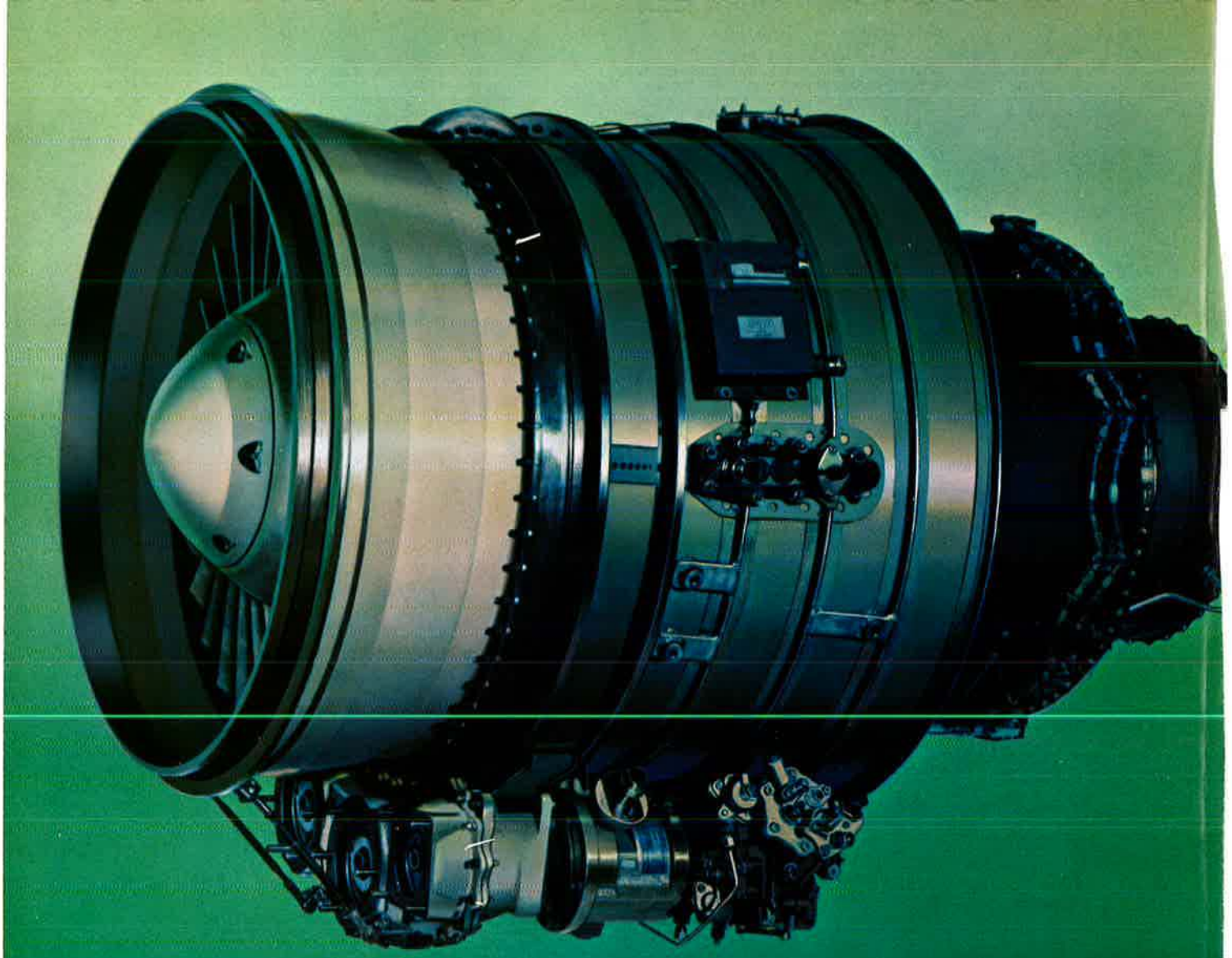
APRIL 1972 / $1

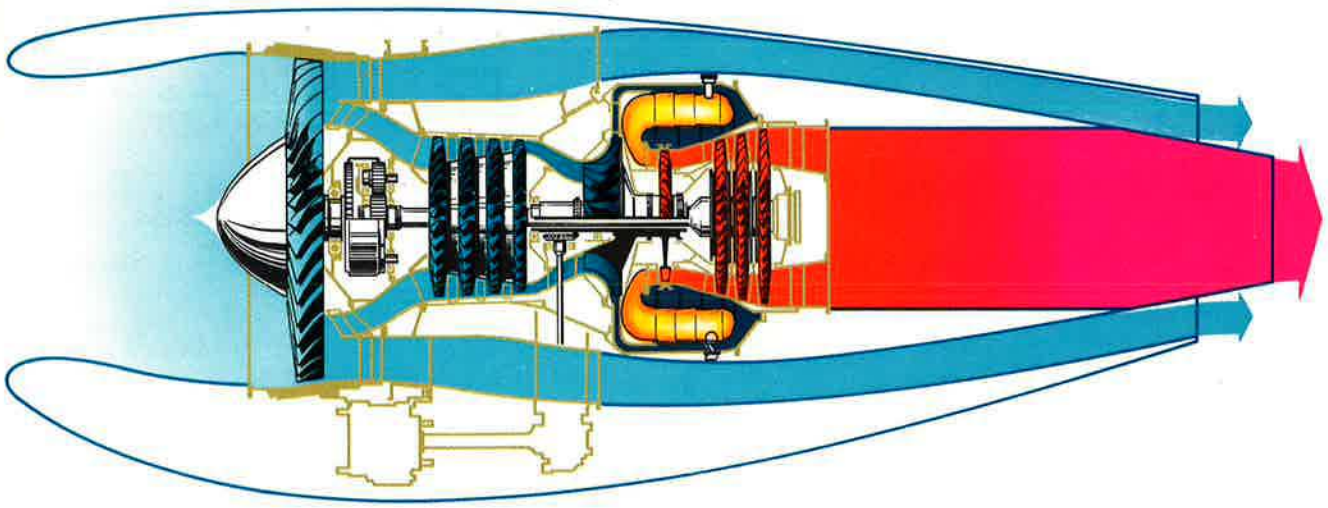
AIR FORCE MAGAZINE

Published by the Air Force Association

CHINA'S GROWING NUCLEAR DETERRENT...

NEW WEIGHT IN THE WORLD BALANCE OF POWER





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for greater economy and range smaller jets need our turbofan.

Put our TFE 731 turbofan on any small to medium size jet and the biggest thing you've got going for you is economy of operation. First, you get better performance at higher altitudes—higher cruise speeds over a longer period of time for more range—up to 2500 miles. You get an unmatched altitude versatility too—because the Garrett AiResearch TFE 731 performs just as well at lower altitudes. You get an extended hold time at airports. And at takeoff, more thrust and an overall good short field performance. Just one more thing, our TFE 731 is years ahead in noise reduction and pollution emission. The Garrett AiResearch TFE 731 engine is now being test flown on the new Falcon 10 and programmed for other small jets.

Garrett AiResearch TFE 731 specifications (sea level, standard day):

Power output	takeoff thrust: 3500 lbs max continuous: 3500 lbs
RPM	fan: 10,967 LP spool: 19,728 HP spool: 28,942
TSFC	0.493 lb/hr/lb thrust
Pressure ratio	fan: 1.54 cycle: 15.09
Bypass ratio	2.67
Airflow	113 lbs/sec
Weight	625 lbs

Write or phone. AiResearch Manufacturing Co. of Arizona, 402 S. 36th St., Phoenix, Arizona 85034. Phone (602) 267-3011.

GARRETT

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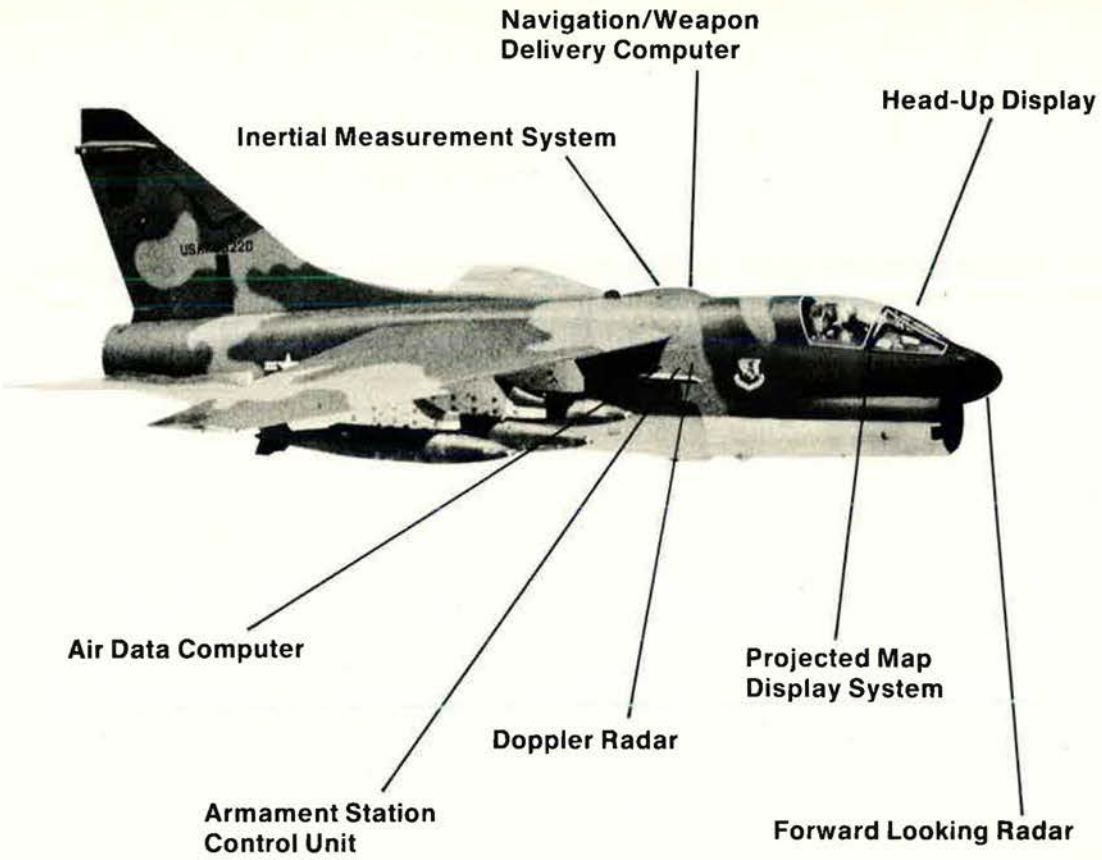
one of The Signal Companies



The whole is greater than the sum of its parts.

This simple definition of synergism is the best way to describe today's A-7. Its advanced electronic systems are so skillfully integrated that they out-perform each of their individual capabilities. Together they make the A-7 the most versatile and effective close air support and interdiction aircraft in the world.

Vought Aeronautics is the first aircraft manufacturer to produce an operational navigation and weapons delivery system that equals or betters unprecedented performance and accuracy guarantees.

Successful development of these systems took almost five years. Vought began with a proven air frame. Then we worked closely with the U.S. Air Force and U.S. Navy to design a superior avionics package that would meet the most exacting operational requirements. System interfaces were resolved with component suppliers. And computer software was developed to ideally coordinate these components.

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As a result, today's A-7 delivers up to 15,000 pounds of varied payload with better than 10-mil accuracy. Destroying hard targets in one-third the sorties required by other systems.

Other aircraft today contain many of the same components found in the A-7. But the A-7 is the only weapons system in operation with demonstrated proof that its integrated whole is greater than the sum of its component parts.

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AIR FORCE MAGAZINE

Published by the Air Force Association

VOLUME 55, NUMBER 4

APRIL 1972

THIS MONTH

THIS MONTH'S COVER . . .

China's rapid strides in both nuclear technology and weapons delivery systems signal a possible shift in the world balance of power. A searching analysis of the emerging Chinese strategic capability begins on p. 22.

THE DEPARTMENTS

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An Editorial

The Political Climate Is Unfriendly

By John F. Loosbrock
EDITOR, AIR FORCE MAGAZINE

As THIS is written, the weird and wonderful process through which the American people choose their national leadership for the next four years is well under way. We have been observing this process for many years now, and it becomes a little like taking one's annual physical—you begin to get used to it, but you don't particularly look forward to it or enjoy it. The electoral process becomes particularly frustrating when the truly important issues are ignored, glossed over, or treated with demagogic cynicism.

From where we sit, it is quite apparent that the question of national security is not going to be the central issue in the 1972 campaign. We think it should be, and a strong case can be made to back that opinion. Right now, it's not even *an issue*. The current level of discussion reminds us of the pungent phrase with which Nebraska's early settlers are alleged to have described the Platte River—"Too thick to drink and too thin to plow." Thus, at a point when, for the first time in more than a quarter of a century, the United States no longer holds a position of superiority over the Soviet Union, the consequences of this state of affairs are going to get shallow thinking, muddy rhetoric, and warmed-over platitudes, instead of the deep, clear, cold analysis they deserve.

It was not always thus. In the 1960 elections, national security was a major issue, and it is safe to say that, while the so-called "missile gap" of that period might have been stretched a little by the speech writers, there would have been a significant gap had not the issue been joined on the hustings. In 1964, national security likewise occupied much of the candidates' prime time. In 1968, a lot of heat was focused on Vietnam, but little light was shed on the broader aspects of national security. So it has been eight years since the problems of national life and death, strength and weakness, have had the kind of public scrutiny that comes only in a Presidential election year.

A measure of the lack of interest in the security issue can be found in two striking differences between 1972 and the last two previous campaigns in which defense stood high on the partisan agendas. In both 1960 and 1964, it was the "outs" who were urging defense buildups against an uncertain, but in retrospect moderate, threat. This year, with a list of candidates almost as long as the roll of starters in the Boston Marathon, the overwhelming majority of aspirants are calling for defense cuts when we're faced with a sharply defined threat of a magnitude that hasn't been approached before during this country's total existence.

The second major contrast between 1972 and the earlier campaigns is even more important. It is the level at which defense issues are being approached. In both 1960 and 1964, there was a relatively sophisticated quality to the public discussion. Questions were raised as to the size and nature of the threat, weapon system and force-level requirements, strategy, alliance arrangements, cost/benefit ratios, and, in general, there was acceptance of the responsibilities of the United States in the quest for a stable, peaceful world.

So far in 1972 the reverse has been true. With rare exceptions, defense is either being ignored or treated with demagogic unreality keyed to the prevailing antimilitary sentiment spawned by Vietnam. Except for the President himself, and Senators Jackson and Humphrey, none of the announced or *de facto* candidates knows very much about defense matters or has seen fit to equip himself with staffers who do.

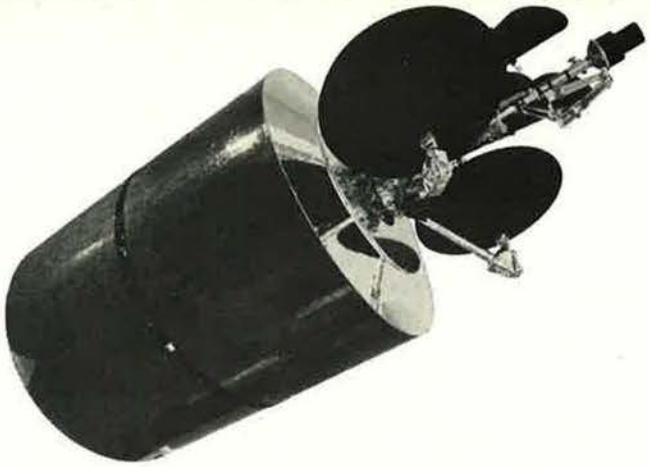
Admittedly, campaign rhetoric has often been quickly forgotten in the harsh, clear air of Inauguration Day. One need dip only a little deeper into history—to the election years of 1916 and 1940—to see how quickly Presidential responsibilities can fill the vacuum of campaign promises. But the American people should not have to count on this. A future enemy is not likely to be as stupid as were Japan and Germany. Indeed, if the other side can read a cue, it must take comfort in the current encouragement of a false sense of security and in the tongue-lashings to which the military is being subjected. Because the negative diplomatic fallout from our domestic dithering may be unintentional makes it no less damaging.

We would be presumptuous to infer that all candidates for national office should share our views on the increasing inadequacy of US defenses. But we can insist that each candidate address the national security issue and the implications of the shifting balance of military power—and that he make clear his position.

If, then, the American people opt for permanent military inferiority, so be it. But in so opting, they should know that they are choosing to live in a world that Senator Margaret Chase Smith recently described as "unimaginably different from any that Americans have ever known"—a world where we would have no choice but to dance to another's tune—or march to the beat of his drum.

Thus, your challenge of 1972 is to *make* national security an issue. As voters, you can do it. ■

WE BUILT THIS SATELLITE



AND THIS EARTH STATION

TO BRING PEKING

INTO YOUR HOME.

The leaders of two of the world's great powers. Meeting face to face. For the first time.

And you were there.

So were hundreds of millions of people worldwide.

You, and they, comprised one of the largest audiences in the history of man.

Why were they watching?

Because every member of that audience, to one degree or another, had a stake in the results.

Hughes was deeply involved.

We built and operated the mobile earth station that was flown to Peking for this event, under contract to Western Union International, to transmit communications out of Peking 24 hours a day.

It provided capacity for one color TV channel and nine voice commentaries. The station also simultaneously carried 60 two-way telephone channels for use of the Presidential party as well as for the press to transmit teletype, telephotos and radio reports.

And we built the giant Intelsat IV satellites for Communications Satellite Corporation (COMSAT), manager for the 83-nation International Telecommunications Satellite Consortium. Stationed over the Pacific and the Atlantic, these satellites carried TV and all press communications from Peking and relayed them to Intelsat's worldwide satellite communications network.

Each satellite can carry 5,000 phone conversations, or 12 television programs, or tens of thousands of teletype circuits. (In contrast, the first commercial synchronous communications satellite—invented by Hughes—had a capacity of only 240 phone conversations or one television program.)

This is just one way that Hughes is helping to meet the need for instant communications.

For the world's needs are many, and Hughes is pioneering in other technologies that promise to advance the lot of mankind.

HUGHES

HUGHES AIRCRAFT COMPANY

Airmail

Inadvertent Glitch

Gentlemen: I want to congratulate you on the fine article [by Edgar Ulsamer] in the February issue describing the SRAM system.

One glitch, however; under the contractor listing you named our company as General Precision, Inc., Kearfott Division. The correct name is The Singer Company, Kearfott Division.

GERALD TOKER, Director
Advertising/Public Relations
The Singer Company,
Kearfott Division
Little Falls, N. J.

• *The SRAM contracts were let before the company name change took place. The information furnished* AIR FORCE Magazine *by the prime contractor and the Air Force indicated the former name.*—THE EDITORS

We Try

Gentlemen: Absolutely excellent ["Technology: Master, Slave, or Friend?", by John F. Loosbrock, February issue]. Let's tell it to the public via newspapers, TV, etc.

JOHN MANIELLO
CBS Laboratories
Stamford, Conn.

Toward an All-Volunteer Force

Gentlemen: In thumbing through an old AIR FORCE/SPACE DIGEST (December 1970) I came to "The Bulletin Board" (page 70), which denotes General Westmoreland's acts of achieving an All-Volunteer Army.

One of his plans of transition from the draft to an All-Volunteer Army is the requirement that . . . "Where they exist, unnecessary irritants and unattractive features of Army life must be eliminated."

Having noted that the same plan is being accomplished in the other services so as to bring about a greater quantity of enlistees, I have concluded that the military is discharging an old moral.

The hardness that used to be incorporated in the military command had the objective of the separation of mind and body, thus producing a highly motivated and efficient force. The so-called "unnecessary irritants" had a psychological effect on recruits and was an essential to maintain our stability of defense.

The unattractive features of the service were evidently then cut, and I feel the allowance of long hair in the military today is the permittance of a symbolism of today's era of chaotic disorder of those who contain the un-American feeling which have no right to contain a voice or vote in our democracy. The gradual giving in to the dissenter of today will bring a failure of deterrence in the future just as it would if aerospace power suddenly became ineffective.

GLENN BLACKABY
Cleveland, Ohio

• *The continuance or discontinuance of the Selective Service System and induction of men into the armed forces is an issue that is not controlled by the military services. In that the current Administration, as well as a large segment of the congressional membership, have expressed an intent to terminate all inductions by June 30, 1973, the armed forces must take those actions that will ensure the maintenance of the strongest possible defense posture within the realities of reduced funding and termination of the draft.*

The Air Force approach to an all-volunteer force is, basically, to provide topnotch training and challenging jobs, and to compensate with a decent salary. Adherence to this philosophy should aid in recruiting the type of individual who has traditionally served his country with honor. However, it is also recognized that society is an ever-evolving phenomenon from which USAF cannot be isolated. Accordingly, since the source of personnel is the nation's society, we must have an armed force that appeals to a large segment of service-qualified individuals. Therefore, the Air Force is eliminating many trivial but irritating practices that have no significant impact upon mission capability.

The importance of maintaining discipline is well recognized within the Air Force. Accordingly, no changes in policies or customs that would contribute to a deterioration of good order and discipline are anticipated. In this regard, a well-groomed appearance is considered applicable; no further liberalization of grooming standards is planned.—THE EDITORS

In Memoriam

Gentlemen: Thanks for your fine parallel obituaries on two close and deeply respected old friends—Bart Leach and Rosy O'Donnell.

It's true that they came from different breeds of cats but each excellent in a common basic trait.

Rosy could and did lead strong and vigorous groups through the toughest defenses the Knute Rocknes or the Japanese military could devise.

Bart led other groups through the obstacles of conventional military thinking in the Pentagon and through another kind of thinking at Harvard.

GEN. LAURENCE S. KUTER,
USAF (RET.)
Naples, Fla.

Gentlemen: Your "In Memoriam" page of the February issue was the first notice I had of Bart Leach's passing; it came as a deep and painful thrust into the memory core of years past.

I knew Bart officially—as we worked the Unification and then the B-36 policy and problems. I knew him professorially—as I matriculated through his Law School, ever puzzled by his "Perpetuities in a Nutshell." I knew him socially—for his bridge games, singing around his fireplace, and his famous after-five cocktail musings.

As my friend, sponsor, counselor, and Air Force associate I knew him to be a man of varied talents, completely dedicated to the US Air Force —from its inception, through infancy, to "Service-hood."

All this to explain this letter of personal thanks for remembering publicly and so warmly the contributions of this unusual man.

S. G. FISHER, EXEC. DIR.
Management Planning
North American Rockwell
El Segundo, Calif.

Gentlemen: Months ago when you wrote that graceful tribute to C. B. Allen I intended to write and thank you, as all his friends and colleagues who saw it probably felt like doing. Now I have just read the two gems you have written about Bart Leach and Rosy O'Donnell and I'm thanking you for all three.

Good writing is a joy to read, especially when the pieces are about friends and more especially when one has done some reporting and knows

something about the difficulty of this particular kind of writing.

They were works of art!

LAUREN D. LYMAN
Southport, Conn.

More About THE BRIDGE

Gentlemen: Thank you for sending me Lt. Col. William Henderson's article "About That Bridge on the River Kwai" [February '72 issue]. I was indeed very much interested, as I always am in matters related with Kwai.

However, my interest was mixed with a certain amount of confusion and even uneasiness when I read: "When I saw the movie for the first time I felt I had been there before," followed by the statement that the writer and the 436th Bomb Squadron of the 7th Bomb Group had dropped bombs on that very spot, thus destroying "the bridge on the River Kwai." For, if the writer's recollection is correct, it leads to the unavoidable conclusion that during World War II Colonel Henderson, together with the 436th Bomb Squadron, bombed Ceylon and destroyed a bridge in that beautiful allied country—the very land where the movie was filmed—which, even after twenty-eight years, might entail no end of international trouble.

Let's be serious. I have told the true story of Kwai about a hundred times. Here it is again (and for the last time, for I have lost all hope of convincing people who passionately desire a different version).

When I had written the first draft of my novel, in which Colonel Nicholson was named Colonel X, Major Shears Major Y, and the river, River A, the next step was to find good names. As far as the river was concerned, I opened an atlas and looked at maps of Burma and Thailand, either country being fit for the historical background of my story—the building of a railroad bridge by British prisoners. That is how I discovered the River Kwai, running more or less in the land I was interested in. The name sounded good and I hesitated no longer. The *Bridge Over the River Kwai* it was to be.

That atlas was all the document I had about the land—the "spot." All the rest was built up, little by little, in a small hotel room in Paris. As a matter of fact, people carefully reading my novel will probably be struck by some peculiar features of the land, all imagined to fit the story: a large plain on one side of the river (enabling people to see and hear the arrival of the train from a long distance), on the other bank, hills covered with thick jungle conveniently disposed for the commandos to hide, to approach the river unseen, and to have a marvelous view over the prisoner's camp, but a flat space between those hills and the river providing a large curve of the railway after crossing the bridge, etc., etc., all features that were required by the story.

When it was decided to make a movie out of my novel, the producer and director went straight to the actual River Kwai. They soon came back, horrified and nearly abusing me for, according to them, it was the last place in the world the story could be filmed. Instead, they found a spot in Ceylon.

And that is it. I am sorry, but Colonel Henderson could not have bombed and destroyed *the* bridge on the River Kwai, because the so-called bridge is a phantom, just as Colonel Nicholson and all the other characters in the story are phantoms, all born in the dreams of an inexperienced novelist.

All this is by no means intended to belittle the merits of Colonel Henderson and his team. I am pretty sure they did bomb *a* bridge on the River Kwai—I mean the one that was hurriedly christened "the Bridge on the River Kwai" by the shrewd Thais, after the name became famous over the world—the one situated not too far from Bangkok, in a convenient place to attract tourists.

I am sure, also, that Colonel Henderson successfully bombed other bridges and targets in Thailand, Burma, and Southeast Asia. I feel the greatest respect for him and for all British and American airmen who fulfilled so many perilous missions over the treacherous Asiatic jungle. I met a few of them in that part of the world at that time and admire them strongly, feeling nothing could add to their glorious role.

PIERRE BOULLE
Paris, France

Gentlemen: I wish to complement Colonel Henderson on his article. I personally know of the extent and time his research on the story has taken, for I sweated that one out with him.

I was the tail gunner on his crew.

RAY HERTZLIN
Rush, N. Y.

The Military in Space

Gentlemen: In the September '71 issue, Edgar Ulsamer reported on an interview with Dr. James C. Fletcher of NASA ["The Shuttle: US's Airline Into Space"], in which Dr. Fletcher pointed out an "antitechnology kick" in the US with regard to spending more money on space. And why not, may I ask? During the regime of McNamara and his whiz kids, their profound decision was that there was "no military mission in space." They turned the whole space effort over to NASA's civilians for a mythical race against the Soviets to the moon—in which money was spent like water, and we won the "race" hands down.

Only there really was no race. It was a sham as far as the Soviets were concerned. And we found ourselves with a brand-new Soviet fleet off our coasts, while all we had was two bags of moon rocks to throw at them—for our $20 billion.

The Soviets, we find also, never did buy the McNamara whimsey of "no military mission in space." . . . So theirs is a very real military threat in space—near space, that is, where the action is—and not on the moon and beyond.

. . . It is time for Congress to affirm once and for all there is a military mission in space. Then turn all near space efforts—including the Space Shuttle—over to military control where it belongs, and let a reduced NASA have the outer space for purely scientific programs.

RICHARD W. ULBRICH, P. E.
Dayton, Ohio

SR-71

Gentlemen: We thoroughly enjoyed your December '71 issue. The article "SR-71: High, Hot, and Headin' Out" by Lt. Col. G. Abe Kardong, was especially enlightening.

However, sir, we would like to add a small, humble postscript to Colonel Kardong's summation. We suggest this poem might be fitting:

Who else has seen the
  Flashing beauty of radar blips?
The total battle?
  Because I am a Weapons Controller
The one in complete control!
  I envy no man who flys!

Block II Instructors
3625th Technical Training Sqdn. (ATC)
USAF Weapons Controller School
Tyndall AFB, Fla.

Gentlemen: We enjoyed reading Lt. Col. G. Abe Kardong's article concerning the SR-71 program in the December 1971 issue, but would like to offer these comments concerning the required physical examination at the School of Aerospace Medicine, Brooks AFB, Tex.

Candidates are referred under the provisions of Air Force Regulation 161-23, paragraph 1b, which gives the Aerospace Medicine Consultant

Airmail

Service the responsibility to evaluate the flyer being considered for or assigned to special flight operations. These examinations are known simply as Special Evaluations, to distinguish them from the cases referred for clinical problems. The same format is utilized for candidates for the Aerospace Research Pilots School (AFSC) at Edwards AFB, Calif., and is derived from a format established for spaceflight candidates. The present format requires only five duty days, unless an unexpected finding extends the period of evaluation.

We regret that Colonel Kardong found his SAM evaluation (in August 1966) to be a "shattering experience," but would like to assure him and your readers that most applicants do indeed "survive" the evaluation. His statement that "a large percentage" do not pass the physical examination does not seem to be justified from the data retrieved from our files; that is, that there have been only three disqualifications among ninety-seven candidates for the SR-71 program, a disqualification rate of 3.1 percent.

Considering all of the Special Evaluations that we have accomplished, dating from 1961, there have been twenty-four disqualifications among 1,089 applicants for various Air Force and NASA programs, an overall disqualification rate of 2.2 percent.

And finally, as Colonel Kardong states, there are considerations other than the individual's flying pay in the rare case where a serious physical problem is discovered, *e.g.*, the individual's health, the cost of the proposed training program, and the cost of an aircraft accident.

LT. COL. WILLIAM H. KING,
MC, SFS
Chief, Flight Medicine Branch
and
COL. JOHN W. ORD, MC
Chief, Clinical Sciences Division
USAF School of Aerospace
Medicine (AFSC)
Brooks AFB, Tex.

F-111 Profile

Gentlemen: No doubt readers are familiar with the English Profile Publications, covering famous aircraft in the form of a small pamphlet.

I am engaged in writing one of these on the F-111. Needed are squadron assignments and deployments of this aircraft. Also news reports of F-111 Southeast Asia deployment. Photographs showing squadron and special markings will also be needed. Careful handling and return of material is assured.

KURT H. MISKA
749 Preston Rd.
East Meadow, N. Y. 11554

Tac Airlift Missions

Gentlemen: The Office of Air Force History would like to hear from individuals who participated in any of the following tactical airlifts:

Operation Junction City (assault and resupply, 1967);

Khe Sanh resupply (1968);

Operation Delaware (A Shau Valley, April 1968);

Kham Duc evacuation (May 1968);

Tet offensive (January 30–February 7, 1968).

Please write, summarizing your experiences and furnishing your address and telephone number for further inquiry.

Hq. USAF (AFCHO)
Washington, D. C. 20304
Attn: Colonel Bowers

UNIT REUNIONS

Air Commando Association

The 1972 convention of the Air Commando Association (ACA) will be held October 6–9 in Ft. Walton Beach, Fla. Persons of all ranks and eras who served in air commando or special operations units are invited to attend. Nonmembers of ACA who are interested should also contact

Maj. Franklin G. Owens
P. O. Box 7
Mary Esther, Fla. 32569

Air Transport Command

Former members (and wives and husbands) of the Air Force Air Transport Command are invited to attend the 30th anniversary reunion at the Frontier Hotel, Las Vegas, Nev., the weekend of May 19–21. A roster of former ATC personnel is being compiled as the first step in arranging special low-cost hotel and dinner reservations. Interested persons should write to

James W. Austin
c/o Hughes Tool Company
250 Park Ave.
New York, N. Y. 10017

Disabled Officers Association

The national convention of the Disabled Officers Association will be held June 22–24, at the Disneyland Hotel, Anaheim, Calif. Contact

Maj. Walter J. Reilly
Disabled Officers Association
1612 K St., N.W.
Washington, D. C. 20006

Vets of Bodney

A reunion, planned for Air Force personnel who served at Bodney, England, during World War II, will be held in Memphis, Tenn., August 19, 1972. Contact

Harold Young
780 Novarese Rd.
Memphis, Tenn. 3812

63d Station Complement Squadron

The third biennial reunion of the 63(Station Complement Squadron (Sp) i being held in Newark, N. J., June 24–25. All members of this WW I unit and their families are cordially invited. For further details contact

Arnold E. Haight
186 Kingsland St.
Nutley, N. J. 07110

98th Bombardment Group (H)

The annual reunion of the 98th Bombardment Group Veterans Association will be held July 18–20, 1972, at the Downtown Holiday Inn in Atlanta, Ga. All "The Pyramiders" who served in the 98th from 1942 till present and are not on the mailing list should contact

W. H. Bolling
Rt. 3, Box 67
Gonzales, La. 70737

414th Bomb Sqdn. Association

The reunion of the 414th Bomb Squadron Association will be held August 17–20, 1972. For further information write one of the following.

Robert Woods
25459 Colgate
Dearborn Heights, Mich. 48125
or
Edward Piotrowski
950 Mayburn
Dearborn, Mich. 48128
or
Charles Merlo
7335 Neckel
Dearborn, Mich. 48126

437th Troop Carrier Group

The 1972 (12th biennial) reunion of the original World War II 437th Troop Carrier Group will be held August 18–20 at the Frontier Hotel, Las Vegas, Nev. For further information contact

437th TC Group Assoc.
P. O. Box 243
Greenacres City, Fla. 33460

464th Bomb Group

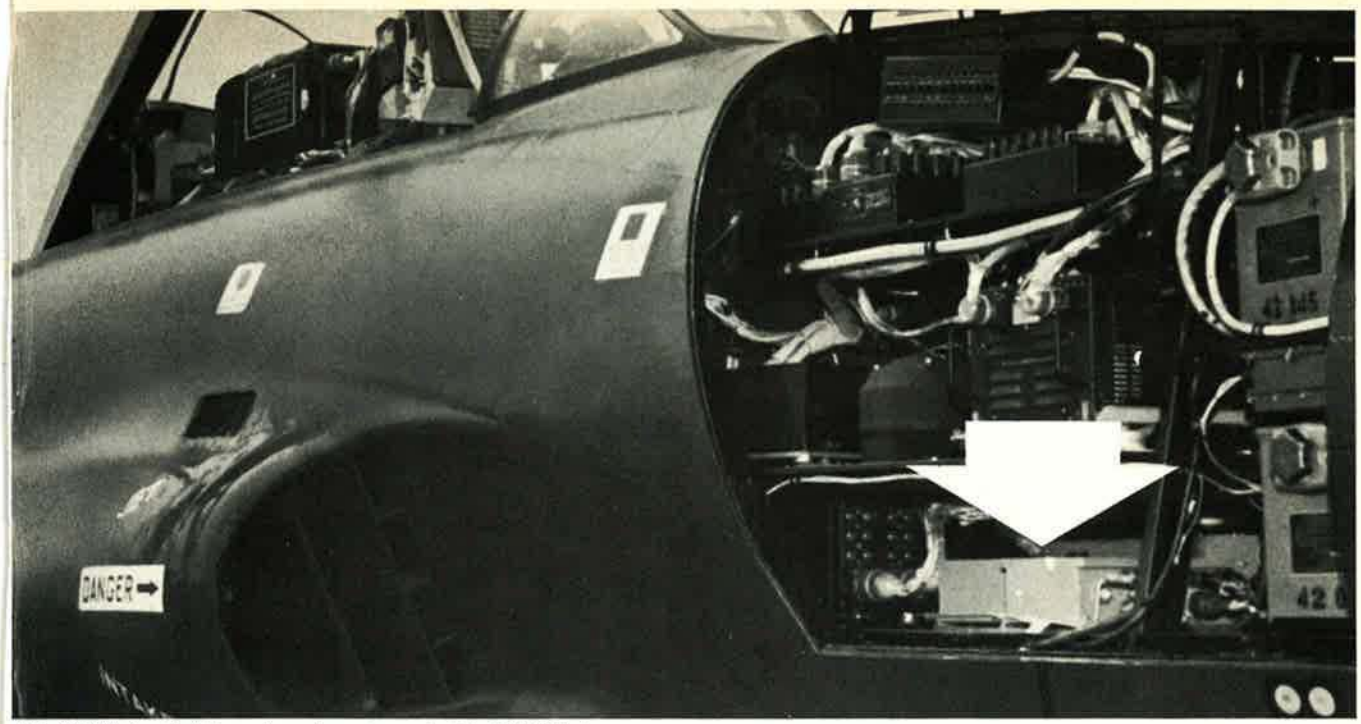
The reunion of the 464th this year will be held in St. Louis, Mo., August 11–13. This reunion is for the members of the 464th Bomb Group, 15th Air Force, that was based in Italy during World War II. For further information contact

H. Robert Anderson
4321 Miller Ave.
Erie, Pa. 16509

493d Fighter Squadron

The reunion of the 493d Fighter Squadron, WW II, will be held in Dallas, Tex., August 17–20. For further information contact

Col. J. L. Cooper, USAF (Ret.)
14 Forge Hill Dr.
Ilion, N. Y. 13357



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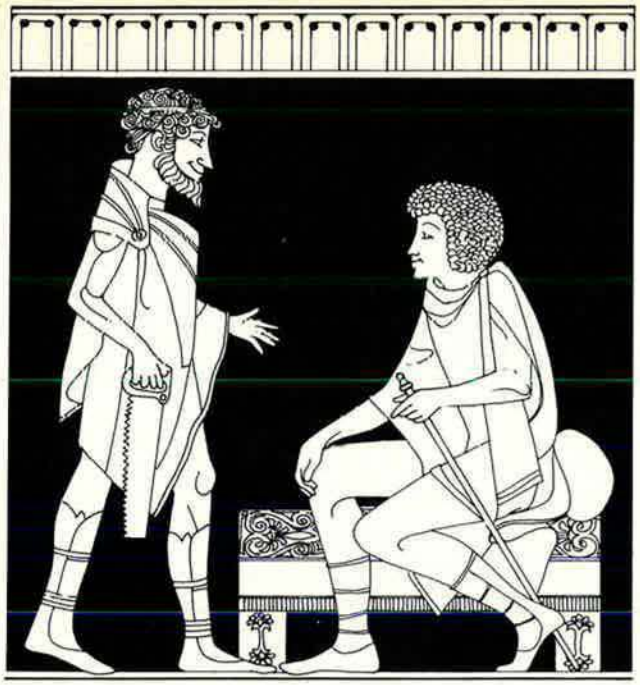

PROCRUSTEAN:

WHAT DOES IT MEAN?

Once upon a time (or so the story goes), there was a Greek named Procrustes who did some funny things with a bed. If you were staying at his place and found the bed too big, for example, Procrustes would say, "No sweat," and stretch your aching frame with ropes and weights until it was big enough for the bed. If the bed were too short for you, Procrustes had a simple solution: he'd cut off your legs until they just fit into the bed.

Understandably, Procrustes' customers spread his name throughout the land. It has come down to us today as a word: *procrustean,* harsh or inflexible in fitting (someone or something) to a preconceived idea, system, etc.

Some companies are procrustean—they take your problem and stretch it or chop it off to fit the solution they happen to have available. At TRW, however, the technology is broad enough to let us deal with *your* problem, not *our* solution.

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Airpower in the News

By Claude Witze
SENIOR EDITOR, AIR FORCE MAGAZINE

The Posture Parade Marches Again

WASHINGTON, D. C., MARCH 3

While China has been dominating the headlines for the past couple of weeks, it has been Russia that got the attention behind closed Capitol Hill doors. Starting on February 15, the annual parade of civilians and soldiers from the Pentagon to the Senate and House Armed Services and Appropriations Committees has been under way. Only cursory reports have appeared in the press, and there are simple reasons for it. Not only are the military posture hearings held in secret, but the unclassified versions of the statements made on Capitol Hill are so voluminous that the press corps is swamped. Almost any account, including this one, has to be sketchy. What is most important can be a matter of any observer's opinion.

One of the more unfortunate decisions made by the United States in the past was the one by President Eisenhower to deemphasize the role of military space activity. The Russians did not do this, and there is no "civilian" space agency in Russia. When Russian space vehicles are exhibited, they are accompanied by military men in military uniform. All of this has been pointed out in years past, sometimes by our own space experts. We have in mind, in particular, Dr. Walter Dornberger, now retired, who proposed the Dyna-Soar project, predecessor of today's space shuttle program, as far back as 1951. That is more than twenty years ago. Dr. Dornberger also is the man who, looking at the military motives behind the Kremlin's space effort, once told this magazine: "If I were a Russian, I would aim at making the United States blind." That was in 1965.

Our national reluctance to acknowledge this possibility has kept us tongue-tied ever since. Top military officers refuse to answer questions on the subject, and that includes the US Air Force Chief of Staff. Now it may be that the front has been broken by Defense Secretary Melvin R. Laird. In his annual report to Congress, Mr. Laird cited the 1957 success of Sputnik as something that shocked the United States. Then he, too, went back to 1965. While we were busy in Vietnam, he said, "the Soviet Union was stepping up its research and development efforts and was beginning to produce many of the weapons systems we note today." Then:

"The USSR has now reached a position where—unless we take appropriate action—there could be new surprises and new 'Sputniks.' But they are less likely to be in areas such as the peaceful exploration of space; rather, they are more likely to be a part of a major new Soviet military capability."

At another point, listing some of the more important Soviet research and development programs, Mr. Laird said they have deployed an expansive space tracking system.

"This system," he added, "would provide the Soviets with the capability of predicting the position of near-earth orbiting satellites."

The Secretary did not expand on this, as he could have, to say that Russia also has demonstrated that it can do more than track near-earth satellites. It can intercept and inspect them and blow them up in space. If they decide to do it, they could blind our intelligence, just as Dr. Dornberger predicted, they will turn space into a battlefield and prove their technological capability. The fact that Mr. Laird has brought the subject up, at long last, puts his 1972 report to Congress in the same category as the final posture statement of James Forrestal. That was the one in which the Secretary of Defense, for the first time, mentioned the possibility that satellites in space might have military applications.

It is difficult to find, in the presentations so far released, any more concrete references to space as a theater of war than that offered by Mr. Laird.

Lt. Gen. Otto J. Glasser, Deputy Chief of Staff for Research and Development at USAF Headquarters, told the Senate Appropriations Committee that more than half of the $345.7 million requested for military astronautics will be spent on "classified special activities." Then he continued:

"One of the programs just removed from this special category is the Defense Support Program. This system consists of deployed satellites and is an outgrowth of several related efforts. Our Fiscal Year 1973 RDT&E request of $21.7 million will be used for Phase II spacecraft design and development and other improvements."

Adm. Thomas H. Moorer, Chairman of the Joint Chiefs of Staff, appeared on the Hill with Mr. Laird. Of all the

—Wide World Photos

The nation's top military chieftains are Defense Secretary Melvin R. Laird (left) and Adm. Thomas H. Moorer, who is Chairman of the Joint Chiefs of Staff. They were the lead-off witnesses in this year's annual presentations to Congress.

statements offered, the Chairman's was the one expressing greatest alarm. At the same time, playing the role of the good soldier, Admiral Moorer avoided entirely the subject of space. He found ample grist in his conviction that "the relative military power of the United States in the world has clearly peaked and is now declining."

Like other witnesses, the JCS Chairman is apprehensive. He fears Russia may build itself into the position where it can carry out nuclear blackmail threats against the United States. He said that Soviet officials already claim strategic superiority. And the lesson is that if that proves true it will have no practical effect in the event of war, but "we will pay a high price in the effectiveness of our diplomacy."

Without being specific about the perils in space, the Admiral said our intelligence can provide a "good indication" of the kinds of weapon systems that lie in the future. But, if we try to look more than five years ahead, the data on what other nations may have is "unknowable." Hence, all we can do is "postulate the kinds of programs which may be economically and technologically feasible, and strategically desirable, for other nations to pursue."

The Admiral appeared most concerned about two areas in which he felt free to speak up. One is the Soviet ICBM buildup and the other, his favorite subject—the perils faced by the US Navy. He said the greatest uncertainty centers on the Russian silo-construction program. There are new silos; we do not know what they are for, or how many Moscow intends to build. The Soviet missile test program, which we monitor from space, is progressing rapidly. They are working on MIRV warheads, improved accuracy, better penetration capability, and mobility. They are expected to have 1,550 operational ICBMs on launchers by mid-1972, while we have 1,054. Beyond mid-1972, the projections are less certain, but they could pose a threat to our Minuteman force.

So far as the Navy is concerned, Admiral Moorer said the Russians have acquired a "global reach" they did not have a few years ago. The challenge will increase unless we speed modernization of our own Navy. He believes we still have the edge in overall offensive seapower, but "the US Navy is no longer the unchallenged master of the seas."

