a tour by yacht of Mobile Waterways, a sherry party at the International Yacht Club following the tour, and a visit to Bellingrath Gardens and Home.

The Convention was hosted by the Mobile Chapter headed by **V. P. Schiavoni; Rollin C. Broughton** was Convention Chairman.

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Following a format established several years ago, the **Utah State AFA Organization's** observance of the twenty-first anniversary of the Air Force proved to be the most all-inclusive event of this type sponsored by any AFA unit.

Programmed events in the month-long observance included an Air Force family day at the Lagoon Resort, a local recreation area; an Air Force Anniversary Ball at the resort; an OOAMA Commanders Anniversary Dining-In, an AFA Logistics Awards Banquet, and an AFROTC Dining-In, all held in the Hill AFB Officers' Club; and an NCO "Honors Night" Dining-In held in the Hill AFB NCO Club.

Between 40,000 and 45,000 people attended the Family Day event, and the Ball attracted 1,000.

At Alabama State AFA Convention are, from left: Rep. Jack Edwards (R.-Ala.); guest speaker Hugh E. Witt, Deputy for Supply and Maintenance to the Ass't AF Sec'y (I&L); Jackson V. Rambeau, AFA Director of Military Affairs; and John O. Gray, AFA's Ass't Executive Director.

Maj. Gen. Robert McCutcheon, left, Commander, OOAMA; Gen. Mark E. Bradley, Jr., USAF (Ret.), center; and Col. Jack Alston, 2d from right, Commander, Hill AFB, display the "Golden Spike" plaques given them at Dining-In sponsored by AFA. Also shown are Regional V-P Nathan H. Mazer, 2d from left, and Utah State President Nolan Manfull.

AF Academy Superintendent Lt. Gen. Thomas S. Moorman, 2d from left, guest speaker at a recent Santa Clara Co., Calif., Chapter dinner meeting, chats with, from left, Chapter President Edwin H. Millson; Maj. Gen. Merrill D. Burnside, USAF (Ret.), program chairman; Brig. Gen. Roger W. Smith, USAFR (Ret.); and AFA Director Bob Vaughn.

More than 350 were at the OOAMA Commanders Dining-In, at which **Gen. Mark E. Bradley,** USAF (Ret.), was the guest speaker. **John Sutherland,** Vice President for Product Support, McDonnell Douglas Corp., was the guest speaker at the Logistics Awards Program; more than 200 were in attendance and eleven awards were presented to military and civilian recipients.

Maj. Thomas Seebode, Career Motivation officer, Hq., Tactical Air Command, and chairman of AFA's Junior Officers Advisory Council, was the guest speaker at the AFROTC Dining-In. Distinguished guests among the more than 200 who attended were Senator **Frank Moss** (D.-Utah) and **Maj. Gen. Robert H. McCutcheon,** Commander, OOAMA.

CMSgt. Paul Airey, the Chief Master Sergeant of the USAF, was guest speaker at the NCO Honors Night Dining-In. During the program, the Utah AFA Award of Merit was presented to seventeen airmen, representing the outstanding NCOs from each military organization attached or assigned at Hill AFB. Limited facilities restricted the attendance, however, and Sergeant Airey's address was broadcast throughout the NCO Club for the benefit of the many NCOs who could not be accommodated at the Dining-In.

As in the past, each event was hosted by one or more of the State's Chapters. Utah State President **Nolan Manfull,** his State staff, and the President and staff of each chapter within the state are to be congratulated and commended on another outstanding observance of the Air Force Anniversary.

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James H. Straubel, AFA's Executive Director, was the guest speaker at the dinner dance of the New Jersey AFA's Twentieth Annual Convention recently held at the McGuire AFB Officers' Club.

Programmed as "A Salute to McGuire AFB," the Convention Program included a tour of the base, briefings on the C-5 and C-141, and a business session.

In his address, Mr. Straubel stressed the broad national advances—economic and social—that flow from the technologies and operations being developed and refined by USAF for the Military Airlift Command.

The State AFA's Airpower Trophy was presented to the **Lockheed-Georgia Co.** for its development of the C-141 StarLifter and the C-5 Galaxy.

The Thomas B. McGuire, Jr., Memorial Award for dedication and service to the New Jersey AFA was presented to State President **Salvatore Capriglione.**

Other State AFA awards were presented to **Singer-General Precision, Inc.; ITT's Avionics Division; Bendix Corp.; Walter Kidde & Co.; Curtiss-Wright Corp.; Lockheed Electronics Co.; Philip J. Corbett,** the outstanding New Jersey cadet at the Air Force Academy; and **Col. Francis R. Gerard,** Deputy Commander, 108th Fighter Wing, NJANG, Commissioner of Aviation for the state of New Jersey and Master of Ceremonies for the evening, who received an award for his outstanding contributions to aviation.

