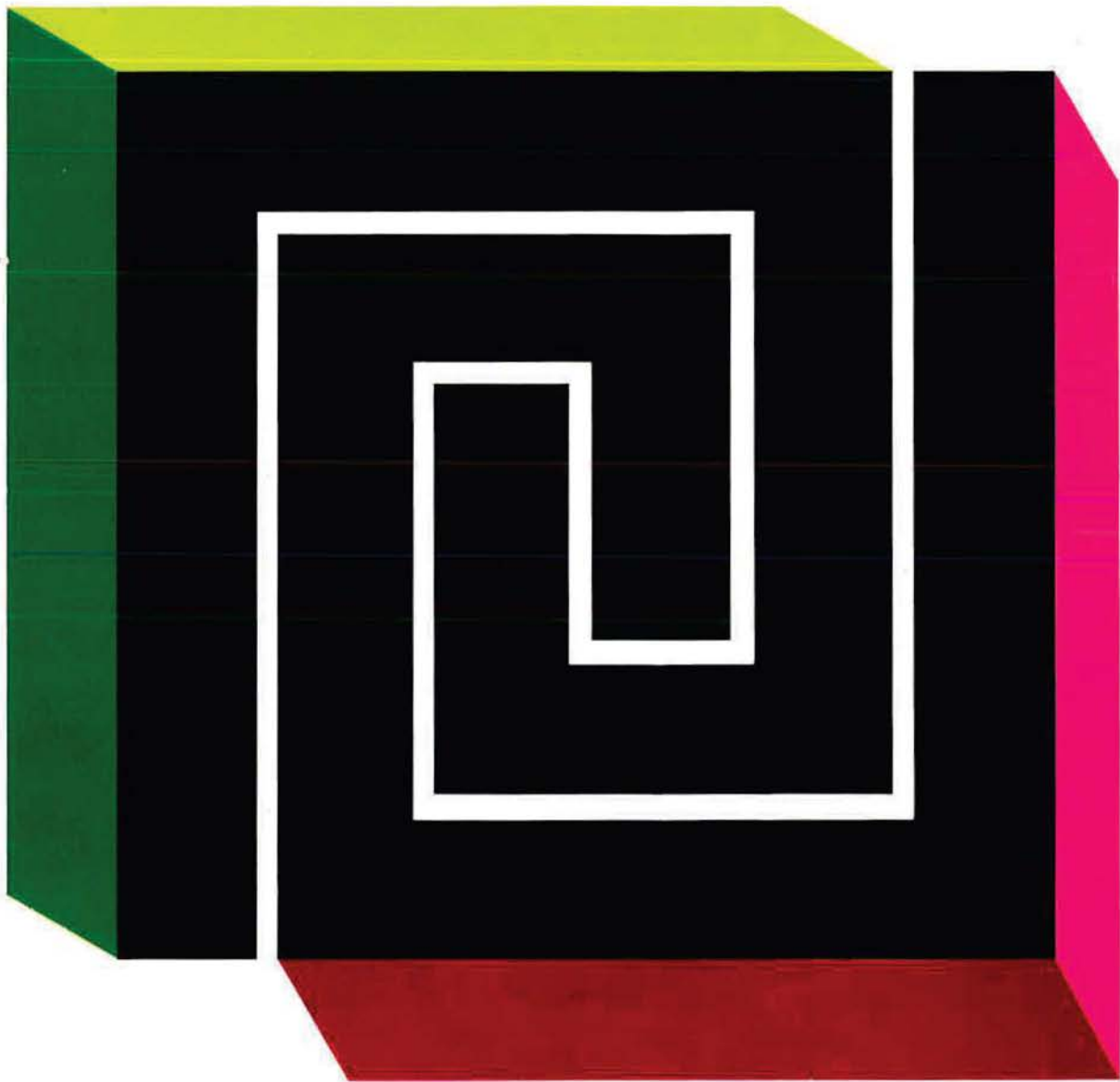


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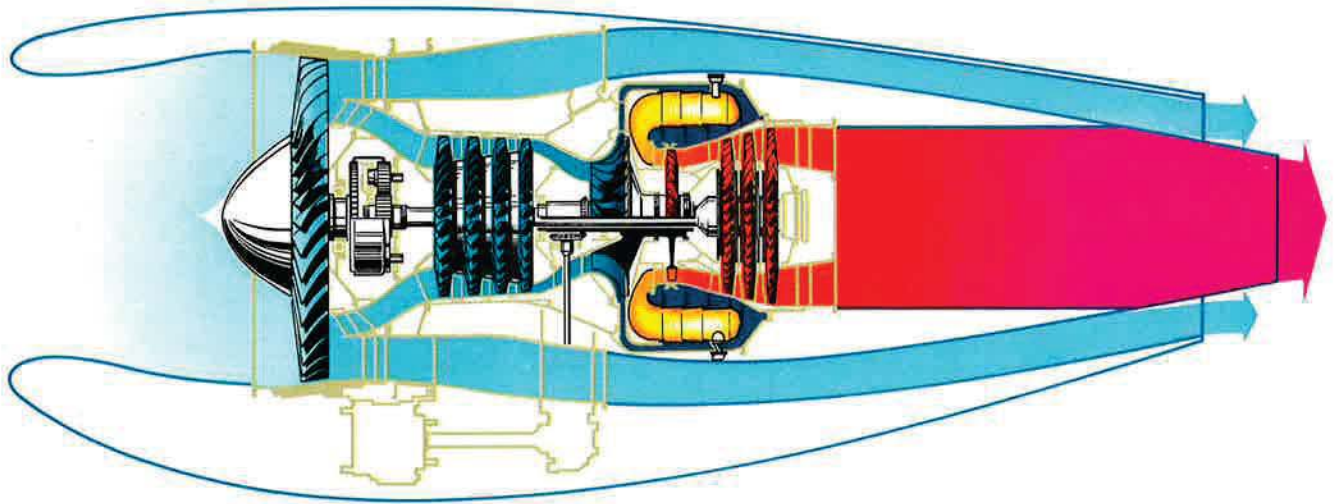
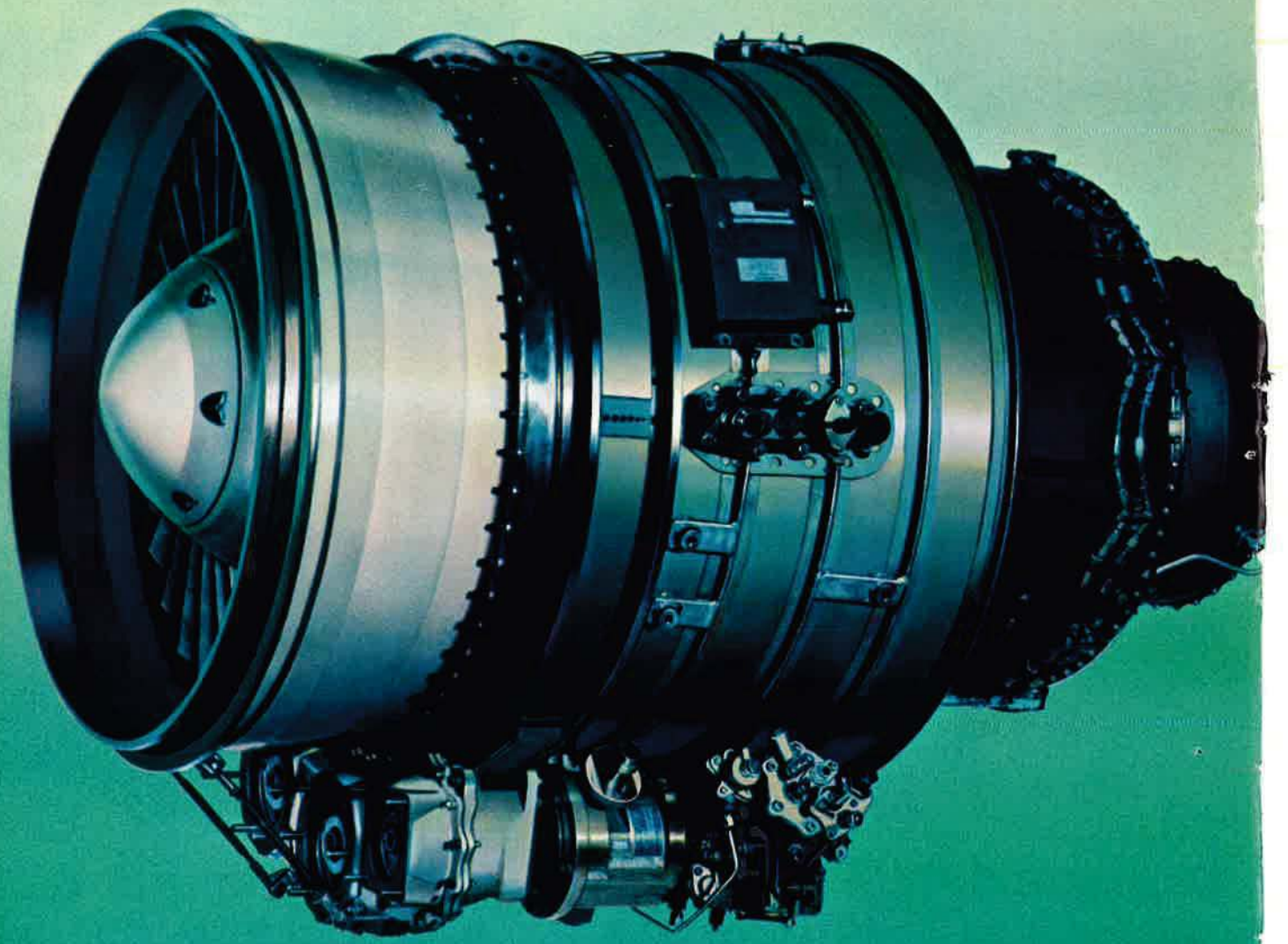
# *AIR FORCE*