Both the Admiral and Secretary Laird placed great emphasis on research and development as the area most in need of immediate attention if we are to meet the threats of the future. The backbone of this case, however, was given to Congress by Dr. John S. Foster, Jr., the Director of Defense Research and Engineering.

THE WAYWARD PRESS

After an extraordinary performance, in print and on the television tube, a small army of US news media representatives has returned from a visit to the People's Republic of China. They were accompanied by President and Mrs. Nixon.

As pointed out by Russell Baker in the New York *Times*, most of the American television industry went on the junket. At least part of the time, US newspapers were providing their readers with reports of what was being shown on the tube, with only rare efforts to improve on the product. Almost without exception, the viewer came away with the impression that our local channels, connected to Peking by satellite, were being exploited by grateful Chinese hosts.

One morning, Barbara Walters, a star of the NBC "Today" show, was on hand as Mr. Nixon's jet touched down at the Chinese capital. The Washington *Post* said she was breathless as she announced: "There is no red carpet, Ed [Newman], we've just received word." The *Post* said she was right, although there did appear to be a small carpet just outside the plane.

We were baffled by the significance of this until we read a Max Frankel dispatch in the New York *Times*. He told why it was significant: "The reception for the press in both Shanghai and Peking has been gracious and efficient. The carpets down the ramps from their planes were thick and red. The receiving lines of officials in each city were long and cheerful."

Considering what the Chinese got out of Mr. Nixon and what they got out of the American press corps, it is not surprising that the thick red carpets were used where they would do the most good.

Most of the commentators were disappointed with what they could learn on the scene about the conversations between President Nixon and the Chinese leaders. They felt they were missing the "real story," and, in the absence of a Jack Anderson or Daniel Ellsberg, there was not much they could do about it. NBC's John Chancellor, looking somber in a fur-collared coat, said there were some "leaks" but only to the effect that the President might talk about the talks when he got home. In the interval, Mr. Chancellor lamented, the American people were going to be treated like Chinese people, and left in the dark. The fact that Moscow was listening, and that things may have transpired which are none of Moscow's business, got scant attention, if any. Mr. Chancellor's conclusion was that the Peking talks "may not be producing much," a conclusion that must have been based on what he did not know.

The Chinese took full advantage of our interest in military matters. They escorted the press and TV Goliaths, complete with camera crews, on a visit to the 196th Division of the People's Liberation Army. There they met and interviewed Keng Yu-chi, the vice commander, and witnessed a demonstration of how China maintains its vigilance against American imperialism.

Philip Potter gave a commendable report of the tour in the Baltimore *Sun*. He quoted Vice Commander Keng as saying China's army is "prepared to smash the aggressive plots of imperialists and their lackeys." To prove this there was a demonstration of troops firing small arms, recoilless rifles, and mortars, as well as a display of the explosive force of land mines. There was sham bayonet practice. On top of this, the newsmen were treated to drinks of mao-tai, described as a sorghum liqueur, and a nice lunch.

Dr. Foster is a man who has, in the past year alone, been vilified and disparaged by some of his peers. Last year, there was an orchestrated effort to discount his competence and his evaluations of Russian technology. It was led by an organization called the Federation of American Scientists, a unilateral-disarmament fraternity that is not a federation of scientists. Memberships are solicited from anyone who wants to join the antitechnology kick and will put up $15 for an annual subscription.

The Defense Research Director struck back in this year's posture statement. He said he confers frequently with university scientists who have open professional intercourse with their Soviet counterparts. Dr. Foster finds that these men, active in nonmilitary research and development, now are convinced that Soviet universities and institutes are less productive than ours. They say the Russians agree with them on that. The reason given is that, while Russian scientists are first class, "they lack the dynamic freedom of action, the instrumentation, and the responsive support which are provided in our universities and nondefense laboratories." *(See also the report on Soviet universities, beginning on p. 40.)*

What Dr. Foster deduces from this is that scientists in the civilian sector are constrained in Russia. Meanwhile, the high priorities and professional freedom are given to scientists working on defense. This is a segment of the Soviet technological world that we almost never see.

"This would," Dr. Foster concludes, "account for any disparity noted between the observations of our university scientists and those of our intelligence community, and is confirmed by the relative output of the civil sector when compared to Soviet space and military achievement."

Pleading for a more vigorous effort to mobilize intelligence about Russian defense technology programs, the R&D chief says, "Realistic deterrence depends on the knowledge and measurement of the relative strength of the US and our allies vis-à-vis our potential adversaries. As long as we retain technological superiority, we can make meaningful measurements of relative strength without fear of surprise. We can estimate their progress because we've already been there."

Where have we not been? Dr. Foster lists eleven areas of defense technology in which he has compared present deployed US and Soviet systems side by side, but not face to face. He credits the deployed Russian forces with technological superiority in these systems:

- Antiballistic missile systems.
- Fractional Orbital Bombardment Systems (FOBS).
- Strategic Air Defense Interceptors.
- All aspects of civil and industrial strategic defense and recuperative planning.
- Tactical antiship missiles.
- Surface attack ships (without carriers).
- Antiaircraft artillery systems.
- Some armored combat vehicles.
- Medium- and high-altitude SAM air defenses.

Somehow, it all reminded us of a Defense Department Joint Civilian Orientation Conference, as described on television. The basic difference is that the networks reported this excursion, with a Communist army, completely deadpan. It was a significant news story, not "The Selling of Peking's Pentagon."

* * *

Last month, in this space, attention was called to the work of a local NBC reporter, Neil Boggs, and how he tells his television audience things go down when they really go up, and vice versa.

Now we are indebted to a sister publication, *The Retired Officer*, for citing the fact that Eric Sevareid, the CBS coast-to-coast pontificator, makes the same kind of mistakes.

It seems that Mr. Sevareid analyzed the 1972 Defense Appropriations Bill in his broadcast of December 1, 1971. After chatting about Adolf Hitler and the Big Lie technique, he proceeded to give out information about the defense budget. Commentator Sevareid said his source was a publication called the *Congressional Quarterly*, a sort of weekly fact sheet about Capitol Hill that is familiar to most competent journalists. Then, Sevareid, as quoted by *The Retired Officer*:

"The Air Force wants two new cars for each recruiter; 1,000 military aircraft are used for pilots to fly around logging their required hours; a $9 billion program for modifying weapons that have already been built. More generals and admirals today than during World War II, when the forces totaled four times as many men. A public relations budget that has jumped threefold in four years."

The Retired Officer weighed these statements, put on coast-to-coast TV by Mr. Sevareid, against what the *Congressional Quarterly* said in its issue of November 27, 1971. It found, of course, that the *Congressional Quarterly* never said any such thing. *The Retired Officer* then accused Mr. Sevareid of making serious errors and wondered, aloud, why he did it.

Later, the editors received a letter from the CBS star. Mr. Sevareid, a little apologetic but never contrite, said it was weeks before he realized he had made a serious error. He admitted that the *Congressional Quarterly* "did not say what I said it did."

Then he said he was baffled. And, perhaps most astonishing of all for a man who works for Richard Salant, he continued:

"I think what I did was to confuse the *Quarterly's* account with a secondary report of its account, probably in a newspaper here. I'm afraid I was both innocent and hasty."

Well, it is easy to believe that CBS news gets its information from unreliable newspapers, which are not unknown in Washington. They go together, like ham and eggs. What is inexcusable is that a newsman of Mr. Sevareid's pretensions would tolerate using copy that did not come from a primary source. A newspaper, unreliable or not, is not a primary source, as every good reporter knows. Neither is the *Congressional Quarterly*, however prestigious.

Mr. Sevareid must learn, as we did many years ago, that the primary source for a budget story is the budget. That is where we go each year in preparing copy for AIR FORCE Magazine. We have no doubt that is where the *Congressional Quarterly* went for its information, later misquoted, the eminent commentator suspects, "in a newspaper here."

The editors of *Congressional Quarterly* say they can find no record of any such distortion in a newspaper, and they have a file of the clippings.

Mr. Sevareid says he is "convinced that the true responsibility for a 'credibility gap' lies with the government far more than with the press."

He did not prove that point in his broadcast of December 1, or with the letter he wrote to *The Retired Officer*. As we have pointed out, when the press is discredited, it is by the press. ■

- Surface-to-surface tactical missiles.
- Heavy-lift helicopters.

There are more areas, seventeen to be exact, in which the technology of deployed US weaponry surpasses that of Russia. These range from our ICBMs, bombers, and submarines to our ordnance and satellite communication systems. In a few parts of the military spectrum, Dr. Foster equates the technology of deployed US and USSR systems as equal. In this category he lists tanks and antitank weapons, satellite tracking systems, satellite navigation systems, and small arms.

The Director says that the US must excel in every area of warfare, and "We have not held our own against determined competition."

What Dr. Foster had to say about space was, for the most part, concerned with US advances, but without any indication that we are interested in anything but passive systems. He said we have an early warning satellite system that is reporting "non-US missile test launchings." The third of the series was launched on March 1 from Cape Kennedy. It can keep its sensor eyes on both the Soviet Union and Communist China. Another satellite, SOLRAD-10, is monitoring solar disturbances that might interfere with other communications, navigation, and surveillance systems.

Dr. Foster went a little beyond this. He cited some successes in the area of basic technology. He said we now have an ability "to detect ballistic missiles and reentry vehicles in midcourse flight with infrared sensors aboard spacecraft." That means our satellites can spot warheads on their way to a target. The witness implied that this can improve our defense against missiles. To it, he added the news that the US has successfully test-fired "controllable thrust, restartable solid-propellant motors with integral thrust vector control." Put in a working package, this means US technology has solved the problem of tracking and chasing incoming warheads, even if they do not follow a simple ballistic course or if they remain in orbit for any length of time.

In a single bow to the admitted new Soviet space capabilities, Dr. Foster disclosed that he is aware of the menace to our satellites in space. He said some of this new fiscal year's funding will be used to "develop more survivable warning systems through diversity of sensors so that it will require multiple types of attacks to knock out our warning capability."

There was some irony in the fact that Mr. Laird and his civilian and military staffs were appearing on Capitol Hill this year while President Nixon was dining and toasting with leaders of the People's Republic of China in Peking. In the briefings it is called PRC.

Dr. John S. Foster, Jr., Director of Defense Research and Engineering, says, "We have not held our own against determined competition" in defense technology areas.

Secretary Laird indicated China is developing an ICBM capable of reaching the United States. He estimated that deployment could not occur before 1975, but ten or twenty missiles could be ready to go by mid-1976. He also gave Peking that interest and capability of developing a nuclear-powered ballistic missile submarine, but said it probably cannot be done until after 1975. (*See also the report on China's nuclear progress, p. 22.*)

Admiral Moorer said a great deal more about China. He said that country is "emerging as still a minor, but nonetheless significant, nuclear power . . . perhaps the third most important nuclear power in the world." Their technological effort is concentrated on ballistic missiles, combat aircraft, and major combatant vessels.

The JCS Chairman warned that the new stature of Red China adds "a new and complex factor to the strategic equation, both for the United States and the Soviet Union. China probably already has a capability to deliver nuclear weapons on Soviet targets in Siberia, and on US forces and US allies in Asia and the Western Pacific. By the mid-1970s, China's nuclear reach could extend to all of the Soviet Union, and by the end of the decade to the continental US as well."

Then, he seemed to have one eye on the television extravaganza coming by satellite from the Chinese capital. "Regardless of how the relations among these three nations may develop in the future," the Admiral said, "US strategic forces must always be sufficient to cope with both the Soviet Union and China simultaneously."

It is essential to report that Secretary Laird expanded on his concept of Total Force Planning for long-range Pentagon purposes. In addition to the money required for modernization of weapon systems and other hardware, he called for new emphasis on strong National Guard and Reserve programs. Full readiness, full manning, and modernization of equipment are needed, he declared, to make the Guard and Reserve worthwhile parts of the Total Force. The new budget calls for an increase of $600 million in funds for this purpose. With total forces that are 1,400,000 below the 1968 active-duty peaks, there is a new role ahead for the citizen soldiers.

By the time these hearings are finished, there will be thousands of pages in the transcript. Under questioning, more facts will be revealed and there are indications from key leaders in Congress that the questioning will be stiff in many areas.

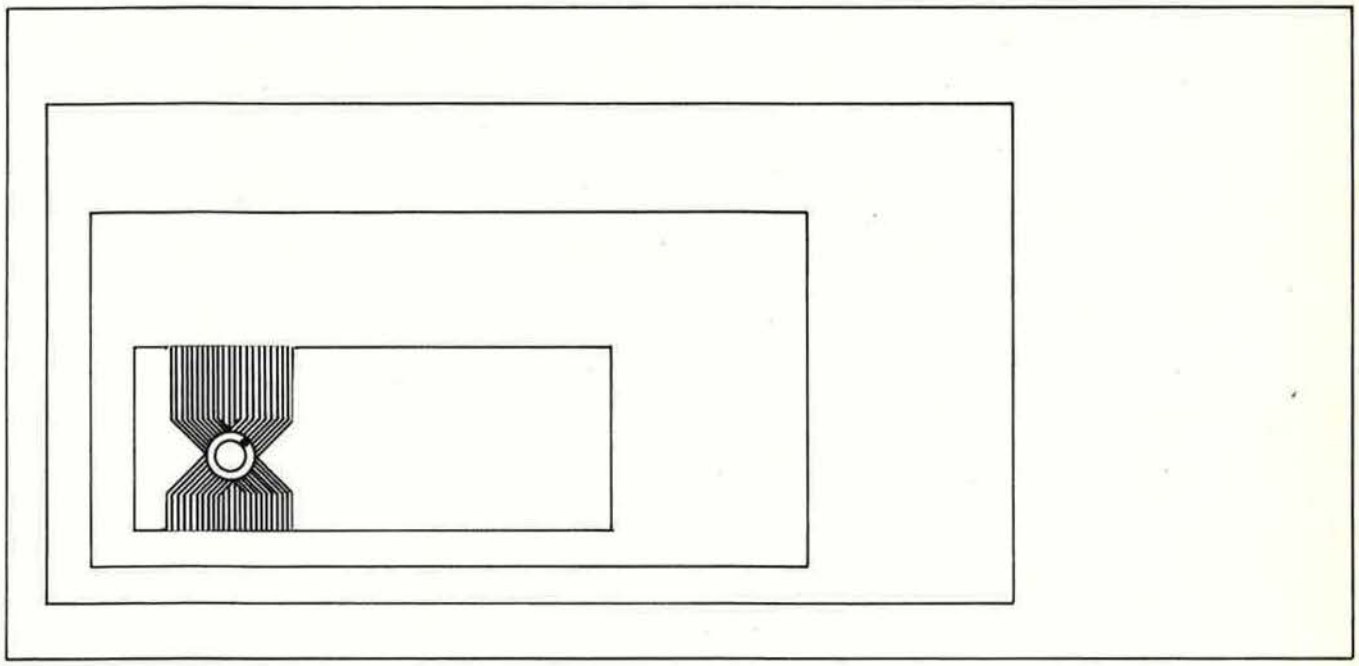
In the atmosphere created by today's eyeball-to-eyeball diplomacy—today in Peking, tomorrow in Moscow—there is small likelihood that Uncle Sam will portray himself as armed with a big stick.

Yet, the fact remains that the technological threat is recognized. A couple of decades ago we talked about our power and paraded it. We told them what the B-36 could do, and then about the B-52, the Atlas, the Titan, the Minuteman, and the first of the undersea launching systems called Polaris.

What Mr. Laird and Admiral Moorer and Dr. Foster are saying now is that new frontiers are closer than we think. The new surprises, the new Sputniks, could bring a new Pearl Harbor. Dr. Dornberger predicted that when the Russians mean war they will put atomic bombs in space and explode them there. And he said he did not understand this concept that we have no military mission in space—so long as the protection of the free world is a mission. And, finally, as if for a debate in 1972: "Somehow, it seems to me that we are not working hard enough on the answers." ■

Coming . . .

July AIR FORCE Magazine



AEROSPACE ELECTRONICS

a special report

In the July issue of AIR FORCE Magazine the editors are planning a series of reports on current and projected applications and requirements of Aerospace Electronics including:

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Published by the Air Force Association

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News, Views & Comments

By William P. Schlitz

ASSISTANT MANAGING EDITOR, AIR FORCE MAGAZINE

WASHINGTON, D. C., MARCH 6

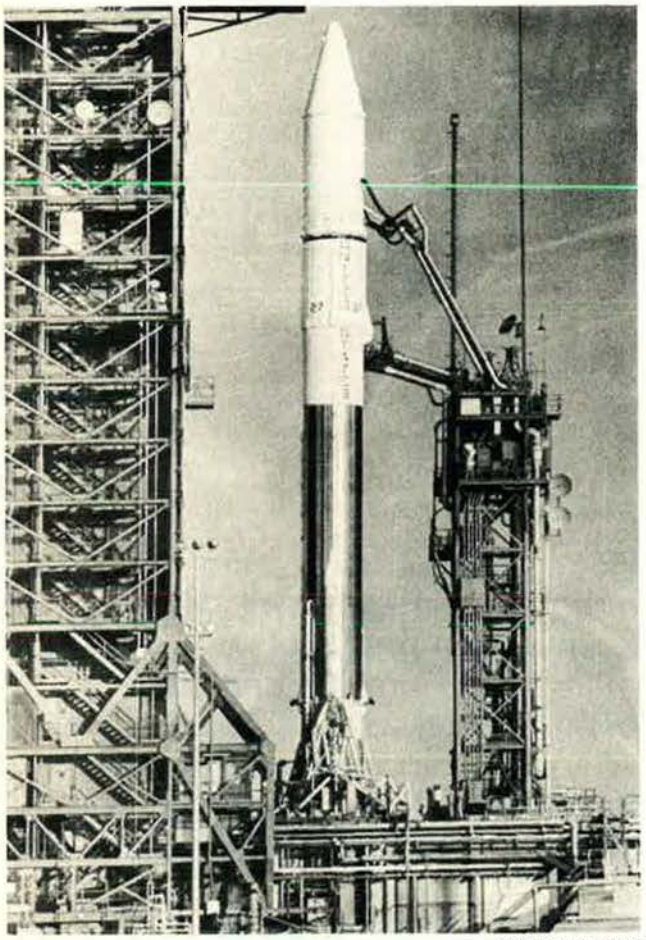
On March 2, Pioneer-10 rose from its launch pad at Cape Kennedy, Fla., to begin an epic journey.

First, it will undertake a two-year trek to the planet Jupiter, from which it will send back photos of that immense body (in density, Jupiter outweighs all the other planets in our solar system put together). Jupiter is so far from earth that signals traveling at the speed of light will take forty-five minutes to reach here.

Following its tour of Jupiter, Pioneer-10 will be thrust into a trajectory that will carry it continuously from the sun, out into an eternal trip in interstellar space, the first man-made object to leave our solar system.

In the event that the spacecraft is intercepted by scientifically educated inhabitants of some other star system—perhaps millions of years from now—Pioneer-10 carrics a pictorial plaque that indicates when it was launched, from where, and by what kind of beings.

The plaque is a thin, gold-anodized, six-by-nine-inch aluminum plate attached to the spacecraft's antenna support struts in a position to shield it from erosion by interstellar dust. Among symbology on the plaque are the figures of a man and woman, the man's hand raised in a gesture of goodwill.



After three frustrating postponements, the gantry finally rolls away from the Atlas-Centaur rocket that launched Pioneer-10 on its journey to Jupiter and eternity. Pioneer-10 will photograph Jupiter and then continue out of our solar system into deep space.

—Wide World Photos

☆

The 1st Special Operations Wing, headquartered at Hurlburt Field, Fla., has been presented USAF's Outstanding Unit Award.

The wing received the award for "its exceptionally meritorious service from July 1, 1969, to April 15, 1971." The unit was lauded for its "contribution to the Air Force's effort in Southeast Asia through its outstanding combat crew training program."

During the period cited, the wing maintained about 200 aircraft of twelve different types and twenty-two separate models, which made it the most diversified operational unit in USAF. The aircraft were flown from five bases spread from Otis AFB, Mass., to Holly Field, Fla.

It was a routinely wild year for men of the wing, who, while conducting their student pilot program, also had to dodge hurricanes and provide support for numerous exercises conducted in the US, Europe, and the Caribbean.

☆

In this time of hostility toward the military, we can offer some contrast: While few returning servicemen receive a hero's welcome these days, San Mateo, Calif., has given *an entire company* of the 101st Airborne Division a hero's welcome.

The story began early in 1968, when Sgt. Jose Artavia of Company A, 1st Battalion, 327th Infantry, 101st Airborne Division, wrote his sister, Mrs. Linda Giese, from the war zone in Vietnam.

He suggested that folks in his home town of San Mateo write to lads in his outfit who were not receiving much mail.

San Mateo responded. Soon there was an outpouring of mail and small gifts, and plans were afoot to officially adopt the unit. Shortly thereafter, Sergeant Artavia was killed in action.

Four years later, the 101st came home, and San Mateo feted Company A royally and enthusiastically in two days of emotion-filled banquets, speeches, a parade, and other events. Messages of appreciation were received from both President Nixon and Gen. William C. Westmoreland, Army Chief of Staff.

"It's the most fantastic thing my troops or myself have ever seen," said Capt. C. R. Quigley of Bountiful,

USAF's initial C-9 aeromedical evacuation transport to be assigned to the Pacific Air Forces takes off on a customer-acceptance flight from Long Beach, Calif., home of McDonnell Douglas Corp.'s Douglas Aircraft Division, the aircraft's builder. A total of four C-9s will serve in the Pacific, while, beginning in June, four more will be delivered to USAFE.

An artist's conception of a Remotely Piloted Vehicle (RPV) proposed for air-to-air combat missions (see Senior Editor Edgar Ulsamer's article on the subject, October '70 issue, p. 40). This is one of Northrop Corp.'s several designs for the RPV. Military planners see RPVs performing a number of combat missions, including air-to-surface attack, recce, and interdiction.

First flight of USAF's Airborne Warning and Control System (AWACS) took place on February 9 at the Renton, Wash., Boeing facility. A Boeing 707-320B Intercontinental, the test-bed aircraft "handled beautifully" during the hour-and-a-half flight, said AWACS Project Pilot James R. Gannett. He reported all test objectives met, and no surprises.

Utah, Commander of A Company. "We just can't express our gratitude enough" at the town's reception of the soldiers.

☆

In the never-ending competition to excel, a USAF flight crew has broken a previous Navy record for nonstop,

Col. E. Ann Hoefly, Chief, Air Force Nurse Corps, has been nominated for promotion to brigadier general, the second female USAFer to wear a star.

—Wide World Photos

On duty at Lackland AFB, Tex., is A1C Annie Foster, one of six WAF who recently became the first to serve in USAF's Security Police. Airman Foster is the daughter of an Army colonel.

straight, long-distance flight by a turboprop aircraft.

The Navy mark was set in January 1971 by a P-3 Orion that covered a distance of 6,857 miles.

On February 20 of this year, an Air Force HC-130 flew nonstop from Taiwan to Scott AFB, Ill., some 8,790 statute miles. At an average speed of 422 mph, the twenty-one-hour, twelve-

Aerospace World

minute flight crossed the international dateline and terminated about three hours before it began (in local time, that is).

The HC-130 crew is from the 57th Aerospace Rescue and Recovery Squadron, Lajes Field, Azores. Its members included: Lt. Col. Edgar L. Allison, Jr., Chattanooga, Tenn., Mission Commander; Capt. Richard J. Racette, Niles, Ill., Aircraft Commander; Capt. David E. Gardner, Southgate, Calif., Pilot; Maj. Anthony Liparulo, New London, Conn., Navigator; Capt. Carl E. Bennett, Hamilton, Tex., 2d Navigator; TSgt. Morelle E. Larouche, Holyoke, Mass., Flight Engineer; TSgt. William F. Litton, Tennington Gap, Pa., 2d Flight Engineer; SSgt. Pat E. Carrothers, Lake Charles, La., Radio Operator; SSgt. William L. Hippert, Rahway, N. J., 2d Radio Operator; TSgt. Theodore F. Trainer, Wapabo, Wash., Loadmaster; TSgt. Robert Landry, New Orleans, La., Crew Chief; and Maj. Kenneth S. Wayne, Oak Park, Ill., Flight Surgeon.

☆

While the new Air Force Museum, Wright-Patterson AFB, Ohio, is still in a state of transition, progress thus far is reported good.

The new building, on a 400-acre site at Wright Field (Area B), was completed last August and dedicated —with high officials including President Nixon and USAF Secretary Seamans participating—in September.

Year by year, the museum has drawn increasingly larger numbers of visitors, and at its new location expects to top well over a million in 1972.

The new facility currently houses about sixty aircraft and will contain eighty when the exhibit renovation is concluded. Two to three years may be required in this effort, which includes such interior work as the installation of audiovisual exhibits, photographs and artifact displays, and its basic controlled walkway pattern that traces chronologically man's adventure with aviation.

Frank G. Anger, president of the Air Force Museum Foundation, expressed particular gratitude to USAF civilian and military personnel for their contributions to the museum building fund. NCO and Officers' Wives Clubs, retired personnel, Air National Guard and Reserve units were also cited for their help.

The in-service fund drive alone netted $274,522 in the campaign to raise $6 million for the new building, museum officials said.

Singling out AFA for honorable mention, museum spokesmen said that eighteen AFA chapters donated nearly $9,000, not including the substantial direct personal contributions by individual AFA members.

☆

To thwart the continuing plague of airliner skyjackings, the FAA has implemented a new regulation that requires mandatory screening of all airline passengers before flight.

To assist in the program, 200 FAA security officers were ordered into the field to beef up carrier personnel.

Applying to all scheduled flag, domestic, and intrastate air carriers, the regulation calls for monitoring all passengers on all flights, using one or more of the following systems: behavioral profile, magnetometer, identification check, or physical search.

At USAF Academy during recent Academies Exchange Program are, from left, Kees Rietsema, AF Academy; Chuck Munns, Naval Academy; Bob O'Hara, Coast Guard Academy; and John Holly, West Point.

To assure blanket coverage, FAA's sleuths fanned out to visit 123 airports to help airline officials plug whatever holes remain in their security procedures. The 123 airports account for ninety-five percent of all US passenger emplanements.

☆

The Air Force Postal and Courier Service has received the first of thirty-seven X-ray devices it will use to detect contraband shipped through the Air Force postal system.

The device has been airlifted for use in SEA, where the bulk of illegal material now originates. Such contraband ranges from drug paraphernalia to weapons. The other thirty-six electronic surveillance systems are to be delivered between now and June and will operate at Air Force installations all over the world.

While USAF was quick to point out that contraband entering the US via the Air Force postal system was small in quantity, the detection devices will act as a major deterrent to contraband shipments.

The USAFPCS manages all Air Force mail and provides airmail service for DoD and in some cases other governmental agencies overseas. It maintains 132 Air Force post offices abroad and 209 postal service centers at bases in the US.

Developed by Philips Electronic Instruments, Mount Vernon, N. Y., the X-ray devices are being produced by Torr X-ray Corp., Los Angeles.

☆

The Air Force, in a test series to last six months, will determine the feasibility of using Boeing 747s as tanker aircraft.

Under the $1.62 million contract,

the huge jetliner will first undergo simulated refueling proximity flights with three current mainstay USAF aircraft—the B-52, FB-111, and F-4 Phantom. Then, the 747 will be modified with standard KC-135 refueling booms and equipment to permit in-flight dry hookups with the three aircraft types at the Air Force Flight Test Center at Edwards AFB, Calif.

Managed by the Air Force Systems Command's Aeronautical Systems Division, Wright-Patterson AFB, Ohio, the tests will also involve ASD's 4950th Test Wing, and SAC and TAC personnel.

An important part of the project is to ascertain whether multipoint refueling from the larger aircraft is feasible.

—Wide World Photos

Built by General Dynamics' Canadian subsidiary, this tilt-wing CL-84 was demonstrated for US Navy at the Pentagon recently. When wings are horizontal, V/STOL flies like an airplane.

☆

A team of NASA researchers and pilots in February conducted the first fully automatic landings by manned helicopter.

This is considered a major milestone in NASA's continuing program to develop systems that will allow helicopters and VTOL aircraft of the future to fly routine missions during conditions of poor visibility.

NASA's Langley Research Center, Hampton, Va., managed the flight experiments, conducted at the space agency's Wallops Island Station, Va., using a CH-46 tandem rotor helicopter furnished and equipped by the Army's Air Mobility Research and Development Laboratories.

Part of the project is to determine performance requirements for automatic VTOL aircraft operations in all-weather, city-center to city-center service.

As the helicopter intercepted its landing guidance path during the research flights, its computer system automatically locked onto the start of the landing approach. At a predetermined point from touchdown, the copter automatically decelerated to zero ground speed, assuming hover about fifty feet over the landing spot. It then descended vertically to touchdown.

☆

Budget limitations have resulted in the termination of one of NASA's most ambitious research projects—development of a 75,000-lb.-thrust nuclear rocket engine.

NERVA (for Nuclear Engine Rocket Vehicle Application) was to have been built jointly with the Atomic Energy Commission for missions in deep space.

While announcement of the termination was expected, NERVA's cancellation will erase more than 600 jobs at the two companies affected—prime contractor Aerojet Nuclear Systems Co., Sacramento, Calif., and major subcontractor Westinghouse Astronuclear Laboratory, Large, Pa.

☆

In the broad area of aircraft safety, electronic gear to eliminate the threat of midair collisions is under study by a number of groups.

One such system, dubbed EROS II by developer McDonnell Douglas Electronics Co., St. Charles, Mo., was successfully demonstrated in mid-February. EROS II is said to be applicable for all aircraft—from propeller-driven planes to giant jetliners and supersonic fighters.

Described as "ready for production," the system has actually been designed in two models, one for installation in airliners and other large aircraft, the other for small business and private planes.

The demonstration in February involved a Boeing 727 airliner and two single-engine Cessnas that simulated midair collision courses to test instrumentation. EROS II systems aboard all three aircraft responded with flashed cockpit warnings and directed pilots in maneuvers to avoid collisions.

United Air Lines has been conducting reliability and serviceability evaluation of EROS II since November, in daily operations aboard a 727 in service between Los Angeles and San Francisco.

Piedmont Airlines has selected EROS II for installation aboard its fleet of Boeing 737s. The lightweight system also currently is being tested aboard small planes.

EROS II is being offered as a backup to the nation's air traffic control system. In addition to protecting against midair collisions, the system can warn against descents below mini-

—Wide World Photos

Hanoi released this recent photo with a caption indicating that USAF Capt. Kenneth J. Fraser, 30, was captured on February 17 when his aircraft was shot down over Quan Binh Province.

Aerospace World

mum altitudes and of hazardous ground obstacles.

☆

All mapping services within the Department of Defense have now been organized under a new independent agency—the Defense Mapping Agency.

Incorporated into DMA are the mapping element of the Air Force's 15th Reconnaissance Technical Squadron; the 1st Geodetic Survey Squadron of USAF's Aerospace Cartographic and Geodetic Service; the Army's Topographic Command; the Air Force's Aeronautical Chart and Information Center; the mapping elements of the Defense Intelligence Agency and those of the Office of the Navy Oceanographer; Navy's Satellite Geophysics Project; the Inter-American Geodetic Survey; and the Army Engineer School's Department of Topography.

Army Maj. Gen. (Lt. Gen.-selectee) Howard W. Penney has been named first Director of DMA. General Penney has been charged with developing a consolidated mapping, charting, and geodesy program for review by the Joint Chiefs and approval by the Secretary of Defense. Thus, so far, the various service arms are still independent of one another.

☆

Dulles International Airport, near the nation's capital, will be the scene May 27 through June 4 of the 1972 US International Transportation Exposition.

Transpo 72, as it's called, is expected to draw well over a million visitors, and will feature exhibits, demonstrations, and displays covering all transport modes.

Not least among the events planned will be a daily, one-hour sport aviation spectacular. During the span of the exposition this will feature parachuting, sailplane aerobatics, formation aerobatic flying, flights of classic antique aircraft, aircraft races, balloon racing, and model aircraft demonstrations, among other things.

Transpo 72, with its heavy emphasis on US and international aviation and aerospace accomplishments —past, present, and future—seems sure to be a major drawing card for aviation professionals and buffs alike, both as participants and visitors.

☆

Proclaiming the 10,000th hour to be flown by an A-7D Corsair II of the 353d TFS, Myrtle Beach AFB, S. C., is Capt. Gerald H. Felix, the aircraft's pilot. Standing by, left, are Col. T. M. Knoles, Commander of the 354th TFW, first USAF wing to fly A-7D operationally, and Lt. Col. W. F. Loyd, Jr., Felix's unit Commander.

NEWS NOTES—The **Third Annual Airsouth Fighter Weapons Meet** is set for July 10–24 near Athens, Greece. Six types of aircraft from Mediterranean NATO nations will compete.

Col. Joseph A. Guthrie, a veteran test pilot, has been named Commandant of USAF's **Aerospace Research Pilot School,** Edwards AFB, Calif.

Maj. Gen. Gilbert L. Curtis, Chief of Staff, MAC, has been presented with the National Guard Bureau's highest honor, its **Eagle Award.**

Walter E. Fellers, internationally known for his R&D work on fighters, will head Northrop Corp.'s team in USAF's **lightweight fighter** prototype competition.

The **Hannover Air Show,** one of the most important of the aerospace industry's showcases, is to take place April 21 to May 1 at Hannover Airport, West Germany.

USAF on March 1 received from Boeing Co. its first production air-to-ground **Short Range Attack Missile** (SRAM) at Hill AFB, Utah.

SAC's **"Olympic Arena '72"**—the fifth annual Missile Combat Competition—will take place April 6–14 at Vandenberg AFB, Calif.

Col. Robert B. Shaw, procurement specialist whose career dates back two decades, has been assigned by Air Force Systems Command as **Director of Procurement and Production,** B-1 Systems Program Office. ■

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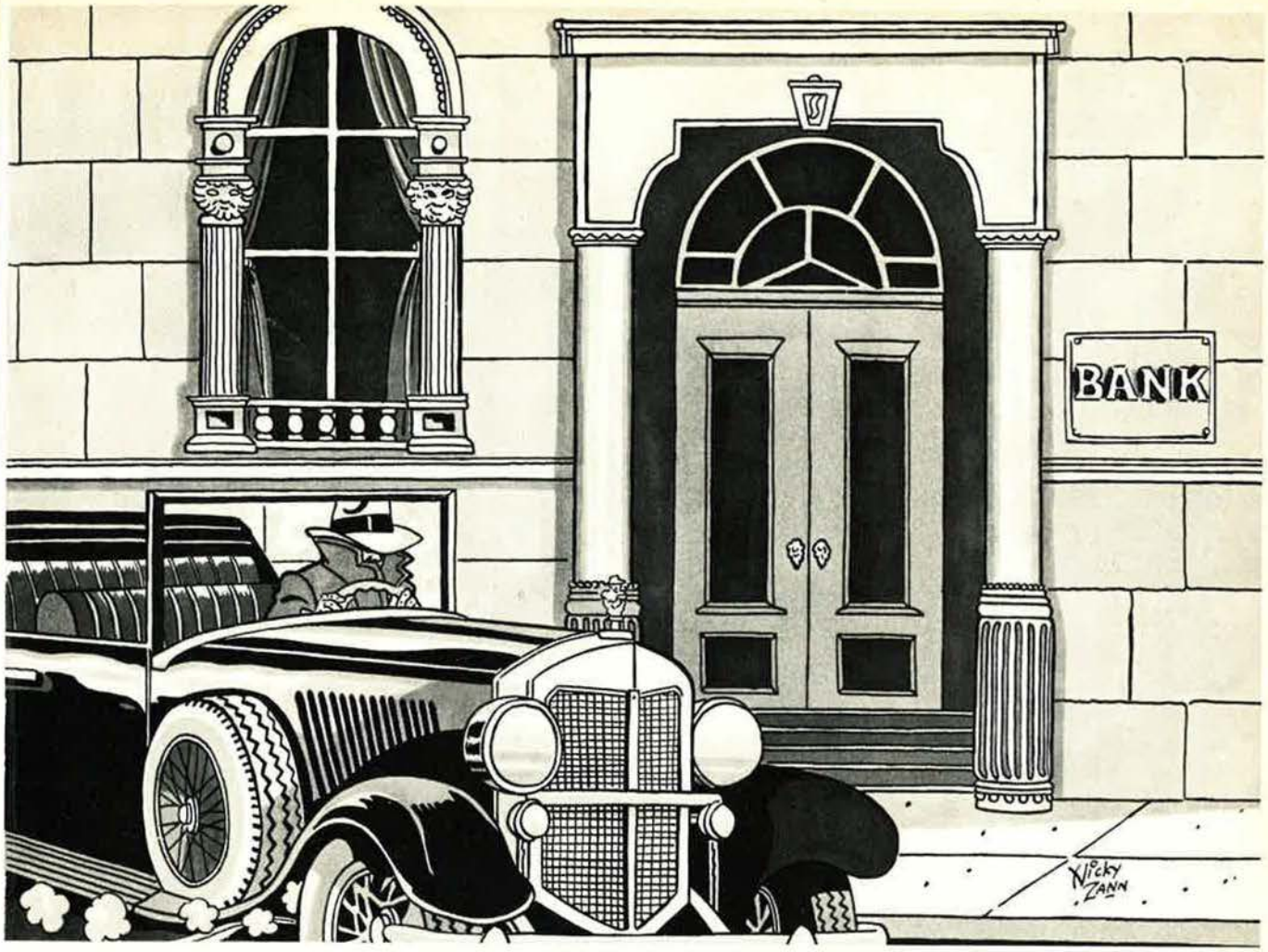

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APRIL 1972 MAGAZINE

The Chinese Peoples' Republic has made more rapid progress in nuclear technology than any other nation. China also has large missile production facilities, a solid rocket fuel plant, a new 6,000-mile test range, a space program that can provide militarily useful satellites, and a growing mixed force of delivery vehicles. All of this may add up, in the late 1970s, to a Chinese deterrent that will significantly alter the world balance of power, perhaps to the advantage of the US. Here are extensive details of their strategic programs and an analysis of the political implications of . . .

CHINA'S NUCLEAR DETERRENT

By Charles H. Murphy

MAINLAND China's recent thrust into the international community of nations coincides with its development of a very significant nuclear weapons potential. Over the last ten or fifteen years, China has been building a solid foundation for its evolving nuclear deterrent, which must eventually be based on long-range missile-delivered thermonuclear weapons.

Two major nuclear materials plants have been in operation for a number of years, and a third such plant has been completed within the last year, yielding a current stockpile of fissile material thought to be sufficient for several hundred nuclear warheads. In the area of fission and fusion warhead development, the Chinese have made more rapid progress than any other nation, and they are expected to possess a variety of suitable warheads in the near future. A large ballistic missile production facility has already been completed in preparation for large-scale deployments.

Although China's actual capability is presently limited to nuclear weapons deliverable by a relatively small but growing force of medium jet bombers and a few missiles, it is expected to have operational a "modest" number of medium- and intermediate-range missiles within six months, and a full-range Chinese ICBM (intercontinental ballistic missile) test into the Indian Ocean appears to be imminent.

The primary objective of Peking's burgeoning nuclear weapons program is the development of a missile force capable of deterring possible attacks by the superpowers—the United States and the Soviet Union. Assuming that the United States abandons its plan to deploy the twelve-site Safeguard area-defense

ABM system, and current trends indicate that it will, a Sino-American deterrent relationship will come into being once China starts deploying operational ICBMs. This, in turn, will undoubtedly lead to an improvement in US-China relations. The Soviet Union, on the other hand, has already erected a thin area-defense ABM system, which has a limited capability to intercept Chinese ICBMs. Its ABM, known as the Galosh system, will degrade the Chinese deterrent, preserving indefinitely the Soviet Union's near first-strike capability vis-à-vis China. While adopting a low-risk strategy in the face of overwhelming US and Soviet nuclear superiority, military planners in Peking will almost certainly attempt to exploit their nuclear deterrent to achieve political and economic goals regionally and globally.

FISSILE MATERIALS

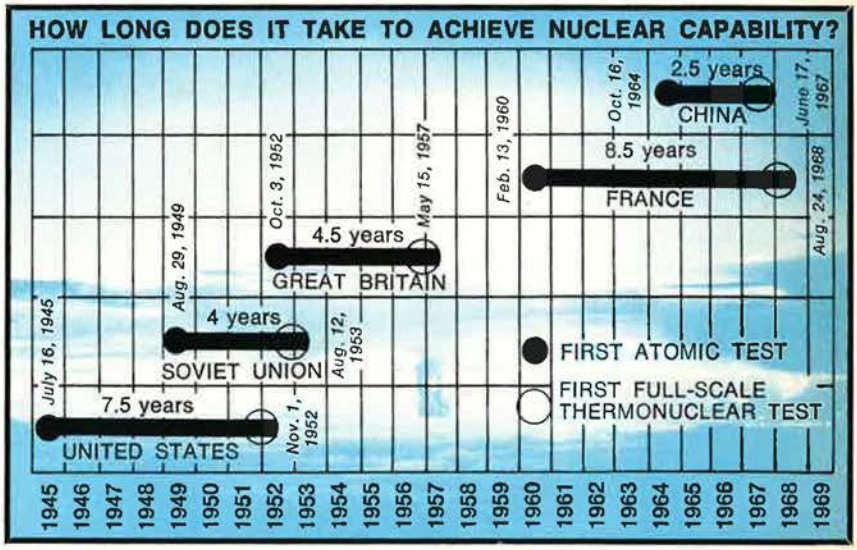
With the combined total product output of its uranium (U-235) and plutonium (Pu-239) plants, China probably has the potential to deploy nearly 300 nuclear warheads. Further "process improvement" could increase yearly uranium output by as much as twenty-five percent, and continued production of both U-235 and Pu-239 will help to increase China's stockpile of fissile material. Nevertheless, the US Defense Department maintains that if a large-scale nuclear weapons production capability is to be realized, expansion of fissile materials production facilities may be required. There have been numerous reports dating back to June 1967 suggesting that China was developing the gas-centrifuge uranium enrichment process, but this had never been confirmed in official sources. Persistent reports indicate, however, that a second gaseous diffusion plant, similar in size and capacity to the present uranium plant near Lanchou, has been built in a remote area of China. Production at this plant will double China's current output of U-235.

As the accompanying table indicates, the Chinese advanced from their first atomic test to their first full-scale thermonuclear test in much less time than any of the other four nuclear powers. China's ongoing atmospheric and underground nuclear test program suggests continuing research aimed at the development of a variety of compact weapons suitable for aircraft and missile delivery.

Thus far, the Chinese have made excellent progress in reducing the weight-to-yield ratios of their fission warheads. Although the first device tested had a twenty-kiloton yield, it reportedly weighed 20,000 pounds; the fourth device tested, also having a yield of about twenty kilotons, is reported to have weighed only 2,000 pounds. So in a period of two years, the weight-to-yield ratio was improved tenfold.

They have also made excellent progress in thermonuclear design. Inasmuch as all four of China's three-megaton devices to date were dropped from TU-16 medium jet bombers, it is reasonable to conclude that the early three-megaton weapon was designed for aircraft delivery. As for the status of an ICBM warhead, Director of Defense Research and Engineering Dr. John S. Foster, Jr., reported two years ago that the Chinese had "detonated a three-megaton warhead having a weight suitable for delivery by ICBMs." Defense analysts expect that it will be ready for missile application by the time they have completed the development of the ICBM system, though the early Chinese ICBM reentry vehicles will be large in size, similar to the early US reentry vehicles.

However, as of February 1970 the Chinese still had not completed development of a thermonuclear warhead in the weight range required for M/IRBM (medium/intermediate-range ballistic missile) use, but a thermonuclear warhead with a yield of a few hundred kilotons in the M/IRBM class could have been developed by now. The development of an M/IRBM warhead with a megaton yield might be possible by 1972–73.



The chart shows how much faster the Chinese advanced from their first atomic test (October 16, 1964) to their first full-scale thermonuclear test (June 17, 1967) than any of the other four nuclear powers.

Ever since the missile-delivered fourth Chinese test of October 27, 1966, which demonstrated a capability to design a low-yield fission warhead compatible in size and weight with an MRBM, the US Defense Department has been predicting large-scale deployment of the first-generation Chinese MRBMs equipped with a twenty-kiloton fission warhead. However, this would have made extremely inefficient use of costly delivery systems and a limited stockpile of fissile material. Moreover, the Chinese have, from the start, placed a high priority on thermonuclear weapon development.