During the business session, **James Grazioso** was elected to serve as State President during 1969. Other officers are: Vice Presidents, **Mamie Kinsley** (North) and **Amos Chalif** (South); Secretary, **Lloyd Nelson;** and Treasurer, **Joseph Gattis.**

Distinguished guests included **A. E. Flock, Jr.,** Vice President, Lockheed-Georgia Co.; **Maj. Gen. William H. Brandon,** Commander, 21st AF; **Brig. Gen. John Harrell, Jr.,** Vice Commander, 21st AF; **Brig. Gen. John H. Herring, Jr.,** Commander, 438th Military Airlift Wing; **Col. Donald E. Matthews,** Commander, McGuire AFB; and AFA's Northeast Regional Vice President **James W. Wright.**

AFA's **McGuire Chapter** hosted the

(Continued on following page)

Admiring the birthday cake at Cape Canaveral, Fla., Chapter dinner meeting honoring USAF's 21st anniversary are, from left, Florida State President Lester Curl; Chapter President Herman Hauck; Mrs. Curl; Maj. Gen. Frederic H. Miller, USAF (Ret.), Chapter President-Elect; and Mrs. Miller.

Convention, and **John Curry**, a former National Director of AFA, served as Convention Chairman.

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The **Mount Clemens, Mich., Chapter's** USAF Academy Night, recently held in the VOQ at Selfridge AFB, drew more than eighty-five attendees, including thirty prospective candidates for the Academy and their parents. These candidates represented some eighteen local area high schools.

Chapter President **Marjorie O. Hunt** opened the program and introduced **Maj. C. K. Vogt**, Air Force Academy liaison officer. The film, "Bring Us Men," was shown, and **Capt. L. Wolfe**, 94th Fighter-Interceptor Wing, Selfridge AFB, and a 1953 graduate of the Academy, showed slides of the Academy facilities and described life at the Academy and in the Air Force, and the opportunities that are available through a USAF career.

Col. T. T. Popovich, Commander, 94th Fighter-Interceptor Wing, described the advantages of a career in the Air Force. While refreshments were served, unit commanders from the base and other Academy liaison officers mingled with the cadet candidates, answering their questions to round out an enjoyable and effective program.

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The **Michigan State AFA Convention**, held recently at the Northland Inn, Southfield, Mich., opened with a well-attended "Hospitality Night" reception.

At the Convention business session, delegates hammered out a Statement of Policy supporting the National AFA Statement as well as urging Michigan to increase and improve aviation facilities within the state and to attempt to attract more aerospace industry to Michigan. Delegates reelected incumbent President **Norman Scott.** Others elected were **Stewart Greer,** Vice President; **Beryl Martin,** Secretary; and **Henry Lemmen,** Treasurer.

The Convention Banquet featured a presentation by **Maj. James O'Nesi,** 305th Aerospace Rescue and Recovery Squadron, Selfridge AFB, on the functions and responsibilities of ARRS. Major O'Nesi also related some of his own experiences in the rescue and recovery of downed pilots. Convention Chairman **Jerry Green** served as Master of Ceremonies, and AFA National Director **George Douglas** of Denver, Colo., introduced the speaker.

During the banquet program, the State AFA's "Airability Award" was presented to **Nicholas Birta,** principal of Detroit's Aero-Mechanics High School.

Out-of-state AFA guests included National Secretary **Glenn D. Mishler;** Wisconsin AFA Vice President **Lyle Ganz;** Colorado AFA Secretary **Parks Deming;** and Columbus, Ohio, Chapter President **Francis Spaulding.**

Air University's Aerospace Presentation Team addressed Olmsted, Pa., Chapter's Annual Fall Dinner Meeting. Shown are Team members Lt. Col. Elro Swindle, seated right, and Maj. Ronald Bockius, standing right. Others, from left, are Chapter President Gilbert E. Petrina and V-P Thomas E. Gurnett.

In conjunction with the Convention, Great Lakes Regional Vice President **William M. Whitney, Jr.,** conducted a regional meeting, and **Don Steele,** Director of Field Organization, conducted an AFA Leaders Workshop.

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CROSS COUNTRY . . . Congratulations to **Col. Willard A. Hawkins,** Selective Service Director for the state of Arkansas and a member of AFA's **Col. David D. Terry, Jr., Chapter,** who recently received the Legion of Merit from **Lt. Gen. Lewis B. Hershey,** national director of the Selective Service System . . . Members of the **Fairbanks, Alaska, Chapter** recently visited Murphy Dome AF Station where they were given a briefing on operations of the 744th Aircraft Control & Warning Squadron.