*Published by the Air Force Association*

*MAGAZINE*



**The Military Balance 1971-1972**



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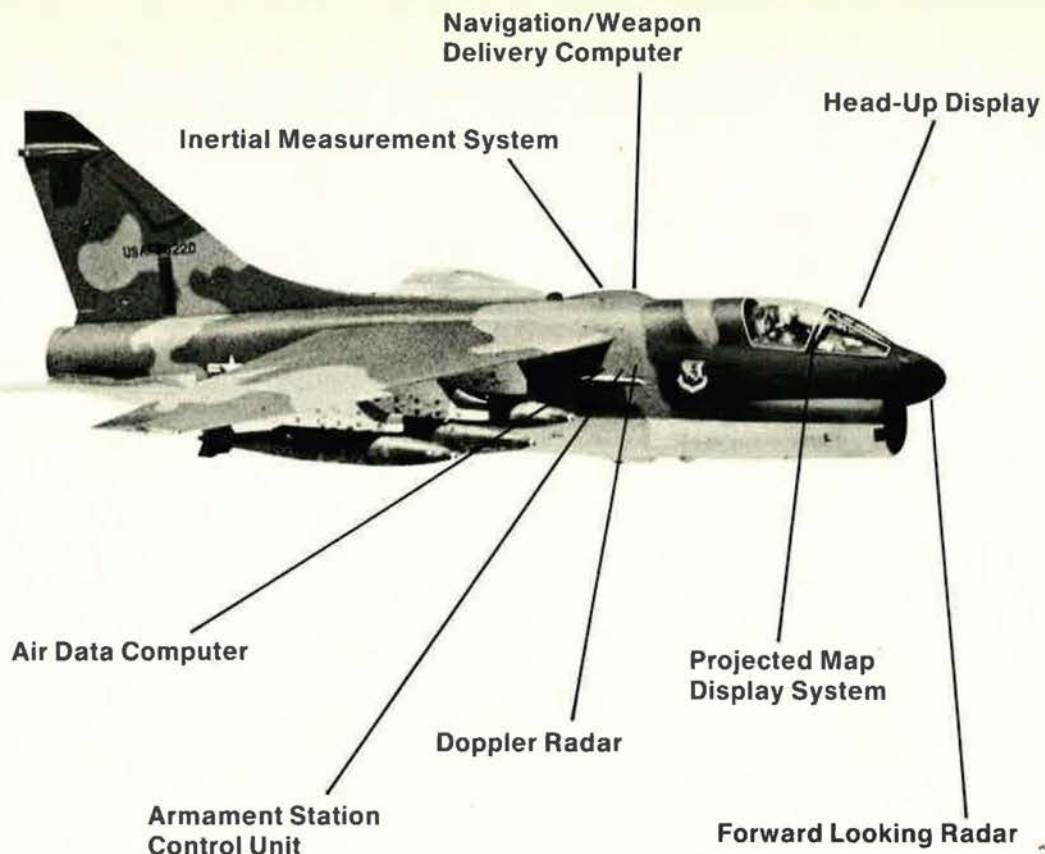
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max continuous:  
3500 lbs  
RPM . . . . . fan: 10,967  
LP spool: 19,728  
HP spool: 28,942  
TSFC . . . . . 0.493 lb/hr/lb thrust  
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# AIR FORCE

MAGAZINE

VOLUME 54, NUMBER 12

DECEMBER 1971

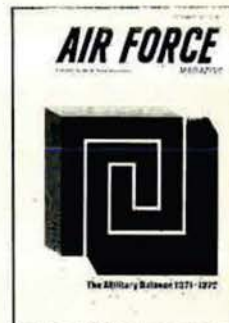
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"The Military Balance," the authoritative annual comparison of the world's military forces, appears on pages 52-110 by special arrangement with the International Institute for Strategic Studies, London.



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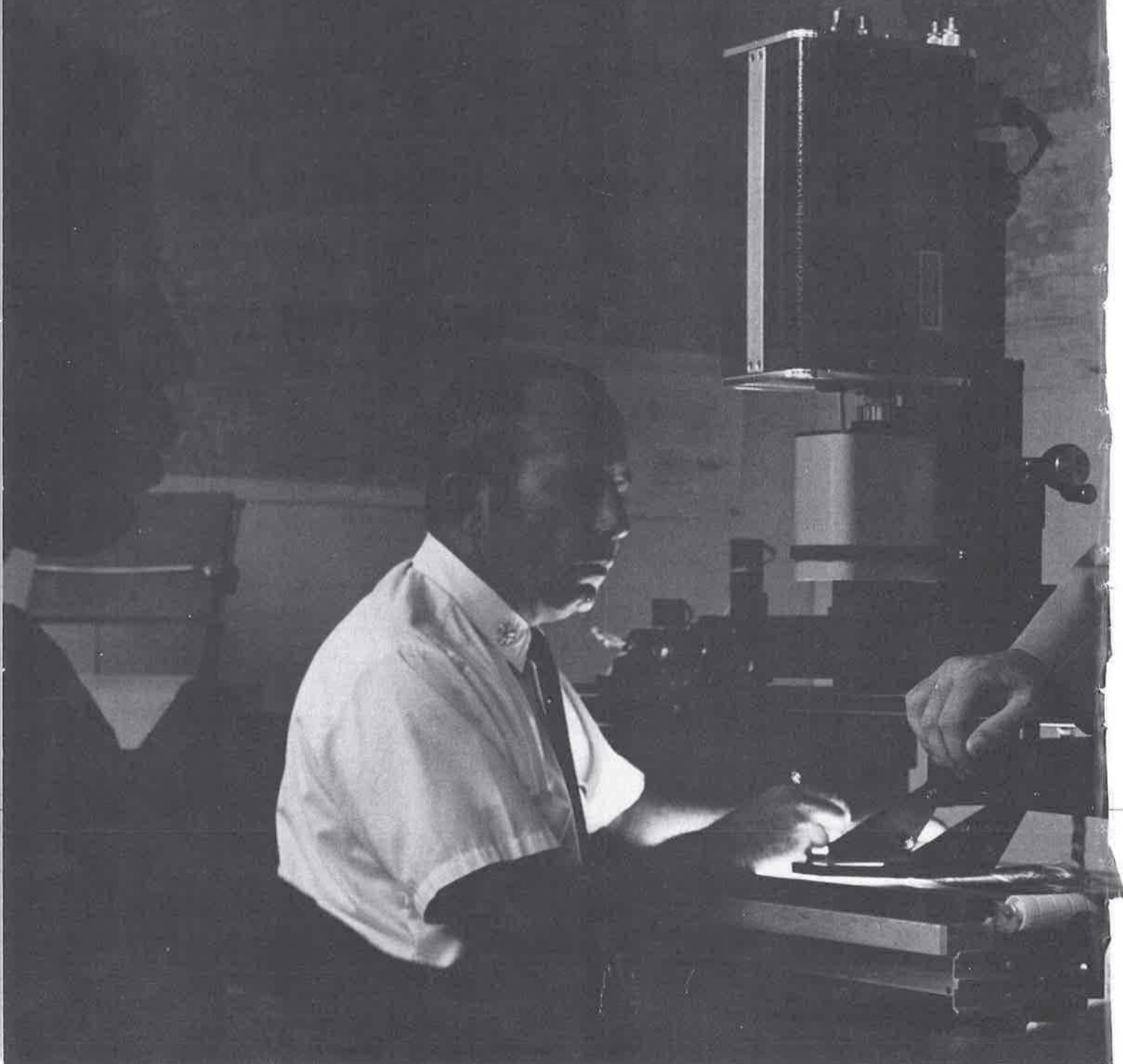
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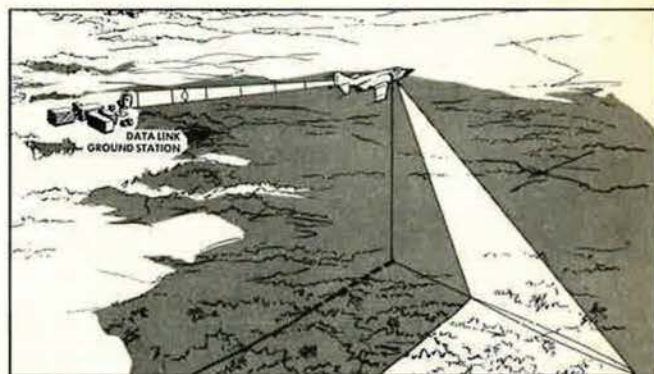
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**GOODYEAR**  
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## About Preaching to the Choir

By John F. Loosbrock

EDITOR, AIR FORCE MAGAZINE

**L**AST month Gen. George Brown, Commander of the Air Force Systems Command, urged in this magazine that:

"We should quit talking endlessly to each other, telling each other the things we already believe. In short, we're really just not going to get anywhere by 'preaching to the choir.' But what if the choir got out and started preaching to the nonbelievers? That could make a profound difference."

If we could find any serious fault with General Brown's reasoning, we would not have published the article in the first place. But we do think it deserves some amplification.

What it really boils down to is that there is no either/or choice involved. We (meaning in this context the readers of AIR FORCE Magazine) must be both the choir—the believers—and the preachers whose job is to convince the unconvinced. We must, as persuasively as we know how, make our views on national defense known to all with whom we come in communicative contact—relatives, friends, neighbors, business associates, political representatives, and our own personal circle of movers and shakers. Preachers, evangelists, salesmen—whatever analogy may best fit our personalities, abilities, and social situations—we all must help spread the word.

To do this effectively, we members of the choir must determine to our own satisfaction what "the word" is. We must be convinced and knowledgeable in our own right, or else our efforts at evangelism are not likely to be convincing. Even organized religion, from which the choir analogy springs, depends as much on teaching the faithful as on preaching to the unconvinced.

And the dynamism of aerospace ideas and hardware makes "teaching" the faithful of our own Air Force choir a task with no holidays or summer vacations. The world of aerospace power won't stand still for that. It won't stand still for our active-duty readers whose lives often are completely immersed in one particular part of Air Force operations, sometimes to the virtual exclusion of the scenery that fills out the big picture. It won't stand still for our many readers now in civilian life who find little time for ferreting out the facts behind the Air Force role in national defense.

Our editorial function, we feel, is to supply the body of factual knowledge, the argumentative rationale, the dialectic foundation out of which each reader can form his own personal brand of evangelism. Not in a dogmatic sense. We write no catechisms. Full play of both intellect and will is encouraged. Our theorems and

propositions must withstand the ideological, economic, and political pressures of the intellectual marketplace. We do not aim to print "funny money" for theoretical gamesmen, but rather to supply the hard coin of reality for what is a truly serious business.

To this end, we range far and wide in our search for purposeful editorial content. We aim, not only to please, but also to inform; not only to entertain, but also to stimulate.

Thus it is that, in this issue, we bring to our readers the only available current, comprehensive, and unclassified survey of world military power—"The Military Balance." There is no point in pretending that it is in any way competitive with *Portnoy's Complaint* or *Peanuts* for light reading of a winter's evening. Rather, it provides those with the desire and need to use it with a convenient and authoritative yardstick against which to lay a great many assertions made glibly and without foundation by those who pretend to expertise on military matters.

Likewise, it is in the interest of providing solid and impassionate facts that we bring to our readers, on a regular bimonthly basis, the *Supplement to Jane's All the World's Aircraft*. John W. R. Taylor and his able colleagues are without peer in the assembly, assessment, and presentation of all that is new and important in the world of aerospace hardware.

We recommend these features highly to those members of the choir who feel the call to evangelism. We urge also a close study and analysis of AFA's Statement of Policy, published in our November issue, along with the Policy Resolutions from the 1971 Convention.

It should also be pointed out at this juncture that much of what appears in this magazine gains circulation well beyond the "choir," through reference and reprints in other publications, in official government documents, and in the *Congressional Record*.