MISSILE DEVELOPMENT

While the Chinese have made very rapid progress in nuclear warhead technology, their advancement toward operational ballistic mis-

sile capability has been slower than expected.

Between 1959, when they started testing rockets, and 1963 the Chinese moved from the flight testing of Russian MRBMs to the development and testing of their own. In 1967, the US intelligence community concluded that the research and development phase of the Chinese MRBM program was ending and predicted that China would start deploying the first-generation MRBM, with a range of 1,000 miles, in 1967–68 and would have eighty to 100 of these missiles emplaced in fixed soft sites by the mid-1970s. While MRBM testing continued up to ranges of 1,000 miles through 1969, large-scale deployment of this missile has not been forthcoming, presumably for lack of a suitable thermonuclear warhead. Reliable sources indicate that a "small number" of these missiles, probably twenty to twenty-five, have been emplaced at operational sites, principally in northeastern and northwestern China, since the summer of 1970.

Instead of deploying substantial numbers of their first-generation MRBMs, the Chinese now appear to be concentrating on the development of a more advanced, single-stage, liquid-fueled IRBM with a range of about 2,000 miles. Chinese military planners have probably decided that the 2,000-mile-range missile offers a more credible deterrent vis-à-vis the Soviet Union as it could be used in retaliatory strikes against major population and industrial centers in European USSR.

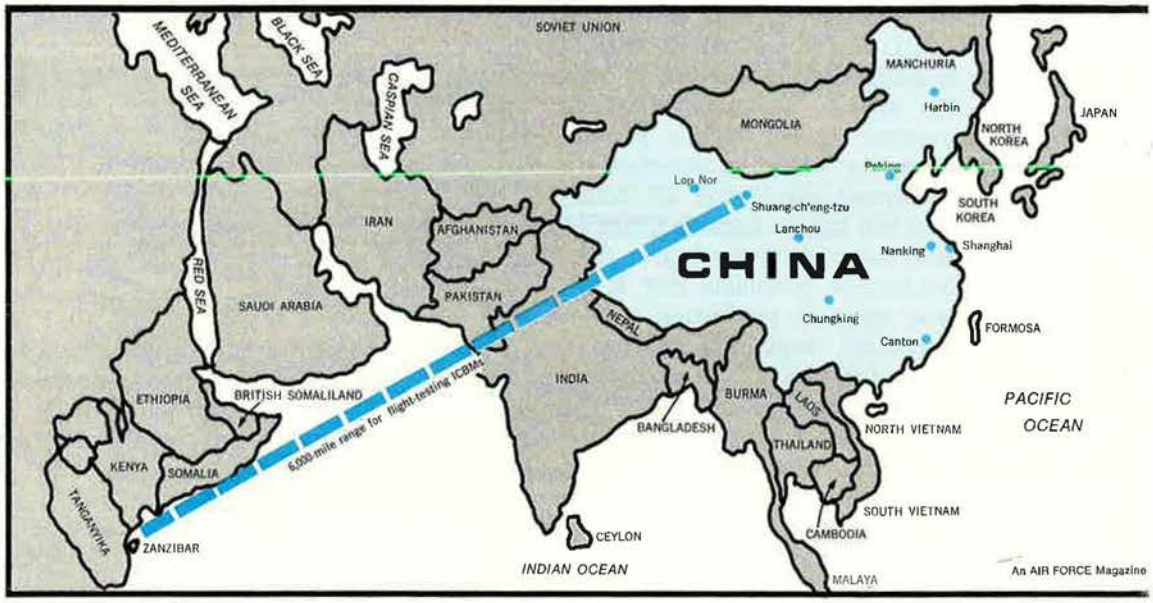
According to US Defense Secretary Melvin R. Laird, "The emphasis in Chinese R&D appears to have shifted in 1970 from the MRBM to the development of an IRBM." The first 2,000-mile IRBM flight test took place in late 1970. IRBM testing continued through mid-1971, and now American defense experts are saying that the Chinese have started to deploy the IRBM. By mid-1972 they are expected to have operational a modest number of missiles, with a mix of MRBMs and IRBMs.

At least four surface-to-surface missile bases have been built and several more are currently under construction. Other recent intelligence reports indicate that the Chinese are building missile silos at some of these sites to increase missile survivability.

ICBM CAPABILITY

The construction of a large ballistic missile-launch facility at Shuang-ch'eng-tzu, which began in 1965, led the American intelligence community in late 1966 to the conclusion that the Chinese were pursuing an ICBM program with a high priority. However, for unknown reasons, the Chinese dismantled the ICBM test stand in 1968–69 and did not finish rebuilding it until February 1970, at which time the US Defense Department again announced that the Chinese were ready to test-launch an ICBM or space booster. Two months later, the Chinese placed a relatively heavy first satellite in earth orbit, using a two- or three-stage liquid-fueled launch vehicle, the first stage of which was the IRBM currently under development. The potential ICBM applications of the space launch vehicle have been subsequently underscored by US Defense officials.

The US Defense Department estimates that China could attain an initial operational capability with ICBMs within three years after flight testing commences. Although the start of testing has not yet been confirmed, Secretary of Defense Laird suggested in a March 1971 state-



The main sites of China's growing nuclear capability are shown on this map, including the weapons test site in Lop Nor, in Sinkiang Province, the missile-launch site at Shuang-ch'eng-tzu, and the major nuclear development center at Lanchou, in Kansu Province. The broken line marks the 6,000-mile trajectory from Shuang-ch'eng-tzu to near Zanzibar, off the eastern coast of Africa.

ment that reduced range testing of an ICBM within China's boundaries may have started in late 1970.

William Beecher of the New York *Times*, who seems to have access to very reliable sources, claims that these tests involved the firing of the three-stage satellite launch vehicle in a missile configuration from the new experimental launch site in northwest Manchuria into western Sinkiang, covering a distance of 2,200 miles. This information seems to suggest that China will use its IRBM, or the first stage of the satellite launch vehicle, as the booster or first stage of the ICBM.

While this three-stage missile might be capable of delivering a small payload 6,000 miles, it lacks sufficient power to deliver the three-megaton warhead the Chinese are developing for their ICBM over such distances. ICBM range and payload capacity will probably be achieved by adding another upper stage to the multistage booster vehicle used in both space shots.

If an initial capability is achieved by mid-1973, which the Pentagon considers possible but unlikely, a force of ten to twenty-five first-generation liquid-fueled ICBMs, each with a three-megaton thermonuclear warhead and a 6,000-mile range, could be on launchers by mid-1975. However, it is more likely that their ICBM will not attain an initial operational capability until 1974 or 1975, in which case they would not have a significant number of ICBMs deployed until late in the decade, possibly by 1978.

A solid-propellant production plant has been built, and there is evidence suggesting that a second-generation ICBM, with this type of powerplant, is being developed for silo emplacement, although it is not expected to be ready before 1975 at the earliest.

TESTING PROBLEMS

Up until very recently, one of the main obstacles to the start of China's ICBM flight-test program was the lack of an adequate test range and associated land- and sea-based tracking and test-range instrumentation systems. Apparently, both problems have been resolved. China's ICBMs will reportedly be launched from Shuang-ch'eng-tzu out over a 6,000-mile range, carrying the missile across India for a splashdown in the Indian Ocean near the East African island of Zanzibar. There Chinese technicians are installing what is thought to be elaborate telemetry equipment that will monitor the final phase of flight to determine missile accuracy. This facility will also play an important role in China's burgeoning space program.

Additional range-monitoring capabilities will be provided by expansion of existing missile-range tracking stations in Sinkiang, by the 12,000-ton Chinese space and missile-tracking ship *Hsian Yang Hung*, which has already been into the Indian Ocean on a shakedown cruise, and possibly by other tracking facilities to be built in Ceylon, Pakistan, and Tibet, or in a second East African country. Recovery of the dummy warhead will probably be undertaken by a Zanzibar-based Chinese missile-recovery ship.

A MIXED NUCLEAR FORCE

The US intelligence community believes that the TU-16 Badger twin-engine medium-range jet bomber, which is now in series production, will be China's principal aircraft for nuclear weapons delivery and probably its primary nuclear delivery system in the near future.

That Chinese military planners would decide to develop, produce, and deploy strategic bombers and missiles simultaneously indicates that they have opted for a mixed nuclear force as did the United States and the Soviet Union. The possession of several hundred TU-16s, which are comparable to the phased-out US strategic B-47 bomber, will enhance considerably the credibility of China's regional nuclear deterrent, especially over the short run.

The TU-16 would provide an additional capability to threaten the destruction of several major Soviet cities, Soviet troop concentrations along the Sino-Soviet border, and American military bases in Asia.

While the Chinese apparently intend to deploy several different strategic weapons delivery systems, a submarine-launched missile will not be part of their nuclear deterrent, at least not in this decade. US weapons experts now estimate that it would take China eight to ten years to develop and deploy a nuclear-powered missile-launching submarine comparable to the US Polaris system.

The complete cessation of strategic submarine construction in 1964 and the ensuing move toward a more defensive maritime posture seem to indicate that the Chinese have either assigned the submarine-launched missile program a much lower priority or abandoned it altogether in favor of an accelerated plan for the development of a land-based nuclear deterrent system.

SPACE PROGRAM

When China put up its first satellite in 1970, it became the fifth nation to successfully orbit a satellite with an indigenous launch vehicle. It was the heaviest first satellite launched to date. Furthermore, China developed the tech-

nology faster than any of the others. While it took China only five and a half years to progress from its first nuclear test explosion to its first satellite launching, it took the United States twelve and a half years and the Soviet Union eight years to make this same transition.

The orbiting of two satellites during the past year and a half seems to presage a major Chinese entry into space for political, military, and scientific purposes. The Chinese government made a first cryptic reference to its future space plans in an official press communiqué the day after the first satellite was orbited, stating that the launching marked "a good beginning in the development of China's space technology."

Shortly after the first satellite was launched, NORAD detected a second Chinese object orbiting the earth about 2,000 miles ahead of the active satellite, which was thought to be part of the final stage of the launch vehicle. The US Defense Department subsequently stated that it would have taken a very large booster to have placed the weight of the two objects, estimated to be no more than 1,200 pounds, into orbit.

The Soviet SS-5 Skean, which is probably comparable to China's IRBM, has been used as the basic first stage, with upper stages added, to orbit payloads up to 2,000 pounds (plus carrier rocket). Some defense analysts have estimated that the Chinese are developing a 1.5-million-pound-thrust booster comparable to those used by the Soviets in their early ICBM and space programs.

While the Chinese will certainly exploit their space feats for propaganda purposes, the primary objective of their space program, according to defense experts, will be the deployment of satellite-borne intelligence and communications systems. Given the overwhelming nuclear superiority and near first-strike capabilities of the superpowers vis-à-vis mainland China, the military authorities in Peking will have to be able, in the event of a counterforce first strike, to launch their strategic missiles and bombers before or immediately after the first incoming warheads begin detonating. To achieve such a capability, the Chinese will have to develop and deploy satellites that can gather electronic, communications, and photographic intelligence as well as those that can provide an early warning against missile attack.

Photographic reconnaissance satellites would be particularly useful at the present time for monitoring Soviet troop movements and military construction along the Sino-Soviet border. The Chinese are probably also anxious to develop communications satellites to improve command and control over the conventional and evolving nuclear forces, which are dispersed across China's vast land area.

These developments, when coupled with the construction of a large ballistic missile production facility, suggest that the Chinese intend to compete on a large scale with the United States and the Soviet Union in the field of strategic nuclear weaponry. Although it would be impossible for them to gain parity with the superpowers—at least in this decade—they could acquire a limited but credible second-strike capability in five to seven years.

IMPLICATIONS FOR THE US

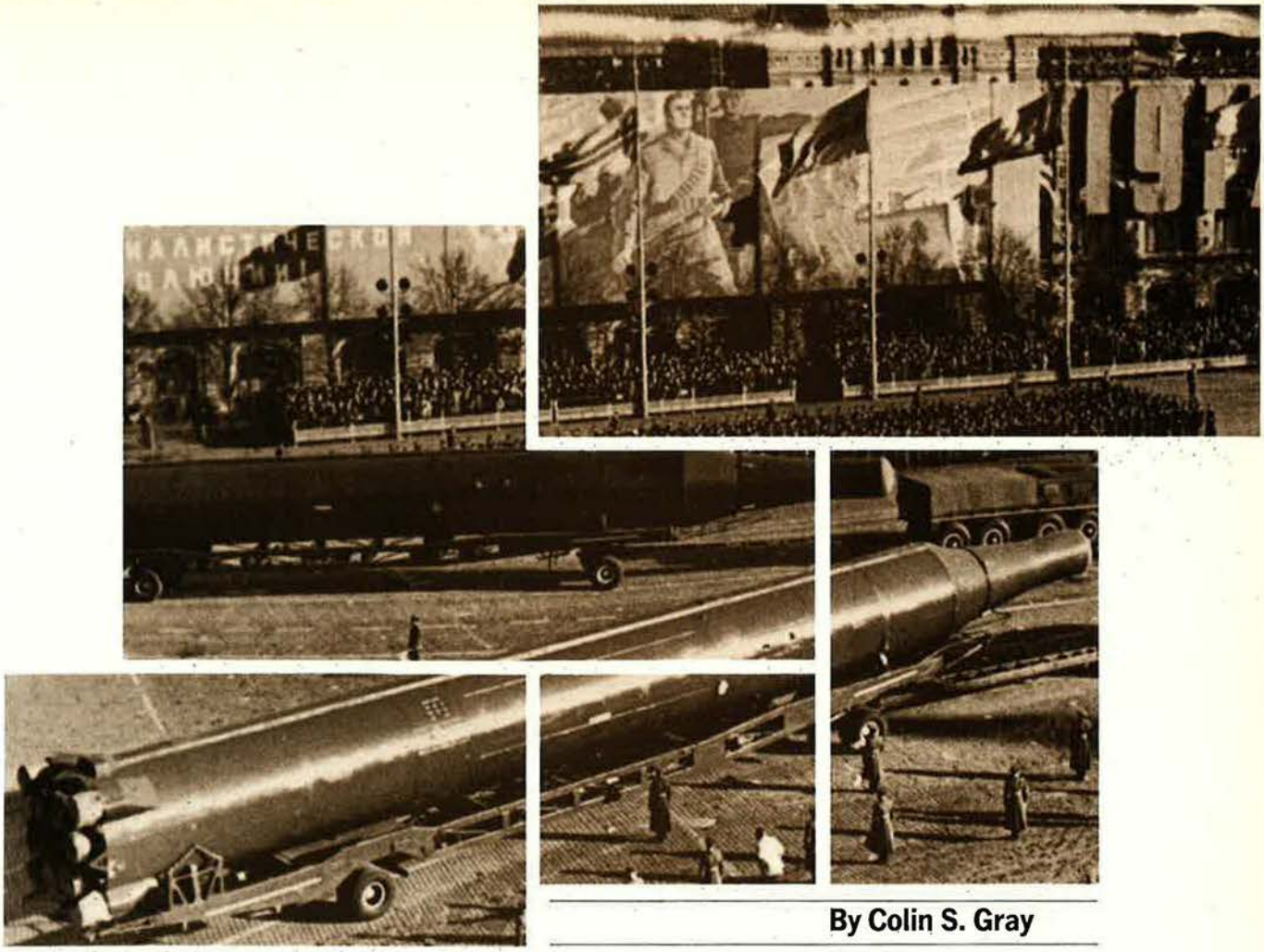
China's force will be of necessity a city-destroying retaliatory force, as it will initially be far too small and will lack the accuracy to be employed in a disarming first strike against US strategic offensive forces. Thus, overwhelming US nuclear superiority will continue to deter offensive nuclear threats or action by China.

Continued US deterrence of China, however, will not necessarily preclude Chinese deterrence of the United States in some situations. The mere existence of even a limited number of Chinese ICBMs, each having the capability to destroy a large American city, would give serious pause to the United States during any confrontation with China. In the unlikely event of a US preemptive nuclear attack, the Chinese would almost certainly attempt to launch their ICBMs before they could be destroyed on the ground. However, with the deployment of the new US "647" Integrated Early Warning Satellite System, which will provide instantaneous round-the-clock surveillance of Chinese launch sites, and the US Minuteman III MIRV-equipped missiles, which have the capability to destroy land-based missiles even in hardened silos, only a very small portion of the first-generation Chinese ICBM force would be expected to survive, as it will consist of long-reaction-time, liquid-fueled rockets emplaced in inadequately hardened sites. Yet some Chinese missiles could survive, and it is this possibility that will almost certainly compel the US to limit its military responses, especially any consideration of the use of nuclear weapons.

The Chinese have been testing a three-megaton thermonuclear warhead, which is thought to be suitable for ICBM use. One such weapon exploded on a large US city could inflict well over a million casualties. A salvo of between ten to seventy-five such weapons, even if only forty percent reliable, could produce fatalities in the range of 7,000,000 to 23,000,000. Thus, while China's second-strike capability will be much smaller than that of the United States, it will be just as effective in deterring attacks.

In the words of Secretary Laird, the Chinese "can do proportionately as much damage to us with a relatively few missiles as we can do to them with a relatively large number of missiles." In short, a Sino-American deterrent relationship will come into being as soon as China begins deploying operational ICBMs. ■

Charles H. Murphy, a former US Marine, graduated from the School of International Service at American University, Washington, D. C., in 1967, receiving his master's degree in Far East Area Studies from the same institution the following year. Since 1968, Mr. Murphy has been a research analyst at the Library of Congress, specializing in Chinese affairs and arms control. Currently, he is a national defense analyst with the Library's Congressional Research Service.



By Colin S. Gray

A Canadian observer argues that "the nuclear arms race is and should be viewed as an instrument of foreign policy, that relative strategic inventory assessments do matter, and that much of the arms control orthodoxy of today does not rest upon sophisticated analysis of the policy-making process or potential ambitions of the arms race adversaries" . . .

Strategic Sufficiency: A QUESTION OF FAITH?

A BELIEF, widespread in our time, is that strategic forces, beyond a certain finite and rather low number, are both a waste of money and a provocation to potential adversaries. This belief rests upon a number of apparently sensible judgments: that the prospect of suffering a nuclear attack from even a handful of weapons should deter all but the most irrational (or accident prone) of adversaries; that the marginal utility, for deterrence purposes, of additional units of destruction diminishes very rapidly; that deterrence rests as much, if not more, upon a manifest determination to use the weapons on hand, rather than upon an imposing if largely redundant stockpile per se; and that the name of the game is

Minimum Deterrence: Unwise Answer to The Sufficiency Issue

At a time when parity, or even inferiority, in strategic nuclear strength is acceptable to many Americans, when numbers are pooh-poohed as a meaningful measure of national strength, when the concept of minimum deterrence is becoming almost an article of faith, the accompanying article, by a distinguished young Canadian defense analyst, is must reading. Among many important points made, the following stand out:

- Deterrence by threat of destroying cities, otherwise known as assured destruction or minimum deterrence, deserves the kind of serious examination it has not yet received.
- The Soviet Union does not believe in minimum deterrence. All indications are that it is going for a war-fighting, not merely a war-preventing, capability.
- An arms race is not a bad thing per se, unless the United States should lose it.
- An arms race is expensive, but it is much cheaper than war and, in fact, an acceptable substitute for it.
- It is better for the US to overreact to an arms race than to underreact.
- Should the Soviets achieve clear-cut superiority, they are likely to exploit it politically.

In developing these themes, the author strips away the illusions and verbiage that have cloaked serious strategic dialogue in the Western World.

Mr. Gray, the author, is currently Executive Secretary of the Strategic and International Studies Commission, Canadian Institute of International Affairs, Toronto, Ontario. In 1970 he was awarded a Doctorate in International Politics by Oxford University, and has taught in both British and Canadian universities. Mr. Gray has written extensively on strategy, defense policy, and arms control for North American and British journals. He recently was awarded first prize in the 1971 essay competition of the Royal United Services Institute of Defense Studies.

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deterrence—that no significant ability to survive a nuclear war, in terms likely to be acceptable to an American President, can be purchased.

The above argument is a little extreme, but it is not a gross oversimplification of the position held by many critics of the military. In contrast to much current criticism, this article will argue that the nuclear arms race is and should be viewed as an instrument of foreign policy, that relative strategic inventory assessments do matter, and that much of the arms control orthodoxy of today does not rest upon sophisticated analysis of the policy-making process or potential ambitions of the arms race adversaries.

Judgments upon the relationship between relative strategic power and foreign policy behavior lie in the softest area of a very soft science (strategic analysis), the apparent precision of systems analysis notwithstanding. Few analysts would deny that nuclear arms races differ fundamentally from past and contemporary nonnuclear arms races. Specifically, it was, and is, recognized that in a nonnuclear race the military establishment was providing in a quite unambiguous fashion for the defense of its state. A large lead in the speed of mobilization or in quantities of weapons would provide the diplomats with an instrument they could *use*: the problem of credibility scarcely arose. Unfortunately for our understanding, the

dividing line between the nonnuclear and the nuclear age has been drawn far too sharply. We can learn more from the record of the naval relations of the USA, Great Britain, Japan, France, and Italy in the 1920s and 1930s than it is currently fashionable to admit.

The "Spring Scares" and "Autumn Anxieties" regularly invoked by certain defense advocates may seem to be overdrawn—indeed, insofar as the prospect of a nuclear Pearl Harbor is concerned, they have been vastly overdrawn—but the anxieties that have underpinned, for example, the following statement by President Nixon must be accorded their due: "That makes it imperative that our strategic power not be inferior to that of any other state."

The Arms Race as a System

A distinguished American arms controller (Jerome H. Kahan, currently with the Brookings Institution) has written that: "Strategic stability in the 1970s can be fully realized only if *both* sides downgrade defenses and emphasize survivable offensive forces which have an unambiguous second-strike role." Unfortunately, such statements are now widely accepted and have become almost an article of faith for a wide segment of the public.

The doubts of this writer concerning the wisdom of the above statement stem from the following considerations: mutual assured destruction, as the dominating characteristic of the Soviet-American strategic *system,* requires *two* players (excluding China as well as the British and French nuclear forces); our more perceptive Kremlinologists are far from certain of the nature of the current (let alone future) strategic doctrine of the Soviet Union—or of the role that doctrine plays in decisions concerning weapon development and procurement; furthermore, the foreign policy implications of the growing Soviet strategic forces are extremely uncertain (probably to the Soviet Politburo also).

Additional doubts as to the wisdom of a "minimum deterrent for assured destruction only" stem from the past, admittedly multimotivated, behavior patterns of the arms-race adversaries. These patterns strongly suggest that crude weapons inventory comparisons are irrelevant only to arms-control logicians. Unfortunately, in the nuclear arms race one cannot assume that American arms-control logic is going to be persuasive to the other side. (It is not even persuasive to President Nixon and Dr. Kissinger.)

Also to reject defenses on the ground that they are ambiguous, in arms-race stability terms, is a comment more upon what the commentator understands to be destabilizing than it is upon the wisdom of the defenses in question. It is not at all certain that continued Soviet adherence to a procurement pattern that favors large numbers and to a doctrine that stresses the defense of the homeland are prima-facie items of evidence of a "backwardness" of Soviet strategic thought—requiring the healthy influence of Western strategic tutelage.

Finally, as many strategic analysts will admit, practically all statements on sufficiency, stability, and superiority—to the extent that they do not merely indicate an academic semantic minefield of no practical relevance—must be viewed in their context of systemic ignorance. More directly, we do not know with any degree of confidence how the nuclear arms race "works." The Soviet Union and the United States are *actors* in the arms-control/arms-race field at only one level of reality. At quite another level each comprises highly complicated bureaucracies that do not necessarily "produce" strategic policy as it might be produced by a solitary, logical, strategic mind.

President Nixon and former Defense officials Packard and McNamara are among those who have publicly grappled with the complex question of what level of strategic capability is adequate for realistic deterrence.

The value of statements concerning the probable reactions of the Soviet Union to various United States strategic moves should be assessed in the light of the following fact recorded by David Holloway (in *Survival,* November 1971, p. 369): "For all the minute study of the Soviet press which has taken place, the institutional arrangements for the formation and execution of strategic policy have been largely neglected."

The Nixon Administration and Sufficiency

When asked by reporters to be more specific about the meaning of "sufficiency," former Deputy Secretary of Defense David Packard was moved to make the following impolitic clarification: "It means that it's a good word to use in a speech. Beyond that, it doesn't mean a God-damned thing." One must sympathize with Mr. Packard's semantic dilemma. Clearly no one is going to favor insufficiency,

instability, or unrealistic deterrence (to take the negative form of some of the more prominent phrases employed by the Nixon Administration).

At the conceptual level there is widespread agreement concerning strategic adequacy. President Nixon, in his statement "US Foreign Policy for the 1970s" of February 25, 1971, set forth the following interpretation of sufficiency: "Specifically, sufficiency has two meanings. In its narrow military sense, it means enough force to inflict a level of damage on a potential aggressor sufficient to deter him from attacking. . . . In a broader political sense, sufficiency means the maintenance of forces adequate to prevent us and our allies from being coerced."

Four criteria have been advanced officially as "guiding lights" for strategic force maintenance and development.

The first is a revised version of Mr. McNamara's assured destruction criterion. Assured destruction now means that the United States must always be able to do as much damage to the Soviet Union as the Soviet Union can do to the United States—no matter how a war might begin. It is a macabre fact that, because of gross differences in population/industrial distributions, the Soviet Union could kill 120,000,000 Americans with 200 one-megaton weapons, while the United States would require 1,200 similar weapons to perform comparable execution upon the Soviet populace. It seems clear, then, that this requirement could be an extremely demanding one (apart from the important question of the political necessity for such equality in destructive potential).

Second, the United States must have enough strategic weapons to ensure crisis stability. In short, the "first-strike bonus" must be virtually nonexistent. No Soviet decision-maker must be offered the temptation to try to shoot his way out of a tight corner.

Third, it is currently maintained by the Administration (as it has been all along by the US Air Force) that the criterion of "relative advantage" must not be forgotten. What this means is that, since all parties to a nuclear war will have every incentive to terminate it well short of Armageddon, the United States must develop and maintain forces of such size and character that the post-exchange balance will be in the favor of the United States.

Finally, there is asserted to be a continuing requirement for a damage-denial capability against third parties, *e.g.*, China. In the context of this last criterion, some US China scholars have claimed that all that can be achieved is to postpone Chinese acquisition of an assured destruction capability, whereas Chinese international behavior might logically be expected to "improve," were the current superpowers deliberately to deny themselves over the long run the maintenance of an unnecessary first-strike capability against China.

The Initiation of War

No *deus ex machina* is going to rescue Soviet and American (*et al.*) taxpayers from the financial and psychological depredations of the nuclear arms race. Critics seem reluctant to accept the fact that the arms race has become a partial functional equivalent for war. Contemporary weapons technology has not fundamentally altered the games that Great Powers feel called upon to play. Neither side is racing to prevail in World War III; indeed a nuclear Pearl Harbor is the most unlikely of all World War III scenarios.

One can envisage (but only barely) war by accident, by inadvertence, by catalytic action, by escalation—but, provided the defense planners are permitted occasionally to transmute blueprints into hardware, hardly a premeditated surprise attack. The problem of deterring an irrational opponent has been addressed by a number of theoreticians and practitioners: the basic "solution" is to (for example) double up on the threatened damage. However, should a national leader be really indifferent to the consequences of his actions (my minimal definition of irrational), then the proper "solution" is to build some checks and balances into the war-initiating processes in national capitals.

How Much Is Enough?

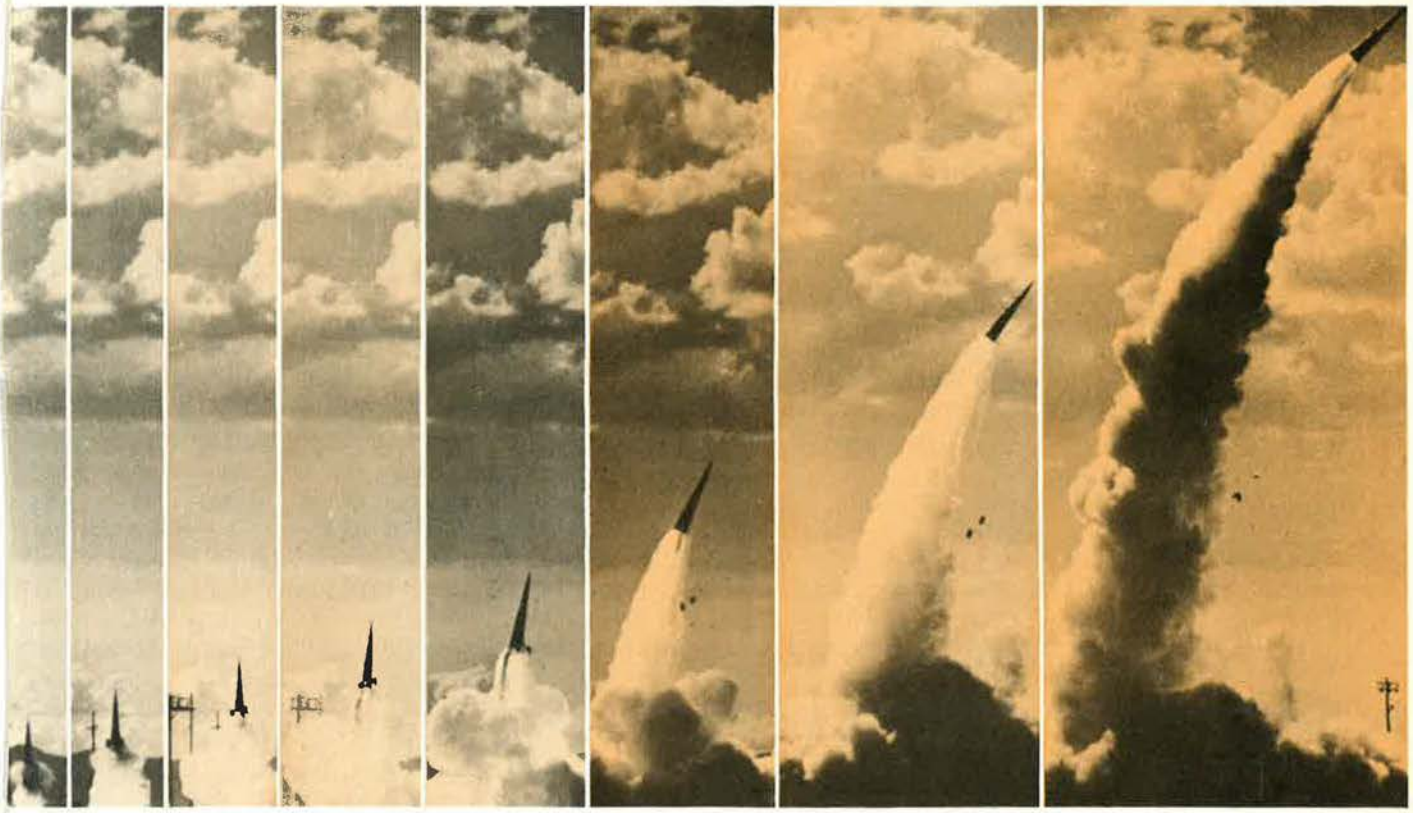
The difficulty in assessing "how much is enough?" is that almost any position is logically tenable. For example, it is perfectly reasonable to argue, in opposition to the Nixon Administration's four criteria of sufficiency, not merely that a militarily useless measure of superiority is irrelevant to avert a homeland attack and the coercion of oneself and one's allies, but even that a substantial measure of inferiority should really impose no great political or psychological disadvantages. How much insurance should be bought? At what point does one begin to suffer from negative returns to scale?

In a recent and well-balanced book, Dr. Joseph Coffey of the University of Pittsburgh has argued for the recognition of the old deterrence truth—that the certainty of response is at least as important as its magnitude. This means that a very small United States strategic force could sustain America's interests in the territorial integrity and foreign policy leanings of the "forward defense" countries of the Eurasian rimlands, provided the United States could persuade Soviet decision-makers that the risks attendant upon aggression would not be insignificant. In good measure, the argument could be continued, mobile conventional forces should be able—indeed ought—to substitute

for a basically suicidal strategic nuclear threat.

Put bluntly, it may be argued that "the threat" is substantially inelastic whenever it must contend with a nuclear armed adversary. Under this theory, strategic forces are essentially decoupled from foreign policy. They exist, they are known to exist, and no rational policy-maker is going to offer any challenge to interests that a nuclear power declares (without straining historical circumstances—in short, plausibly) to be vital.

This line of argument concludes by asserting that all one needs to do with strategic forces is to keep them—at as low a level as possible—assuredly invulnerable to a surprise attack. Invulnerability may be ensured by timely modernization and by rejecting those options that potentially pose a disarming first-strike threat against the adversary. Thus, in this view, MIRV and BMD should not even be tested, let alone deployed.



There are some serious objections to a defense arms race, but reexamination of the acceptability—and necessity—of a deterrent posture requiring millions of civilian hostages may be forthcoming. Shown here in launch sequence is Sprint, key element in antimissile defense.

Assessing the Arguments

Unfortunately, we have no definitive way of knowing whether the above argument for a low-level, minimal definition of sufficiency is correct or not. *History and common sense would seem to suggest that it is not.* The United States is an island empire competing with a Eurasian heartland power. The US has to project her power over vast distances, posing problems of credibility with which the adversary need not be concerned. The Soviet Union has given every evidence of believing (a) that war is possible, and (b) that strategic weight confers certain, although admittedly somewhat intangible, diplomatic advantages—or, more dangerous still, *should* confer diplomatic advantages.

The momentum that has gathered behind the Soviet strategic forces buildup since 1965 (a buildup that has been accorded first priority among Soviet defense objectives) serves to document the fact that the Soviet Union does not share the minimum deterrence logic of many American defense critics. President Nixon's determination not to permit a "further erosion of the strategic balance with the USSR" is both prudent and nonprovocative in arms-race terms. (Even as of October 1962, it has been estimated that the Soviet Union could have killed 50,000,000 Americans in a second strike.)

When racing against a cautious adversary who does not unambiguously share your notions of deterrence, who is striving for a reasonable place in the sun, and who is dealing with a country whose self-confidence has been shaken both by a Vietnam and by a host of long-deferred domestic problems, a measure of

arms-race overreaction is vastly to be preferred to underreaction. The political consequences of refusing to accept the arms-race challenge implicit in current Soviet activities are quite unknowable. Crystal balls are not dispensed with Ph.D.s in Systems Analysis or Soviet Studies.

Sufficiency and the Soviet Union

The Soviet Union has no known criteria of sufficiency. Indeed, it has never adhered, even inferentially, to a Soviet equivalent of assured destruction. As some scholars have indicated, Soviet military policy, which seems quite unequivocally to be attempting to provide a war-fighting capability, is out of step with Soviet political policy as reflected at SALT. In an article of this nature, treating an abstraction as though it were a concrete reality is a constant danger. References to *the* Soviet Union or to *the* United States obscure domestic differences that may be very real.

For example, since at least 1965 there has been a constant difference of emphasis between US Air Force and civilian Department of Defense spokesmen over the importance of damage limitation—though both have been in agreement as to the overriding importance of maintaining an assured-destruction capability. Similarly, while the Soviet SALT delegation seems to be genuinely interested in consolidating the strategic, and attendant political, gains of the past seven years, military statements and military deployment suggest that a measure of politically exploitable superiority is a likely Soviet objective.

Long historical memories, a lifetime of political conditioning, and natural professional prudence have led many senior Soviet military men to a set of beliefs regarding "stability" and "sufficiency" that are blatantly heretical by Western orthodox arms-control standards. The problem is not to identify the beliefs or their hardware manifestations; it is to know to what extent the beliefs and attendant military capabilities are likely to govern future Soviet military conduct. A rejection of mutual deterrence (as dependence upon the goodwill of the enemy), the desirability of preemption, and the need to defend the homeland (denying hostage status to the urban Soviet Union) are all tenets that may be found embedded in recent Soviet military development and deployment.

Interaction

There is no reason why the Soviet Union and the United States should attain either a symmetry of forces or of strategic doctrine. If the experience of prenuclear arms races is of any relevance (and I believe that it is), what is important is that each side should comprehend the minimum security requirements of the other side—as defined by that other side. What is undesirable is that there be any serious attempt to freeze a dynamic technology, not because the stopping of history would necessarily be undesirable, but rather because all the evidence at hand suggests that it would be futile.

Each side must, and does, understand that it will accelerate the arms race if it develops strategic forces of such a character that a disarming first strike is likely to be salable to decision-makers by the planners of the other side as not totally beyond the bounds of credibility. Redundant overkill capabilities may be extremely undesirable from almost all points of view, but it is important that each side believes that a rough parity exists. Parity should not be defined by treaty; indeed, such an attempt could not hope to be successful (that is, across the board of military capabilities, geopolitical positions, political interests, etc.). Parity exists in the eye of the beholder, and each current superpower should inform the other of the boundary of permissability, in very precise terms, so far as strategic force development is concerned.

In short, the strategic arms race—provided both sides behave prudently and with due and sophisticated attention to the reasonable interests of the other side—is a natural consequence of an inescapable political rivalry. It is an expensive mode of competition, but it need not be very dangerous. What is long overdue is a serious examination of the concept of deterrence through assured vulnerability—*i.e.*, a city-oriented minimum deterrent for assured destruction only—as sold by most Western strategic analysts. There are some serious objections to a move toward a defense-defense arms race, but the writings of Herman Kahn and Donald Brennan over the last few years should stimulate a reexamination of the long-term acceptability (and necessity) of a deterrent posture requiring millions of civilian hostages.

Nuclear arms races—like all arms races—can be won or lost. Bearing in mind the connection that persists in the minds of Soviet, American, and allied decision-makers between strategic muscle and diplomatic freedom of action, the Soviet leaders need to be reminded—as both President Nixon and Secretary Laird have done recently—that nothing short of equality (the minimum condition of sufficiency) will suffice for the American nuclear deterrent.

Soviet foreign policy would appear to be in a transitional phase, from one reflecting the fears and ambitions of a largely land-locked nation to a policy supporting the uncertain ambitions of a global superpower. If Soviet caution may be encouraged by intimations (even if no more than that) of their marginal strategic inferiority, reminders of that possibility should be given. But the means to back up such reminders must exist. ■

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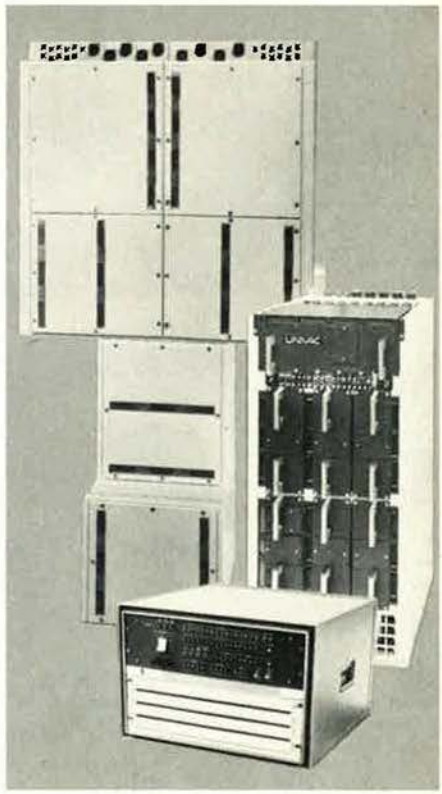

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SPERRY RAND

A modified C Buffalo is now experimental airc for STOL resea

Because of the rapidly increasing technological competition by other free world nations at a time when the US research and development effort is stagnating, the Nixon Administration is looking for ways and means to stretch the federal R&D dollar to the maximum. A recent White House study program has led to significant adjustments of the current budget and seeks to get . . .

Double Mileage From the Military R&D Dollar

By Edgar Ulsamer
SENIOR EDITOR, AIR FORCE MAGAZINE

THE NEW federal research and development (R&D) budget of $17.8 billion has been beefed up by about $700 million on the civilian side and by almost $150 million in the military sector to exploit what the Administration calls "technological opportunities." It also contains the rudiments of a national policy for managing technology and a strong commitment to intertwine civilian and military R&D.

These innovative features of the FY 1973 budget are the first results of a comprehensive and recently completed White House study, called the "New Technological Opportunities Program." The study was coordinated by the President's special consultant for technology, William M. Magruder. Principal Department

of Defense participants included former Deputy Secretary of Defense David Packard, Director of Defense Research and Engineering John S. Foster, Jr., and Secretary of the Air Force Robert C. Seamans, Jr.

The study focused on the lingering slump in the aerospace industry; the lack of momentum and direction in the nation's technology effort; mounting and vigorous competition from abroad by government-subsidized consortia; and the virtual impossibility of obtaining private financing for civilian aerospace projects because of high costs and high risks.

Mr. Magruder, formerly director of the government's supersonic transport development program, told AIR FORCE Magazine that the study, launched in July 1971, revealed a categoric need for a government-backed lending institution to help finance the development and production of future civil aircraft and systems. If government financial backing is not forthcoming, he said, "I think we [will] have lost civil aviation in this country. It's that simple."

One approach would be a publicly held, government-underwritten corporation modeled after the Communications Satellite Corp. (Comsat). The other would be an "Aerospace Reconstruction Finance Corp.," a government-operated lending institution. The latter is advocated by the Chairman of the Civil Aeronautics Board, Secor D. Browne, on grounds that the rising costs of developing and producing technologically advanced commercial aircraft exceed the credit resources of private industry. To put a modern superjet into production forces the manufacturer to go "about $1.5 billion in the hole at the maximum negative cash flow." Previously this flow was absorbed, Mr. Browne said, "by the role of the Department of Defense, which, with steady production of bombers and tankers and the development of engines and airframes, made possible the 707 and DC-8 family."

Military Seed Money

Similarly, Mr. Browne said, the 747 and the DC-10 were made possible by the C-5. "The C-5 paid for the development of the General Electric engines that power the DC-10. A parallel program paid for the development of the Pratt & Whitney engines that now power the 747." Without this military seed money, he said, "industry today simply can't raise the kind of financial resources to go from development to production," adding that "our industries are competing not with other industries but with governments—the French, British, German, Italian, and Japanese—either singly or in combination."

The President of Eastern Air Lines, Samuel L. Higginbottom, who served as chairman of the White House study's advisory group on aviation matters, stated that, without a federal finance agency, the United States would, in time, cease to be a major supplier of airplanes and related equipment. The consequences, he said, would be catastrophic for the US aerospace industry, the nation's largest manufacturing employer, with 931,000 people on a payroll that adds up to $10.8 billion annually.

In addition, the Technological Opportunities study found that US industry could capture about seventy-five percent of the free world's jet transport market, estimated to total about $150 billion between now and 1985. Conversely, should the US lose its leadership position, the potential loss to the US would be close to $100 billion, consisting of about $77 billion in sales to foreign airlines and some $20 billion that US carriers would have to spend abroad. At the same time, military procurement costs, while not easily measurable, would rise because of higher overhead costs.

No Federal Superstructure

Mr. Magruder stressed to this reporter that the financing problem eventually must be solved "in consonance with the free enterprise system and must not lead to creation of a federal superstructure which runs the industry. It should function solely in the financial arena as a loan institution which assesses the risks and the market." Chairman Browne believes that the government should "provide the financial muscle to continue the historic process whereby the air carriers develop their requirements, the manufacturers bid, and the carriers make down payments, progress payments, and final payments.

Magruder: Civil aviation needs government financial backing.

Browne: Calls for government-operated lending institution.

All I want the government to do is to undergird this process, provide that portion of the risk which is simply beyond the ability of the airline industry and the manufacturing industry to handle. . . . We must have something to sell in the marketplace. Otherwise, I am afraid, we will turn into a nation of service industries very busily taking in each other's laundry."

The Technological Opportunities Program concluded that among the new commercial aircraft types that should be developed here if this country is to retain aeronautical preeminence are an airbus (comparable to the 250-passenger, wide-bodied A-300 under development by a European consortium), a transonic (about Mach 1 cruise speed) transport, a jumbo freighter, a STOL jetliner, an advanced heavy helicopter, and an SST.

The airbus, the transonic transport, the advanced technology freighter, and the SST, Mr. Magruder told AIR FORCE Magazine, cannot be launched by the US aerospace industry without government financial backing.

With respect to the SST, Mr. Magruder said, "If the United States is either unable or unwilling to launch a full-scale program within two or three years, we will not be able to compete in the second-generation SST market, and the field will become the monopoly of the European aircraft industry."

