

DECEMBER 1957 / 35c

AIR FORCE

● The Magazine of AMERICAN AIRPOWER / Published by the Air Force Association

Dr. James R. Killian, science chief of staff for...



The Technological War

ALSO IN THIS ISSUE:

4,000 Miles on Soviet Airliners—We Flew Aeroflot
Republic's P-47—The Unbreakable Jug

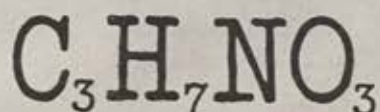


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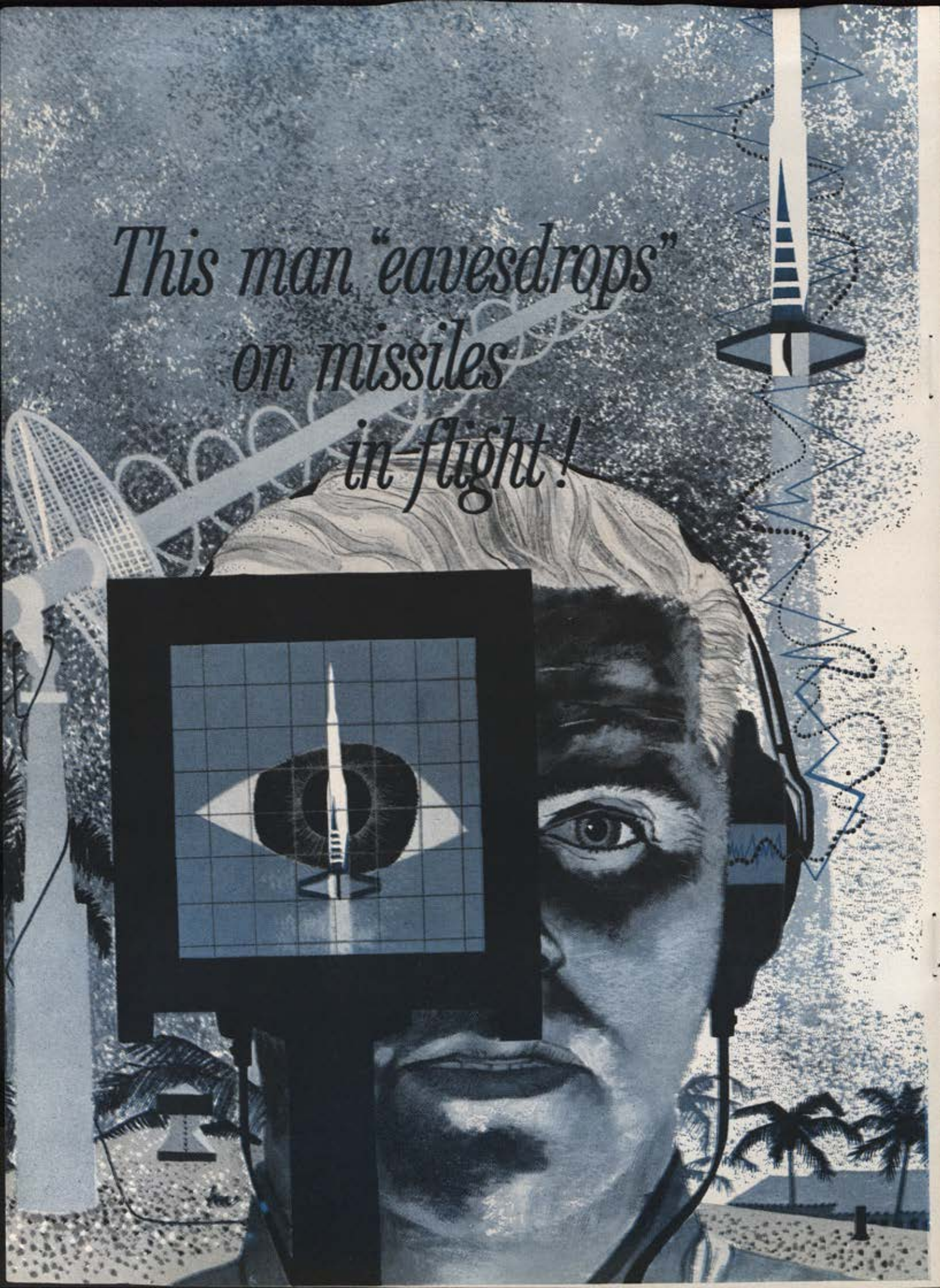
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To Advance America's Global
Position In The Race
For Air Power

*This man "eavesdrops"
on missiles
in flight!*



**Robot controls automatically broadcast
the technical data our scientists need to study the performance
of missiles flying at supersonic speeds**

Where



fits in this picture

At left you see one of a group of men who work in telemetry stations strung like beads in a line from the Florida coast far into the Atlantic.

His job—one of the world's most important. To measure with hairbreadth accuracy the performance of supersonic missiles in flight, as they slip past his position at heights beyond the vision of the human eye . . . at speeds almost beyond the comprehension of the human mind.

Every movement of the missile . . . every change of course . . . every correction of control is automatically broadcast to this man and others like him—and relayed back to a central control point where engineers and scientists wait to correlate the results and study missile performance.

This is the world of guided missiles. Not the world of tomorrow, but the world of today.

Where does AC fit in this picture?

The engineers at AC are an important part of the team, working with scientists in American universities, and officials in the ICBM, IRBM and "Air-Breathing" Missile Programs at the tremendous job of producing operational missiles.

This team consists of men in the armed forces, and some of the best-known and best-respected names in science and industry. It is a tightly knit group of missilemen, small in number, but spread from Cape Canaveral, Florida, to M.I.T. . . . and from White Sands and Holoman Air Base in New Mexico to air-frame factories from Los Angeles to Baltimore . . . and including AC's own electronics group in Milwaukee.

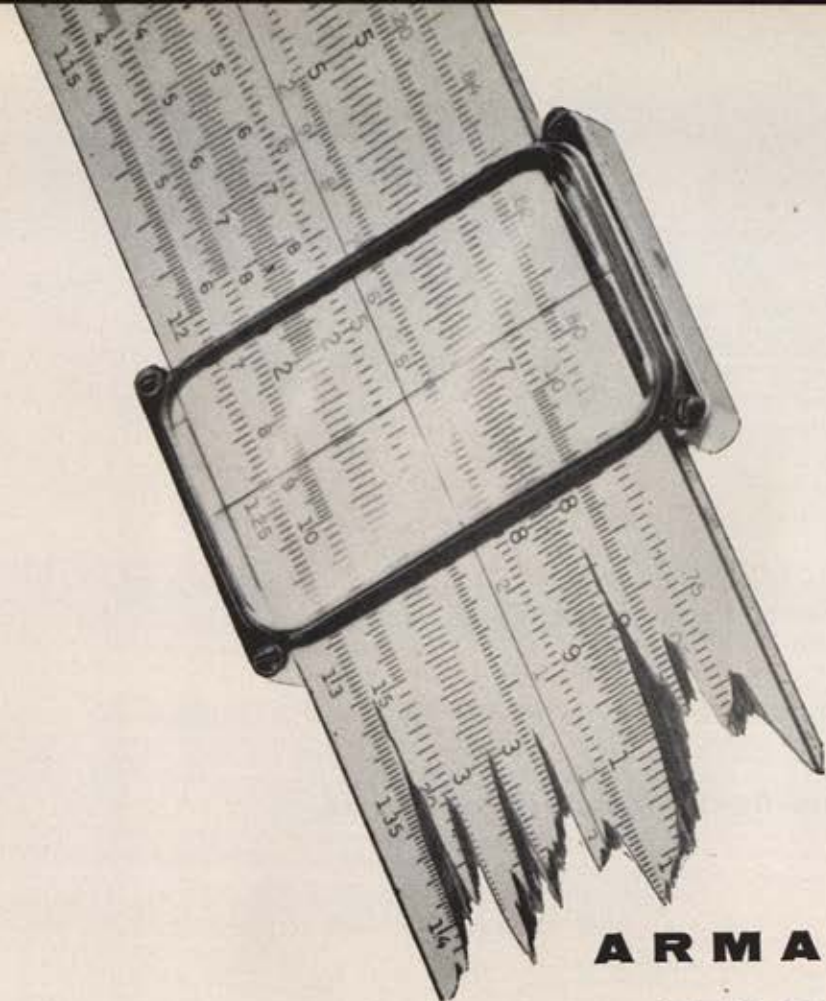
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AIR FORCE

THE MAGAZINE OF AMERICAN AIRPOWER

Volume 40, Number 12 • December 1957

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AIR FORCE Magazine • December 1957

Features

<i>Views & Comment</i>	31
<i>Organizing for the Technological War</i> A STAFF STUDY.....	41
<i>How Much Time Is Left?</i> A SPECIAL REPORT.....	50
<i>How the Soviets Run Their Missile Program</i> DR. RAYMOND L. GARTHOFF	53
<i>We Flew Aeroflot</i> RICHARD E. STOCKWELL AND BLAINE M. MILLER, JR.....	57
<i>Primer for Prestige</i> DR. T. F. STATON.....	68
<i>A Look at NACA's Lewis Laboratory</i> BOB STROBELL	74
<i>Scouts Aloft</i> NELL WOMACK EVANS	77
<i>Postgraduate Training for the Air National Guard</i> EDMUND F. HOGAN	78
<i>The Test Pilot</i> FLINT O. DU PRE	84
<i>Republic's P-47—The Unbreakable Jug</i> JIM WINCHESTER.....	100

Departments

<i>Air Mail</i>	6
<i>Index to Advertisers</i>	13
<i>Wing Tips</i>	14
<i>What's New With Red Airpower</i>	17
<i>Airpower in the News</i>	18
<i>Airman's Bookshelf</i>	23
<i>Jet Blasts</i>	64
<i>The Ready Room</i>	80
<i>Tech Talk</i>	90
<i>AFA News</i>	97
<i>This Is AFA</i>	106



air mail

A Prophecy

Gentlemen: In my article entitled "Obsolete Thinking—A Greater Danger Than Obsolete Aircraft," published in the January 1956 issue of AIR FORCE Magazine, I made the following statement:

"Our Errors Are Coming Home to Roost:

"In the face of Russia's intercontinental air capabilities, which it acquired by our default, all the errors of our strategic judgment are now coming home to roost. Our huge inventory of limited-range aircraft to implement the policy of strategic-air-offensive-via bases, and the billions of dollars spent on those aircraft and on the maintenance of their overseas bases, whether fixed or floating, may have to be written off as a total loss. Most tragic of all, as a result of these strategic miscalculations, will be the waste of time and of vast engineering and scientific effort, together with the splendid skills and technical and tactical ingenuity displayed by the Strategic Air Command.

"More money for national defense will not alone solve the problem. The whole military philosophy must be changed or we shall forever trail the rest of the world, not only in conventional aircraft, but in intercontinental ballistic missiles (ICBM) and even in man-made earth satellite development.

"We must remove the curse of the outmoded strategy of balanced forces and free the American creative genius from the confines of this fallacious concept. . . ."

In view of Russia's technological breakthrough with the man-made satellite, following so closely on the heels of their ICBM, perhaps it would be a good idea to rerun this passage in bold type, since the underlying causes of our military stagnation have not yet been removed. I respect and admire tradition. I value the importance of esprit de corps. But when these fine heritages interfere with human progress and threaten our very security, I feel that we must have the moral courage to relegate them to the nostalgic past, and to make the necessary fundamental changes in our military setup. Unless we do this, and

do it at once, I feel we are finished as a great and free people.

Alexander P. de Seversky
New York, N. Y.

Old Abbreviation, New Meaning

Gentlemen: I read with surprise in your September issue's section on staff changes that the USAF still has an Air Transport Command, the name of which I thought had long since been changed to Military Air Transport Service. Is there still an organization called Air Transport Command?

Bernard H. Kamenske
Washington, D. C.

● AIR FORCE was caught with its abbreviations down. ATC, now the abbreviation for Air Training Command, was formerly the symbol for the World War II Air Transport Command. After the war, and until after the formation of the joint command MATS (Military Air Transport Service), Air Training Command was referred to as "ATRC." The shortened abbreviation, ATC, was adopted some time later when, the Air Force felt, there would no longer be any confusion with the old Air Transport Command. There is, obviously, still some confusion, as evidenced by this magazine's use of Air Transport Command in our September issue's "Airpower in the News," for Lt. Gen. Charles T. Myers and Brig. Gen. Bertrand E. Johnson. Both references, of course, should have been to Air Training Command.—The Editors.

Where Credit Is Due

Gentlemen: I wish to point out an error of unit designation in your review of *Low Level Mission* ("Airman's Bookshelf," October 1957). You state that Colonel "Killer" Kane led the 96th Group over Ploesti. As Colonel Kane's bombardier on the Ploesti mission and as a long-time member of the 98th Bomb Group, I should like to see proper credit given where such credit is due. So please, the 98th, not the 96th.

I haven't had the pleasure of reading Mr. Wolff's book as yet but your review has made the work number one on my "must" list. Through past

experience I have found that your reviews are very often as interesting as the books themselves.

Maj. Harold F. Korger
Offutt AFB, Neb.

● You're absolutely right. Colonel Kane did lead the 98th Bomb Group over Ploesti. And thanks for the kind words about our reviews.—The Editors.

No Bloodshed, Please

Gentlemen: Regarding the caption under the pic in the upper right-hand corner of page 93 of the October issue of AIR FORCE—correction as follows is requested:

The check being presented to Mrs. Andersen is the gift of the Skokie Valley Squadron of the Illinois Wing. True, the Wing organization did present a check to the National College of Education for the support of the workshop.

Since certain members of the above-named Squadron spent the legendary blood, sweat, and tears on this project, it behooves me to request a correction, else they decide to spend some blood of persons other than their own.

It might be worth noting here that this was the first financial assistance to be given to the first Workshop for Aviation to be established in the United States.

Nicholas J. Schwall, Jr.
Secy., Illinois Wing, AFA
Forest Park, Ill.

Active Interest

Gentlemen: Although I am a charter member of "this here outfit," I must admit I have not been very active. However, those of us who have remained in the field of aeronautics and astronautics (and I'm sure there are many) often find time to reminisce as I did the other night about the close-knit organization we had some fifteen years ago—the all-out effort—teamwork—dependence—and "do-it-now" attitude.

That same evening I watched the Sputnik rocket transverse the sky. I was impressed!

To top it off, I read your timely editorial in the October issue, entitled (Continued on page 9)

**Vertol helicopter
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FM COMDR 55TH AIR RSQ SQ THULE AB GRNLD
TO VERTOL AIRCRAFT CORP MORTON PA
UNCLAS TT/VER 7-V71 PD AT 5:15 LOCAL TIME
A VERTOL H-21 HELICOPTER MANNED BY THE 55TH AIR RESCUE
SQUADRON AT THULE GREENLAND COMPLETED THE FIRST HELICOPTER
LANDING EVER MADE ON ICE ISLAND T-3...THE VERTOL H-21 WAS
ASSIGNED THE TASK OF EVACUATING TEN CIVILIAN PERSONNEL PD
THE TERRAIN ON T-3 WAS SUCH THAT WHEEL OR SKI LANDINGS WERE
IMPOSSIBLE PD HOWEVER THE VERTOL H-21 HELICOPTER
COMPLETED THE EVACUATION WITHOUT DIFFICULTY PD THIS
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U.S. ARMY PHOTOGRAPH

"When Is a Decision Not a Decision?"
The impetus of these factors has resulted in this note.

Perhaps it's time to "up periscope" and then get the team back together. Surely let's not waste time and money on a congressional investigation!

Although many such as I have been passively engaged, we are actively interested.

Charles S. Davis
Santa Barbara, Calif.

Good News

Gentlemen: I thought you might be interested in the following excerpt from a letter I received this week from Robert N. Redmayne, general manager of the Air Industries and Transport Association of Canada:

"It gives me a great deal of pleasure to notify you that your article, 'Our Busy Allies—the Canadians,' in July 1957 *Air Force Magazine* has been awarded second prize in Class 2 (Magazine Articles) of this year's Canadian Aviation Writing Awards contest.

"This award carries with it a cash prize and a certificate."

This will be my eighth citation by the judges since the inception of this national contest in 1952. (In one year I was fortunate enough to win three citations.)

The Canadian Aviation Writing Awards contest is sponsored jointly by the Air Industries and Transport Association and the Canadian Branch of the Aviation Writers Association. It is financially supported by such aviation companies as Avro Aircraft Ltd., Canadair Ltd., Rolls-Royce of Canada, and Trans-Canada Air Lines.

James Hornick
Toronto, Canada

• We're sure our readers would like to join us in hearty congratulations, Jim.—The Editors.

Pleased Reader

Gentlemen: The two features "When Is a Decision Not a Decision?" and "SAC's Saboteurs" in the October issue of our journal were most interesting and informative. Your editorials are well written, with a presentation and analysis of available facts. Never, to my knowledge, has there been a hint of the distasteful sensationalism and panic so characteristic of many aviation periodicals. It is with anticipation that I look forward to reading each new issue. Of most interest, as is probably obvious, are data concerning guided missiles.

Lee Ruetz
St. Paul, Minn.



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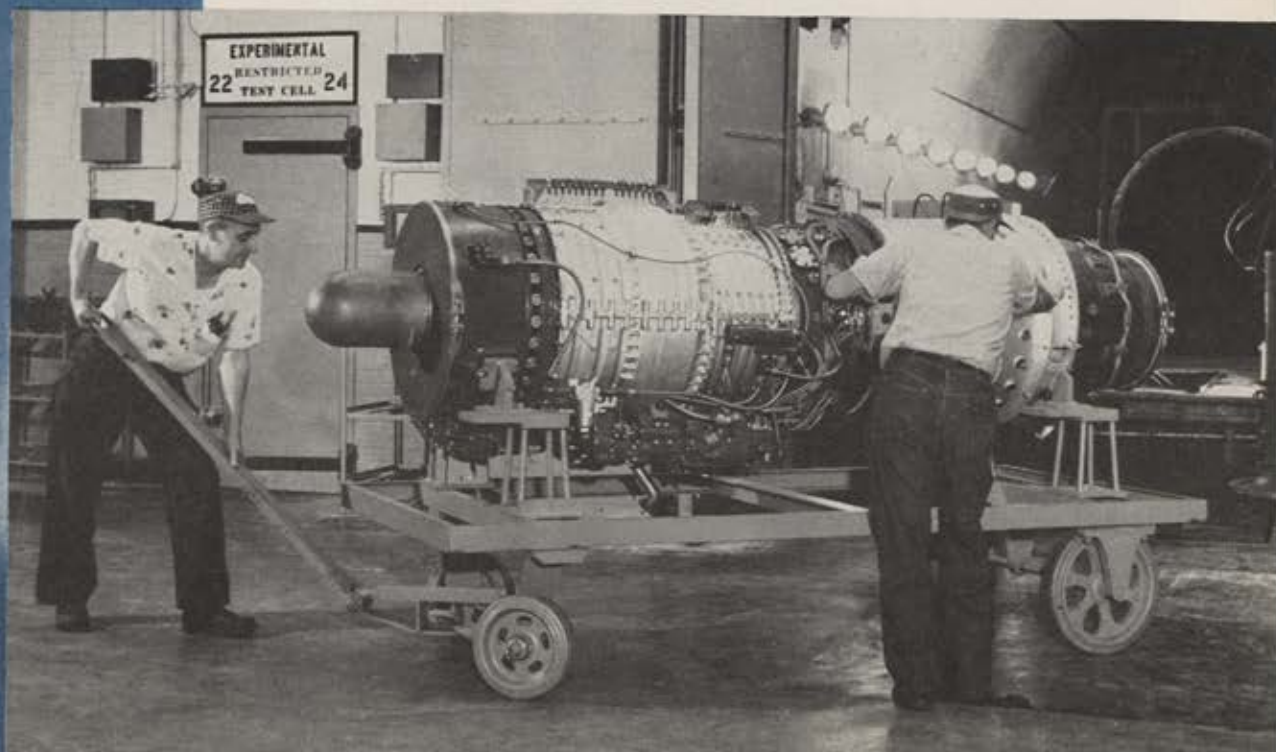
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THE SOLDIER

Much more than the H-Bomb is needed to insure our total security.

For the threat of massive retaliation is not a complete deterrent to aggression. Border incidents and "brush fire" wars cannot be handled by nuclear weapons alone.

What kind of military program, then, do we need? The consensus of top military strategists answers it this way:

We must have forces capable of meeting every aggressive threat, adaptable to the strength and skill of the aggressor and to the terrain, climate and geographical factors in the military problem involved.

This means the mobile, lightning-fast soldier of the new Pentomic Army...the man on foot with a gun in his hand, artillery behind him, and the full might of our entire arsenal readied for his support. For this man is the military policeman upon whom the keeping of the peace must always heavily depend.

Martin is a prime contractor to all branches of the military. Among the most advanced weapon systems currently being produced for the soldier is LACROSSE. As the prototype of a new family of artillery guided missiles, this important weapon is one of the basic developments of the Army's advanced Pentomic concept.

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INDEX TO ADVERTISERS

AC Electronics Div., General Motors Corp.	2 and 3
Aerojet-General Corp.	8
Aeroproducts Operations, Allison Div., General Motors Corp.	103
AiResearch Manufacturing Co., Div. Garrett Corp.	15
Allison Div., General Motors Corp.	55
Arma Div., American Bosch Arma Corp.	4
AVCO Manufacturing Corp.	40
Avro Aircraft, Ltd.	33
B&H Instrument Co., Inc.	99
Beech Aircraft Corp.	16
Bell Helicopter Corp., Inc.	49
Bendix-Pacific Div., Bendix Aviation Corp.	85
Burroughs Corp.	69
Cessna Aircraft Co.	34
Chandler-Evans, Div. of Pratt & Whitney Co., Inc.	67
Clifton Precision Products Co., Inc.	63
Continental Aviation & Engineering Corp.	88
Convair, a Div. of General Dynamics Corp.	Cover 4
Daystrom Instrument Div., Daystrom, Inc.	29
Dow Chemical Co.	28
DuKane Corp.	93
Eaton Manufacturing-Aircraft Div.	79
Firewel Co., The	9
Ford Instrument Co., Div. of Sperry Rand Corp.	82
Francis Aviation	98
General Electric Co., LMEE	51
General Precision Equipment Corp.	60 and 61
Goodyear Tire & Rubber Co., Inc.	1
Gulton Industries, Inc.	72
Haloid Co., The	27
Hamilton Standard Div., United Aircraft Corp.	Cover 2
Hayes Aircraft Corp.	89
International Telephone & Telegraph Corp.	96
Lockheed Aircraft Corp., Corlac	46 and 47
Lockheed Aircraft Corp., Gelac	94 and 95
Martin Co., The	12 and 13
Nuclear Products-ERCO Div., ACF Industries	92
Philco Corp., G&I Div.	104
Phillips Petroleum Co., Rocket Fuels Div.	52
RCA Defense Electronic Products, Radio Corp. of America	56
RCA Electron Tube Div., Radio Corp. of America	73
Radioplane Co., Subsidiary of Northrop Aircraft, Inc.	70
Raytheon Manufacturing Co.	76
Reaction Motors, Inc.	91
Ryan Aeronautical Co.	20
Saginaw Steering Gear Div., General Motors Corp.	66
Servomechanisms, Inc.	Cover 3
Sikorsky Aircraft Div., United Aircraft Corp.	65
Smith, A. O., Corp., Aeronautical Div.	30
Southwest Airmotive Co.	14
Sperry Gyroscope Co., Div. of Sperry Rand Corp.	86
Stromberg-Carlson Co.	19
Sundstrand Machine Tool Co.	24 and 25
Sylvania Electric Products, Inc.	59
Thiokol Chemical Corp., Rocket Div.	38
US Air Force	81
Vertol Aircraft Corp.	7
Westinghouse Electric Corp.	10 and 11

wing tips

By Wilfred Owen

Empty seats left by "no-show" airline passengers represent an estimated \$29 million revenue loss per year.

Trans-World Airlines has logged the first nonstop commercial polar flight from London to San Francisco. The Lockheed Jetstream covered the 5,900

miles in twenty-three hours, nineteen minutes.

Donald W. Douglas, Board Chairman of Douglas Aircraft, predicts two-hour transcontinental airline service within fifteen years. Horizontal landing, he says, will ultimately give way entirely to vertical landing.

Aircraft operating on transatlantic scheduled flights last year had seating capacity for 1,226,000 passengers. Actual number carried was 785,000.

Last year's transatlantic air parade

included 21,115 scheduled passenger flights, 1,737 all-cargo planes, and 847 chartered airline hops.

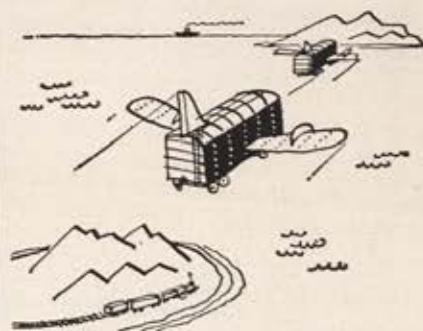
Piper Aircraft Corporation has produced its 45,000th plane.

Air cargo ton-miles in the first half of 1957 were up twenty-six percent from the first half of 1956, and 1956 was twenty-one percent above 1955.

Flying Tiger Line has inaugurated new transcontinental all-cargo service using Lockheed Super H Constellations that have more than twice the cubic capacity of a forty-foot railroad boxcar. Six of these planes will fly 129 tons of freight from coast to coast each day.

Riddle Airlines recently filled the gap in Puerto Rico transport when a strike tied up shipping services. It added 213 extra sections to its cargo plane service during one month.

The government railroad system of New Zealand, serving both the north and south islands that make up that country, is overcoming the water bar-



rier by air. Regular shuttle runs are made over a seventy-two-mile route through a contract with an air cargo line that once flew sixty railroad cars from one island to the other.

Lockheed's commercial version of the C-130 will be able to carry 45,000 pounds of freight 1,750 miles nonstop. The turboprop Hercules will be priced at about \$2 million, but operating costs are expected to be below six cents per ton-mile.

Oil workers in Louisiana commute by helicopter to their jobs at oil rigs fifty miles offshore in the Gulf of Mexico. One offshore helicopter operator flew 80,000 passengers in 1956 and estimates this year's passenger volume at 150,000.

The domestic scheduled airlines of the United States burn up 79,000 gallons of gasoline and oil every hour.

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What's New With



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Here's a summary of the latest available information on Soviet air intelligence. Because of the nature of this material, we are not able to disclose our sources, nor document the information beyond assurance that the sources are trustworthy.

Here's how the Commander in Chief of the Soviet Air Forces, Air Marshal K. A. Vershinin, views the ICBM, according to official Russian sources:

"Great distances no longer play a decisive role in the era of rocket technology and atomic energy. What was inaccessible before has become quite accessible now. The modern means of air attack, the tremendous speeds and vast ranges of operation, make it possible to strike military targets at any point of the globe. The means of transporting the most formidable weapons, the hydrogen bombs, are now such that they can be dispatched to the remotest areas of any continent of the world with the aid of intercontinental ballistic missiles."

The Russians say they have found, as a result of their ICBM test-firings, that the ballistic missile apparently is more accurate than expected. They attribute this to the fact that during most of its long trip it is in relatively airless space, where there is nothing to push it off course. Therefore, say the Russians, it is more accurate than artillery—for the shells from the latter arrive at their target in the lower regions of the atmosphere and are pushed off course by air currents, etc.

The Soviets confidently say they can put ballistic missiles into areas that are ten to twenty kilometers (six to twelve miles) from the target—close enough if the missiles are equipped with nuclear warheads.

Despite their progress with missiles, the Russians still look to aviation for some of their heroes. A few weeks ago the highest award of the land, the Order of Lenin, went to fifteen different Russian test pilots who are said to have carried out dangerous work for the good of the state. What they had done was not identified beyond "work in testing modern jet planes."

More information is available on the engines in the new Soviet transports. Both the *Ukraina* and the *Moskva* are powered by turboprops credited to General Designer N. D. Kuznetsov, who was in charge of all turboprop work at the big Kuibyshev engine plant, at least up until a few years ago, and possibly is still there.

However, the somewhat larger *Ukraina* (126 seats for tourist version, compared to 100 for the *Moskva*) will get engines done by Chief Designer Ivchenko when it goes into production. These evidently will be somewhat more advanced engines than the 4,000 eshp the Soviets now claim for the engine in the *Moskva*. Perhaps they will be up to the 5,100 eshp claimed for the engines in the *Ukraina* when it was first displayed. Evidently the Soviet announcement indicated the power output of the production model's engines, and not the powerplants in the prototype.

By the time this column appears the Soviets probably will have announced their next new transport. A design credited to Tupolev, it is a 170-180 passenger turboprop with a top speed of 630 mph. Called the *Rossia*, it is to be a true intercontinental airplane, able to fly non-stop

from Moscow to Peiping or Vladivostok. It will be powered by Kuznetsov turboprops, but perhaps these will be the large 12,500 eshp engines also credited to him and which already power the bomber, Bear.

Incidental Info: The Soviet fighter pilot who won the trophy in air gunnery in the Soviet Union this year received a motorcycle as a special gift for his achievement.

Russians have not limited themselves to ballistic missiles. They also admit in some of their own aviation publications that they have subsonic or low-supersonic mis-



Sovfoto

Soviet designer O. K. Antonov's new twin-engine light-plane "Little Bee" can carry six passengers at 125-145 mph, and is said to be able to land on fields or roads "wherever there is an open space sixty yards long." The plane can also carry light cargo or be used in air rescue.

siles, powered with turbojets, and which may be controlled from the air or the ground. Range is relatively limited, however.

A missile control system the Reds are talking about is the use of a television camera in the nose of the missile. It transmits a picture back to the control station, which then directs the missile toward its target by radio. Whether this has yet been made practical or not, the Soviets do not indicate, but they do discuss it seriously as one method of control.

We've recounted in this column on other occasions how the Soviets are going through a period of trying to decide whether or not Mozhaisky was a hero. He is the Czarist naval officer who is supposed to have flown an airplane in 1882, some twenty-one years before the Wright brothers.

Until last year the official Russian line was that Mozhaisky was a hero. Then some Soviet aviators and others in Russia began to cast doubt upon his very existence.

However, in recent months, the Russians have pulled themselves together and the new line is the old line: Mozhaisky to the fore. All those who criticized before, and many more who were considered laggard in not advancing his cause, have recanted. Officially, Mozhaisky is the world's first man to fly in heavier-than-air craft—Soviet style.

Officially, the Soviets say they were early in lighter-than-air craft, too. The date they claim for the first hot-air balloonist in Russia is 1731.—END

■ Closest thing yet to an American science chief of staff, the new Special Assistant to President Eisenhower for Science and Technology, Dr. James Rhyne Killian, is a veteran of government service, having taken time off from his duties as president of Massachusetts Institute of Technology several times in recent years to advise on technical and defense matters.

Fifty-three years old and the first MIT graduate to head that institution, Dr. Killian has often called for higher national stress on the training of critically needed technical manpower. Toward that end, he last year urged that the approximately \$60 million spent annually on scholarships in this country be increased by fifty percent, even if government funds had to be used to raise the needed sums.

A native of Blacksburg, S.C., Dr. Killian attended Duke University, from which he transferred to MIT in 1923, where he has worked ever since that time. At MIT, he rose to the assistant managing editorship of MIT's *Technology*



Sovfoto

Reds claim their new TU-114, four-engine turboprop, is largest plane in world. Craft is now in Aeroflot fleet.

Review, from which post he became executive assistant to then MIT president Karl T. Compton. In 1939, he helped Dr. Compton organize MIT for its World War II technical development program. He became executive vice president of MIT in 1943 and vice president in 1945, and succeeded Dr. Compton as president in 1949.

■ Largest passenger aircraft in the world? On the heels of their ICBM and Sputnik announcements, the Soviets are now claiming leadership in the civil transport field with their new four-propjet TU-114 (see cut), described as capable of carrying 220 persons on flights of from 800 to 900 miles and 170 passengers on longer flights, with an additional claim of ability to transport 120 persons from Moscow to New York City in from ten to twelve hours. The Soviet announcement said the TU-114 had two elevators, its own telephone system, and a restaurant accommodating forty-eight persons. For a comprehensive look at the USSR's Aeroflot system, see "We Flew Aeroflot," beginning on page 57.

■ Airmen may soon be using "lipstick," but not for their looks, in the near future. The unusual new development unveiled at the recent meeting of the Association of Military Surgeons in Washington was a lipstick-type food dispenser, designed to feed pressure-suited pilots flying the new Century series aircraft.

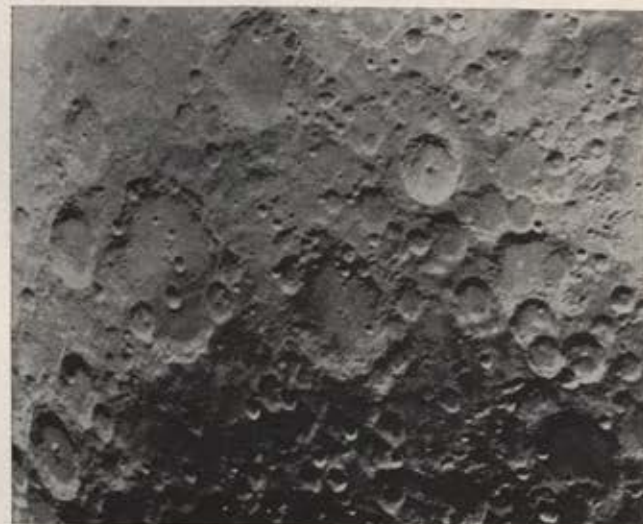
The dispensers, containing dehydrated foods, will fit onto the front of the pilot's pressure helmet, and a screw device similar to that on a woman's lipstick will enable the

pilot to push the food into his mouth. Already under development for the air age ingestion system are packets of chicken, beef, and turkey.

■ Bear fanciers need have no fear about the fate of four black ursines purchased recently by the Air Force for use at the Aeromedical Laboratory at Holloman AFB, N.M. The Air Force hastened to state publicly that it had no intention of using the bears as passengers in future US space satellite programs. The bears were purchased from a game farm in Catskill, N.Y., and were given medical checks before aerial delivery to Holloman.

■ The "fastest man in the world"—USAF Col. John P. Stapp, Chief of the Aeromedical Laboratory—says that US research had proved humans could survive a trip to the moon and work efficiently there for short periods before making the return trip. Colonel Stapp's view is that with existing equipment and know-how, a scientist could be fully protected during the lunar voyage and could tolerate a ten-hour stopover and the return trip.