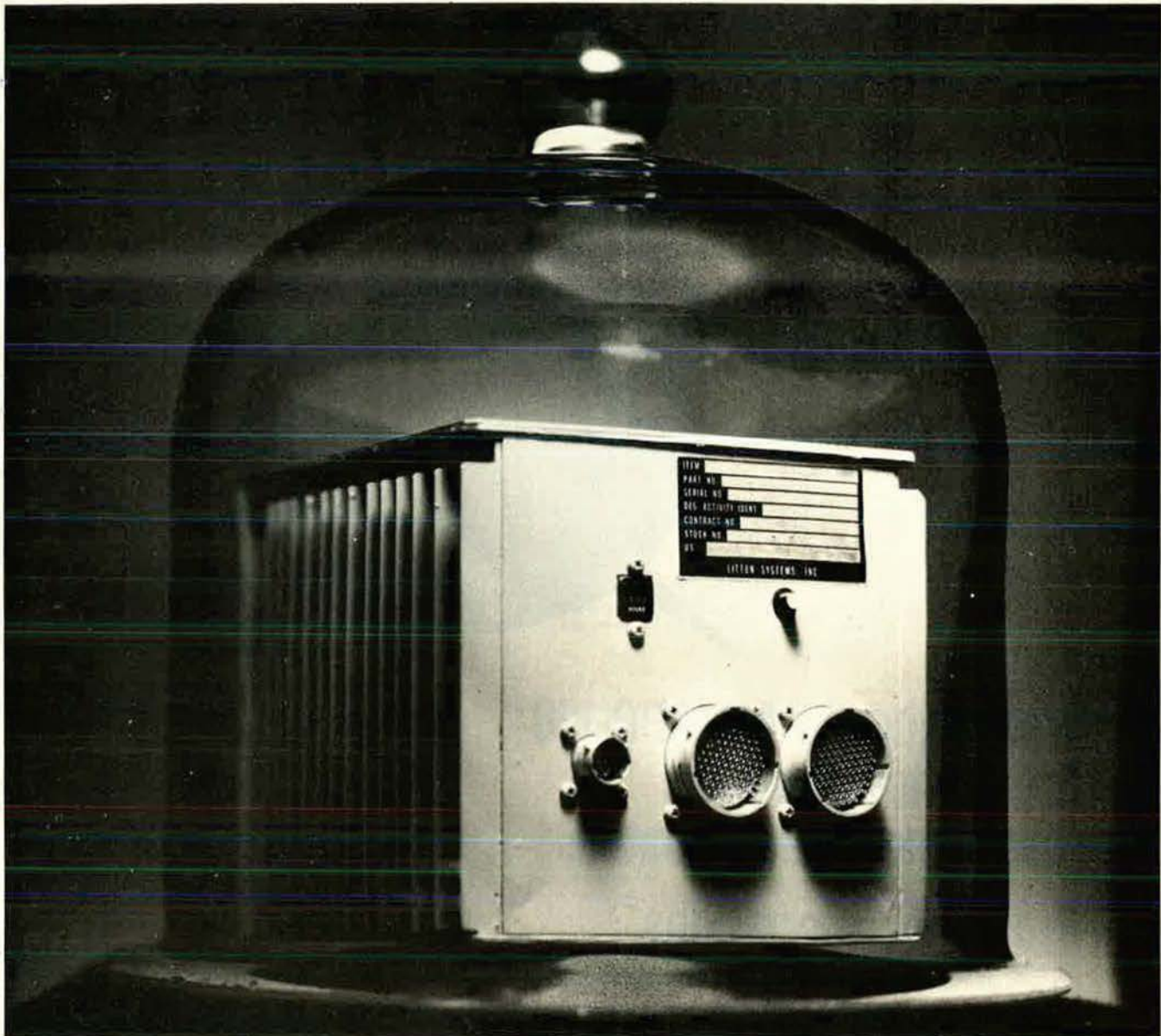
Thus, we find no quarrel with those who urge preaching to wider and more variegated audiences than "the choir" provides. The need for widespread documentation of the threat, of the Triad concept of deterrence, of the manifold social benefits provided by the military establishment, has never been greater or, in many ways, more difficult to articulate.

Our function will continue to be, as in the past, to provide as authoritative and complete a "bible" as we are able.

It is up to you to seek out the pulpits, preach the sermons, and convert the ill-informed and apathetic. ■



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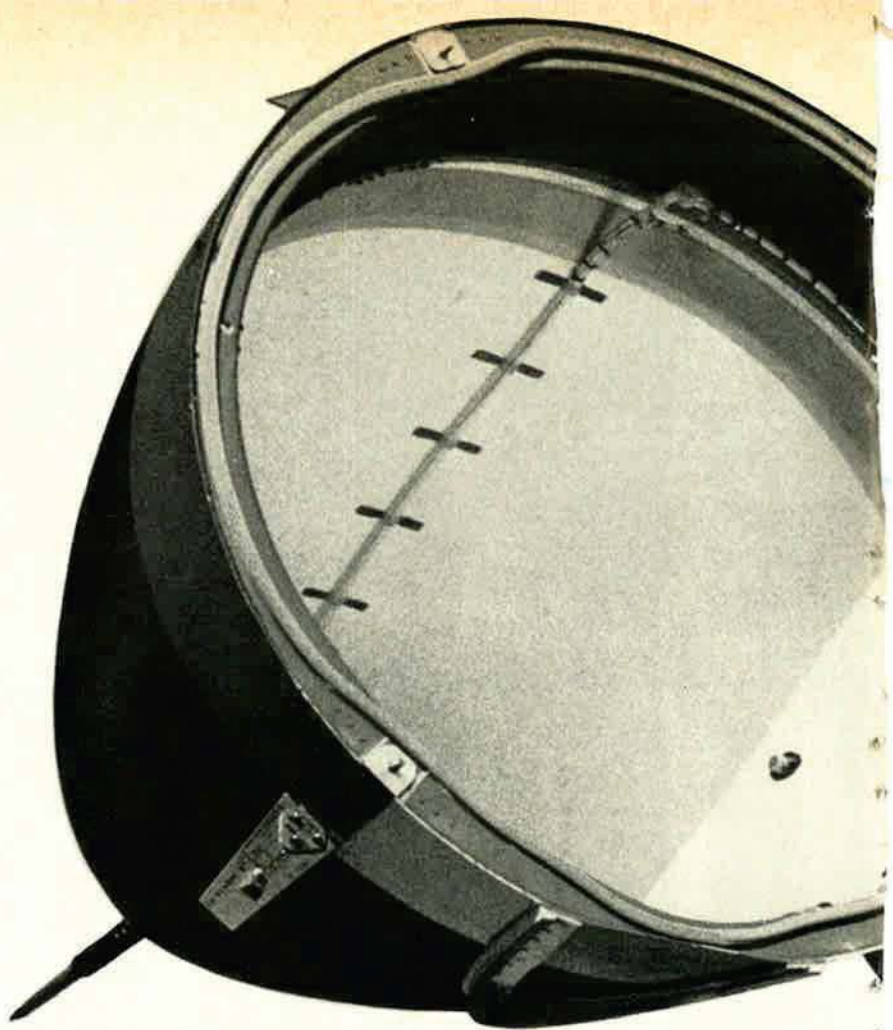
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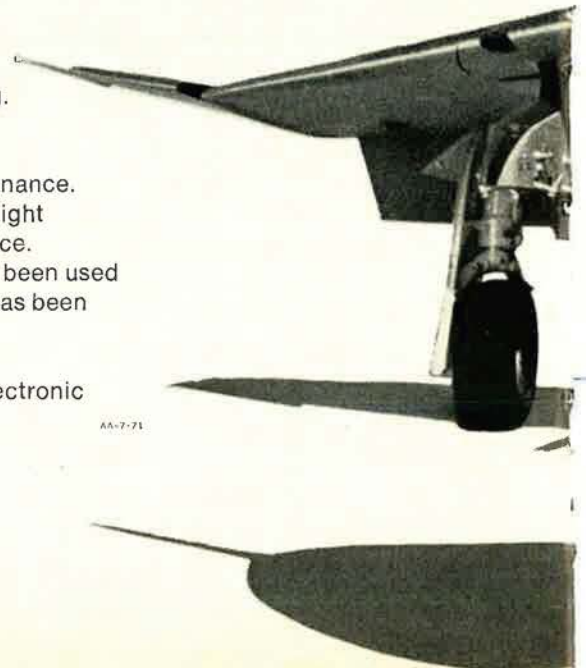
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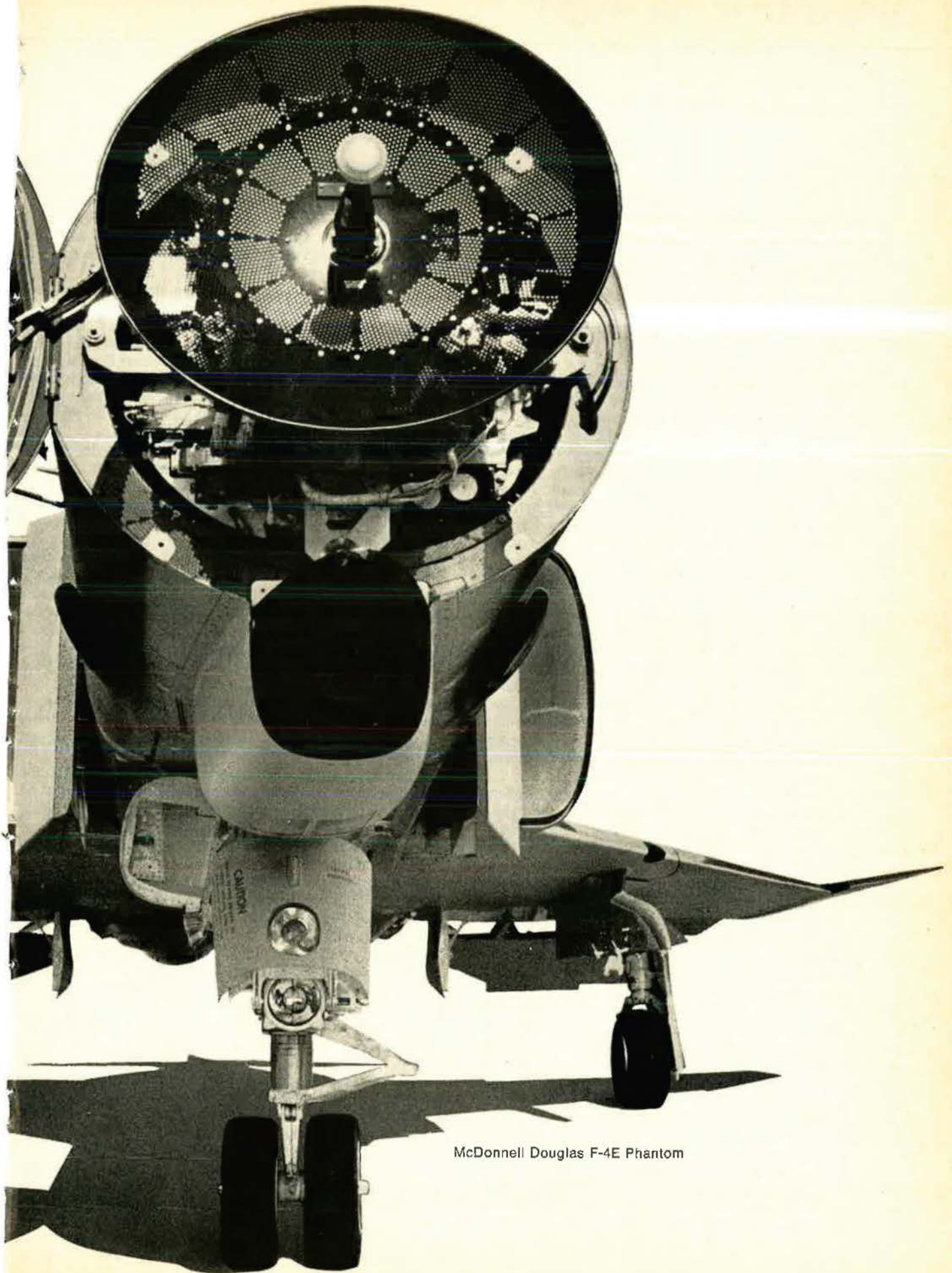
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# Airpower in the News

By Claude Witze

SENIOR EDITOR, AIR FORCE MAGAZINE

## The Procurement Jungle

WASHINGTON, D. C., NOVEMBER 10

As 1972 comes around the corner, in this holiday season, it behooves all of us to take a close look at some of the trends that have become more pronounced. We must separate them, if we can, from the ones that have proved ethereal. There is no area in which this is more important than that of procurement. For the aerospace industry, in particular, the coming year can, and probably will, be critical.