Following congressional refusal to fund the nearly completed SST prototype program last year, this country halted all SST work except for what basic research in the faster-than-sound design field is conducted by NASA. The White House and the Department of Commerce are currently considering steps to reconstitute a national SST program as part of the government's search for a suitable financial catalyst for the lagging national technology effort, according to Mr. Magruder.

Joint Military-Civilian Programs

A central conclusion that emerges from the White House study, according to Mr. Magruder, is the need for coordinating interdepartmental, government-sponsored technology programs, especially military R&D programs. Efforts are currently under way to achieve government-wide coordination and cooperation so that, "in the future, programs like the C-130, the C-141, and the C-5 don't become purely military programs" and that thereby their "very healthy civilian market potential" can be realized, he stressed. (Senior Air Force R&D officials emphasized to this reporter that cooperation of this type must not lead to a degradation of the military capabilities of systems involved in joint military-civil efforts.)

Mr. Magruder said there exists real enthusiasm "on the part of the Department of Defense for such cooperation. They [DoD leaders] realize that the mood of the Congress favors meeting civilian technological needs through military R&D programs in cases where this sort of approach does not compromise the basic military requirement. We are keeping our finger on the pulse of military projects that might have civilian application. No such mechanism [to scout DoD R&D programs for civilian fallout] exists at the moment, but we are in the process of creating such a clearinghouse."

The first, and most promising, military R&D project which could also stimulate the US civilian technology effort and export market is the Air Force's Advanced Medium Short Takeoff and Landing Transport (AMST).

AMST is one of two USAF advanced prototype programs funded by the Congress. Its commercial importance stems from the fact that it involves not only developing a flight vehicle of a size and performance highly attractive to the worldwide civilian STOL market, but includes the development of an advanced technology prototype engine in the 20,000-pound-thrust range.

The AMST program was implemented by the Air Force early in 1972 to demonstrate the technical and operational feasibility of a low-cost STOL vehicle, approximately equal in size to Lockheed's C-130, with good short takeoff and landing characteristics and austere field capabilities. Mr. Magruder told AIR FORCE Magazine that such a vehicle "will have an excellent civilian market potential in all areas of the world plagued by high air traffic congestion levels." He said several hundred such aircraft could be sold abroad. An even greater market, estimated by the government at between 6,000 and 8,000 units, is forecast for the AMST's 20,000-plus-pound-thrust engine.

It is ironic that in the case of the STOL aircraft, as well as the engine, the main competitors are US aerospace companies who have entered into cooperative development ventures with foreign governmental combines because they could not get the necessary money in this country. In what CAB Chairman Browne termed "a reverse brain drain," Boeing entered into an agreement with Italian authorities to develop a commercial STOL aircraft, and General Electric has agreed with SNECMA, the French state-owned engine factory, to develop a quiet, advanced technology engine in the 20,000-pound-thrust class to power a number of commercial aircraft, including STOL. Both Mr. Magruder and Chairman Browne stressed that US industry, hobbled by financial and eco-

nomic conditions in the US, had an obligation to keep its engineering teams together and to safeguard the interests of its stockholders.

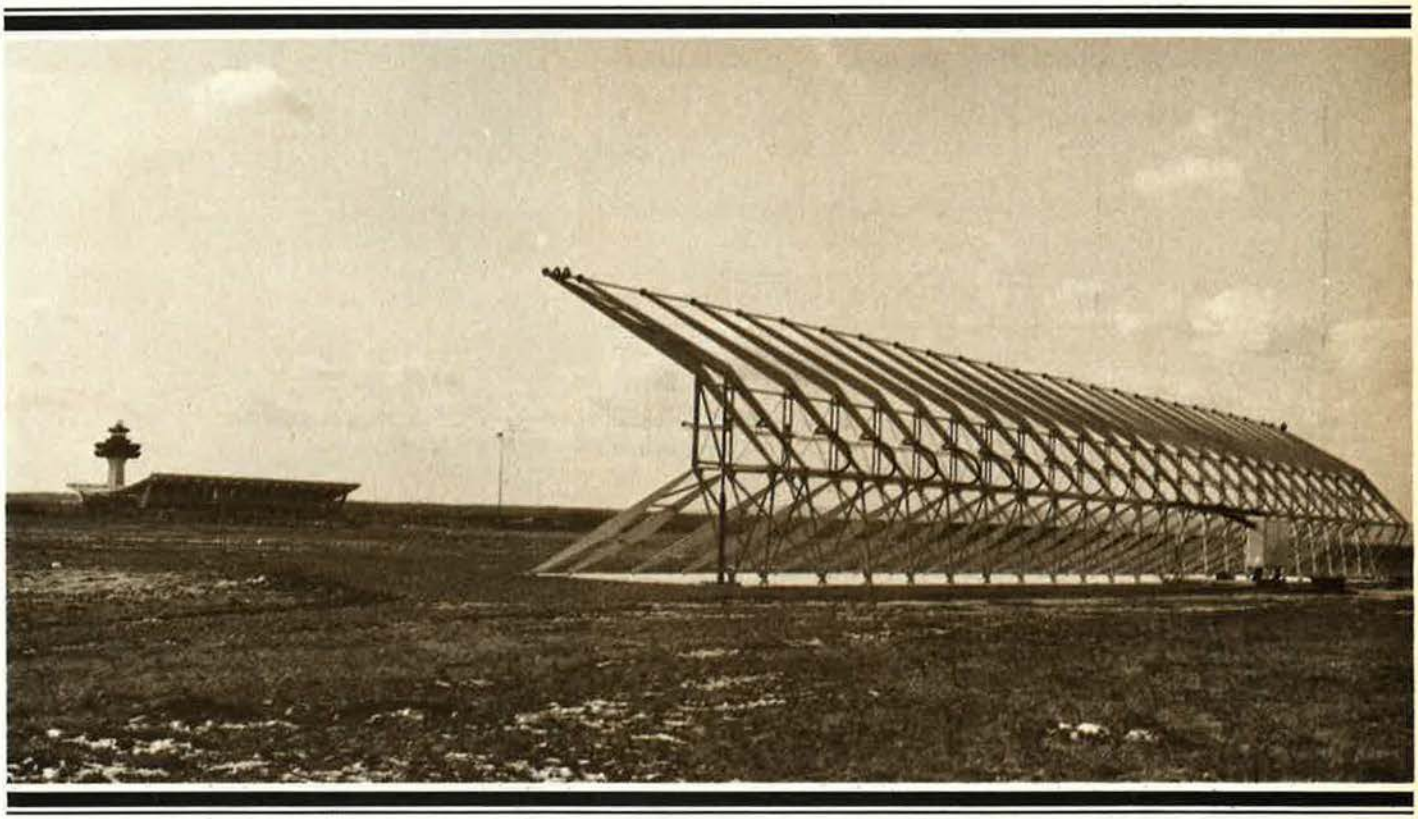
AMST Competitors

Requests for proposals for the AMST were issued by the Air Force to Lockheed Aircraft Co., Marietta, Ga.; North American Rockwell, Los Angeles, Calif.; McDonnell Douglas Co., Long Beach, Calif.; General Dynamics, Fort Worth, Tex.; the Boeing Co., Seattle, Wash.; Grumman Aerospace, Long Island, N. Y.; LTV Aerospace Systems, Dallas, Tex.; Bell Aerosystems, Buffalo, N. Y.; and Fairchild Industries, Inc., Hagerstown, Md.

First flight is planned for 1974, but the program, in line with the recently evolved prototype concept, does not yet include a commitment to production. The prototype program will involve two contractors, each of whom is to build and flight-test two prototype aircraft.

USAF's request for proposals for the 20,000-pound-thrust engine were issued to General Motors' Detroit Diesel Allison Div., Indianapolis, Ind.; United Aircraft's Pratt & Whitney Aircraft Div., East Hartford, Conn.; General Electric's Aircraft Engine Group, Cincinnati, Ohio; Teledyne's CAE Div., Toledo, Ohio; Avco's Lycoming Div., Stratford, Conn.; and Garrett Corp.'s AiResearch Manufacturing Div., Los Angeles, Calif.

The prototype engine program consists of two distinct phases. Phase I, to be completed within thirty-six months from the date of contract award, will involve two competing contractors. One of the competitors will be chosen to conduct Phase II, which will culminate in the engine's preliminary flight rating testing (PFRT) sometime in 1976.



The new instrument landing system at Dulles International Airport, Washington, D. C., guides incoming flights to the centerline of the runway when visibility is as low as 700 feet.

QUESTOL

Augmenting the Air Force's work in the STOL field, Mr. Magruder said, is a related NASA program that will be carried on in FY 1973 at a cost of about $28 million. This experimental program, involving an off-the-shelf engine and a small experimental aircraft, which is not sized to meet eventual production requirements, will concentrate on such advanced aerodynamic technologies as blown flaps or possibly other techniques to increase an aircraft's aerodynamic lift by channeling the engines' airstream over or through its lifting surfaces.

Three airframe manufacturers are currently

involved in a six-month preliminary design phase for NASA's so-called QUESTOL (quiet, experimental STOL) program. From among the three competitors NASA plans to name one who will build two experimental transport-type airplanes for a NASA flight research program. The competitors in the preliminary design phase, scheduled for completion by mid-1972, are: Douglas Aircraft Co., Long Beach, Calif. (a division of McDonnell Douglas Corp.); Grumman Aerospace Corp., Bethpage, N. Y. (a subsidiary of Grumman Corp.); and Lockheed-Georgia Co., Marietta, Ga. (a division of Lockheed Aircraft Corp.).

Several major aerospace companies are working with these companies in subcontracting roles. Mr. Magruder explained that the Administration originally considered assigning two separate STOL programs to NASA, but decided to proceed with the Air Force program because of its broader competitive stance, "which should yield greater technological creativity and can provide us with an aircraft that can be introduced into operational service sooner than a NASA development."

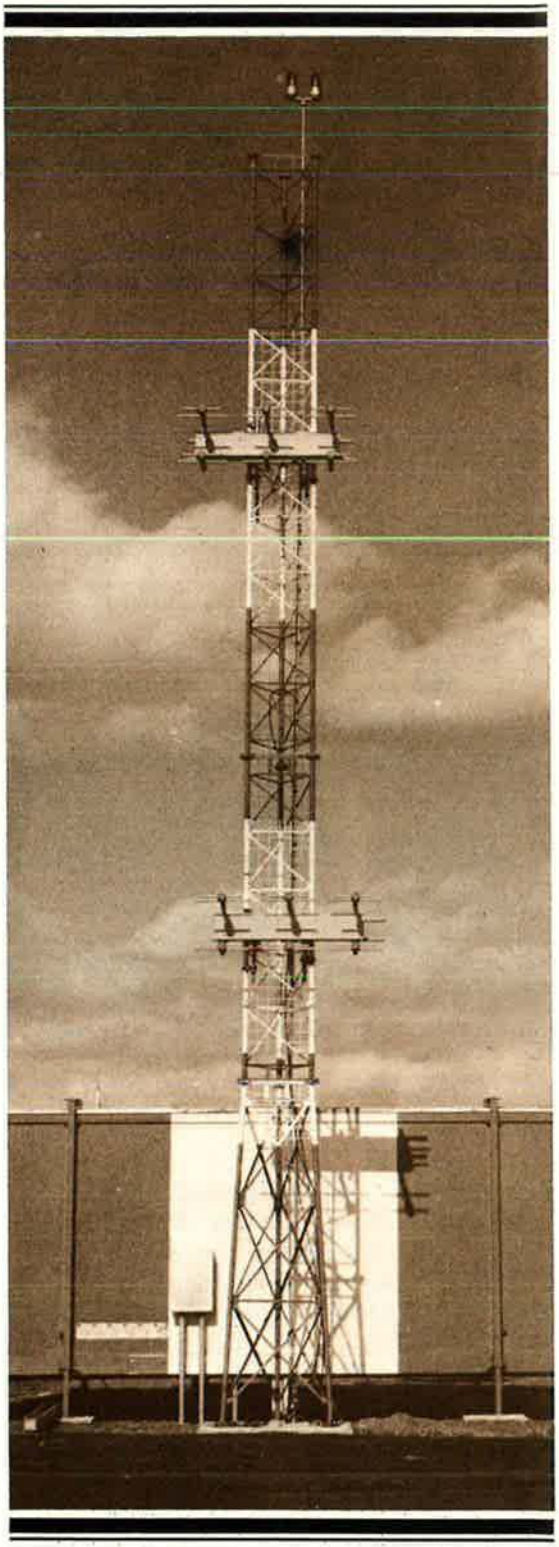
Other Joint Military-Civilian Programs

The Technological Opportunities Program also seeks to tap military R&D for long-term civilian needs in the VTOL (vertical takeoff and landing) field by encouraging Department of Defense research of tilt-rotor designs similar to the Air Force's now defunct LIT (Light Intratheater Transport) program. Associated with these efforts, Mr. Magruder said, will be DoD research in suitable lift and cruise engines.

Such a VTOL tilt-rotor prototype aircraft, to be developed jointly with NASA, will combine vertical takeoff with highly efficient cruise speed. First flight could occur in 1974. A new 1,500-horsepower turboshaft engine is being developed that could offer significant operational advantages for VTOL aircraft in the late 1970s or early 1980s. The VTOL program, if successful, could provide the technology base for a new class of intercity transports, Mr. Magruder said.

The third Department of Defense R&D program, which the White House study supports, is the US Army's Heavy Lift Helicopter (HLH). Funded to the tune of $53 million in the FY 1973 budget request, the HLH program is to demonstrate the capabilities of a prototype heavy lift helicopter that can carry a payload of up to 22.5 tons. First flight is expected in 1974 or 1975. Mr. Magruder said such a vehicle would have a highly promising civilian potential in such areas as construction, logging, and fire fighting.

Recommended for study short of hardware by the White House group was the Navy's COD (Carrier on Deck logistics support air-



This glide slope antenna for the new Category IIIa instrument landing system at Washington's Dulles International Airport provides vertical descent guidance to inbound flights.

plane), because of its great potential as a highly productive local carrier (commuter) aircraft. Such a vehicle would not only help remove US commuter airlines from CAB operating subsidies but would have "an enormous export potential so far as the underdeveloped countries of the world are concerned," according to Mr. Magruder.

The Navy is considering a modification of its S-3A antisubmarine aircraft, involving a larger fuselage and use of the F-14 fighter's advanced technology engine to be able to bring mail and high-priority supplies from shore stations to carriers over distances of up to 2,000 miles. Because the Navy's requirement is for only thirty-six aircraft, the White House group felt that both the military and civilian sectors might be better served by a design that allows for the commonality of the military and the civilian missions.

Microwave Landing System

Yet another recommendation by the White House group involves a joint DoD/FAA microwave landing system that can demonstrate advanced technology, all-weather landing capabilities by next year. Such a system, Mr. Magruder explained, could consolidate the currently existing but not standardized all-weather systems in order to provide the nation with certified fail-safe blind landing capabilities.

The final candidate for the transfer of military developed techniques to civilian applications involves health care, based on the experience of the Air Force's paramedics in Vietnam. "Our wounded [in Southeast Asia] get better attention by far and have less mortality and morbidity [medical complications] than our [traffic victims] on the highways. We injure 10,000,000 people a year in this country and we lose something like 60,000 lives a year due to inadequate emergency care. Yet the Vietnam experience shows that we have adequate tools, in the form of integrated communications systems, helicopters, ambulances, and medical centers, which can cope with all major accident and injury areas to save $2.5 billion annually in health costs and reduced morbidity," Mr. Magruder stressed.

In areas outside the purview of the Department of Defense, the New Technologies Opportunities Program urged intensified research in environmentally safe and nonpollutant energy generation involving accelerated research on laser-induced nuclear fusion (*see* AIR FORCE *Magazine, Dec. '70 issue, p. 28, "Laser —A Weapon Whose Time Is Near"*). This technology might provide mankind with an essentially unlimited energy reservoir without disturbing the ecological balance.

Mr. Magruder stressed that aerospace technology is also undergirding the development of modern mass transit systems that are currently moving toward demonstration status. These involve computer-controlled, four- to six-passenger, coin-operated personal transporters, operating on lightweight rails above city streets. The transporters can be summoned "on demand" and would be routed by computers. Also in a preliminary design phase are 300-mph "levitational vehicles" operating in tubes and propelled by linear induction (magnetic) motors. Another approach, designed to overcome the urban congestion and pollution problem, is being pursued by a joint NASA and Department of Transportation program known as the dual-mode transporter. This vehicle could operate with an external power source, completely automatic on freeways, but would shift to manual control by the operator and an internal power source once off the freeway system.

Clear Precedents

In summarizing the findings of the White House technology study, Mr. Magruder said, "Our target is less federal control and more private innovation. Nevertheless, there are clear economic and historical precedents for our government to respond, and to not only stay within our private enterprise and free trade concepts, but to enhance them. These criteria are:

- When the public welfare is at stake and the private sector cannot perform the function. For example, national defense;
- When the marketplace is imperfect and governmental action is required to reduce friction and artificial barriers. For example, FHA mortgages, Federal Deposit Insurance Corporation, and the Securities and Exchange Commission; and
- When major economic shifts occur as a result of basic changes in federal policy, such as the shift from a war to a peacetime economy with regard to unemployment.

"If we can succeed in these efforts, then, combined with the progress that will be derived from the Defense Department efforts, they will form a package that could assure our continued preeminence in aerospace and related technologies," Mr. Magruder said.

And he added: "We must succeed, for tens of billions of dollars in trade—perhaps half a million jobs and billions in tax money—are at stake, all of which can help our other important domestic programs." ■

An observer of the Soviet educational system reports on Russian universities and other institutions of higher learning. Who is selected for the still limited privilege of advanced education? What is the purpose of the educational structure? How does it operate? What is university life like? Are the short-term strengths of the Soviet system likely to be outweighed by long-term weaknesses?

The Soviet Universities: Dig Narrow, Dig Deep

By Susan Jacoby

HIGHER education in the Soviet Union is a coveted privilege granted to only a relatively small minority of the nation's youth. The restricted role of Russian higher education and the Soviet universities as leadership entry points stand in stark contrast to America's dramatic postwar surge toward quasi-universal higher education.

More than 4,500,000 Russian students are now enrolled in some 800 institutions of higher learning. One in seven high school graduates is now entering some kind of institution of higher learning. But this proportion is expected to drop to one in ten by 1975, due to a major expansion of secondary schooling with no corresponding increase in the number of places in the universities. For the Soviets the future holds some interesting dilemmas as an increasing number of their young develop rising expectations in a society in which university entry is strictly controlled and where jobs requiring university graduates are still limited.

The differences and similarities between Soviet and American higher education are equally instructive. Soviet higher education is largely dominated by the fact that university admissions constitute a singular privilege, rather than a right as a citizen, and this fact shapes everything from the political attitudes of the students to the organization of university faculties.

During my two years in the Soviet Union, I met students who attended universities of widely varying academic quality and content, in Moscow and in other cities from the Caucasus in the south to the Baltic republics in the north. Some of the students were liberal by Russian standards, eager for more exposure to Western ideas and contact with young people from the West. Others —not surprisingly in a country where students are entirely dependent on their government for their education—seemed conservative even within the context of Soviet society.

All of the young men and women I met were far more serious and seemed to place a much higher value

This article is excerpted from a longer article, entitled "Toward An Educated Elite: The Soviet Universities," which was published in the November 1971 issue of Change *Magazine, New Rochelle, N. Y. The material is used with permission of that publication and the author.*

Moscow State University, the Harvard of the Soviet Union, ranks at the top of the USSR's fifty-odd universities.

—Novosti Press Agency

on their education than American students—either my college generation of the early sixties or the more radical students I subsequently wrote about as a newspaper reporter during the era of campus revolts. To most Russian students, entering and staying in school is a serious business—the first essential requirement for succeeding in their society.

Conform and Conquer

According to the 1970 census, approximately 5.5 percent of Soviet citizens above age ten possess some education beyond secondary school; 4.2 percent have completed their higher education. A university diploma provides a virtual guarantee of a high-status job. There is no reason to question the practical value of higher education in the Soviet Union, since the government only trains as many people as it needs to fill specific jobs. Most students, well aware that they constitute a fortunate elite, have neither the time nor the inclination to question the philosophical value of their education.

In Tbilisi, capital of the Soviet republic of Georgia, for example, a burly young man who is active in the Komsomol (Young Communist Youth League) has heard about the Black Panthers and is convinced that they are soul brothers. He did not understand what I was talking about when I suggested to him that the Panthers are in many respects a revolutionary organization, while the Komsomol can hardly be considered revolutionary since it is dedicated to preserving rather than changing the Soviet system. He appears to believe everything he has ever read in his political textbooks.

Students do not necessarily represent the most intelligent segment of Soviet youth, although that is sometimes the case. The Soviet university entrance system discriminates heavily against students who have not made the grade in high school, particularly against those whose behavior has been considered obstreperous or "antisocial." A brilliant student with a history of rebellion against high school rules and officials would find it far more difficult to gain admission to a Soviet university than an American student in a similar position.

After a student is admitted to a university, an even heavier penalty is exacted if he displays signs of political or purely intellectual nonconformity. A case in point is Andrei Amalrik, the young historian and writer who is now serving three years in a prison camp for writing and authorizing Western publication of his books, *Involuntary Journey to Siberia* and *Will the Soviet Union Survive Until 1984?*

Amalrik first came into conflict with Soviet officialdom when he submitted a thesis paper at Moscow State University (MGU) on the civilization of *Kievan Rus,* the early

Russian state centered around the present capital of the Ukraine.

Amalrik's research was acceptable to the faculty examiners, but his conclusion—that early Russian civilization was strongly shaped by Byzantine and Norman influences—was unacceptable. It ran counter to the official and highly chauvinistic historical view that Russian civilization was developed primarily by Slavs. Amalrik was eventually expelled from the university for sticking to his conclusion and for trying to communicate with a Danish scholar who held similar views.

There are, of course, many first-rate minds among students at Soviet universities. Some of the best students enroll in science departments rather than the humanities, because the sciences are more sheltered from political controversy and therefore from the possibility of making a political "error" in one's academic work.

A Broad Spectrum

Higher education is an enormous government-financed enterprise in the Soviet Union. All of its 4,500,000 students, except those with extremely poor grades, receive stipends of thirty-five to forty rubles a month. (One ruble equals approximately $1.11 at the official rate of exchange. The average Soviet worker's salary is about 133 rubles a month.) Dormitory fees are seldom more than five rubles a month. Tuition is free.

The term "higher education" has a broader meaning in the Soviet Union than it does in the United States. It includes full-fledged universities with doctoral programs, music conservatories to train concert artists, agricultural and teachers' colleges, even institutes designed to produce automotive engineers only one level above high-grade mechanics.

Some fifty institutions are designated as universities by Soviet education officials; most of these are the equivalent of American universities in the breadth of their course offerings and other academic programs. All of the remaining institutions of higher education train young people for specific professions ranging from medicine to animal husbandry. A Soviet university is not necessarily more prestigious than an institute. In Moscow, for example, the best foreign language instruction is offered not in the appropriate department at MGU but at the Institute of Foreign Languages. This is true even though MGU is in many respects the Harvard of Soviet higher education.

In universities and in many institutes, it takes five or six years for a student to receive the equivalent of an American undergraduate diploma. A candidate's degree, roughly the equivalent of a master's, theoretically takes an additional three years. The three-year figure is purely theoretical, because Soviet universities are far less strict than American universities about time limits for the completion of graduate study.

The average age of scientists receiving candidate's degrees is forty—evidence of an academic-scientific time lag that some prominent Soviet scientists have already sharply criticized. A doctor's degree does not necessarily represent a higher academic level than a candidate's degree; it is often awarded on an honorary basis for scholarly research or, in the case of scientists, applied work. A common practice is to award a doctorate to a professor on his sixtieth birthday.

Who and How Many?

The Soviet system of higher education begins with a complicated admissions process that is integrally linked to the nation's central economic planning. The number of students in foreign language departments is determined by the State's decision on how many foreign language specialists it wishes to train in a given year, not by demand. Broad decisions on the number of college-trained personnel needed in each major area of employment are included in the Five-Year Plans for economic development. The Five-Year Plans are approved and their basic direction shaped at the top level of the Communist Party.

The broad economic and educational decisions are naturally adjusted somewhat from year to year in different areas of the country. The assistant rector of Latvia State University explained this planning process:

"Each year in February or March, a new determination must be made about how many students will enter the universities—and each department within the universities—the following September. This is, of course, related to the question of how many specialists will be needed for jobs five or six years in the future. Everyone participates—the universities, government, and Party planning organs at the city, republic, and national level. The final decisions are reviewed in Moscow at *Gosplan* [the central government's top economic planning agency]."

—Novosti Press Agency

Students at Tashkent University in the Uzbek Soviet Socialist Republic.

I said it must be quite a chore to prepare for each academic year with so many government agencies in on the act, but the assistant rector merely smiled.

Decisions on how many specialists the State wants may regulate the number of places in every university department, but they do not regulate the number of applicants. The assistant rector at Latvia State said the most popular departments were law, biology, and foreign languages, and the least popular was a department concerned with accounting and bookkeeping. In some departments at MGU and Leningrad State University, there may be fifteen or twenty applicants for each place.

Every August millions of young people throughout the Soviet Union

take written examinations for entrance to the university departments where they have already applied. Only last year, the notion of predicting academic success on the basis of Soviet university-level examinations was publicly attacked in *Literaturnya Gazeta,* the weekly of the Soviet Writers Union. V. Bespalko wrote that Soviet entrance tests produced such pressures on the applicants that "their real capabilities are not accurately reflected."

The common American practice of applying to several universities with differing admissions standards is prohibited; if a student fails to make the grade on the MGU entrance exam, he cannot fall back on his application to a less prestigious university.

Young men and women are kept in the dark about their fate until they receive official notices of whether they have been admitted, usually two or three weeks before the universities open. Many secondary school graduates who had counted on continuing their education find themselves unexpectedly in a factory or office as a result of a low score on the entrance exam.

The exam scores generally play the most important role in determining university admission. A student's high school record, both academic and extracurricular, has some influence. It is particularly helpful to have been active in the Komsomol.

Some preference is also given to young people who have worked a year before taking the entrance exam, and to children of peasants and blue-collar workers, who are underrepresented in the universities in comparison to the children of the Soviet intelligentsia. Soviet education officials never disclose exactly what weight is given to the social and professional background of an applicant's parents. There is general agreement that the proportion of students from blue-collar and farm families is rising slightly; some universities have even set up special preparatory programs for students from poor rural high schools. The intent is similar to that of American universities where new programs have been organized to aid black students; in the Soviet Union, children who live on farms suffer from unequal educational opportunity in much the same fashion as children who live in America's central cities.

Despite official efforts to achieve a more diverse student population in Soviet universities, a majority of young people enrolled in higher education institutions still come from families in which the parents also had some education beyond high school. The Soviet intelligentsia is as successful at perpetuating itself as the intelligentsia of any other country.

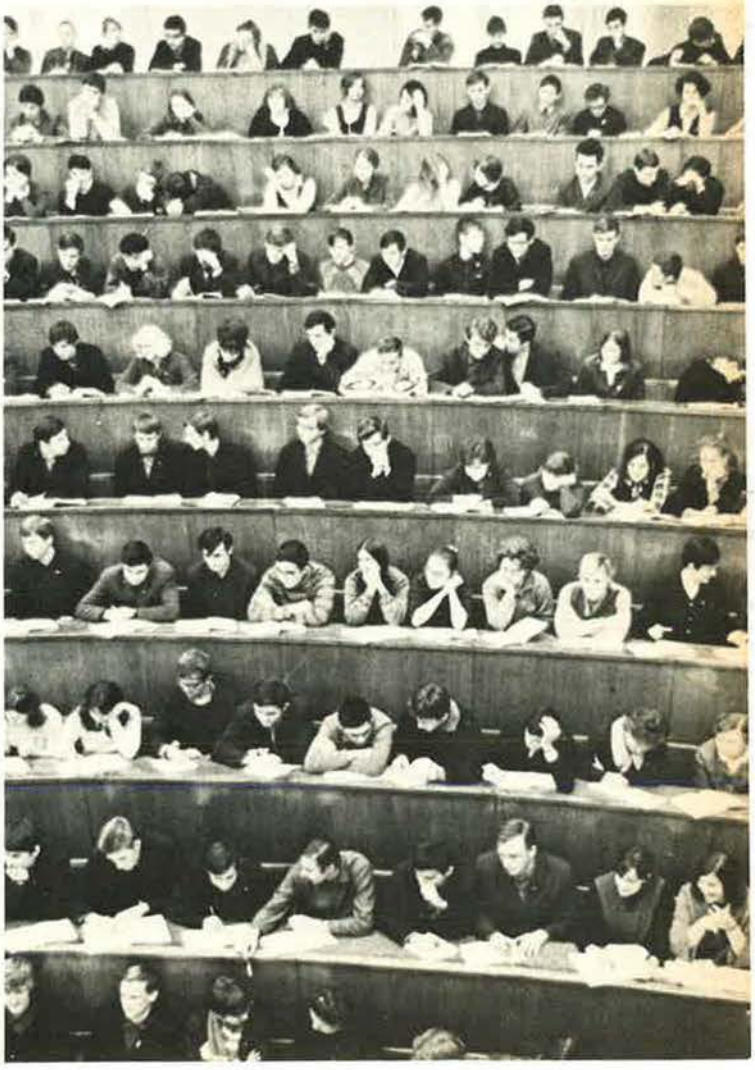
Increasing Competition

The disparity between the limited number of university places and the growing numbers of students who want to go to college leads some families to take desperate measures. Many urban parents pay hundreds or even thousands of rubles for private tutoring, hoping their children will score higher on the university entrance examination. Some instructors who had access to the examination questions have gone to jail for their part in tutoring rackets. The more honest tutors simply try to "teach the test" in a fashion hallowed around the world.

Some college admissions officers have been involved in outright bribery—an abuse of the system that receives an unusual amount of publicity in the official press. The Soviets are prouder of their advances in education than of almost any other achievement since the Bolshevik Revolution, and they are extremely sensitive to any charges of official misconduct in educational institutions.

While the Soviet authorities take a stern attitude toward abuses of official position in education, they are not willing to address themselves to the basic social problem behind the bribery: a massive expansion of secondary schooling during the past fifteen years without a corresponding increase in university facilities and enrollment. The number of high school graduates has jumped seven hundred percent while the number of university places has only doubled.

A stepped-up expansion of higher education does not fit in with Soviet economic planning for the foreseeable future. The Russian economy still depends far more on unskilled labor, particularly in agriculture, than do the industrial nations of the



The large lecture system is widely used at Soviet universities. Students spend ten or more hours a day at their highly specialized studies. Tuition is free, living costs low, and most students receive a stipend from the state.

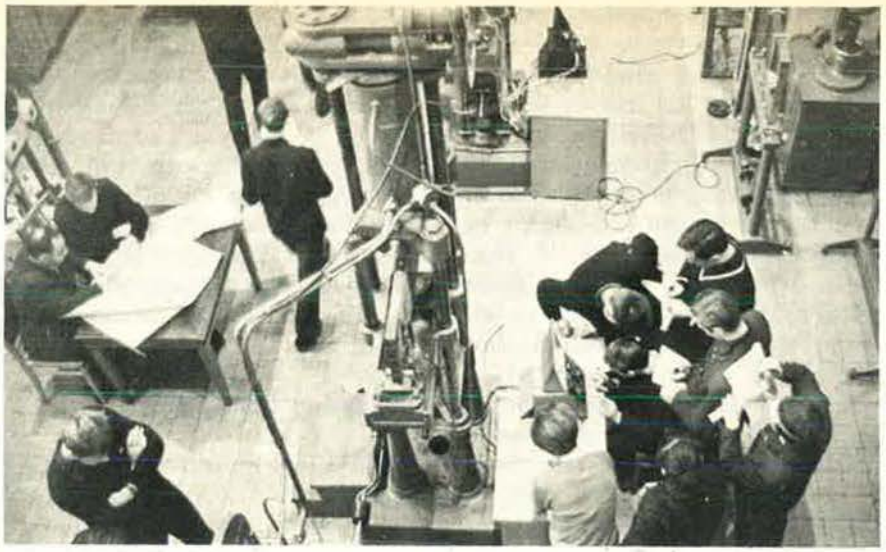
—Novosti Press Agency

West. The country's most urgent need at this point of economic development is to upgrade its skilled blue-collar labor force. Russian planners regard expanded secondary school education as being in line with the need for a larger and better skilled labor pool; they believe—probably correctly—that the Soviet economy cannot put more college graduates to effective use at this time.

Thoughtful Soviet officials are beginning to discuss the problems inherent in a system that now allows millions of young people to finish secondary school but offers them no realistic hope of continuing their education.

"I believe we have what the Americans call a syndrome of rising expectations," one social scientist said. "Intellectually, I know we are going to have a great many unhappy young people on our hands. Realistically, I know the number of university places is not going to be significantly increased in this Five-Year Plan or the next or maybe even the next.

"How can our government spend money to train students for jobs that don't yet exist in our economy? And yet we encourage our young people to dream that they can become anything, do anything they want. I don't see any answer right now, only fiercer competition to get into the universities during the next ten or fifteen years."



—Novosti Press Agency

A laboratory at the Moscow Power Engineering Institute. There are many more institutes than universities in the USSR.

University Life

Given such a situation, it is not surprising that the fortunate few make every effort to meet whatever demands the universities impose on them. Those demands on a student's time and energy are stringent; a Soviet student's life, while rich in terms of future rewards, is not easy or pleasant by Western standards.

One of the most striking characteristics of Soviet higher education is that a student must spend far more time in the classroom than he would in any American college or university. In most Soviet institutions or universities, an undergraduate attends class five or six hours a day, Monday through Saturday. The large lecture system is as widely used at Soviet universities as it is in the United States with one important difference: attendance is compulsory.

A student who misses a lecture without an official excuse from the college infirmary or some other university agency is reported to an appropriate Komsomol representative. If absence from class becomes a regular pattern, the student is called before a Komsomol committee to account for his actions, disciplined in some way, and probably escorted to class thereafter by a dedicated Komsomol member.

My conversations suggested that the average Soviet student spends ten to twelve hours attending or preparing for each day's classes. It is impossible to pass courses simply by cramming for final exams, because Soviet universities demand regular written and oral assignments from students just as high schools do. Critics within the Soviet academic establishment have noted unfavorably the resemblance between universities and high schools.

The university system requires students to specialize from the beginning of their academic careers. A student has little say in *planning* his curriculum other than making the basic choice of a department when he applies for admission. The often bewildering supermarket of American university courses available even to freshmen and sophomores would be unthinkable in a Soviet institution of higher education. The course requirements for each five- or six-year undergraduate degree are strictly laid out, and they concentrate almost entirely on the occupation for which a student is being prepared. Generally, the only courses a student takes outside of his specialty are political subjects such as Marxist-Leninist theory, the history of world communism, and Marxist economics.

In Moscow, I met a fourth-year electrical engineering student who had never taken any courses unrelated to his engineering specialty. He was astonished when I told him that most American universities require students to take some courses in the humanities and the physical and social sciences during their first two years.

Perils of Specialization

Like the class attendance system, the high degree of specialization in Soviet universities is the logical outgrowth of a secondary school structure in which youngsters have no choice about their classes. One Soviet educator told me that specialization works in the universities because "our students have all received the basic background in high school that your students get during their first year or two of college."

My own observations of Soviet high schools did not convince me that they provide anything like the equivalent of first- or second-year basic courses in American universi-

ties. The average Soviet high school student is required to take many more hours of science and mathematics than the average American student, but quantity and quality of instruction do not necessarily go hand in hand.

I found no evidence—either in classroom observations, conversations with students and teachers, or in textbooks—that Soviet high schools were turning out graduates who knew any more about modern science than American high school graduates. Russian high school students are particularly deficient in their knowledge of history and other areas of the humanities. They take ten years of Russian and modern Soviet history, but do not study world history in any meaningful way until their final year in high school. Such students can hardly be considered so "well grounded" that they need no equivalent of American basic college courses, unless the sole aim of a higher education is to train a young man or woman for one job.

The results of overspecialization are evident in the educational deficiencies of many Soviet university graduates. One highly intelligent young man, a graduate of the prestigious Moscow Institute of Foreign Languages, startled me by asking who Aristotle was when he came across the name in a book I had given him.

The fascinating colloquium of scientists published in *Literaturna Ukraina* indicated that many first-rate scholars and scientists believe overspecialization hampers the intellectual development of all Soviet students. Victor O. Kononenko, a member of the Ukranian Academy of Sciences, wrote that he had been extremely impressed by the creativity of Western graduate students, particularly by their ability to answer questions in areas entirely different from their specialized fields of study.

Kononenko views higher education as a two-stage process: the informative stage, in which a student basically absorbs and memorizes information, and the creative stage, in which the student begins to apply knowledge to new problems. He wrote that Soviet higher education "pays [its] main attention to the first stage and sometimes forgets about the second stage." He added, "We always dream that a man will start thinking independently by himself, but the student seldom fulfills such dreams because he is not prepared for creative, independent thinking."

The scientists also touched on another point that is not generally acknowledged in Soviet academic circles: complete specialization in the universities may be as detrimental to the country's long-range employment needs as it is to the development of creative minds. A scientist who is trained in only one narrow specialty rather than in the application of creative, inductive research will probably be unable to cope with rapidly changing scientific concepts.

Also, the best-laid charts of economic planners go awry when people decide they do not like the jobs for which they have been trained. Soviet students are assigned to a job by the government for two years after graduation, but after that period of service is ended they are relatively free agents. Switching professions is common, and the new profession often has no relationship to the job for which a student was trained in college.

Mirror of Soviet Society

The problems of Soviet universities—particularly the lack of emphasis on creative, independent thinking—are political as well as academic. Scientists, secure in the knowledge that they are essential to the Soviet State, are generally more outspoken than humanities scholars about the deficiencies in their system of higher education. A system that does not allow an Andrei Amalrik to conclude that *Kievan Rus* was influenced by the Normans can also place constraints on scientific research. Foreigners easily forget that Soviet universities, like all institutions of Soviet society, must operate within the framework of one "right answer"—Marxist-Leninist theory as interpreted by current political leaders.

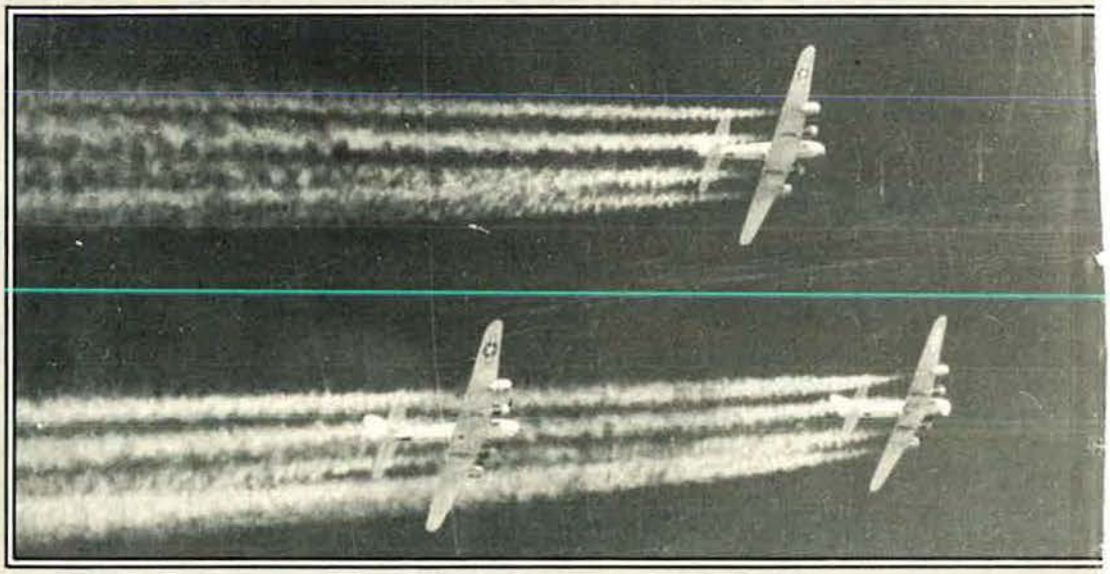
Only fifteen years ago, the Soviet academic and scientific worlds were still held in a devastating grip by the theories of Joseph Stalin's favorite biologist, the charlatan Lysenko. Soviet scholars and scientists died in prison camps for opposing him. Lysenko was finally toppled from his pedestal only in 1965, after years of concerted scientific attacks. Meanwhile, several generations of Soviet students had learned Lysenkoist biology from fearful and compliant faculty members.

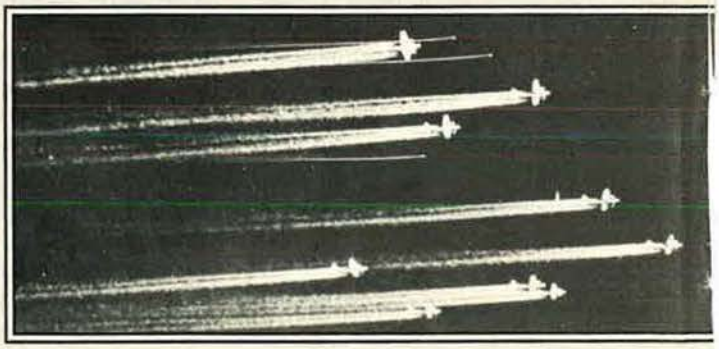
The Soviet university today is a far more open forum for academic discussion and debate than it was in Stalin's day, but the importance of such a repressive heritage cannot be discounted. Part of that heritage is the relative isolation from international contacts that characterizes the scholarly work of both students and professors. Only a small percentage of university faculty have had the opportunity to work or study outside the Soviet Union in areas of the world most pertinent to their academic specialties. Needless to say, undergraduate and graduate students almost never have the opportunity to travel.

In its heritage of isolation and rigidity, the Soviet university merely reflects the basic condition of Soviet society. The possibility of change is inherent in debates within the academic establishment, but such changes are likely to take place only over a period of several decades. It is difficult to determine whether the elite nature of the university system makes change more or less likely. Intellectuals may have the most to gain from change, but they also have the most to lose by sticking their necks out. With such scarcity of opportunity, moral courage must often bow to the necessity of survival, despite the desire for change and a freer intellectual life. ■

Susan Jacoby, now a free-lance writer, covered urban and educational affairs for the Washington Post *in the late 1960s. Miss Jacoby recently spent two years in the USSR with her husband, Anthony Astrachan, then the* Post's *Moscow correspondent. Some of her articles have appeared in* Saturday Review, The New Republic, *as well as in* New York Magazine. *Miss Jacoby's book, "Moscow Conversations: Friendship and Fear," is to be published by Coward, McCann, and Geoghegan.*

Flying Forts in Operation Frantic

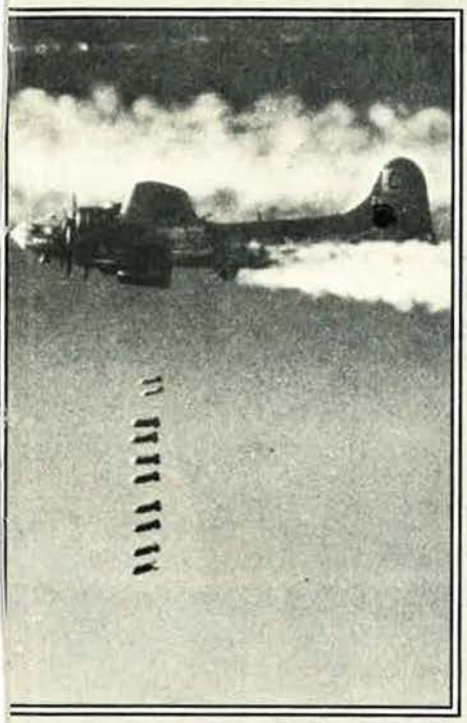




The Germans had moved their factories eastward, out of range for Allied bombers from Britain. To strike at them, B-17s took off from England, hit their target, and continued eastward to land in the Soviet Union. In June 1944, the Luftwaffe caught the Flying Fortresses on the ground at one of the Russian bases—a disaster for the . . .

Shuttle Raiders to Russia

By Glenn B. Infield



AT 0530 hours on the morning of June 21, 1944, 163 Flying Fortresses took off from their Eighth Air Force bases in Great Britain and disappeared into the overcast hanging 400 feet above the runways. These 163 heavy bombers were only a fraction of the task force that took off that morning to attack targets in the area of Berlin, but they were the only ones that were *not* scheduled to return to Great Britain after dropping their bombs. They were assigned to Frantic II, the second mission of "Operation Frantic," one of the most secret military projects of World War II.