The aeromedical chief acknowledged that the Soviets are obviously ahead of us in vehicular development, in view of the Sputnik launchings, but said that the US is well ahead on the human factors. He revealed that a complete table of human tolerances for moon flights had been worked out at Holloman, and that indications showed that if properly retrained a man should be able to take a



USAF ROTI's-eye view of the moon. Picture was shot by new optical system used for missile flight photography.

force of thirty Gs for two-tenths of a second or less. This force, he said, is much more than a man would have to stand in space flight.

In the wake of Colonel Stapp's statements, the USAF has already at least one volunteer for the first US trip to outer space. He's Maj. David G. Simons, who recently set a world's altitude record with his 102,000-foot-high balloon flight.

■ The 321st Bomb Wing, based at Pinecastle AFB, Fla., won the coveted Fairchild Trophy in last month's SAC bombing, navigation, and reconnaissance "world's series"

(Continued on page 21)



World's newest and fastest

Time: 9 December, 1957.

Occasion: the Eastern Joint Computer Conference in Washington.

Event: a major breakthrough of speed, quality, flexibility and cost reduction in the field of data processing and transfer.

Featured: the new device pictured above.

Known as the "Stromberg-Carlson Model 5000 High-Speed Electronic Printer," this equipment combines CHARACTERON® computer read-out tube, made by Stromberg-Carlson, and XEROX® COPYFLO® electronic printer, made by Haloid. Together, they translate stored electronic information into visual material—at 5 to 10 times the volume output of mechanical printers representing the same investment.

In operation, the CHARACTERON shaped-beam tube reads out and displays on its face the output of any data processing equipment—at speeds up to 10,000

characters a second. Acting electrostatically and with dry materials, these displays sensitize the surface of a selenium drum in the XEROX COPYFLO printer. The data are then transferred to a roll of paper, vellum or multilith master and come off the printing machine at the rate of 5,400 pages an hour!

Besides speed, many other advantages are inherent in the system. There is no intermediate processing, as with engraving or letterpress—*lower cost per page!* Manufacture of the "Model 5000" utilizes printed circuitry and transistors—*dependability!* Texts, graphs and business forms can be combined—*flexibility!* And computers whose idle time may be valued at as much as \$300 an hour can be "emptied" in just minutes—*efficiency!*

We are confident that this system is the answer to hundreds of electronic data processing output problems, military and commercial. Inquiries should be addressed to Stromberg-Carlson, San Diego, Calif.

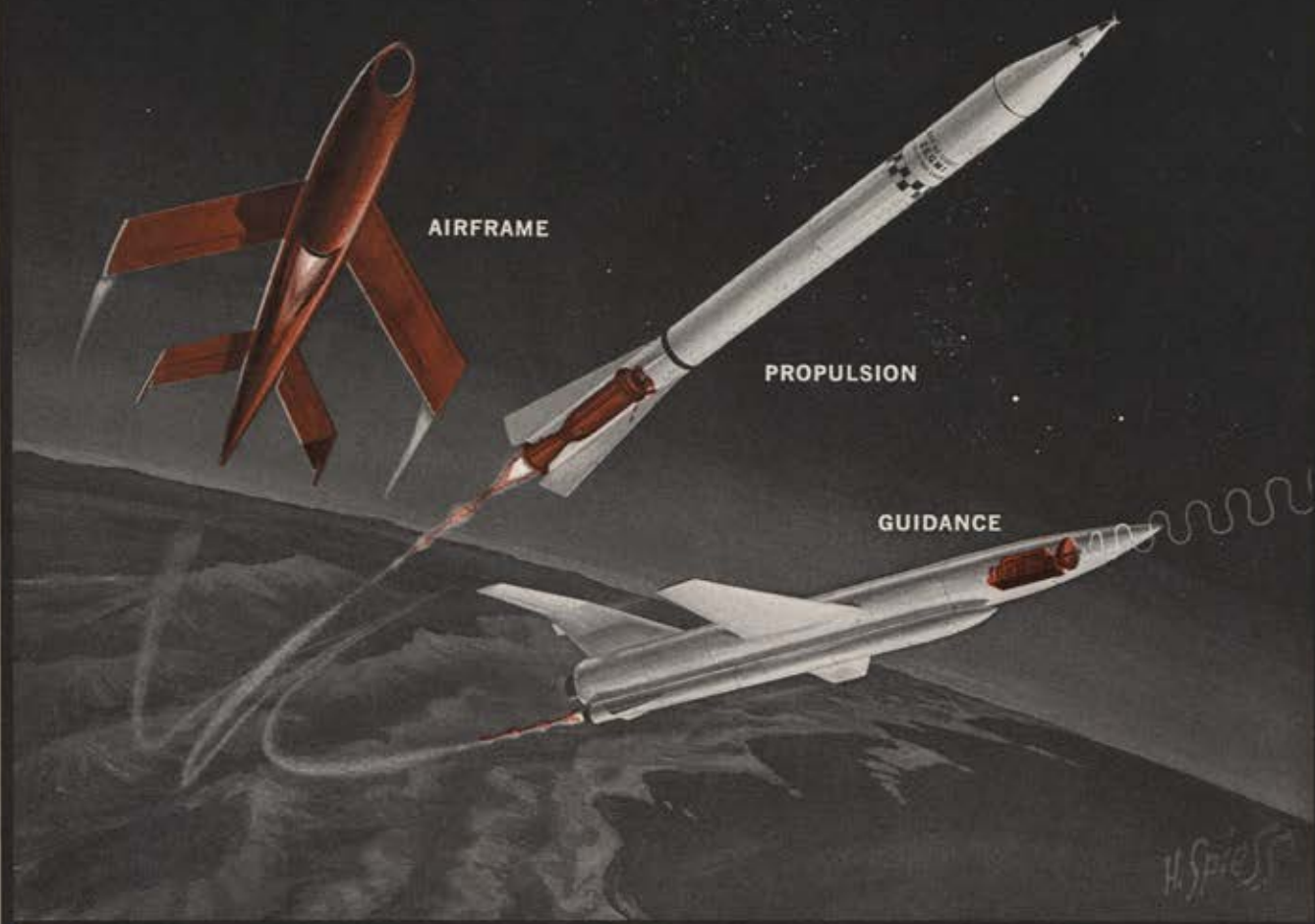


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held at Pinecastle. The championship crews were commanded by Lt. Col. William F. Zimmerman and Capt. Clyde W. Armstrong.

The 321st, flying from its home field, scored 1,744 points to win the trophy with the best combined bombing and navigation scores. The wing flies Boeing B-47 Stratojets. A total of ninety crews—the best in SAC and the RAF, which flew Vickers Valiants and Avro Vulcans—participated in the rugged six-day competition. Each participating crew flew a 3,200-mile course three times, attacking pinpoint targets in St. Louis, Mo., Kansas City, Mo., and Atlanta, Ga. All crews flew a 1,100-mile leg by celestial navigation alone.

Sixty-six of the ninety crews taking part flew B-47s or RB-47s; ten flew RAF Vulcans, and two flew Valiants. Crews could score a total of 1,000 points, 750 by bombing and 250 by navigation, and each wing could score a possible 2,000 points. Participants, flying at about eight miles a minute, bombed from 35,000 feet.

■ USAF has announced that retraining opportunities will be offered to eligible airmen whose units are scheduled for inactivation. The program calls for allowing airmen to volunteer for retraining into Air Force careers offering greater upgrading, promotion, and supervisory opportunities. The retraining would be accomplished under the Air Force's 5 and 7 skill level retraining program, and as volunteers, the airmen would indicate their first three choices of formal technical schools.

Arrangements, the Air Force says, will be made with the Technical Training Command for the priority entry of the volunteers into formal technical courses as soon as they become available for school assignments. To facilitate the program, commanders of units scheduled for inactivation have been directed to report to Headquarters USAF their eligible surplus airmen who do not volunteer for retraining with recommendations for technical courses the non-volunteers would be qualified for under the 5 and 7 skill levels.

■ The second Wright Memorial Lecture, commemorating the first flights by the Wright Brothers on December 17, 1903, is scheduled to be delivered this year at the Air Force Academy by USAF Chief of Staff Gen. Thomas D. White. The lecture, given as close as possible to the anniversary date, is scheduled tentatively for December 14. Last year's address was given by Gen. Nathan F. Twining.

■ Rodeoactivity in Libya. . . . Libyan neighbors of Wheelus AB, Tripoli, were scheduled to get their first look at America's "Wild West," November 30-December 1, as the Seventeenth Air Force and the air base planned an old-fashioned Texas Rodeo with more than 100 airman cowboys doing their riding, bucking, and racing stuff at a special temporary arena built through the cooperation of Tripolitan authorities. Also on the agenda was a display by a crack team of the Libyan Mounted Police and the unique feature of US airmen trying their bronc-busting luck on wild camels.

■ Ten years of Project Blue Book. . . . After a decade of study, the Air Force has announced that it has found no evidence to confirm the existence of so-called flying saucers. The Air Force announcement said approximately 5,700 reports had been received on unidentified flying objects (UFOs) in the past ten years, and that, although not every UFO report had been completely explained, its investigators believed that with more detailed objective ob-

servational data, unexplained reports could have been disposed of, too.

■ Argentina's Aviation Week last month featured a goodwill visit by USAF B-52 and B-47 jet bombers and the new Boeing KC-135 jet tanker, plus ground displays of the new Boeing IM-99 Bomarc missile—just ordered into production—as well as C-119, C-124, C-130, and F-100 aircraft. On hand too for the show was the Air Force's famed Thunderbirds flying team with a demonstration of formation flying in their F-100 fighters.

■ STAFF CHANGES. . . . Brig. Gen. John W. Carpenter, III, until recently Chief, Plans and Programming Office, Hq. ARDC, Baltimore, has assumed duties as Assistant Vice Commander, ARDC, with additional duties as Director of Plans and Programming there. . . . Maj. Gen. Donald R. Hutchinson is now Assistant for Mutual Security at Office, DCS/M, Hq. USAF. He had been serving as Deputy Assistant. . . . Brig. Gen. Sidney F. Giffin, formerly Vice Commandant, Air War College, Air University, Maxwell AFB, Ala., has assumed his new assignment with OSD as Director, Office of Armed Forces Information and Education, at Central Control Group, Hq. USAF. . . . Brig. Gen. Albert P. Clark, formerly Chief of Staff, USAFE, is now Commander, Second Air Division, USAFE, and Chief, US Military Training Mission, Saudi Arabia, with additional duty as Department of Defense Representative, Saudi Arabia, for Technical Discussions. . . . Brig. Gen. Dale O. Smith, who had held General Clark's new post, is now assigned to Hq. 313th Air Division, Pacific AF, as Commander, 313th Air Division, Fifth AF. . . . Brig. Gen. Felix L. Vidal, formerly Special Assistant for AFRes at Hq. CONAC, is now assigned to Office, ACoS for Reserve Forces. . . . Brig. Gen. Frederick E. Calhoun, who was serving as Deputy Commandant, Industrial College of the Armed Forces, has assumed his new post as Vice Commandant, Air War College, Air University, Maxwell AFB, Ala.

Maj. Gen. George W. Mundy succeeds General Calhoun in his post at the Industrial College. He had served as Commander, Second AF, Barksdale AFB, La. . . . Maj. Gen. John P. McConnell, who had been assigned as Director of Plans, Hq. SAC, Offutt AFB, Neb., succeeds General Mundy as Commander, Second AF. . . . Brig. Gen. Charles B. Westover, until recently Commander, 819th Air Division, succeeds General McConnell as Director of Plans, Hq. SAC. . . . Maj. Gen. John H. Ives, formerly CofS, CONAC, is now assigned as Commander, First AF, Mitchel AFB, N.Y. . . . Maj. Gen. Thomas R. Rampy, who had been a patient at Walter Reed Army Medical Center, is now assigned to the Office of the Comptroller of the AF for duty as directed by the Comptroller.

Retired. . . . Maj. Gen. Earl W. Barnes, Hq. USAF, effective September 30, advanced to grade of lieutenant general. . . . Maj. Gen. Roger J. Browne, Commander, First AF, Mitchel AFB, N.Y., effective October 31, in grade of major general. . . . Brig. Gen. Woodbury M. Burgess, in grade of brigadier general, effective September 30. . . . Brig. Gen. William P. Nuckols, in grade of brigadier general, effective November 15. . . . Maj. Gen. Julius K. Lacey, in grade of major general, effective October 31. . . . Brig. Gen. Robert L. Scott, Jr., in grade of colonel, effective October 31, and advanced to grade of brigadier general. . . . Maj. Gen. Albert Boyd, in grade of major general, effective October 31. . . . Maj. Gen. James H. Davies, in grade of colonel, effective October 31, advanced to grade of major general.

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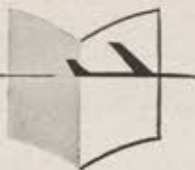
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AIR FORCE Magazine • December 1957



airman's bookshelf

Once upon a time in England "believing made it so"—photographic evidence notwithstanding.

The day was March 20, 1940, six months after World War II began. The previous night RAF's Bomber Command had attacked its first target on German soil—the island of Sylt, believed to be the main base for Nazi mine-laying aircraft.

The attack was mounted at a time when British fortunes were at very low ebb, and as the bombs tumbled from the forty-nine Wellingtons, Whiteleys, and Hampdens participating, an elated Prime Minister Chamberlain announced to a cheering midnight session of Commons that the enemy stronghold on Sylt was at that very moment being obliterated. The next morning English newspapers carried banner headlines of the "devastating blow!"

With the British public gloating and Bomber Command filled with incredulous elation, it was up to Squadron Leader Peter Riddell and his small team of RAF photo-intelligence experts to produce the irrefutable proof.

Camera-laden Blenheims left at dawn for Sylt. All eyes were on Riddell, scheduled to deliver the proof immediately to the government, a clamoring press, and, no less, Buckingham Palace itself. The Blenheims returned, the film was feverishly processed and scanned with a sinking feeling. Everything on Sylt was "horribly intact."

Only half a dozen bomb craters dotted the dunes nearby. There was one hit, a "tiny hole in the roof of one of the hangars. . . ." British officialdom reacted with disbelief, and there followed a terse announcement that "the photographs taken have proved to be of no value in indicating the extent of the material damage. . . ."

England needed and enjoyed its "Sylt." America had its "Tokyo" several years later, with the carrier-launched Doolittle raid by a handful of B-25s.

Air Spy, by Constance Babington-Smith (Harpers, \$4)—the exciting behind-the-scenes story of the role of photo intelligence in the winning of World War II—tells this tale and scores like it, pointing up the vital significance of aerial reconnaissance in the planning and execution of military operations and its special importance in providing realistic knowledge of the enemy's day-to-day situation.

When World War II began, in Poland, British photo air intelligence was a military stepchild. It did not come into its own until men like Australian-born Sidney Cotton, pre-war color-film businessman, together with RAF pioneer photo interpreters and recon pilots Michael Spender, Peter Riddell, Geoffrey Tuttle, and Fred Wintherbotham made their contributions. The author was on the original team—the 1st Photo Reconnaissance Unit (PRU).

The magnificent job PRU did tracking Hitler's planned invasion of Britain as it took shape on the French coast, reporting ship concentrations, pinpointing massing of troops, etc., and then giving the all-clear signal when aerial photos indicated the "grand plan" had folded, gave the infant PRU the stature it sorely needed in its struggle for adequate quarters, equipment, personnel, and official recognition.

Soon PRU added other laurels to its record—daily reports on the German warships *Bismarck*, *Prinz Eugen*, *Scharnhorst*, and *Gneisenau*, pre- and post-strike target evaluation, cross-channel German ground force movements, Luftwaffe dispersal, strength, and unit shifts from airfield to airfield—information of incalculable value to Britain.

Meanwhile, the basic principles of air intelligence and photo interpretation evolved and the three-stage interpretation cycle, used with high success throughout the war, emerged. Interpreters, working in bombed-out quarters, frequently had to hold umbrellas over their desks to keep photos dry. Training courses were organized, new personnel brought in.

As the war expanded, new units were organized and new equipment (Stirlings, Beaufighters, Mosquitoes, and Spitfires) gave extended range and speed to the "eyes" of the British and Allied forces.

As demands for aerial photos increased, PRU pilots reached out from Britain over all northern Europe. A second PRU, established in the Mediterranean, operated out of Malta and flew over Italy, southern Europe, and even Russia and helped pave the way for destruction of the Italian fleet and the successful air operations in those areas.

While *Air Spy* is primarily the story of British photo reconnaissance, it does trace the origins and operations

of USAAF and Navy photo reconnaissance in the European and Mediterranean Theaters. As early as the spring and summer of 1941, US Army and Navy officers were arriving in England to study British techniques and photo operations. American officers like Capt. (now Col.) Harvey Brown of the AAF and Lt. Cmdr. (now Capt.) Robert S. Quackenbush, Jr., USN, returned to America to organize US photo intelligence in their branches. Other outstanding contributors included Col. Karl Polifka, Col. Leon Gray, Col. Elliott Roosevelt, Maj. James G. Hall, among many others.

British and American photo reconnaissance hit its peak during the combined Allied bomber offensive. Reconnaissance planes ranged far and wide over *Festung Europa*, usually alone and unarmed, to provide American combat air and ground planning staffs with priceless information. Regensburg, Schweinfurt, Ploesti, and Berlin are but a few of the historic places panned by the cameras of unarmed recon pilots to produce the celluloid evidence from which plans, tactics, and strategies evolved. No place was immune from scrutiny, and PR interpreters were credited with discovering underground factories, calculating production rates of German industry, providing target information, and exposing the enemy's most intimate secrets. The story of these recon missions, their failures, and their successes, is dramatically recounted.

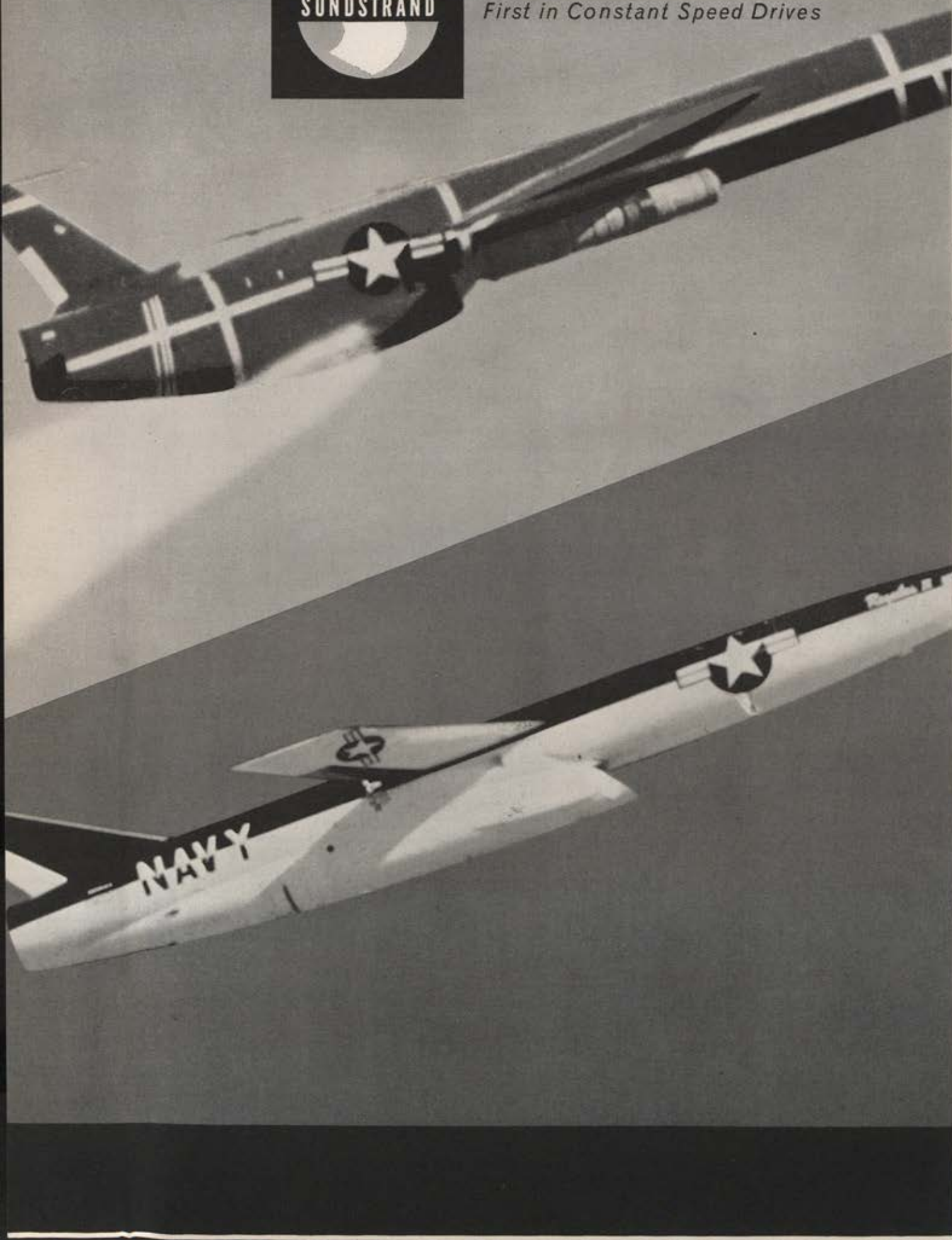
The most interesting chapter details the reconnaissance on German V-weapons and launching sites. Intelligence began collecting data as early as May 1942 on "strange ring-like things" appearing on aerial photos taken by mistake of Peenemünde. By spring of 1943, curious installations began appearing along the French channel coast. How the whole pattern was pieced together, the V-1 and V-2 with their launching sites discovered and systematically eliminated in bold air strikes, makes exciting reading.

The author, a former flight officer in the British WAAF, became one of the leading photo-intelligence interpreters of World War II. Specializing in "airfield and aircraft," she was responsible for discovering the V-2 sites. After V-E Day she was assigned to the USAAF, and later received the Legion of Merit for her work on Pacific Theater photo interpretation—the

(Continued on page 26)



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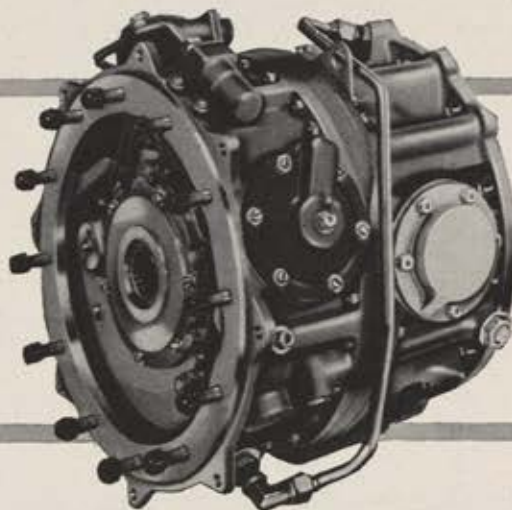
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Air Spy is her story—not a definitive treatment of photo air intelligence, but an engrossing story told as she saw it develop from the beginning. Her manuscript is somewhat limited because of security classifications which still becloud even fifteen-year-old official RAF and USAF World War II documents. Her style is crisp, descriptive, and meaningful, and the personal human angle woven into the narrative makes *Air Spy* delightful and interesting reading.

German Gen. Werner von Fritsch once said, "The side with the best photographic reconnaissance will win the war." When German air recon operations were analyzed after V-E Day, many photo experts knew the why of Nazi strategic and tactical blunders. And they marveled how the Wehrmacht lasted as long as it did.

On September 5, 1940, handsome Oberleutenant Franz von Werra, crack Luftwaffe fighter pilot of 2 Gruppe, Third Fighter Geschwader (based on the Pas de Calais), pancaked his damaged ME-109 in the British countryside near Winchet Hill. The daring German baron and Battle of Britain ace crawled from the cockpit, burned his personal papers, and surrendered to British Home Guards with a courteous click of the heels. He was taken to the London District Prisoner-of-War Cage in Kensington Palace Gardens for interrogation.

Thus began one of the truly bizarre adventures of World War II. The drama ended nineteen months later, on April 18, 1941, with von Werra stepping from an airliner in Berlin after a flight from Rio de Janeiro. By then the dapper pilot had become a

national hero and one of the shrewdest and most widely publicized escape artists of the war. His story is dramatically narrated by Kendal Burt and James Leasor in *The One That Got Away* (Random House, \$3.95).

No German POW escapee succeeded in returning to Germany from the British Isles, but three were known to have made it back to the Fatherland from Canadian camps. Franz von Werra was one of the three.

Before his transfer to Canada, he had escaped from two camps in England, but had been recaptured each time.

This third try occurred in Canada in January 1941 and was successful. Von Werra, en route to a POW compound in the western provinces, plunged through an open window of his speeding train near Smith Falls, outside Montreal. Groping his way through open country he crossed the partially frozen St. Lawrence River under darkness, pushing a small skiff ahead of him for use in navigating the ice-free shipping channel near the American shore. He landed in the vicinity of Ogdensburg, N. Y., and haughtily surrendered to the "neutral USA," invoking the Geneva Convention to a dazzled band of city policemen.

From Ogdensburg, he made his way to Rio de Janeiro—after a period of gay New York City night life and numerous appearances in Washington, D. C. He finally turned up again in Germany after slipping out of the U.S.

The oberleutenant returned to combat on the Russian front in the summer of 1941 and downed eight more Russian aircraft, upping his total to twenty-one. In September he transferred to Holland and on October 25 he crashed into the sea on a coastal patrol mission.

At the time of his death, von Werra had completed a book-length manuscript of his adventure. The German Air Force prohibited its publication for the duration on grounds of security. British authors Burt and Leasor obtained the manuscript from Frau von Werra after the war and painstakingly documented all the facts against official British records and personal interviews with people mentioned in the von Werra account. *The One That Got Away* is the result—an authentic tale of high adventure filled with escape techniques that every combat pilot should be familiar with.

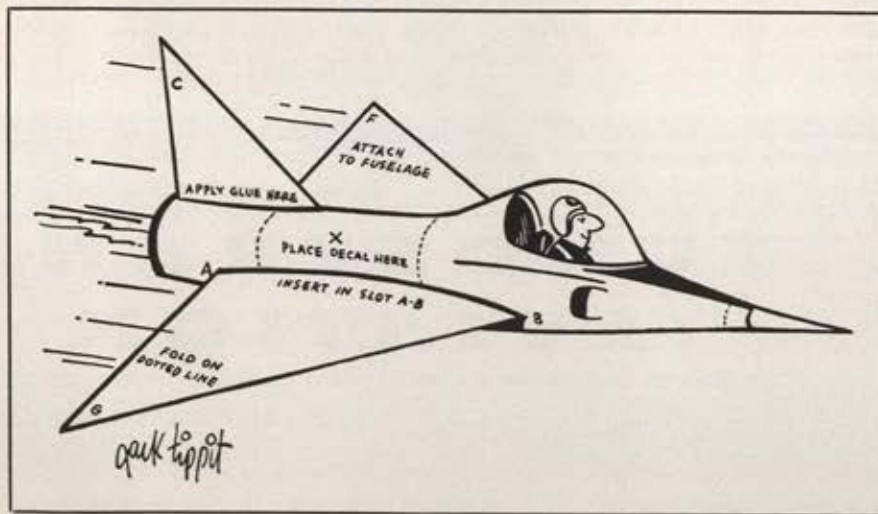
Of equal interest is Josef M. Bauer's *As Far As My Feet Will Carry Me* (Random House, \$4.50), translated from the German by Lawrence P. R. Wilson.

This adventure chronicles the successful escape of Clemens Forell, German paratrooper officer, from a Russian Siberian prison on the Chukotski Peninsula, western shore of the Bering Strait, and his three-year journey westward across Siberia to Iran and freedom. Forell, a member of an "elite" Nazi corps, had taken part in the German airborne operations at Rotterdam, Eben Emael, and Crete. Wounded in the knee on Crete and hospitalized, he was later transferred to the Eastern Front where he parachuted with a small group behind the Russian lines east of the Urals. Captured by Russian Cossacks, he was paraded with 22,000 German POWs for 2½ days through the hostile streets of Moscow before being sentenced to twenty-five years' labor in Siberian lead mines.

The journey from Moscow to the Chukotski Peninsula lead mines took its toll. Thousands died from starvation, disease, cold, and inhuman treatment.

Forell slipped out of the prison camp hospital one wintry Sunday in 1949 and disappeared into the vastness of arctic Siberia. Eluding search parties, he trekked westward and after weeks of wandering found aid among the reindeer people near the Kolyma Mountains. Once beyond the search circle, he took renewed hope and pushed west—the only direction he knew. For three years and two months he inched onward, mining gold, working on forest labor gangs, and bluffing his way past "check points" and identification barriers. He lived by menial labor, handout, theft, and off the land. His route took him over the Anadyr and Kolyma Rivers in Eastern Siberia to Yakutsk, Chita, and Ulan Ude in the Lake Baikal area. From there he

(Continued on page 29)



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Stromberg-Carlson's Model 5000 electronic printer, incorporating the Charactertron® readout tube (below) and the XeroX Copyflo continuous printer, was shown for the first time at the recent Eastern Joint Computer Conference, Washington, D. C.



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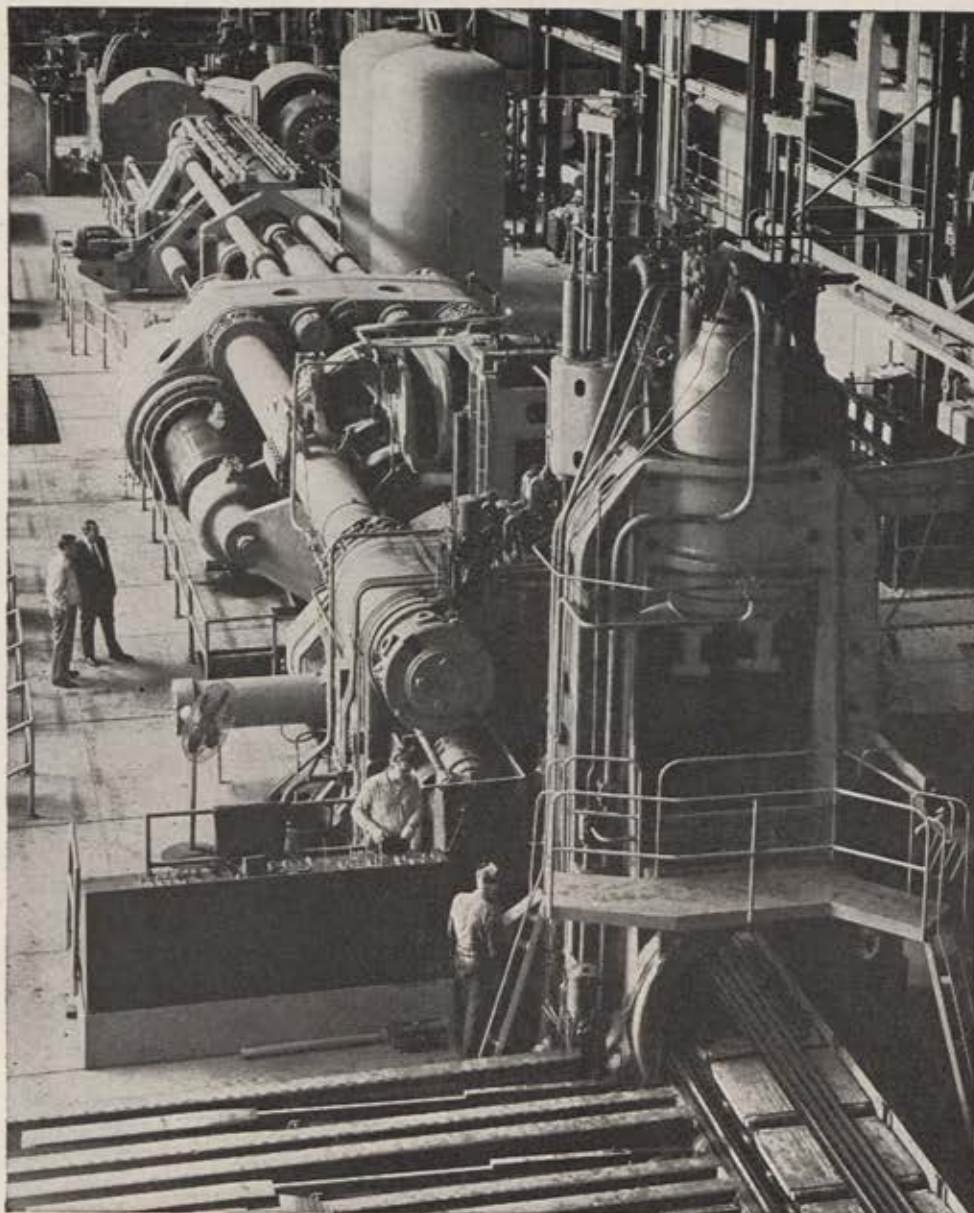
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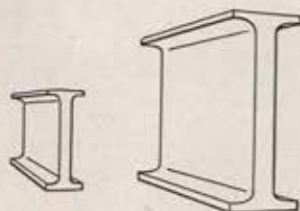
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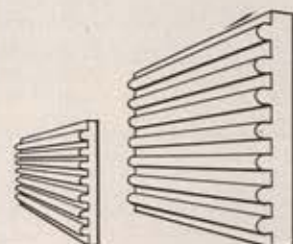


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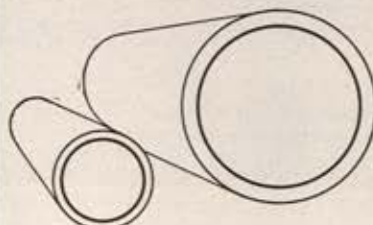
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passed Irkutsk, Abakan, Rubtsovsk, Semipalatinsk, Novokazalinsk, on the Aral Sea, to Urda on the Caspian Plain. Heading down the western shore of the Caspian, he passed through Grozny and crossed into Iran, where he deliberately got arrested by the Iranian police.

The story of his adventure underscores the human endurance that the quest for freedom can inspire within a man. It is filled with interesting details of the Siberian country, climate, people, and the ingenious tricks of surviving in that barren and inhospitable expanse.

The escape ordeal left its mark on Lt. Clemens Forell. The author, Josef Bauer, a German newsman and prize-winning author, spent several years patiently interviewing Forell, and then researching and piecing together his story into desperate, compelling prose.