The blunt fact of the matter is that private ownership and control of this industry is in peril. The clamor for extreme measures has grown louder. We do have a Commission on Government Procurement, set up by an act of Congress, that has the mission of analyzing the federal statutes on procurement. The result is supposed to be a set of recommendations that will unify and clarify procurement regulations for all branches of government. The report now is due by December 31, 1972. It will not call for extreme measures, obviously, but it is safe to forecast that the outcome will be under fire before the type is cold.

Meanwhile, the Aerospace Industries Association has published a report, aimed at the Procurement Commission and all other interested parties, proposing a set of Federal Procurement Principles to "establish the framework for governing, with fairness and equity, the fundamental contracting relationships between the federal government and the private sector." This document, which we will report on at greater length, speculates that government contracting with private enterprise may be the world's biggest business. It estimates that Uncle Sam spends about \$100 billion a year for goods and services, almost one-half of the national budget.

Troubles that beset the aerospace industry's segment of this market now seem to be the only ones in the public spotlight. There are headlines in it, and votes. The industry suffers from overcapacity at this time. There have been some major disasters. The critics blame this on the industry, despite strong evidence that it often was the customer who made the basic bad decisions. AIA, in its report, resorts to characterizing the situation as one of monopsony—a market where a single buyer has commanding leverage over the seller—and says that, like monopoly, this condition is a breeding place for abuses.

The clamor for a radical solution is not going to decline in 1972, efforts of the industry and the Procurement Commission to the contrary. One evidence of this came up a couple of weeks ago, when John Kenneth Galbraith, the Harvard economist and guru of the New Left, came to town as a guest of Ralph Nader, to talk about corporate power in the United States. Mr. Nader is in favor of having the federal government in charge of chartering all US corporations. He says the present system of scattering this power among the states results in too many loopholes and abuses. Challenged to support this idea, the best Professor Galbraith could do is come up with a suggestion that we nationalize the defense industry, starting with General Dynamics Corp. and Lockheed Aircraft Corp.

Now, compared with Mr. Nader's idea, this is juvenile stuff. The defense industry already is heavily policed by the customer. This is done from the Pentagon, the Congress, and some outside agencies such as the Renegotiation Board. Professor Galbraith paid no attention to these things, and he obviously thinks they are inadequate, if he knows they exist.

Mr. Nader was staging a meeting called the Conference on Corporate Accountability, which appeared to be his effort to inject the issue of corporate power, its use and misuse, into the 1972 presidential campaign. The only candidate to pay any attention was Democrat Fred R. Harris of Oklahoma, the populist, who said corporations wield political power and are a menace. He said that the tools of corporate power are "all legal, but all contrary to the public interest." Today, he dropped out of the race.

Mr. Nader pressed his concept of having the federal government take charge, instead of the states. It was significant, to this listener, that neither he nor any of his dozen panelists faced up to the problem of how a federal corporation control agency would operate. The job would be too big to be set up as an activity of the Commerce Department, for example. We later asked a man with wide corporate experience how many bureaucrats would be required to operate a federal agency with this mission, and his guess was 135,000, considering the way bureaucrats operate in town these days. That is about five times as many people as are employed in the Pentagon. It is interesting that the existing bureaucracies—cumbersome, inefficient, self-perpetuating—are themselves frequent targets of Mr. Nader's ire. If he thinks that a new Department of Corporations would be any different, even under a Secretary Nader or a Secretary Galbraith, he did not say so.

There were some other strange devices enunciated at the Conference on Corporate Accountability, but almost no realism. These ideas are not important to the aerospace industry, specifically, but are worth mention for their flavor alone. General Motors, of course, was beaten again, to a pulp. A professor from Yale, Robert Dahl, said he was astounded to learn that corporations, particularly GM, are interested in profit when everyone knows their contribution to our society should be their paramount concern. He challenged the idea that stockholders should control a corporation. He can find "no moral or philosophical basis for such a special right." He opined that maybe the consumers or, in line with Mr. Nader, that the general public should control corporations.

A professor from Utah, John Flynn, also does not like stockholders. He says they lead to the concentration of wealth and aggravate what he considers to be a maldistribution of wealth in our society. He says wealth is accumulated "in the hands of those who do nothing to create or expand wealth." Mr. Flynn is described as a professor of law, not economics.

Then, there was a Professor Gilbert Geis, from California, who gave a speech about law 'n' order. He wants heavy penalties inflicted on business executives who violate the laws controlling business. He said a jail term helps to inculcate "moral values." Mr. Geis also detects that

many acts which "seriously harm, deprive, or otherwise injure the public" are not defined as crimes, although they "clearly deserve severe criminal penalties."

At this point it would not be accurate to say that Ralph Nader's Center for Corporate Accountability, which sponsored the two-day meeting at the capital's Mayflower Hotel, can do anything to increase the burdens already on the back of the aerospace industry. With too much capacity, too much competition, too many controls, and insufficient funding, it would be hard to compound the trouble. The fact remains that some form of government trusteeship, if not the out-and-out nationalization recommended by Professor Galbraith, is a threat. Both the Commission on Government Procurement and the Aerospace Industries Association seem to realize this. AIA's study argues, in essence, that the courts have, over the years, recognized that the government should behave like any other customer and follow "the same rules and practices of the commercial marketplace as an individual, except where clearly necessary to protect the sovereign interest."

At the top echelon of the executive departments, this appears to be accepted. Even Robert McNamara, as Secretary of Defense, paid obeisance to the concept. He was quoted, frequently, as being concerned about the profit level enjoyed by defense contractors, in the same sense that he said it should be adequate. He meant that it should be increased. Now, the focus in the Pentagon in this respect is on David Packard, the Deputy Defense Secretary. This man, himself a giant of the corporate world, recognizes all the problems faced by the industry, particularly the relation between profit and the ability to raise capital. From the outside, it appears that Mr. Packard has been trying to stimulate his procurement people to a more liberal attitude on profits in their negotiation with defense contractors. He also is reported to have under consideration a change in the rules that would permit the recovery of interest charges when a contractor has to borrow money. It is an example of a business cost that is passed on to the customer in all normal commercial transactions.

According to a recent article in *The Wall Street Journal*, Mr. Packard "wants to increase a contractor's incentive to invest in new plant and equipment that would improve productivity and lower costs. And he would like to eliminate inequities in the present system that make it possible for a company with a small capital investment to make a bigger profit than a company with a large investment." The *Journal* also says Mr. Packard, at the moment, "favors issuing 'guidelines' to Pentagon procurement people simply directing them to 'give more recognition to capital in establishing' profit levels."

Observers on the inside express some skepticism. This is because, in their experience, the "procurement people" resist the changes Mr. Packard is trying to bring about. They resisted them under Mr. McNamara and continue to do so. "Harnessing the profit motive" may be a commendable slogan in the front office but it is not one chanted with enthusiasm by contracting officers. Why? One reason is that congressional pressure amounts to intimidation. On the Hill, profit always is described as the "taxpayer's dollar" on the assumption that the taxpayer will vote first for the man who screams for economy, at any cost. The real slogan for the contracting officer, who knows he may have to defend his action under congressional scrutiny, is "play it safe." As far back as 1955, the Hoover Commission staff found that forty-six percent of the military buyers and seventy-three percent of the contractors they questioned were so fearful of congressional critics that they placed more emphasis on curtailing profits than they did on the ultimate price. No doubt, these percentages have increased substantially by this time.

The AIA study just released does not go into these fine

details, but it does give attention to government power and how it is exercised. The proper name for it, AIA says, is monopsony—to repeat, the condition that exists in a market when there is only one buyer. AIA says "the buyer has commanding leverage over the seller unless . . . control is maintained." It has that much in common with monopoly, although the roles are reversed. "Both conditions are considered by the economist to be extremes of imperfect competition and undesirable imbalance for an ideal marketplace," AIA declares.

The power of the sovereign customer, in the case of government procurement, is used in what AIA calls "the elusive cause of 'public interest.'" Then, there is this observation:

"This is at least partially due to the competition among and within agencies for funds, authority, control, and so forth, which often result in actions more in the agency interest than in the public interest. Further, the environment of public contracting provides strong incentives for the natural inclination of sincere and dedicated people to find and use every advantage which sovereign power pro-

### AIA's Ten Proposed Procurement Principles

The Aerospace Industries Association suggests that these ten principles have precedence in all federal procurement actions:

- The government favors the use of and will procure to the maximum extent from private enterprise to fulfill its needs for goods and services.
- All government procurement actions, including those resulting from actions of sovereignty, shall be based on a doctrine of fairness and equity.
- The government shall abide by the same business principles that govern others in the field of commerce.
- The government, when its procurements comprise the sole or dominant share of a market, shall recognize and avoid the use of its monopsonistic leverage to exact unfair or inequitable contractual arrangements or conditions.
- The opportunity to earn a reasonable profit shall be fostered in government procurement commensurate with the risks assumed and comparable to similar commercial endeavors.
- Government procurement shall acquire the benefits of competition through the use of either formal advertising or negotiation.
- The government shall pay fair prices for goods and services by accepting all ordinary and necessary costs, consistent with accepted commercial practices.
- The government shall issue procurement regulations as required to establish equities and protect the public interest while at the same time assuring that regulations are not excessive, conflicting, or impose undue costs.
- Formal criteria for the content, development, and approval of all procurement policies, regulations, and procedures shall be established by each agency, be common among agencies where possible, and be consistent with these Federal Procurement Principles.
- The government recognizes and shall protect the rights of affected parties to participate in the procurement regulatory process and to seek independent review of such regulations for amendment or repeal based on these Federal Procurement Principles.

## Airpower in the News

vides. Acts purportedly based on sovereignty, when such is not absolutely clear and obvious to all, are more apt than not to land on the wrong side of fairness and equity."

It continues, with an eye on the contracting personnel: "Such powers, by their very nature, are readily available to those in the lower tiers of bureaucracy where the bulk of contracting decisions are made. Their positions, far from the seats where power is checked and balanced and perspectives are broader and farther ranged, are nevertheless close enough to borrow added strength when this is deemed useful or necessary."