Operation Frantic was the code name for shuttle bombing missions by American heavy bombers "shuttling" between their home fields in England or Italy and Russian air bases. Since the early days of the war, USAAF leaders had been attracted by the idea.

The Germans were relocating many of their aircraft plants so far east that they were out of bombing range from the Allied bases, and shuttle bombing would permit attacks on these plants. In addition, shuttle bombing would force the Luftwaffe to assign more fighter units to the eastern front, a vital move in view of the upcoming Allied invasion across the English Channel (already in progress for two weeks at the time of Frantic II). And it would demonstrate to the Soviet Union how eager the US was to help on the eastern front.

President Franklin D. Roosevelt also thought that Operation Frantic, the first direct collaboration between military units of the Soviet Union and the US, would pave the way for better postwar understanding between the two countries.

Target Ruhland

"Gas siphoning from No. 3 main tank!"

Col. Archie J. Old, Jr., commanding officer of the Frantic II task force, glanced out the cockpit window of the lead B-17 as soon as he heard the warning from the waist gunner. One look and he knew instantly that the filler cap was loose, that he would have to land. It was a bitter disappointment. He didn't want anything to interfere with Frantic II being as successful as Frantic I, flown by the Fifteenth Air Force under the command of Lt. Gen. Ira C. Eaker on June 2, 1944. Yet, he had no choice but to land and tighten the filler cap.

After a second takeoff thirty minutes later, Old climbed through the overcast, discovered that his deputy leader had the task force assembled, and was able to take the lead again. At 0707 hours the Frantic II task force left the English coast and headed for the Soviet bases on a flight of 1,441 miles.

Colonel Old checked the formation and smiled. The 45th Combat Wing, composed of the 96th, 388th, and 452d Bombardment Groups, and the 13th Combat Wing, made up of the 95th, 100th, and 390th Bomb Groups, were both veteran units. The near-perfect formation of the B-17s pleased him.

While the Flying Fortresses were climbing to bombing altitude en route to the target at Ruhland, seventy-five miles south of Berlin, the escorting P-51s, led by Col. Donald J. Blakeslee, took off to rendezvous with the bombers.

The colonel's 4th Fighter Group and the 352d Fighter Group had been chosen by Lt. Gen. Carl Spaatz, Commanding General of the US Strategic Air Forces in Europe (USSTAF), to protect the bombers on the long flight to the Soviet Union.

Joining the Frantic II task force just west of the target, Blakeslee and his pilots circled overhead while Old's bombers dropped their high explosives on the synthetic-oil plant at Ruhland with excellent results.

As the B-17s and P-51s continued eastward toward Russia, several German fighters attacked the formation near Bjala, Poland, but the Mustangs drove the Luftwaffe planes off with the loss of one bomber. One P-51 was shot down. After that short skirmish, the Frantic II task force continued eastward, passing near Minsk on their way to the three Russian air bases of Poltava, Piryatin, and Mirgorod.

Achtung!

Col. Wilhelm Antrup, commanding officer of the Luftwaffe's KG 55, was working in his office at the German air base near Minsk at noon on June 21, 1944, when he was interrupted by a lieutenant carrying a teletype message. Looking up, he muttered, "What is it now? More forms to fill out for Berlin?"

"No, Colonel. American heavy bombers have just crossed the eastern front headed for Russia again!"

Antrup shoved the papers on his desk aside and got to his feet. This is what he had been waiting for ever since the B-17s from Italy had landed in the Soviet Union nineteen days earlier and surprised the Luft-

Flying Forts in Operation Frantic

waffe. This time there would be no surprise!

His own KG 55, the "Legion Kondor" (KG 53), commanded by Col. Fritz Pockrandt, KG 27, and KG 4 with its target-marking aircraft had all been moved to Minsk to await another American shuttle mission to Russia. The Luftwaffe was ready.

Touchdown

Colonel Old led his Frantic II task force to 20,000 feet, trying to get over a weather front east of the target area and, with fuel and oxygen running low, managed to get all but eight of the B-17s to the Russian air bases safely. One was shot down and seven more Flying Fortresses made emergency landings on Soviet soil before reaching their destination.

But Old had spotted a single-engine German fighter that paced his task force to the Russian fields, ducking into the clouds whenever Blakeslee's Mustangs tried to attack it. The thought of it still worried Old even after he landed at Poltava, headquarters of USSTAF's Eastern Command. Would the enemy pilot alert Luftwaffe reconnaissance planes?

About the same time that Old led the 45th Combat Wing into Poltava, the 13th Combat Wing landed at Mirgorod and the Mustangs of the 4th and 352d Fighter Groups touched down at Piryatin, the third Russian air base Stalin had made available to Operation Frantic.

At Poltava the Flying Fortresses were dispersed as much as possible on the small field. Fourteen of the planes were parked on the turf at the north end of the air base while the other fifty-nine were spread out in a gentle arc parallel to the western side of the runway. Three B-17s occupied the only blastproof revetments on the field.

High above Poltava, Lt. Hans Mueller maneuvered his Heinkel 177 carefully as he photographed the American heavy bombers parked below. Within an hour the pictures would be in the hands of Willi Antrup and the other Luftwaffe commanders preparing to attack the Russian base that night.

Eat and Run

Old and his flyers received a welcoming reception from the Americans and Russians at the air base and were shown to their temporary quarters. Old was informed by Maj. Gen. Robert L. Walsh, commanding officer of the Eastern Command, that the Russians were giving a dinner that night in Old's honor, and that it would start at 2200 hours.

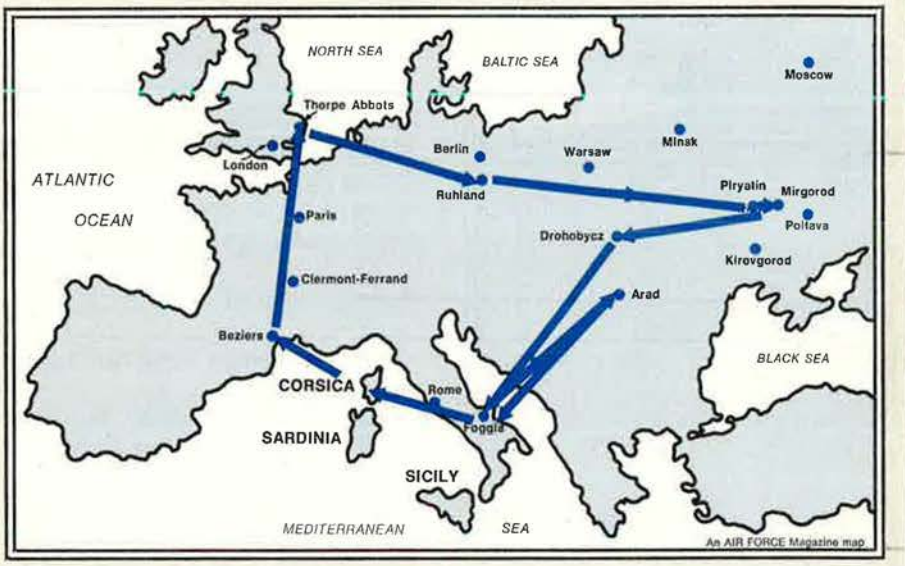
After washing and changing clothes, Old made certain that his men were properly quartered and the bombers were being serviced and repaired. By the time he and Walsh reached the Russian dining hall shortly after 2200 hours, he was hungry and ready for the meeting with the Soviet officials, especially the tall, friendly Russian general, A. R. Perminov, who commanded the Soviet contingent at the air base. At 2335 hours, however, just as Old leaned back in his chair to listen to a joke being told by Walsh, a Russian soldier rushed into the dining room and handed Perminov a message.

"German aircraft have crossed the Russian front lines and are headed toward this area," Perminov explained.

The American officers and the Russian hosts resumed their dinner after the unperturbed Perminov observed that the Luftwaffe no longer came as far east as Poltava.

Antrup and his pilots had taken off from the airfield near Minsk shortly after 2100 hours and, joining with the HE-111s and JU-88s of KG-4, KG-27, and KG-53, had headed directly toward Poltava. The Luftwaffe force of eighty planes crossed the Russian-German front lines during a rain squall at approximately the same time Old heard Perminov read the warning message at Poltava.

Continuing eastward, Antrup discovered that the weather was much better in the target area. Ten minutes away from Poltava, he transmitted a short message to his veteran crew:



With landing fields in Russia, the shuttle raiders could strike at targets in easternmost Germany. Shown here is the route of the 100th Bombardment Group (see page 51), which landed at Mirgorod, then dispersed, escaping a tragedy like that which befell other elements of the task force.

Glenn B. Infield, a former Air Force major, is a combat veteran who has written extensively about flying. He is the author of Unarmed and Unafraid, *the story of aerial photo reconnaissance, and* Disaster at Bari, *which was reviewed in the December issue of this magazine.*

Undeterred by a single Allied fighter, the Luftwaffe pounded Poltava, destroying American aircraft, fuel, and munitions.

"Pilot to crew, prepare for attack!"

When the Russian soldier brought a third warning into the dining hall, Perminov was convinced. "I think we should go to the slit trenches."

Old, Walsh, Perminov, and other American and Russian officers hurried to the slit trenches, reaching them just as the Russian antiaircraft guns around the perimeter of the air base opened fire. Looking upward, Old could see nothing but blackness, but he could hear the sound of planes — many planes. Then, suddenly, a brilliant marker flare lit up the entire base bright as day. Other parachute flares drifted slowly down, directly above the base, clearly outlining the parked aircraft.

"Where are the Red Air Force fighters?" Old called to Walsh.

Not a single Russian fighter was in the sky.

The Luftwaffe Strikes

Above the air base, Antrup maneuvered his HE-111 carefully as his bombardier lined up the Flying Fortresses in his sights. He watched as the bombardier delicately made last-second adjustments, saw the veteran's thumb move slowly over the small, red bomb-release button, and smiled as the thumb firmly pressed the button.

"Bombs are falling!"

The bombing of Poltava began at 0030 hours on the morning of June 22, 1944, and continued unabated until 0145 hours. During this period, Antrup and the other Luftwaffe pilots dropped 110 tons of bombs. Some were high explosives, some incendiaries, some antipersonnel bombs. The antipersonnel bombs were dropped from low altitude after a fifteen-minute lull in the attack.

From 0200 hours until 0220 hours, the German planes renewed the raid on Poltava, dropping "butterfly" antipersonnel bombs and strafing the burning planes, the fuel dump, and the bomb storage area.

Of the seventy-three B-17s and ten other USAAF aircraft on the Russian air base, forty-seven were destroyed or damaged beyond repair; two C-47s and one P-51 were lost; and twenty-nine other US aircraft were damaged.

Antrup's task force also set fire to 254,700 gallons of 100-octane fuel that had been laboriously brought into Russia for Operation Frantic, and destroyed 465 250-pound H.E. bombs, 1,400 100-pound incendiary bombs, and 400,000 .50-caliber cartridges.

So accurate were the Luftwaffe crews that only two Americans were killed during the raid. Flight Officer Joseph G. Lukacek, a B-17 copilot, and Lt. Raymond C. Estle were hit during the second phase of the attack as they tried to take cover behind a brick wall. Lukacek was killed instantly while Estle died later of the wounds he received.

Thirty Russians died, most of them killed by antipersonnel bombs as they rushed to the burning B-17s in a futile effort to extinguish the flames.

The following night, the Luftwaffe attacked Mirgorod, where the planes of the 95th, 100th, and 390th Bombardment Groups had

Maj. Gen. Robert Walsh, commander of Eastern Base Command, US Strategic Air Force, and General Perminov, commander of a Red Air Force fighter group, welcome American aircrews to Russia after a shuttle bombing mission.

Flying Forts in Operation Frantic

landed, but the Flying Fortresses had been dispersed to other Russian airfields. While the planes were saved, nearly 200,000 gallons of

Col. Wilhelm Antrup led his HE-111s, flying from Minsk, as part of the Luftwaffe's eighty-ship strike force.

100-octane fuel were lost during this second attack.

Omens of the Future

The tragedy at Poltava swung the pendulum from elation over the success of Frantic I to the depression of Frantic II—all within the month of June 1944. After nine months of preliminary negotiations, followed by the miracle of delivering equipment, supplies, and personnel to the Soviet Union in a minimum of time under extreme hardship and at a cost of millions of dollars, Operation Frantic faced a crisis that could lead to cancellation of the project.

Old summed it up in a message sent to the headquarters of the 3d Bombardment Division in England shortly after the Poltava raid:

> It is not believed that heavy bomber operations can be successfully carried out from Russia until adequate defenses are installed consisting of night fighters, AA, and radar. Now only two fields are available for the bombers, and the enemy can pound them at will with existing defenses.

Gen. "Hap" Arnold tried to get Stalin to permit stationing a squadron of US night fighters in the Soviet Union to protect the three air bases that the B-17s would use. After a long period of difficult negotiations conducted by Ambassador Averill Harriman, Stalin refused, thus signaling the imminent death of Operation Frantic.

The next two Frantic missions were flown by fighters based in Italy, but they could not do the job of the heavy bombers.

During the Warsaw revolution in August and September 1944, B-17s of the Eighth Air Force flew three more Frantic missions, one a supply drop to the resistance fighters inside Warsaw. That mission, flown on September 18, 1944, was a desperate but not very successful attempt to help General Bor-Komorowski's Home Army, which was fighting the Germans in the city, after Stalin had decided to leave these patriots to their doom.

The Warsaw drop was the last Frantic mission. During the winter of 1944–45, a force of 200 Americans stayed at Poltava to keep the project alive. The following spring, because of the change in the overall war situation in Europe and the Pacific, Washington decided that there was no longer a need for the shuttle missions. The war in Europe ended on May 7, 1945, and on June 22, exactly one year after the disastrous raid on Poltava by the Luftwaffe, the last two planeloads of American personnel and equipment departed Poltava. The project was officially ended.

It was little wonder that after the German attack on Poltava, Gen. Rudolf Meister, commanding officer of the IV Fleigerkorps, sent the following message to Colonel Antrup and his pilots:

> On June 21, 1944, about 1500 hours, American four-motor bomber planes coming from England occupied Soviet airfields. Despite the fact that the units KG 4, KG 53, KG 55, and KG 27 were not alerted until after 1500 hours, these Geschwader succeeded in an exemplary way to be prepared in a short time to conduct an annihilating blow against the American units. After an approach under difficult weather conditions and with exemplary cooperation of target-finder, target-marker, and target-lighter aircraft, the above units attacked with great success. I thank the men of these units and recognize them for their proven bravery.

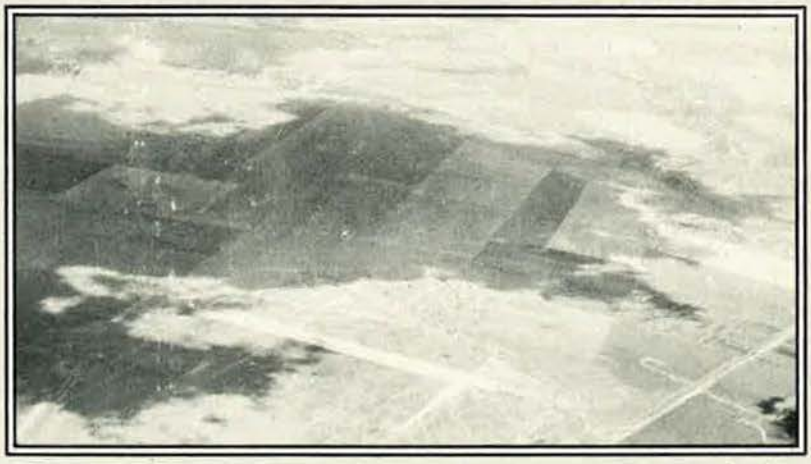
It was one of the Luftwaffe's most successful missions . . . and one of the USAAF's worst tragedies. ■

Reichsmarschall Hermann Goering (second from right) visits Colonel Antrup's KG-55 after the Poltava raid. When the war ended, Goering, then a prisoner, reminisced, "Those were wonderful days."

Flying Forts in Operation Frantic

Not all the shuttle raiders to Russia were caught in the Poltava tragedy (page 46). Some crews put in at Mirgorod, where the sights included a goat with a bra. A veteran recalls the experience of . . .

Stopping Over at Ivan's Airdrome



Six weeks before the 100th arrived, the primitive airfield at Mirgorod (above) had housed a Luftwaffe squadron. After the 100th's arrival, the Russian hosts (below) agreeably pose for souvenir snapshots.

By Lt. Col. Marvin S. Bowman, USAFR (Ret.)

Flying Forts in Operation Frantic

NOBODY at our level ever determined just who dreamed up the shuttle mission from England to Russia. But you might call it a success—depending, of course, on what you were trying to succeed at.

Perhaps the main objective was to convince the Russians that there really was an American Air Force. Apparently the top brass believed that actual contact with the Army Air Force would do something for Russian morale.

Orders went out for a task force of six B-17 groups to fly from England to Russia, thence to Italy, and back home to England, dropping bombs here and there as they went.

We should have realized how screwy the impending mission was to be when the field order came through, for it specified that every officer and airman take along a Class A uniform. One concern of the task force would be to impress the Russians with snappy salutes, the soldierly appearance, and the military proficiency of the Americans. (Some of us wondered why a matter of such delicacy was entrusted to the air arm, which was notoriously deficient in the first two of these attributes.)

The field order also set forth that each group would take along its own intelligence and communications officers, a smattering of medics, and others of the ground echelon needed to organize a return mission from alien soil. I went as S-2, or intelligence officer, of the 100th Bombardment Group, 13th Combat Wing.

Bypassing Big B

It being English midsummer, the morning of our departure, June 21, 1944, was damp, foggy, and depressing. Spirits were low, as is usual at the ungodly hour of dawn, when such enterprises are mounted.

One by one the Forts waddled down the runway at Thorpe Abbots, lifted into the fog, and disappeared.

I was flying in the lead ship with Col. (later Maj. Gen.) Thomas S. Jeffrey, who proceeded to demonstrate how bomb groups manage to get off the ground and assemble when the air is solid fog, 20,000 feet deep.

The answer was electronics. Each group had a truck, which carried a portable broadcasting station that could send a cone-shaped signal upward. As each pilot left the ground, he kept the radio signal constantly on his right. Circling upward, he climbed an invisible spiral staircase around the signal, which consisted of a continuous identifying letter or number. A group that had to land through an overcast simply reversed the process.

After what seemed like an eternity of this terrifying instrument flying (there were five air bases in a five-mile-square area), we suddenly popped into the clear dawn above. As we circled in a five-mile loop, a second plane rose from the mists, then the third. Each, as it reached clear air, cut across the circle to catch up with and take its assigned place in the group formation. And so we set out for Germany at 28,000 feet, with the temperature sixty degrees below zero.

The target for all the bombers except our shuttle crews was Berlin, the most heavily defended spot in all Germany. Nearly 1,000 heavy flak guns ringed the city, and only Hitler knew how many fighters he had available.

No doubt fighters had attacked the head of the 100-mile-long bomber stream as soon as it entered German airspace, but our group was too far back in line to know.

At Kirovgorod, second stop in Russia for the 100th Bomb Group, this American G.I. found time for swimming with new-found friends. Fraternization with allies—especially female allies—was a pleasant adjunct to the mission.

But before long, the horizon darkened, and we were heading for the heart of what appeared to be a huge thunderstorm. Soon the thunderstorm revealed itself in its true form. The black wasn't made up of clouds; it was smoke from bursting flak shells, so thick that, as crews used to report, "you could walk on it."

The sight was no novelty to the 100th airmen. Our group had been the first to hit Berlin by day, and we had a Presidential citation to prove it. But we didn't try our luck over Berlin that day. Our target was a large synthetic-oil refinery at Ruhland, southeast of the German capital. Ruhland was only lightly de-

fended. The gunners were taken by surprise. After all, there was a doozy of a raid going on over Berlin. The only flak they managed to get off was too little and too late, through the flames of the blazing refinery.

The Luftwaffe apparently wrote us off as a lost contingent that could easily be dealt with when we tried to return, alone, to Britain. By the time they realized we weren't intending to return that day, we were over Poland, and nearing the Russian border. So the Germans alerted their squadrons along the Russian front, and waited.

The author, Marvin S. Bowman, was S-2, Combat Intelligence Officer, of the 100th Bomb Group (H), Eighth Air Force, in England, from 1943–45, and took part in the shuttle flight to Russia described in this article. He also served in World War I, in the US Air Service, spending six months overseas with the AEF. He retired from the AFRes in 1955 as a lieutenant colonel. He has had an extensive career in journalism, including work with the Associated Press, the Boston Post, *the Boston* Herald, *the Los Angeles* Herald, *the San Antonio* Light, *and the Boston* Sunday Advertiser. *His home is in Cambridge, Mass.*

Surprise

Three groups of big, slow B-17s must have seemed ideal prey. Fifty miles from the Russian front the enemy fighters jumped us, tearing in head-on from 12:00 o'clock high and level—ripping through our formation with guns blazing. One Fortress in the group ahead folded its wings and went down near Warsaw. The fighters made their turn behind us and prepared for a more leisurely and deadly attack from the rear.

But the Luftwaffe had miscalculated. No Allied fighter had ever flown from Britain to Russia. The Teutonic mind, therefore, had not considered the possibility. The Eighth Air Force had, though. High above us were the P-51 Mustangs, fitted with extra fuel tanks and sent along as our escort. The German radar had not untangled the fighters' blips from those of the bombers.

Suddenly, the air was full of drop tanks, Mustangs, and departing Messerschmitts, with here and there a parachute bearing an indignant member of the Herrenvolk to safety.

After that the fighters left us alone. Strictly.

We had been ordered to cross the Russian lines at 2,000 feet, so that our Slavic allies could identify us easily. Either the Russians were not expecting us on that day, or they didn't believe their own information. Russians and Germans alike spent a happy ten minutes peppering us with machine guns as we crossed the lines.

Once over Russia, the formations let down still further, and cruised to their designated airfields. Our base was at Mirgorod, which, I am told, means "Peacetown." One B-17 wing settled down at Poltava. The fighters had their own field at Piryatin.

The Mirgorod airdrome was a primitive affair that only six weeks earlier had housed a Luftwaffe squadron. We landed with a clatter and crash on steel mat which extended the modest stone runway.

Russians and Ruins

A delegation of Lend-Lease trucks carried us through the town, where interesting sights awaited. First: a woman leading a goat. Not an unusual sight perhaps, but this goat was remarkable in that she was wearing a brassiere—a piece of violet cloth tied over her back and under her udder, to keep it from dragging on the ground.

Along the main street many houses were missing, and the earth at each of these sites was stained a deep red. The Germans, on evacuating, had leveled every brick house, taking the bricks with them when they departed.

A group of workers waved to us, and then returned to their task of restoring to its pedestal a concrete bust of Stalin that the Germans had pulled down and consigned to a ditch.

And, most extraordinary, a file of four women. They were barefoot, gray haired, and singing. They carried on their shoulders a sizable telephone pole.

Our quarters were part of a military installation that, in the old days, had sheltered a regiment of the Czar's cavalry. It boasted two-story barracks.

Officers and men selected bunks, donned their Class A uniforms, and repaired to a tent, where they took full advantage of the regulation providing that aircrews returning from combat be given the comfort of a stiff shot of liquor.

This pleasing ceremony concluded, the 100th lined up for chow. And then occurred one of those heartwarming incidents that the presence of the American G.I. seems to bring about.

Our G.I. contingent, mostly mechanics and radio experts to service the Fortresses, had arrived nearly a week earlier. It was inevitable that they should fraternize with our allies—particularly with the female allies. Our uniformed ambassadors had taught their new comrades a smattering of basic English —enough, at any rate, to give the group's brass a proper welcome.

When the colonel entered the mess tent, he was greeted by a trio of Slavic goddesses, immaculate in uniform, who presided over three G.I. cans containing, in order, beef stew, mashed potatoes, and boiled squash. As each of the ladies ladled a generous helping into the colonel's mess kit, she beamed at him and said clearly:

"F . . . . . K rations, Sir."

The colonel was visibly shaken. No one had the heart—or the Russian—to disillusion the young ladies, who doubtless still believe that they were greeting us with the English version of *na zdrovia* ("good health").

On the Receiving End

The 100th slept soundly that night, but morning brought news. The Luftwaffe had crossed the lines around midnight, and our companion wing at Poltava had been thoroughly bombed, losing, so rumor had it, nearly fifty Fortresses on the ground. *(See accompanying article, p. 46.)*

Flying Forts in Operation Frantic

One American had been killed, but there had been many casualties among the Russians who ran onto the field and attempted to salvage .50-caliber machine guns from the burning planes. (They were said to have wondered why the Americans did not join in these attempts. Answer: The Americans had plenty more guns!)

All during that day, observation planes could be heard circling Mirgorod at high altitude, and it took no second sight to foresee that the 100th could expect visitors that night. Accordingly, the order was given, just at dusk, for the group to seek a more distant airfield.

Most of our planes did so; but the colonel, in turning onto the runway, struck a soft spot in the paving. Our Fortress' wheel sank out of sight. We were at Mirgorod for the night.

We unloaded the ship and mentally kissed the plane farewell. When we returned to the barracks, we found a battalion of women hard at work digging slit trenches. Their foresight was justified.

At midnight the radio warned that Jerry had crossed the lines. Ten minutes later he was overhead, and we were in the trenches. From this vantage, on the slope of a hill, we had a grandstand view of a bombing attack on an airfield—with the added benefit of reasonable immunity.

It was an awesome sight. The German planes, later identified as Junkers 88s, came in at about 10,000 feet in waves of four or five, dropped some of their bombs, then circled for a second try. There were about fifty planes, and the field got a thorough going over. Finally, a giant flare was dropped to let the German cameras record the ruin beneath. The attack was over.

What the cameras recorded was an empty field—empty, that is, except for one lonely, untouched B-17 and several score bomb craters.

The visitors, however, did leave one souvenir before departing: a shower of "butterfly" bombs. Each one, as it fell, hung suspended by a short cable from a spinning propeller, so that the bomb descended slowly, like a whirling maple seed. When the "butterfly" touched earth, it armed itself, and thereafter would explode on the slightest provocation, such as a nearby footfall.

Since the bombs were painted green and the airfield was mostly covered with foot-high grass, the butterflies presented a real problem. But not to the Russians. A horse-drawn mowing machine, preceded by a soldier armed with a twenty-foot pole, set about the sticky task of mowing the field. The man swung the pole before him like a scythe, exploding any bombs within

Colonel Jeffrey (standing, third from left) and the crew of the lead ship. Author Bowman (with sunglasses) is second from right. An attack on Mirgorod imminent, most of the B-17s left for safer fields. A wheel on Colonel Jeffrey's aircraft sank in a soft spot. The lone Fortress was there for the night, but survived the raid untouched.

АМЕРИКАНСКИЕ
ВОЗДУШНЫЕ СИЛЫ

летчик
Capt. Marvin S. Bowman
O-474852

I AM AN AMERICAN.	Я АМЕРИКАНЕЦ.	YA AMERICANYETSS.
I AM HUNGRY.	Я ГОЛОДЕН.	YA GOLODYENN.
I AM THIRSTY.	ХОЧЕТСЯ ПИТЬ.	KHOTCHETSYA PIT.
I AM WOUNDED.	Я РАНЕН.	YA RANYEN.
BREAD . WATER.	ХЛЕБ. ВОДА.	KHLEB . VODA.
SHELTER.	УБЕЖИЩЕ.	OUBEJISTCHYE.
WHERE CAN I HIDE.	ГДЕ МНЕ СПРЯТАТЬСЯ.	GDYE MNYE SPRYATATSSYA.
WHERE IS THE SOVIET FRONT.	ГДЕ СОВЕТСКИЙ ФРОНТ.	GDYE SOVIETSSKY FRONT.
NORTH . SOUTH.	СЕВЕР. ЮГ.	SEVER . YOUGG.
EAST . WEST.	ВОСТОК. ЗАПАД.	VOSSTOK . ZAPADD.
WHERE ARE THE SOVIET AUTHORITIES.	ГДЕ СОВЕТСКИЕ ВЛАСТИ.	GDYE SOVIETSSKYA VLASTY.

The sentences on this card were supposed to get non-Russian-speaking Americans by in an emergency. G.I. ambassadors also taught girls in the mess tent at Mirgorod some English words not included on the card.

reach. Sometimes we heard several blasts in quick succession. Then would come a brief interruption, which signified that the soldier, for obvious reasons, was being replaced. But the field was cleared.

Where Are You Now, Tovarich?

We jacked the colonel's wheel out of its hole, reloaded the B-17, and took off to rejoin our group at Kirovgorod, some hundred miles to the south. The field was a pilot training base for Russians who were to fly the Stormovik attack planes, a form of kamikaze peculiar to the Russian air arm.

The field was commanded by a young two-star general of whose name I was never certain. He was a fine figure of a man, a good six feet two, broad-shouldered, and handsome.

The evening of the second day I became better acquainted with the general. He had flown fighters in Spain, and had picked up bits of French and Spanish. I spoke no Russian, but we were able to communicate.

The general was proud of his country and its army.

"Look at me," he said, "the child of peasants who never were able to write. What chance would I have had in the old days? None. I would have lived and died a beast of burden.

"But now! I am a general in the Red Army. I have the best of education in the army colleges. I am an aeronautical engineer, a designer of planes, and also a fighter pilot. And this my government has done for me."

He was completely sold on the honesty and love of humanity of the Soviets. He told me:

"What a wonderful world we are going to make together after this war ends! No more poverty, no more war, no more disease, ever. Working together we will make a paradise for everyone.

"We know that America is for goodwill, and Russia wants nothing but peace and prosperity for everyone. Together we shall make the world behave."

Where are you now, friend general? And what are your views today on our Brave New World? Disillusioned, no doubt. Liquidated, perhaps, unless you kept your ideas to yourself.

Target-hopping Home

Our stay in Russia continued until June 26. The bombers didn't visit us again, and our next objective was Italy. Our passage was bad news for a synthetic refinery at Drohobycz, Poland. There was no opposition at all, and things went quietly until late in the day, when we were nearing the Adriatic.

The lead group dropped below 14,000 feet, and the 100th, 2,000 feet below, was scraping the mountaintops. No one had warned us that the Germans had planted flak batteries in the mountains, and fate led us directly over one.

Our lowness saved us. We could see the German gunners sprinting for their pits, but heavy flak guns cannot be aimed accurately at fast-moving, short-range targets. The Jerries managed to scare the bejesus out of us, but no one was hit. An hour later we had crossed the Dolomites and part of the Adriatic, and settled down on one of the satellite airfields clustered around Foggia.

While awaiting orders, the 100th paid an official visit on July 3 to a Romanian oil field, at Arad. Bombing was precise, and we suffered no casualties.

Finally we got one new target and our orders home. We took off July 5, on a cloudless morning, and struck off across Corsica for an oil-storage facility at Beziers, in southern France. We found the town calm and serene. No flak was in evidence.

The bombs fell, and huge storage tanks went up in smoke clouds 20,000 feet high. We watched the flames as we headed north toward England.

Ten minutes later we ran into a weather front, and the rest of our trip across France was over a solid undercast, broken only when we passed over Clermont-Ferrand, where four ineffectual flak bursts saluted us. (I took this personally, having been stationed at Clermont for several months during World War I as a daylight bomber pilot.)

Half an hour from the Channel, Col. "Gabby" Gabreski and a flock of American fighters picked us up and escorted us home. We later learned that they had driven off a contingent of ME-109s that was hunting for us.

Once across the Channel, the air was clear—and there was England, green and beautiful.

No veteran of that memorable shuttle expedition was ever again heard to gripe about British quarters, food, traffic, tea, or even that horrible concoction they called coffee.

We discovered we'd been living in a country club all the time! ■

DOMESTIC SCENE AT FORT MYER—CIRCA 1943

Gen. Hap Arnold invited two distinguished wartime journalists, Corey Ford and Alastair MacBain, to his home for dinner. Dinner was late that night in Quarters 8 at Fort Myer, because the General did not get home from his Pentagon office until well after 8:00 p.m. The nerves were a bit frayed and the famous smile was wan. When the entrée was served, the General complained to Mrs. Arnold that he was getting tired of chicken and wished he could have beef. Mrs. Arnold looked at her visitors sadly and said: "Hap doesn't know there's a war on."

—CONTRIBUTED BY DR. MURRAY GREEN, OFFICE OF AIR FORCE HISTORY.

(AIR FORCE *Magazine will pay $10 for each anecdote accepted for publication.*)

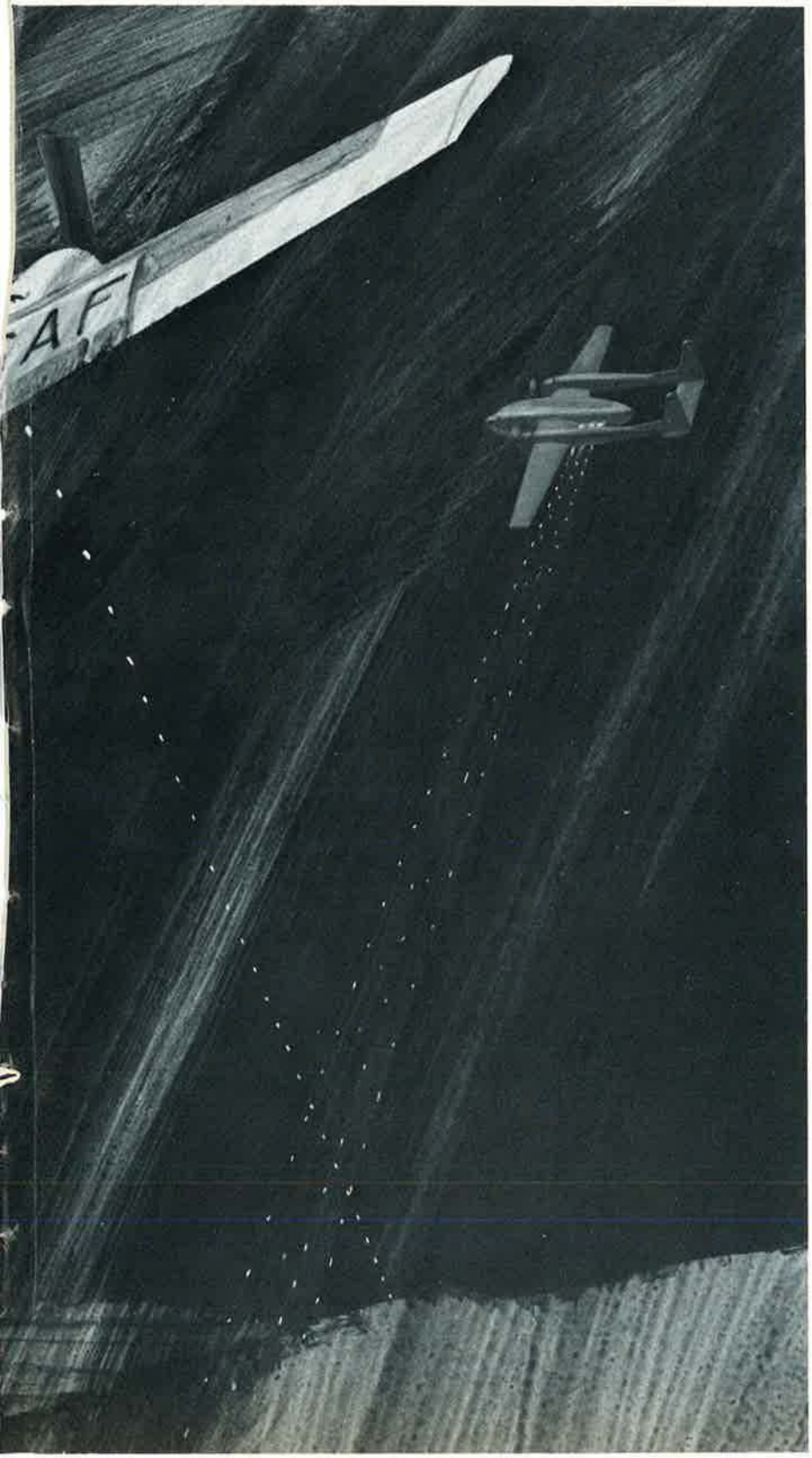
Air War in Vietnam

Enemy mortars and artillery zero in on an Army outpost as the author's C-130 crew works desperately to get a wounded bird off the dirt strip. Not much like the night shows the 1st Air Commando Wing used to put on at Eglin, this . . .

Airshow at Bu Dop

By Maj. Curtis L. Messex, USAF (Ret.)

Illustration by Fred Holz



THE HARD edge of the couch armrest gradually drags me out of my doze. I shift to a more acceptable position and open one eye for a look at my watch. 1730. Long day. Too much coffee, too many old magazines, not enough to do. Wonder if we can bug out early this afternoon. My speculation collapses as the squawk box rasps, "Alert Crew report to Ops."

Damn! Had to happen just before quitting time. Heave off the couch, check the lounge. All bodies are present—one or two awake, watching me. The Assistant Operations Officer walks in as I start for the door.

"There you are. One of our C-130s is down at BuDop with a blown tire. Crew has gone over duty day. The 817 mission is coming in to take you up there. Maintenance is getting their stuff ready. Couple of men will be going with you to change the tire. Okay?"

I check the time again. Even at the best rate of progress it's going to be dark before we get there. BuDop is about 2,900 feet of unlighted dirt, carved out of the jungle near the Cambodian border.

"How about runway lights?"

"Already set up. The Army will have flare pots out."

It's a pretty hot area. A big bird on the ground is a ripe target.

"Air cover?"

"Division has laid on a FAC and a Shadow. Should be there about dark. Got their frequencies right here." He hands me a scrap of paper.

Sounds good. An AC-119 is better than a series of fighters.

"Okay. Crew truck outside?"

"Back shortly. The 817 should be down in twenty minutes."

"Who's the pilot?"

"Umm . . . Robinson, I believe."

What do you know . . . Dave and

I used to be in the 1st Air Commando Wing. Good choice for the job. He and I have landed on flare pots many times. Like for airshows at Eglin. Now it's BuDop for real.

I turn away to roust the crew up and find them clustered behind me, listening hard. "Let's get the stuff out of the lockers. No briefcases or water jugs. We'll go light." A thought. Back to the ops officer. "We should take M-16s for this."

There is an instant of dead silence.

"Right. I'll set it up."

The rat race starts. A minor hitch develops at weapons checkout.

"Only supposed to issue one clip per weapon and ten rounds." I want three, fully loaded and taped together.

"Sarge, where we're going, if we need any, we'll need a lot."

"Yes, sir, but . . . well . . . oh, all right. If you'll sign for it I guess I can do it, but my OIC is going to raise hell."

"I'll sign." What a system! You can have a $3 million airplane with only an implied promise to bring it back, but have to sign your life away for an extra box of ammunition.

817 Rolling

Maintenance has their goodies on a pallet. When the bird is ready, a forklift slips the load on the tail gate. A minute with the chains while Dave cranks up, and then we are on our way. The Saigon airport is already dark as we thunder off runway 25 and make a right turn out. 1845. Took longer than we figured.

Before too long, I spot the flare pots ahead.

"There it is, Dave."

He nods. I watch him go through the checklist as he sets up for a straight-in approach.

The landing is a good one, and Dave wastes no time getting back to the south parking ramp. His loadmaster opens the tail gate and shouts that the cripple is off to the right. We jump out into darkness and stinging, prop-whipped dirt. Fan out, away from the prop wash. A familiar shape looms up against a dark sky. Past its nose another shape with the figure of a man on it. I can see a helmet against the sky.

"Who are you?"

"Perimeter guard—you here for the airplane?"

"Yeah. How many of you out here?"

"Two APCs. Get that mortar magnet outta here, will ya?"

"Soon as we can." Nice to know we have some support. I turn back in time to see our pallet coast off the lighted tail gate and drop to the ground as Dave moves out. Thirty seconds later he is on the roll, blacked out, blue flame streaming from tailpipes. Thunder fades to a deafening silence. A string of red balls floats silently upward northwest of the runway. Jungle noises are starting before the muffled sound of the distant machine gun drifts in. I make a mental note to avoid a left turn after takeoff.

But back to the pallet. The two troops from maintenance and my loadmaster have the tie-downs loose. I give them a hand picking up the wheel.

"Airplane is over there," pointing. "We have an Army perimeter guard. Put your guns on the floor just inside the paratroop door while you work. John, you and George take positions to the front and rear of the bird where you can see anybody coming up from either side. I don't want to get satcheled while we work on the wheel."

We drag the equipment over to the cripple and go to work. I check the forms. Left rear tire flat. UHF radio inoperative. VHF radio weak. Right antiskid inoperative. Left brake lines broken.

Hoisting a Herk

A thin layer of gritty red dirt covers everything. The men outside mutter and curse softly. An urge to whisper seems to have come over everyone.

The hydraulic jack starts protesting squeakily as somebody works the handle up and down in the narrow gap between the belly and the ground. With each swing of the handle, knuckles thump against the ground below and aluminum above. The airplane doesn't move, but the slab of armor plate under the jack gradually sinks into the ground. With a frustrated curse the man on the jack rolls out, nursing his hand, and another takes his place. The irregular beat continues.

I drift out to check my guards. The copilot, young and nervous, is seated by a low stack of pallets.

"How's it going?"

"Slow. The airplane is just starting up."

"Christ! They've been pumping twenty minutes."

"Yeah. Sank the armor plate about three inches and now I think the jack is leaking."

"Oh, boy. They wouldn't send anyone in to pick us up, would they?"

"Nope. We fly it out or spend the night."

Kawhap! The sharp sound is doubly loud against the sudden, momentary silence of the jungle.

"What was that?" The young man is up, M-16 ready, staring into the darkness.

"Mortar. Fairly small, I'd say. Outgoing."

Kawhap! It's from the camp across the runway. A third and fourth sound before the first, distance-softened *whump* drifts back from the north. I move back to the workers. The pumping rate has increased sharply.

The hub cover and antiskid unit are off now. Ready to pull the wheel as soon as we get it off the ground. My engineer rolls out from under.

"Jim, forms say the brake lines are broken."

"Yessir. Tire tore them up when it blew. I just got the pieces off and a cap on the line. Going to give us a problem with the wheel, though."

"How so?"

"We usually set the brakes to hold the brake disk in position when we pull the wheel. Now we'll have to get it lined up by hand while we slide the wheel on."

The mortar adds another string of four and is followed immediately by the lower pitched *kawhump!* of a larger tube. I notice the soft purr of an O-1 circling. No sign of the AC-119 yet.

The wrinkled tire reluctantly crawls up from the dirt. A wrench flashes in the soft yellow beam of a tired flashlight. Two men strain, and the wheel clunks free of the axle. The heavy brake disk hangs for a moment, then clanks down against the puck housing. Underneath the belly the man on the

jack keeps pumping grimly to provide clearance for the inflated tire.

I move out to circle the airplane again. Except for the irregular beat of mortars from the camp, the night is peaceful. Soft night air, insect noises, an occasional bird screeches in the jungle. John is smoking as I walk up behind him unnoticed.

"That cigarette makes you pretty easy to find." It promptly disappears into the dirt.

Back to the wheel well area. A pile of wooden wheel chocks has been placed under the axle and Jim is working on the jack in the beams of three flashlights. Dark hydraulic fluid soaks the dirt.

"Can you fix it?"

"Yessir. I think so."

"Need anything?"

"No, sir." As I straighten up there is a snarling *brrraappp!* and a river of tracers falls out of the sky to the north.

The Shadow Speaks

The AC-119 is here, working on something less than a mile away. He opens up again with his Miniguns and the deadly cascade of fire streams down, disappearing about a thousand feet above the ground as the tracers burn out. A string of tracers floats upward as someone foolishly talks back. There is a ripple in the cascade as Shadow shifts his aim to hose the gun without releasing his trigger. Back talk ceases abruptly.

A couple more long bursts in the darkness, then two soft pops with showers of yellow sparks, quickly changing to the brilliant white of flaming magnesium. Unearthly light floods everything as the flares drift slowly toward us, trailing white streamers of smoke. Shadow finds another target under the merciless glare and fires again. Closer to us.

The mortars pick up their beat, working in rhythm with the gunship, holding their fire as he swings over the camp, firing as he moves away. The impacts can be heard clearly now.

I sit beside John and watch Shadow work. Crickets sing on undisturbed, but the jungle birds are more restless now. Soft, warm night breezes stir faintly. Reminds me of a romantic Fourth of July evening long ago. After a while the jack starts squeaking again, protests for several minutes, stops. More problems? I walk back to see.