Retirement from the Armed Forces (Military Service, \$4.95) is bound to interest all career men, enlisted and commissioned, on active duty in the armed forces, as well as Air National Guardsmen and Air Reservists. The compendium of up-to-date information was prepared by a committee of retired Army, Navy, and Air Force officers and covers a wide area of vital information on such subjects as psychological and economic transition to retirement, medical and health features and benefits, tips on how to get a job, where to live and acquire a home, programs for savings and investments, advice for widows, Veterans Administration, Social Security and service rights and restrictions, travel at home and abroad on military transportation, and a host of other items. Carefully compiled, it digests all of the pertinent official retirement laws and regulations into a readable, cross-referenced, and indexed volume. Dozens of tables provide quick answers to difficult questions and many chapters have bibliographies for further reading. An extremely practical book for the military man to have around the house.

The tenth revised edition of *From the Ground Up*, by Sandy A. F. MacDonald (Aviation Service Corporation), includes chapters on airmanship, theory of flight, meteorology, air navigation, radio, engines, airframes, and typical CAA examination questions. This handy over-sized paperback aeronautical textbook is officially approved by the Air Industries and Transports Association.

—JAMES F. SUNDERMAN

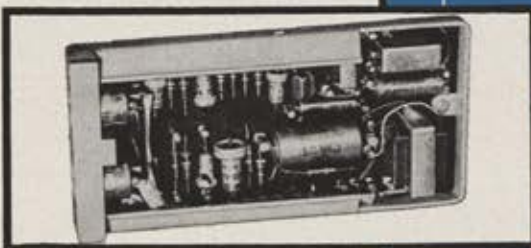


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The Price of Security and Freedom

On November 3, the morning of the day the Soviets announced their Sputnik II and four days before President Eisenhower's speech on "Science in National Security," the Board of Directors of the Air Force Association, meeting at Colorado Springs, Colo., issued the statement reprinted below.

Both Sputnik II and the President's announcement that he had appointed Dr. James R. Killian as his Special Assistant for Science and Technology served to further alert the nation to the gravity of the current situation. But neither development served to change the basic considerations which prompted the AFA statement. It follows.

IN THE wake of Sputnik, the Board of Directors of the Air Force Association note a national awareness and critical concern regarding the technological achievements of the Soviet Union.

The Board extends its congratulations to Secretary of Defense McElroy for restoring some research and production money to the defense program.

At the same time, the Board expresses concern over the apparent willingness to substitute propaganda for constructive action in meeting the challenge of Russian progress in new weapons. Press releases can orbit in space forever without strengthening our position in the Technological War.

Further, the Board deplores the apparent willingness to permit the people of America to remain uninformed, and even misinformed, on major issues regarding our own weapons development. This is contrary to the principles of a democratic society. We hope the current official statements on our defense position will not tranquilize the populace into further complacency.

We understand the grave obligation to deny the enemy access to true military secrets. We also recognize, especially at this critical stage in our history, the psychological and diplomatic value of demonstrating that Free World ideals are supported by adequate military power.

In weighing these conflicting forces, we believe that further relaxation of our censorship policies can be achieved, to our national benefit, without betraying military secrets or compromising diplomatic relations.

For example, we see no reason why the American people should not be told that our military services have yet to fire a long-range ballistic missile with a guidance system other than a modified auto-pilot. We see no reason why the public should not know that the "pre-selected target area" for ballistic missile testing, as stated in official Defense Department releases, is not a target at all, in the common usage of the term, but actually is 10,000 square miles of Atlantic Ocean.

We see no reason why the public should not know, that, to date, the Air Force Thor missile has flown more than 500 miles further than any other American ballistic missile.

The responsibility of the Department of Defense to withhold important military information must be coupled with the parallel responsibility to provide American citizens with the facts, consistent with realistic security policy, in matters of public interest and public controversy, particularly when the Soviet Union is using scientific achievements as a major propaganda weapon.

Only immediate and constructive action by the Department of Defense can prevent a situation more detrimental to national unity than the B-36 hearing controversy of a few years ago.

The nation cannot afford destructive interservice rivalry at a time when America's technological superiority and military power are being seriously questioned by nations on both sides of the Iron Curtain. Now, as never before, we have need for service unity, as well as an enlightened public.

We must embark on a great national program of research, development, and education to the end that American superiority in new weapons is assured.

The current crisis in missile development demands emergency action—first, to make clear-cut decisions regarding weapons selection, organization, and programming; second, to accelerate research, development, and production programs with additional funding. Such action becomes mandatory in regaining supremacy in the Technological War.

If this requires raising the federal debt ceiling, the ceiling must be raised.

The American people, clearly informed and strongly led, have never failed to pay the price of security and freedom.

New Word on Cordiner Recommendations

WHEN the Congress returns to Capitol Hill this January, awaiting it will be legislation designed to implement the recommendations of the now famous Cordiner Committee. Hearings on one such bill, S. 2014, introduced jointly by Senators Stuart Symington (D., Mo.) and Barry Goldwater (R. Ariz.) were begun last August. They consisted of a statement by Ralph J. Cordiner, President of the General Electric Co. and chairman of the Committee, and questioning by members of the Senate Armed Services Subcommittee on Compensation. The Symington-Goldwater bill was introduced last session,

readers will recall, when the Administration turned thumbs down on a Department of Defense version as inflationary.

However, with changing times, Sputniks, a new Secretary of Defense—Mr. McElroy—and a general awakening to the defense facts of life throughout the nation, a warmer atmosphere toward the sweeping Cordiner recommendations about the military pay structure is evident within the Administration. At this writing (November 8), the Defense Department was putting together a draft of legislation calling for the original Cordiner recommendations,

(Continued on following page)

plus an across-the-board, six-percent increase, to take care of the increase in the cost of living since the original Cordiner study. Of course, the newly proposed legislation still has to face the hurdles of Budget Bureau and White House approval, and the fate of last year's proposal makes us leery of optimistic prophecy.

Basically, the differences between the new DOD proposal and the original Cordiner recommendations as spelled out in the Symington-Goldwater bill, are as follows:

1. Present basic pay would be raised six percent, except for those with less than two years' service.

2. Officers and warrant officers would receive their new pay rates under a four-year conversion plan, i.e., they would receive the full Cordiner boost of twenty-five percent annually over a four-year period.

3. Presently retired personnel, while receiving the six-percent cost-of-living increase on their present pay, would not get Cordiner increases.

It is to be hoped that one version or another will receive prompt and favorable action by the Congress. For the need for an overhaul of the antiquated pay system is growing with every day that passes. As Mr. Cordiner put it in his statement before the Senate subcommittee:

"The question you are considering in these hearings is not simply whether some members of the armed forces should have a raise in pay. The real issue is this:

"Is the United States going to be ready, in an age of supersonic airplanes, nuclear weapons, and intercontinental missiles, to defend itself against sudden attack? Or will this country be defended by a force of inexperi-

enced military personnel who do not know how to command and operate modern weapons?"

"Already the skills of the armed forces are falling behind the advance in weapons, and the situation will deteriorate as technology advances.

"Look down the road to the 1960s. This country is investigating billions in the development of weapons of fantastic complexity, speed, and power—and the more billions Congress appropriates toward weapons advance, the greater the gap between the skills needed and the skills actually available in the armed forces.

"The United States has no choice but to meet the challenge of Communist technology and expend billions in the development of these scientifically advanced weapons; otherwise, the free nations will lie helpless before overwhelming Communist power.

"But along with these billions for new weapons, we must invest for the next two fiscal years the few hundred millions necessary to develop and retain the military manpower that is capable of commanding, operating, and maintaining scientifically advanced equipment.

"Such skills cannot be developed overnight. The training must begin now, and the men with useful skills must be retained and motivated, so that the United States will actually be able to defend itself and provide a genuine deterrent to war in the age of intercontinental missiles with atomic warheads, supersonic airplanes, and nuclear-powered submarines.

"Thus, to put it bluntly, the real issue behind the Committee proposals you will be discussing in these hearings is national survival in this nuclear age."

Staff Changes for Air Force Magazine

AFA President Peter J. Schenk, in his report to the Board of Directors of Air Force Association at Colorado Springs, on November 2, announced the following changes in duties for *AIR FORCE Magazine* staff members:

James H. Straubel will continue as Publisher of the magazine, in addition to his duties as Executive Director of AFA. Straubel, 42, a native of Green Bay, Wis., served as Editor and Publisher of *AIR FORCE Magazine* all through World War II, when it was the official publication of the Army Air Forces. He was discharged in 1946 in the grade of colonel and was awarded the Legion of Merit by Gen. H. H. "Hap" Arnold.

A graduate of Lawrence College, Appleton, Wis., Straubel worked successively for the Appleton *Post-Crescent*, the Green Bay *Press-Gazette*, and the Milwaukee *Journal*. He was Managing Editor of *American Aviation* magazine when he entered military service in 1941.

After World War II, Straubel became Associate Publisher of the Avon Publishing Co., New York City. He joined *AIR FORCE Magazine* as Editor in February 1946, was appointed Executive Director, Air Force Association, in September 1948. He is married, has one daughter, and lives at Fairfax Station, Va.

Succeeding Straubel as Editor is John F. Loosbrock, 39, who has been Managing Editor since April 1951. Loosbrock is a native of Omaha, Neb., and spent more than four years in the infantry during World War II, including

nineteen months of enlisted service. He was commissioned in 1942 from the Infantry School, Fort Benning, Ga., and almost immediately went overseas with the First Infantry Division. His combat experience included the North African landings at Oran, the Tunisian campaign, and the Sicilian campaign. Decorations include the Silver Star, Bronze Star, and Purple Heart. He was discharged in 1945 in the grade of captain, after service as an instructor in small unit tactics at the Infantry School.

Loosbrock majored in journalism at Marquette University, Milwaukee, Wis., from which he was graduated in 1939. Before entering military service in 1940 he worked for *The Daily Herald*, Oskaloosa, Iowa. Following discharge from the Army, he worked for the Milwaukee *Journal* before coming to Washington as Associate Editor of *The Infantry Journal*, predecessor publication to *Army* magazine. For three years before coming to *AIR FORCE*, he was Washington Editor for *Popular Science* magazine. He is married, has two daughters and a son, lives in Wheaton, Md.

The new Managing Editor of *AIR FORCE* is Richard M. Skinner, who has been Assistant Managing Editor for the past six years. Skinner, 33, is a native of Princeton, Ill. He entered Knox College, Galesburg, Ill., in 1942 and was graduated in 1949, his education having been interrupted by service with the Army Air Forces during World War II. He received an M.S. degree from the Columbia

(Continued on page 35)



ON GUARD IN CANADA...IN EUROPE...
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University Graduate School of Journalism in 1950 and came to AIR FORCE in September 1951.

During World War II he served as a cryptographer in the Seventh Air Force, on Oahu, Saipan, Guam, and Okinawa, and was discharged as a staff sergeant. Skinner was recalled to active duty during the Korean War and served a year as an information specialist with MATS at Andrews AFB, Md. He is married, has a daughter, lives in Chevy Chase, Md.

At the same time Mr. Schenk announced the appoint-

ment of John O. Gray as Administrative Director of AFA, reporting directly to Straubel. Gray joined AFA in February of this year (AIR FORCE, March 1957) as Director of Projects, Golden Anniversary of the Air Force, after a four-year tour of duty as Reserve Forces Liaison officer with the AF Office of Information Services stationed in the Pentagon.

The above changes, Mr. Schenk pointed out, are designed to keep pace with the constantly expanding activities of the Association.

Much News Was Bad News . . . Reactions to SPUTNIK

ON OCTOBER 4, 1957, the sharp reality of here and now took over from the science-fiction writers.

The Soviet Union, and not the United States, took the first step into outer space with the launching of an astounding 184-pound artificial satellite. An odd-sounding word to Western ears was added to everyone's vocabulary—Sputnik.

Nearly a month later, the world reeled again as Sputnik II, six times heavier, and carrying a live dog, took its extra-terrestrial position in a second orbit.

How did America take the news?

"We have been jolted hard, and that is very good, for nobody can defeat us but ourselves."

The words were those of *The Reporter* magazine in its post-Sputnik editorial of October 31. Grim sentiments echoed across the country as Americans reacted to the advent of the space age—Soviet style.

For those who had long warned of a growing Soviet military-technological threat—men like Sen. Stuart Symington, Trevor Gardner, Dr. Edward Teller—the crisis of the satellite had the unhappy consequence of making them appear even *more* right about dire predictions they had made in the past.

For those, and there had been too many, who had believed in a kind of inevitable superiority of American science, the Sputnik pill was hard to swallow. Dr. Vannevar Bush, a major contributor to American World War II military science, had once said, and been widely quoted, that successful scientific inquiry in a totalitarian society could not match the untrammelled approach of the free West.

He had not taken into account Dorothy Thompson's cogent point that freedom and comfort are not the prizes of the Soviets; rather their view is that they are "the wave of the future," and that with their faith, they are willing to sacrifice freedom and comfort in a single-minded drive toward military and scientific achievement designed to make them appear irresistible to the uncommitted nations of the world.

The editorial and political mood of the nation, in the wake of Sputnik, was one of sober realization that (1) there was no question of retreat—that our only choice was to catch up with and surpass the Soviets or be swallowed by them, and (2) that we could not equate gadgetry and comfort with deterrent strength in a world where most people except Americans are gadgetless and where raw strength is, as it has been through history, the great equalizer.

Sample editorial views across the country:

The New York *Herald Tribune*: "We had better get going. The clock on the cover on the monthly *Bulletin of the Atomic Scientists* points to two minutes to midnight. It is late. Very late."

The New York *Times*: "Moscow has startlingly reminded us that its scientists are capable of great technical achievements. . . . The only answer is for our scientists [in NATO] to work together."

The Philadelphia *Inquirer*: "The beep-beep of that Soviet satellite is being heard around the world. It will be folly indeed to pretend that we in America do not hear it, or do not grasp its message."

The Washington *Post and Times Herald*: "This newspaper believes that the American people would rather pay more taxes, if the necessity were presented to them frankly, than to have the best-balanced budget for the second-best defense."

The New York *Journal-American*: "The American people 'bristle' because the Russians have beaten us psychologically and politically in launching Sputnik, and they will bristle more if the bugs aren't removed from our missile development."

Across the nation, the editorial view was much the same. As Dr. C. C. Furnas, former Assistant Secretary of Defense for Research and Development, put it in *Life* magazine: "Let us not pretend that Sputnik is anything but a defeat for the US. During World War II, when officials were trying to make light of a discouraging setback in the Burma campaign, Gen. Joe Stilwell said impatiently, 'I claim we got a hell of a beating.' We might as well make the same admission regarding the Russian satellite."

But, with all the serious concern expressed editorially and politically, if you walked down the streets of suburban,

(Continued on following page)

RAISE IN DUES—A REMINDER

Beginning January 1, the annual dues for active, service and associate members of the Air Force Association will be \$6.00 instead of \$5.00 as at present. The raise was voted by delegates to AFA's convention in Washington in August as a partial answer to constantly rising costs. Squadrons will benefit thereby, since each squadron will receive a refund of \$2.50 for each new member and renewal member who forwards his dues through a squadron. The squadron refund has been \$1.50. In addition, wing organizations will receive a refund of \$.50 for each member in their respective states, whether or not he belongs to a squadron.

Subscription rate likewise will go up on January 1, from \$4.00 to \$5.00. The cadet rate of \$3.00, for AF-ROTC cadets and CAP cadets, was unchanged.

more comfortable America 1957, still sadly evident was a lack of real consciousness of the dangers ahead. People joked of the Sputnik cocktail (one part vodka and two parts sour-grape juice), or of "Muttink" (an almost instantaneous reaction), and they sensed a menace. But the thought of tomorrow was still of business as usual . . . well, nearly.

How did Western Europe react to the biggest story of the twentieth century, a story that in a quieter world would have augured nothing but scientific good for all humanity, but which in an age of ever increasing East-West tension, bore the most significant military-political consequence.

A close study of the West European press revealed unabashed admiration for the Soviet achievement, in both NATO and non-NATO countries. Yet, for the most part, the Western press did not take the view that Soviet science in general was superior *per se* to that of the US. Rather, most European papers seemed to express the opinion that American technology was as good as ever and that, unhampered by secrecy and benefiting from freer exchange of information with NATO countries, it would soon catch up and surpass Soviet achievements.

All of the Western press acknowledged the major Soviet propaganda coup in the Sputnik launching, especially as the story affected underdeveloped areas, and many pointed out that the Russian accomplishment's price was the excessively low standard of living in the Communist world and the repression of Soviet subject countries, especially Hungary and Poland.

Most NATO-country papers said the Sputnik victory confirmed earlier Russian ICBM claims and that the world was in for new tension—a new, changed balance of military power between the US and the USSR. But, they pointed out, too, that the Soviets were still highly vulnerable to SAC attack and missile bombardment from American bases overseas.

Some apprehension was expressed that, in the face of the new Soviet technological threat, the US might reconsider the value of its overseas bases and NATO commitments and possibly entertain Russian overtures for an American-Soviet rapprochement. This fear was expressed in many Western papers which called for a strengthening of NATO ties and closer US-European scientific, political, and military collaboration.

The British press reaction was swift. Like their Continental counterparts, British papers initially stressed the scientific triumph of the Soviets, but this soon gave way to military and political speculation.

Generally, British journals called for a reappraisal by the US and its allies of the Western missile program. In this area, there was much call for reestablishment of the

World War II US-British scientific partnership. There was also much editorial criticism of American interservice rivalry and what was called a "dispersed" missile program, with a call for bringing US development under a centralized control.

"Space Age Is Here," shouted the mass-circulation British Conservative *Daily Express*, and "Russia Wins the Race into Outer Space," headlined the Laborite *Daily Herald*. Soon the emphasis switched to military implications of Sputnik, and the *Times* talked of "US Disquiet at Power of Satellite Launch."

Editorial comment pointed out that the USSR had scored a heavy propaganda victory and further that the Russians now had the capability of producing long-range missiles with nuclear warheads and high accuracy. But also expressed was the belief that although the world balance of power was not upset at present, Sputnik was an ominous warning to the West.

Additional points brought out were the need for adequate international agreement on space control and the view that on no account should such agreement take the form of bilateral agreement between the US and Russia.

Although the British press acknowledged, in the face of Sputnik, that, as the Manchester *Guardian* put it, "Mr. Khrushchev was speaking no less than the truth" (about the ICBM), general comment indicated press belief that the present trend could be reversed and that the Russians did not yet have a preponderance of world power.

Calling for Western scientific pooling, the *Times* asked, "Is it too much to hope that the latest proofs of Russia's technological advance will lead to better cooperation between Britain and America . . .?"

In France, the Sputnik story was page one for several days. Surprise and admiration for the Russian achievement were plentiful. Referring back to the ICBM, the influential *Le Monde* said, "Soviet intransigence at the disarmament talks has been connected with the ICBM . . . [and] Western experts believe that the publicity given by Moscow to its missile is especially aimed at forcing the US to accept a two-way bargain between the US and the Soviet Union in regard to pending problems." Conservative *Figaro* agreed that Russia was trying to "bludgeon the NATO allies at the disarmament talks."

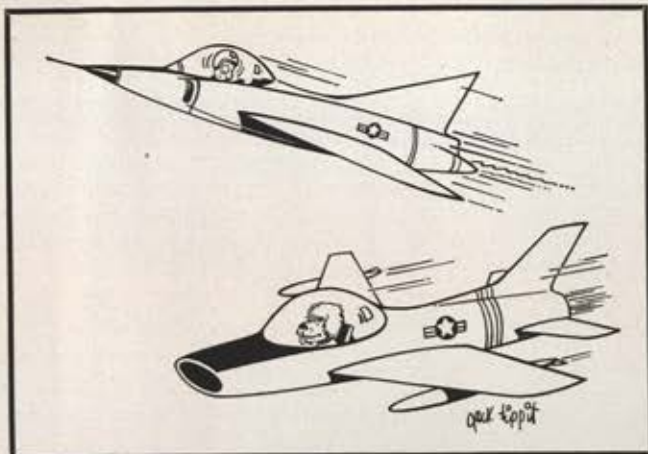
Most French papers expressed faith in US capabilities, and *Le Monde* and *Figaro* asserted that Europe would remain firmly in NATO. *Aurore* predicted that "the US, no matter how hesitant its policy, how vague its conceptions of the best interests of its allies, will not break Atlantic solidarity."

The Belgian and Dutch press, after initial shock, generally expressed the belief that NATO would survive the Sputnik and that US science would catch up with the Soviets.

Most Low Country papers generally applauded the Eisenhower statement that the US would discuss space controls and satellite problems only in the United Nations and not bilaterally with the USSR. There was one discordant note—the Dutch *De Volkskrant* said it thought a space control agreement between Russia and the US was better than no agreement at all.

The picture was much the same in the West German press. Obvious was the frank admission that Soviet capability had been sadly underrated and belief that the Sputnik confirmed earlier Russian ICBM claims. There was, as in France and the Low Countries, some fear that the US might consider disengagement from its European allies. The acknowledgment of Russian achievement was

(Continued on page 39)



1958 AFA Convention Housing Office Opens

Hotel reservations accepted beginning this December 1

S EVEN air-conditioned hotels have set aside 2,500 rooms for AFA's 1958 Convention and Airpower Panorama in Dallas, Texas, September 25-28. The Dallas Hotel Association will operate AFA's Housing Office. All reservations should be requested from this office, *not* from AFA Headquarters in Washington.

The three major hotels—Adolphus, Baker, and Statler Hilton—are within three blocks of each other (*see cut*), and the same distance from Dallas' new \$12 million Memorial Auditorium, where the Panorama and many of the major Convention events will be held. This makes Dallas an ideal convention and exhibit city.

Listed below are the AFA hotels, their room rates, and a coupon for your use in requesting reservations. Please fill out the coupon in full, particularly the arrival and departure dates and the names of occupants. List first and second choices of hotels. No deposit is required.

You will note below that a triple headquarters has been established for the 1958 Convention. This is necessary in order to accommodate all groups attending the Convention. For your guidance in selecting the hotel at which you wish to stay, the major events will be held in the Auditorium; the AFA business sessions will be held at the Adolphus; the VIP Host Suite will be at the Statler Hilton; and the Reserve and Guard meetings will be held at the Baker.

The Convention proper gets under way at 9:00 a.m., Thursday, September 25. There will be, however, a Directors meeting and an AFA Leaders workshop the afternoon of Sept. 24. AFA Directors and AFA Leaders should keep these meetings in mind when they are making their hotel reservations. On the accompanying list, the Dallas Hotel is farthest from the Auditorium.



Downtown Dallas—showing main hotels and Auditorium.

HOTELS	SINGLE ROOMS	DOUBLE ROOMS	TWIN ROOMS	SUITES 1 & 2 B/R
ADOLPHUS	\$5.00— 7.00	\$9.00—14.00	\$10.00—14.00	\$20.00—40.00 36.50—85.00
BAKER	5.00—11.50	7.00—12.00	8.50—13.00	23.00—25.00 32.50—65.00
DALLAS	5.00— 7.00	8.00—10.00	8.00—12.50	16.00—24.00 No 2-bedroom 16.50—17.50
SOUTHLAND	4.50— 7.50	5.50— 8.50	6.50—10.50	No 2-bedroom 20.00—38.00
STATLER HILTON	7.00—13.00	10.00—15.00	12.50—18.00	41.00—56.00 15.00
TRAVIS	5.00— 7.00	8.00— 9.00	8.00— 9.00	No 2-bedroom 15.00—27.00
WHITE-PLAZA	4.50— 8.50	6.00—10.00	6.00—12.00	

CONVENTION HEADQUARTERS

AFA Members.....Adolphus
Reserve & Guard.....Baker
Industry.....Statler Hilton

—SEND ALL RESERVATIONS TO—

AFA Housing Office
1101 Commerce Street
Dallas 2, Texas

HOTEL ROOM RESERVATION FORM AIR FORCE ASSOCIATION CONVENTION

DATE _____

NAME _____

ADDRESS _____

CITY & STATE _____

HOTEL _____

First Choice

Second Choice

() Low () Average () High

Type Room

Desired Rate

OTHERS IN ROOM _____

ARRIVAL DATE & HOUR _____

DEPARTURE DATE _____

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evident in comments like that in the independent Essen *Die Welt*, which said, "Even a dyed-in-the-wool anti-Communist does not lose face by taking his hat off to the Soviet scientists and confessing how erroneous his disparaging opinion about their technical abilities has been."

West Berlin's *Tagesspiegel* pointed up the propaganda value to the Soviets of Sputnik with its assertion that the propaganda would apply "primarily to the underdeveloped nations . . . whose narrow tie to the West was maintained only by their belief that it represented the peak in technical civilization."

West German press references to the role of German research in the Soviet triumph were underplayed.

One of the most significant assentations was by the strongly pro-US and pro-Adenauer *Kölnische Rundschau*, which commented that "Western Europe can no longer reckon unconditionally with the protection by America's atomic shield in the event of limited conflicts."

A constant fear expressed was of a possible US-Russian "deal." Many of the serious papers and Hamburg's mass-circulation tabloid, *Bild-Zeitung*, suggested that the Sputnik strengthened "Moscow's aim—to negotiate with the US alone . . . with a view to dividing the world between them and thereby removing the American bases surrounding Russia and China."

Some German papers, such as Munich's *Sueddeutsche Zeitung* and Augsburg's *Schwabische Landeszeitung*, seriously suggested that the needs of world peace might even justify bilateral talks between the US and Russia.

On the American catch-up issue, some German papers warned the US of the obvious dangers of falling behind. There was one significant comment by the *Frankfurter Allgemeine* on the American reaction. That paper talked of its belief that "American worries ring unmistakably through Eisenhower's efforts to appear calm and unperturbed."

Nearby Austria, so recently released from Soviet shackles, saw heavy Sputnik press play, and both Socialist and independent papers criticized American complacency on the training of technical manpower.

Second thoughts in the Italian press, after the initial admiration of the Sputnik coup, showed general agreement that the Sputnik confirmed ICBM claims that had earlier been widely doubted in Italy.

Prior to Sputnik, there had been in the Italian press a considerable pro-and-con argument on Soviet technology. But the Sputnik smashed all doubts. Subsequent editorials were critical of US policy, saying that America had been beaten by wasteful interservice competition and waste of scientific talent. Speculating on the military implication of Sputnik, the Vatican's unofficial weekly, *Osservatore della Domenica*, warned that it was "naïve to think that the Russian satellite is a peaceful instrument."

Rome's conservative *Il Messaggero* said the only answer to the Russian threat was a "united West," while Milan's *Il Corriere della Sera* soberly asserted that "until yesterday, the US was safe while the rest of humanity lived under the shadow of bombing by intermediate missiles. . . . Today the US has joined the rest of humanity, and it will have no greater power when it has perfected the ICBM, for it will be able to do no more than it now can with intermediate missiles."

Il Corriere joined many other Italian papers in its belief that the most likely result of Sputnik would be an intensification of the cold war, foreshadowing a concerted Russian offensive aimed at splitting America off from NATO with the eventual aim of a US-Soviet bilateral deal.

The universal view was that the US must reestablish "strategic parity" with the Russians.

The controlled Spanish press confined itself, for the most part, to comment on the scientific progress evidenced by the satellite. But at least one paper, Catholic Actions's *YA*, said, "The shape of Western strategy will have to undergo a radical change." Most papers expressed confidence that Western nuclear potential was still strong enough to deter the Russians from sneak attack.

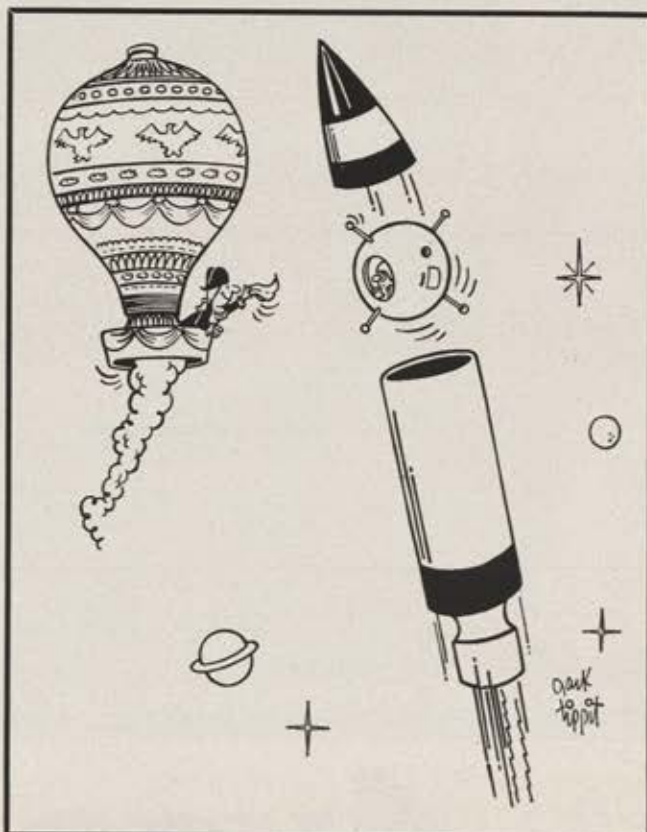
The Sputnik story led the Swedish press for several days. There was a grudging admiration for an accomplishment that had not been expected. Earlier the Swedes had belittled Soviet ICBM claims, or at least Russian production potential. And much in contrast were post-Sputnik headlines in Sweden like: "Russia Wins Race with the United States." Primary concern emerging in most Swedish editorial comment was the now-accepted fact of the ICBM. In addition, there was much speculation on the reconnaissance potential of satellites, as well as the question of how far up into space territorial boundaries really extend.

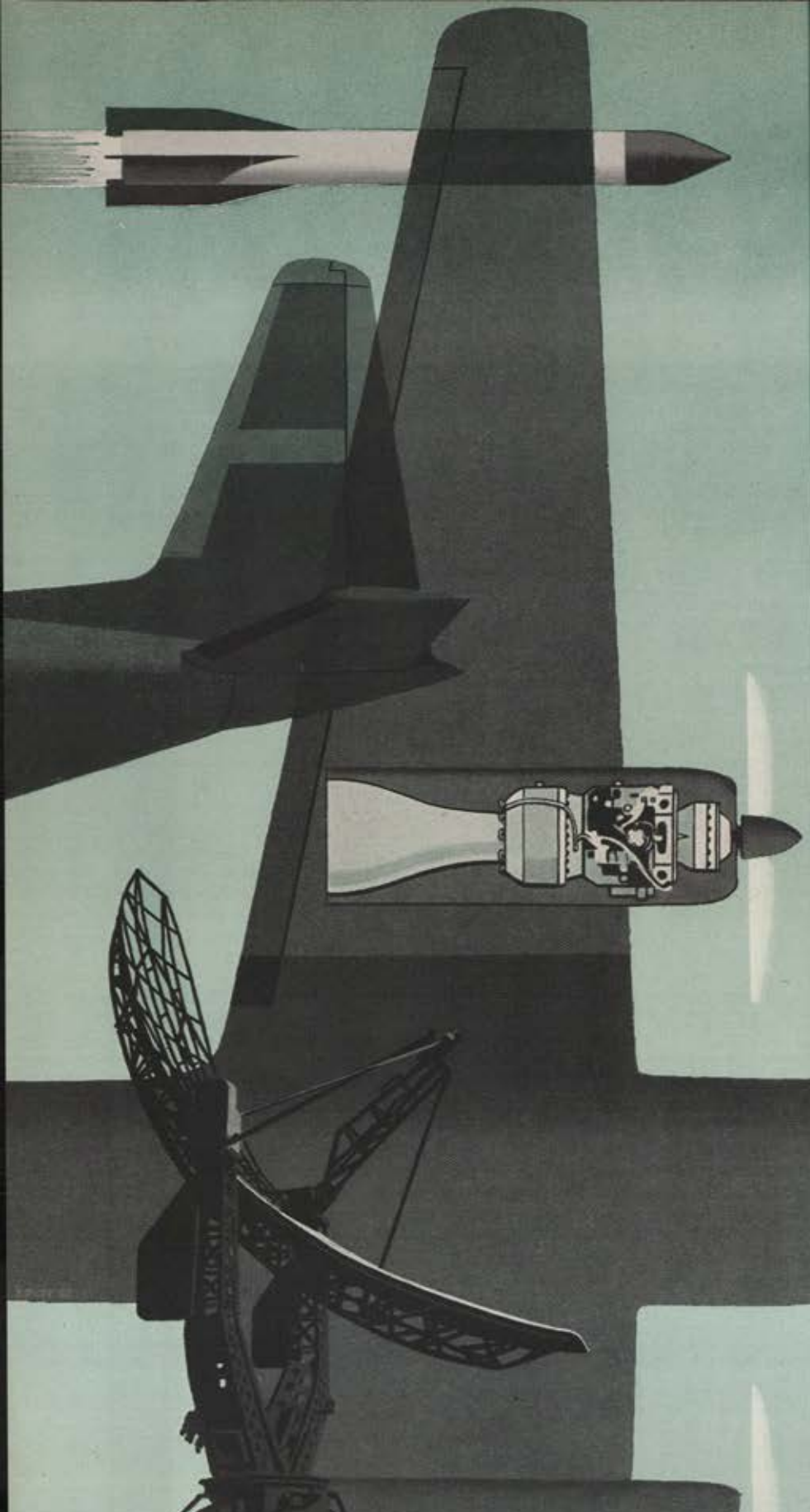
Most papers stressed the Middle East and Asian propaganda value of Sputnik. Many papers joined general Western criticism of Russian secrecy of their satellite project. The air was of sober confidence. As *Expressen* put it, "The US does not scare easily."

Close under the Soviet shadow, Finland's press comment was nevertheless lively.

The pro-West *Helsingin Sanomat*, the country's most influential daily, conceded that the Russians had "achieved a scientific advance which is also highly significant from the viewpoint of propaganda and prestige." It added hopefully that "in time, perhaps we may hear the news that the [US] has gone even farther in the race."

—WILLIAM LEAVITT





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ORGANIZING FOR THE TECHNOLOGICAL WAR

An Air Force Magazine Staff Study

The material on the following pages was written during the period between the advent of Sputnik I and the first of the series of speeches by President Eisenhower on November 7. It represents the distillation, however, of several years of study, discussion, rumination, and research. It is presented as neither bible nor blueprint but as a basis for serious thought and analysis for those who see the recent Soviet technological achievements as the very real threats to our national survival that they are—and also for those who may still be laboring under the delusion that all is well. "Blood, sweat, toil, and tears," was the Churchillian promise. Let us hope that with the prompt application of sweat and toil to the problem at hand we and our children may yet escape the blood and the tears.—THE EDITORS.