"This is not to suggest malicious intent, but rather to recognize human behavior and the sheer size and complexities of managing what, in the Department of Defense alone, amounts to about ten billion procurement actions per year. It is also recognition that it is very easy to assume mistakenly that an agency's needs and desires are synonymous with the 'public interest.'"

On the subject of monopsony, AIA says it has "almost totally avoided formal controls to prevent abuses." This is a subject previously explored, to our knowledge, by Merton J. Peck and Frederic M. Scherer nearly ten years ago in their Harvard University study called "The Weapons Acquisition Process." They are worth quoting here to this extent: "Just as contractors often seek to avoid the risk of loss, government contracting officers commonly wish to minimize the risk of especially profitable contract outcomes which might reflect unfavorably on their negotiating ability." That is what the Hoover Commission staff said, in its own language. AIA, obviously, thinks there is truth here, a truth that is missed by too many of the industry's critics.

AIA charges that "pressures have become commonplace" as the monopsony tries to enforce lower prices and inequitable contract terms. Risks are being shifted from the customer to the contractor, with no compensating opportunity to increase profit. Contractors are denied the right to reimbursement for many necessary costs, which "means that these government agencies are using their monopsonistic leverage to get advantageous prices by not paying for all ordinary and necessary costs the contractor must incur in delivering the product." AIA says this impact in defense contracts with the aerospace industry has quadrupled in the past eight years and has reached the point where it equals thirty percent of before-tax profits. Interest on loans, mentioned earlier, is one of these. Others are independent research and development, leasing, and patent charges.

On the subject of profits, AIA finds too common the portrayal of government business as synonymous with profiteering. It points out that in Fiscal 1970 the Renegotiation Board received 4,400 filings from contractors. Of these, 1,029 showed that the contractor lost money on the deal. In only 123 cases was there a determination of excess profits. AIA says aerospace contractors face a high degree of risk and that they should be rewarded for accepting that risk. If the rule is not followed, available capital will go elsewhere, where there is less risk in relation to profit opportunity.

The report cites a recent poll that found eighty-three percent of the interviewed manufacturing executives are not interested in more defense contracts. Forty-eight percent of these same men considered defense business as their line of work. Equally important, and related, was the

count of bankers covered in the poll. Seventy-two percent of those questioned said they are not interested in financing defense work. As reported earlier, this is the factor that deeply concerns Deputy Secretary Packard, and it is the one he is trying to get across to military procurement personnel.

The AIA report goes into the industry's competition with the outmoded arsenal concept, arguing that there is an erosion taking place, with more work going "in house." This helps support the bureaucracies, but is not in the public interest from a standpoint of efficiency or economy. So far as competition among contractors is concerned, it should be fostered, but there are many misconceptions about how to accomplish this. One myth is the idea that there is no competition where there is negotiation. The truth, says AIA, is that "high-cost, sophisticated products and services cannot be wisely and effectively procured except through negotiation. . . ." And, "the myth that negotiated procurements are not competitive should be dispelled."

The weaknesses of existing regulations are fully explored, but not with any greater detail than that put out since 1969 by the Military Operations Subcommittee of the House Committee on Government Operations. These were the hearings that led to the law creating the Commission on Government Procurement. AIA accuses the legislative branch of not giving more than cursory attention to procurement regulations, a charge that can be supported from the transcript of many committee hearings and floor debates. The regulations are patched, never replaced. The effect, again, is reflected in the conduct of contracting officers. Policy changes do not penetrate into the bureaucracy. The costs attributable to procurement regulations are impossible to find. They must be staggering.

For a copy of the AIA report, address a request to the Office of Public Affairs, Aerospace Industries Association, 1725 DeSales Street, N. W., Washington, D. C. 20036.

The procurement jungle at least is recognized and is getting attention from the legislative and executive branches of the government. The competence and possible result of the work being done, particularly by the Commission, is not something on which any sensible man would speculate. The one certainty is that the subject is critical, particularly in the aerospace part of the procurement spectrum. Without improvement and acceptance of these improvements at all levels in the bureaucracy, the concept of industry as a key partner in defense is in peril.

### The Wayward Press (cont.)

There are a couple of recent quotes that are worth your attention. One of them comes from the November issue of (MORE), a new journalism review published in New York. There is an article in it dealing with California newspapers and how they covered a recent Ralph Nader report. Here is the first sentence from the article, under the by-line of Bob Kuttner:

"Nearly all of Ralph Nader's reports are released in Washington, where much of the press corps shares his gusto for taking on the bureaucracy and journalists regard him as a comrade-in-arms."

In the New York *Times* of November 7, there is an article about recent staff changes at the Washington *Post*, with some suggestion that there is an upheaval under way at the latter publication. The details are not important here, but Benjamin C. Bradlee, the *Post's* chief news executive, was interviewed, and is quoted as saying:

"Yes, there has been an increased effort to be sure we're being fair. The condition of society makes that mandatory."

Mr. Bradlee, meet reporter Kuttner of (MORE). ■

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## Tac Weapons Meet

*Gentlemen:* Your October issue coverage of "Best Hit '71—Modern Weapons in an Old-World Setting" [by Lt. Col. Harold A. Susskind], the AIRSOUTH International Weapons Meet, was outstanding.

Because of your excellent treatment of the story the many readers of AIR FORCE Magazine will have a better understanding of the capabilities of the Air Forces of the Southern Region as well as the close cooperation which exists between them and the visiting US forces.

We hope you can be with us at Best Hit '72, the AIRSOUTH meet scheduled to be held in Greece next year.

LT. GEN. FRED M. DEAN  
Commander  
Hq. AIRSOUTH  
Naples, Italy

## A Change in Approach

*Gentlemen:* My assistant, some of our cadets, and I attended the Annual Air Reserve Forces Seminar held on Wednesday afternoon during AFA's Silver Anniversary Convention. We enjoyed seeing the displays and exhibits, and hearing the various speakers. Renewing some old acquaintances was a particularly enjoyable aspect of the Convention.

I would like to comment on the theme of what was said by the seminar members. Sitting on a university campus I could not be more aware of the image problem of the military. I do not believe that getting new and better hardware, and "working harder," is the answer to our problems. These are only partial answers. More fundamentally, we need basic shifts in our total approaches, especially in the area of people problems. We can talk all day about how people are our chief concern, but if we do not dramatically alter our thinking and behavior we haven't made any substantial progress.

With a view toward recruiting and retaining high-quality people, we need to put our resources where our mouth is. More specifically, we could use more money and better facilities to help attract qualified people into the military.

I offer the above comments because it is my hope that we will move more rapidly in the directions I have mentioned.

LT. COL. LAMBERT L. KROONE  
Professor of Aerospace Studies  
Det. 125, AFROTC  
Georgetown University  
Washington, D. C.

## Broader View

*Gentlemen:* I have just read Col. William C. Moore's "View From the Blue" [September issue]. How realistically he sets forth the comprehensive idea of the "traveling fortress" strategy. The article should do much to stimulate our leadership to do their part to help bring this vital capability into being.

COL. ROBERT D. BANKER,  
USAF (RET.)  
Boston, Mass.

## Author's Note

*Gentlemen:* You have done a fine job of editing and layout on my October article "Our First Long Step Into Space." The pictures are well chosen, and I am very pleased with the way in which you have presented the subject.

Your picture caption editor slipped up on page 59 by identifying the flying clothes the crew wears in the picture as those worn on the actual flight. Not so! They wore sweaters and jackets of odd assortment but considerably less bulky than the flying suits shown. They toyed with the idea of the suits, but gave them up as not really necessary and so it turned out. Such grem-lins do creep into publishing now and

then. Having gone through a few myself I offer sympathy rather than criticism.

Of a more serious nature, however, is the error in the brief biographical sketch on page 63. I am *not* the "Chief of History, Hq., MACV." A very charming lady, Col. Elizabeth H. Branch, USA, quite capably fills that position and I handle the Air Force portion under her guidance.

LT. COL. JOHN H. SCRIVNER, JR.  
APO San Francisco

• *Our apologies to Colonel Scrivner and to Colonel Branch.*—THE EDITORS

## Let's Hear it for Mayor Fritz

*Gentlemen:* Thanks to AIR FORCE Magazine, I'm thinking of running Commander Fritzgerald for Mayor of Napoli. Your idea of running the story along with cartoons by Jake Schuffert was tremendous.

The story was a big hit in this community. What amazed me most was the fact that you have such an enormous readership among the women. In one of the local hairdressing shoppes around here your magazine has more time under the hair dryer than some of the women. Women have stopped their cars in the Navy Exchange area to tell my wife how much they enjoyed the story. She had never met the people before.

I'd also like to thank you for the coverage you gave the Best Hit '71 story. I sent some copies of the magazine to the Turkish Air Staff to thank them for the wonderful cooperation they gave us during the meet.

LT. COL. HAROLD A. SUSSKIND  
Director of Information  
Hq. AIRSOUTH  
Naples, Italy

## Those Nostalgic Ballads

*Gentlemen:* What an unusual article you have published in the September 1971 edition of AIR FORCE Magazine, entitled "Throw a Nickel on the Grass," by Lt. Col. George L. Weiss.

Before all of this balladry is lost, couldn't Colonel Weiss, or some other hero, get some recordings made of this wonderful material? After all, there are an awful lot of people

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## Airmail

around who treasure the memories of the days with which these lyrics deal, and probably many, like myself, are curious as to some of the music that accompanied the words.

BRIG. GEN. ALFRED L. WOLF,  
USAFR (RET.)  
Philadelphia, Pa.

*Gentlemen:* "Throw a Nickel on the Grass" . . . brought back many memories. But, alas, the best of the best, Takhli, Thailand, and the 355th Tactical Fighter Wing are no longer around.

The key words at Takhli were pride and morale and there was a helluva lot of that regardless of whether you were a desk jockey or a jet jockey.

TSGT. RAYMOND W. MCCLEERY  
Patrick AFB, Fla.

*Gentlemen:* Enjoyed George Weiss's article on the memorable melodies well known to fighter pilots and those of us who wished we were. But old George is dated (that happens when you hang up the blue for the last

time). Here are a couple of not-so-old classics which came out of our squadron (the 23d TASS), *Nails*, when we were FAC'ing Uncle Ho's Trail last year.

Well, I am a Nail FAC in Laos,  
I've been here since heaven knows  
when,  
But I'd rather be back in old Aspen  
town,  
Skiing dry powder again.

The air on the trail is polluted,  
It's filled with rarefied tin,  
Great clouds of flak claw at your  
back,  
Watch out, Wolf, Nail's at your ten.

ZPU gunners are happy,  
They get to practice all day,  
But what the heck, if I found a truck  
"Blue Chip" gave my bombs away.

I'd rather be in California,  
Surfing the waves in the fall  
Than feeling the shudder, as I hit  
full rudder,  
Dodging those red fiery balls.

This war is run by computer,  
It's commonly called "TFA"  
So what the heck, why should I  
break my neck,  
They claimed we won yesterday.

We are allowed no diversions,  
The flights hit their frag for the day,  
So forests we plunder, and monkeys  
plow under  
While six trucks stand one klick  
away.

I wish that I had the big picture,  
That old Seventh paints every day,  
Then I'd fly the wild, with a  
contented smile,  
Watching those trucks drive away.