In the wheel well three men wrestle with the wheel. The axle is high enough. Somebody crawls underneath to try and hold the brake disk up into position. Low voiced commands sound.

"Watch your hands!"

"You know it."

A sharp *crack!* interrupts the rhythm of the mortars.

"What was that?" somebody asks in a hoarse whisper.

"Incoming. Over in the camp." My voice is low, too.

An authoritative *blam!* joins in.

"Now what?"

"Sounded like a 105 howitzer."

Another voice from the darkness of the wheel well, "This is no place for me. I joined the Air Force."

"As long as they keep their war private, we're all right. How's it going?"

"Can't get the damn ring lined up."

Thirty Minutes

I slide under the belly and find Jim wrestling with the brake disk. "Lemme put a light on it . . . up a little more . . . gimme a screwdriver to hold this side up. . . ." We shove and pry awkwardly, lying in the dirt, lifting the heavy ring into position over our heads so the wheel will slide over it, trying to mesh teeth with notches.

"Try it now . . . hold it . . . back off a little. . . ." The unbelievable perversity of inanimate objects arouses bursts of deeply felt profanity, punctuated explosively by a steadily rising tempo of mortars, artillery, and Miniguns.

"Major, where are you?" It's the copilot's voice.

"Under here. What's up?"

"There's an Army captain out here. Wants to know how much longer. Says they gotta pull back into the camp pretty soon."

"Tell him about ten minutes after we get this blasted ring lined up."

An unfamiliar head enters the dim glow of my flashlight.

"What's the problem?"

I explain. He nods. "Okay. If you haven't gotten out of here by midnight, we'll have to pull you back into the camp."

Midnight? I check my watch . . . good grief, 2330!

"Give 'er another try . . . easy . . . rotate it my way a little. . . ."

A sudden cough of heavy machine-gun fire. Close. Sounds like a .50 from the camp. I catch a glimpse of tracers floating out almost level, then between mortar blasts the crackle of rifle fire.

"That stuff is coming in! Keep the lights down out there." As I say it I realize the flares have us pretty well lighted for anyone interested.

"Come on. Let's get this damn thing together and get out of here."

Long minutes later the stubborn pieces suddenly slide smoothly together. "Hold it. Lemme get my screwdriver out . . . okay, push it on." The wheel slides on with a satisfying clunk. I roll out into harsh flare light, conscious again of the rhythmic blasts of mortars, the intermittent snarl of Shadow's Miniguns, the snap and crackle of small-arms fire.

Shadow is working much closer now. Looks to be just a few hundred feet to the right of the far end of the runway. The small-arms stuff seems to be focused a couple hundred yards over on the far side of our end of the runway. So far nobody seems to have noticed us. About the time one of our engines lights off they'll notice in a hurry.

By the light of the flares I check the taxi route over to the runway, policing up a couple pieces of sharp debris. My guards have moved into the shadows of the plane to keep out of sight. A jeep is sitting under the wing. It's the Army captain.

"How's it going?" he asks as I approach.

"They're buttoning it up. About another five minutes. Better back off when we start winding up the GTC."

"Right . . . and you better be a moving target as soon as *you* can, too."

Turning Three

Four incoming mortars announce their arrival in the camp with sharp explosions.

"Sort of sounds that way, doesn't it?" Back to the wheel well. My engineer and loadmaster are lifting the heavy hydraulic jack into the air-

plane. Last bolts are going into the hub cover. A low-voiced call brings the crew together. "Let's get ready to go."

Into the cockpit. Checklists. The loadmaster stands outside with his long interphone cord.

"How're they doing, Load?"

"About finished, sir. They're fastening the gear door now."

"Okay. Keep them clear of the GTC." To Jim: "Start it."

The gas turbine that provides air to start the first engine moans a rising crescendo, burps, stutters, and wails into full cry. The cat is out of the bag now. As if it were coordinated, darkness falls. Shadow has stopped dropping flares.

"Clear No. 3 engine."

"Clear."

"Turning Three." I mash the starter and listen to the rush of high-pressure air. This is the critical one. If it doesn't light off, we're in trouble. If it goes, it will give us twice the air pressure for starting the others.

No. 3 winds up slowly and hangs for a long, heart-stopping moment before the tailpipe temperature gauge comes to life and the tachometer swoops up to full speed. The airplane quivers with life. Four thousand horsepower waits my bidding with bellowing impatience.

"They all finished?"

"Yes, sir. Everybody's in."

"Button up the GTC and come on in. We'll start Two and taxi. Get the outboards going while I move out." The crew clicks with the precision of a well-practiced football team. I have the big bird moving before the second engine is on speed, trying to call the FAC and Shadow to let them know we are coming. No luck. Both radios are dead. Landing lights show the way to the runway as my copilot and engineer start the outboard engines and race through the checklists.

Before we clear the small ramp area, a jeep and two APCs trail a cloud of dust past the left wingtip, heading for the camp. I swing into position on the runway and douse the lights. The flare pots have long since expired. Another try with the radios. Still nothing. I can tell where Shadow is by his cascades of tracers, but someplace up there is an O-1. All I can do is hope he sees us moving and stays out of the way.

Warm Send-off, Cool Welcome

Hold for a moment until Shadow quits firing across the far end of the runway, then, "Landing lights on. Turn them off and retract when we lift off." Two bright flashes from about where we were parked as I hit the throttle stops and release the brakes. The empty C-130 surges forward up the rise to the middle of the runway. Sharp *whumps!* of concussion from the left. All gauges hold steady. Keep her centered on the narrow, rutted ribbon of dirt. Over the hill—no unpleasant surprises on the runway ahead.

Tracers streaming down just off to the right. Trees standing tall ahead. Ninety knots. Liftoff. Lights out . . . go baby!

Going to be too close to Shadow's line of fire . . . break left, remembering the gun. Scan the blackness. A dim red light—it's the O-1 cockpit lights! We're turning into each other! "Nav lights and beacon on." The O-1 breaks away. "Lights out!" Too late. The gunner on the ridge has us spotted now and we are barely 1,500 feet from him. Tracers reach out, sizzling past on the right as I make a hard left turn, crossing above and to the left as I drop the nose and whip back to the right, falling below as I haul the '130 up into a steep climb. They stop as he loses us in the darkness.

"Pretty sneaky, Major," says somebody on interphone.

"Luck! Let's see if we can raise anyone with the HF radio and have them warn Saigon tower we're coming in without talking to them."

"Right." John goes to work. The engineer advises me that he can't get any cabin pressure—which limits the altitude we can climb to. The navigator reminds me that we will be plowing through active artillery firing unless we can climb. The engineer comes back with a reminder that we have no brakes at all on the left side and no antiskid on the right.

I contemplate the lights of Saigon sparkling sixty miles ahead, throwing a bright glow on the clouds. There are artillery shells arching back and forth through the darkness, but the odds are in our favor. I glance around. Everybody is looking at me, waiting for a decision—and some reassurance.

"No sweat. If they can't hit us on purpose, they sure won't get us by accident—and the brakes won't be any problem."

For some reason they all relax. Such faith. The old man says it's no sweat—so, no sweat. I watch the ground ahead for muzzle flashes and explosions, the weight of six lives leaning a little heavier on my shoulders.

Checklists again. Into the traffic pattern blinking the landing lights. Green light from the tower as we turn final. Ease 'er down on the inside runway, check the speed with reverse thrust and drift slowly into the parking area, babying the remaining brake. A maintenance truck spots us and rushes out, lights flashing, to lead us into a revetment and give us a ride to Operations.

A chair squeaks violently as we come in and an unhappy Operations Officer comes to the counter. "How come you didn't call coming in? We've been sweating you out."

"No radios."

"Oh. What took you so long? We had to change tomorrow's schedule."

"Had a little trouble getting the wheel on. Got pretty interesting up there. Shadow put on a good show."

"Really?" He isn't interested. "We changed you to a 1330 takeoff. Can you make that?" It cuts into our mandatory crew rest time a little so I could refuse, but if I do he'll have to scramble to get another crew set up. One of his drivers is engrossed in a magazine behind the counter.

"I suppose so. How about a ride to quarters?"

He turns away, relieved, glancing at the wall clock. "Bus will be here in about fifteen minutes."

"Right." It takes all kinds. ■

This is the fourth story by Curt Messex, a retired Air Force officer with 1,200 hours of combat time, to be published in AIR FORCE *Magazine. Major Messex now makes his home in Cheney, Wash., where he divides his time between writing and hunting.*

What They're Saying . . .

(From time to time, AIR FORCE Magazine will publish in this space excerpts from speeches pertinent to defense and aerospace matters.)

President Nixon, in his foreign policy message to Congress on February 9:

Last year there were uncertainties in our appraisal of Soviet strategic forces. Some of these uncertainties have now been removed, unfortunately not in a reassuring way. Others remain. At this time last year, it appeared that the Soviets might have slowed and perhaps ceased deployment of land-based strategic missiles. It was hoped that this was an indication of self-restraint. It was not. Since that time, the overall Soviet strategic program has continued to move ahead.

The pause in construction of ICBM silos was apparently related to the introduction of major improvements or the deployment of a totally new missile system. There is evidence that two new or greatly modified ICBM systems are being developed.

Nearly 100 new ICBM silos are being constructed. Some of these silos are for large, modern missiles, such as the SS-9, which, because of their warhead size and potential accuracy, could directly threaten our land-based ICBMs.

The multiple-warhead version of a second ICBM system has already been extensively tested.

An improved submarine-launched ballistic missile is also being perfected, and ballistic missile submarine production has increased significantly. The Soviet Union now has operational or under construction more modern ballistic missile submarines than does the United States. In the near future the USSR will have achieved parity in nuclear-powered ballistic missile submarines, while additionally maintaining some 100 SLBM [submarine-launched ballistic missile] launchers on older submarines.

A new Soviet bomber is being flight-tested.

ABM [antiballistic missile system] construction has resumed around Moscow; new types of ABM radars and ballistic missile interceptor systems are being tested.

In short, in virtually every category of strategic offensive and defensive weapons the Soviet Union has continued to improve its capability. These collective developments raise serious questions concerning Soviet objectives. The Soviet Union is continuing to create strategic capabilities beyond a level which by any reasonable standard already seems sufficient.

It is therefore inevitable that we ask whether the Soviet Union seeks the numbers and types of forces needed to attack and destroy vital elements of our own strategic forces.

Dr. John S. Foster, Jr., Director of Defense Research and Engineering, before the Senate Armed Services Committee on February 17:

The Hardsite Defense Program has continued on schedule through the stage of contract definition, and the selection of a prime contractor for prototype development is expected in the first half of this calendar year.

I should remind you that Safeguard is being deployed at Minuteman sites to protect against the Soviet ICBM threat as we think it will develop during the mid-1970s. We are continuing work on the Hardsite Defense prototype demonstration so that we can provide additional improved protection for Minuteman, if required, to counter an advanced Soviet threat. This program is being designed to meet possible Soviet threats that may develop later in the period and are too difficult for Safeguard alone to handle. Hardsite Defense involves the use of more interceptors (modified Sprints) and specially designed radars to handle heavier attacks at minimum cost.

Secretary of Defense Melvin R. Laird, before the House Armed Services Committee, on January 25:

Our current airborne command system is severely deficient in survivability and capacity and cannot fulfill our essential needs in the event of nuclear attack on our country. It lacks the survivable secure communications needed for control and execution of the forces, the long endurance, the space for sufficient high-level staff to support the President, and the space for the battle staff and equipments which provide the information needed to make decisions.

Earliest possible correction of deficiencies is essential. We believe that by moving vigorously now we can greatly improve our command and control posture by early 1975. To achieve this goal, the first steps are to acquire aircraft with the size and endurance needed and to initiate acquisition of the new onboard facilities.

To perform the command and control job, a total fleet of seven AABNCP aircraft is needed. We are requesting $113.8 million in FY 1972 to purchase the first four Boeing 747 aircraft. Our present plan is to purchase two more aircraft in FY 1973 and one aircraft in 1974 to achieve early correction of our deficiencies. The initial aircraft will provide some important improvements in our capability by 1973. Three of these first four aircraft will use the existing EC-135 electronic equipment and the fourth will be used for a special Electromagnetic Pulse Test Program and as a test-bed for the development and operational testing of those new equipments which will be needed. By providing a larger, more capable aircraft, even with the present electronic equipment, we will be able to obtain greater endurance, more flexibility, larger battle staffs, a larger group of varied experts to support top-level decision making, and additional space to put improved communications and automatic data processing as it becomes available.

Secretary Laird before the Senate Armed Services Committee on February 15:

Here at home, I foresee a new order of Total Force application with regard to protection of sea lanes and sea surveillance. We are at work on plans in which the Air Force would share with the Navy some of the responsibility for our deterrent posture at sea. If, for example, B-52s can be employed with great effectiveness in a tactical ground support role in Vietnam—a task for which this aircraft was not originally intended—then there is no reason why the Air Force cannot be assigned some major responsibilities for control of the seas. ■

The Bulletin Board

AFA's Military Manpower, Junior Officer Advisory, and Airmen Councils met concurrently in February and heard Pentagon briefings on personnel topics, including possible changes in retirement and survivor benefits and social actions.

Retired Pay and Recomp

The military retired payroll is high, and headed higher. If the present system continues, the cost—not counting disability retirement pay—will grow to more than $17 billion a year by the end of the century.

This, plus the changing nature of military retirement, led to White House appointment of an Interagency Committee to study the matter and recommend changes. No legislative proposal based on the Interagency Committee report *(see "The Bulletin Board," February '72 issue)* has been sent to Congress yet, but it has already become a heated issue among both active-duty and retired servicemen.

Army Maj. Gen. Leo E. Benade, DoD Manpower and Reserve Affairs, led a team of briefers who discussed the controversial proposal, which is still being reviewed by the Pentagon.

The present retirement system, General Benade said, is based on Civil War vintage laws. Prior to World War II, military service was usually a lifetime career, with most officers retiring at age sixty-five. In recent times, though, the nation's need has been for a younger as well as a larger military force. Some servicemen are only thirty-seven when they hang up their uniforms. The extended period these younger retirees will remain on the retired payroll, along with the growing number of them, has swelled the cost of the military retirement system. For most, military service has become the first part of a two-career lifetime, and during that second career their retired pay serves as an income supplement rather than as an old-age annuity.

Furthermore, the committee held, individuals with only slightly different retirement dates often end up with markedly different annuities, because retired pay is computed on terminal base pay. The retiree who leaves service immediately after a pay raise gets the advantage of it, while one who leaves immediately before does not. By contrast, civil service retirement pay is based on an average of the three years during which wage earning was highest.

The first three WAF ever to join the Nebraska Air National Guard—Lesli Doughty, Chris Sherman, and Jody Urbauer—are congratulated by Gov. J. J. Exon following their enlistment. After basic training and tech school, the three WAF will return to the Guard unit at Lincoln with duty in the administrative field.

Since 1957, members of the military services have been covered by Social Security, and the government, as their employer, matches their contributions to Social Security during their active-duty years. Thus, the committee felt, the government has already contributed to a retiree's old-age income, and these Social Security contributions should be taken into account in deciding on fair retirement benefits.

As for Reserve retirees, the committee felt that benefits to them are presently more generous than necessary to attract and retain sufficient manpower. While a Reservist's retired paychecks do not begin until age sixty, his annuity is based on pay scales in effect then, not years ago when he actually retired.

The committee recommended sweeping changes in both the nondisability and Reserve retirement systems.

Nondisability retirement payments would be reduced in three ways: a smaller annuity during the retiree's second career years; computing his annuity on the average of his three years of highest pay rather than on his terminal pay; and integration of Social Security and retirement benefits. (Reductions would go into effect very gradually—as is explained further on.)

Under the proposal, retirees would not begin drawing their full annuity until they reach an "old-age threshold"—age sixty for those retiring with less than twenty-five years of service, age fifty-five for retirees with more than that. In the interim, their annuity would be reduced by two percent for each year they were below the old-age threshold at the time of retirement. For example, an individual retiring at age forty would receive sixty percent of his full annuity until he is sixty years old, and the full amount after that.

Another Look Ordered

At presstime, Defense Secretary Melvin R. Laird has just convened a new committee to look again at the retirement situation and the Interagency Committee report, and come up with new recommendations by March 31.

Assistant Secretary of Defense Roger Kelley chairs the new committee, and each service is being represented by its Assistant Secretary for Manpower and Reserve Affairs, as well as by its Deputy Chief of Staff for Personnel.

The formula for calculating retirement annuities would change, too. At present, retirement pay is the multiple of two and a half percent of terminal basic pay, times years of service up to thirty. This works out to retiring at half pay after twenty years, and runs to a maximum of seventy-five percent after thirty years. The committee recommended a varied multiple: two and a half percent for the first twenty-four years; three percent for years twenty-five through thirty; and two percent for each year of service from thirty-one through thirty-five. This new formula would also apply to Reserve retirements.

Also, the annuity would be based on the retiree's average income during his three years of highest pay while on active duty—normally, the last three—rather than the wage he was earning on the date he retired. The committee report noted that this formula is generally more liberal than that used in most nonfederal retirement plans.

Under the committee proposal, military members would continue under Social Security, but when benefits become payable, they would be integrated with military retirement pay. The retiree would receive a full paycheck from Social Security, but an amount equal to the part of that paycheck attributable to federal contributions on his behalf would be deducted from his military retirement pay.

A Reservist's annuity would be based on an average of his three years of highest pay before he entered the retired Reserve—not on pay scales in effect when he begins drawing his annuity, as now. The committee, however, did not recommend integration of retirement and Social Security benefits for Reservists. The government is not the Reservist's primary employer during his working life, so very little of his Social Security income is attributable to federal contributions.

The Interagency plan would add some features not found in the present retirement system, including benefits for veterans with at least ten years' service, but not enough for full retirement.

An active-duty serviceman separating between his tenth and nineteenth years would get his choice of (a) a lifetime annuity, beginning at age sixty, of two and a half percent of his "high three" basic pay times years of service; or (b) a lump-sum settlement of five percent of his terminal annual basic pay times years of service. A Reservist with between ten and nineteen years would automatically get the lump-sum payment.

Maj. Robert E. Frank, a member of AFA's Military Manpower Council, has been selected by the Columbus, Ohio, Jaycees as one of their Ten Outstanding Young Men of the Year.

At present, Reservists cannot receive their annuities earlier than age sixty. Under the Interagency plan, Reservists with at least twenty-five years of creditable service could receive full annuities at age fifty-five. Any retiring Reservist could opt for an actuarially reduced annuity as early as age fifty, or for lump-sum settlement.

All benefits under the Interagency plan would be adjusted according to the Consumer Price Index (CPI).

Written into the plan are "save pay" and transition clauses. "Save pay" means that no retiree will receive a lesser dollar amount in benefits than any similar serviceman who retired before him.

No reduction will be applied to the amount an individual already retired is receiving; instead, the new system would come into effect by phases for new retirees. The transition period would be the span of time encompassing the next ten pay raises after implementation of the plan. For those retiring before the first of those raises, there would be no change. Those retiring after the first raise but before the second would have their annuity reduced by one-fifth of one percent for each year they are under the "old-age threshold," And so it would go on, an additional one-fifth of one percent reduction applied to new retirement annuities after each raise, until the full two percent reduction is reached after the tenth raise.

Only those federal contributions made to Social Security *after* enactment of the new plan would be subject to integration with retirement benefits. Additionally, only pay tables in effect after enactment would be used in calculating the "high three" base.

Two other proposals from the Interagency report—survivor benefits and recomputation—are receiving considerable separate attention.

A retiring military member already has the option of bequeathing a part of his retired pay to survivors under the Retired Serviceman's Family Protection Plan (RSFPP). Over the years, though, only about fifteen percent of all retirees have done so, mainly because the cost is high. The Interagency Committee suggested a low-cost survivorship plan, which in most respects parallels H.R. 10670—the "Widow's Equity" bill—now before the Senate. *(See "The Bulletin Board," January '72 issue.)*

Recomputation—or updating all retired pay to the current pay scales each time the active-duty force gets a raise—has been a volatile issue ever since 1958, when Congress stopped the practice and instituted adjustment of retired pay by the Consumer Price Index (CPI) instead. The Interagency Committee recommended a one-time recomputation, effective at age fifty-five for retirees with at least twenty-five years of service, and at age sixty for those with less service.

Hopes for recomputation—one-time or otherwise—now appear dead. In a letter prepared to answer correspondence he receives about recomp, Rep. F. Edward Hébert, Chairman of the House Armed Services Committee, wrote:

". . . Let me assure you that I was correctly quoted in the press when I stated that, in my view, no recomputation proposal had any prospect of passage in the Congress. I am quite aware that many members of the military retired community would prefer to hear me say otherwise. However, I would be doing a disservice not only to all retired military members but also to my constituents if I were less than honest and forthright on this vital issue.

"The political and practical realities of this problem simply preclude the type of legislative action urged by the military retired community. . . .

"Many members of Congress are of the view that the existing military retirement system is, in fact, much too liberal. This view is predicated upon a growing awareness of the immense and burgeoning cost of military retirement. Thus, it is utter folly to believe that the Congress would reinstitute the recomputation principle

in military retired pay when such action would not reduce future military retired pay costs but would actually add billions of dollars to the cost of the unfunded military retirement system."

Social Actions

Col. David Thompson, Chief of the newly created USAF Social Actions Division, told the three AFA Councils how the Air Force is approaching contemporary problems like drug and alcohol abuse, racial disharmony, unequal opportunity or treatment, and alienation from the military.

Social actions officers and airmen specialists are now authorized at every base in the Air Force, he said, and bases with a thousand or more people are to have at least one full-time race-relations expert.

The new office's stock in trade includes information, instruction, and referral service—as well as providing a channel of communication when normal channels fail. The Social Actions office, however, is not an agency that competes with the local commander.

"Up to this time," Colonel Thompson said, "a commander has had specialists to deal with the mission and specialists to deal with support activities, but he has had no specialist to help with social problems."

Although the Social Actions office will be responsive to all, it is responsible to the commander, reporting directly to him.

Air Charter Service

The Airlift Panel of the House Armed Services Committee has concurred with the stated intention of the Civil Aeronautics Board to limit military air charter service between the United States and Europe. *(See "The Bulletin Board," January '72 issue.)*

At present, these charter flights are available to active-duty military people, DoD civilian employees, Reservists, Guardsmen, and retired military. The CAB proposed that flights continue only for active-duty military members stationed overseas and their immediate families.

The congressional panel agreed with the CAB that charter flights should be limited to those based outside the United States, but recommended that overseas DoD employees and their families be included.

AFA had earlier communicated to the panel its position that the charter service should be allowed to continue essentially in its present form.

Brig. Gen. William W. Spruance, ANG, is new chairman of the Board of Trustees, Embry-Riddle Aeronautical Institute, Daytona, Fla. He is a long-time member of AFA's Board of Directors, and previously headed the AFA Air National Guard Council.

Resolutions Accepted

The Air Force has agreed to two policy resolutions passed by AFA at its Convention last fall. USAF reports that it "concurs with your recommendation that the Outstanding Airman of the Year Ribbon be changed to a medal with precedence above the Air Force Good Conduct Medal." Secondly, the Air Force has concurred in the recommendation that the Chief Master Sergeant of the Air Force be a member of the Air Force Aid Society Board of Trustees. The proposal will be put to the trustees at their meeting in May.

New Major Generals

PROMOTIONS: To be **Major General:** James R. **Allen;** Lew **Allen,** Jr.; James A. **Bailey;** Benjamin N. **Bellis;** Charles I. **Bennett,** Jr.; Jonas L. **Blank;** Frederick C. **Blesse;** Marion L. **Boswell;** John J. **Burns;** Kenneth R. **Chapman;** Harold E. **Collins;** Peter R. **DeLonga;** Frank W. **Elliott,** Jr.; Walter T. **Galligan;** John F. **Gonge;** James V. **Hartinger;** James E. **Hill;** Roger **Hombs;** Eugene L. **Hudson.**

William A. **Jack;** Daniel **James,** Jr.; Warren D. **Johnson;** Oliver W. **Lewis;** George G. **Loving,** Jr.; Jessup D. **Lowe;** Leroy J. **Manor;** Otis C. **Moore;** Charles C. **Pattillo;** Cuthbert A. **Pattillo;** John W. **Pauly;** Bryce **Poe** II; Edward **Ratkovich;** Donald H. **Ross;** Bryan M. **Shotts;** Lawrence W. **Steinkraus;** Kenneth L. **Tallman;** Walter R. **Tkach;** Vernon R. **Turner.**

Senior Staff Changes

B/G Arnold W. Braswell, from Dep. Dir., Force Development, D/Plans, to Dep. Dir., Plans, DCS/P&O, Hq. USAF, replacing B/G Edmund B. Edwards . . . **B/G James M. Fogle,** from Asst. DCS/Ops, NORAD/CONAD, Ent AFB, Colo., to Cmdr., 20th NORAD/CONAD Region, with add'l duty as Cmdr., 20th Air Div., Ft. Lee AFS, Va., replacing M/G Jack K. Gamble . . . **M/G Jack K. Gamble,** from Cmdr., 20th NORAD/CONAD Region, with add'l duty as Cmdr., 20th Air Div., Ft. Lee AFS, Va., to Cmdr., 25th NORAD/CONAD Region, with add'l duty as Cmdr., 25th Air Div., McChord AFB, Wash., replacing retiring M/G Archie M. Burke . . . **B/G Eugene W. Gauch, Jr.,** from C/S, Hq. TAC, Langley AFB, Va., to Cmdr., 834th Air Div., TAC, Little Rock AFB, Ark. . . . **M/G George J. Keegan, Jr.,** from DCS/P&O, Hq. AFLC, Wright-Patterson AFB, Ohio, to ACS/Intelligence, Hq. USAF, replacing retiring M/G Rockly Triantafellu.

Col. (B/G Selectee) John R. Kelly, Jr., from Cmdr., 42d Bomb Wing, SAC, Loring AFB, Me., to Cmdr., 93d Bomb Wing, SAC, Castle AFB, Calif. . . . **Mr. Edward C. Killin,** from Dep. Dir., Dependent Schools, European Area, GS-15, Hq. US Army, Europe, Karlsruhe, Germany, to Dir., Pacific Overseas Dependent Schools, GS-16, Hq. PACAF, Hickam AFB, Hawaii . . . **M/G Jerry D. Page,** from Cmdr., Sheppard TTC, to Asst., Cmdr., ATC, Sheppard AFB, Tex. . . . **M/G Robert L. Petit,** from DCS/Ops, Hq. PACAF, Hickam AFB, Hawaii, to Cmdr., Sheppard TTC, ATC, Sheppard AFB, Tex., replacing M/G Jerry D. Page . . . **M/G James L. Price,** from DCS/Ops, Hq. ADC, Ent AFB, Colo., to Cmdr., 21st NORAD/CONAD Region, with add'l duty as Cmdr., 21st Air Div., Hancock Field, Syracuse, N. Y. . . . **B/G Edward Ratkovich,** from Dep. ACS/Intelligence, Hq. USAF, to Dir., J-2, US European Command, Vaihingen, Germany.

RETIREMENTS: B/G Cleo M. **Bishop;** M/G Archie M. **Burke;** B/G Arthur W. **Cruikshank,** Jr.; B/G John A. **Des Portes;** B/G Thomas B. **Kennedy;** M/G John W. **Kline;** M/G David I. **Liebman;** B/G George K. **Sykes;** M/G Rockly **Triantafellu.** ■

JANE'S

ALL THE WORLD'S AIRCRAFT SUPPLEMENT

MiG-21MF single-seat fighter (Tumansky RD-11-300 turbojet engine) (French Air Force photo)

MiG
ARTEM I. MIKOYAN, USSR

When Marshal Pavel Stepanovich Koutakhov, Commander in Chief of the Soviet Air Forces, paid a five-day official visit to France in September 1971, his Aeroflot Tu-124 transport was escorted on the last stage of its flight by six MiG-21MF fighters. They remained at Reims air base (No. 112) throughout the Marshal's stay, and contributed formation and solo performances to an air display in which French Vautour and Mirage fighters also participated.

This provided the first opportunity for close inspection and photography of the latest production version of Russia's standard fighter aircraft, which has been in service with Soviet squadrons in Egypt since 1970.

MiG-21
NATO Code Names: "Fishbed" and "Mongol"

The Soviet design bureau that was led by the late Colonel-General Artem I. Mikoyan developed the MiG-21 air superiority fighter on the basis of experience of jet-to-jet combat between MiG-15s and US aircraft during the war in Korea. The emphasis was placed on good transonic and supersonic handling, high rate of climb, small size, and light weight, using a turbojet engine of medium power, in contrast with the heavier and much more powerful Sukhoi Su-7 and Su-9 fighters that were developed simultaneously. The first versions of the MiG-21 were, therefore, day fighters of limited range, with comparatively light armament and limited avionics. Subsequent development of the type has been aimed primarily at improvements in range, weapons, and all-weather capability.

The prototype MiG-21 flew for the first time in 1955, and the fighter made its public debut during the fly-past in the Soviet Aviation Day display at Tushino Airport, Moscow, on 24 June 1956. The initial production version (NATO "Fishbed-A") was built in only limited numbers, with a Tumansky RD-11 turbojet engine rated at 8,600 lb (3,900 kg) st dry and 11,240 lb (5,100 kg) st with afterburning, and with an armament of two 30 mm NR-30 cannon. Meanwhile, the Soviet Union had been developing a small infra-red homing air-to-air

missile, designated K-13 (NATO "Atoll") and generally similar to the US AIM-9B Sidewinder 1A. Underwing pylons for two K-13s were fitted on the MiG-21F, the suffix "F" standing for *Forsirovanny* (boosted) and indicating that this model also had a slightly more powerful turbojet. To make room for avionics associated with the missiles, the port NR-30 cannon was removed and its blast-tube fairing on the lower fuselage was blanked off. Further details of this and subsequent versions of the MiG-21 are as follows:

MiG-21F ("Fishbed-C"). First major production version. Short-range clear-weather fighter, with radar ranging equipment and a Tumansky RD-11 turbojet rated at 9,500 lb (4,300 kg) st dry and 12,500 lb (5,670 kg) st with afterburning (designation of engine given in Soviet press statements as TDR Mk R37F). Two underwing pylons for UV-16-57 pods, each containing sixteen 57 mm rockets, or K-13 air-to-air missiles, and one NR-30 cannon in starboard side of fuselage. Under-fuselage pylon for external fuel tank. Small nose air intake of approximately 27 in (69 cm) diameter, with movable three-shock centre-body. Under-nose pitot boom, which folded upward on the ground to reduce risk of ground personnel walking into it. Transparent blister cockpit canopy which hinged upward about base of integral flat bullet-proof windscreen. Transparent rear-view panel aft of canopy at front of shallow dorsal spine fairing. Large blade antenna at rear of this panel, with small secondary antenna mid-way along spine. Small forward-hinged air-brake under fuselage, forward of ventral fin, two further forward-hinged air-brakes, on each side of under-fuselage in line with wing-root leading-edges, integral with part of cannon fairings. Brake-parachute housed inside small door on port underside of rear fuselage, with cable attachment under rear part of ventral fin. Semi-encapsulated escape system, in which canopy was ejected with seat, forming shield to protect pilot from slipstream, until the seat had been slowed by its drogue chute.

MiG-21PF ("Fishbed-D"). Basic model of a new series of operational versions with forward fuselage of less-tapered form. Intake enlarged to diameter of approximately 36 in (91 cm) and housing much larger centre-body for search/track radar (NATO "Spin Scan") to enhance all-weather capability (designation suffix letter "P", standing for *Perekhvatchik*, is applied to aircraft adapted for all-weather interception from an earlier designed rôle). Remainder of airframe generally similar to that of MiG-21F, but pitot boom repositioned above air intake; cannon armament and fairings deleted, permitting simplified design for forward air-brakes; larger main wheels and tyres, requiring enlarged blister fairing on each side of fuselage, over wing, to accommodate wheel in retracted position; dorsal spine fairing widened and deepened aft of canopy, and rear-view panel deleted; primary blade antenna repositioned to mid-spine and secondary antenna deleted. Uprated RD-11 turbojet, giving 13,120 lb (5,950 kg) st with afterburning. Prototype shown at Tushino in 1961 had dummy metal centre-body. Production aircraft in service with many air forces.

"Fishbed-E". Basically similar to "Fishbed-C", but with broader-chord vertical tail surfaces, achieved by extending the leading-edge of the fin forward about 18 in (45 cm). Small dorsal fin fillet eliminated. Parachute-brake repositioned into acorn fairing at base of rudder, above jet nozzle.

MiG-21PFM ("Fishbed-F"). Later production variant of MiG-21PF, the suffix letter "M" indicating a modification of an existing design. Additional refinements, including broad-chord vertical tail surfaces and repositioned parachute-brake as on "Fishbed-E"; new sideways-hinged (to starboard) canopy and conventional windscreen quarter-lights; simple ejection seat instead of semi-encapsulated type; and large dielectric portion at tip of tail-fin. Aircraft of this series in service with the Czechoslovakian Air Force are referred to by the designation MiG-21SPS, the suffix standing for *Sduva Pogranichnovo Sloya* and indicating use of a flap-blowing system which reduces the normal landing speed by some 22 knots (25 mph; 40 km/h).

MiG-21FL. Export version of MiG-21PF series. Some built under licence in India by Hindustan Aeronautics Ltd, with an airframe factory at Nasik, Bombay, and a turbojet factory at Koraput, Orissa.

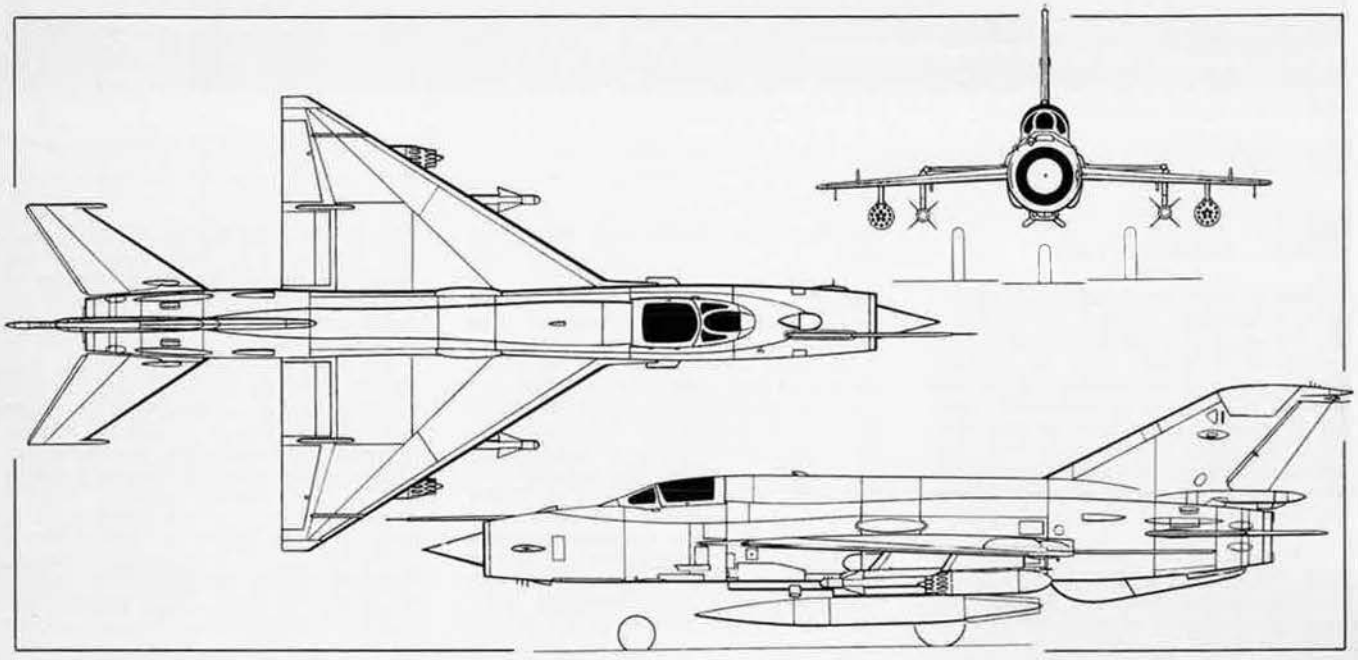
Analogue. Based on a standard MiG-21PF airframe, this aircraft was fitted with a scaled-down replica of the "ogee" delta wing of the Tu-144 supersonic transport, for aerodynamic flight testing and development before the Tu-144 prototype was completed. It had no horizontal tail surfaces. As a result of its several dozen research flights, modifications were made to the full-size wing. One only.

"Fishbed-G". Experimental STOL version of MiG-21PF, with a pair of vertically-mounted lift-jet engines in lengthened centre-fuselage. Demonstrated in the air display at Domodedovo in July 1967, and described and illustrated in the 1970–71 *Jane's*. Prototype only.

"Fishbed-H". Reconnaissance version, basically similar to "Fishbed-J". Equipment usually includes an external pod for a forward-facing or oblique camera, or ECM devices, on fuselage centre-line pylon. Suppressed antenna at mid-fuselage and optional ECM equipment in wingtip fairings.

MiG-21MF ("Fishbed-J"). Latest multi-rôle version of MiG-21 identified in large-scale service. Equips Soviet Air Force units at home and in Egypt, and is also used by Czech Air Force. Basically similar to MiG-21PFM but with deeper dorsal fairing above fuselage, giving straight line from top of canopy to fin. This may contain additional fuel tankage. Pitot tube remains above air intake but is offset to starboard. Two short 23 mm cannon, each with 100 rounds, in shallow under-belly pack, with splayed cartridge-ejection chutes to clear each side of centre-line store. Four underwing pylons, instead of usual two, for a variety of ground attack weapons and stores, as alternative or supplementary to K-13 air-to-air missiles. Able to carry two underwing fuel tanks in addition to standard under-belly tank, which is interchangeable with a 23 mm gun pack. This gun pack is carried by aircraft of this sub-type built under licence in India. Uprated Tumansky RD-11-300 turbojet, SPS flap-blowing system, JATO attachments on each side of rear fuselage, small rear-view mirror above cockpit canopy, debris deflector beneath each suction relief door forward of wing-root, and small boat-shape fairing with angle-of-attack indicator on port side of nose.

MiG-21MF multi-rôle fighter, with two K-13 missiles and two UV-16-57 rocket packs on underwing pylons. Centre-line drop-tank shown in side view only (Pilot Press drawing)



"Mongol". Two-seat training versions. Initial version, sometimes referred to as "Mongol-A", is generally similar to the MiG-21F but has two cockpits in tandem with sideways-hinged (to starboard) double canopy, larger main wheels and tyres of MiG-21PF, one-piece forward air-brake and pitot boom repositioned above intake. Cannon armament is deleted. Later models, sometimes called "Mongol-B", have the broader-chord vertical tail surfaces and under-rudder parachute-brake housing of the later operational variants, with a deeper dorsal spine and no dorsal fin fillet.

Alternative designations, allocated by the Soviet authorities to MiG-21s used to set up FAI-recognised international records, are as follows:

E-33. This designation has been applied to training versions of the MiG-21 ("Mongol") used to establish women's records. Those confirmed by the FAI include an altitude of 79,842 ft (24,336 m) set up by Natalya Prokhanova on 22 May 1965, and a sustained altitude of 62,402 ft (19,020 m) in horizontal flight established by Lydia Zaitseva on 23 June 1965.

E-66. Aircraft basically similar to MiG-21F, used by Col Georgi Mossolov to set up a world absolute speed record (since beaten) of 1,288.6 knots (1,484 mph; 2,388 km/h) over a 15/25 km course on 31 October 1959. Engine described as a 13,120 lb (5,950 kg) st Type TDR Mk R37F turbojet.

E-66A. Variant of E-66 used by Mossolov to raise the world height record to 113,892 ft (34,714 m) on 28 April 1961, from Podmoskovnoe aerodrome. Powered additionally by a 6,615 lb (3,000 kg) st GRD Mk U2 rocket engine in under-belly pack, exhausting between twin ventral fins. Other changes compared with then-standard operational model included a widened dorsal spine and repositioned blade antenna, as standardised for the MiG-21PF, and a blister fairing above the nose. This aircraft demonstrated its high rate of climb, under rocket boost, at the 1961 Tushino display.

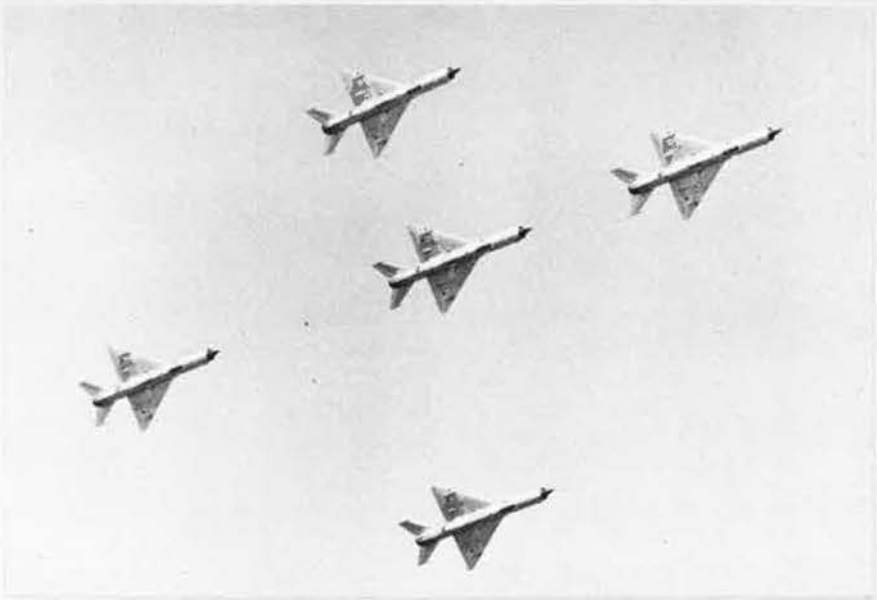
E-76. Designation allocated to apparently-standard MiG-21PFs used by Soviet women pilots to establish international records. Those confirmed by the FAI are for a speed of 1,112.7 knots (1,281.27 mph; 2,062 km/h) over a 500-km closed circuit by Marina Solovyeva on 16 September 1966; a speed of 485.78 knots (559.40 mph; 900.267 km/h) over a 2,000-km closed circuit by Yevgenia Martova on 11 October 1966; a speed of 1,148.7 knots (1,322.7 mph; 2,128.7 km/h) over a 100-km closed circuit by Miss Martova on 18 February 1967; and a speed of 700.5 knots (806.64 mph; 1,298.16 km/h) over a 1,000-km closed circuit by Lydia Zaitseva on 28 March 1967.

MiG-21s have been supplied to the Afghan, Algerian, Bulgarian, Chinese, Cuban, Czech, Egyptian, Finnish, East German, Hungarian, Indian, Indonesian, Iraqi, North Korean, Polish, Romanian, Syrian, North Vietnamese, and Yugoslav Air Forces. The Egyptian Air Force was believed to have up to 300 MiG-21s of various models at the beginning of 1972, with a further 150 Soviet-manned MiG-21MFs based in Egypt for purely-defensive operations.

The following details refer to the MiG-21MF ("Fishbed-J"):

TYPE: Single-seat multi-rôle fighter.

WINGS: Cantilever mid-wing monoplane of clipped-delta planform, with slight anhedral from roots. Sweepback approximately 53°. Small pointed fairing on each side of fuselage forward of wing-root leading-edge. Small boundary-layer fence above each wing near tip. All-metal construction. Inset ailerons, actuated hydraulically. Large "blown" trailing-edge flaps.



Formation of five MiG-21MF fighters photographed during their display at Reims air force base (French Air Force photo)

FUSELAGE: Circular-section all-metal semi-monocoque structure. Ram air intake in nose, with three-position movable centre-body. Large dorsal spine fairing along top of fuselage from canopy to fin. Forward-hinged door-type air-brake on each side of under-fuselage below wing leading-edge. A further forward-hinged air-brake under fuselage forward of ventral fin. Blister fairings above and below wing on each side to accommodate main wheels when retracted.

TAIL UNIT: Cantilever all-metal structure, with all surfaces sharply swept. Conventional fin and hydraulically-powered rudder. Hydraulically-actuated one-piece all-moving horizontal surface, with two gearing ratios for use at varying combinations of altitude and airspeed. Tailplane trim switch on control column. No trim tabs. Single large ventral fin.