Organizing for the Technological War

SINCE 1907, America, the birthplace of aviation, has three times lost its qualitative air leadership. The first loss began almost immediately after the Wright Brothers' success and continued through World War I, when not an American-designed and built warplane saw combat. The second was in the waning months of World War II, with the appearance of the German V-1, V-2, and ME-262 jet fighter. The third was in early October 1957, with the announcement of the launching of Sputnik I by the Soviets.

The world has now entered upon the scientific age, marked by a technological war between the US and the USSR, in which the Soviets are currently gaining by an inspired pioneering spirit, and by our default. Since the end of World War II, Soviet science has forged ahead unrelentingly. During the same period, American science has been bogged down by a bureaucracy which places major emphasis on economy and red tape and little emphasis on results.

As a nation, we were once proud of our pioneering and adventurous spirit. Today, our scientific pioneers spend most of their time and energy fighting for adequate budgets and submitting progress reports.

The race for the conquest of space is today's major engagement in the technological war. And we must win it, for the nation which dominates space will be in a position to dominate the world.

Furthermore, we are in a dynamic situation in which science is creating new threats to our security faster than it can develop adequate countermeasures. Thus, at some point, the loss of a significant engagement in this war may prove fatal. In short, either the US promptly goes ahead in the technological war and stays there, or human freedom will eventually succumb to Communist tyranny by default.

The Problems

At present, we are taking unprecedented risks with our national existence because only a few of our political leaders understand the impact of science on our security, industrial growth, and way of life.

As a result, the following things appear to be true:

1. We are becoming a nation of timid, unimaginative people. The emphasis is on "safe" men, not on pioneers. The rewards for daring are small, in comparison with the penalties for failure.

2. The decision-making machinery of the government bogs down because many problems have a high technical

content, which many government officials do not understand and hence cannot evaluate.

3. Many national policy decisions of profound importance are made by default, at the working level, without ever being considered by the National Security Council.

4. When the NCS does consider an important problem with high technical content, it generally does so only after the problem has become a crisis.

5. Instead of "security with solvency," we are heading toward insecurity and waste, because we have not adjusted our defense organization to the incredible advances in weapons technology.

6. We have not fully comprehended the scientific (as well as political) interdependence of the free nations, and we have not integrated our technical effort with that of our Allies. As a result, we have not taken full advantage of Allied scientific and technological capabilities.

7. The American people have not been given an adequate understanding of the technological war and of its growing demands for resources. While justifiably concerned about security information, we have oscillated wildly between two extremes, either making boastful claims or not saying anything. We still *talk* too much, but we don't *say* enough, and we are misguiding the American people in the process.

8. Even after Sputnik I showed us how wrong we were, we continued to overlook the psychological impact of technology upon world opinion and were caught flatfooted by Sputnik II. We knew the anniversary of the Red Revolution was on the Soviet calendar. One wonders why we were unable to plan a spectacular achievement for announcement on November 7, to take the psychological initiative for a change.

This is no time for panic; it is a time for sober thought and sound action. For either we accelerate the quality and pace of our scientific effort, or we enter upon a period of steady decline in our relative strength, which can only end in our eventual extinction as a nation.

Statesmen, Soldiers, and Scientists

Since the end of World War II, statesmen, soldiers, and scientists have tried to come to grips with problems of unprecedented complexity, arising from the ever-faster pace of the age of science. However, even though outstanding men in all walks of life have worked together devotedly for the welfare of the nation, our ability to cope with such problems has deteriorated.

Scientists have participated in government policy-making largely only as *advisers, when invited*. Final decision-making has remained mostly in the hands of the lawyer, businessman, or soldier. There has been one important exception to this statement. The Atomic Energy Commission has never been without at least one outstanding scientist; the present scientist-member has been, on occasion, acting chairman of the Commission.

In other fields, just as important as atomic energy, scientists have rarely held jobs at government policy-making levels. And, unhappily, there have been few government officials who have taken an active interest in scientific progress and in its implications. It has been said that the last President of the US to sit down at dinner with the National Academy of Sciences was Woodrow Wilson in 1918.

Thus, more often than not, we have had no real, dynamic leadership in science. Rather, we have had decisions based on that part of some scientist's advice which is easiest and cheapest to follow.

In part, this stems from the unwillingness of scientists themselves to assume greater responsibility for the consequences of their work. And, in the largest part, it is the direct result of an educational system which brings up children with little knowledge of science, but with a conviction that God has forever ordained our scientific leadership, rather than teaching those children that "our" great scientists and "our" great scientific discoveries have been largely imported from abroad.

Some statesmen have belittled the relationship between science and national strength. Others have assumed that a scientist trained in one field is automatically an expert in all sciences. Some military men have been hesitant to embrace science's new ideas and new weapons. Others have used scientists as professional "ax-grinders" for a particular service's point of view. Some scientists have cloaked with scientific "infallibility" both their rather naive non-scientific views on nonscientific questions, as well as their judgments on scientific questions in fields outside their area of competence. Others have tried to maintain that scientists have made no mistakes, and that it is somehow wrong to admit that they have.

It is not suggested that all statesmen and soldiers abdicate, and let the scientists take over. Few scientists have the desire or aptitude to hold top positions in the administrative and policy-making field in government. But there is a crying need for men in such positions who have a scientific background, who understand scientists and how to work with them, and who know how best to make use of scientific advice.

More scientists should be integrated, where appropriate, into the working structure of government, particularly in the Executive Branch, as well as in the Congress. Furthermore, among those scientists working for the government must be men who understand the dominant technologies of our time. Today, one of the most important of these is the technology of aeronautics.

The White House

Corrective action must begin with the White House itself and the President's Science Advisory Committee.

Up to the present, even though the chairman has a direct line to the President which he can use if he wishes, this committee has generally waited for the President to ask it to do something. Since Presidents have little time to develop an understanding of science, they don't know when to ask for help and advice, or what to ask, for that matter. Thus, usually, someone on the "working level" must "maneuver" for months to get the President to ask the committee to study a scientific problem that may have been crying for attention for years.

When the committee has been called on for assistance, the problem has generally been too narrowly defined, and many recommendations have gone unimplemented for budgetary reasons. Mostly, the committee has studied narrow military problems, rather than such major questions as the adequacy and effectiveness of the entire national research and development effort.

For all of these reasons, in spite of a few outstanding contributions, the committee has been passive and only partially effective.

The committee must be revitalized, and its membership, mature in judgment but hard-pressed for working time, supplemented by working groups of younger men like those who came out of our scientific effort in World War II. Furthermore, more of these men must understand the dominant technologies of our time (e.g., only one man on the present committee is an aeronautical scientist).

The committee must undertake studies of national importance on its own initiative, and it must be given to understand that the Chief Executive would welcome such action. Right now, the committee should take on a broad study of action required to insure our survival in the technological war.

The study should include these major areas:

- Attracting greater numbers of qualified young people to the study of science;
- Insuring that scientists understand political problems and know how to communicate with their fellow-men;
- Insuring that every graduate in the arts, letters, law, medicine, etc., is not completely ignorant of technical matters;
- Improving the economic and social stature of teachers and professors;
- Reorganizing the national scientific research and development effort to place emphasis on achievement, rather than administrative tidiness;
- Insuring that security regulations do not smother technological progress;
- Insuring the adequacy and effectiveness of the entire research and development effort;
- Drastically modifying the over-centralized bureaucracy in Washington, which has our military and industrial scientists spending most of their time making budget presentations and writing progress reports;
- Reducing lead-times required to bring new weapons and ideas to operational and full use;
- Infusing the entire structure of government with more adequate numbers of men who understand the dominant scientific trends of our time.

The Cabinet

Most Cabinet discussions of technical problems are conducted by technically uninformed people. This is dangerous for the nation. The same is true on the sub-Cabinet level.

For example, most of the national defense budget during the past five years has been spent on aviation. Many of the great airpower leaders in the nation have been lifetime Republicans. Yet, not one of them has been asked to do a Cabinet-level job, with the exception, recently, of the Special Assistant for Aviation Facilities Planning.

At least one Cabinet-level officer should be an outstanding technologist-statesman.

Initially, this Cabinet-level officer might be a Special Assistant to the President for Science, with membership on the National Security Council and the President's Science Advisory Committee. Eventually, it might prove wise to set up a Department of Science, with Cabinet representation.

The Science Cabinet Officer would become the focal
(Continued on following page)

ORGANIZING FOR THE TECHNOLOGICAL WAR

point for formulating national science policy, and for such agencies as the National Science Foundation, National Bureau of Standards, the NACA, and similar organizations.

The recent appointment of Dr. James R. Killian, president of the Massachusetts Institute of Technology, as Special Assistant to the President for Science and Technology, is indeed a welcome first step toward fullfledged representation of science at the Cabinet level.

National Security Council Planning Board and Staff, Operations Control Board, and State Department Planning Group

None of these organizations has enough people who understand the impact of science on national policy. For example, the implementation of a US aerial surveillance program has lagged terribly. First, it took years to "sell" the program and explain its importance. Then, budgets to develop the necessary equipment were not forthcoming. Various officials trembled at the thought of sending up a US satellite whose orbit might intersect the space over Soviet Russia. While we debated, the Soviets went ahead and did it, and the military, political, and psychological consequences are now well known.

Top-caliber technical people should be promptly added to the staffs of each of these agencies. The present practice of using *ad hoc* groups of consultants to study complex technical problems under the aegis of the NSC should be continued. The full-time technical staff members would insure that such *ad hoc* studies are started on time and that something constructive is done with the results.

Joint Chiefs of Staff

There are two impasses at this level.

The first has to do with the impact of science on strategy and war planning. At the present time, the Joint Chiefs are advised on science by people who tend to present the narrow point of view of a particular service. The Joint Chiefs of Staff should be advised by a few outstanding, independent scientists, who can lay technical facts on the line, regardless of the impact on any specific service. Such scientists should, above all, be wise, objective men, who will stick to their own fields of competence, get additional help where they need it, and not become scientifically trained "ax-grinders."

The second problem has to do with the Weapon Systems Evaluation Group, which was set up some ten years ago to assist in the selection of weapon systems which represent "maximum combat effectiveness" at minimum cost.

All three services have contributed to keeping this organization largely ineffectual.

Recently, steps have been taken to strengthen WSEG, by recruiting scientists in more adequate numbers, and by giving the Group an independent and strong Board of Trustees, many of whom are outstanding scientists. These steps, taken through the creation of the Institute of Defense Analysis under WSEG, should be further accelerated.

WSEG is supposed to be able to spend twenty percent of its effort studying problems on its own initiative. Actually, the present small organization has never been strong enough to complete on a timely basis the many studies which the Joint Chiefs and Defense Secretaries have asked it to perform. Furthermore, congressional sniping and budget-cutting have already begun to inhibit the growth of WSEG.

WSEG is one of the principal keys to the elimination of obsolescent forces, which load on the taxpayer an additional bill for equipment which will never be used in combat. WSEG can also foster the more rapid development of

weapons which promise greater combat capability per defense dollar.

Both the Executive and Legislative Branches of the government have a major stake in accelerating its effectiveness.

Department of Defense

There are four basic problems which must be solved in the present organization of the Department of Defense.

- First, the Joint Chiefs of Staff organization must be reoriented, to make possible war planning and force level determinations in an atmosphere of national interest, rather than service interest.

- Second, the Defense Department organization must be streamlined, for the reasons outlined in the 1956 Statement of Policy of the Air Force Association, which said:

"Sweeping revolutions in weapons technology have outmoded our country's traditional approach to national security. If we are to achieve security with solvency, fundamental changes must be made in our military establishment.

"Our present system of three separate military services compels patriotic men to strive for objectivity in an atmosphere of service partisanship. The system too often ties military careers, and therefore military operations, to obsolescent weapons and concepts. The system encourages the postponement of basic decisions by piling compromise on compromise, committee on committee. It includes jurisdictional disputes harmful to national security. It is wasteful of time, money, and manpower.

"The three-service system can no longer be tolerated. The goal must be one program for utilizing national resources in the national defense. We must have one defense plan. We must have a single military service with one secretariat, one Chief of Staff, one promotion list.

"We must achieve this singleness of purpose, organization, and operation at the earliest possible moment. We must achieve this goal without compromising essential competition of ideas in defense planning and weapons development, while eliminating uncontrolled and wasteful competition for scarce manpower, money, and material."

- Third, the armed forces must be reorganized for specific military tasks, rather than around means of locomotion, i.e., ground, sea, and air. The present roles and missions have been obsoleted by spectacular advances in the reach and destructiveness of modern weapons. (See "How the Soviets Run Their Missile Program," by Dr. Raymond L. Garthoff, page 53.)

- Fourth, the military research and development effort of all three services must be freed from the shackles of bureaucracy, and placed in an administrative framework in which the emphasis is on achievement and the required resources are more readily provided. This must be done in a manner which retains constructive technical competition in research and development. At the same time, wasteful political competition must be ruthlessly eliminated, and a mechanism provided to insure that new weapons are selected for production on a "maximum effectiveness at minimum cost" basis.

The problem of military research and development has special significance in the face of mounting evidence of Soviet progress in new weapons technology. Accordingly, this paper limits its specific discussion of Department of Defense problems to those having to do with research and development.

Military Research and Development (R&D)

The basic needs of R&D can be simply stated: competent men, money, facilities, proper administrative environment, and sound organization.

Competent Men

With the end of the war, the National Defense Research Council—Office of Scientific Research and Development was disbanded. The nation's outstanding scientists, who had so ably managed wartime development of the atomic bomb, radar, proximity fuzes, etc., returned to their universities and research laboratories. Simultaneously, with explosive demobilization, the three services lost many of their military and civilian technical men, who did such an outstanding R&D job during the war in fields such as aviation, which were not covered by the NDRC-OSRD.

Since then, only a few outstanding scientists have been willing to accept full-time assignments in military R&D. For example, a major fraction of all past military R&D budgets has gone into the field of aviation; yet, an outstanding aeronautical scientist has never been the top defense official for research and development. Similarly, although the three services have been working hard to improve their military and civilian technical staffs, inadequate military personnel policies and salaries and the outmoded procedures of the Civil Service Commission have made progress extremely slow.

On the national scene, the Bureau of Labor Statistics put out a report in the late 1940s which said, in effect, that there was a glut of scientists and engineers. Ironically, during this same period, the military R&D budget was being limited because of an alleged shortage of scientists and engineers!

The Soviets are now training scientists and engineers at about twice the US rate. As long ago as 1952, then Under Secretary of the Air Force Roswell A. Gilpatric warned that, unless we stepped up training of scientists and accelerated the pace of our R&D effort, we would, eventually, lose the race for qualitative supremacy of weapons to the Soviets, by default. We are now in the process of seeing this happen.

There is no easy solution to the shortage of trained scientists. Many of the things which might be done are mentioned above, as items for study by the President's Science Advisory Committee.

Certainly, we must make science careers much more rewarding than they presently are. The Soviets have far outstripped us in this field, as is witnessed by the social and economic prestige they accord their scientists. Awards and recognition such as the Fermi Prize, now awarded annually by the Atomic Energy Commission and the Atoms for Peace Prize of the Ford Foundation should be extended into other scientific fields besides atomic energy.

R&D Budget

The military R&D budget has been inadequate every year since the end of World War II, with the exception of the calendar years 1950-52. Furthermore, we have twice made a fundamental blunder in equating a *stable R&D program with a constant R&D budget*. In fact, so long as the Soviets choose to engage us in an armaments race, the military R&D budget must continue to rise steadily, in pace with the Soviet effort.

The reason for this is simple. Each successive generation of weapons has better performance, to match the gains being made by the enemy. These performance improvements are bought by geometric increases in the cost of prototypes of military hardware. Thus, if the R&D budget remains stable, we reach a point where we can no longer initiate new prototypes.

This happened during the Johnson economy era, prior to Korea. For some two years, the Air Force did not have

enough R&D dollars to lay down any new prototypes. We went into the Korean War with only one fighter capable of matching the Soviet MIG-15. That fighter, "our" F-86 Sabre, was equipped with a jet engine designed by the British, and a sweptback wing designed by the Germans.

The same thing has happened since 1953. In spite of the fact that it appears otherwise because accounting procedures have been changed periodically, the R&D effort has been slowed down over the past five years. For example, the dollars for Air Force R&D work in industry during the current year were programmed at some \$120 million less than they were during the last fiscal year of the Truman administration.

The figures put out recently by the National Science Foundation on the national R&D effort are helpful in considering this problem. Whereas the gross national product has grown about four percent per year, the total R&D effort of the nation (for both civilian and military purposes) has increased by about thirteen percent each year.

This basic statistic is enormously important. It indicates that, as the world gets more and more complicated, it takes a progressively greater effort to invent new things. Thus, if we wish to stay ahead of the Soviets, we cannot "solve" our shortage of scientists and engineers by cutting down on military R&D programs and discharging technical people, as we are now doing.

Rather, we should be stepping up both technical training and our military R&D programs.

In the field of military aviation, the present R&D budget is inadequate by a figure of perhaps \$250 million per year. If the Soviets choose to continue the armaments race, it is not unreasonable to foresee a military R&D program in aviation alone amounting to as much as \$5 billion per year by 1975.

There appears to be a misconception in the Executive Branch of the government that industry should "foot the bill" for military R&D. This should and can be done, to some extent, in fields such as electronics. In aviation, it simply cannot be done, for two basic reasons:

First, commercial sales of aircraft do not produce sufficient profits to let industry support military R&D programs.

Second, profits on military production contracts are too small, industry's R&D charges against those contracts are mostly disallowed, and the Treasury Department has been reluctant to allow tax write-offs on industry dollars spent for new prototypes.

Actually, it would take more than the entire net worth of the aircraft industry to support the military R&D program for one year at its present rate.

The military R&D budget must increase steadily, so long as the pace of the R&D effort of our Soviet competitors continues to accelerate.

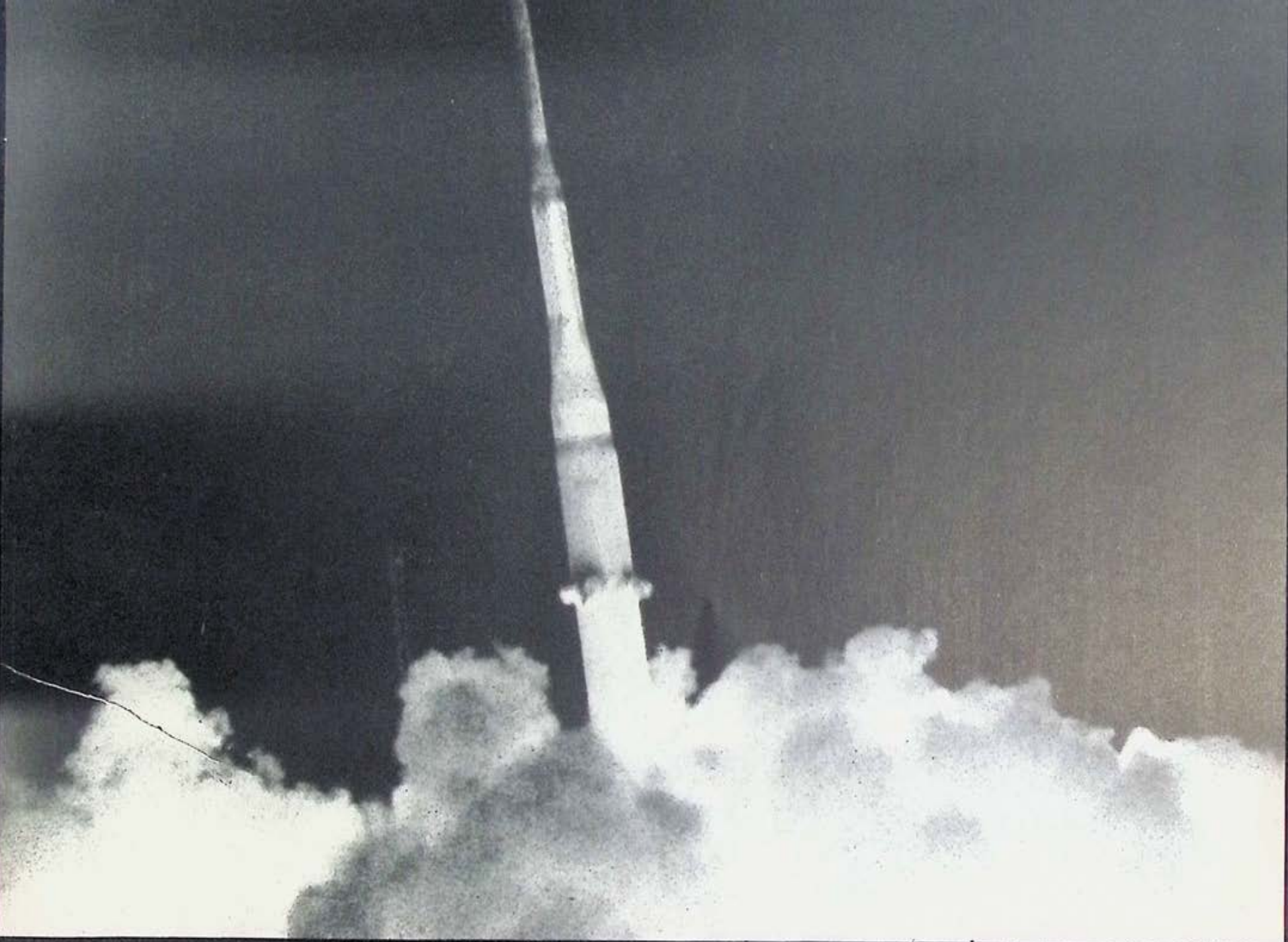
The Secretary of Defense should submit promptly to the NSC a statement of additional R&D budgets required.

The objective should be to outpace the Soviets in aeronautical technology. No artificial "guide lines," limiting in advance the monies to be requested, should be imposed on the Defense Department.

R&D Facilities

Regarding R&D facilities, a long time-cycle is involved in getting major construction programs approved by the Pentagon, and getting authorizing legislation and appropriations passed by the Congress, as part of the Public Works program. As one example, let us take the Engine Test Facility (ETF) at the Arnold Engineering Development Center (AEDC), in Tullahoma, Tenn.

(Continued on page 48)





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The ETF is capable of testing full-scale jet engines under simulated flight conditions. The basic facility was designed and constructed in Germany, and was operating in Munich in 1945. There are many horror stories about how long it has taken the Soviets to reassemble various industrial plants, either purchased or seized abroad. In this case, and in many others like it, the US out-Russians the Russians.

In spite of the almost frantic efforts of the Air Force, the Engine Test Facility *was not put into operation again until 1953, some eight years after it was taken over from the Germans.*

During this period, American airpower was severely handicapped due to a shortage of full-scale jet engine test facilities. We got off to a late start in the development of jet engines, after the war. Many aircraft were lost due to jet engine failures, at a cost of many lives and millions of dollars.

The entire cost of building full-scale engine test facilities could have been amortized for a fraction of the cost of jet aircraft lost. Yet it required an incredible administrative struggle, lasting many years, to get program and budget approvals.

The story repeats itself in the case of practically every large military R&D installation constructed by the government. It is a dreary story, in which our military and civilian scientists see their projected and urgently required facilities slowly grow obsolescent, while they struggle and wait for program approval.

A joint task force, composed of representatives of the Department of Defense, Bureau of the Budget, and the Military Affairs and Appropriations Committees of both houses of Congress, should study this problem and recommend appropriate action at an early date.

R&D Administrative Environment

The post-World War II economy era forced the Defense Department's Research and Development Board (RDB) to place major emphasis on "policing," i.e., to "prevent duplication." As the fight over unification emerged, the three services began staking out their future in the fields of new weapons development. This made the policing function of the RDB all the more difficult. At one point, the RDB had an organization of several hundred committees, panels and subpanels, and several thousand consultants, enmeshed in organizational procedures which sometimes required as much as two years for approval of a major R&D program.

During this same period, the Office of the Assistant Secretary of Defense (Comptroller), the Bureau of the Budget, the General Accounting Office, and the Comptroller General gained strength and began exercising more control over research and development projects. Simultaneously, armed services procurement regulations and property accounting procedures were rewritten, often adding to the administrative red tape involved.

Thus, while the top defense R&D organization was engaged in a futile attempt to achieve a degree of coordination which the three services were organized not to permit, an amoebic bureaucracy slowly enmeshed the R&D organizations of the Army, Navy, and Air Force.

This brief historical note leads to one basic point: if the Department of Defense is reorganized to eliminate *undesirable* competition among the three services, the major reason for the myriad of centralized controls imposed upon the military R&D effort by the various arms of the Executive Branch of the government and the Congress will have been eliminated. It should then be possible

to construct anew a proper administrative environment for military R&D.

R&D Organization

There have been two schools of thought on the R&D organization. One has maintained that a civilian-type organization should be set up outside of the Department of Defense, similar to the British Ministry of Supply. The other has contended that the military must retain control of the R&D organization, using civilian scientists only as employees and consultants.

What actually is needed is a mixed organization, composed of military and civilian scientists, in which people are assigned solely according to their technical and administrative competence.

The military man brings to the job a sense of mission, born of the knowledge that he may one day have to fight and die using the weapons that come out of his R&D effort.

The civilian scientist can bring to the military R&D effort a level of scientific training and insight which has been achieved by the military man only in rare exceptions. Both civilian and military scientists are essential to the task. One cannot do without the other. The basic need is to create a unique administrative environment for military R&D first, as recommended above. Then, almost any reasonable organization will produce results.

The urgency of an increased effort in this field, thanks largely to Sputniks I and II, is now generally acknowledged. By and large our shortcomings in this vital field would be overcome, should the reorganization suggested in the preceding portions of this article come about. For, as Trevor Gardner has pointed out in a recent *Life* article, we have bogged down in missiles and satellites because of (1) inadequate funds, and (2) an administrative jungle of government by committee.

The President's action in designating Assistant Secretary of Defense Holaday as the Pentagon's missile czar is encouraging. But it must be made clear that Mr. Holaday is, in fact, a decision-maker and not a coordinator, that he is indeed "clothed with all the authority the Secretary himself possesses in this field, so that no administrative or interservice block can occur." One way to insure this would be to designate Mr. Holaday's job as that of Deputy Director of Defense for Missiles.

There are additional problems, if we are to meet successfully the challenge of the Technological War. One is covered in some detail in the statement issued by the Board of Directors of the Air Force Association at Colorado Springs on November 2 (*see page 31*). It concerns the need for maintaining an informed and enlightened public without jeopardizing true military secrecy. The other is the need, expressed by the President, for the pooling of the scientific resources of the entire Free World to meet the threat of the burgeoning technology from behind the Iron Curtain.

It all adds up to a tremendous undertaking, with short-term decisive action coupled with long-range reorganizing and planning. One will not do the job without the other.

The foregoing is presented, not with the idea of being a panacea for all our scientific ills, but with the thought that we cannot meet the Soviet challenge without first recognizing the magnitude of the task facing us. Then we must demonstrate our willingness to pick up the technological gantlet which the Soviets have flung at our feet, else we inevitably will lose the freedom which was purchased for us by the blood and sweat of our forebears.

—END

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A Special Report

How Much Time Is LEFT?

(The source of the following information cannot at this time be revealed. It represents the thinking, however, of a group of highly placed individuals who are charged with the responsibility of attempting to insure the survival of this nation in the face of nuclear attack. It is alarming in its contention that the period for catching up has already passed, that a shift in the balance of nuclear striking power is inevitable, and that this will come in little more than a year, no matter what action the United States may take in the meantime. We commend the following material to your attention and sober consideration.—THE EDITORS.)

THE continued and heavily emphasized advances in long-range rocketry made by the USSR since the end of World War II, as publicly evidenced by Sputniks I and II, lead to some hard and inescapable conclusions regarding our doctrine of deterrence.

The various factors of deterrence upon which we have relied in the past are rapidly losing their validity, and some are already of questionable value. Let us look specifically at the factors that comprise deterrence. First, however, a definition of deterrence which might serve this discussion:

"Deterrence exists when allied offensive and defensive strengths, probably remaining after an initial Soviet attack, constitute a force adequate to inflict upon the USSR an unacceptable level of damage."

Obviously, if these are the conditions prerequisite to deterrence, when they are absent, deterrence is gone.

At the risk of oversimplification, there seem to be three general world conditions (see chart, above) that have or can prevail in a nuclear age in a world split into two great and mutually antagonistic camps.

First—deterrence: when the net effectiveness of the combined offensive and defensive capabilities of the USSR are less than those of the US and its Allies. Referring to our definition of deterrence, you will understand the value of the initiative factor on the Soviet side of the equations.

Second—stalemate: a lesser or questionable degree of deterrence, plus the possibility of mutual destruction.

Third—blackmail: or an invitation to war with a high probability of Soviet success.

It is apparent that we have passed the period of deterrence, that we are now approaching the end of the stalemate period and the beginning of the blackmail period. By mid-1959 we will definitely be in this period of blackmail, if indeed we are not already.

When the US has an operational ICBM, the situation

BALANCE OF POWER

1947-56			
SOVIET		ALLIED	
Offense Defense Initiative	<	Offense Defense	= Deterrence
1956-58			
SOVIET		ALLIED	
Offense Defense Initiative	=	Offense Defense	= Stalemate
1958-?			
SOVIET		ALLIED	
Offense Defense Initiative	>	Offense Defense	= Blackmail or War

will stabilize to a certain degree. But it will not begin to improve until we obtain an adequate warning system, and the balance will not be restored until we get an active defense system, and unless the decision-making machinery within our government and the time required to launch our retaliatory missiles mechanically can be so compressed as to insure successful launch of an adequate number of missiles after a very short warning period.

The time is fast approaching, particularly the period of 1959 through 1961, during which the USSR should achieve a substantial inventory of operational ICBMs, while the US will have no warning system and no active defense system against such missiles. At best it will have only a few research and development missiles which could possibly be used offensively in an emergency.

During this period the USSR will have enough missiles to strike without warning at all of the targets in this country which might be used in retaliation against them. And it will have other weapons in its inventory to reduce our other offensive weapons deployed around the world to a level of effectiveness with which their own air defense system can cope.

From every consideration we can apply—all the information we have today—the answer emerges the same. *This will be an ideal period for the USSR to blackmail the Free World.* If its objectives cannot be fully met through blackmail, this would also be the most advantageous time for the USSR to initiate war.

There is nothing the US can do to overtake this lead—to close this gap by obtaining either a reliable detection system or an operational ICBM before the USSR does. Therefore, all that can be done is to compress this time period, and to take such steps as may reduce the depth of imbalance. Every possible action that may assist in compressing this period to the absolute minimum must be taken now. There are many ways this can be done. Here are some of the most important:

- Obtain a national level decision on the degree of offense and defense required. Following and in consonance with this decision,

- Develop and establish at national level the decision-making machinery which will first insure the earliest possible operational ICBM and second insure the earliest possible detection and active defense system against the ICBM.

- While carrying out the first two actions we must raise our existing and programmed forces to peak strength and effectiveness in order to reduce the imbalance in deterrence to an absolute minimum.—END



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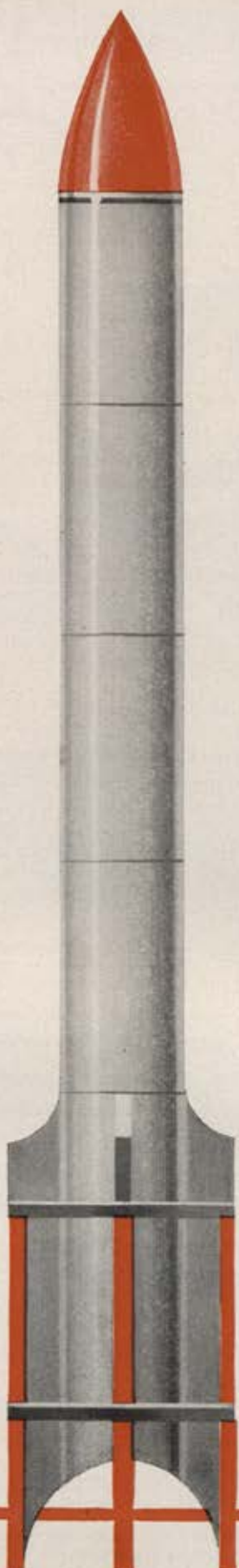
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HOW THE SOVIETS RUN THEIR MISSILE PROGRAM

By Dr. Raymond L. Garthoff

AMID all the headlines, one important aspect of the Soviet rocket, missile, and satellite achievements has so far remained unexplored—their research, development and production program, and organization. Unfortunately, not too much is known on this score, but for a better understanding of the Soviet posture and from the standpoint of the current reappraisal of our own missile program, it is worthwhile to examine what knowledge we do have of the Soviet organization and approach.

Toward that end, let's look at the Russian past. As the Soviets rightly claim, as early as the turn of the century and continuing into the 1920s and 1930s, Russian scientists like Tsiolkovsky, Kondratiuk, and Tsander were engaged in serious theoretical research on rockets. Goddard in the United States and Oberth in Germany were similarly studying rocketry. During World War II the Soviets effectively used salvo rocket artillery. But in the Soviet Union—and the United States—the first serious military missile development program began only at the end of the war, and on the foundation of the German wartime effort. To their benefit, the Soviets obtained the major portion of the German missile and rocket facilities, completed ordnance, and scientific-engineering personnel, although the United States did get the services of about 160 of the leading German scientists and engineers and about 1,000 V-2 rockets.

The Soviets immediately began a restoration of the German facilities at Peenemünde and other centers, and a continuation of the German program. They also began secretly to organize entirely independent Soviet missile research institutes in the Soviet Union. In October 1946, several hundred German specialists were quite suddenly moved to locations in the Soviet Union. There they continued their work—but independently of the Soviet research institutes and design bureaus. During the period 1950 to 1952 most of them were relieved from work on

missiles, and after a "cooling period" which varied from several months to several years almost all were returned to Germany. Many are now in West Germany.

This interesting and important aspect of the Soviet postwar approach not only benefited very greatly from what the Germans had done—and what they still continued to do—but also permitted the Russians to develop their own research staffs without becoming dependent upon the Germans, since the latter were not integrated into their program. Some specific problems faced by the Russians were cross-checked by being given to German groups, but on the whole the Germans were not permitted knowledge of the Soviet work.