AFA National Director **Vito J. Castellano** has been appointed by Defense Secretary Clark Clifford as a consultant to DoD in the office of Alfred B. Fitt, Assistant Secretary for Manpower and Reserve Affairs, and, also, as a member of the Medical Care Advisory Committee, which is responsible for the continuous review of DoD's medical policies . . . Congratulations to **Maj. William J. Knight,** Astronaut, X-15 pilot, and a very popular Master of Ceremonies at many local and national AFA events, who was recently named the winner of the 1968 **Harmon International Aviator's Trophy.**

COMING EVENTS . . . **Wisconsin State AFA Convention,** Milwaukee, December 6 . . . **Idaho State AFA Convention,** Boise, December 7 . . . **Georgia State AFA Convention,** Savannah, December 14 . . . **State Presidents' Orientation Meeting,** Washington, D. C., January 9-10, 1969 . . . **Board of Directors and Nominating Committee Meetings,** Washington, D. C., January 11, 1969 . . . **AFA** National Convention, Houston, Tex., March 18-21, 1969. —DON STEELE

The Novato, Calif., Chapter of AFA recently sponsored a dinner honoring Maj. Gen. Carroll W. McColpin on occasion of his retirement from USAF. Shown with the General (standing at far left) are members of the famed WW II Eagle Squadron, of which he also was a member, and their ladies, who attended the party as a pleasant surprise to General McColpin, a veteran ADC Commander.

THIS IS AFA

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.

Membership

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

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

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

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

Objectives

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

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El Segundo, Calif.

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Washington, D.C.

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Joseph J. Lingle
Milwaukee, Wis.

Carl J. Long
Pittsburgh, Pa.

Father Henry J. McAnulty
National Chaplain
Pittsburgh, Pa.

Howard T. Markey
Chicago, Ill.

J. B. Montgomery
Van Nuys, Calif.

Martin M. Ostrow
Beverly Hills, Calif.

Earle N. Parker
Fort Worth, Tex.

Julian B. Rosenthal
New York, N.Y.

Peter J. Schenk
Arlington, Va.

Joe L. Shosid
Fort Worth, Tex.

C. R. Smith
Washington, D.C.

Carl A. Spaatz
Chevy Chase, Md.

William W. Spruance
Wilmington, Del.

Thos. F. Stack
San Francisco, Calif.

Arthur C. Storz
Omaha, Neb.

Harold C. Stuart
Tulsa, Okla.

James M. Trail
Boise, Idaho

Nathan F. Twining
Arlington, Va.

Robert C. Vaughan
San Carlos, Calif.

Jack Withers
Los Angeles, Calif.

REGIONAL VICE PRESIDENTS

Information regarding AFA activity within a particular state may be obtained from the Vice President of the Region in which the state is located.

Walter E. Barrick, Jr.
P.O. Box 257
Danville, Va. 24541
(703) 793-1011
Central East Region
Maryland, Delaware, District of Columbia, Virginia, West Virginia, Kentucky

Paul W. Gaillard
100 S. 19th St., Rm. 1250
Omaha, Neb. 68102
(402) 344-2322
Midwest Region
Nebraska, Iowa, Missouri, Kansas

Joe F. Lusk
24 Sagamore Ave.
West Medford, Mass. 02155
(617) 483-8279
New England Region
Maine, New Hampshire, Massachusetts, Vermont, Connecticut, Rhode Island

W. M. Whitney, Jr.
708 Francis Palms Bldg.
2111 Woodward Ave.
Detroit, Mich. 48201
(313) 567-5600
Great Lakes Region
Michigan, Wisconsin, Illinois, Ohio, Indiana

Will H. Bergstrom
655 Bridge St.
Colusa, Calif. 95932
(916) 458-2179
Far West Region
California, Nevada, Arizona, Hawaii

Jesse J. Walden, Jr.
P.O. Box 748
Fort Worth, Tex. 76116
(817) PE 2-4811
Southwest Region
Oklahoma, Texas, New Mexico

Jack T. Gilstrap
10029 Camille Dr., S.E.
Huntsville, Ala. 35803
(205) 881-1907
South Central Region
Tennessee, Arkansas, Louisiana, Mississippi, Alabama

Martin H. Harris
Martin Marietta Corp.
P.O. Box 5837
Orlando, Fla. 32805
(305) 855-6100, ext. 4421
Southeast Region
North Carolina, South Carolina, Georgia, Florida

Nathan H. Mazer
5483 S. 2375 W.
Roy, Utah 84067
(801) 825-2796
Rocky Mountain Region
Colorado, Wyoming Utah

Warren B. Murphy
P.O. Box 4124
Boise, Idaho 83705
(208) 344-8146
Northwest Region
Montana, Idaho, Washington, Oregon, Alaska

Dick Palen
4440 Garrison Lane
Edina, Minn. 55424
(612) 926-0891
North Central Region
Minnesota, North Dakota, South Dakota

James W. Wright
13 Devon Lane
Williamsville, N.Y. 14221
(716) 633-8370
Northeast Region
New York, New Jersey, Pennsylvania

AFA'S BOLDEST, NEWEST

EXTRA INCOME

THREE PLANS TO CHOOSE FROM

☐ MEMBER ☐ MEMBER & SPOUSE ☐ ENTIRE FAMILY

WHAT IS AFA EXTRA INCOME HOSPITAL INSURANCE?