LANDING GEAR: Tricycle type, with single wheel on each unit; all units housed in fuselage when retracted. Forward-retracting non-steerable nose wheel unit; inward-retracting main wheels which turn to stow vertically inside fuselage. Tyres on main wheels inflated to approximately 115 lb/sq in (8 kg/cm²), ruling out normal operation from grass runways. Pneumatic braking on all three wheels, supplied from compressed-air bottles. Steering by differential main wheel braking. Wheel doors remain open when legs are extended. Brake parachute housed inside acorn fairing at base of rudder.

POWER PLANT: One Tumansky RD-11-300 turbojet engine, rated at 11,240 lb (5,100 kg) st dry and 14,550 lb (6,600 kg) st with afterburning. Fuel tanks in fuselage, with total capacity of 581 Imp gallons (2,640 litres). Provision for carrying one finned external fuel tank, capacity 110 Imp gallons (500 litres), on under-fuselage pylon and two similar drop-tanks on outboard underwing pylons. Two jettisonable solid-propellant JATO rockets can be fitted under rear fuselage, aft of wheel doors.

ACCOMMODATION: Pilot only, on ejection seat with spring-loaded arm at top which ensures that seat cannot be operated unless hood is closed. Canopy is sideways-hinged, to starboard, and is surmounted by a small rear-view mirror. Flat bullet-proof windscreen. Cabin air-conditioned. Armour plating forward and aft of cockpit.

SYSTEMS: Single hydraulic system, supplied by engine-driven pump, with back-up by battery-powered electric pump, and emergency electric tailplane trim and manual operation of flying controls.

ELECTRONICS AND EQUIPMENT: Search and track radar in intake centre-body. Other standard avionics include VOR/ADF and warning radar with an indicator marked in 45° sectors in front of and behind the aircraft.

ARMAMENT: Two 23 mm cannon, with 100 rpg, in under-belly pack. Four underwing pylons for weapons or drop-tanks, including two K-13 ("Atoll") air-to-air missiles on inner pylons and UV-16-57 rocket packs (each sixteen 57 mm rockets) on outer pylons. Optional 23 mm gun in under-fuselage centre-line pack.

DIMENSIONS, EXTERNAL:

Wing span	23 ft 5½ in (7.15 m)
Length, including pitot boom	51 ft 8½ in (15.76 m)
Length, excluding pitot boom and intake centre-body	44 ft 2 in (13.46 m)
Height overall	14 ft 9 in (4.50 m)
Wheel track	8 ft 10 in (2.69 m)

AREA:

Wings, gross	247 sq ft (23 m²)

WEIGHTS:

T-O weight:	
with four K-13 missiles	18,078 lb (8,200 kg)
with two K-13 missiles and two 110 Imp gallon drop-tanks	19,730 lb (8,950 kg)
with two K-13s and three drop-tanks	20,725 lb (9,400 kg)

PERFORMANCE:

Max level speed above 36,000 ft (11,000 m)	1,203 knots (1,385 mph; 2,230 km/h) = Mach 2.1
Max level speed at low altitude	701 knots (807 mph; 1,300 km/h) = Mach 1.06
Service ceiling	59,050 ft (18,000 m)
T-O run at normal AUW	2,625 ft (800 m)
Landing run	1,805 ft (550 m)
Range, internal fuel only	593 nm (683 miles; 1,100 km)
Ferry range, with three external tanks	971 nm (1,118 miles; 1,800 km)

FLUWAG Bremen ESS 641 single-seat glider tug (180 hp Lycoming O-360-A3A engine)

FLUWAG BREMEN

FLUGWISSENSCHAFTLICHE ARBEITS-GEMEINSCHAFT (FLUWAG) BREMEN; Address: Rockwinkeler Landstrasse 33, 28 Bremen Oberneuland, German Federal Republic

FLUWAG BREMEN ESS 641

Members of the FLUWAG Bremen, including Hans von Engelbrechten and Ulrich Stampa, have designed a single-seat glider-towing monoplane known as the ESS 641. This aircraft, registered D-EAVE, was flown for the first time at Ganderkesee airfield near Bremen on 17 September 1971, and early in 1972 was awaiting certification by the LBA.

The main objectives of the design are to improve operating efficiency and reduce initial and operating costs compared with other types of aircraft currently employed in the glider-towing rôle. In this respect the elimination of the need for a second crew member affords a saving of some 15 per cent in airframe basic weight and 13 per cent in aircraft cost, compared with a typical two-seat aircraft designed for the same purpose. Construction is straightforward, making use of inexpensive materials, and it is claimed that operating costs will be very little higher than those of the winch method of launching sailplanes.

Construction of the ESS 641 began in June 1967, following some two years of design work including wind tunnel tests carried out by the Ingenieur-Hochschule at Aachen. Initial flight testing has been quite satisfactory; production is to be considered after an unrestricted C of A has been obtained.

TYPE: Single-seat glider-towing aircraft.

WINGS: Cantilever low-wing monoplane. Wing section NACA 63_3618 (constant). Dihedral 4°. Incidence 3°. Constant-chord wings, of single main spar construction with auxiliary rear spar. Wings are fabric-covered except for leading-edge, which is plywood-covered, and wingtips, which are of glass-fibre reinforced plastics (GRP) and are hollow to serve as fuel tanks. Wooden plain flaps and wooden ailerons, hinged to auxiliary spar. Ailerons are mass-balanced and are actuated by control rods. Walkway on port wing at root.

FUSELAGE: Conventional arc-welded steel-tube structure, of basically rectangular section with rounded top-decking. Framework in cockpit area is reinforced, and the pilot's seat is attached to a bulkhead so that the entire seat-back forms a crash-proof frame. The two-piece engine cowling is of GRP; the centre portion of the fuselage is covered with duralumin sheet, the remainder being fabric-covered. Attachment in rear of fuselage for tow coupling.

TAIL UNIT: Cantilever wooden structure. Plywood-covered fixed-incidence tailplane, attached to top of fuselage by three bolts, and plywood-covered fin. Fabric-covered rudder and one-piece elevator, each cable-actuated. Cable-operated Flettner-type trim tabs in centre of elevator and at base of rudder.

LANDING GEAR: Non-retractable tailwheel type. Cantilever arc-welded mainwheel legs, hinged to lower fuselage longerons and independently sprung by English Lockheed oleo-pneumatic compression struts. Main wheels are fitted with hydraulic brakes and have Goodyear 600-6 tyres, pressure 14 lb/sq in (1 kg/cm²). Tailwheel, suspended from fuselage by lever-hinged rocking arm and pneumatic shock-strut, is fitted with a Scott solid tyre, and is steerable via the rudder pedals.

POWER PLANT: One 180 hp Lycoming O-360-A3A four-cylinder horizontally-opposed air-cooled engine, with direct drive to a Hoffmann Ho-27-198/115 two-blade fixed-pitch wooden propeller. Fuel in two main tanks (each 11.6 Imp gallons; 53 litres), one in each wingtip, and one collector tank (1.8 Imp gallons; 8 litres) in fuselage, aft of main spar. Total fuel capacity 25 Imp gallons (114 litres). Refuelling point on top of each wingtip tank. Oil capacity 1.8 Imp gallons (8 litres).

ACCOMMODATION: Single seat for pilot, fitted with safety harness, in heated and ventilated cockpit lined with sound-absorbing and heat-insulating materials. Fully-transparent, optically-neutral canopy, with GRP windshield and hood frames. Hood slides rearward in two lateral rails and a rearward rail to provide access to cockpit. The tow coupling in the rear of the fuselage is controlled by cable from the pilot's seat; a rear-view mirror is fitted to the upper part of the windshield, on the inside.

SYSTEMS: 12V electrical system, including 38A generator and 38Ah battery, provides power for engine starting and, when required, for an electrically-driven fuel pump.

ELECTRONICS AND EQUIPMENT: VFR instrumentation and Becker AR 400 radio standard. TOST towline release gear in rear of fuselage.

DIMENSIONS, EXTERNAL:

Wing span	34 ft 5½ in (10.50 m)
Wing chord, constant	5 ft 3 in (1.60 m)
Wing aspect ratio	6.7
Length overall	23 ft 11½ in (7.30 m)
Height overall	7 ft 4½ in (2.25 m)
Tailplane span	11 ft 1¾ in (3.40 m)
Wheel track	6 ft 10¾ in (2.10 m)
Wheelbase	17 ft 5½ in (5.32 m)
Propeller diameter	6 ft 6 in (1.98 m)
Propeller ground clearance	1 ft 7¾ in (0.50 m)

AREAS:

Wings, gross	177.6 sq ft (16.50 m²)
Ailerons (total)	15.93 sq ft (1.48 m²)
Flaps (total)	19.16 sq ft (1.78 m²)
Fin	9.04 sq ft (0.84 m²)
Rudder, incl tab	6.03 sq ft (0.56 m²)
Tailplane	18.08 sq ft (1.68 m²)
Elevator, incl tab	12.06 sq ft (1.12 m²)

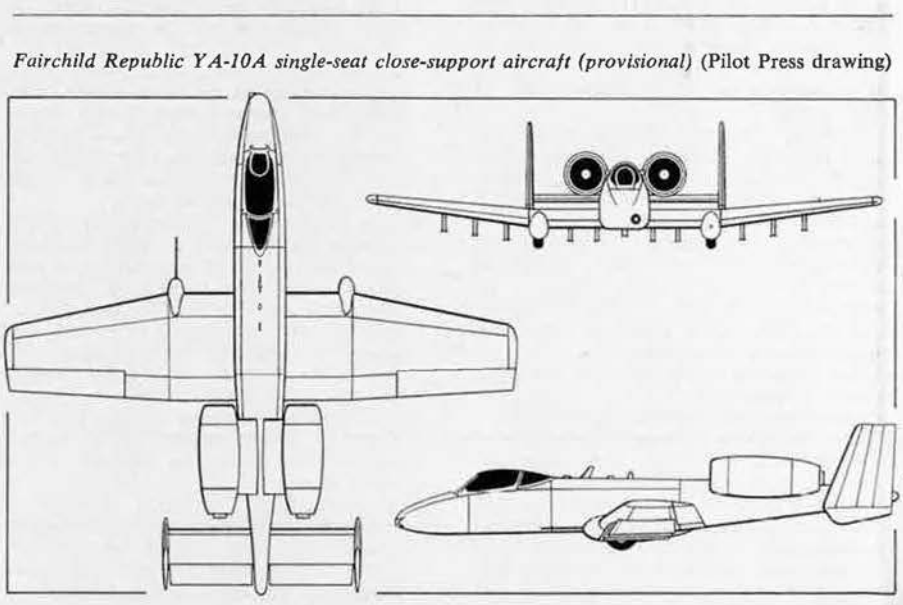
WEIGHTS AND LOADINGS:

Weight empty, equipped	1,221 lb (554 kg)
Max payload	189 lb (86 kg)
Max T-O and landing weight	1,543 lb (700 kg)
Max wing loading	8.71 lb/sq ft (42.5 kg/m²)
Max power loading	8.6 lb/hp (3.9 kg/hp)

PERFORMANCE (estimated, at max T-O weight at S/L except where stated):

Max level speed	108 knots (124 mph; 200 km/h)
Max permissible diving speed	161 knots (186 mph; 300 km/h)
Max cruising speed	108 knots (124 mph; 200 km/h)
Towing speed	70 knots (80 mph; 130 km/h)
Stalling speed, flaps up	43 knots (49 mph; 78 km/h)
Max rate of climb at S/L	2,067 ft (630 m)/min
Rate of climb at 13,125 ft (4,000 m)	1,082 ft (330 m)/min

Fairchild Republic YA-10A single-seat close-support aircraft (provisional) (Pilot Press drawing)



Rate of climb at 1,640 ft (500 m) towing a two-seat glider 886 ft (270 m)/min
Rate of climb at 1,640 ft (500 m) towing a single-seat glider 1,280 ft (390 m)/min
T-O run, zero wind 377 ft (115 m)
T-O to 50 ft (15 m), zero wind 567 ft (173 m)
Landing from 50 ft (15 m), zero wind 702 ft (214 m)
Landing run, zero wind 308 ft (94 m)
Max range (55% power) approx 323 nm (373 miles; 600 km)
Endurance (55% power) 3 hr

FAIRCHILD REPUBLIC

FAIRCHILD REPUBLIC DIVISION of Fairchild Industries; Divisional Office and Works: Farmingdale, Long Island, New York 11735, USA

The USAF Chief of Staff stated the requirement for a new close-support aircraft in September 1966, and more recent experience gained by the USAF in South-east Asia has highlighted the importance of this type. However, at the present time, the inventory of the Air Force does not include a single machine designed specifically for this mission. In consequence, the gap has been filled to date by utilising those types of aircraft possessing as many as possible of the desirable characteristics for this tactical rôle. These include STOL capability; a high degree of manoeuvrability in the medium- to low-speed range; large, flexible payload; extended loiter time; highly accurate weapons delivery; simplified maintenance to permit operations from forward airfields; and the ability to survive a hard-hitting counter-attack from ground weapons.

To meet this requirement in a single type, the USAF drew up the specification of a machine which they designated provisionally the A-X (Attack-Xperimental) close-support aircraft. This called for a low-cost aircraft with a speed of 350–400 knots (403–460 mph; 650–740 km/h), with a high degree of manoeuvrability at speeds below 300 knots (345 mph; 555 km/h); the carriage of up to 16,000 lb (7,250 kg) of mixed ordnance in a mission that could extend up to four hours; the ability to carry all close-support weapons, both droppable and forward-firing, including a 30 mm multi-barrel gun; twin engines designed to provide a high thrust-to-weight ratio with good fuel consumption in the low-speed range; large fuel capacity to provide a mission radius of 175-260 nm (200–300 miles; 322–483 km) with a loiter time of 1½ to 2 hours.

Good STOL performance was required to permit operation from small unimproved airstrips, with a take-off run of less than 1,000 ft (305 m) with a reasonable payload, and which was to be achieved by low wing loading rather than by complex and costly high-lift devices. Full all-weather capability was considered to be an unnecessary luxury, since experience has shown that some 85 per cent of close-support missions can be flown in visual conditions, and this permits the use of a high proportion of off-the-shelf avionics to limit cost. Adequate space and power were required by the specification to allow introduction of new sensors that might be required at a later date. Maximum take-off weight was expected to be around 40,000 lb (18,145 kg).

To meet the need for a high degree of survivability in a battlefield environment, it was required that cockpit and critical components should be protected adequately by armour, and that other essential features included a redundant flight control system, twin engines, blast resistant and redundant structures, and reserve fuel (sufficient to provide "get-home" range) contained in self-sealing reticulated foam-filled tanks.

USAF preliminary design study contracts were awarded to the Convair Division of General Dynamics Corporation, Grumman Aerospace Corporation, Northrop Corporation, and McDonnell Douglas Corporation in April 1967. Subsequent analysis of the studies submitted by these companies, based on the use of turboprop engines, led to revision of the specification to reduce size, weight, and cost.

This new specification became the basis of the Requests for Proposals that were issued to 12 airframe manufacturers in May 1970. Of these, only six submitted proposals in August 1970: The Boeing Company, Vertol Division; Cessna Aircraft Company; Fairchild Republic Division; General Dynamics Corporation; Lockheed Aircraft Corporation; and Northrop Corporation.

On 18 December 1970, the USAF announced that Fairchild Republic and Northrop had been selected to participate in the competitive prototype development phase of the programme. This requires that the competing companies each build two prototypes of their design to participate in a "fly-before-buy" programme that is expected to extend over a period of about 26 months. The "fly-off" competition is scheduled to begin at the USAF's Flight Test Center, Edwards AFB, California, late in 1972. The winning contractor will be expected to complete development and testing and to begin delivery of production aircraft by the mid-1970s.

The fixed-price contracts awarded for construction of the prototypes were worth $41.2 million and $28.9 million to Fairchild Republic and Northrop respectively. Total development costs of the A-X programme were estimated at $230 million.

FAIRCHILD REPUBLIC A-10A

Fairchild Republic's design for the A-X programme has been given the official designation A-10A. No detailed information concerning the construction of the YA-10A prototypes has yet been released, but it is possible to give an outline of the aircraft's configuration:

TYPE: Single-seat close-support aircraft.

WINGS: Cantilever low-wing monoplane of all-metal construction. Sweepback on leading-edge of outer panels. Wide-chord wings of deep aerofoil section to provide low wing loading. Wide-span ailerons. Trailing-edge flaps. Redundant flight control system.

FUSELAGE: All-metal semi-monocoque structure. Pilot's compartment in nose, well forward of wing leading-edge.

TAIL UNIT: Cantilever all-metal structure, with twin fins and rudders mounted at the tips of constant-chord tailplane. Conventional rudders and elevators. Redundant flight control system.

LANDING GEAR: Retractable tricycle type with a single wheel on each unit. Nosewheel retracts into fuselage. Main wheels retract forward and upward into fixed fairings attached to the lower surface of the wings. When fully retracted approximately half of each main wheel protrudes from the fairing, allowing for an emergency landing in the event of failure of the gear extension system.

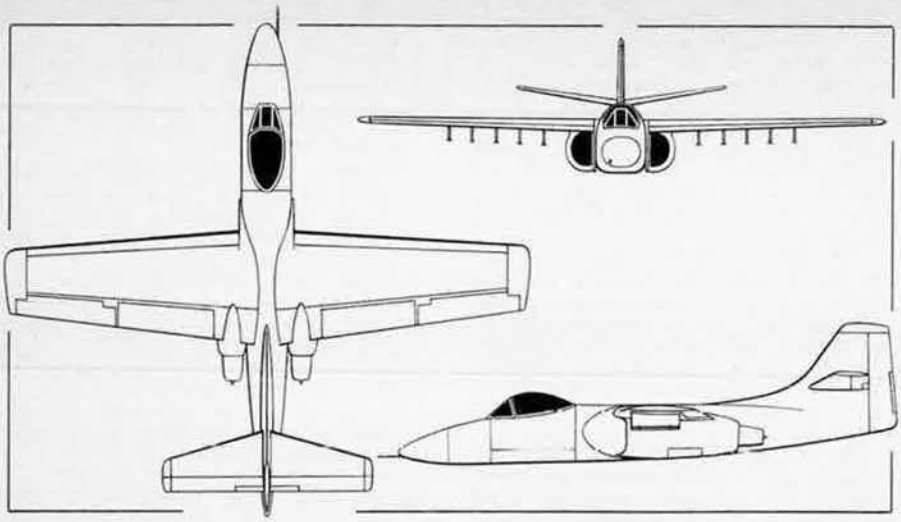
POWER PLANT: Two General Electric TF34 high by-pass ratio turbofan engines, each of some 9,000 lb (4,080 kg) st, enclosed in pods and pylon-mounted to the upper rear fuselage, at a point approximately midway between the wing trailing-edge and the tailplane leading-edge. Fuel contained in self-sealing reticulated foam-filled tanks.

ACCOMMODATION: Enclosed cockpit for pilot only, well forward of wing, with large transparent bubble canopy to provide all-round visibility.

AVIONICS: Head-up display giving airspeed, altitude, and dive angle; weapons delivery package with dual reticle optical sight for use in conjunction with laser aiming; target penetration aids; associated equipment for Maverick and Sidewinder missile systems; IFF; TACAN; UHF/DF; VOR/ILS provisions; heading and altitude reference system (HARS); UHF/AM, VHF/AM, and VHF/FM communications.

ARMAMENT: Multi-barrel forward-firing 30 mm (20 mm on prototypes) gun mounted in the fuselage nose. Five underwing pylons on each wing, two inboard and three outboard of main wheel fairing, to allow carriage of a wide range of stores including 24 x 500 lb Mk-82 LDGP, 24 x 500 lb Mk-82 retarded, 16 x 750 lb M-117 LDGP, 16 x 750 lb M-117 retarded

Artist's impression of Fairchild Republic YA-10A (two General Electric TF34 turbofan engines)



Northrop YA-9A single-seat close-support aircraft (provisional) (Pilot Press drawing)

or 4 x 2,000 lb Mk-84 general-purpose bombs; 8 BLU-1 or BLU-27/8 incendiary bombs; 4 SUU-25 or SUU-42 flare launchers; 20 Rockeye 11 cluster bombs, 16 CBU-24/49, 8 CBU-43, or 12 CBU-60 dispenser weapons; 9 AGM-65 Maverick and 2 AIM-9E/J Sidewinder missiles; Mk-82 and Mk-84 laser-guided bombs; Mk-84 EO-guided bombs; 2 SUU-23 or recoilless gun pods.

DIMENSIONS, EXTERNAL:

Wing span	54 ft 8 in (16.66 m)
Length overall	54 ft 8 in (16.66 m)
Height overall	15 ft 5 in (4.70 m)

AREA:

Wings, gross	600 sq ft (55.74 m²)

WEIGHTS (estimated):

Operating weight, empty	21,300 lb (9,661 kg)
Basic flight design weight	29,130 lb (13,213 kg)
Max T-O weight	45,825 lb (20,786 kg)

NORTHROP

NORTHROP AIRCRAFT, Division of Northrop Corporation; Address: 3901 West Broadway, Hawthorne, California 90250, USA

NORTHROP A-9A

The two prototypes of Northrop Aircraft's entry for the competitive development phase of the USAF's A-X close-support aircraft programme have been designated officially YA-9A. The requirement for the A-X aircraft has been detailed in the introductory paragraphs to Fairchild Republic's A-10A (above).

No precise details regarding the construction of Northrop's YA-9A prototypes have been released to date, but all available information follows:

TYPE: Single-seat close-support aircraft.

WINGS: Cantilever high-wing monoplane of all-metal construction. Conventional ailerons and wide-chord flaps occupy the entire wing trailing-edges outboard of the engines. Redundant flight control system.

FUSELAGE: Semi-monocoque all-metal structure. Pilot's cockpit situated well forward of wing leading-edge.

TAIL UNIT: Cantilever all-metal structure. Tailplane has swept leading-edge and considerable dihedral. Trim tabs in elevators and rudder. Redundant flight control system.

LANDING GEAR: Retractable tricycle type. Nosewheel retracts into fuselage. Main wheels retract into engine fairings.

POWER PLANT: Two Lycoming ALF 502 turbofan engines, each of 6,000 lb (2,720 kg) st, mounted beneath the wing root on each side of the fuselage. Fuel contained in self-sealing reticulated foam-filled tanks.

Artist's impression of Northrop YA-9A (two Lycoming ALF 502 turbofan engines)

ACCOMMODATION: Enclosed cockpit for pilot, well forward of wing leading-edge, with large transparent canopy to give good all-round visibility.

AVIONICS: As for Fairchild Republic A-10A.

ARMAMENT: Five underwing pylons on each wing, outboard of engine and inboard of aileron, to carry a similar range of stores as detailed for the A-10A.

DIMENSIONS, EXTERNAL:

Wing span	57 ft 0 in (17.37 m)
Length overall	53 ft 6 in (16.31 m)
Height overall	17 ft 10 in (5.44 m)

AREA:

Wings, gross	550 sq ft (51.10 m²)

WEIGHTS (estimated):

Operating weight, empty	17,200 lb (7,802 kg)
Basic flight design weight	23,850 lb (10,819 kg)
Max T-O weight	39,570 lb (17,949 kg)

DASSAULT-BREGUET

SOCIÉTÉ DES AVIONS MARCEL DASSAULT-BREGUET AVIATION; Address: 33 Rue du Professeur-Pauchet, 92-Vaucresson, France

DASSAULT MIRAGE F1

Early in 1964 Dassault was awarded a French government contract to develop a replacement for the Mirage III, followed shortly afterwards by an order for a prototype aircraft which was designated Mirage F2. This aircraft was designed as a two-seat low-altitude penetration fighter, and was powered by a SNECMA (Pratt & Whitney) TF 306 turbofan engine. It first flew on 12 June 1966 and was described and illustrated in the 1967–68 *Jane's*.

Concurrently with work on the Mirage F2, Dassault also developed, as a private venture, a much smaller single-seat aircraft, the Mirage F1, with a SNECMA Atar 09K turbojet engine. The prototype Mirage F1-01 flew for the first time on 23 December 1966. It exceeded Mach 2 during its fourth flight on 7 January 1967, but was lost in a fatal accident on 18 May 1967.

In September 1967, three pre-series F1 aircraft and a structural test airframe were ordered by the French government. The first pre series aircraft, the Mirage F1-02, reached Mach 1.15 during its first flight on 20 March 1969, and Mach 2.03 during its third flight on 24 March. It completed the first phase of its flight test programme on 27 June 1969. This comprised 62 flights, during which the aircraft was flown at speeds of up to Mach 2.12 (1,200 knots; 1,405 mph; 2,260 km/h) at 36,000 ft (11,000 m) and up to 702 knots (808 mph; 1,300 km/h) at low level; at altitudes of more than 50,000 ft (15,250 m); and with various external military loads, including air-to-air missiles and drop-tanks.

The F1-02, during its initial flight tests, was powered by an Atar 09K-31 turbojet engine developing 14,770 lb (6,700 kg) st with afterburning. It was re-engined in 1969 with the more powerful Atar 09K-50 turbojet; this engine was also fitted in the two later pre-series aircraft, and is standard power plant of the initial production version.

The Mirage F1-03 flew for the first time on 18 September 1969, followed by the final pre-series aircraft, the F1-04, on 17 June 1970. The F1-04, which has the wing leading-edges extended for a greater proportion of the overall span than the preceding aircraft, has a complete avionics system and is representative of the initial production version.

By the Autumn of 1971 the prototype and pre-series aircraft had made a total of 775

flights, including 504 by Dassault pilots, 125 by pilots of the Centre d'Essais en Vol and 29 by pilots from six other countries.

The Mirage F1 is dimensionally similar to the Mirage III series, and its swept wing is virtually a scaled-down version of that fitted to the F2 prototype, with improved high-lift devices which help to make possible take-offs and landings within 1,600–2,600 ft (500–800 m) at average combat mission weight. Operation from semi-prepared, or even sod, runways is possible, and aircraft systems have been improved by comparison with the Mirage III, for increased efficiency and easy servicing. Compared with the Mirage III, internal fuel capacity is some 40 per cent greater, trebling the endurance of the F1 for patrol or high-altitude supersonic interception missions and doubling the possible combat radius in the attack rôle. Performance during flight testing has met or exceeded all expectations, and has included reductions of 22 per cent in approach speed and 28 per cent in take-off distance compared with the Mirage III. It is claimed that manoeuvrability has been increased by as much as 80 per cent.

The primary rôle of the Mirage F1 is that of all-weather interception at any altitude, and the initial **F1-C** production version, to which the details below apply, will at first utilise similar weapons systems to those of the Mirage III-E, with more advanced systems to follow. It is equally suitable for attack missions **(F1-E),** when it may be fitted with terrain-avoidance radar and carry a variety of external loads beneath the wings and fuselage. Dassault has projected a "utility" version, the **F1-A,** for operation only under VFR conditions, in which much of the more costly electronic equipment is deleted, the space so vacated being occupied by an additional fuel tank. Other projected versions include a 2-seat training version, the **F1-B** (not yet ordered by the French Air Force), and a navalised version with M53 engine as a potential replacement for the F-8E(FN) Crusaders of the French Navy.

By the beginning of 1972 two contracts, for 30 and 55 aircraft respectively, had been placed for Mirage F1s for the French Air Force. It is anticipated that a further 20 may be ordered during 1972, these being of a "second-generation" version powered by the SNECMA M53 Super Atar engine of 12,379 lb (5,615 kg) st dry and 18,646 lb (8,458 kg) st with afterburning. With this engine, the maximum level speed of the Mirage F1 is expected to reach Mach 2.50. It has been estimated that the M53-engined version would have approximate weights of 17,120 lb (7,765 kg) empty, 24,555 lb (11,140 kg) maximum for take-off in "clean" condition, and 33,070 lb (15,000 kg) maximum for take-off with full weapons load.

Production of the 85 Atar 09K-50-engined Mirage F1s so far ordered is being undertaken by Dassault-Breguet in co-operation with the Belgian companies SABCA, in which Dassault-Breguet has a parity interest, and Fairey SA, which will build rear fuselage sections for all Mirage F1s ordered. Dassault-Breguet also has a technical and industrial co-operation agreement with the Armaments Development and Production Corporation of South Africa Ltd, whereby the latter company has rights to build the Mirage F1 under licence.

The first deliveries of production F1s to the French Air Force are scheduled to begin in the Spring of 1973, and the aircraft is due to enter service from early Summer 1973. It has been reported that the first unit to receive the Mirage F1 will be the 30e Escadre at Reims, currently equipped with Sud-Aviation Vautours, followed by the 5e Escadre at Orange and the 12e Escadre at Cambrai.

The description below applies to the initial production version for the French Air Force.

TYPE: Single-seat multi-mission fighter and attack aircraft.

WINGS: Cantilever shoulder-wing monoplane, with anhedral from roots. Sweepback of approx 50° on leading-edges, which have extended chord (saw-tooth) on approx the outer two-thirds of each wing (first two pre-series aircraft had extended chord on only approx the outer one-third of each wing). All-metal two-spar torsion-box structure, making extensive use of mechanically or chemically milled components. Trailing-edge control surfaces of honeycomb sandwich construction. Entire leading-edge can be drooped hydraulically. Two differentially-operating double-slotted flaps and one aileron on each trailing-edge, actuated hydraulically by servo controls. Ailerons are compensated by trim devices incorporated in linkage. Two spoilers on each wing, ahead of flaps.

FUSELAGE: Conventional all-metal semi-monocoque structure. Primary frames are milled mechanically, secondary frames and fuel tank panels chemically. Electrical spot-welding for secondary stringers and sealed panels, remainder titanium flush-riveted or bolted and sealed. Titanium alloy also used for landing gear trunnions, engine firewall, and certain other major structures. Central intake bulkheads of honeycomb sandwich construction. High-tensile steel wing attachment points. Nose-cone over radar, and antennae fairings on fin, are of plastics. Large hydraulically-actuated door-type air-brake in forward underside of each intake trunk.

TAIL UNIT: Cantilever all-metal two-spar structure, with sweepback on all surfaces. All-moving tailplane mid-set on fuselage, and actuated hydraulically by electrical or manual control. Tailplane trailing-edge panels are of honeycomb sandwich construction. Auxiliary fin beneath each side of rear fuselage.

LANDING GEAR: Retractable tricycle type, of Messier design. Hydraulic retraction, nose unit rearward, main units outward and upward into rear of intake trunk fairings. Twin wheels on all units. Nose unit steerable and self-centering. Oleo-pneumatic shock-absorbers. Main wheel tyre pressure 128 lb/sq in (9 kg/cm²), permitting operation from semi-prepared airfields. SNECMA (Hispano) brakes and anti-skid units. Brake parachute in bullet fairing at base of rudder.

POWER PLANT (initial production version): One SNECMA Atar 09K-50 turbojet engine, rated at 11,100 lb (5,035 kg) st dry and 15,798 lb (7,166 kg) st with afterburning. Movable semi-conical centre-body in each intake. All internal fuel in integral tanks in fuselage, on each side of intake trunks. Provision for three jettisonable auxiliary fuel tanks (each 264 Imp gallons; 1,200 litres) to be carried under fuselage and on inboard wing pylons.

ACCOMMODATION: Single SEMMB (Martin-Baker Mk 4) ejection seat for pilot, under rearward-hinged jettisonable canopy. Cockpit is air-conditioned, and is heated by warm air bled from engine, which also heats the radar compartment and certain equipment compartments. Intertechnique liquid oxygen system for pilot.

SYSTEMS: Two independent hydraulic systems, for landing gear retraction, flaps and flying controls, supplied by pumps similar to those fitted in Mirage III. Electrical system includes two Auxilec 15kVA variable-speed alternators, either of which can supply all functional and operational requirements. Emergency and standby power provided by SAFT Voltabloc 23Ah nickel-cadmium battery and EMD static converter. DC power provided by transformer-rectifiers operating in conjunction with battery.

ELECTRONICS AND EQUIPMENT: Thomson-CSF Cyrano IV fire-control radar in nose. This permits all-sector interception at any altitude, and incorporates a system to eliminate "fixed" echoes when following low-flying aircraft. Two UHF transceivers (one UHF/VHF), Socrat 6200 VOR/ILS with Socrat 5600 marker, LMT TACAN, LMT NR-AI-4-A IFF, remote-setting interception system, three-axis generator, central air data computer, Bézu Sphere with ILS indicator, Crouzet Type 63 navigation indicator, and SFENA 505 autopilot. CSF 196 sight, with magnifying lens, provides all necessary data for flying and fire control. Equipment for attack rôle can include Doppler radar and bombing computer, navigation computer, position indicator, laser rangefinder, and terrain-avoidance radar.

ARMAMENT AND OPERATIONAL EQUIPMENT: Standard fixed armament of two 30 mm DEFA 553 cannon, with 125 rounds per gun, mounted in lower front fuselage. Two Alkan universal stores attachment pylons under each wing and one under fuselage, plus provision for carrying one air-to-air missile at each wingtip. Max external combat load 8,820 lb (4,000 kg). Ex-

Dassault Mirage F1, carrying one 1,200 litre external fuel tank, two Matra R.530 and two Sidewinder air-to-air missiles

Dassault Mirage F1 in interceptor configuration, with under-fuselage Matra R.530 missile

ternally-mounted weapons for interception rôle include Matra R.530 or Super 530 radar homing or infra-red homing air-to-air missiles on under-fuselage and inboard wing pylons, and/or a Sidewinder or Matra 550 Magic infra-red homing air-to-air missile at each wingtip station. For ground attack duties, typical loads may include one AS.37 Martel anti-radar missile or Nord AS.30 air-to-surface missile, eight 450 kg bombs, four launchers each containing 18 air-to-ground rockets, or six 158.5 US gallon (600 litre) napalm tanks. Other possible external loads include three 264 Imp gallon (1,200 litre) auxiliary fuel tanks, or two photoflash containers and a reconnaissance pod incorporating an SAT Cyclope infra-red system and EMI side-looking radar.

DIMENSIONS, EXTERNAL:

Wing span	27 ft 6¾ in (8.40 m)
Length overall	49 ft 2½ in (15.00 m)
Height overall	14 ft 9 in (4.50 m)
Wheel track	8 ft 2½ in (2.50 m)
Wheelbase	16 ft 4¾ in (5.00 m)

AREA:

Wings, gross	269.1 sq ft (25.00 m²)

WEIGHTS AND LOADING:

Weight empty	16,314 lb (7,400 kg)
T-O weight, clean	24,030 lb (10,900 kg)
Max T-O weight	32,850 lb (14,900 kg)
Max wing loading	122.2 lb/sq ft (596 kg/m²)

PERFORMANCE (at max T-O weight, except where indicated):

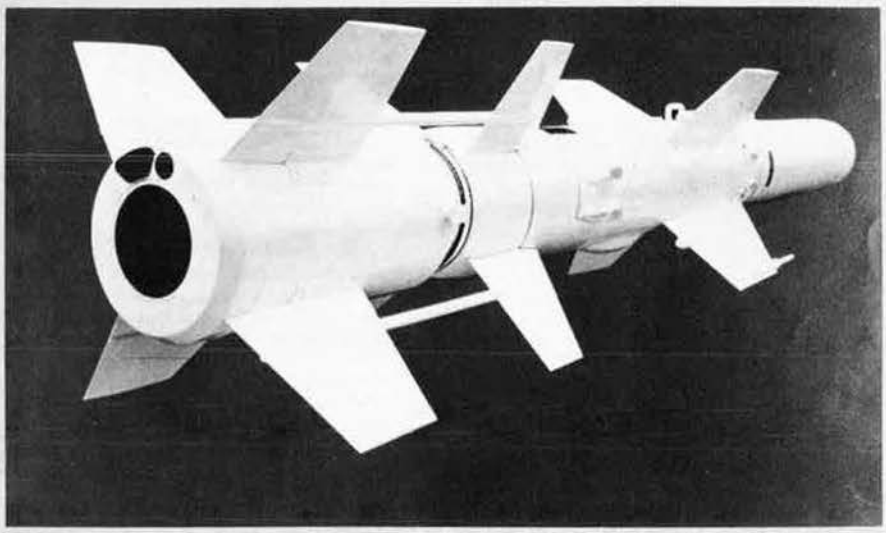
Max level speed (high altitude)	Mach 2.2
Max level speed (low altitude)	Mach 1.2
Approach speed	141 knots (162 mph; 260 km/h)
Landing speed	124 knots (143 mph; 230 km/h)
Max rate of climb at S/L (with afterburning)	41,930 ft (12,780 m)/min
Max rate of climb at high altitude (with afterburning)	47,835 ft (14,580 m)/min
Service ceiling	65,600 ft (20,000 m)
Stabilised supersonic ceiling	60,700 ft (18,500 m)
T-O run (AUW of 25,355 lb; 11,500 kg)	1,475 ft (450 m)
Landing run (AUW of 18,740 lb; 8,500 kg)	1,640 ft (500 m)
T-O run (typical interception mission)	2,100 ft (640 m)
Landing run (typical interception mission)	2,000 ft (610 m)
Endurance	3 hr 45 min

MDAC

McDONNELL DOUGLAS ASTRONAUTICS COMPANY (Division of McDonnell Douglas Corporation); Headquarters: 5301 Bolsa Avenue, Huntington Beach, California 92647, USA

President Nixon's 1973 Fiscal Year budget provides for continued development of MDAC's ZAGM-84A Harpoon advanced anti-shipping missile, of which illustrations have become available since the 1971–72 *Jane's* went to press. It has also been reported that the US Navy is studying the possibility of larger, submarine-launched cruise missiles in this category. They are envisaged as 6,000 lb (2,720 kg) weapons, with a body diameter of 40 in (100 cm), which would be launched vertically from a new generation of quiet submarines now projected. They would travel to the target beneath the radar cover of the enemy ship, on which they would home by means of an active radar seeker. The missiles' range would be greater than that of currently-known Soviet anti-submarine weapon systems.

Mock-up of ZAGM-84A Harpoon anti-shipping cruise missile



HARPOON

US Navy designation: ZAGM-84A

Harpoon will be a US Navy missile suitable for launching from aircraft and ships against shipping targets, from extended stand-off ranges. It will be an all-weather weapon, with an air-breathing propulsion system.

Five major US aerospace companies responded to requests for proposals issued by Naval Air Systems Command on 22 January 1971, at the end of three years of research and study. This had included seeker flight and ground tests, propulsion studies, aerodynamic testing, and analytical investigations of a number of possible configurations.

In May 1971 General Dynamics and McDonnell Douglas were asked to submit additional technical and financial data on their proposals, which were then evaluated by representatives of Naval Air Systems Command, Naval Ordnance Systems Command, and selected Navy field activities. These evaluations considered all aspects of the proposals, including the design approach, the extent of modifications required to existing launch systems (*e.g.*, the Asroc launcher) to accommodate the new missile, the technical risk, and projected costs.

As a result of this review, the Navy selected McDonnell Douglas as prime contractor for development of the Harpoon missile on 21 June 1971, under the programme management of Naval Air Systems Command and with major support from Naval Ordnance Systems Command. The work is being performed by McDonnell Douglas in St. Louis and by its major subcontractor, Texas Instruments Inc, at Dallas, Texas.

The initial contract, valued at approximately $60 million, awarded to McDonnell Douglas Astronautics Company covers the development and demonstration of a number of engineering model missiles over a two-year period. Successful completion of this phase of the programme will lead to the final phase of development and the initiation of Harpoon production in about 1975.

Teledyne CAE and Garrett AiResearch were awarded contracts for initial development of the Harpoon's turbine propulsion system; the final choice of power plant is expected to be made in mid-1972. Simultaneously a $2.5 million funded study for the Navy of the feasibility of launching Harpoons from submarines is underway.

The general configuration of Harpoon is shown in the accompanying illustration. It is a torpedo-shape missile, with cruciform wings indexed in line with cruciform tail surfaces. The turbojet power plant is mounted in tandem, apparently with a bottom air intake between its own cruciform stabilising fins and those of the basic missile.

The control and guidance equipment is expected to include active radar terminal homing. No details of the expendable turbojet engines being developed for Harpoon are yet available; but Garrett AiResearch has announced that complete examples of its ETJ 331 engine, intended as a contender for the Harpoon contract, have been running since the Summer of 1971.

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Weapons in Space?

One of the most closely guarded areas of military technology is the use of space for national defense purposes. This applies double to the Soviet Union, whose penchant for secrecy is pervasive. A recently released Congressional report on the extent and direction of recent Soviet space developments gives a rare and illuminating glimpse of the massive Soviet space program, and raises . . .

THE QUESTION OF SOVIET ORBITAL BOMBS

By Edgar Ulsamer
SENIOR EDITOR, AIR FORCE MAGAZINE

MORE THAN half of all Soviet launches to date have served military purposes. The USSR's Strategic Rocket Troops (comparable to the ICBM component of the US Strategic Air Command but an autonomous military service) launch almost all Soviet spaceflights. Russia's three principal launch bases—at Tyuratam, Kaputsin Yar, and Plesetsk—are operated by the military. "Beyond all reasonable doubt," the Soviet Union flies the largest number of military spy satellites of any nation. The Soviet Union apparently has an operational FOBS (Fractional Orbital Bombardment System), and some of the SS-9 missiles may carry FOBS payloads in place of ICBM warheads. And the Soviet Union has tested what is likely to be a space inspector/destructor system.

These are among the findings of a recently released study of the Soviet space programs prepared by the Library of Congress for the Senate's Committee on Aeronautical and Space Sciences. The nearly 700-page report also raises the question of whether the Russians "intend to develop a standby capability to station nuclear weapons in orbit." The report concludes that "this cannot be answered in the affirmative; but on the other hand, neither is there any proof that they do not."

A section on military aspects compiled by Dr. Charles S. Sheldon, II, Chief of the Science Policy Research Division of the Library of Congress, hypothesizes that "technically, a [nuclear] bomb can be placed in orbit. If only one or very few are put up, and their presence is kept secret at least to the extent of the contents of the spacecraft, this probably would have limited military and political effectiveness when matched against existing second-strike capabilities of the opposite great space power."

War-gaming this scenario further, the report suggests that if a limited number of orbital nuclear weapons are put up *with* publicity as a means of blackmail, such a "threat might not be effective in bringing a surrender; instead it might be taken as a declaration of war."

In discussing the possible deployment of orbital weapons in quantities sufficient to defeat the opponent's second-strike capability, the report says "there is considerable question whether this could be accomplished in secrecy. There are many analytical techniques available both to Russian and American defense authorities which should start the alarm bells ringing long before" a sufficient number of weapons can be put in space.

"Although the aggressor might hope for enough indecision on the part of the intended victim nation that he could succeed in getting up a sufficiently large force to be decisive, he would also run the risk that, having telegraphed his punch, a preemptive strike would be mounted against him," the report suggests.

Differentiating between near-term and long-term threats, the Congressional report speculates that "the general state of Soviet technology today would seem to exclude weapons stored in orbit as a practical danger. There are too

many failures of hardware now, and too many payloads decay at random all over the world, with the consequent risk of disclosure of nuclear material, were it on board. At the same time, in light of long-term development and at least precautionary exploration of weapons technologies, one cannot exclude the possibility of some probing on the part of the Soviet military technologists into the early stages of orbital weapons."

The Congressional report finds areas of technical uncertainty so far as vulnerabilities in command and control are concerned. These apply mainly to jamming and spoofing signals by the opposing force. (The United States is believed to be holding development of recallable warheads in abeyance for the same reason. In theory, recallable ICBM systems offer significant advantages over standard systems because launching them on warning would not constitute an irrevocable commitment to nuclear war. In case of a false alarm, or for other reasons, the warheads could be ordered not to impact and detonate on the target. A more thorough probing of the associated command and control problem leads to the conclusion, however, that there is no assurance that the enemy might not be able to "spoof" the control mechanism and thereby render the weapon useless.)

Referring to the "mysterious collection" of flights by a four-stage adaptation of the SS-9, the report calls it the "F-1-m," and suggests it involves several subcategories in addition to the satellite inspector/destroyer mission. The study maintains "that there remains the outside chance that there has been a small move toward space weapons. It would be irresponsible to draw a positive conclusion in this regard, or to panic over the possibilities. The closest flight to a possible but not necessarily probable orbital bomb carrier is Kosmos 316 [launched on December 23, 1969]. It flew at the FOBS inclination and stayed in orbit for many months. But it was in an eccentric orbit with so low a perigee [the point of the orbit closest to the earth] it was certain to decay within a year, as it did; and it fell in the United States where its large remnants could be inspected."