Meanwhile, how was the Soviet program organized? The highest level decisions were and are taken by the Presidium (Politburo)—decisions on priority and allocation of tasks to the various working-level institutes and other agencies. Reporting to the Presidium are representatives of three ministries and one other "cabinet-level" organization: the Ministry of Defense, the Ministry of Defense Production, the Ministry of Aviation Production, and the Academy of Sciences. Unfortunately, it is not known whether there is a single coordinating chief at this level. Possibly a special "committee" of the Presidium guides this work; it is known that under Stalin there was such a Politburo committee, which included Malenkov.

The actual work on the research, development, and production of missiles and rockets is divided among institutes of the four ministerial-level bodies on a coordinated basis, without duplication. Within the Defense Ministry, Marshal of Artillery N. D. Yakovlev is believed to be responsible for over-all coordination of the various institutes. Work on surface-to-air rockets and on surface-to-surface ballistic missiles—including the IRBM and ICBM—has been conducted by Artillery Administration institutes (at least in part directed by Chief Marshal of Artillery N. N. Voronov). Guided, cruise-type, air-breathing missiles, and air-to-air rockets have been Air Force Administration responsibilities (in part under Col. Gen. of Aviation Engineering I. V. Markov).

In the Ministry of Defense Industry, under Col. Gen. D. F. Ustinov, and the Ministry of Aviation Industry, under Lt. Gen. P. V. Dement'ev, the developmental and production facilities are managed. Many of these are headed by professional military technical officers. The two ministers themselves are civilian managers who were given their high military ranks during the war.

The head of the Technical Sciences Section of the
(Continued on following page)

ABOUT THE AUTHOR

Dr. Garthoff has written numerous articles on various aspects of Soviet military and political affairs, and is the author of the book *Soviet Military Doctrine* (Free Press, Ill., 1953). His views on Soviet approaches will be outlined in greater detail in his forthcoming book *Soviet Strategy in the Nuclear Age*, scheduled for publication next year. Long a student of the Soviet ideology in its military and political ramifications, he has lectured at the National, Air, and Army War Colleges. Dr. Garthoff spent seven years with the RAND Corporation, as a Soviet specialist.

Academy of Sciences is Lt. Gen. of the Artillery Technical Services A. A. Blagonravov. Also under the Academy of Sciences is the Commission on Interplanetary Communications, which has responsibility for the space satellite and moon rocket programs. Such, then, as the "high command" of the Soviet missile and rocket program.

Reliable data on the lower working level organization is unfortunately incomplete. But there is no need for our present purpose to try outlining in detail the actual disposition of the Soviet research and testing facilities. German specialists now in the West who formerly worked for the Soviets have reported the location of a number of R&D installations. Among those reported, some of the most important are the Scientific-Research Institutes (*Nauchno-issledovatel'skii institut*, or NII) of the ministries located at Ostashkov, Khimki, Kuibyshev, and Kaliningrad. Peenemünde also remains in operation. Of the actual test areas, aside from inconclusive but logical reports of Baltic and Arctic sites, it was recently revealed that a major test site is located at Kapustin-Yar near Stalingrad, and that this site had been under American long-range radar surveillance from Turkey since 1955. Doubtless there are other facilities.

It is clear that the organizational system of Soviet missiles development is complex. But it also represents a coordinated effort geared to mobilize all the most competent military and civilian scientific talents for the overall rocket, missile, and satellite program. The system avoids duplication. There are no competing service efforts to devise, for example, an anti-aircraft missile or an IRBM, though of course different *approaches* are tried. Artillery, aviation, and industrial organizations all have important roles, but they are each assigned specific missions presumably according to their relative competence; these objectives complement one another rather than duplicate. And finally, the question of operational assignment for employment of the finished weapon systems (which we shall review presently) is decided entirely on other grounds. Thus, for example, aviation institutes develop rocket motors which are used in artillery-developed ballistic missiles.

With this organization, Soviet missiles progress has run like this: During the first three years—1946 to 1949—the main emphasis was apparently on perfecting and extending the range of the V-2. Other German missiles, especially surface-to-air, such as the *Taifun*, *Rheintochter*, and *Wasserfall*, were also further developed. Stalin personally is reported to have become very interested in a manned antipodal or "skip" bomber of super-long range with rocket or jet propulsion, and the German author of a plan for such an aircraft—Dr. Eugen Sänger—was unsuccessfully sought by the Soviets.

By 1949 the Soviets had developed an improved V-2 of 200- to 300-mile range, and they turned toward developing an IRBM. Experiments with guided cruise-type missiles and antipodal bombers continued but on a definitely lower priority than the short- to intermediate-range ballistic missiles. There was, of course, no extended interruption in their program such as there was in our own from 1947 to 1951.

By late 1953, the long-range ballistic rocket program had proved itself sufficiently for the Soviet leaders to be assured of ultimate success. Indeed, it would appear from published Soviet references that there was an exaggerated flush of expectation from December 1953 to March 1954. This was followed by a silence until the spring of 1955, which suggests that perhaps a more sober second look, or a hitch in the program during

that year, had occurred. But again, in the spring of 1955, the air of confidence returned to the Soviet references.

The latter part of 1955 saw a second breakthrough. Large numbers of 800- to 900-mile "junior IRBMs" were successfully tested. By late 1956, the first 1,500- to 1,800-mile IRBMs may have been tested. By mid-1957 the first ICBM test rockets were launched, and in August 1957 the Soviets startled much of the world with their announcement of a successful ICBM test, although it still is unclear if the range was as great as their anticipated requirement of 5,000 miles. More probably it was about 3,500 miles.

Meanwhile, the satellite program reached the stage of requiring the formation of the special Commission on Interplanetary Communications in about September 1954 (it was officially announced only in April 1955). The first and second Sputniks immediately followed the ICBM—and no one can be sure when the Soviets will launch the first rocket to the moon. Also importantly, if less spectacularly, the Soviets have been perfecting (and now have operational) both surface-to-air and air-to-air defensive missiles.

We have noted that the Soviet development program has integrated the work of various artillery, air force, scientific, and industrial institutes. What of the operational assignment of these various weapons?

The Soviet military establishment, under the *really* unified Ministry of Defense, is divided into four forces headed by commanders in chief: (1) the ground forces, (2) the air forces, (3) the navy, and (4) the air defense command; and two other autonomous forces headed by commanders; (5) the long-range air force, and (6) the airborne forces. Thus, the air defense forces are *not* a "joint" air force and army command; they are a completely integrated and autonomous command composed of radar-warning personnel, anti-aircraft artillerymen, and fighter-interceptor fliers of the *air defense forces*. The air defense artillerymen have conventional AAA and surface-to-air rockets and guided missiles; the interceptors have air-to-air missiles in their armament. The ground forces have in their field artillery rockets and missiles up to and including the junior IRBMs of 900 miles' range. The navy has surface-to-air, air-to-surface, and submarine-mounted surface-to-surface missiles. The tactical air forces have air-to-air rockets.

One important question remains not fully answered: whether the long-range IRBM and the ICBM will be assigned to the ground forces' rocket force. Most likely, the latter will be established. Probably a new "Strategic Striking Force" will be created, made up of two components: the present long-range air force (under a marshal of aviation) and the new long-range rocket force (under a marshal of artillery), with the whole command under a "marshal of the Soviet Union." This would parallel the existing Air Defense Force, and continue the trend toward mission orientation of Soviet military organization.

The Soviet rocket and missile development program is largely managed by various military and industrial institutes closely coordinated in an integrated plan under the direction of the top political leadership. Operational subordination of the resulting missile systems is in terms of functional *mission* forces rather than traditional land, air, and sea "services." While a closer inspection of the advantages and disadvantages of this system for our own forces might or might not lead us to judge it inferior to our own approach, it might on the other hand offer some valuable suggestions for improving our own programs.

—END

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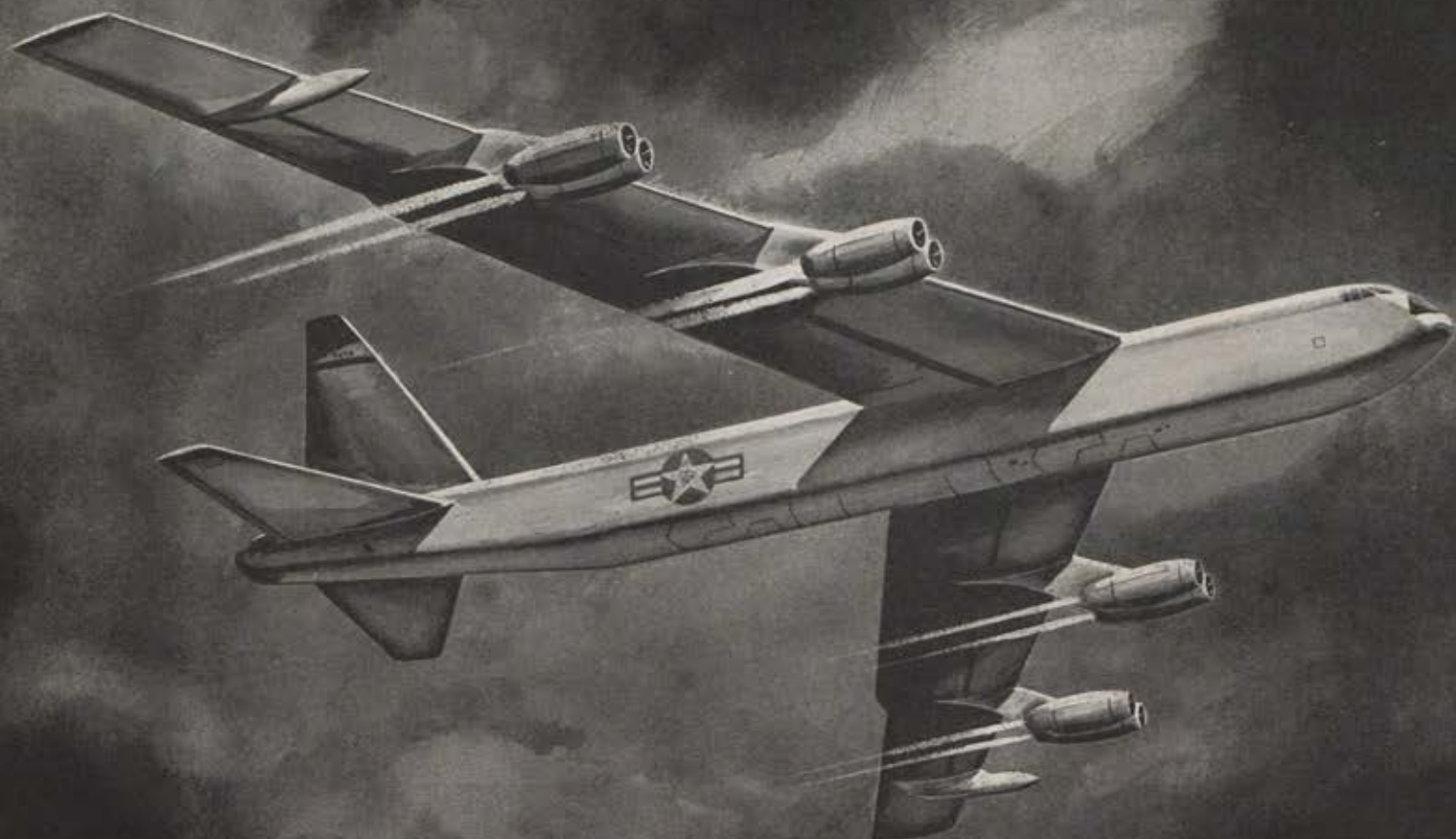


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Aeroflot route map, assembled by the authors from timetables, showing the more than 200,000 miles of Red air lanes.

4,000 miles on Soviet airliners

We Flew Aeroflot

By Richard E. Stockwell and Blaine M. Miller, Jr.

FOR A LONG time now it has been fashionable to make fun of Soviet air transportation because it lacks sophistication. Without mitigating that criticism, it is important to point out that the Russians have a system well geared to their needs, and well on its way to becoming one of the great air transport systems of the world.

This past June, the writers traveled some 4,000 miles on Aeroflot, the Soviet state airline, aboard IL-14s and IL-14Ms, and the TU-104 jet transport from Moscow to Prague. Our general impression was of a sound air operation, with a good record for safety and operational probity, on the verge of a great expansion program to increase its service and bring it into competition with the world's other major air carriers.

We rode on Aeroflot's IL-14s from Riga to Leningrad, and from there by

night flight to Adler on the Black Sea, from Tiflis to Moscow on a daylight flight, and finally, from Moscow to Prague aboard the TU-104.

What we saw of the airline's operations showed its concentration on basic Soviet needs. Our flights reminded us of some of our US feeder-line operations at times, in which the practicality of transportation between points was the important thing. There was no red-carpet treatment. Meals with champagne, stewardesses fussing over passengers, were notably absent—but the airplanes were precisely on time, piloting was competent, and mechanical operation of the IL-14s seemed very good.

Aeroflot is designed for the transportation of air cargo as well as passengers, and its airplanes are equipped for both in about equal proportion. Its workhorse plane is the IL-14, which carries eighteen passen-

gers. Most of the IL-12s evidently have been turned back to the paratroops of the armed services. The IL-14M carries twenty-four. This aircraft weighs about 36,000 pounds gross, or about 14,000 pounds less than the Convair 440.

Air freight is very important to Russia, despite the failure of Soviet statistics to reveal just how important. The country is wide, covering some eleven time zones and 4,000 miles from Leningrad on the Gulf of Finland to Magadan, on the Manchurian coastline. Industry is dispersed, with many key factories located in the interior. There is a fair degree of industrial integration among plants, and it is Aeroflot's job to haul many key items to keep production lines humming. At the same time, the airline carries many luxury items. This is particularly true of flights into

(Continued on following page)



The TU-104 at Prague. Note chin radar and astrocompass dome. Craft cruises at 500 mph, has range of 1,900 miles.

At left, the IL-14, parked at Moscow's Vnukovo airport. Plane is equipped with VHF and ILS, cruises at 200 mph.

Moscow. En route there from Tiflis, we saw many odd little handmade crates packed with peaches from the south, and other fruits and fresh vegetables which fetch a high price in the capital.

Aeroflot, we were told, is profitable, Communist-style, because it pays no interest on money it borrows from the state, and buys aircraft in large lots—never fewer than twenty-five to an order—as well as accepting some costly military operating features in order to avoid expensive retooling. A case in point: twenty-five TU-104s were ordered initially by Aeroflot. Many of this plane's features, such as the navigator's nose and the radar operator's chin-box, point up significantly the short distance between commercial and military aircraft production in the USSR.

During the past two years Aeroflot has gone through a tremendous change in equipment. IL-12s, the backbone of the airline since World War II, were turned back to the VDV, the paratroop organization of the armed services, and IL-14s were substituted. Actually, the two airplanes do not differ greatly, although the IL-14 has more powerful engines, a little more speed, and incorporates a great number of minor refinements, including more navigation equipment. For navigation it is one of the best-equipped airplanes in the world.

Instrument landing system equipment is standard for Aeroflot, and every airport we saw had ground control approach equipment suitable for military and civil operations. There was long-range radio equipment aboard our IL-14s for communications control centers. For the flight between centers, the aircraft is equipped with an astrocompass, which

shows as a clear plastic dome atop the fuselage. Both VHF and regular-wave radio have been installed, with four posts of varying lengths for VHF. In addition, all passenger-carrying Soviet aircraft are equipped with a radio altimeter, an innovation we had not expected to see in this so-called "backward" country.

So many reporters have returned from the USSR with vivid stories about how the pilot followed the railroad track or the road in getting from one place to the next that an explanation is in order. This method is common because no Russian commercial plane now in regular operation is pressurized except the TU-104. This means that for passenger safety, 10,000 feet is maximum altitude for the IL-14s. And when the pilot encounters a line storm, as he did on our flight from Leningrad to Minsk, he takes the craft down to about 2,000 feet and flies just ahead of the rolling line squall. With that technique, the air was smooth, and except for the heat of the plains at that low altitude, the flight was quite good.

However, on another occasion, when we flew from Tiflis to Moscow, most of the flight was made above the clouds, at about 10,000 feet, where the air was smooth and clear. Letdowns were well executed and aligned with airport traffic patterns, and the plane clearly was kept on the beeline course all of the way, indicating the Russians know their all-weather navigation.

Many airports in Russia have yet to be paved. Sod runways become severely rutted with the changing seasons. But more and more hard-surfaced runways are being installed, like the new cement runway at Tiflis

being readied for the TU-104. Or, the new runway at Kutaisi, where landing lights were being installed on about a 6,000-foot strip.

But generally, runways at such key industrial cities as Stalino and Khar'kov are short by US standards—something less than 4,500 feet long. In both cases they have been lengthened with steel mats to accommodate MIG-15s and MIG-17s. Two such aircraft usually were on ready-alert at the end of the runway at most airports where we stopped. If they weren't, it usually meant there was a military field to accommodate them not far off.

The lack of paved runways is a reason why Aeroflot has stuck to its twin-engine transports. Even the recently announced AN-10 *Ukraine* (AIR FORCE, Nov. '57), a four-engine turboprop, has been built with a special gear that spreads the weight to land it on sod, since most airports will not have paved runways by the time the AN-10 goes into regular service.

Within the next year or two the Soviets will introduce two or three more new transport aircraft. The TU-104 twin-jet already is known for its daily flights between Moscow and Prague; to Khabarovsk and Peiping; and to Tashkent and Novosibirsk. The TU-104A version of this plane, fitted with seventy seats for passenger traffic, carries more payload. The new TU-110, a four-jet transport, is akin to the TU-104 in the same manner that the Bison bomber is akin to the Badger. The TU-110 will handle up to 100 passengers in tourist seating, about seventy-eight in first-class seating. The AN-10 *Ukraine* carries up to eighty-four passengers in the tour-

(Continued on page 61)



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WE FLEW AEROFLOT

CONTINUED



TU-104 took about 5,000 feet of runway on takeoff at Prague. Three-quarters of a mile out, it's no higher than this, and plane's wheels are still down.

ist version and is powered by four turboprops. The new *Moskva*, designed by Ilyushin, also is powered by four turboprops, and rather closely resembles the Lockheed Electra, now being built in this country. Two more new transports, a turboprop and a turbojet, may appear soon.

Within a year Aeroflot will have something over 100 new jet and turboprop aircraft. It is only an estimate, but we believe this means that Aeroflot roughly will double its seat-mile capacity in one fell swoop. This represents an enormous change, and while the growth in airline passenger traffic has been quite impressive in Russia, it will have to grow even more rapidly in the next few years if its planes aren't to run empty a good deal of the time.

If we assign (as Soviet statistics in fact do) an index of 100 to air passenger traffic in Russia for 1940, we find that the index had climbed to 728 by 1955. This is a growth of more than 700 percent. And by 1960, according to Soviet predictions, air transportation will be twenty-two times what it was in 1940. Thus, something like a 1,500 percent growth is predicted for the years 1955-60.

However, they will not be able to achieve their passenger-carrying potential unless they can get more people to ride their aircraft, which they are working on by trying to cut air fares. Right now, hard seats aboard a train from Tiflis to Moscow cost 220 rubles, and the trip takes two days. But to most Russians this represents no great hardship, and they take the train rather than Aeroflot at 507 rubles for soft seats and a seven-hour flight.

Already some fares have been adjusted slightly to encourage traffic, and it is possible that air fares will be cut radically as more equipment becomes available and Aeroflot has the extra seats to offer. It is also likely that the number of airports re-

ceiving Aeroflot service (about 135 to date, including airports in foreign countries—see map) will be increased over the next few years. Both Soviet industry and population have gone through quite a shift eastward since the basic pattern of Aeroflot's routes was established, and it would appear that considerable route expansion is due in Siberia. At present the airline has something like 200,000 route miles.

Aeroflot has made clear that it will enter the international air transport field in earnest in 1958. One route it is eager to exploit is Copenhagen-Tokyo. Soon TU-104s will be operating from the new, long runway especially built to accommodate them at Copenhagen. From there they will fly to Moscow, across Siberia and, for the moment, they will terminate in Peiping, but the Russians have made known their desire to continue on to Tokyo. Such a route—because it is shorter than existing routes connecting Europe and the Far East—would siphon traffic from carriers already experiencing sharp competition over the route through the Middle East and southern Asia.

Similarly, Aeroflot wants to get into the transatlantic race, and there are indications of Soviet interest in Latin America and Africa. The airline is in a position, of course, to charge some of the route operations off to political purposes, always the prime goal of a Communist country.

However, before Aeroflot can compete very satisfactorily on such routes, it will have to improve its aircraft, both from an operational and comfort standpoint. Today's world air traveler is a pampered fellow, treated to the extras that strongly influence him to travel by air in the first place.

We rode the TU-104 from Moscow to Prague, and there is no question that while the craft represents a very great achievement, it will not be

(Continued on following page)



The AM-3 engine, photographed by the authors in Moscow Air Museum. The casing is split horizontally and radially. Bolt heads for stators appear through casing wall.



Reverse view of the engine. Note small gas turbine in nose cone for starting the larger turbine. Small turbine is sixty hp. AM-3 engine is about 48½ inches across.

competitive with other jet types that soon will be in service.

The TU-104 is based on a bomber design, and so it is heavy—far too heavy to be economical. The airplane weighs about 150,000 pounds and carries fifty first-class passengers. It has a range of about 1,800-2,000 miles, absolute.

Compare this with the French Caravelle, which weighs about 90,000 pounds and will carry the same number of first-class passengers about the same distance. The Caravelle is quiet—almost silent—one has to listen to hear the engines. The TU-104, especially toward the rear of the cabin, is noisy, and the jet exhausts set up a turbulence around the tail of the airplane that causes much vibration and possible structural problems.

The Caravelle, in production version, will have two Rolls-Royce Avons of 11,500 pounds thrust each, while the TU-104 has two AM-3 engines of about 15,000 pounds thrust each. Further, the TU-104 has a very high fuel consumption—something in excess of 0.90 pound of fuel per pound of thrust per hour.

Furnishings in the TU-104 are rather old-fashioned, representative of a kind of Russian Victorianism rather common in the USSR. But for competition on the world's air routes Aeroflot has much to learn about decor from lines like SAS, KLM, TWA, Pan American, and others.

TU-104 pressurization is quite inadequate. At 30,000 feet, cigarettes were slow-burning and for the first time in our lives we were conscious of our breathing. Apparently pressurization on our flight (and other Americans we met reported similar experiences) was maintained only at about 14,000 feet. For those who might need them, oxygen masks were available, however.

We were fortunate in getting a good look at the engine in the TU-104. One now reposes in the Air Museum in Moscow (see cuts).

Its diameter is very close to 48½ inches. It has an eight-stage compressor; inlet guide vanes are variable. None of the stator blades is variable, however.

The turbine wheel has seventy-eight blades, and we could not be sure whether there was or wasn't a second stage to the turbine ahead of the nozzle guide vanes. We were not able to see far enough up the engine to determine this. Although published data indicate that there are two turbine stages, we cannot verify this as a fact. If there are two, the Russians would appear to have accomplished a magical feat in getting two turbine wheels and the burners in the short section available to them behind the compressor.

The burner section is short, and the burners are of annular type. There are fourteen fuel nozzles. Bleed air is fed forward for deicing of inlet guide vanes and front frame struts.

Both turbine and compressor blading lack sophistication and indicate quite clearly that this engine has a low pressure ratio (five to six) as well as a relatively high fuel consumption.

The most interesting feature and only true innovation is the small gas turbine buried in the nose cone. This engine, which generates sixty to 100 horsepower, is used to start the main gas generator. All Russian commercial

airplanes have self-starters, and this device is in keeping with general practice. The small gas turbine is started by an electric motor.

Once it is fired up, the small gas turbine gets the large turbine up to speed for firing in about thirty to forty-five seconds.

The AM-3 engine is temperature limited, we are quite certain. Current Russian turbojets are running at turbine inlet temperatures in the neighborhood of 1,600 degrees Fahrenheit, and we observed after takeoff that the pilot cut back his engines a little as soon as the wheels left the ground. He cut them back a little more as soon as he had gained a few hundred feet.

Thus the TU-104, as can be seen from the pictures, makes a slow climb.

But whatever its faults, there is no question that the Russians have made a remarkable accomplishment with the TU-104. Considering that the Soviets had no jets at the end of World War II and a tremendous amount of technology to catch up on, for them to have come up with the first operationally proven jet transport in the world is no small achievement. The USSR is making its mark in air transportation, and speeches in praise of US science and engineering won't change the pace of their advance.—END



ABOUT THE AUTHORS

Authors Blaine M. Miller, Jr., left, and Richard E. Stockwell took leaves of absence earlier this year from their posts with General Electric to tour the Soviet Union and get a first-hand look at the operation of the USSR's civil airline, Aeroflot. Mr. Miller is employed by General Electric as a mechanical engineer specializing in advanced preliminary design at the company's Flight Propulsion Laboratory in Cincinnati, and Mr. Stockwell, long a student of military airpower, is the author of a recently published book, *Soviet Airpower* (Pageant Press, New York, \$7.50). Mr. Stockwell is a management information analyst at General Electric's Aircraft Gas Turbine Division, also located at Cincinnati.



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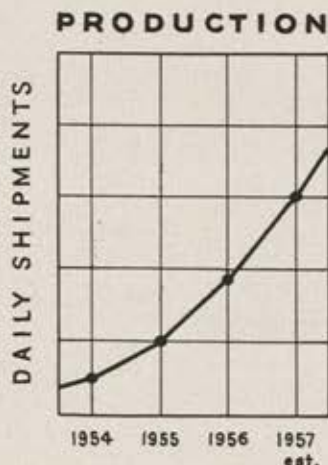
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For several years our military leaders have been pointing out these several factors concerning national defense:

- If World War III comes, it is highly likely to be won or lost with the forces in being. A few reserves may get into action, but by then the issue will most likely be decided.

- All three services are having a highly expensive and dangerous turnover of technical personnel. Billions of training dollars are being lost because these personnel are leaving the service for better paid jobs in industry.

- Drastic measures must be taken to retain trained personnel in order to cut costs and have a professional force in being.

The matter was considered so serious that a committee of outstanding and capable citizens was requested to study the problem of retention and make recommendations. The Cordiner Committee did that.

This is not to belabor the lack of action taken on the Cordiner Committee's recommendations. The fact that the committee was appointed is mentioned merely to indicate that the government was aware that the retention of highly trained personnel was the number one defense problem. However, it should also be pointed out that the Cordiner Committee did report that if we could *increase the retention rate*, if the services could retain a bigger percentage of the trained personnel they now lose to industry, then the annual saving would be in the billions of dollars and the effectiveness of the force in being would increase at least twenty-five percent.

The price of democracy, its freedom and justice which are maintained by a double check and balance system, is red tape. Democracy is slow in responding to the will of its people; it is slow in making itself more efficient. It is understandable that action based on the Cordiner Committee's recommendations has lagged. Reform always has to be fought for.

Then, suddenly, all three services were ordered to reduce their forces. A second reduction was also ordered,

and a third was promised. Economy was given as the justification.

Few officers of the armed forces are in a position to question whether this nation dares risk reducing the armed forces at this time. Such problems are resolved at high levels. Still fewer officers are in a position to judge whether the economic dangers of sustaining the recent level of our armed forces are greater than the military risk of lowering them. However, they are in a position to judge what these reductions will do to the retention program and how those reductions will increase costs, not lower them.

The reasons why people stay in the service are many and varied. However, the services can never hope to keep people in by merely matching industry dollar for dollar. The two systems cannot be compared accurately since industry is based on an eight-hour day while the services are, and must be, based on a twenty-four-hour availability basis. The government could not afford to pay the overtime which service personnel work.

The things that keep the greater majority of career people in the services are that they can learn a technical trade or profession, work for twenty years in a job where they feel they are needed and "one of the vital team," and then retire if they desire at half pay at a comparatively young age.

The service people who stay in know that industry rarely has pensions to match that. They are willing to overlook service life inconveniences such as the continual moving, the long periods of being away from one's family, and the disruptions of their children's education. They suffer those for the independence and the security which that pension plan gives. Naturally, pride of belonging to a military organization so devoted to peace, pride of being vital to the defense of the United States, helps. But considerations for the future welfare of themselves and the education of their children must take first priority. The premise upon which our constitution was written and this government was established

was that such an organization could better serve the individual, his needs, and his welfare. That premise has bred loyalty.

That pension plan does give independence. After twenty years of service, many servicemen and women will not yet be forty. With their training and with that fifty percent pay pension, they know that they will have time to decide where they desire to live, what they desire to do, and for whom they desire to work, if they desire to augment the pension.

With the present reductions, the retention program no longer has the twenty-year retirement plan as its best selling point. When a full colonel with a record of sixteen years on active duty in the Army is given the choice of being a corporal or a civilian, enlisted men and young officers become very hard to convince that they should work for less than industrial wages with no extra pay for overtime, burdened with the inconveniences of service life, in hopes that they might make the twenty years. They react with justified cynicism to statements that the "service takes care of its own" and that "loyalty is a two-way street."

In the last four years in the Air Force, the reenlistment rate of airmen has increased from around twenty to over thirty percent. It should be about sixty-five percent in order to maintain a highly professional group at low training costs and still weed out ineffectives. The present retention of officers is around twenty-five percent and should be at least fifty-five percent, thus being even more selective than the enlisted ranks.

The next few years will reveal the actual cost of the present reductions. Instead of increasing to where they should be, the reenlistment rate of enlisted men and the retention rate of officers will drop drastically. The millions saved by today's reductions will not balance the billions lost in the next ten years because—as one general so aptly puts it—"we are running a billion dollar prep school for industry."

(Continued on page 67)

AROUND THE WORLD WITH SIKORSKY HELICOPTERS



AFTER 1000 FLYING HOURS—The lead aircraft in this formation of five Army H-37As (Sikorsky S-56s) over Fort Rucker, Ala., completed 1000 hours of accelerated test flying within six months after delivery, a unique record for helicopters.

A new Army command, the Transportation Aircraft Test and Support Activity, conducted the unprecedented testing program. The big H-37A was the command's first assignment in a program designed to develop a system to provide engineering data.



OVER ANTARCTIC ICE—A Navy HO4S (Sikorsky S-55) hovers over the Coast Guard icebreaker *Northwind* in the Antarctic, supporting U. S. participation in the activities of the International Geophysical Year. Sikorsky helicopters are vital to the exploration and development of hard-to-reach areas the world over.



OVER THE BEACHHEAD—A Marine Corps HUS (Sikorsky S-58) takes off from the carrier *Leyte* during exercises in the Caribbean. The HUS normally carries up to 12 passengers, or even more for short distances. Current Marine Corps tactics emphasize vertical envelopment of enemy areas using many transport helicopters.



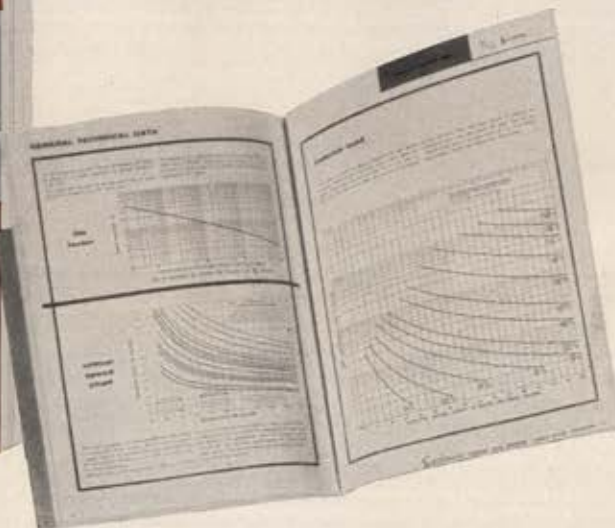
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However, the shattering blow will fall five to ten years from now. Many service personnel, those who stayed in after World War II and those who returned to active duty during Korea, are "over the hump" right now. With five or ten years to go, they cannot afford to get out now and lose what they have put into those years. They will "sweat out their chances," they will stay in and hope that the reduction does not hit them. However, *they are the largest single group in the services today.* For instance, of all Air Force officers, about fifteen percent are regulars, about sixty-two percent are career reservists, and twenty-three percent are young officers who have come in recently. The Air Force has not been successful in holding on to more than *one in every four* of those young officers.

The result is that the load today is being carried—at least sixty percent of it—by officers between thirty and forty, many of them older than that. This in itself is a weakness. Modern combat demands the young.

But far worse than this weakness is the fact that when this hunk of sixty percent retires five or ten years from now, the bottom will drop out. During that period the reenlistment and retention rates will have to skyrocket to overcome that sixty percent loss over a comparatively short period. To keep enough people in uniform, we may have to offer double the wages in industry. Remember, we have no trouble drafting enough people. The trouble is caused by not being able to selectively retain those who can absorb the highly expensive technical training.

The retention program was the number one problem in the armed forces. It had some good selling points. It had loyalty to offer in exchange for loyalty. It promised a future of being needed, a future of security and independence, in exchange for twenty years of faithful service, petty annoyances, and the ever-present strain of possible battle tomorrow. Now, a reduction in force which will cost billions has knocked the props out from under that retention program. Its biggest selling points have been rified.

—MAJ. BERT J. DECKER

Retread Major Decker was recalled to active duty in 1951. He helped activate NATO's European radio frequency agency in London and then joined Marshal Juin's combined staff in Fontainebleau. At present he is communications electronics officer of SAC 6th Bombardment Wing at Walker AFB, N. M.



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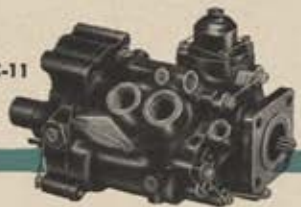
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Primer for PRESTIGE

By Dr. T. F. Staton

NOT LONG ago I was invited by a group of junior officers to join a discussion of ways to increase the prestige of airmen.

"It seems to me that we ought to get higher salaries so we can have housing and drive automobiles that induce respect," said a lieutenant.

"I'll buy that," agreed another. "And along with it let's put a stop to being questioned and investigated when you go to cash a check."

A short gripe session followed, and finally the discussion settled down to the serious question of "How?" HOW can Congress be persuaded that airmen deserve more money? HOW can cashing a check be made an easy, unquestioned matter? HOW to gain the prestige so earnestly desired? And soon the conferees agreed on the crux of the matter—that more money, check-cashing privileges, and the like were not *causes* of prestige, but *results* of prestige.