For every day you (or members of your family, if you have elected family coverage) are hospitalized AFA sends you money for up to 365 days . . . money you can use as you wish, without restrictions of any kind.

WHO IS ELIGIBLE?

Any United States citizen under the age of 60 who is or becomes a member of the Air Force Association is eligible to apply for AFA Extra Income Hospital Insurance for himself, his spouse, and unmarried children more than 14 days and less than 21 years of age.

HOW ARE BENEFITS PAID?

Once AFA receives verification that hospitalization has taken place, you will receive a benefit check within seven days with additional checks thereafter on a weekly basis upon AFA receiving certification of your continued hospitalization.

FIRST TIME OFFERED TO ACTIVE DUTY MILITARY PERSONNEL

HOW MUCH EXTRA INCOME DO YOU NEED? CHOOSE THE BENEFIT AMOUNT YOU REQUIRE FROM THIS FLEXIBLE GROUP PLAN!

1. You are the key to family finances. How much extra money would your family need if you were hospitalized? Check Plans A-1 and AA-1.

2. Does part of the family income depend on a working spouse? Would a cook, or maid or housekeeper be needed during a wife's hospitalization? How much would this, and other expenses cost? Check Plans A-2 and AA-2.

3. If you have a family, you should consider providing extra income for children's hospitalization. Accidents involving whole families *do* happen, especially with military families living around the world. Check Plans A-3 and AA-3.

And remember: Benefits are paid up to 365 days of hospital confinement for *each* accident or sickness for *each* insured person while the patient is under the care of a legally qualified Doctor of Medicine.

BENEFIT SCHEDULE

COST SCHEDULE

INDIVIDUAL PLAN — PLAN A-1 [Member: $20 per day]

Member's Age	Annual	Semi-Annual
Under 40	$ 29.00	$15.50
40-49	$ 37.00	$19.50
50-59	$ 53.00	$27.50
60-64	$ 76.00	$39.00

LIMITED FAMILY PLAN — PLAN A-2 [Member: $20 per day; Spouse: $15 per day]

Annual	Semi-Annual
$ 59.00	$ 30.50
$ 72.00	$ 37.00
$103.00	$ 52.50
$147.00	$ 74.50

FULL FAMILY PLAN — PLAN A-3 [Member: $20 per day; Spouse: $15 per day; Children: $10 per day]

Annual	Semi-Annual
$ 74.00	$ 38.00
$ 86.00	$ 44.00
$118.00	$ 60.00
$162.00	$ 82.00

PLAN AA-1 [Member: $40 per day]

Member's Age	Annual	Semi-Annual
Under 40	$ 54.00	$28.00
40-49	$ 68.00	$35.00
50-59	$100.00	$51.00
60-64	$147.00	$74.50

PLAN AA-2 [Member: $40 per day; Spouse: $30 per day]

Annual	Semi-Annual
$107.00	$ 54.50
$132.00	$ 67.00
$195.00	$ 98.50
$284.00	$143.00

PLAN AA-3 [Member: $40 per day; Spouse: $30 per day; Children: $20 per day]

Annual	Semi-Annual
$134.00	$ 68.00
$159.00	$ 80.50
$222.00	$112.00
$312.00	$157.00

WHY DO YOU NEED EXTRA INCOME HOSPITAL INSURANCE?

Hospital costs for Non Military Families are climbing out of sight!

In 1966, according to the American Hospital Association, average *total cost* per hospital admission was $380.39 — *up 412%* in just 20 years.

Average 1966 cost per hospital day, over an average hospitalization of 7.9 days, was $48.15 — a figure which includes only basic costs.

And costs are going higher. Other authorities estimate that average cost per hospital day may reach $100 by 1980.

Would your present hospital benefits begin to cover this cost? Do they even cover today's costs?

Military Families Can Have Severe Money Losses Caused By Hospitalization

Military families as well as civilian families can be financially hurt by the indirect expenses of hospitalization and serious illness.

Even if every cent of direct hospital cost is covered by government benefits (or hospital insurance) there may be hundreds or thousands of dollars in indirect losses. For example:

Loss of income, especially when more than one member of the family works

Extra travel expense (sometimes for long distances) for other family members

Cost of housekeeper or "sitters"

Special diets, sometimes for long periods

Expense of special home care.