That last one told of some of the frustrations of life on the Trail. "Blue Chip" was the controlling agency, TFA a computer palace, Seventh, of course, was Seventh Air Force, and Wolf referred to the Fox Fours (F-4s) out of the Wolfpack (8th TFW).

Here's another which was written about the "Crickets," the call sign that preceded "Nails," and which was taken directly from the French FACs who flew at Dien Bien Phu. They were the original Crickets.

Run, run, Cricket run,  
Ho Chi's coming with a loaded gun,  
He's mighty angry and you've caught  
his eye,  
He's throwing flak up in the sky.

Run, run, Cricket run,  
For your flying days are through  
Thirty-seven, maybe ZPU  
So run, run, Cricket run.

You've been tearing up all his roads  
And burning all his trucks  
You keep doing things like those  
And Ho Chi, he's fed up.

Run, run, Cricket run,  
As fast as you know how  
If you want to be a Cricket anymore  
Then you'd better be a chicken now.

Hope you have room to carry these as an addendum to George's article. Know some Nails, past and present, who'd appreciate it.

LT. COL. STUART W. SHADBOLT  
Deputy Editor in Chief  
*Pacific Stars and Stripes*  
APO San Francisco

### UNIT REUNION

#### Wray's Ragged Irregulars

The 91st Bomb Group (H), known as "Wray's Ragged Irregulars," and its supporting units, Station 121, Basingstourn, England, 1942-45, will hold its 3d National Reunion at Anaheim, Calif., in July 1972. Please contact  
MSgt. George W. Parks, USAF (Ret.)  
Western Division Sec'y-Treas.  
109 Wilshire Ave.  
Vallejo, Calif. 94590

1972  
MAY  
SEPTEMBER  
NOVEMBER  
DECEMBER

1972

MAY  
SEPTEMBER  
NOVEMBER  
DECEMBER

-SEE PAGE 119

# **SCIENCE/SCOPE**

Maverick, new TV-guided "smart" missile for the U.S. Air Force, is now in production at Hughes' Tucson, Ariz. plant. Extolled by USAF for meeting all performance and cost requirements during its R&D phase, the air-to-ground missile will be carried by the A-7 and F-4 and is being considered for the AX now under development.

Maverick is a "shoot-and-scoot" missile. The pilot flies toward the target until it appears on a display in the cockpit, then locks Maverick's guidance system on the target. After launching the 8-ft., 500-lb. missile, the pilot can take evasive action while Maverick's electro-optical homing device guides it to a direct hit.

Mutual radio frequency interference between communications satellites and terrestrial point-to-point microwave relay systems in the 6 gigahertz range they share will be measured and evaluated by a computer-controlled receiver/analyzer system Hughes is developing for NASA's Goddard Space Flight Center. The system will be tested following the launch of NASA's Applications Technology Satellite F in 1973. Purpose of the experiment is to determine the minimum size of ground antenna systems and the minimum transmitter power satellites can use without suffering interference from terrestrial microwave links for TV programming.

Laser rangefinders for the U.S. Army's M551 Sheridan armored reconnaissance vehicle will be built by Hughes under a contract awarded recently by Frankford Arsenal in Philadelphia. The Sheridan rangefinder consists of a ruby laser, telescope-like optics, and associated control panels and electronics. The production award followed the successes of the prototype program, which was begun in February 1970, and of the laser for the M60A1E2 tank, for which Hughes produced 300 systems.

The first airborne flight test antenna for AWACS, the U.S. Air Force's Airborne Warning and Control System, was delivered recently to Boeing -- three weeks ahead of schedule. Boeing will install the Hughes-built antenna in a radome assembly for testing. Hughes is one of two competitors for the AWACS radar contract. The winner will be determined by a flyoff next year.

AWACS is designed for the vital roles of air defense and tactical command and control. It will employ an advanced three-dimensional radar capable of long-range detection and tracking of enemy aircraft through dense ground and sea "clutter".

The Phoenix weapon system which Hughes is developing for the F-14 fighter has so far "demonstrated all major design performance requirements" during flight tests in a TA-35 test-bed aircraft, according to the U.S. Navy. Its successes include: launches and hits at extremely long ranges; two missiles guided simultaneously to two widely separated targets; a hit against a tightly turning drone simulating a maneuvering fighter; one missile fired against two targets in close proximity to each other which picked out the correct target and passed within lethal range; a hit on an extremely small, very-low-altitude target; and a hit on a high-speed, high-altitude target.

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# MIA/POW Action Report

By William P. Schlitz

ASSISTANT MANAGING EDITOR, AIR FORCE MAGAZINE

## Shifty Shenanigans

Those involved in MIA/POW matters are cautioned against unscrupulous people who are zeroing in on the MIA/POW situation for personal gain.

Age-old confidence rackets have been dusted off and reshaped to take advantage of the combined emotional and financial outpourings generated by the MIA/POW movement. Many of the con games thus employed are outright fraud, while others fall in that murky area of the law where loopholes and vagueness help the knowledgeable entrepreneur operate with near impunity.

An example of the latter occurred last year in Mississippi. It seems that confidence men like best an atmosphere that has reached a certain emotional furor. At the time, "The people of Mississippi were up for the prisoners," says Mrs. Donnie Collins, League of Families state coordinator, whose husband is now in his seventh year as a POW. "Many MIA/POW activities were going on all across the state," she recalls.

At that point, a stranger arrived in her home town of Clinton, checked into a hotel, and placed in the local paper a classified ad that read like this:

**WANTED:** Patriotic youth to solicit money for worthwhile cause. Call [telephone number] for interview. \$2 an hour.

The first inkling of trouble came

soon after with phone calls to Mrs. Collins informing her of widespread street-corner solicitations by groups of students seeking money to help the POWs. "It was all very well organized," says Mrs. Collins, "with properly printed placards, and buckets to receive the contributions. The kids really put their hearts into it." Investigating, Mrs. Collins traced the operation to its source and then pressed the local police for action. After some hesitancy on the part of the officialdom because of apparent doubts about the activity's illegality, things speeded up and the organizer "beat it out of town with the police hot on his trail," Mrs. Collins remembers, "but not before he was able to collect much of the money donated." While no estimate can be made of the con man's haul, League members paid the kids' wages, Mrs. Collins says.

Atlanta was the scene of an attempted confidence game that was marked by both the precipitators' audacity and maladroitness.

A group calling itself "Concert Caravans" (a claim to a Dallas headquarters was later found to be untrue) came to Atlanta and heralded grandiose plans to stage a "benefit" show to raise funds for the League of Families. This enterprise was announced at a "news conference" to which area League members were invited. The only news media to attend, however, was a local radio newsmen alerted by League member Carolyn Collins (sis-

ter of a POW also in his seventh year and no relation to Mrs. Donnie Collins). Apparently, no others were notified.

On the surface, the Concert Caravans' proposal sounded first rate: Entertainment at the "benefit" was to be provided gratis by top talent in the country-western music field, a group of stars having already been contacted. If this promised galaxy appeared, an almost certain sellout of the Atlanta Stadium, the intended performance site, was assured.

But from the start, League members, including Miss Collins and League area coordinator Mrs. Millie Parrott (wife of a POW), had their doubts, triggered by the suspicious news conference and other discrepancies such as a "news release" that seemed to have been composed by an illiterate.

Without going into the convoluted details, the operation finally dissolved when the promoters announced that their advance backing had fallen through and requested League members to put up \$30,000. When the League families could not come up with this money, the group, evidently not having another source, skipped town in a flood of unpaid bills.

In an instance on the West Coast, confidence men turned to the "boiler room" operation—whereby batteries of phones are employed to contact prospective donors. The gimmick used here was a "special issue" of a phony publication that was to be devoted to



*In distinct contrast to "shifty shenanigans" (above), many worthwhile activities concerned with MIA/POW affairs are being conducted across the country. Mrs. Helene F. Knapp, coordinator for the Colorado Springs, Colo., MIA/POW organization, presents the first sheet of Christmas seals honoring US MIA/POWs in Southeast Asia to Air Force Academy Superintendent Lt. Gen. A. P. Clark. Cadet First Class Thomas McDonald of Cedar Creek, Tex., second from left and chairman of Cadets to Aid Families of POWs, suggested the idea for the seals. Hal Blume, second from right, is chairman of Colorado Springs POW organization. Mail orders for a minimum of \$2 for 200 seals can be sent to Colorado Springs for POWs, Box 100,000, Colorado Springs, Colo. 80901.*

the MIA/POW cause. For \$5, said the caller in a convincingly emotional tone of voice, the subscriber could have his name printed in the "special issue" as a contributor.

It was a "natural"—as men in the confidence trade phrase it. How many people could turn down such a worthwhile and emotional appeal at such little cost? Again, there is no accurate estimate of how much in proceeds lined the insiders' pockets before the authorities—in this case the Orange County, Calif., district attorney's office—moved in.

The detrimental effect of such nefarious schemes on MIA/POW activities is twofold at the very least: First, MIA/POW groups all across the country are placed in a particularly bad light by one of them having been linked—no matter how innocently or remotely—to whatever variety of shady enterprise. Second, the nation's entertainers and others in the spotlight, whose aid and encouragement are of immeasurable benefit, may become hesitant about becoming involved in MIA/POW efforts (several of the country-western stars who canceled lucrative engagements to schedule the Atlanta show were justifiably dismayed at the outcome).

The League has given us some suggestions on how to guard against being fleeced by flimflam artists.

First, check with your police department to ensure that local law is being complied with in any solicitation activity. For example, municipal licenses are required almost universally in fund raising. (It is estimated that perhaps ninety percent of the illicit operators could be clamped down on in this respect.)

Next, contact your area League coordinator or the League's Washington headquarters if you suspect individuals or groups raising funds to be involved in shenanigans.

Also, for MIA/POW families, contact your casualty service officer for advice (every MIA/POW family has one assigned to it).

Contact the Department of Defense's POW/MIA Task Force.

Consult your personal attorney.

Finally, in cases where staging shows or other public events is suggested, check references carefully, and then make certain that there is an independent audit of all receipts.

### Happy Ending for One G.I.

On August 12, 1969, a US Army armored unit engaged in battle in South Vietnam was forced to withdraw because of devastating enemy firepower. In the action, a crippled vehicle containing a wounded man was

*Freed by Communist captors and recuperating in a US Army hospital is SSgt. John Sexton, Jr. As his parents look on, he is awarded the Purple Heart for wounds received in combat in Southeast Asia before he became a prisoner of war.*



left behind. Although the area was searched the next day, the man, Army SSgt. John Sexton, Jr., of Warren, Mich., had disappeared. Sergeant Sexton was listed missing in action and his parents were notified.

About a month later, an enemy propaganda leaflet was found that contained a photograph of the bandaged Sexton and what apparently was the reproduction of a letter handwritten by him.

The letter—addressed to "whoever is concerned"—attested to Sergeant Sexton's well-being and mentioned his wounds: "My right arm is broken and I have shrapnel in my face and legs, none of which is too serious. . . ." In the letter, Sexton said hello to two of his army buddies.

Although this seemed to present enough evidence that the man was alive, he was kept in MIA status—through, the Army admits, a snafu.