With that realization the group soon arrived at another truth—that prestige is not something *bestowed* on a group, but *earned* by the group through knowledge, accomplishment, superior behavior, and character. The conferees had begun by confusing prestige with privilege, and had reached the understanding that it was basically similar to respect, with external trappings of privilege and money falling to a group as a *result* of the group's having earned prestige. In short, prestige produces privilege, not vice versa.

As a psychologist living in a civilian community and working on an Air Force base for ten years, I was in a uniquely favorable position to examine this intangible from the standpoint of how an airman can achieve

the prestige he wants and deserves. This prestige, enhanced, not only benefits the airman but accrues to the nation, by aiding the Air Force mission of defending the nation. A service manned by people who, individually and collectively, are held in high respect by the public is less liable to injury by ill-informed or selfishly motivated persons in positions of power. Its personnel's prestige protects it from demagogues and the vagaries of political fortune. It makes possible professional rather than political control of airpower, and this means more national protection per dollar and per man.

How to enhance prestige?

The first step in developing group prestige is competent, conscientious, efficient performance of duty. The second is consistently fine character and behavior which induce public admiration. The third is public relations, not a flamboyant advertising campaign, but a habitual way of life on the part of airmen which leads their civilian neighbors, employees, associates, and acquaintances to a deep-seated respect for Air Force personnel as citizens and men. Competence, responsibility, and dedication have to be recognized before they are appre-

ciated, before they can earn prestige. Here are some principles and techniques whose application has contributed to the prestige of other groups, a kind of primer for prestige:

Be scrupulously polite and a little formal in public, business, and social situations.

Back-slapping camaraderie and a "just folks" attitude promotes a dubious sort of popularity, but not real confidence of the sort desired by citizens in men on whose nerve, judgment, skill, and discipline rest the chances of the survival of a nation.

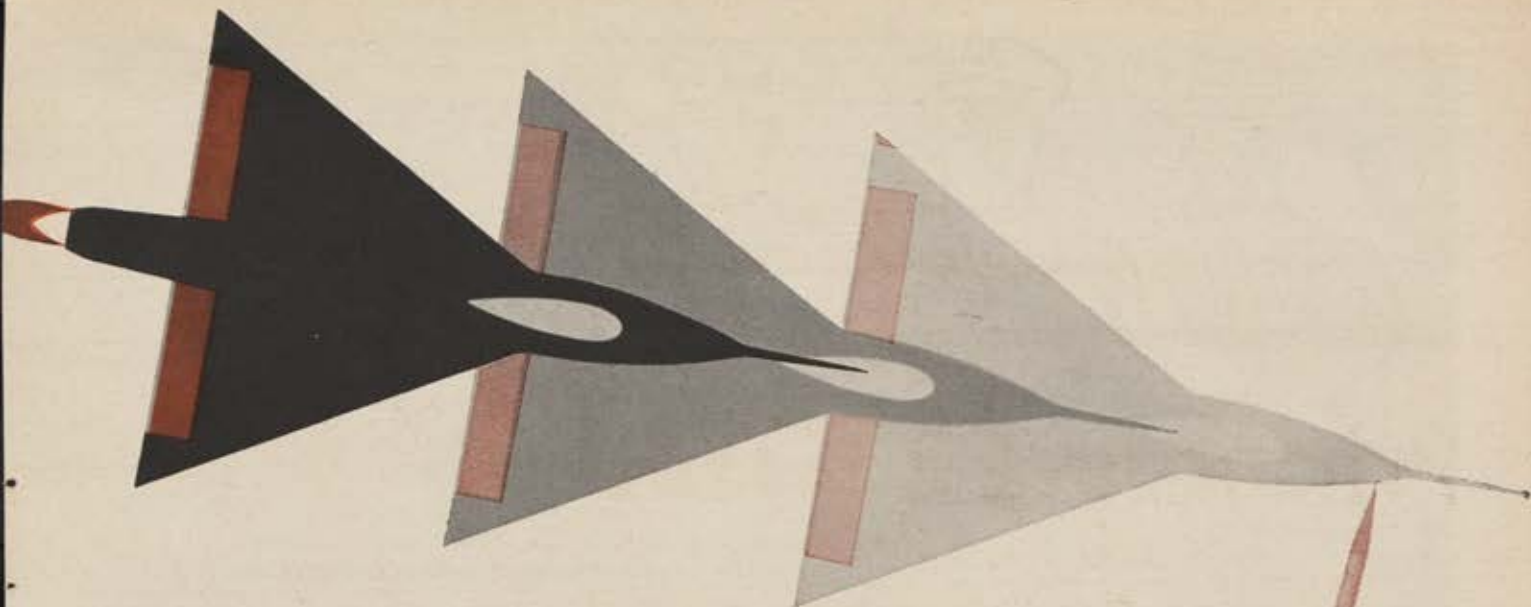
It is human nature to afford a larger measure of trust and confidence to people who appear cooler, more self-contained, more perfectly poised than ourselves. Formality, dignity, and punctilio over and above that commonly displayed by those whose business is not the life and death of the nation subtly underlines the gravity of the job of the airman. Judges, physicians, and ministers as groups tend to manifest this bit of reserve. They do it almost imperceptibly and in a manner which does not offend but still hints of weighty responsibilities setting the bearer a tiny bit apart.

Being a prig, a snob, a "wet blanket" is appropriate nowhere. But bearing one's self with the dignity befitting the seriousness of your responsibility is becoming to an airman. The Prussian tradition of the Imperial German Army which forbade an officer to carry a bag or package on the street and required him to be in formal dress or uniform from seven until nine each evening he was at home is a little extreme for American attitudes and policies. But it did identify a man as a member of a group which for various reasons enjoyed an almost incredible prestige and reputation for selfless, austere, competent devotion to duty. Tailored to American democratic social processes, formal, dignified behavior can go a long way in identifying Air Force personnel in the minds of the citizenry as calm, thoughtful, cool, dependable, dedicated men.

Airmen must relax, like everyone else, which is why service clubs are provided to supplement public recreations. Relax in your club, in your home, in the company of fellow-airmen. But maintain your dignity and self-possession in the sight of those for whose sons you will be responsible in the event of a war. You are the nation's leaders in its times of greatest crisis. The influence on life and death you wield in your sphere of action is a grave matter. Show by your de-

(Continued on page 71)





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meanor that you appreciate the gravity of your responsibility.

Emphasize the high, objective standards for airman selection, retention, and promotion held by the Air Force.

A prerequisite of group prestige is recognition by the public of the high standards of selection and competence existing for the group. Be careful in your rating of men under you, to guard jealously the Air Force tradition that ability and performance are required to qualify as even "average" airmen. No one respects a group whose standards of performance are low. See that your standards, for yourself and your subordinates, are kept high.

Let your conversation reflect this attitude and practice. When opportunity offers, refer to cases where airmen suffered career-wise for an error or low ability. Let your hearers realize that mediocrity is not encouraged in the Air Force. Emphasize the keen competition for promotion and the little things that can prevent an airman's being selected for promotion. Don't brag or be ostentatious about it, but when opportunity offers let it be known that competition among air-



men is keen (especially in peacetime) and only the competent achieve recognition.

Emphasize the "mission orientation" of yourself, your unit, and the Air Force.

In your conversation, reflect, primarily, concern with the task facing the Air Force and your interest in that job. The Air Force exists to provide security for the nation, not to provide advantageous careers for airmen. We

all know and accept that fact. But civilians can only judge the depth of your concern by what they hear you say, and the attitudes you reflect. Let your position on subjects be dictated by the criterion of how to accomplish the Air Force mission. Whenever questions of what should be done for or with the Air Force or Air Force personnel arise, evaluate such questions in terms of what will best achieve national security. Putting first things first will always enhance the prestige of the Air Force.

Don't dwell on your rights—over-concern with commissary privileges, retirement benefits, and the like. Such attitudes give the impression you are in the service for what you can get out of it. Your leaders will be in a much better position to get your rights if the public feels that you are too busy safeguarding the national welfare to bicker about your own. Since it is true that you are primarily dedicated to accomplishing the Air Force mission, why not convey that impression?

Identify yourself with the civil com-



munity in which you are stationed.

National feeling about the Air Force is, after all, only the aggregate of the feeling prevalent in thousands of communities. Only by mixing with the civil population can the traits of character and abilities discussed here be made clear to civilian neighbors. The essence of good Air Force public relations is a knowledge by the public of the quality of Air Force personnel. Mixing with the civilian community is the best way to instill this knowledge.

Living on the base, with children attending a base school and the family

worshipping at the base chapel, unfortunately, eliminates some of the obvious ways of participating in community life. But if you live in town, opportunities are numerous to know your neighbors. Chat with them, include them in your pattern of social life, and let yourself be included in theirs. Don't be afraid to take the initiative in this. Attend the PTA if your child is in a community school. Encourage your wife to help in school organizations and activities.

If you or your wife can find time to help in Scout or other youth activities, it will promote good will toward your profession as well as being a worthwhile experience for you. Participate as fully as you can in community projects and activities. Be known as one willing to help in civic enterprises. Aside from the value of this to the Air Force, you will find a rich reward in the recognition and respect you can gain among those who will come to know you. Active work in a Sunday school class is fine. So is membership in a civic club.

Develop a good knowledge of inter-



national affairs and keep up to date on developments.

Local and national politics are touchy subjects, of course, for newcomers in a community, but international relations and foreign policy are less prejudicial topics. And, Air Force personnel are credited generally with interest in such matters. Most have traveled in foreign countries, and their careers are intimately concerned with friendly and hostile foreign powers. But mere discussion is not enough. Subscribe to news magazines

(Continued on following page)

ABOUT THE AUTHOR



Educational adviser at the Air Command and Staff College, Air University, Maxwell AFB, Ala., since 1949. Dr. Staton has, in that capacity, addressed more than 10,000 Air Force officers, in addition to stints as visiting lecturer at the University of Florida and Louisiana State University. Before his connection with the Air University, he was a psychologist in the Atlanta, Ga., public school system, and during World War II he served as a clinical psychologist with the US Army. He received his doctorate in psychology in 1949 from the George Peabody College.

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and *study* carefully the news reports on foreign affairs. Make a habit of thoroughly reading at least one good daily newspaper and watch for articles on foreign problems or situations in periodicals. This is considerable reading, but no more than any professional man is expected to do in his off-duty hours to supplement his area of primary knowledge, pursued during normal working hours.

Nowhere has an airman better opportunity to promote his own reputation and that of the Air Force than through a high level of knowledge of international affairs, enabling him to converse with assurance, citing facts and authorities rather than airing mere emotionalized personal reactions born of ignorance, or vague generalities. Knowledgeable conversation will pay off in respect.

Another important point:

Many more people will remember and repeat the story of a snafu in an Air Force operation or unit than will remember and repeat a description of the competent, efficient, day-to-day operations of units. In your conversations with non-Air Force personnel, therefore, avoid anecdotes and humorous stories which would portray the Air Force in an unfavorable or ridiculous light. Select as your spectacular stories and conversation pieces facts and happenings which reflect credit on the service. Save the snafu stories for reminiscences inside the family.

Does all this limit your freedom of thought and speech? Of thought, no, of course.

Of speech among your fellow airmen, no. Among those to whom you represent not merely yourself, but the Air Force, yes. This is because you are morally obligated to consider the welfare of your service as well as your personal desires, and to censor yourself accordingly.

All of the foregoing admonitions seem to impose rigorous conditions on airmen. They do. To command the lives of men and to earn the respect that should accompany such command are rigorous tasks, and require men of outstanding ability and self-discipline. The public will respect and trust men who obviously demand of and maintain for themselves standards of perfection which few others can meet. Such respect and trust we call "prestige." It has to be earned, and earning it is a rigorous business. But it is worth earning. It means, in the long run, not merely a satisfying situation for airmen, but far more important—a greater recognition of our airpower.—END

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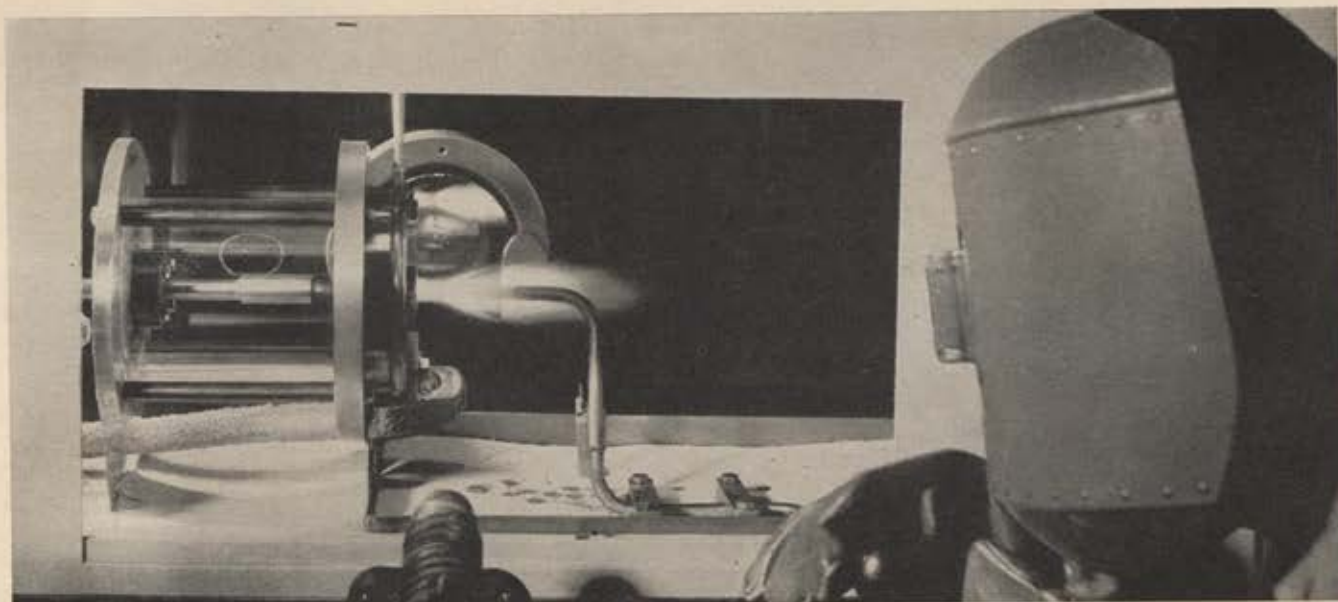


A miniature laboratory ion-propulsion model, operating at near-vacuum conditions, produces thrust which is detected by the small wheel behind the jet. Ion-propulsion units serving as low-thrust engines may be useful in space flight.

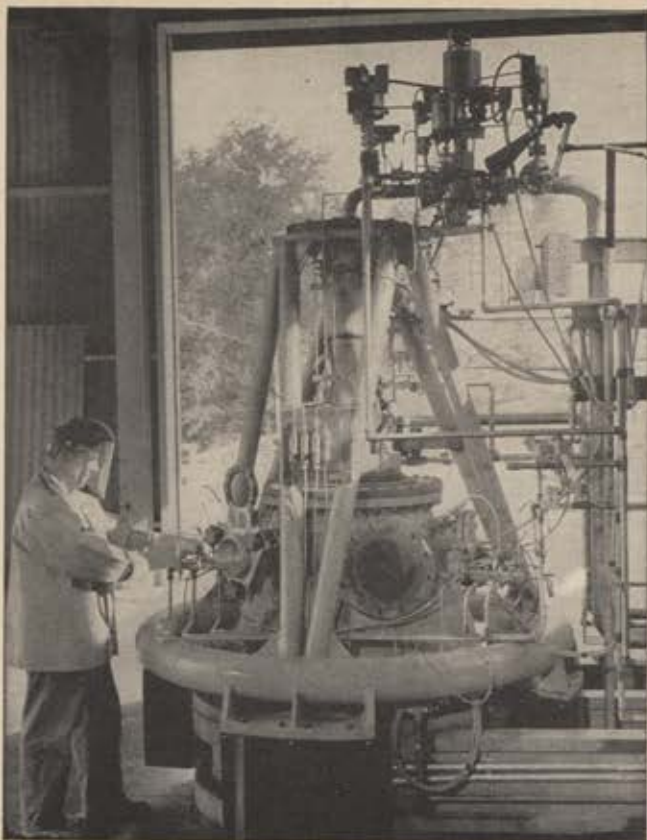
A Look at NACA's Lewis Laboratory

The Lewis Flight Propulsion Laboratory, Cleveland, Ohio, one of three major research centers operated by the National Advisory Committee for Aeronautics (NACA) opened its \$100 million facility to the press recently. Lewis, primarily engaged in analytical and experimental research

of aircraft powerplant problems and the aerodynamics of high-speed flight propulsion, revealed its latest contributions which will be used by the military services and the aircraft industry. Lewis scientists soon will be equipped with a new research reactor at Sandusky, Ohio, to enable



Plasma jet of ionized air produces a high-speed stream at temperatures of 10,000 to 20,000 degrees Fahrenheit. It is shown here disintegrating a small aircraft model. This lab device is useful in studying aerodynamic heating problems.



Technician adjusts research rocket engine mounted vertically within the tubular frame. The 20,000 pounds of thrust developed by the rocket are measured through the frame.



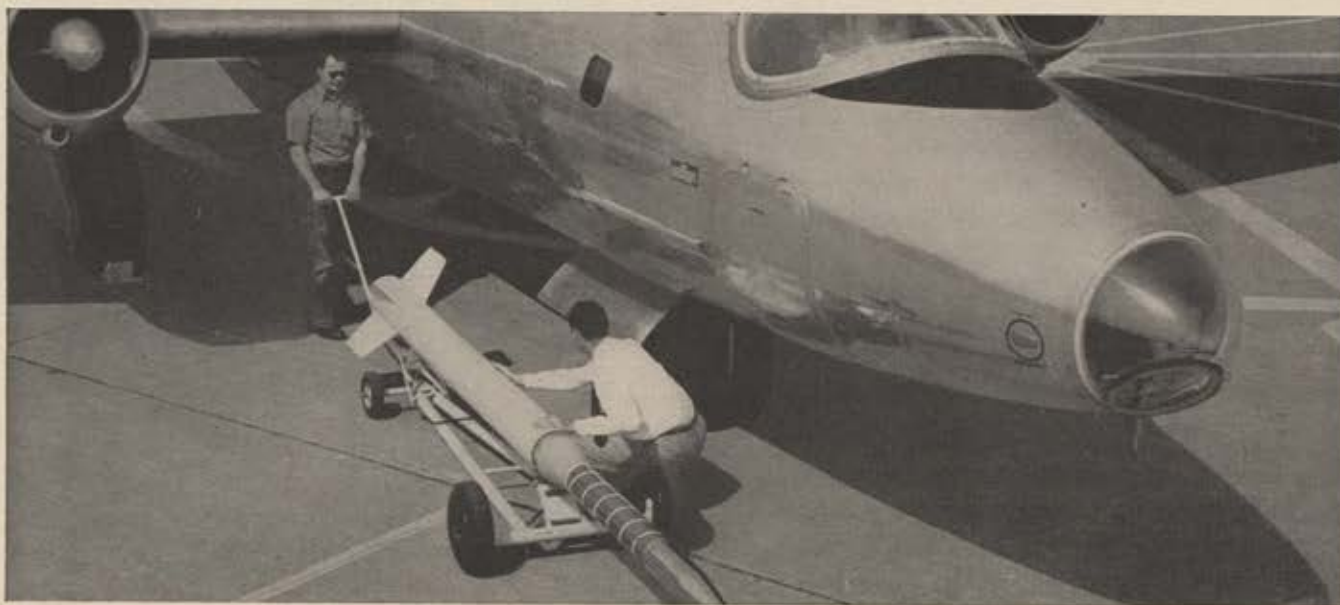
Experimental nozzle shapes to suppress turbojet noise are mounted on a J-47 engine of a B-47 Stratojet for tests.



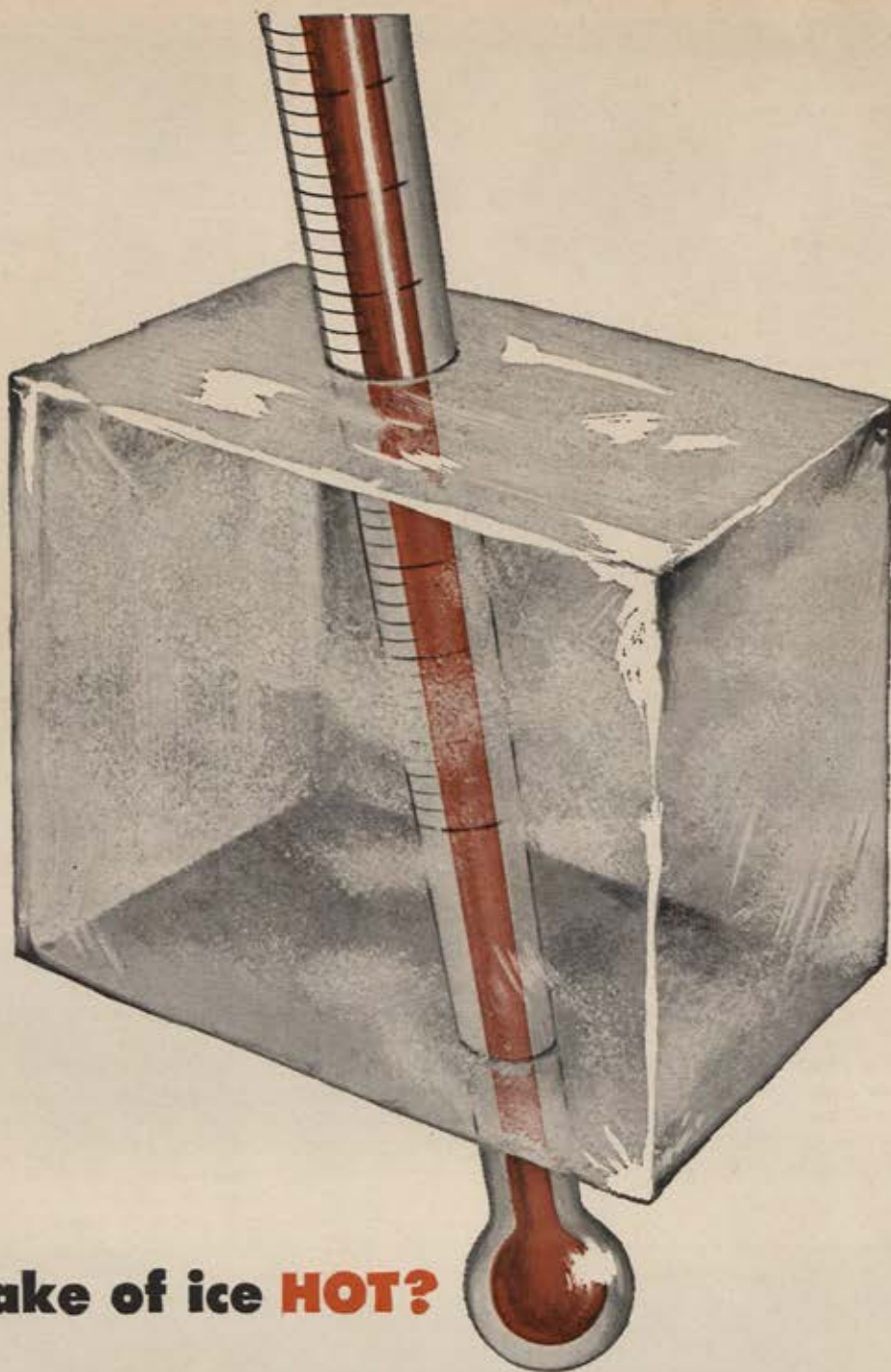
Model of theoretical 2,600-mph turbojet engine has only three compressor rows instead of the usual fifteen. The unit will be much more efficient than present equipment.

them to further their studies of aircraft nuclear propulsion. Application of nuclear energy to aircraft intensifies the high-temperature problems already under study, and brings with it a whole host of new and difficult problems produced by radiation.

—BOB STROBELL



A two-stage hypersonic rocket is readied for flight-test launching from a Martin B-57A bomber. Designed for propulsion research, this fifteen-foot rocket reaches a top velocity of about 7,000 mph at altitudes of 40,000 feet.



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Explorers get a repairman's-eye view of an engine and some expert instruction in "buildup" from an Air Force mentor.



Vital preflight training of parachute fitting, here prior to Easter flight to Mexico, alerts Scouts to safety needs.

SCOUTS ALOFT

By Nell Womack Evans

TOMORROW's airmen—the fifty-six enthusiastic members of Squadron One, Air Explorers, Pikes Peak Council, Boy Scouts of America—are getting an exciting and realistic preview of careers in the air age at Ent AFB, Colorado, thanks to the cooperation of the officers and men of the Colorado Springs headquarters of the Continental Air Defense Command.

The program, now in its fourth year, is giving the Explorer Scouts a real taste of Air Force life through a curriculum of flight familiarization, weather training, aeronautics, mechanics, air safety, ground observation, and other air subjects, and is supplemented by tours of bases. Most exciting prospect at the moment is a projected flying trip to Florida for a look at the USAF jet school.

Already, under the program, the Scouts have "commanded" Ent, on Civic Day in the area, having been previously shown the operation they were to "boss" for a day. And they have made cross-country flights, after strict preflight safety orientation, including vital lessons in parachute packing.

Playing godfather and mentor to the Pikes Peak Explorers—who range in age from fourteen to eighteen—are Ent personnel contributing their time voluntarily. The troop, directed by Scout adviser Floyd X. Grover, finances the program as a part of the boys' training.

These "flyingest" Scouts are getting their unusual training under provisions of the Air Force Regulation 46-2, which authorizes Air Force aid to the Explorer program. And although the authorization specifies that such cooperation is in no way an official recruiting program, it is no secret or surprise that, as the program develops, there grows with it an increasing mutual admiration and respect between the Air Force teachers and the Scouts.

Twelve of the Pikes Peak group are actually getting a

double taste of air-age life as Explorers and Air Force sons. And they in common with their spirited fellows in advanced scouting look on their special training as ideal orientation for careers in the US Air Force should they choose them.

For all of them, it's a unique way of receiving what one of their instructors has called a program that approaches, with its varied subject matter (even including instruction in airmen's social graces) a year's active Air Force training.—END



Scouts at Combat Operations Center meet AF's Maj. Gen. Frederick H. Smith, Jr., left, Navy and Army colleagues.



Student classroom has individual desks for each pilot and is soundproofed to eliminate outside interference. Training aids include movie projector.

Postgraduate Training for the Air National Guard

PHOTOS BY J. T. DENSFORD, SR.



Each flight receives individual weather briefing in the operations section.



As much personal attention as possible is given to pilots so that all phases of flight can be covered in detail.



Instructors use the venerable Link trainer to advantage as a means of teaching standardized instrument procedures.

By Edmund F. Hogan

LAST month the Air National Guard established a memorable first. Six young Guard pilots were graduated from the Guard's own jet instrument school at Ellington Air Force Base, Tex., marking the first time that a reserve component had conducted a schooling program that had always been operated by the active Air Force.

The National Guard Bureau established the school because Air Force no longer can give advanced instrument training to ANG pilot graduates. For almost a year these young pilots have been returned to their home squadrons for advanced training, and no single squadron had the personnel or equipment to do the job properly. The solution to the problem lay in establishing a central school where pilot graduates could report after they had won their wings.

Maj. Gen. Winston P. Wilson, Deputy Chief of the Bureau, obtained Air Force approval for the school. Fourteen instructor positions were established, and ANG jet pilots throughout the country were asked to apply for the openings. The top fourteen applicants were accepted and placed under the supervision of Maj. James T. Crump of Houston, former operations officer in Texas' 111th Fighter-Interceptor Squadron.

Eighteen students are entered in the current class, which will run for six weeks. Eventually, fifty-four pilots will be in training at all times under 100 percent Air Guard direction and supervision.—END

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Rotor Blade Assembly of J-57 Engine which uses Eaton blades. The J-57 is the predecessor of the more powerful J-75.

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The READY ROOM

RESERVE AND AIR GUARD NEWS

Recent cutbacks in the flying programs of the Air Guard and Air Force Reserve have been condemned by the Air Force Association's Air Guard and Air Reserve Councils.

Meeting in Colorado Springs last month in conjunction with the Association's Board of Directors, both Councils adopted positions 180 degrees at variance with the cuts which pulled ten troop carrier squadrons out of the Reserve and three squadrons from the Guard.

"Your Council," the ANG group reported to the Board, "vigorously opposes the recently announced reductions in the force of the reserve forces of the Air Force and, in particular, the effect these reductions will have on the Air National Guard."

The Reserve Council charged that the cuts in the Reserve had been made for purely budgetary reasons which it described as "thinking based on the dubious and invalid philosophy that a balanced budget will defend the republic."

The Reserve group prefaced its condemnation of the cuts with a statement which declared that it "subscribes wholeheartedly to the philosophy that the decisive phase of the next conflict will be decided by the Regular forces in being."

These forces, the Council said, must be tailored to this objective. "To this end," the Council continued, "our long-range striking forces, as well as our air defense forces, must be built to greater strengths than at present. Behind these two systems there must be a vital research and development program, balanced not only to the present needs of these systems, but to the ever-lengthening foreseeable future."

To back up this kind of a force in being, the Council called for an "enlarged, well-trained, and adequately-equipped Reserve structure, likewise in being."

The Council proposed that the Air Force Association go directly to President Eisenhower and express its "deep concern" not only in connection with the Reserve cuts but also in connection with cuts being applied to Strategic Air Command, Air Defense Command, and Air Research and Development Command.

Apparent in the discussions of both Councils was the fear that the cutbacks (see AIR FORCE, November '57) were merely the first in a series that eventually would reduce the Guard and Reserve to token forces.

In this frame of reference, the Reserve Council discussed at length recent studies made of the functions of Continental Air Command at the behest of Headquarters

USAF. These studies were aimed at reducing the number of officers and airmen assigned to conduct the business of CONAC either through the elimination of one of the four numbered Air Forces in the command or retaining the four Air Forces at a reduced manpower strength.

The Council concluded that the outcome of the studies will be a decision to retain the four Air Forces at a reduced strength but questioned whether the cuts will not be extended to the Reserve centers.

One straw in the wind, it developed, was the fact that general training courses, as such, will be halted on December 31. After that date, according to Council members, technical training detachments would be established in the centers and Regular officers would be substituted for Reservists as center group commanders. This would have the effect of further reducing the number of officers in paid training status.

The Guard Council declared that reduction of units because of money strictures bears no relation to the fact that "the total Air National Guard authorized strength has been only a minor fraction of the total authorized reserve structure."

The Air Guard, the Council went on to state, "has accepted its mandate to organize and operate whatever units were asked of it and it has done so with remarkable efficiency, economy, and combat efficiency."

The Guard Council declared that the states have indicated a willingness and desire to accept an increased force structure and that "in these days of peril the Air National Guard Council requests that the Air Force Association take positive action to restore the ANG force structure to its position prior to the recent elimination of three wing headquarters and three fighter squadrons and further that the Air Force Association make representation in the proper echelons of government to serve notice that the Air Guard is capable of assuming enlarged and expanded roles and force structures now or at any time in the future."

This statement developed as a result of a discussion of the Air Guard as potential operators of the air defense missile, Boeing's Bomarc.

Last year the Air Guard Council launched a study to determine whether Air Guard units could operate the missile. Col. James M. Trail and Warrant Officer Dale Hendry of the Idaho Air Guard studied the proposal in concert with Air Research and Development Command. The conclusion was reached that the Guard, with its thousands of highly skilled air technicians, could handle the Bomarc mission. This conclusion coincided with an independent study made by an Air Force board headed by the former commander of Continental Air Command, Lt. Gen. Charles B. Stone, III.

The Council noted, however, that despite the agreement between the Trail study and the Stone Board report, nothing has been done to get the ANG into the Bomarc picture. This, the Council said, was discouraging in view of the fact that Bomarc has been tested successfully; in view of the fact that factory training for active Air Force operators of Bomarc has begun; in view of the fact that money has been appropriated for the purchase of Bomarc; and in view of the fact that the Army has announced a plan to turn over many of its Nike antiaircraft sites to Army National Guard units.

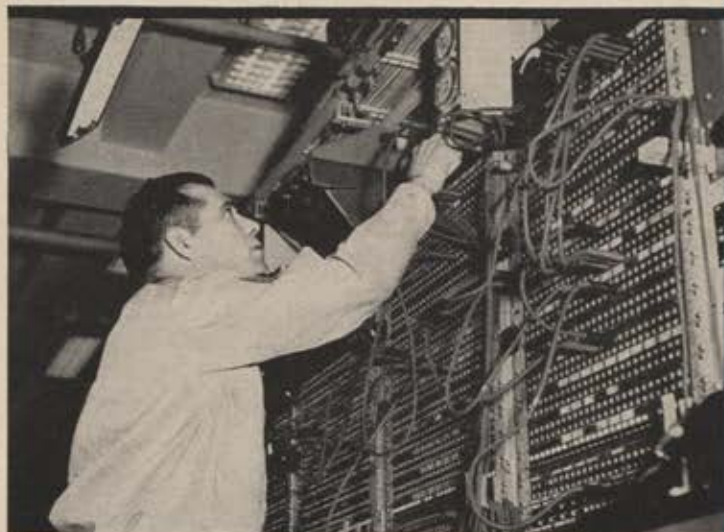
Therefore, said the Council, some action must be taken
(Continued on page 83)

New Deputy Assistant Secretary of the Air Force for Reserve and ROTC Affairs is Benjamin W. Fridge of San Jose, Calif. A Reserve colonel and deputy commander of the 340th Troop Carrier Wing (Reserve) in California, he succeeds Donald J. Strait, who resigned in August to return to New Jersey.



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There is no more important job than being an Air Force specialist. For he is not only a fine technician, but also a man of responsibility. On his shoulders rests the vital assignment of maintaining and operating the increasingly complex equipment that makes his Service the world's most efficient striking force. But with this responsibility, he also knows great pride...and a future that's *guaranteed*. As a technician, you, too, can have this same satisfaction and assurance—in the U. S. Air Force. See your Air Force Recruiter, or mail the coupon.

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Scientist operates Cambridge-developed light gun used in the VOLSCAN air traffic control system. Use of the gun puts on aircraft "blip" under control of a computer which directs the aircraft to a timed landing under all weather conditions.