AFA EXTRA INCOME HOSPITAL INSURANCE PROVIDES THIS MONEY. BENEFITS ARE PAID DIRECTLY TO YOU — AND YOU USE THIS MONEY TO BEST SUIT YOUR NEEDS.

INSURANCE PROGRAM

HOSPITAL INSURANCE

Pays CASH benefits up to $40 per hospital day for each insured person!

All AFA members — military and civilian — and their families are eligible.

OTHER BENEFITS

Protected AFA members may continue their coverage at the low, group rate to Age 65, or until they become eligible for Medicare, whichever is earlier. Hospitalization for **all** sicknesses and accidents is covered, except for a few standard exceptions listed under "Exclusions."

LIMITATIONS

Hospital confinements separated by less than three months for the same or related conditions will be considered continuations of the same confinement.

Coverage will continue through the life of the master policy unless terminated for whichever of the following reasons occurs first for the protected person: (a) attains age 65; or (b) becomes eligible for Medicare; or (c) AFA membership dues are due and unpaid; or (d) a premium payment is due and unpaid. For dependents, coverage will continue through the life of the master policy unless terminated for whichever of the following reasons occurs first: (a) such dependent ceases to be an eligible dependent; or (b) the protected person's insurance terminates hereunder; or (c) the dependent spouse either attains age 65 or becomes eligible for Medicare; or (d) any required dependent premium payment is due and unpaid.

EXCLUSIONS

The plan does not cover losses resulting from (1) declared or undeclared war or act of war; (2) service in the armed forces of a country *other than the United States;* (3) acts of intentional self destruction or attempted suicide while sane or insane; (4) pregnancy (including childbirth or resulting complications); (5) confinement in any institution primarily operated as a home for the aged or engaged in the care of drug addicts or alcoholics; (6) illnesses for which the insured has received medical treatment or advice or has taken prescribed drugs or medicines within 12 months prior to the effective date of his insurance. Coverage for such pre-existing illnesses will begin after 12 consecutive months during which he is covered under the policy and receives no such medical treatment or advice and takes no such prescribed drugs or medicine; (7) hospital confinement commencing prior to the date the protected person or eligible dependent becomes insured under this policy.

HOW TO APPLY

Fill out the attached application and mail it to AFA with your first premium payment. You may elect to pay premiums either annually or semi-annually.

APPLICATION

AFA EXTRA INCOME HOSPITAL INSURANCE

*Underwritten by **Mutual of Omaha Insurance Co.** Omaha, Nebraska*

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

DATE OF BIRTH _____ CURRENT AGE _____ HEIGHT _____ WEIGHT _____ SEX _____

PLAN OF INSURANCE

MEMBER ONLY	MEMBER & SPOUSE	MEMBER SPOUSE & CHILDREN
☐ PLAN A-1	☐ PLAN A-2	☐ PLAN A-3
☐ PLAN AA-1	☐ PLAN AA-2	☐ PLAN AA-3

METHOD OF PAYMENT ☐ Annual ☐ Semi-Annual

This insurance coverage may only be issued to AFA members. Please check the appropriate box:

☐ I am currently an AFA member.

☐ I enclose $7 for annual AFA dues (includes subscription ($6) to to AIR FORCE/SPACE DIGEST).

I enclose my initial premium in the amount of $_____ (Refer to premium table to determine correct premium amount.)

Please complete this section only if you are requesting coverage for dependents (Limited Family or Family Plan) and list only those persons for whom you are requesting coverage.

FULL NAME	RELATIONSHIP TO AFA MEMBER	SEX	DATE OF BIRTH
	WIFE (HUSBAND)		
	child		
	child		
	child		
	child		
	child		
	child		

In applying for this insurance coverage, I understand and agree that:

1. coverage shall become effective on the last day of the calendar month during which my application together with the proper premium amount is mailed to AFA.
2. only hospital confinements commencing after the effective date of insurance are covered, and
3. any condition for which I or any of my eligible dependents received medical treatment or advice or have taken prescribed drugs or medicine within twelve months prior to effective date of the insurance coverage will not be covered until the expiration of twelve consecutive months of insurance coverage without medical treatment or advice or having taken prescribed drugs or medicine for such condition.