Two years later, while Sexton's parents were talking over his case with an Army representative, a copy of the letter slipped from the file. It was only then that the parents knew there was an excellent chance that the Sergeant was alive.

The bureaucratic goof that brought about the agonizing delay caused Secretary of Defense Melvin R. Laird to order a review of all MIA/POW files in the hope of perhaps turning up similar evidence that missing men are still alive.

To cap this stranger-than-fiction chain of events, three days after the letter was uncovered, the Sergeant walked out of the jungle, released by the Communists. The enemy told Sexton that they expected our side to release one of their men, which was done. Whether this exchange indicates that the enemy is toying with the idea of reciprocity, or just toying, is purely speculative at this juncture. In any

event, Sergeant Sexton returned home safe.

### On Behalf of the MIA/POWs

This past September, AFA's Florida Suncoast Chapter put a lot of effort into a dinner meeting in honor of the MIA/POWs.

The event drew 176 persons, including representatives of the 1st Tactical Fighter Wing at MacDill AFB; the Red River Valley Fighter Pilots Association (the "River Rats"); the OSI Club; the Veterans Liaison Council of Pinellas County; the Veterans of Foreign Wars; the American Legion; the Jewish War Veterans; and the Holiday Isles Shrine Club.

Also attending as special guests were the wives and parents of several MIA/POWs.

Guest speakers were Maj. Fred Thompson, USAF, one of the few men to have been released by the North Vietnamese; Cmdr. Charles Klusmann, USN, the first American POW in Southeast Asia and the only man to have escaped from a prison camp in Laos; and Lt. Col. James Jones, MIA/POW Coordinator for the Secretary of the Air Force's Office of Information.

Marshall Cleaver, news commentator for WLCY-TV in St. Petersburg, was Master of Ceremonies, and the speakers were introduced by MIA wives Pat Luna and Sharon White. Maj. Gen. Edward White, USAF (Ret.), expressed the Chapter's appreciation for the guests' participation in the program, and Chapter President Marion Chadwick presented Certificates of Appreciation to each speaker and an honorary AFA membership to Marshall Cleaver.

\* \* \*

On October 9, AFA's Antelope Valley Chapter hosted a reception and lun-

## MIA/POW



From left, Robert Dornan of Los Angeles station KTLA; James Hull, President of AFA's Antelope Valley Chapter; Brig. Gen. Chappie James; Mrs. Carole Hanson; AFA National President Martin M. Ostrow; and California AFA President Floyd Damon.

cheon in honor of US MIA/POWs, and paid tribute to MIA/POW relatives as well. The event was held in Lancaster, Calif., at the Exposition Hall, Antelope Valley Fairgrounds. The morning reception provided an opportunity for MIA/POW families to meet and talk about their situation with military, civic, and political leaders and others.

The luncheon program featured as keynote speaker Brig. Gen. Daniel "Chappie" James, Jr., Deputy Assistant Secretary of Defense for Public Affairs. More than 300 persons heard General James discuss the current MIA/POW impasse. He said that "unofficial" negotiators with North Vietnam, both within and without government, had delayed or prevented agreements concerning release of sick and wounded prisoners and an accounting for those men listed as missing. He urged all Americans to join in expressing genuine concern for the MIA/POWs and their families.

Robert K. Dornan, host of a TV discussion program on station KTLA, Los Angeles, served as Master of Ceremonies. Mr. Dornan has twice traveled around the globe with wives and mothers of MIA/POWs. During his remarks, Mr. Dornan told of the frustration felt by MIA/POW next-of-kin with whom he traveled when heads of state and foreign governments refused to meet with the wives and mothers. Mr. Dornan made a special introduction of each POW or MIA represented by a family member, announcing their service and rank, and recognizing the relative present.

Also participating was Mrs. Carole

Hanson, Chairman of the League of Families. Mrs. Hanson spoke for MIA/POW families attending the luncheon and poignantly told of how she was denied the privilege of putting a letter to her husband on a plane bound for Hanoi. She stated that the MIA/POW issue must be kept before the public or the North Vietnamese government would consider that we had abandoned our men. She urged that such programs as the MIA/POW reception and luncheon be continued by AFA and other organizations.

Martin M. Ostrow, newly elected National AFA President, introduced Mr. Dornan, who conducted the program. Lt. Col. William D. Franks, Base Chaplain from Edwards AFB, Calif., delivered the invocation and a prayer for American MIA/POWs. Steven Szabo, former Hungarian Freedom Fighter and a prisoner of the Communists himself for six years, led the Pledge of Allegiance.

Members of the Red River Rats of Edwards AFB escorted the MIA/POW relatives into the reception and luncheon. In addition to Mrs. Hanson, other family members attending were Mr. and Mrs. A. D. Appleby; Mrs. Tammy Bloodworth; Mrs. Dorothy Brazelton; Mr. and Mrs. Warren Brazelton; Mrs. William Brown; Mr. and Mrs. Al Castro; Mrs. Corrita Chambers; Mr. and Mrs. Jack Fleckenstein; Mrs. Fred M. Fortner; Mrs. Doris Hallberg; Mr. and Mrs. Shipley (parents of Carole Hanson); Mrs. Patti Hardy and her mother, Mrs. W. P. O'Hara; Mrs. Jane Lemon; Mrs. Janice Lyon; Mrs. Pat Mearns; Mr. and Mrs. Truman Pugh; Mr. and Mrs. Charles Ray; Mr. and Mrs. John Rehmman and Miss Jeannette Rehmman; and Ley Meyer and Linda Color.

Distinguished guests included Assemblyman Newt Russell and Mrs. Russell; Brig. Gen. Robert M. White, Commander of the Air Force Flight Test Center, Edwards AFB, and Mrs. White; Brig. Gen. William W. Spruance, Assistant Adjutant General for Air, Delaware ANG, and a National Director of AFA; Col. Philip J. Conley, Jr., Vice Commander of AFFTC; Lt. Col. Gerald E. Swecker, Commander of the Army Aviation Systems Test Activity at Edwards AFB, and Mrs. Swecker; Francis Gary Powers and Mrs. Powers; and Pancho Barnes, aviatrix and a member of the Antelope Valley Chapter.

Chairman of the MIA/POW Reception and Luncheon Committee was Barbara Rowland, a member of the Antelope Valley Chapter Council and State AFA Secretary. JoAnn Doell, California AFA MIA/POW Coordinator, served as liaison with the MIA/

POW relatives and VIVA (Voices in Vital America) of Los Angeles, who provided displays.

Chapter officers and Council members who participated in the planning and served on the luncheon committee were, in addition to President Hull, Chapter Vice President Robert B. Craik; Secretary Paul B. Scharf; Treasurer Harry S. DuBois; Historian Jeanne K. Craik; and Council members R. E. Bell, A. Hays Blessing, F. S. Forbes, Pat Patillo, Billie Plunkett, W. V. Ralston, Ed Stout, Kerns Vaughan, and Col. Jesse P. Jacobs, Jr., Military Adviser to the Chapter.

Scheduled to attend the luncheon was Miss Martha Raye, who was to be honored by the California AFA organization for her work with the MIA/POW families. Unfortunately, Miss Raye had been injured in a fall and could not be present. She will accept the State Award of Merit at a later date.

### League of Families Board

At the recent national convention of the League of Families, held in Washington, D. C., a new board of directors was elected to serve during the 1971-72 period. The board includes:

Mrs. Carole Hanson, Chairman, El Toro, Calif.  
George Brooks, Vice Chairman, Newburgh, N. Y.  
Mrs. Evelyn Grubb, National Coordinator, Colonial Heights, Va.  
Col. Edwin L. Brinckmann, USAF (Ret.), Newport News, Va.  
Robert Brudno, Philadelphia, Pa.  
Lt. Col. Paul J. Burns, USA (Ret.), El Paso, Tex.  
John B. Coker, Linden, N. J.  
Harry Dunn, Hutchison, Kan.  
Capt. Robert D. Hagerman, USAF, Dayton, Ohio.  
Mrs. Patricia Hardy, Azusa, Calif.  
Mrs. Iris Powers, Washington, D. C.  
Mrs. Barbara Rausch, Hamburg, N. Y.  
Mrs. Sybil Stockdale, Coronado, Calif.  
Mrs. Sallie Stratton, Dallas, Tex.  
Mrs. Joan Vinson, immediate past National Coordinator, Alexandria, Va.  
New League officers selected by the board who will be working out of the League's Washington, D. C., office are:  
Mrs. Evelyn Grubb, National Coordinator.  
Mrs. Sara Frances Shay and Mrs. Bonnie Metzger, Assistant National Coordinators.  
Janice Ray, Secretary-Treasurer.  
Cathi Ray, Office Manager.  
The League office is located at 1608 K St., N. W., Washington, D. C. 20006 (telephone 202-628-6811). ■



## The Boeing 737 has joined the Air Force.

Its new military name is the T-43A Navigator Trainer. And the U.S. Air Force has just purchased 19 of them to replace 79 of their older navigator trainers.

On the outside it's the reliable Boeing 737, already proven in five years and more than a million hours of commercial airline service. On the inside it's the most modern and efficient airborne training environment on the market.

These new Boeing trainers, along with ground

simulators being designed by Honeywell, will provide Air Training Command with a fully integrated navigator training system.

For example, the T-43A's advanced navigation equipment will permit complete airborne training in all types of operational USAF systems from celestial to inertial navigation.

A wide body gives the T-43A plenty of room for student and instructor stations plus a clear, wide passageway running the full length of the cabin.

Jet training environment provides the student natural, rapid transition to modern military jet aircraft.

And the airplane's

easy maintenance features, plus Boeing's logistics and maintenance service, means less down time and lower overall costs.

The T-43A is adaptable to a variety of other missions, too, such as electronic warfare training, radar bombing training, ASW training, and logistics resupply.

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GAS TURBINE CONTROLS/PUMPS • AIRCRAFT/MISSILE CONTROLS, VALVES AND ACTUATORS



By William P. Schlitz

ASSISTANT MANAGING EDITOR, AIR FORCE MAGAZINE

WASHINGTON, D. C., Nov. 12

The year 1972 will mark the silver anniversary of the establishment of the US Air Force as a separate service.

For the year-long observance of its twenty-fifth birthday, USAF has adopted the theme "Pride in the Past—Faith in the Future," which ties together the progress made in the first quarter century of Air Force history with the role airpower is expected to play in the nation's existence in the time to come.

An anniversary symbol incorporating the theme has been distributed throughout the Air Force, and commanders are being urged to make use of it in emphasizing such special events during the year as appearances of the Air Force Band, the Thunderbirds, or activities on Armed Forces Day in May.

Local and national Air Force Association events also will serve as focal points to commemorate the anniversary year, "with strong emphasis on internal activities that contribute to improved *esprit de corps*, morale, and retention," officials said.

Climaxing the year will be a USAF birthday celebration next September at Andrews AFB, Md. (The National Security Act of 1947, which estab-

*Sleek as a white charger is the mockup of USAF's upcoming B-1 bomber. The intermediate step in the development of the B-1 was recently shown to the public for the first time at North American Rockwell's Los Angeles Division.*



lished the Air Force, became law on September 18, 1947.)