The study added that "obviously no nuclear material was found, nor would it have been expected. On the other hand, neither was there explanation for the very thick dimension of some of the metal plates recovered. As with so many new Soviet programs, we are simply left with a mystery. If the program was dead-ended, we may never know more. If further flights occur, we may gain fresh insights."

Dr. Sheldon concluded, therefore, that "it must be an expected task of US defense and intelligence authorities to watch the Soviet program constantly for the first signs that such a capability to place weapons in orbit is under way, let alone to detect actual bombs, should they be placed into space in violation of the treaty."

In another section, the report states that military observation satellites are the largest single element of Soviet space activities and that "what must be photographic recoverable missions fly throughout much of the year with virtually continuous coverage. Infrared detector flights and nuclear-detection missions may be hidden within purportedly scientific programs. A variety of electronic ferreting missions almost certainly are flown within the large number of repetitive nonrecoverable flights which do not have specific purposes."

The report could find no concrete evidence that the Soviets have acquired an early-warning space surveillance system comparable to that of the US, but it suggested that a number of Soviet spacecraft appear to have the capability to accommodate "Midas and Vela classes of detectors."

Though the Soviet Union appears to have an operational FOBS system, the report stated that "there is no indication that any FOBS has carried an actual nuclear warhead during the development or training period. Nor has any dummy warhead crossed the United States, as these are retrofired over the Soviet Union just short of one orbit, which avoids passage over this country." The study then adds: "Although most US analysts doubt the cost-effectiveness of FOBS, undoubtedly their presence in the Soviet inventory complicated US planning. They could come the long way around, or fly by a direct route with a depressed trajectory, reducing some kinds of early warning. But new US sensors may cut such advantage of surprise. Also, FOBS payloads are reduced in weight as against the use of an SS-9 as an ICBM, and accuracy could be reduced."

According to the Congressional report, the four-stage booster, derived from the SS-9, which puts up FOBS, is also used to launch satellites capable of inspecting and destroying enemy space systems.

"Several flight models have been exercised with most of the inspectors later exploded into clouds of debris. The potential threat would be to deny the use of space to other nations. There is no sign at this point that such a threat is about to be exercised because it is mutually advantageous not to interfere with spaceflights," the report contends.

The Congressional report contains the ominous statement that "some other maneuverable payloads put up by the F-class [SS-9 based] launch vehicle probably serve other military purposes [that] have not yet been defined by Western analysts. These uses may go beyond the kind of military support flights of a passive nature which make up all US military spaceflights and the bulk of Soviet military spaceflights as well." ■

AFA's ANNUAL CONVENTION and AEROSPACE BRIEFINGS and DISPLAYS

SEPTEMBER 18-19-20-21
WASHINGTON, D.C.

Proudly saluting the 25th ANNIVERSARY of the United States Air Force

AFA's 1972 Annual National Convention and Aerospace Briefings and Displays, being held at the Sheraton-Park Hotel, September 18-21, will be highlighted by the 25th Anniversary of the United States Air Force. The Air Force will hold a two-day National Capital Area Open House and Air Show at Andrews AFB, Maryland, on Saturday, September 16 and Sunday, September 17. The special Anniversary observances will also be highlighted by an Air Force Band Concert at Constitution Hall on Sunday evening, September 17.

All reservation requests for rooms and suites should be sent directly to the Sheraton-Park Hotel's Reservation Office, 2660 Woodley Road, N.W., Washington, D.C. 20008. Be sure to refer to AFA's Annual National Convention when requesting your reservations, otherwise, your reservation request may not be accepted by the hotel.

AFA's Annual National Convention activities will include luncheons for the Secretary of the Air Force and the Air Force Chief of Staff, an AFA Reception, and the USAF's Silver Anniversary Reception and Dinner Dance. The National Convention will also include AFA's Business Sessions, an Air Force Symposium, an Air Force Reserve and Air National Guard Seminar, and several other events, including the President's Reception for AFA's Chapter Officers and Official Convention Delegates, The Annual Outstanding Airmen Dinner, and the Chief Executives' Buffet Reception.

With the special observances of the Air Force's 25th Anniversary, a record attendance is expected at AFA's National Convention, and we urge you to make your reservations at the Sheraton-Park Hotel as soon as possible.

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TENTATIVE SCHEDULE OF EVENTS

SATURDAY, SEPTEMBER 16

All Day	USAF 25th Anniversary—National Capital Area Open House & Air Show, Andrews AFB, Md.

SUNDAY, SEPTEMBER 17

All Day	USAF 25th Anniversary—National Capital Area Open House & Air Show, Andrews AFB, Md.
12:00 NN	Registration Desk Open
8:00 PM	USAF 25th Anniversary Concert, Constitution Hall

MONDAY, SEPTEMBER 18

8:00 AM	Registration Desk Open
10:00 AM	Opening Ceremony & Awards
1:00 PM	1st AFA Business Session
7:00 PM	AFA President's Reception

TUESDAY, SEPTEMBER 19

8:00 AM	Registration Desk Open
8:30 AM	2d AFA Business Session
9:00 AM	Briefings & Displays
11:45 AM	Briefing Participants' Buffet Luncheon
11:45 AM	USAF Chief of Staff Reception
12:30 PM	USAF Chief of Staff Luncheon
2:30 PM	Air Force Symposium
6:00 PM	AFA Anniversary Reception

WEDNESDAY, SEPTEMBER 20

8:00 AM	Registration Desk Open
9:00 AM	Briefings & Displays Open
11:45 AM	Briefing Participants' Buffet Luncheon
11:45 AM	USAF Secretary's Reception
12:30 PM	USAF Secretary's Luncheon
2:30 PM	USAF Reserve and Air National Guard Seminar
4:00 PM	Briefing Participants' Reception
7:00 PM	USAF Silver Anniversary Reception
8:00 PM	USAF Silver Anniversary Dinner Dance

THURSDAY, SEPTEMBER 21

9:00 AM	Briefing & Displays Open
11:45 AM	Briefing Participants' Buffet Luncheon
4:00 PM	Briefing Participants' Reception

AEROSPACE/DEFENSE COMPANIES TO PRESENT THEIR "HARDWARE OF THE SEVENTIES"!

Some 50 companies will present their latest advances in aerospace/defense hardware at the 1972 Aerospace Development Briefings and Displays, to be held in conjunction with AFA's 26th Annual National Convention at the Sheraton-Park Hotel in Washington, September 18-21.

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Last year, 5,483 persons participated in the Briefings and Displays, including 189 General Officers and Admirals and 549 Colonels and Naval Captains. The Secretary and the Chief of Staff of the Air Force were honored at a reception in the Exhibit Hall, attended by some 2,000 guests.

This year's Convention salutes the 25th Anniversary of the United States Air Force, established in 1947; thus attendance at the 1972 Briefings and Displays is expected to be the largest yet. The Briefing concept was developed by AFA in 1964 and has been widely acclaimed for its ability to guarantee exhibitors an audience in their booth on schedule.

Over 24,000 square feet of display space have already been assigned for 1972. Companies wishing to participate in the Briefing and Display Program should contact AFA as soon as possible. A minimum of 300 square feet is required to conduct briefings; no minimum is required to display only.

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Airman's Bookshelf

Fighters and Fighter Pilots

Fighter Tactics and Strategy, 1914–1970, by Edward Sims. Harper & Row, New York, N. Y., 1972. $6.95.

Knights in shining armor are anachronistic in twentieth-century warfare—or are they? When you get through *Fighter Tactics and Strategy, 1914–1970*, you will be convinced that the traditions and codes of knighthood are still very much in evidence.

Of course, there has always been a lot more to fighting wars than knights, steeds, grooms, and handlers—or fighter pilots, fighters, crew chiefs, and maintenance people. There have been all the other combatants as well as strong political forces and economic pressures—not to mention a little intrigue here and there. So when you look at the evolving twentieth-century innovation of air warfare, you are really restricting your overall picture of warfare. And, when you look at only the evolution of fighter operations—which is what Edward Sims has done—you get an even narrower, albeit fascinating, view of military conflict.

With that as a preface, the reader of Edward Sims's latest book should expect to find himself starting off with the employment of airpower in World War I. Building on a foundation of extensive research, the author creates vivid word pictures of air-to-air and air-to-ground combat over the World War I battlefields. With a little imagination, you can feel the shudders and shakes of those old wood and fabric flying machines and hear the wind whining through the struts and rigging.

The author's interviews are reported with such skill that the reader feels personally acquainted with the great fighter pilots of World War I: Eddie Rickenbacker and those who flew with Raoul Lufbery and Frank Luke; Grinnel-Milne, Lee, and Rochford of the United Kingdom; some who flew with Richthofen's Flying Circus; and other German aces.

There are lessons to be learned from those World War I fighter pilots who flew combat patrols and engaged their enemies in Fokkers, Spads, and Sopwith Camels. The lessons are measured in terms of what it took to succeed—both in equipment and pilot skills. But at the same time, there is the hazard of losing sight of the many other forces and pressures that influenced the outcome of the war. In his enthusiasm to tell the fighter pilots' story, the author generalizes and editorializes in his conclusions—and in doing that, he tends to overplay the role of fighter aircraft, crucial though that role might have been.

In the succeeding parts of the book, Mr. Sims focuses on World War II, Korea, and Southeast Asia. Here again, the interviews come to life before the reader. You can almost feel you are there in the cockpit beside the RAF greats, Bird-Wilson, Cunningham, and Rosier; or their American counterparts, Preddy, Meyer, and Johnson; or high-scoring Luftwaffe aces like Hartmann, Rall, and Rudorffer.

Which fighter was the best? Was it the ME-109 or the Spitfire, the P-51, the P-47, or the Focke-Wulf? Or was it the skill and daring of the pilots, or the inevitable toll of numerical superiority? The reader can judge for himself—but it won't be easy.

In Korea, the reader's job is easier because the superiority of the F-86F (with American pilots) over the MIG-15 (with whatever pilots) becomes quite apparent. A more even balance is portrayed in the encounters between F-4s and MIG-21s over North Vietnam.

But it all comes back to the lesson of gaining the advantage—and how to do it. As Gen. John C. Meyer observes in the Foreword, the successful fighter pilot attacks from above, out of the sun, and fires at point-blank range—*whenever he can*. The problem comes when he can't. It is then that those who choose to stand and fight must consider the host of variables that will in the aggregate determine the outcome.

In the end, the author again generalizes beyond the bounds of his material. He concludes that fighters used as fighters—and not tied too closely to the bombers—win wars, and bombers cast in the role of fighter-bombers (such as the B-52s at Khe Sanh) also help.

Substantiation for such a bold conclusion is lacking. The author has presented only a single facet of military force: fighters and their pilots. However important that narrow facet might be, it is still but a part of the much bigger whole.

That point aside, Edward Sims has done an excellent job. The end product is much more than just a collection of views, impressions, and observations. By deftly avoiding what could have been a patchwork quilt, the author develops the pattern of a successful fighter pilot. The pattern that emerges is this: He is quick but steady; he has keen vision and sound judgment; and, above all, he constantly concentrates on balancing his own capabilities and limitations—and those of his aircraft—to gain the advantage.

—Reviewed by Col. Art Barondes, Special Assistant to the Vice Chief of Staff of the Air Force.

Memoirs of a Titan

Memoirs of Hope: Renewal and Endeavor, by Charles de Gaulle (translated by Terence Kilmartin). Simon & Schuster, New York, N. Y., 1972. 392 pages. $10.00.

For twelve years, General de Gaulle sat on the sidelines and sadly watched as seventeen prime ministers of the Fourth Republic attempted to solve the problems of France, but were thwarted by "the absurdity of the regime." In domestic matters, civil servants, technologists, and the military dealt of their own accord with events while the outside world determined and obtained what it wanted from France.

By 1963, however, de Gaulle points to a rekindled long-forgotten light and warmth in France. He portrays himself as having completely overhauled France's political institutions; transformed her empire into a vast system of interdependent states; put down a serious military revolt; restored France's economy, finances, and currency; and eventually reestablished France's power and prestige to ensure her independence.

The day-to-day decisions that contributed to this rebirth of France's greatness are told with astonishing frankness by General de Gaulle in this volume of his memoirs. He writes very openly about his feelings, his intentions, and the reasons for his actions. The reader gains a new insight into this "enigma wrapped in a mystery."

De Gaulle's plan for a Europe stretching from the Atlantic to the Urals is discussed candidly as is his

attempt to found a new socio-economic system of "association" as an alternative to either capitalism or communism for the French people. In this regard, he goes to great lengths —but not very convincingly—to refute the many charges that he constantly neglected internal problems for international prestige.

His account is at its best in the detailed description of the politics he pursued to bring the Algerian war to a conclusion and the problems encountered in bringing the military to heel, especially General Salan, who had "something slippery and inscrutable" in his character. In fact, de Gaulle devotes considerable space to the question of the military's loyalty to the State. His discussion of the role of the military in society is both relevant and enlightening.

Throughout these memoirs runs the drama of de Gaulle's encounters with the leaders of the world. His comments about men such as Eisenhower, Kennedy, Khrushchev, Macmillan, and Adenauer are incisive. His revelations about a "possible deal" over Berlin by both Macmillan and Kennedy, as well as Khrushchev's charge that Eisenhower was a "second-rate fellow," make this book as fascinating as it is important.

At times, de Gaulle's self-righteousness is irritating, yet the book is essential reading for those who want to understand the making of the contemporary world. It is history at its best, written in a brilliant style with a penetrating analysis only this illustrious man could provide.

—Reviewed by Capt. John E. Merchant, Assistant Professor of History, USAF Academy.

A New View of Vietnam

The Village, by F. J. West, Jr. Harper & Row, New York, N. Y., 1972. 288 pages. $7.95.

Etched in sharp contrast to the tragedy of My Lai is this true story of a small group of US Marine volunteers who lived and fought and died in the village of Binh Nghia, only a few miles from the massacre site in the notorious "Eye" Corps area of South Vietnam. Officially their mission was to assist Vietnamese Popular Forces and police to "pacify" the countryside in this key strategic location—to help restore government control in an area long acknowledged to belong to the Viet Cong.

This is the story of brave men, both American and Vietnamese, and their interrelationships when cast together by war. It is a tale of night patrols and actions in a world that was geographically very limited, but seemed large indeed to the participants. All of the elements of human strength and weakness mingle in this kaleidoscopic picture of seventeen months of war.

Set against the complexity of Vietnamese politics, the story reveals the strange ethic that governs this internecine struggle of stealth, terror, and ambuscade. For the benefit of the reader who may be unfamiliar with Vietnam, there should perhaps be a bit more description of the structure and function of the village. This would illustrate how such insularity is possible in a relatively crowded area. However, this is a minor discrepancy.

The Village is a frank account of war at the level of the common man. The author, a Marine combat veteran, has visited the scene on numerous occasions during and after the period described. While doing a RAND study on this project, he scrupulously researched the documents and interviewed nearly all of the available survivors. He has woven the details into a narrative which holds the reader's attention. It is a must for those who would understand this unusual war. American readers may well emerge with a new appreciation of both the Marines and their Vietnamese allies.

—Reviewed by Maj. William J. Prout, Department of History, USAF Academy.

Tokyo War Crimes Trial

Victors' Justice: The Tokyo War Crimes Trial, by Richard H. Minear. Princeton University Press, Princeton, N. J., 1971. 299 pages with appendices and index. $7.95.

Richard H. Minear is an associate professor of History at the University of Massachusetts. He authored *Japanese Tradition and Western Law* and has written articles on Japan and Vietnam.

Professor Minear leaves no doubt as to the purposes of the book: ". . . to demolish the credibility of the Tokyo trial and its verdict." His area of attack covers both the basic assumptions and purposes for conducting a trial of selected military and civilian leaders of prewar and wartime Japan by an international tribunal rather than conventional military tribunals, or even of having a trial at all. The author also attacks the composition and conduct of the tribunal.

Agreeing to the need for conventional war-crimes trials, disagreement arises whether an individual performing an act of state should or could be tried for the war itself. The author takes issue with the basic rationale leading to the Nuremberg Charter, which was adopted by the Tokyo Charter to a large extent. Further, he believes, the judgment of the Nuremberg trials should not be precedent to support the Tokyo trial or any alleged changes in international law.

Besides fixing individual responsibility, the trial created a record showing the events that led to Pearl Harbor, Japanese aims in the Pacific, and the extent of participation in the Axis Alliance. Were there acts of aggression? Professor Minear discusses the difficulties the world has had in agreeing to a definition of aggression and then analyzes history to determine if the attack on Pearl Harbor was aggression. Following the theory of a defense counsel's argument at trial, the proposition is presented that the Japanese may have been exercising legitimate self-defense tactics due to the American support of China in the war with Japan.

The book studies international law in 1945, the structure and procedure of the tribunal, the qualification and behavior of the justices, and the post-trial review process. The author finds the trial to have been unjust and its judgment unsupportable. Therefore, any foreign policy founded on the illegality theory of aggressive war is wrong, in his view.

The book is well written, provides a wealth of reference sources and—subject to Mr. Minear's admitted bias and stated objective—is well worth reading.

—Reviewed by Lt. Col. Bruce Irving, Department of Law, USAF Academy.

A Diplomat Reports

Living With the Communists, by Sir Humphrey Trevelyan. Gambit Press, Boston, Mass., 1972. $5.95.

Most men read history; some men observe history being made; and a few are privileged to be a part of history. Sir Humphrey Trevelyan fits the latter, most select, category. Trevelyan has a unique talent for reporting in an admittedly biased but nonetheless informative and entertaining manner the history that he had a part in shaping. *Living With the Communists* is his finest literary effort since his retirement from the British Foreign Service in 1967.

Drawing from two of his more interesting posts in a distinguished diplomatic career, Trevelyan brings to the reader insights and revelations not

available elsewhere. The author relates in a frank, uncompromising manner the observations that only he had an opportunity to make while serving in China from 1953 to 1955, and in the Soviet Union from 1962 to 1965.

Trevelyan devotes the first part of his book to his stay in Peking. He was first an unofficial, unaccredited British envoy. After the Geneva Meetings of 1954, he became a formal British representative to the court of Chairman Mao. Arriving in China before the conclusion of the Korean Armistice talks, Sir Humphrey was unique among Western diplomats in having the opportunity to personally observe the masked events that transpired in China during a critical three years in contemporary international politics.

Through his personal contacts with Chou En-lai, Sir Humphrey was able to form insights denied to any other Western envoy. This reviewer considers the highlight of the entire book to be Sir Humphrey's personality portraits of Mao and Chou.

Trevelyan's tenure in the Soviet Union came during a time of transition within the Kremlin. Arriving a month after the Cuban crisis of 1962, his three-year stay afforded him a vantage point to view the fall of Khrushchev and the emergence of the Kosygin-Brezhnev collective leadership. Demonstrating a genuine affection for Mr. Khrushchev, the author, with an overtone of irony, reveals the lack of domestic furor within the Soviet Union at the time of worldwide concern over Mr. Khrushchev's decline from power.

Events within the Moscow diplomatic community are related in a humorous and factual style that inevitably leads to comparisons between the diplomat's lot in Peking and Moscow, with the latter coming across as a more predictable but certainly a more enjoyable tour of duty. He concludes his account of service in Moscow with a frank and open letter to Premier Kosygin that will cause both reflection and controversy by those who may be familiar with the issues he addresses.

The reader is impressed with the subtleties of diplomacy in a complex age and a dangerous international environment. Sir Humphrey covers a myriad of topics, with the major thrust on political commentary, but he still finds it appropriate to discuss the "charm" of Chinese culture and the "warmth and friendship" of the Russian people.

He also projects a discernible sympathy for American foreign policies that he characterizes as "tactically clumsy." His story blends all of these subjects into a coherent whole that even a casual student of Communist affairs will find of considerable interest and value.

—Reviewed by Capt. James F. Wheeler, Department of Political Science, USAF Academy.

Communist Party Roundup

Yearbook on International Communist Affairs: 1971, edited by Richard F. Staar. Hoover Institution Press, Stanford Univ., Stanford, Calif., 1971. 833 pages with index. $25.00.

This is the Hoover Institution's annual survey of what Communist parties are doing in ninety-five countries. Data is given on party leadership and organizational structure, party internal affairs, stands on domestic and foreign affairs, publications, and relations with other Communist parties. There also are reports on Communist front organizations, international conferences, publications, and a selection of documents. The extensive list of names associated with Communist activities, a chronology, and a bibliography make the book easy to use.

New Books in Brief

Aircraft, Engines and Airmen: A Selective Review of the Periodical Literature, 1930–1969, by August Hanniball. A former SAC pilot, now a librarian at the University of Utah, has compiled a massive guide to aviation literature, covering fifty-seven English language periodicals, but excluding highly technical journals. The book is divided into five parts: aircraft, aircraft engines, biography, air forces, and miscellaneous material. Scarecrow Press, Inc., Box 656, Metuchen, N. J., 1972. 825 pages. $20 hardcover.

German Air Force Bombers of World War Two, Vol. II, by Alfred Price. This book, one of a series on aircraft of the world, covers the Arado 234, Dornier 217, Heinkel 177, Junkers 188, and Mistletoe. There is an extensive history of each aircraft, illustrated with both black-and-white pictures and color plates. Doubleday, Garden City, N. Y., 1971. 64 pages, large format, hardcover. $5.95.

The Military Airplane: Its History and Development, by Arch Whitehouse. The prolific Mr. Whitehouse has produced a comprehensive history of military aviation from 1914 to the late 1960s. Most of the significant planes, engines, and armaments of the principal nations are covered, but the scope of the book has limited the depth of description to a point where it is interesting and useful to the layman, but not to a genuine buff. Well illustrated. Doubleday, Garden City, N. Y., 1972. 383 pages with bibliography and index. $14.95 in hardcover edition.

Peace With China?, edited by Earl C. Ravenal. The book is made up of a series of papers presented at a symposium sponsored by the Institute for Policy Studies in Washington. Eighteen spokesmen, ranging from former government officials and military men through revisionists to representatives of the New Left discuss the Nixon Doctrine, decision-making, and economic factors that relate to US-China relations. Liveright Press, New York, N. Y., 1971. 248 pages with index. $2.45 paperback.

Terror and Urban Guerrillas, edited by Jay Mallin. The book includes an introduction by the editor, and a series of writings by terrorist leaders and theorizers of the Viet Cong, Middle East, Latin America, and the US. Its aim is to acquaint Americans with what the editor believes to be a genuine problem for this country. University of Miami Press, Coral Gables, Fla., 1972. 176 pages with index. $7.95.

Wings of Adventure, by Dale M. Titler. Here are fifteen dramatic stories of civilian and military flying from early days to the recent past. Dodd Mead & Co., New York, N. Y., 1972. 364 pages with index. $6.95.

Wings of Fire, Vol. IV, by Edward Jablonski. This is the last volume of Jablonski's illustrated history of World War II's air war. It covers the closing months of war in both theaters. Doubleday, New York, N. Y., 1972. 243 pages with index, in large format. $9.95.

Recent additions to Ballantine's Illustrated History of the Violent Century series include: *Africa Korps* by Maj. K. J. Macksey; *Armoured Onslaught—8th August 1918,* by Douglas Orgill; *Their Finest Hour: The Story of the Battle of Britain, 1940,* by Edward Bishop; *Reichstag Fire,* by R. John Pritchard; *Tito,* by Phillis Auty; and *Trench Fighting 1914–18,* by Charles Messenger. Each volume 160 pages. $1.00 paperback. ■

THE CHARLESTON CHAPTER, S. C., AND THE SILVER AND GOLD CHAPTER, COLO.

cited for effective programming in support of the AFROTC and the AFJROTC program

By Don Steele
AFA AFFAIRS EDITOR

Usually, there is one AFA Chapter program each month that is so outstanding that selection of the **"Unit of the Month"** is fairly easy. This month, however, two programs—one supporting the AFJROTC and one supporting the AFROTC—in all fairness to both, had to be recognized as corecipients of AFA's "Unit of the Month" award for April. A report on the outstanding programs of the **Charleston Chapter** and the **Silver and Gold Chapter** follows:

Through two unique and commendable programs, the **Charleston, S. C., Chapter** is providing very effective support to the **AFJROTC units** in its area.

First, the Chapter established a program through which business, professional, and civic leaders are made available to the AFJROTC units for presentations that are intended to make the cadets more knowledgeable about the impact of the various businesses and professions on the local, state, and national economy, and the personnel and operating requirements of today's commerce. This program —**The Today Series**—will contribute much to producing informed citizens for the future.

Next, the Chapter conducted an **essay contest** for the AFJROTC cadets at Charleston Heights's **Garrett High School** and Moncks Corner's **Berkeley High School.**

The cadet from each school submitting the best essay on "My Responsibilities as Well as My Rights as an American," received a four-day trip to Washington, D. C. The winners —selected by a board of judges headed by **Dr. Robert W. Achurch,** head of the Department of English at the College of Charleston — were **James L. Pasquino** of Garrett High School and **David E. Badger,** who is from Berkeley High School.

In February, accompanied by **H. Foster Hamilton,** Secretary of the South Carolina AFA, Cadet Captain Pasquino and Cadet Badger were guests of the Charleston Chapter for four full days of sightseeing in Washington. The **Nation's Capital Chapter** helped with arrangements for the Washington sightseeing tours.

Sen. Strom Thurmond (R-S. C.) greets AFJROTC Cadets David E. Badger, left, and James L. Pasquino during their visit to Washington, D. C. The cadets were winners in a recent essay contest sponsored by AFA's Charleston, S. C., Chapter, and were guests of the Chapter for a four-day tour of the Nation's Capital.

The highlight of their four-day visit —during which they dined at several of the city's best restaurants and private clubs, visited AFA National Headquarters, the Pentagon, the White House, the Capitol, and many other historic and tourist attractions— was a chat with **Sen. Strom Thurmond** (R-S. C.) in the Senator's office.

Both these excellent programs contribute to the missions of AFA and the AFJROTC, and could be adopted by all AFA Chapters in areas with AFJROTC units located nearby.

We commend Chapter President **C. Hal Goodwyn** and the officers and members of the Charleston Chapter on two very effective programs.

Some fifty senior AFROTC cadets from **Colorado State University,** the **University of Colorado,** and the **University of Wyoming** have a better understanding of their future responsibilities and activities in the Air Force as a result of a recent one-day seminar sponsored by the **Silver and Gold Chapter** of Denver, Colo.—one of AFA's most recently chartered Chapters—in cooperation with the **Air Force Accounting and Finance Center** (AFAFC) and the **Air Reserve Personnel Center** (ARPC).

After welcoming remarks by **Brig. Gen. Larry M. Killpack,** Commander, AFAFC, and **Col. Willard W. Stukey,** Vice Commander, ARPC, General Killpack presented AFA's Silver Medal to **Cadet Col. Richard B. H. Lewis,** Commander, AFROTC Detachment 90, Colorado State University; and **Cadet Col. Howard M. Schrinar,** Commander, AFROTC Detachment 940, University of Wyoming.

Speaking from experience, General Killpack, a distinguished ROTC graduate from the University of Utah, urged the cadets "to seek out responsibility in your Air Force assignments, no matter whether your Air Force career will be short term or for a lifetime."

Command mission briefings by AFAFC and ARPC, as well as civilian personnel, data automation, AFROTC, and Project Aware briefings completed the first annual Joint AFROTC Seminar at the AFAFC.

An informal luncheon, attended by members of the **Junior Officers' Council,** gave the cadets an opportunity to exchange ideas with officers assigned to both AFAFC and ARPC, many of whom are AFROTC graduates.

Chapter President **Ted Stell** and the other officers and members of this fledgling Chapter are to be commended not only for an outstanding program, but for their initiative and

This Is AFA

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

Membership

Active Members: US citizens who support the aims and objectives of the Air Force Association, and who are not on active duty with any branch of the United States armed forces—$10 per year.

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Cadet Members (nonvoting, nonofficeholding): US citizens enrolled as Air Force ROTC Cadets, Civil Air Patrol Cadets, Cadets of the United States Air Force Academy, or a USAF Officer Trainee—$5.00 per year.

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Objectives

• The Association provides an organization through which free men may unite to fulfill the responsibilities imposed by the impact of aerospace technology on modern society; to support armed strength adequate to maintain the security and peace of the United States and the free world; to educate themselves and the public at large in the development of adequate aerospace power for the betterment of all mankind; and to help develop friendly relations among free nations, based on respect for the principle of freedom and equal rights to all mankind.

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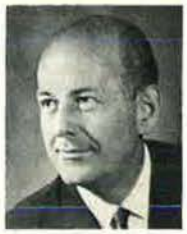
Martin M. Ostrow
Beverly Hills, Calif.



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immediate involvement in a program contributing to AFA's mission.

A recent dinner meeting hosted by AFA's **Langley, Va., Chapter** featured a presentation by **Brig. Gen. Kenneth R. Chapman** on Advanced Aircraft Prototype Development. General Chapman, who is Deputy Chief of Staff for Development Plans, Hq. Air Force Systems Command, gave a thought-provoking review of four projects proposed for initiation in Fiscal Year 1972—the Lightweight Fighter, Medium STOL Transport, Very Low Radar Cross-Section Test Vehicle, and the Quiet Aircraft.

Distinguished guests included **Brig. Gen. C. A. Pattillo,** Assistant DCS/Ops & Training, and **Col. W. P. Paluch, Jr.** (Brigadier General Selectee), DCS/Requirements, both from Hq. Tactical Air Command at Langley AFB.

More than 300 AFA, military, and civic leaders attended the **Utah AFA's** recent Dining-In honoring the outstanding NCOs at Hill AFB and observing the Air Force Twenty-fifth Anniversary.

The event featured an address by **Brig. Gen. Howard T. Markey,** USAF Reserve, who is the mobilization assignee as Assistant to the Commander of the Tactical Air Command, a former AFA National President, and a permanent member of AFA's Board of Directors.

In his address, General Markey called for pride in America—"a justifiable pride when you get things in perspective."

He said there is no basis for national guilt feelings. This is not chauvinism, he said; a "guilty nation will never solve its problems."

During the program, **Utah AFA Awards of Merit** were presented to the following Hill AFB NCOs: **CMSgt. Lee R. Bishop,** 4754th Radar Evaluation Squadron; **MSgt. Val E. Wayment,** 945th Military Airlift Group (Reserve); **MSgt. James R. Stone,** 4677th Defense Systems Evaluation Squadron; **MSgt. James R. Horton,** 1906th Communications Squadron; and **MSgt. Dean M. Daily,** 2701st Explosive Ordnance Disposal Squadron.

Also, **MSgt. Henry M. LaPrairie,** Base Hospital; **MSgt. Eddie L. Achord,** 1550th Avionics Maintenance Squadron; **TSgt. Willis Cohu,** Operating Location Detachment 6; **TSgt. Phil G. Bake,** 2952d Combat Logistics Support Squadron; **TSgt. Henry L. Montoya,** Headquarters, Ogden Air Materiel Area; **SSgt. Bernabe S. N. Kumiyama,** Headquarters 2849th Air Base Group; and **Sgt. Clarence E. Smith,** Headquarters, 1550th Air Crew Training and Test Wing.

The awards "for professionalism" were presented by **Maj. Gen. Richard M. Hoban,** Commander, Ogden Air Materiel Area.

AFA National Secretary **Nathan Mazer** presented a special AFA plaque to General Markey as a memento of his visit to Hill AFB.

AFA's eighth annual **State Presidents' Orientation Meeting** was held in Washington, D. C., February 17–18, in conjunction with meetings of AFA's **Executive Committee** and **Board of Directors.**

Twenty-six of AFA's thirty-four state organizations were represented at the two-day meeting, which convened at AFA's Headquarters offices for briefings on membership-fulfillment procedures and data-processing operations.

AFA Executive Director **James H. Straubel** chaired sessions at the International Club and at the Sheraton-Park Hotel, during which presentations were made on the responsibilities and operations of the various departments within AFA Headquarters. A special presentation was made by **James W. Carter,** Tennessee AFA President, on the unique organizational structure of his state organization, and a briefing on "The Threat," which he is in the process of developing for presentation to groups throughout his area. **Col. T. E. Lamb,** Chief, AFJROTC, Maxwell AFB, Ala., brought the group up to date on activities of the AFJROTC.

The final session was held at the Pentagon and was chaired by **Brig. Gen. Thomas P. Coleman,** Deputy Director of Information, Office of the Secretary of the Air Force. After opening remarks by **Dr. Robert C. Seamans,** Secretary of the Air Force, presentations were made by the following: **Lt. Col. John W. Walton,** Chief, Office of Resources and Proj-

At a recent Langley Chapter dinner meeting, Chapter President Lester J. Rose, left, chats with Brig. Gen. Kenneth R. Chapman, center, Deputy Chief of Staff for Development Plans, Air Force Systems Command Headquarters; and Col. Walter P. Paluch, Jr., Deputy Chief of Staff for Requirements, TAC Headquarters. General Chapman, the guest speaker, spoke on "Advanced Aircraft Prototype Development."

An Air Force Anniversary cake is the center of attention of, from left, Brig. Gen. Howard Markey, Maj. Gen. Richard M. Hoban, and Utah AFA President Glen Jensen at the State AFA's recent NCO Dining-In conducted at Hill AFB.

AFA News

Capt. William D. Smith, left, AFA Project Officer for the 3245th Air Base Group at Hanscom Field, Mass., and the featured speaker at a recent meeting of AFA's Hanscom Chapter, watches as Col. Richard M. Connor, Deputy Commander of the group, signs an AFA membership application.

ects, Office of Information, "Plans for Observance of the Twenty-fifth Anniversary of the Air Force"; **Maj. Gen. Rockly Triantafellu,** Assistant Chief of Staff, Intelligence, Hq. USAF, "The Threat"; **Mr. Joseph J. F. Clark,** Deputy Director for Legislation and Investigation, Office of Legislative Liaison, Office of the Secretary of the Air Force, "Legislative Activities"; and **General Coleman,** "The Triad."

Following the briefings, the State Presidents and members of AFA's Board of Directors were guests of the Air Force at a reception. Many military and civilian leaders of the Air Force, including Chief of Staff **Gen. John D. Ryan,** Vice Chief of Staff **Gen. J. C. Meyer,** and the **Hon. John L. McLucas,** Under Secretary of the Air Force, were on hand to talk with the AFA leaders.

Speakers at the two luncheons held for the state presidents were AFA National President **Martin M. Ostrow** and **Claude Witze,** Senior Editor, AIR FORCE Magazine.

Attending the meeting were: **John H. Haire,** Alabama; **Vic Davis,** Alaska; **William P. Chandler,** Arizona; **Floyd Damman,** California; **Roy A. Haug,** Colorado; **Daniel Callahan,** Florida; **H. L. Everett,** Georgia; **Carl W. Tipton,** Idaho; **Earl D. Clark, Jr.,** Kansas; **Ralph R. Chaffee,** Louisiana; **James Fiske,** Massachusetts; **Stewart Greer,** Michigan; **Victor Vacanti,** Minnesota; **Rodney Horton,** Missouri; **Amos Chalif,** New Jersey; **Gerald Hasler,** New York; **Robert Maltby,** Ohio; **Edward McFarland,** Oklahoma; **John Nall,** Oregon; **Robert Carr,** Pennsylvania; **James Hackler,** South Carolina; **James Carter,** Tennessee; **Vic Kregel,** Texas; **Glen Jensen,** Utah; **Richard Emrich,** Virginia; and **Norman Rowley,** Washington.

At a recent meeting of the South Georgia Chapter were, from left, Rep. Dawson Mathis (D-Ga.); Lt. Gen. George B. Simler, Commander, Air Training Command, and featured speaker; Col. Cecil E. Fox, Commander, 3550th Pilot Training Wing, Moody AFB; and Chapter President Joseph H. King.

(Photo by Jamie Connell, The Berrien Press, Nashville, Ga.)

IN SYMPATHY . . . AFA extends its deepest sympathy to the family and friends of **Alan P. Tappan,** who died in January. Mr. Tappan, the former president of the Tappan Stove Co., served in World War I as a first lieutenant pilot in the Air Service of the Signal Corps, US Army, and in World War II as a colonel in the Office of the Assistant Chief of Air Staff. A Life Member of AFA, he was the first elected Commander of the Ohio AFA Wing and was a member of the Convention Committee for AFA's first national convention in Columbus, Ohio.

CONGRATULATIONS . . . to **David H. Whitesides** of Layton, Utah, a Past President of the Utah AFA, who recently was elected President of the Hill AFB Chapter of the National Association of Supervisors . . . to **Kenneth A. Rowe** of Richmond, Va., Assistant Director of the Virginia Division of Aeronautics and Vice President of the Virginia AFA, who recently was reelected to a third term as Treasurer of the National Association of State Aviation Officials.

COMING EVENTS . . . **California AFA Convention;** Gen. George S. Brown, Commander, Air Force Systems Command, to be the featured speaker, Rickey's Hyatt House, Palo Alto, April 14–16 . . . **Massachusetts AFA Convention,** Lt. Gen. James T. Stewart, Commander, Aeronautical Systems Division (AFSC), to be the featured speaker, Hanscom Field, April 22 . . . Florida AFA Convention, the Tides Hotel & Bath Club, Redington Beach, May 4–7 . . . **Alabama AFA Convention;** Lt. Gen. George B. Simler, Commander, Air Training Command, to be featured speaker, Selma, May 12–14 . . . **Washington AFA Convention,** Aggie's Motel, Port Angeles, May 19–20 . . . **Utah AFA Symposium and Convention,** Salt Lake City, May 25–27.

AFA's Dinner honoring the **Outstanding Squadron at the Air Force Academy;** Tennessee Ernie Ford to be the Master of Ceremonies, the Broadmoor, Colorado Springs, Colo., June 3 . . . **Texas AFA Convention,** Abilene, June 16–17 . . . **Virginia AFA Convention,** Executive Motor Hotel, Richmond, June 17 . . . **Pennsylvania AFA Convention,** Holiday Inn, Sewickley, June 23–24 . . . **New York AFA Convention,** Plattsburgh, June 24 . . . AFA's Twenty-sixth **National Convention and Aerospace Development Briefings,** Sheraton-Park Hotel, Washington, D. C., September 17–21. ■

Maj. Gen. Rollin B. Moore, Jr., departing Commander of the Air Force Reserve, receives an Air Force Association citation from Dr. Dan Callahan, Georgia AFA Vice President, in ceremonies at Robins AFB, Ga.

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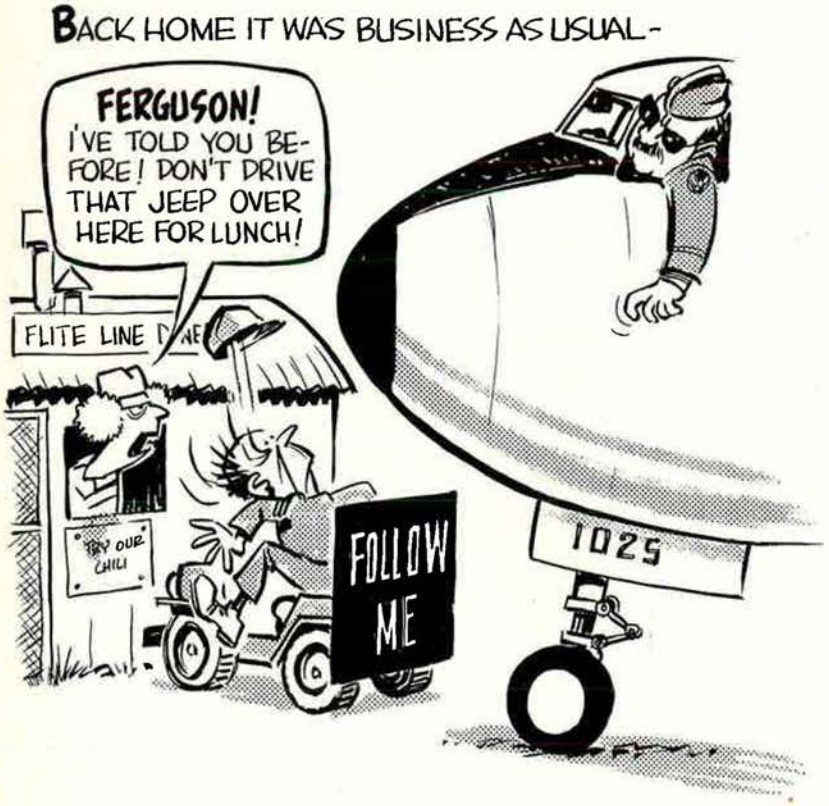
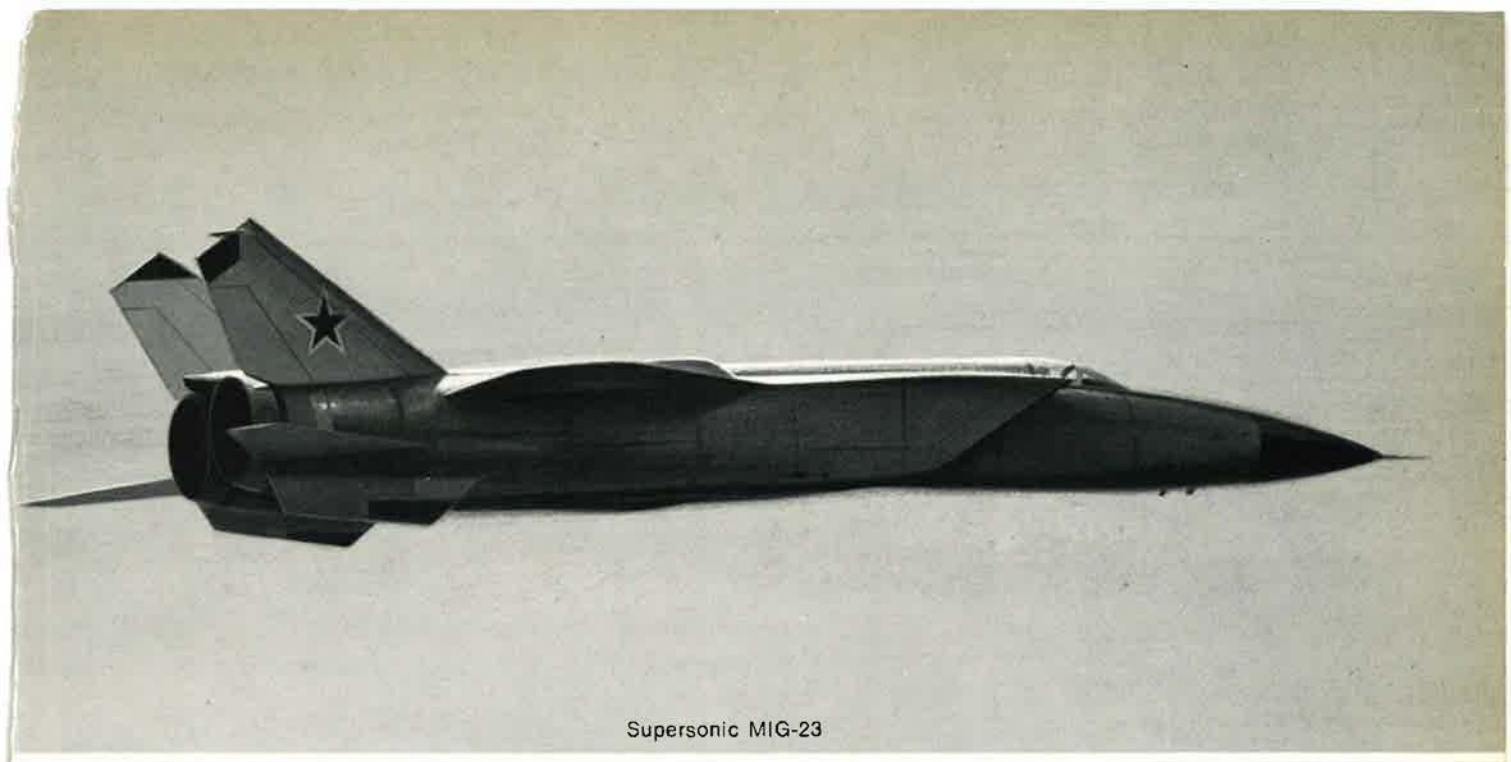
Bob Stevens'

"There I was..."

See the foe of yesteryear,
The Kamikaze "volunteer."
See the T/O—also changed.
The whole damned world's been rearranged . . .





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stability and handling qualities throughout the full flight regim
The F-4F leading edge slats reduce drag at high angles
attack, and increase tracking time on target. ☐ The new F-4F ha
greater energy maneuverability, plus all the toughness
and dependability we've built into every Phantom.
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