DATE _____ SIGNATURE _____

Application must be accompanied by check or money order. Send remittance to:

INSURANCE DIVISION, AFA, 1750 PENNSYLVANIA AVE., N.W., WASHINGTON, D.C. 20006

Form 2332MGC App. 12-68

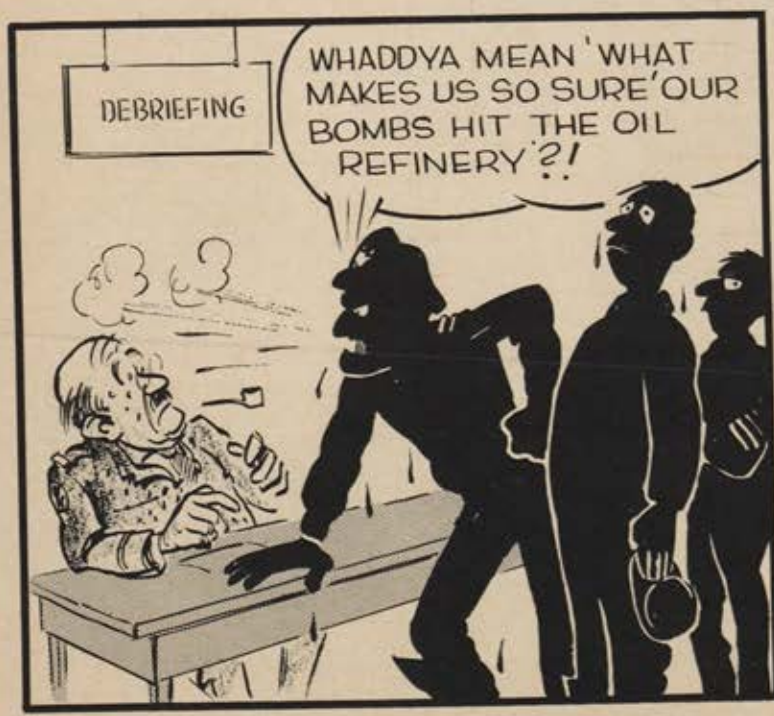
Bob Stevens'

"There I was..."

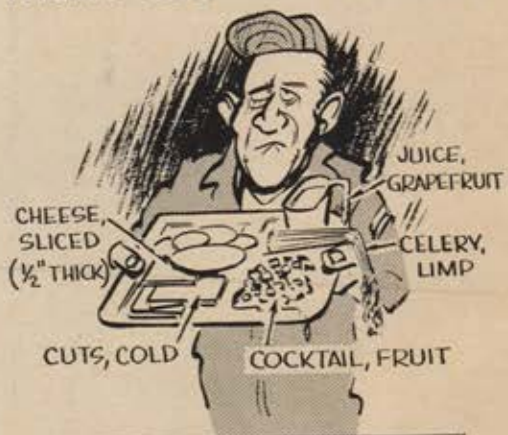
Back in the days of the old Air Force—which is to say in the 1940s and through the 1950s—sometimes there were more bad days than good. But *now*, in today's modern, streamlined, jet-propelled, worldwide USAF, things are different. Aren't they? . . .