CAMBRIDGE RESEARCH CENTER DEVELOPS SUPERHUMAN EYES AND EARS FOR AIR FORCE

At the Air Force Cambridge Research Center, in Bedford, Mass., the Air Research and Development Command has a broad program under way in electronics, geophysics and human engineering — and is expanding into many new areas in these fields.

The objective of much of the Center's electronics research is to improve the systems and instruments that serve as visual and auditory senses for the Air Force, making it possible to control and detect the incredibly fast missiles and planes of today and tomorrow. Such work has included development of "super systems," such as the SAGE air defense system, which provides coordinated aerial detection and interception over a vast area. Other projects include mobile, tactical air control systems (TACS); advanced radar for ground, aircraft and missile systems; automatic aerial traffic control systems, such as VOLSCAN; research in computer techniques, as well as creating computers for Cambridge's own use; and extensive work in communications, data processing, magnetics, radiochem-

istry, weapons control systems, and many other fields.

Cambridge is cooperating closely in the International Geophysical Year — as well as doing its own research into meteorology, auroral physics, storm detection and weather forecasting techniques, the upper atmosphere, meteor physics, jet stream research, and many other areas now becoming of intense interest to practical science.

This Center is also responsible for a broad program in "human engineering." It is concerned with research on hearing, speech intelligibility, and information processing by the human operator. Other studies involve the human limitations and capabilities of members of complex communications and control networks.

Cambridge, located at L. G. Hanscom Field, makes use of the talents of hundreds of government scientists and engineers — and also draws upon the brain power of a great many universities and colleges, as well as industrial organizations — helping to keep the United States technically second to none.

This is one of a series of ads on the technical activities of the Department of Defense.



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Engineer at Ford Instrument checks airborne data transmission equipment developed for Air Force traffic control application. U. S. Air Force photo.

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immediately to have the Trail study and Stone Board report implemented so that the Air Guard might move into the Bomarc operational field without delay.

The Guard Council also expressed an opinion that ANG aircraft control and warning squadrons, several of which are currently playing an active role daily in the air defense mission, might be increased.

The Reserve Council, in reviewing the status of Reserve officers on extended active duty, recommended—and the Board of Directors concurred—that the Air Force create a **single officer corps**, in which there would be no distinction between Regular officers and Reserve officers of any component on indefinite active duty.

The proposal was advanced as a means of encouraging young Reserve officers, who may feel that they cannot compete with Regular officers for retention and promotion, to remain on active duty.

The proposal made the point that in "view of technological advances requiring career service in the Air Force, the single officer corps concept will substantially contribute to solving the officer retention dilemma."

To accomplish the single officer corps program, the Council proposed:

- All officers in this single integrated corps be afforded equal and comparable consideration in matters of assignment, retention, elimination, and promotion.

- Existing provisions of law which perpetuate present differences in status of career officers be brought into conformity with this single officer corps concept.

- All officers in this single corps shall be screened annually under one criterion in determining standards of performance and to assure that those officers of substandard performance be periodically eliminated; and to further insure that when more than normal reductions in force become necessary, personnel who will be retained will be those best qualified under this screening procedure.

This latter point obviously was aimed at the current reduction in force being applied within the Air Force, in which virtually all of the 3,000 officers being separated are Reserve officers on extended active duty.

Both Councils took a long, hard look at the twenty-four amendments to the Reserve Officers Personnel Act, which are scheduled to be presented to the Congress when it reconvenes next month (AIR FORCE, November '57).

The Reserve Council agreed to go along with the proposed amendments, including the controversial item of changing the law to provide temporary or "spot" promotions, while the Guard Council warned that unless considerable force is brought to bear on the Congress the proposed changes will be lost in the welter of defense legislation having a higher priority—such as a look into the status of the country's missile development. The Guard Council further informed the AFA Board of Directors that it will make a detailed study of the proposed amendments and submit a formal position.

The Guard Council, consisting of thirteen Air Guardsmen from all sections of the country, is headed by Donald J. Strait of New Jersey, former Deputy Assistant Secretary of the Air Force and commander of New Jersey's 108th Fighter-Interceptor Wing.

The Reserve Council, also consisting of thirteen Reservists representing each of the four numbered Air Forces in CONAC, is headed by Paul S. Zuckerman, New York stockbroker and a brigadier general who has a mobilization assignment to Continental Air Command.

Another attempt has been made to get the long-stalled Air Reserve Technician plan off the ground. Last month,

the Assistant Chief of Staff for Reserve Forces, Maj. Gen. Richard A. Grussendorf, asked Air Force manpower people to provide at least fifty civilian positions so that the program can get under way.

The fifty civilian positions, if authorized, would be divided among four Reserve flying wing locations. And while this would be a token complement in a program aimed at the eventual employment of 9,000 technicians, it would at least mark a start on the project.

The program has had a long history of disappointments. It was conceived in 1954 by Continental Air Command, and almost two years went by before it cleared a number of hurdles in the Air Force. After Air Force had approved it, the program ran into opposition in the Civil Service Commission, which questioned the requirement that a technician be a member of the Reserve unit. This, the Commission said, made military service a prerequisite to federal employment.

The Air Force finally convinced the Civil Service Commission of the merit of the plan, but just about the time it was ready to be implemented, the Administration ordered heavy cuts in civilian personnel strengths of the services. Under present manpower ceilings in the Air Force, there are no spaces available and, therefore, the technician plan has been completely stalled.

Failure to implement the technician program is one of several problems confronting the Air Force Reserve which came to light last month in a status report from General Grussendorf to the Defense Department's Reserve Forces Policy Board.

Another concern is the recall of medical Ready Reservists. Currently, the Office of Defense Mobilization has issued instructions to the Air Force that it may not call medical Reservists essential to support emergency civilian requirements in specific disaster areas until the Federal Civil Defense Administration director concerned has declared the situation under control.

The Air Force, however, holds that in the event of an emergency it plays the primary role in the initial phase and, therefore, must be permitted to plan on immediate recall of Reserve doctors and nurses.

Whether ODM, along with other governmental agencies, will buy the concept depends on the outcome of conferences between that agency and the Air Force surgeon general.

There is a bind, too, in the critical skill enlistment program. This is a program, begun a year ago, which permits individuals facing induction, who have skills needed by the Air Force, to enlist in the Reserve through the six-months plan. This arrangement permits the individual to go on active duty for six months, then serve at least five years in the Reserve in an assignment matched against his civilian skill. The majority of persons who can take advantage of this program are employed in industries which support the defense effort.

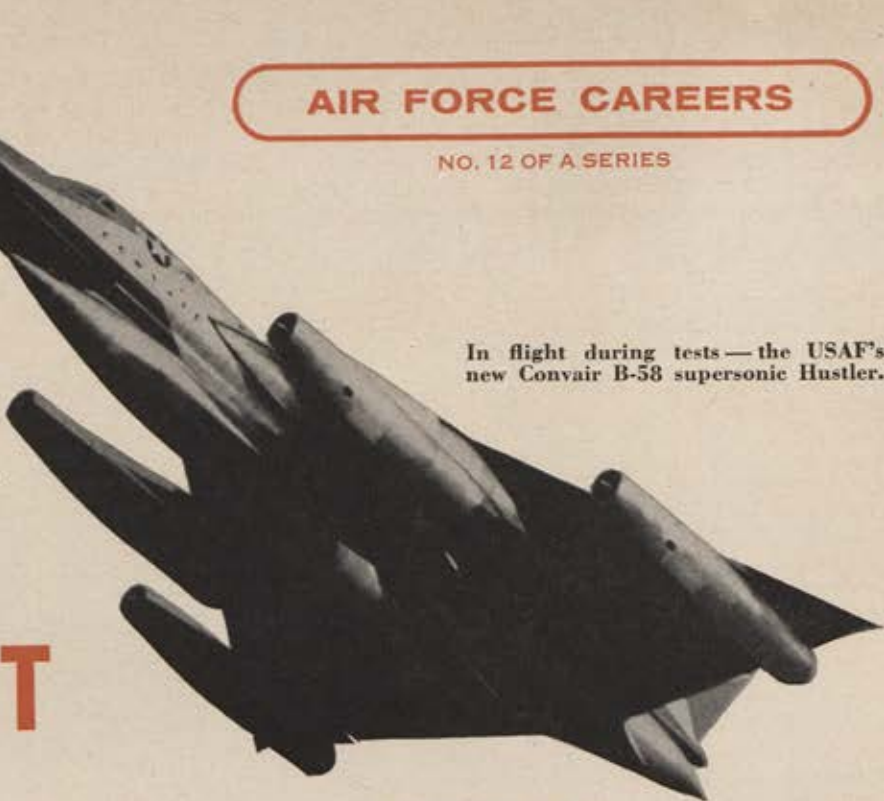
Despite the Air Force needs for such individuals, the program has come to a virtual standstill because of the limited number of Air Force activities which can provide the six months of active duty plus limited funds for Reserve training, which make it almost impossible to offer further schooling even after they finish six months of active duty.

So enlistments in this program have been suspended until such time as the Air Force can provide training. And to help in this area, a request has been made that eight percent of the total six months active-duty training enlistment quota each year be set aside for the critical skill plan.

—EDMUND F. HOGAN

Sky Scientist—

THE TEST PILOT



In flight during tests—the USAF's new Convair B-58 supersonic Hustler.

By Flint O. DuPre

WANTED: Young man with imagination, skill, courage, and pioneering spirit. Go places fast. Apply at nearest Air Force base.

AN AD like the above would well illustrate the vital role of USAF test pilots today in a field that calls for increasingly higher skill and the same daring spirit that brightened the early history of aviation.

And right now the Air Force doesn't have enough of these test-flight officers to fill the requirements of its current aircraft inventory, men who would be trained for their unique assignments at ARDC's Flight Test School at Edwards AFB, Calif.

What are the requirements for test-pilot training? Well, before any young Air Force officer can apply, he must first hold a current rating of pilot, be on flying status, and have a minimum of 1,500 hours diversified flying time.

He must be between the ages of twenty-five and thirty-three at the time of application. He must have a current working knowledge of college algebra, plane geometry, differential calculus, theory of flight, aeronautical mechanics, and aerodynamics. And above all, he must have an overwhelming desire to fly airplanes at high speeds and unprecedented altitudes with skill and precision.

A big order? Very much so, because test-pilot training is a business not for the fainthearted or accident-prone.

Young officers accepted for test-pilot training face half a year's course of

intensive instruction in the classroom and in the air. The first thirteen weeks are devoted to performance, and the second thirteen weeks to stability and control.

Veteran instructors at the Flight Test School at Edwards take the fledglings in hand and mold them carefully for their final exams, scheduled high in the clear blue sky over California's Mojave Desert, where Muroc Dry Lake offers approximately sixty-five square miles of solid landing area and a natural runway twenty-two miles long. Edwards and its classrooms adjoin this mammoth and near-perfect testing site.

During his first thirteen weeks at Edwards, the prospective test pilot concentrates on the fundamentals of performance flight testing. He delves deeply into flight techniques, theory of aircraft performance, and flight-test data-reduction methods. He works especially hard at learning to write a project report—because a test pilot must know how to put down on paper the details of his thrusts into the unknown, to guide those who follow him.

About midway in the performance phase of the schooling, the candidate is ready to make complete flight tests in both reciprocating and jet aircraft. This flying involves, among other items, calibration, level flight, take-

off, and landing. During this phase, he gets a taste of theoretical subsonic and supersonic aerodynamics to prepare him for future assignments.

The second thirteen weeks of his course—called the stability and control phase—are devoted to teaching the future test pilot how to fly tests with concentration on the question of whether aircraft meet minimum standards of flying qualities consistent with safety and acceptable control.

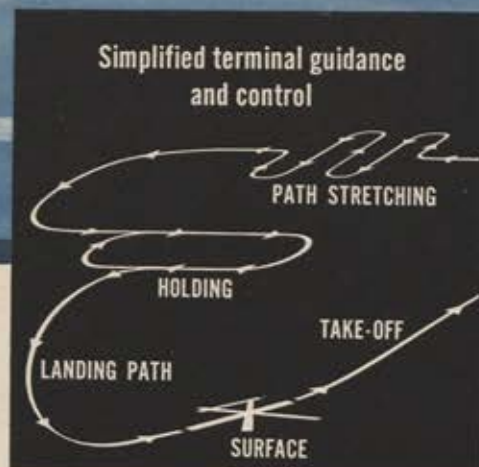
In this phase he learns longitudinal stability, which includes stalls, static stability, acceleration, elevator power, dynamics, trim changes, and landing tests. Concurrently, he bones up in the classroom, putting his lessons into practice in prop and jet craft.

At graduation, the candidate is awarded Air Force Specialty Code 8744—experimental flight test officer—and is assigned to pilot positions in test or tactical units, other test centers, or to organizations requiring his special skills.

The Air Force test pilot has his counterpart in industry, men like Pete Girard, who flies the Ryan X-13 Vertijet; B. A. Ericson of Convair, who put the supersonic delta-winged B-58 Hustler bomber through its paces; or Bob Hoover of North American, A. M. "Tex" Johnston of Boeing, and others.

(Continued on page 87)

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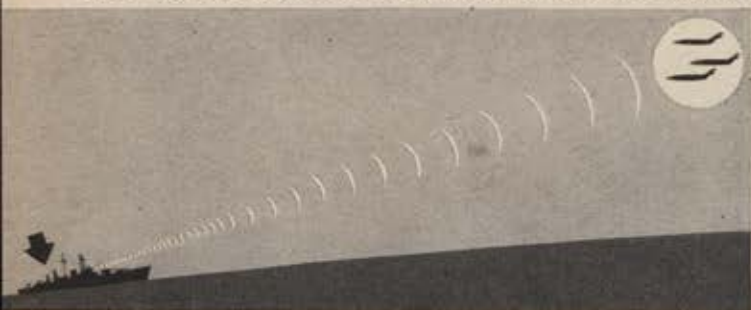
Bendix-Decca, originally developed in the United States, is the low frequency area-coverage navigation system. It is the only proven, extensively used system in the world. Growth potential allows unlimited automatic air traffic control improvement.



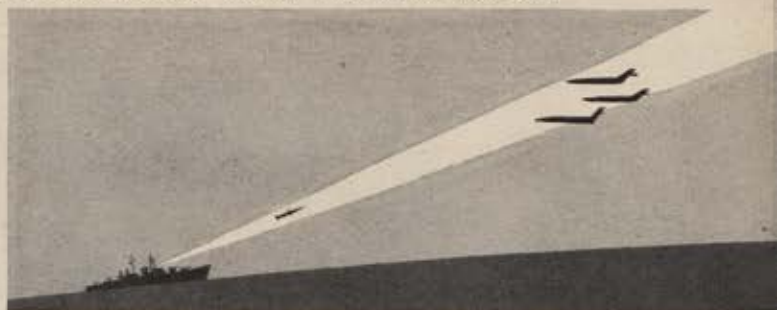
THE STORY BEHIND THE STORY



Terrier missile roars into sky from *U.S.S. Canberra*, first Navy missile ship equipped with Sperry SPQ-5 long-range radar. Antennas resembling searchlights track approaching aircraft and simultaneously launch and guide missiles with extreme accuracy.



Tracking aircraft miles past horizon, new radar pinpoints targets approaching from any direction at all heights.



Singling out separate aircraft from close-flying group, SPQ-5 radar guides missiles along radar beam to selected targets.

SUPER-ACCURATE RADAR EXTENDS NAVY DEFENSE

Tracks far-distant aircraft, enables deadly missile interception

Below decks trained operators monitor on radarscopes the automatic tracking and destruction of targets.



Until recently, the head-on silhouette of an aircraft approaching at supersonic speed has registered as little more than a microscopic dot on radarscopes—until the plane itself was dangerously close. Sperry's development of the SPQ-5 radar for the Navy's Bureau of Ordnance now makes engagement of a potential enemy possible while he is still far beyond the horizon.

Resembling searchlights, the antennas of these super-radars cover the complete expanse of the skies, in all

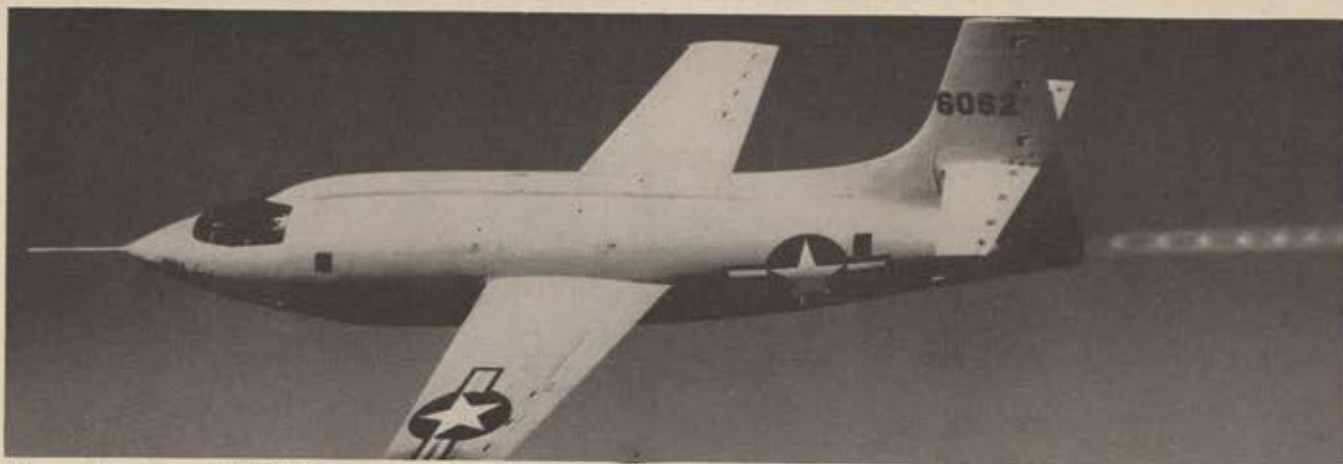
directions and at all altitudes. On radarscopes below decks, distant aircraft can be studied, and the course of individual planes can be plotted. In event of hostilities, full salvos of missiles like the Terrier can be launched and guided straight to their targets, riding the same powerful radar beam.

Other products of Sperry's Surface Armament Division include surface-based missiles, fire control systems, weapon direction systems, artillery locators, battlefield surveillance equipment and electronic counter-measures.

SURFACE ARMAMENT DIVISION

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DIVISION OF SPERRY RAND CORPORATION



The rocket-powered Bell X-1, the plane that then Capt. Charles Yeager flew through sound barrier on October 14, 1947.

Civilians like these and the USAF's test pilots naturally compliment each other in aircraft developmental work. For example, Boeing's test pilots worked long and hard testing the B-52 eight-jet Stratofortress before Air Force men took over for further acceptance tests over the Mojave Desert. This pattern is traditional with all new aircraft and was followed in the testing of the Convair B-58 Hustler, the new fighters in the Century series, the Boeing KC-135 Stratotanker, and the huge new Douglas C-133A turboprop transport.

Today's USAF test pilots follow in a great tradition—the tradition of Wilbur and Orville Wright whose December 17, 1903, flight at Kitty Hawk was in truth the most significant flight test in history, signaling man's conquest of the air. Not many years after that came Charles Lindbergh's test hops over the San Diego Bay area in April 1927 to determine if his Ryan-built monoplane, "Spirit of St. Louis," could lift gasoline loads of 300 and 400 gallons and still fly straight and level. It could and did, and carried Lindbergh on to fame.

Only twenty years later—in 1947—man, in the person of USAF Capt. Charles Yeager, first flew faster than sound in his record-breaking flight in the rocket-powered Bell X-1 research aircraft when he hit Mach 1.06. Captain Yeager set a fast pace for those who followed with other record flights—men like Maj. Arthur "Kit" Murray, who also flew the X-1 and X-1A, and Lt. Col. Frank K. "Pete" Everest, Jr., who pushed the Bell X-2 even faster.

Another USAF test pilot, Capt. Iven C. Kincheloe, took the X-2 in 1956 to the greatest height ever reached by man in a plane, a reported 126,200 feet. Kincheloe mastered the highly

(Continued on following page)



AF Lt. Col. Guy Townsend and Boeing's "Tex" Johnston tested the B-52.



Lt. Col. Frank K. Everest, Jr., who pushed the Bell X-2 to record speeds.



Lt. Col. "Chuck" Yeager, left, with Maj. "Kit" Murray in front of the Bell X-1A.



Capt. Iven Kincheloe, Jr., with X-2.

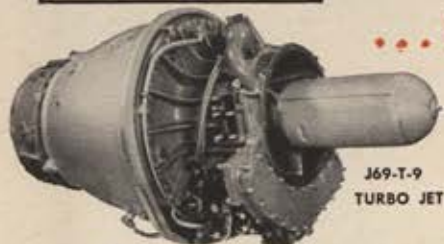


X-2 claimed Capt. Milburn Apt's life.



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J69-T-9
TURBO JET



J69-T-19A
TURBO JET



MODEL 141 GAS TURBINE
AIR COMPRESSOR

Air Corps flight training routine took a significant step forward recently, when the T-37 twin jet trainer entered its Phase VIII testing at Bainbridge Air Base, Georgia. Twenty hand-picked officers embarked on a course known as PROJECT PALM, with the two-way goal of training for them, and suitability testing for the plane. This new high-performance ship advances the jet phase of fliers' training to an earlier stage in the training schedule, speeding the transition from propeller-driven planes to jets, with gains in both safety and economy. Twin J69-T-9 turbines by C.A.E. provide the power.



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THE TEST PILOT—CONTINUED

exacting climb technique required for taking full advantage of the extremely short fuel duration of the X-2 and brought back to the Flight Test Center at Edwards priceless information. For his feat, he was awarded the coveted Mackay Trophy.

In September 1956, the constant danger faced by USAF test pilots was dramatized by the death of Capt. Milburn G. Apt in his first flight in the X-2 (see *AIR FORCE*, March '57). Instruments carried in Captain Apt's plane were examined after the accident and revealed that the pilot had traveled at about 2,178 miles per hour.

What's it like for a man to be encased, peanut-like, in a shell and hurtle through the air at tremendous speed? What does he feel? What does he think about?

Charles Yeager, the first man to smash the sonic barrier, says he had little time for thought during his historic fourteen-minute flight at Edwards on October 14, 1947. When the X-1 was cut loose from the B-29 Superfortress which had carried it to altitude, he says, his strongest consciousness was of the brilliant sunshine that flooded his tiny cabin. The rest of his world was silent, he recalls, except for the purr of a cine-camera photographing the instrument panel over his shoulder.

The X-1 lost altitude slightly. Then Yeager fired his rocket motor. As the X-1 began to accelerate, it was no longer silent. The pilot tested his controls. He went into a full power climb and leveled off at 40,000 feet, and the X-1 began to buffet. He pulled down on the stick and fired the shut-down rockets.

Yeager watched the Mach needle. It swung off the dial and back. He had gone through the sound barrier, as the designers and scientists on the ground could see by their instruments. After the long glide home, he says, he was too busy to feel emotions.

For those likely to answer the ad at the beginning of this article, the requirements are best illustrated by the quality of today's and yesterday's test pilots—skillful, courageous men, wedded to superb equipment.—END

ABOUT THE AUTHOR

Flint DuPre, now with the Office of Information Services, Hq. USAF, has worked in AF information, in and out of service, since 1942. A veteran newspaper writer, he was earlier sports editor of the *Dallas Journal*.



STRETCHING the AIRCRAFT DOLLAR

It took Man over 4,000 years to attain a motorized speed of 40 mph. But within the last few decades, aircraft have attained speeds up to 1500 mph, pilotless missiles now travel thousands of miles, and plans are afoot to send guided missiles to Mars and the moon.

Rapid progress of the aircraft industry is an industrial production miracle. Engineers who design a new plane may consider it "obsolete" by the time it is produced, because they already have a better one on their drawing boards.

This fast changing pace of the Air Age, plus current cut-backs in new plane production, illustrates the economic need for aircraft modification. Primarily, Hayes' business is modification of planes—not because they are worn out but because they need to be modernized, and can be modified for a fraction of the cost of new planes. Instead of being scrapped, Hayes modified aircraft go back into service of the National Defense Program at a savings of millions of dollars to American taxpayers.

ENGINEERS, SCIENTISTS, NEEDED

Hayes is an aircraft modification, repair, and maintenance facility, including guided missile work. Good positions are open for aircraft design engineers, graduate engineering students, and aeronautical scientists. Write Personnel Director, Department 405, P. O. Box 2287.



Tech Talk

By Bob Strobell

Litton Industries and the Air Force have jointly announced that Litton's Inhabited High Vacuum Laboratory has simulated the pressure conditions prevailing ninety-five miles above the earth. Litton's scientists have been working inside the chamber of the laboratory (see cut) under high vacuum conditions at the Beverly Hills, Calif., location.

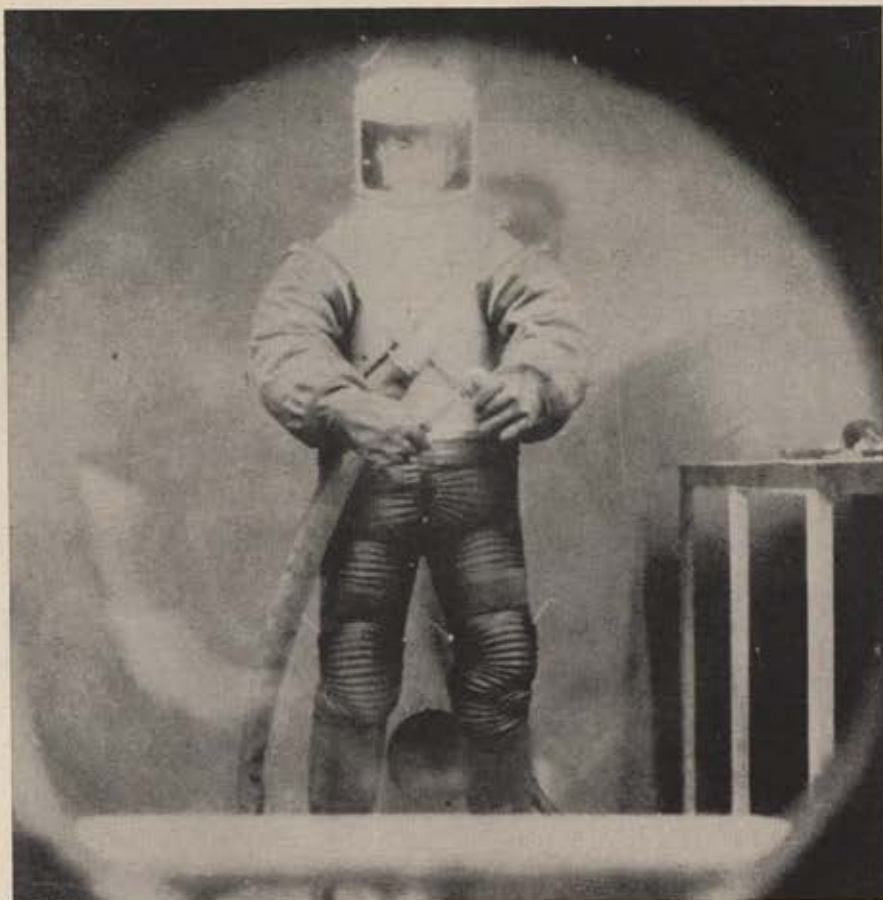
The laboratory is a valuable research tool in performing fundamental studies on development of ultra-high-altitude weapon systems, and the new facility consists of a chamber eight by fifteen feet, plus a specially developed pressure suit which permits researchers to observe and control experiments inside the vacuum chamber. Two huge pumping systems remove the air from the chamber, leaving only one out of every 18,000,000 molecules of air within the steel cylinder, thus achieving a vacuum the equivalent of 528,000 feet above the earth.

The laboratory will be used to facilitate the advancement of knowledge about the behavior of physical phenomena, equipment, and instrumentation under conditions of extremely low pressure and density, data which are vital to the development of high-altitude weapon systems.

Convair recently released a series of four unusual photographs showing their F-102A Delta Dagger firing a salvo of folding-fin aircraft rockets during a test. The photo below was taken about two-tenths of a second after the firing, and shows the full blast of exhaust from the twenty-four-rocket salvo blending into a homogeneous mass of flame as the leading

At right, new folding airplane tire by Fairchild uses continuous high-tensile nylon cord, bike spoke style.

Below, high-speed camera freezes action of FFAR rockets in their explosive flight from the Convair F-102A.

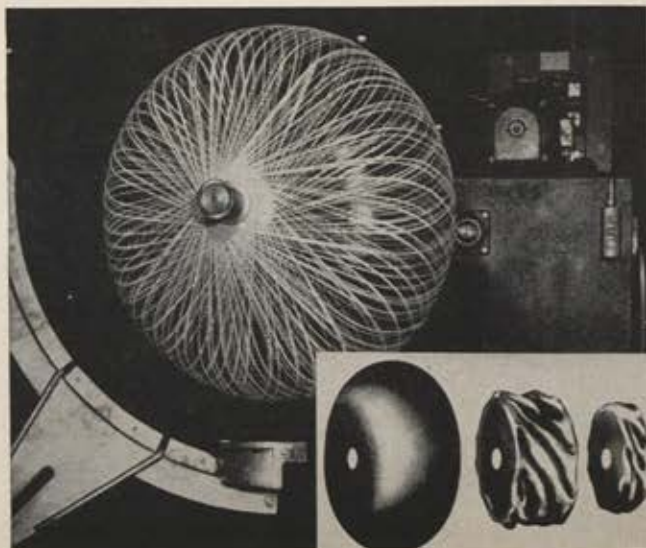


Litton scientist shows he can handle a wrench while wearing pressure suit designed for USAF by his company. Altitude is a simulated ninety-five miles.

rockets begin to outdistance the interceptor. The fiery burst of exhaust is momentary and does not damage the F-102A which is protected by a coat of gray enamel. Small metal scoops opposite the three rocket tubes in each of the F-102A's four large missile doors deflect exhaust debris away from

the aircraft structure, keeping carbon and fire out of the interceptor's missile bay.

Fairchild Aircraft Division has developed a radically new type of landing gear (see cut), based on use of a (Continued on page 93)





rocket power from reasoning power

A *reasoning* mind—man has always found this his most useful weapon when venturing into unknown fields. Today's frontier—one of the greatest unknowns ever faced by man—lies in outer space.

RMI, America's *first* rocket family, is uniquely qualified to help our country conquer the new frontier. For this project will require more powerful and more efficient rocket propulsion systems than any yet designed. And RMI's experience in the rocket power field extends back over 15 years . . . years in which RMI scientists and engineers pooled their reasoning power and knowledge

to develop entirely new methods of propulsion and to produce rocket powerplants for dozens of military vehicles.

With this backlog of experience—and with an increasing staff of imaginative, reasoning engineers—RMI continues to blaze trails in many fields of rocket power: supersonic manned aircraft . . . versatile helicopters . . . catapults and test sleds . . . and missiles for defense and space exploration.

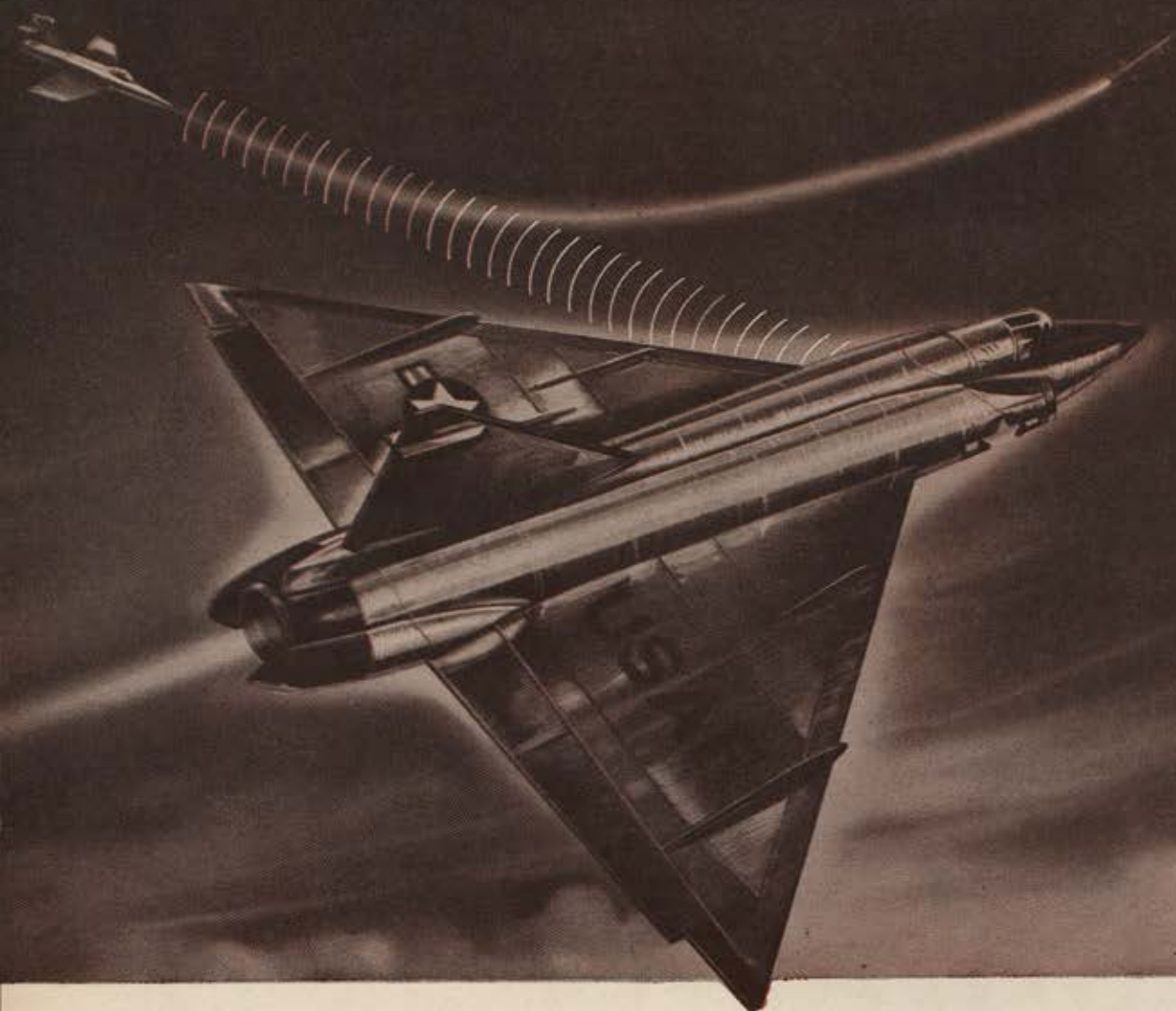
Engineers, Scientists—Perhaps you, too, can work with America's *first* rocket family. You'll find the problems challenging, the rewards great.