IDEA FROM THE CONFEDERATE AIR FORCE 'DISPATCH' TEXAS

THANKS TO SMSGT J.L. MURRAY HQ PACAF APO S.F. 96553

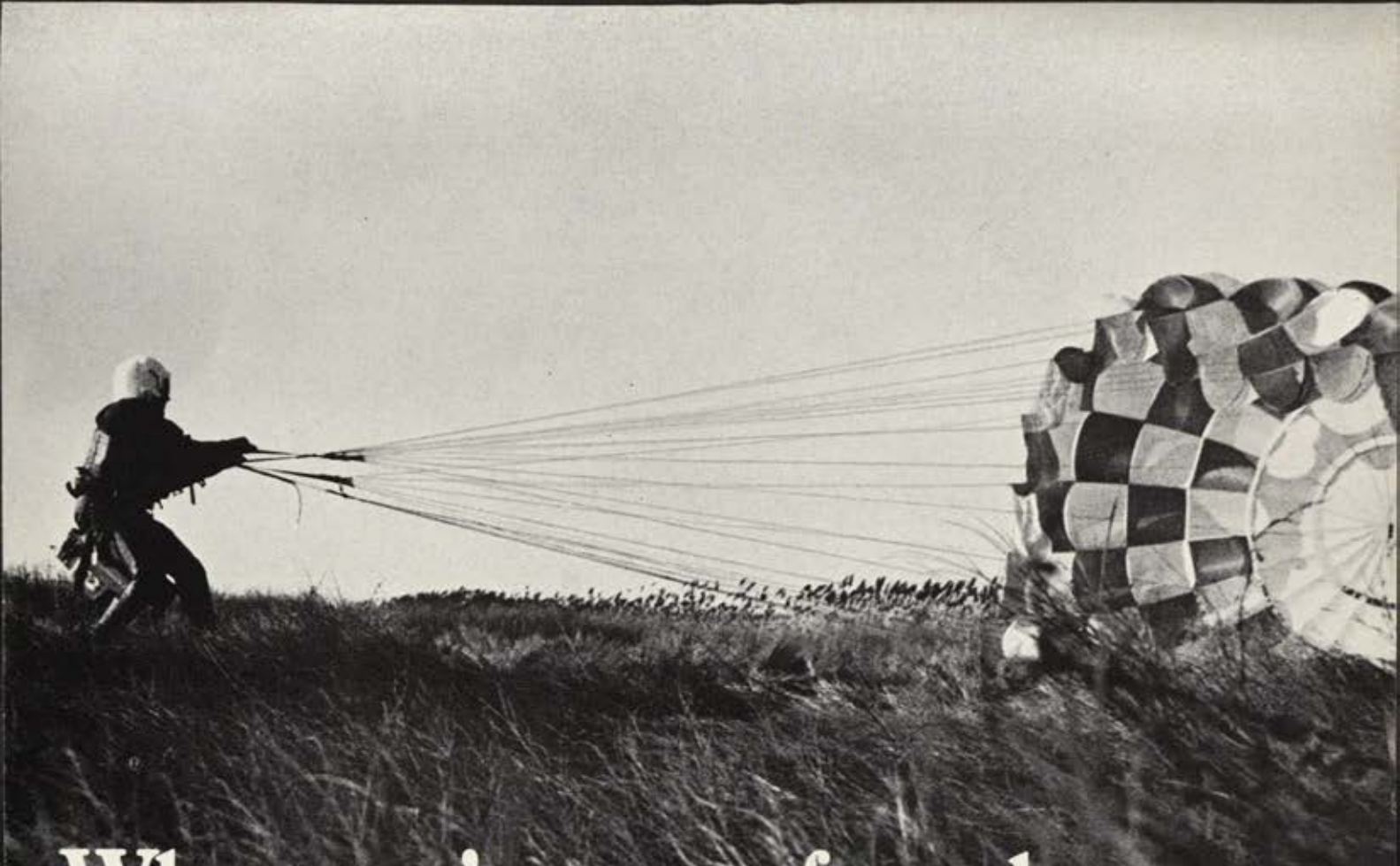


REMEMBER THOSE SUNDAY NIGHT GOURMET MEALS?



NOTE: THE 'GOONEYBIRDS' RAN INTO A COLD FRONT OVER MICHIGAN - WATCH FOR A NEW ETA...

Bob Stevens



When you're away from home, a portable radio can be a life-saver.

It can be pretty comforting to hear a friendly voice when you're lost and alone.

Especially, when you're surrounded by a lot of unfriendly voices.

So we developed a miniature dual-channel rescue transceiver that lets downed fliers tell air and sea rescue units where to find them.

It weighs only a pound and a half, measures 6.3 x 3.1 x 1.4 in., and fits neatly into the pilot's vest pocket.

Sounds simple, but it represents a real breakthrough in electronics. Anybody can make a laboratory model. And anybody can make an operational dual-channel radio that weighs ten pounds.

But only Sylvania succeeded in putting a lightweight, dual-channel radio into production. And into the field.

Here's how it works:

The transceiver either sends a homing signal on the military distress frequency, or allows the pilot to communicate directly on either of two voice channels.

To tell where he is, how he is, where the enemy is, what the terrain is like, how to get him home.

Once activated the homing signal will continue uninterrupted.

The AN/PRC-90 transceiver is extremely rugged, and has a beacon range of over 85 miles. It works on a single 6 oz. mercury battery—at altitudes up to 40,000 ft. and after immersion in 50 ft. of seawater.

We think it's quite an achievement in microcircuitry.

Airmen think it's quite an achievement in lifesaving.

Sylvania Electronic Systems, 40 Sylvan Road, Waltham, Mass. 02154.

SYLVANIA

A SUBSIDIARY OF GENERAL TELEPHONE & ELECTRONICS

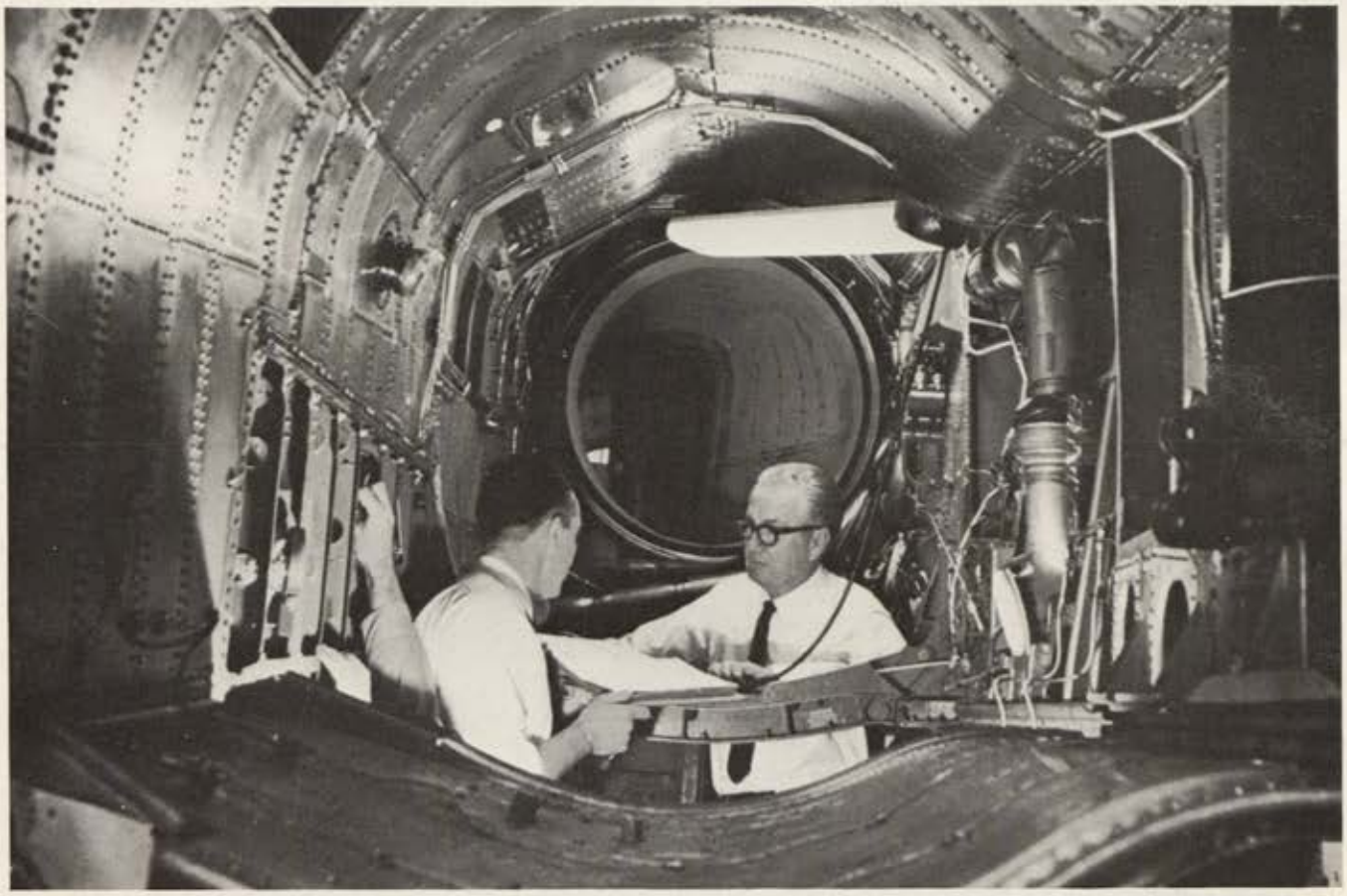


PHOTO COURTESY AMERICAN MACHINIST MAGAZINE

Next Generation Fighter: A Manufacturing Pioneer Looks Ahead

McDonnell Douglas' C. Warren Drake reviews the state-of-the-art in aerospace production and talks about what he believes possible in the years ahead.

For his trailblazing use of new methods and materials in Mercury and Gemini spacecraft and the incomparable Phantom fighter series, American Machinist Magazine selected Mr. Drake, McDonnell Douglas VP for Manufacturing, as the AM "Man of the Year" in 1967.

Q. Mr. Drake, you've been in manufacturing since you were a youth. What is the key to building advanced aircraft such as those being talked about for the 1970s?

A. Planning. We key every step to the end-product delivery date. New processes and techniques, as they are perfected, are released to designers and we begin to plan how they will be integrated into a production program. When the design comes in, we schedule every action so that every part is brought to the fabrication or assembly point at just the right time to build the aircraft "in-station". Work done too soon ties up inventory, space, and money. Work done too late means delivery delays and complex make-up work. A detailed production plan, scrupulously followed, keeps every task "in-station" where your top people can do the job.

Q. What do you see as "practical" as you look ahead toward building a new-generation aircraft?

A. We've made some great strides in fabrication of advanced materials. We've reached a point where the designer has considerable latitude in his choice between titanium and aluminum.

Considering basic cost, in-service cost, and weight-saving advantages, a high performance aircraft containing more titanium than aluminum can now be planned and built at high production rates. Last year McDonnell Douglas used more than 2 million pounds of titanium in making production airframe components. That proves to me that we can work with this material at high production rates. We're doing it now.

Q. What processes are you using today that have increased the designer's choice?

A. Foremost, I'd say, is numerical control machinery. We're constantly updating our equipment in this field, even to tying the NC machine directly to the computers on the factory floor. Part of making these processes practical is keeping the machines busy and to do that, you don't want them material-limited. We also are advancing other processes. Diffusion bonding, new coating techniques, boron composites, and thin sheet fabrication are all practical for tomorrow's aircraft.

MCDONNELL DOUGLAS