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A MEMBER OF THE OMAR TEAM



taking the **homing** out of enemy pigeons

In today's concept of modern weapons our defenses must be many, varied and impregnable. Much has been said about our physical resources — our defense aircraft and our guided missiles — but there is another area — the area of counter measure—a defense system that has been kept as quiet as the operation of the equipment itself.

ERCO developed one of these counter measure systems — a system that will out-calculate the enemy's computer and cause its missile to deviate from its "locked-on" course line.

ERCO's wide range of capabilities in counter measures is backed up by the most modern engineering, drafting, machine shop, fabricating, and assembly facilities. And ERCO's scope of activities ranges from small electronic equipments to complete trailerization of critical electronic systems — concrete proof that this is an industrial giant in the making.

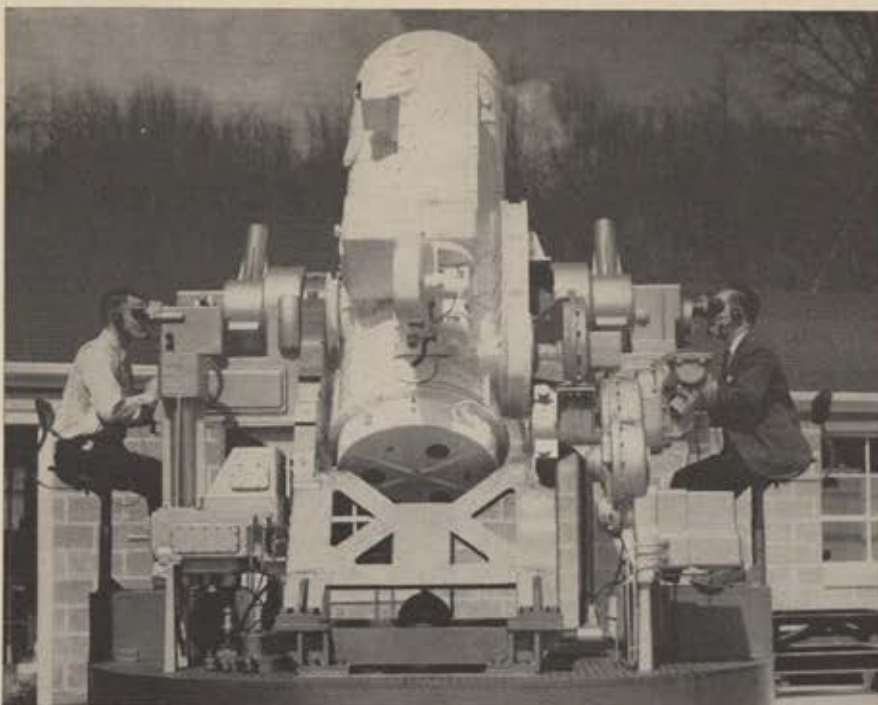
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Technicians operate the dual sighting telescopes of USAF's ROTI, the long-range camera-telescope used to track missiles and collect data on tests. The device has a focal length of 500 inches, is set on a power-driven mount.

folding tire. The new tire is unique in its use of an automatic vent system for inflight storage. Use of high-tensile nylon and natural rubber in a continuous strand of cord, a new manufacturing technique, will keep the weight of the tire down without affecting strength.

A normal high-pressure tire has been found to be the best contact mechanism for runways, but after touchdown on unprepared fields, obstacles like rocks and ditches transmit more shock to a high-pressure tire than they would to a low-pressure tire.

What is needed, then, is a tire that

serves as a high-pressure unit on pavements, but which can be immediately converted to low-pressure use.

Fluorine is, in many ways, the most desirable oxidizer for high-energy rocket fuel-oxidant combinations, but at the same time is among the most difficult to handle. Common materials used in fuel systems today decompose or burst into flame in the presence of fluorine, and fluorine-supported flames may be 2,000 to 3,000 degrees Fahrenheit hotter than the 5,000-degree common fuels now being used. This is important in the improvement of rocket performance. Against this difficulty, therefore, the General Chemical Division, Allied Chemical and Dye Corp., has developed a means of truck-transporting liquid fluorine by the ton. Heretofore fluorine could only be shipped as a gas under pressure in 200-pound cylinders, delivering only six pounds of fluorine.

General Chemical's new tank system is likened to a "giant thermos bottle," maintaining liquid fluorine in an inner tank at minus 307 degrees Fahrenheit, the boiling point of the liquid. Liquid nitrogen in a surrounding tank cools the fluorine. Valves for the flow system (see cut) to fill and empty the tank are located on one end of the seven-foot tank. The system is designed to be used as stationary storage or as a bulk shipping container, when mounted on a standard trailer transport chassis.—END



Operator checks mechanism on new Allied Chemical and Dye's transport system for fluorine, now in successful use.



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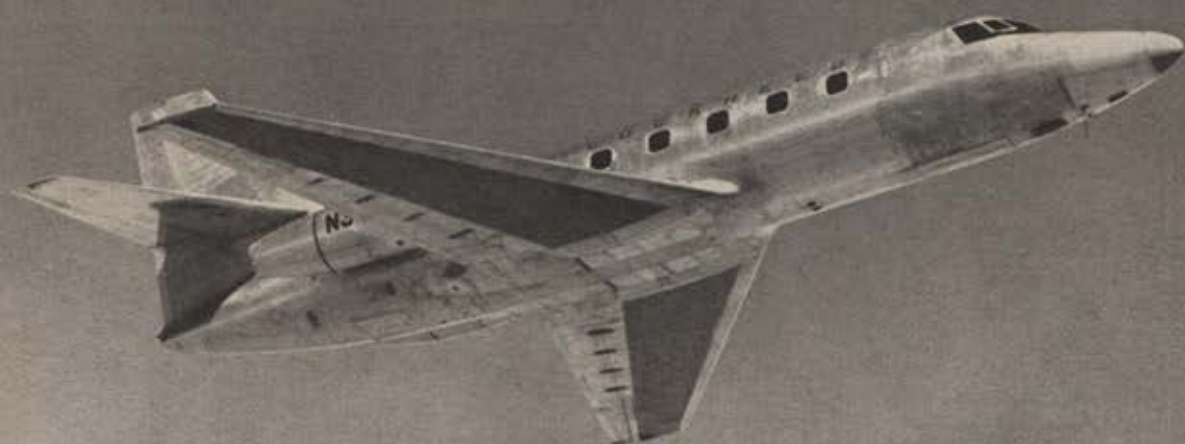


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Designed, built, and flown in record-breaking time, the new "economy size" Lockheed JetStar can perform the following missions (just as well as the big jets—and for only a fraction of their costs):

For ATC: The *JetStar* fills an indicated need of the Air Training Command for a "top-off" navigator bombardier trainer aircraft which more nearly equals the speed of jet bombers on operational duty. Cruising faster than 450 knots at altitudes up to 45,000 feet, the *JetStar* fills existing speed/altitude gaps between trainer and tactical aircraft in current use.

For MATS: The Aids to Airways Communication Service, operated under the Military Air Transport Service, is charged with the responsibility of airways inspection. The *JetStar's* high speed and altitude capabilities—com-

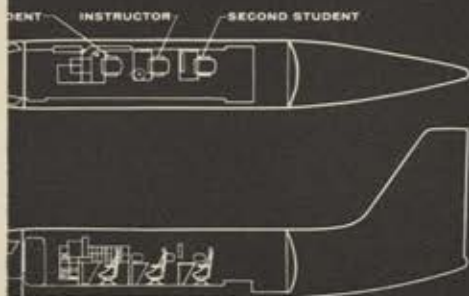
parable to today's tactical aircraft—will permit more thorough and effective airways inspections.

For SAC: The Strategic Air Command depends upon high speeds to rush high priority cargo from its headquarters to its retaliation bases. The new Lockheed *JetStar* can transport critical parts for bombers and navigation instruments to SAC bases—with jet speed (but at much lower cost than the big jets).

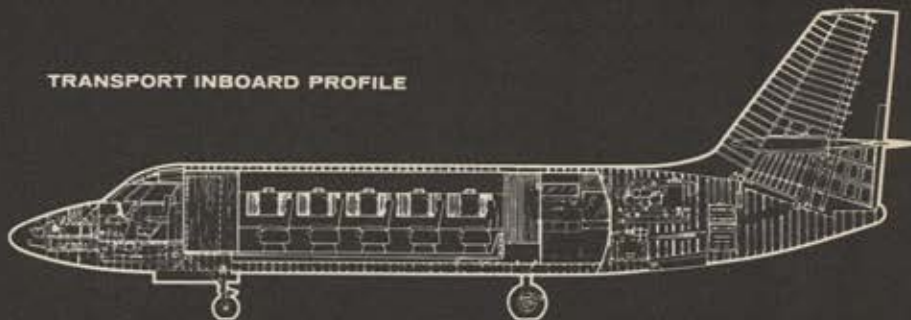
In addition to those above, the new Lockheed *JetStar* can perform many other essential military missions. Like all Lockheed planes the *JetStar* is easy to maintain, and has the inherent stamina to insure optimum utilization—qualities that are more important today in military aircraft than at any time in our history.

GEORGIA DIVISION, *Lockheed Aircraft Corporation, Marietta, Georgia*

NAVIGATOR BOMBARDIER TRAINER



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AFA NEWS

SQUADRON OF THE MONTH

Boise Valley Squadron, Cited for

dramatizing to the Bay Area community the importance of the regular units of the Air Force, and the contributions made by those units to the community.

San Francisco Squadron, continuing its fine "Airpower in Action" series, last month sponsored a novel "Commander's Reception" (see cut) at the Fairmont Hotel, by way of tribute to the men who lead the Air Force units in the area. The program introduced Bay Area Air Force commanders to the more than 200 people on hand.

Included in the "reception line" were Maj. Gen. Hugh Parker, Commander, WADF; Maj. Gen. Sory Smith, 4th AF; Brig. Gen. Charles Eisenhart, 14th AD; Brig. Gen. Curtis Low, 28th AD; Brig. Gen. Don Dorrow, Deputy Commander, Pacific Division, MATS; Col. George Ceuleers, Hamilton AFB; Col. Frank Amend, Travis AFB; Col. Robert Hubbard, San Francisco Air Reserve Center, and Col. William Brown, Oakland Air Reserve Center.

AFA President Pete Schenk made one of his first official visits to the Bay Area, joining at the head table Squadron Commander Tom Barbour, board member Charles O. Morgan, Jr., Wing Commander Harvey McKay, and Tom Stack, a former vice president and board member who served as toastmaster.

Santa Monica Area Squadron recently played host to thirty-eight of the city's business and civic leaders on a two-day tour of the air-defense facility at Hamilton AFB, near San Francisco (see cut). Gil Nettleton,

Squadron Commander, made the necessary arrangements, and acted as official host to the group. Joe Myers, Wing Organizational Chairman, and Robert Dodson, Squadron member, accompanied the group.

On October 12, Queens Squadron, N. Y., kicked off a new youth air-age educational program to run for the next five months, planned to give Air Explorer Scouts of Queens education for the jet age (see cut).

Charles Alexander of the Squadron is program chairman. Subjects to be taught include aviation history, theory of flight, powerplants and propellers, navigation, and others, and the courses are under the jurisdiction of representatives of airlines and government agencies. CAA, the US Weather Bureau, and National, Capital, Northeast, Seaboard & Western, Pan American, Trans-World, and United Air Lines, are furnishing lecturers. The

(Continued on following page)

At San Francisco Squadron Commander's Reception (see text), planned by Thomas Barbour, the Squadron Commander, head-table guests include (standing) Barbour, AFA President Peter J. Schenk, and Thos. F. Stack. Seated are Brig. Gen. Don O. Dorrow, Brig. Gen. Curtis Low, and Maj. Gen. Hugh Parker. The banquet was planned to introduce area USAF commanders to San Franciscans.



Bert Zostora, United Air Lines coordinator, explains the inner workings of a DC-7 to Air Explorer Scouts Jay Lilienthal, Sam Cohen, Roy Horton, and Ed Beckman. Queens Squadron sponsored the tour of United's facility at Idlewild Airport in their new air education program (see text).



Here part of the group of thirty-eight Santa Monica area business and civic leaders, who were guests of the Santa Monica Area Squadron and Western Air Defense Force for a two-day tour of the air-defense facility at Hamilton AFB, Calif., wave goodbye before boarding their airplanes.





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AIR FORCE Magazine

vigilance

Final victory over cancer will come from the research laboratory. But there are victories today. Many cancers can be cured when detected early and treated promptly. *Vigilance* is the key to this victory. There are seven signals which might mean cancer. Vigilance in heeding them could mean victory over cancer for you.

1. Unusual bleeding or discharge.
 2. A lump or thickening in the breast or elsewhere.
 3. A sore that does not heal.
 4. Change in bowel or bladder habits.
 5. Hoarseness or cough.
 6. Indigestion or difficulty in swallowing.
 7. Change in a wart or mole.
- If your signal lasts longer than two weeks, go to your doctor to learn if it means cancer.

AMERICAN
CANCER
SOCIETY



Shown at Charter Night program in Wichita as Air Capital Squadron accepts its charter are, left to right, Lt. Col. James Jabara, history's first jet ace and a native of Wichita; Mayor E. E. Baird, who made the formal presentation; J. Chesley Stewart, Midwest Regional Vice President, and Col. John Foster, McConnell AFB. The dinner meeting was held in the club at the base.

courses will be held each week in United's Hangar #8 at Idlewild Airport. Sam Hananel is Squadron Commander.

The annual Weber Valley, Utah, Fair this year took as its main theme a salute to the USAF Fiftieth Anniversary, and played to a packed house. AFA's Ogden Squadron and the Roy, Utah, Chamber of Commerce were co-sponsors of the program, which included a "fly-in breakfast" for 350 private pilots from a five-state area, displays of USAF aircraft, a model plane meet, and a demonstration by the USAF Thunderbirds.

Sen. Arthur V. Watkins delivered a major address on the "Growth of the Aviation Industry." Ogden's Mayor Raymond S. Wright welcomed the private pilots to Ogden. Dale Erickson, Utah Wing Commander, served as general chairman of the program.

Arnold Air Society, in line with its continuing program of securing scholarships and fellowships for top technical students at colleges sponsoring AAS units, has announced that the Link Foundation will award two \$1,500 fellowships to outstanding college senior Arnold Cadets, to be used for graduate study in aviation medicine, administration, education, or aeronautical engineering.

Fellowships will be awarded after national competitive examination of approximately 600 top seniors, to be administered by the Princeton Educational Testing Service.

The Society has obtained three undergraduate scholarships in its program. General results of the examination for them will be sent to industry and educational foundations to spur interest in providing additional scholarships and fellowships.

—GUS DUDA

Brig. Gen. Charles S. Root, Deputy Commander, Middletown Air Materiel Area, officiates at swearing-in ceremony of Harrisburg "buddy flight" of new USAF recruits during recent Golden Anniversary celebration at Olmsted AFB, Pa.





DOUBLE DIAGNOSIS TO PREVENT "HEART DISEASE"

...BY THE B&H

JETCAL ANALYZER

Two of the most important factors that affect jet engine life, efficiency, and safe operation are *Exhaust Gas Temperature (EGT)* and *Engine Speed (RPM)*. Excess heat will reduce "bucket" life as much as 50% and low EGT materially reduces efficiency and thrust. Any of such conditions will make operation of the aircraft both costly and dangerous. The *JETCAL Analyzer* predetermines accuracy of the EGT and (interrelatedly) Tachometer systems and isolates errors if they exist.

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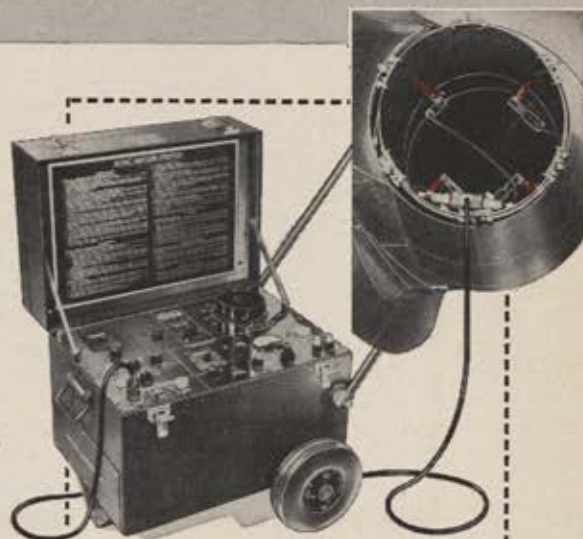
- 1) The JETCAL Analyzer functionally tests EGT thermocouple circuit of a jet aircraft or pilotless aircraft missile for error without running the engine or disconnecting any wiring. GUARANTEED ACCURACY is $\pm 4^\circ\text{C}$. at engine test temperature.
- 2) Checks individual thermocouples "on the bench" before placement in parallel harness.
- 3) Checks thermocouples within the harness for continuity.
- 4) Checks thermocouples and paralleling harness for accuracy.
- 5) Checks resistance of the Exhaust Gas Temperature system.
- 6) Checks insulation of the EGT circuit for shorts to ground and for shorts between leads.
- 7) Checks EGT Indicators (in or out of the aircraft).
- 8) Checks EGT system with engine removed

from aircraft (in production line or overhaul shop).

- 9) Reads jet engine speed while the engine is running with a guaranteed accuracy of $\pm 0.1\%$ in the range of 0-110% RPM. Additionally, the TAKCAL circuit can be used to trouble shoot and isolate errors in the aircraft tachometer system.

- 10) JETCAL Analyzer enables engine adjustment to proper relationship between engine temperature and engine RPM for maximum thrust and efficiency during engine run (Tabbing or Mic'ing).

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Republic's P-47

THE UNBREAKABLE

SIXTEEN bandits. Six o'clock level. Coming in fast!"

It was shortly after noon on the morning of June 26, 1943, when Capt. Robert S. Johnson, destined to become the Air Force's fourth-ranking ace in air-to-air combat with twenty-eight victories in World War II, looked back through the canopy of his P-47 Thunderbolt at 27,000 feet, north of Paris and spotted a flock of German Focke-Wulf 190s closing in on the squadrons—the 61st, 62d, and 63d—of the 56th Fighter Group.

"We were flying cover for some B-17s, returning from a strike deep into Germany," recalls Johnson, now a projects administrator for Republic Aviation Corporation in Farmingdale, L. I., N. Y. "I pressed the mike button on my throttle and repeated the warning twice. It was all I could do to keep from swinging around hard into them, head-on.

"But nope—by damn!—I was determined to stay in formation until I was shot out of it. I was deep in the doghouse with my outfit, or at least felt I was. I had broken the common law for fighter combat two or three times already in the short time we'd been in England. As a wing man I wasn't supposed to break off on my own and attack. Yet I'd done it and I'd got my man, too. But I'd gotten chewed

out for doing it, rather than being congratulated.

"Well, I received no answer to my call and was wondering what action to take when suddenly several boulders smacked through the front of the house. Thirty-caliber bullets rained all over the plane like hail, and cannon shells from the FW-190s' guns ripped my cockpit seat apart. The P-47 nosed straight down and rolled half to the right. The canopy glass flew out in a thousand pieces. I snuggled back as close to the armor plate as I could. A bullet nicked the bridge of my nose. Fire and smoke filled the cockpit.

"There was no doubt in my mind. This was it! I'd had it.

"I grabbed for the canopy bar to slide it back and bail out and at the same time I hit the 'D' button on my radio and yelled 'May Day.'

"The canopy opened about six inches and snagged. My engine was thumping badly. Oil covered my windshield. Vaguely, as I fell, I recall seeing huge dark shapes on either side of me. They were B-17s. Luckily, I missed them all.

"After dropping for several thousand feet I stopped tugging at the canopy long enough to level out. The fire had stopped, but the smoke was still swirling around. I went to work on the canopy again, using both

hands. I put both my feet on the instrument panel and pushed for extra leverage, smashing out all my instruments in the process. No dice!

"I stood hunched up and pushed against the canopy with my head and shoulders. I beat on the canopy with my fists. It still wouldn't give. Then I started out through a hole in the left side of the cockpit. But I could only get through as far as my waist because of my parachute. I had to give it up. I sure wasn't going to jump without it!

"So I righted the plane, and sat back for a second. The fire and smoke were all gone now. I had a moment to think. By this time I was down to 18,000 feet. I decided to try and make it to the Channel, get far enough out to ditch, then get picked up by Air Rescue.

"Surprisingly, I could still control the airplane fairly well, though I had to fly half the time with my eyes closed and the rest of the time with my head out in the breeze, sticking it out through a hole in the right side of the canopy. When I'd been hit, a 20-mm. cannon shell had entered the left side of the cockpit and torn off my flap handle. This released a considerable amount of hydraulic fluid into the cockpit, and there was a mist swirling about.



England, 1944. Bob Johnson (second from left, standing) poses with other P-47 pilots of famed 56th Fighter Group. Standing, from left: Lt. Col. Francis S. Gabreski, Johnson, Capt. Walker M. "Bud" Mahurin, Col. Robert B. Landry; seated, Capt. Walter V. Cook, and Lt. Col. David C. Schilling.

JUG

By Jim Winchester

"This half blinded me and my eyes were burning and swollen. By this time I was down to 7,000 feet and seven or eight miles south of Dieppe, still descending. As I stuck my head out into the breeze again I looked around and there, slightly aft of my right wing and a few feet above, about 1,000 yards away, was a shiny new FW-190, his nose pointed directly at me.

"I watched and waited for the yellow flashes to appear from his guns. They didn't come. He held his nose directly on me, as if he were taking pictures. I let him close in to about fifty yards and then swung under him, twisting back toward the Channel. I couldn't fight with him because I didn't know how badly my airplane controls were shot up, and I still didn't know if the plane was going to keep flying from one minute to the next. I watched him as he passed over my tail, then I made a shallow turn to his right. I knew he was going to fire on me, but I couldn't do anything about it!

"Let the son-of-a-bitch shoot! He can't hurt me any more than I'm hurt right now," I said to myself.

"He started firing. And he didn't miss. Bullets splattered all over like hail on a tin roof. He passed over me and moved slightly to the right and

ahead. I stuck my head out the right side of the cockpit, hit right rudder to swing my nose generally in his direction and pulled the trigger.

"I didn't even think of hitting him. But I did. Two of my bullets nicked his left wingtip. They didn't hurt him in the least but it did my morale a lot of good.

"The FW-190 swung into a tight show-type formation behind my right wing. I didn't mind his being there, just so long as he didn't get behind me. I could almost touch his left wingtip with my right hand. He looked my P-47 over from tail to nose and back several times and then he would just shake his head.

"He took me right over the middle of Dieppe at about 4,000 feet and probably saved me from being shot down by flak. His people on the ground couldn't fire because we were so close together. We finally passed the coast, out over the Channel. He stayed with me for about two miles, then he gave me a wave with his hand. I sighed with relief. I thought he was going to leave me. I wasn't that lucky. He swung back into firing position behind me and let go. Again, he didn't miss. But he was out of ammunition by now. He stayed with me a few more minutes, wobbled his wings and left. I was way out over the Channel by now, down to 1,000 feet.

"It was only then I realized I was really still alive and that lovable old P-47 was still flying. I climbed as best I could until the airspeed fell off to 120 mph, then leveled out, regained a little speed, and repeated my climb until I got back up through some scattered clouds to 5,000 feet. The old Jug was still carrying me toward England. My airspeed was slow, and I thought I'd never get across that Channel. When I did though, I came in right over an English air base, Hawkinge, in southern England. I decided to go on to Manston, though, where most of our Group had landed. I dropped my wheels and, luckily, the tires and wheels were okay. I made one of the prettiest landings you ever saw by looking out first one side and then the other from the cockpit. I couldn't see ahead because of the oil and hydraulic fluid on my windshield. As I rolled down the hill to the center of the runway and started up the other side, I pushed on my left rudder and spun the P-47 to the left in a ground loop. I had no hydraulics for either brakes or flaps. When I finally stopped I cut my engine and switches, undid my chute and seat belt buckles, and crawled out through the broken canopy. I pulled my chute out and jumped to the ground and kissed it!

"An ambulance rolled up to meet me. Immediately the medics started cleaning and doctoring my face and hands. It was only then that I realized I had been hit. My nose had been nicked, my wrist watch had been shot from my arm, I had a burn on my left forehead, and my eyes were swollen and burning. I had several 20-mm. splinters in both hands and flesh wounds in two places on my right thigh.

"The P-47 was in far worse shape than I was. It never flew again but I figure it earned its keep *that day*."

• • •

This tale of the ruggedness and dependability of the Republic P-47, as a high-altitude fighter, bomber, bomber-escort, and ground strafers in both the European and Pacific Theaters during World War II, is only one of hundreds which earned for this plane the sobriquet, "The plane that can do anything."

For the USAF, the "old Jug" is long gone, but in some two and a half years of overseas operations in World War II, in action in every theater except Alaska, Thunderbolts flew more than 546,000 combat sorties, dropping 132,000 tons of bombs and expending more than 135,000,000 rounds of ammunition and 60,000 rockets. They destroyed 7,067 enemy aircraft, shooting down 4.6 enemy planes for every P-47 destroyed by the enemy. Two-thirds of all Thunderbolts produced—and 15,329 of them rolled off Republic's assembly lines in Farmingdale, N. Y., and Evansville, Ind.—found their way overseas.

Tales of how these formidable fighter-bombers continued to fly after being hit with everything the Japs or Germans could throw at them, are still being told wherever World War II flying men gather.

Take the hair-raising experience of Lt. James E. Duffy. Cruising back to England over enemy-held Holland, he ran into a hail of anti-aircraft fire at 21,000 feet. He caught it plenty.

"When I looked the ship over later on the ground," Duffy recounts, "I almost passed out. I don't see how it flew at all."

The right aileron and wheel pants had been buckled in a dive into which the P-47 spun after being hit and before Lieutenant Duffy could make a recovery. German flak had shot out two of the engine cylinders along with the oil line and had made a sieve out of the tail section, shot up two blades of the prop, put a hole the size of a man's head below the pilot's seat on the underside of the fuselage, sprayed holes in the turbo supercharger system, and scattered more

(Continued on following page)

than three dozen holes elsewhere in the fuselage.

The story was much the same in the Pacific, where the last American ace to qualify in World War II made history in a P-47N Thunderbolt on the day before the fighting ended.

Flying their Thunderbolts on their longest mission since entering combat, pilots of the 507th Fighter Group tangled with the Imperial Japanese Air Force and shot down eighteen planes, damaged one in the air, blasted another before it could take off, and destroyed two more on the ground.

After a whirlwind seven-minute battle, the Japanese were routed and Lt. Oscar F. Perdomo emerged as America's last war ace after shooting down his fifth enemy plane.

"We took off from Okinawa and headed for Nagasaki and Keijo in search of targets of opportunity," Lieutenant Perdomo reported. "Over Nagasaki I looked down at an incredible sight. The city had been struck a few days before with an atomic bomb. A huge portion of it looked as though someone had put a layer of brown dust over it. Not a thing was left standing. Not a living soul could be seen anywhere."

Off the tip of Korea the Thunderbolts sighted a Japanese destroyer, but continued inland to their objective, three airfields at Keijo. Over Keijo they attracted no attention.

"We were getting disgusted," Perdomo reports. "It seemed to be the

same old story—no one to fight. Then it came—'Betty at eight o'clock.' I could see it about 10,000 feet below.

"Down we went in a steep dive. A Captain Hoyt made the pass and fired a short burst. The Betty hit the ground like a bursting bomb, sending flames 300 feet into the air. I made a 180-degree turn over the town and saw a buddy on the tail of an Oscar. He was so close that the bullets of only six guns were hitting the Japanese; the slugs from the other two guns were passing the Oscar's wingtips. The two planes went hurtling down until the Japanese finally crashed into a low hill.

"I made a ninety-degree turn and found myself entangled with three Oscars," Perdomo recalls. "I gave it water and managed to get behind them. One was right in my sight and I blew him up. I let my Jug skid and that put number two under the piper, and I blasted him.

"The leader saw me coming and dove down, using very little evasive action. I went after him, following him almost to the ground, firing as I went. I didn't know if I had hit him, but I could see that he was going to crash into the ground if he didn't pull out. I had the urge to yell, 'Pull out! Pull out!' Then he hit the ground, and I climbed back up.

"As I climbed out," Perdomo says, "I saw a pilot floating down in a chute. I headed for him, ready to shoot. He reminded me of a little

teddy bear, the way he was dressed. He saw me coming, and I could see that he was afraid. I just couldn't squeeze the trigger.

"Turning away from him, I ran into two Japanese. They separated, and I chased the one to the left. I bore down upon him so fast that I found myself pressing my wheel brakes in an effort to keep from flying into him. I fired two short bursts, and he disintegrated.

"After that I began to climb again and found four Oscars approaching me at 120 degrees. We began firing and they broke—three to the right and one to the left. I fired into the latter, and he hit the ground and exploded. I got another in my sights and tried to fire, but I was out of ammunition.

"My plane had been hit, and I was developing trouble. My prop was out and only one magneto was functioning. I flew over 800 miles in that condition, and when I got back to the base, we found a magneto lead shot away and the governor damaged. Also a slug had entered my main gas tank."

The story of the Thunderbolt began during the spring of 1940 when the stunning coordination of Nazi plane-tank teams forced the surrender of France in forty days. At that time Republic had contracts for production of the P-43 Lancer and was at work on the prototype of a light, very fast fighter designated the P-44.

In the late summer of 1940, an Air (Continued on page 105)

A Jug they couldn't break. Though chewed up on a low-level strafing mission, this P-47 made it back to base.



Twelfth Air Force P-47s, guns poised for action, fly over the snow-covered Italian Alps on a WW II escort mission.





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Roaring in at treetop level, this Eighth Air Force P-47 cuts loose on a German flak tower defending an airdrome in occupied France during World War II.

Corps board evaluated and analyzed the new requirements for fighters in the light of the Nazi victories. They canceled the P-44 and demanded something bigger and better.

The decision was a heartbreaker for Alexander Kartveli, Republic's top designer, but he immediately studied the board's report, recalculated data, and flew to Wright-Patterson Field in Dayton in time for a meeting of the board the next morning. When he returned to Republic the following day, he had with him a rough sketch of the design for the P-47.

It was a daring concept.

The P-47 was to carry a larger engine than any other Air Corps pursuit plane, a 2,000-hp aircooled Pratt & Whitney Double Wasp. Its initial armament was to be eight fifty-caliber machine guns, with provisions for rockets. It would embody all the protective features the US demands for its pilot—armor plate, extra oxygen, fuel reserves, and stamina capable of bringing a man home from the direct aerial emergencies. This meant that the P-47 would weigh about two tons more than any other Air Corps single-engine fighter. Its approximately seven tons were to be able to swoop and dive, make bone-crushing turns at extreme speeds, and climb at incredible rates of speed while superchargers compressed the air to a density at which the engine could function best—allowing the controls to remain so maneuverable that the pilot could send the plane easily through whatever aerobatics that might be required for survival.

There were other specifications. The wingspan would be forty feet, 9 5/16

inches. Its propeller would be oversized and have four blades to use up the 2,000-hp efficiently.

Kartveli and his immediate associates worked on the basic design all through the late summer of 1940. And on May 6, 1941, the first flight of the XP-47, which by then had been dubbed "Thunderbolt," was made. It had been built and readied for flight just eight months after Kartveli had fixed the design.

On that bright spring morning, Test Pilot Lowry Brabham taxied the new plane out along the flight line at Farmingdale as Republic executives and employees watched silently.

As Brabham throttled the sleek new Thunderbolt along the runway for its maiden flight the roar of the Double Wasp drowned out all else. The plane had to climb to 15,000 feet in six minutes with a battery of eight fifty-caliber machine guns and munitions, a heavier load of armament than anything known at that time. It was to reach 40,000 feet and afford the pilot protection from attack in all directions with its heavy armor plate and still allow him enough speed and maneuverability to fight off an enemy.

Brabham took the Thunderbolt up and flew back over the field in a series of maneuvers and passes, then headed for nearby Mitchel Field, where he touched down before another interested group of spectators.

He telephoned back to Republic that the plane had all the responsiveness of a thoroughbred race horse.

"Boy, we've hit the jackpot!" he shouted into the telephone.

The first Thunderbolts went into action with the 4th Fighter Group

from bases in England in 1943. From their first day in combat there seemed to be no limit to the amount of punishment they could absorb. Take the mess that Lt. Charles T. McBath and his Thunderbolt found themselves in after blowing up a fifteen-car ammunition train in Germany.

Lieutenant McBath spotted the train while on a strafing mission in the Schweinfurt area. Whistling to himself, he dove down and raked the freight cars with machine-gun fire. The train exploded, throwing up a curtain of flame 1,000 feet high, and a dense cloud of smoke and debris to 5,000 feet. Undaunted, McBath flew his plane through the inferno, emerging with most equipment shattered and one wing afire.

When one of his squadron buddies, Capt. Walter L. Flagg, noticed McBath's predicament, he flew alongside, calling to him over the radio. After learning that McBath couldn't read his instrument board, he proceeded to shepherd him out of Germany. Captain Flagg led the crippled plane safely through the flak belt, gave continuous encouragement and directions, and stood by until friendly territory was reached and McBath could crash-land.

But the story that tops them all was that of the Thunderbolt squadron that "captured" 800 German ground soldiers. In late August 1944, as the Germans were being pushed back through France, the P-47 pilots spotted a group of German soldiers at the edge of a forest. Wheeling around for a closer look, they saw several of the Nazis wave white flags. The P-47s circled warily overhead, until finally it looked as if the crowd of would-be prisoners had finished gathering. Then the Thunderbolts headed toward the American lines, wagging their wings for the Germans to follow. The P-47s continued their round-up, circling until all the Germans had been marched into American hands.—END

ABOUT THE AUTHOR

Jim Winchester is by now well known to AIR FORCE Magazine readers as a frequent contributor. He wrote our July '57 piece on "Milt Caniff's Air Force," and his most recent article was "SAC's Saboteurs," which appeared in our October '57 issue. A veteran newsman, Mr. Winchester works in New York City, where he's a writer for the King Features Syndicate.

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