Many happy returns, USAF.



As this was being written, scientists were anticipating the beginning of "an information explosion" generated by a US spacecraft taking the closest look yet at one of our neighbors in space—the planet Mars.

The Mariner-9 spacecraft's 167-day journey to the Red Planet was to culminate when the spacecraft's rocket engine fired to brake it into orbit around the planet.

If all goes as planned, Mariner will radio during its ninety-day mission some twenty-five to thirty million bits of information about Mars—fifteen times the data previous flyby craft have returned.

Plans called for Mariner to take more than 5,000 television pictures, many with the resolution to discern objects the size of a football field. With this data, scientists will be able to map more than seventy percent of the Martian surface.

Mariner's orbit will enable it to scrutinize phenomena that have fascinated man for centuries, including the seasonal change in the planet's surface coloring (called by some scientists the "wave of darkening"), and the dramatic dust storms that swirl across Mars from time to time.

Mars also will be studied for clues as to whether it is hospitable to life forms. Man knows that water vapor exists on Mars, and scientists are hopeful of discovering a spot on Mars that could harbor primitive organisms.

Data from Mariner may provide a giant step for mankind in solving some of the age-old puzzles about Mars, earth, and the solar system.



Rolls-Royce (1971) Ltd. and the United Aircraft Corp.'s Pratt & Whitney Aircraft Division have agreed to joint development of advanced versions of Rolls' Pegasus vectored-thrust turbofan engine.



*Capt. Joel N. Gordes, left, and Capt. Thomas G. Dorsett, 363d TRW, Shaw AFB, S. C., explain an RF-4C mission to, from left, Secretary of the Air Force Robert C. Seamans, Jr.; Gen. William W. Momyer, TAC Commander; and Gen. J. D. Ryan, USAF Chief of Staff. The brass visited Brass Strike VIII at Pope AFB/ Fort Bragg, N. C.*

## Aerospace World

Included is an option for Pratt & Whitney to build Pegasus in the US and Canada. P&W will also service Pegasus engines operating in the US

The current 21,500-pound-thrust Pegasus 11 is the powerplant for the RAF's V/STOL Harrier and the US Marine Corps version, the AV-8A. RAF plans a total of ninety Harriers in three squadrons, while USMC has on order thirty of a planned buy of 114 aircraft.

US Navy is considering an advanced Pegasus 15 engine with about 24,000 pounds of thrust for use in the aircraft as part of its sea-control ship program. Sea-control ships are visualized as vessels of about 11,000 tons' displacement configured with short flight decks suitable for the operation of helicopters or fixed-wing attack and fighter aircraft like the USMC's AV-8A.

The agreement between the two companies must be approved by their respective governments.



The Office of Air Force History has published a slim study, "US Air Force Victory Credits—Southeast Asia," summarizing the results of air-to-air combat over North Vietnam. The study was prepared by Charles A. Ravenstein of the Historical Research Division at the Air University.

Credits have been awarded for eighty-six enemy aircraft shot down in



*Maj. Gen. R. N. Ginsburgh, Chief, Office of Air Force History, pins the Exceptional Civilian Service Medal on Kenneth Sams, Deputy Chief, Project CHECO (Contemporary Historical Examination of Current Operations). Mr. Sams pushed reports of SEA air operations to DoD top command. He's also a contributor to AIR FORCE Magazine.*

aerial combat between July 1965 and February 1968—sixty-one MIG-17s and twenty-five MIG-21s. Credits for these eighty-six victories were awarded to 131 Air Force officers. For twenty-five of the victories, credit went to pilots of the single-place F-105. Sixty victories were split between the two-man crews of F-4s and F-105Fs, each crew member receiving half a credit for each victory. The eighty-sixth enemy aircraft was destroyed by a pair of two-man crews, each crewman receiving credit for one-fourth of the victory.

Thirty-six officers accumulated one or more full credits. The two top scorers, both F-4 aircraft commanders, were Col. (now Brig. Gen.) Robin Olds—four victories, shared (apparently) with three different backseaters for two credits; and Lt. Col. (now Col.) Robert F. Titus—three victories shared with his backseater, Lt. Milan Zimer, for one and

a half credits. The leading single-place F-105 MIG-killer was Capt. Max C. Brestel, with two victories.

The F-4C/D-equipped 8th Tactical Fighter Wing led the hunter pack with a total of thirty-seven and a half MIGs destroyed, followed by the 355th TFW (F-105)—nineteen and a half; 366th TFW (F-4C)—thirteen; 388th TFW (F-105)—eight; 35th TFW (F-4C)—four; 15th TFW (F-4C)—two; 432d TFW (F-4D)—two.



Deputy Secretary of Defense David Packard has signed a directive that requires active recruiting for all units of the National Guard and Reserve to reflect the racial, religious, and ethnic character of the communities from which they obtain members.

Dr. T. C. Marrs, Deputy Assistant Secretary of Defense for Reserve Affairs, lauded the new directive: "We want to make it clear to all minority groups that they are welcome in the Guard and Reserve. We need their participation if the Guard and Reserve are to perform their portion of the Total Force mission," he said.

The National Guard Bureau has said that its most immediate objective is to double the number of blacks in the National Guard within the next year as a first step toward balancing units along ethnic lines.

And, according to DoD, "Informal responses from other Reserve components have indicated equal enthusiasm for the recruiting effort."

As part of its guidelines, the new directive also revises policies on priorities for enlisting nonprior-service persons in the Guard and Reserve to provide latitude for the minority recruiting campaign. For example, all qualified female applicants and male nonprior-service applicants, except



*It's a shower bath for Maj. Alfred C. Montrem, Patrick AFB, Fla., who reached his 2,000th flying hour in the HH-53 helicopter in mid-October. He's the first USAF helicopter pilot to hit that mark. Major Montrem flew ninety-nine SEA combat missions. He's now with Detachment 15, 44th Aerospace R&R Squadron.*

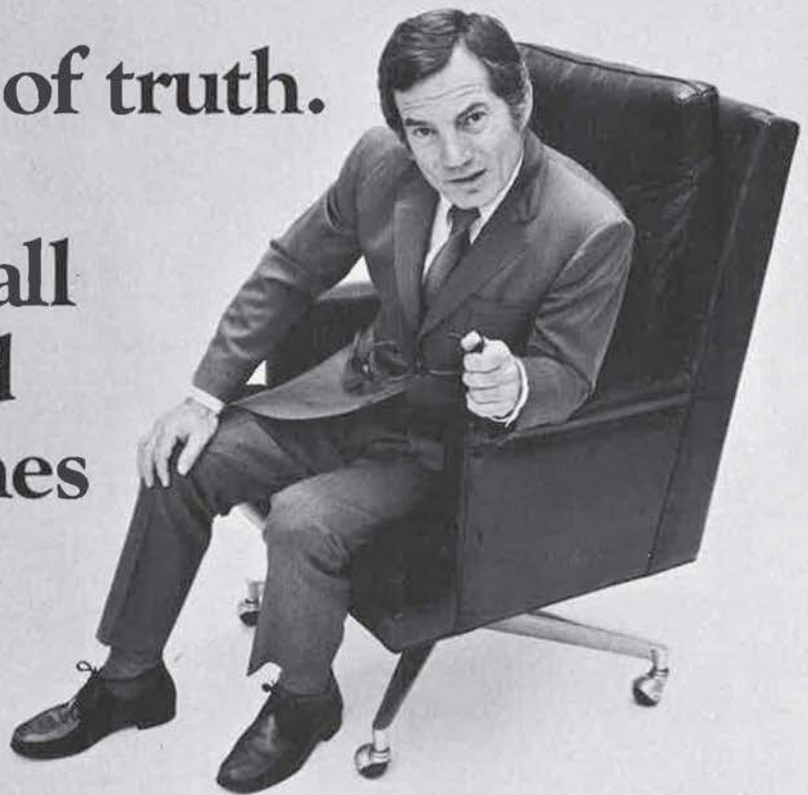
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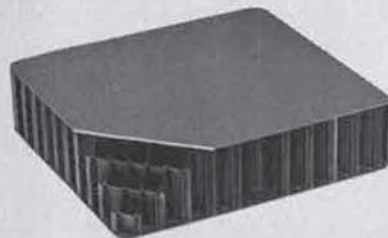
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# **Stresskin**





A "slave arm" that follows directions of its counterpart on a human arm gets its orders via three-dimensional TV system. It was developed by MBAssociates, under Navy/NASA/AEC contract.

those in their prime year of draft eligibility, may be enlisted without regard to the waiting lists.

Those in prime draft vulnerability continue to be accepted on a first-come, first-enlisted basis after all other categories of applicants have been considered.



Very much related to the racial situation in the services is the attitude of each individual, which is also obviously true of our society as a whole.

AIC Ray Halsell, RAF Upper Heyford, England, is facing the issue head on and in a very personal way. Airman Halsell is black, and he has formed within the 20th Tactical Fighter Wing a group called "Unity for Afro Americans."

The singular goal of the group, which numbers upwards of fifty persons, is to increase racial harmony through discussion and understanding.

"Italians, whites, Chinese, all races are invited to our meetings. There is no racial discrimination in this group," says Airman Halsell. If racial injustices arise on the base they are evaluated at the group's weekly meetings. When a complaint is deemed appropriate, the proper channel is sought—such as the Equal Opportunity Council on the base. Airman Halsell is himself a council member.

"There has been no trouble on this base this year and we are helping to keep it that way," the Airman says. While agreeing that black men on the base do sometimes use their color as an excuse and a cop-out, he also emphasizes that his group has been successful in dealing with the minor irritants and injustices that could have mushroomed into a major racial blow-up.

Base officials and the newly appointed human relations adviser to the commander, Chaplain (Maj.) Sam Nelson, are supporting the group.

The group has offered speakers to any gathering willing to listen to its point of view. It is also raising money for the Air Force Aid Society. The

funds will be available to any "brother or sister, black or white" who needs them, Airman Halsell says.

The group also is hoping to make a trip to West Germany, where a racially explosive situation exists among US military forces there. The plan is to study the problem and offer advice based on the group's own experience to increase racial understanding there.

One good man—or group for that matter—can turn a lot of things around.



Apollo-16 is tentatively scheduled for liftoff from Cape Kennedy on March 17, 1972. The fifth manned

## PEARL HARBOR ANNIVERSARY



December 7, 1971, marks the thirtieth year since the Japanese surprise attack on US military installations at Pearl Harbor. There, much of the US Pacific Fleet was destroyed by Japanese aircraft—a catastrophic entry for America into World War II.

Although for Japan other brilliant victories were to follow—the fall of Singapore and the Philippines, and the conquest of much of Asia—Pearl Harbor was in reality the harbinger of Japan's ultimate defeat.

For in less than four years, America had brought her great weight to bear—while also helping her allies conduct a major, European-wide struggle—and the Japanese empire had evaporated, her armed forces shattered, her homeland in ruins, her military gamble lost.

Then began a period unique in human history. For the conqueror proved benevolent, and, with US aid, Japan began to rebuild.

Now the island nation is at a crossroads. Economically she is a superpower—third greatest in the world. Next to mammoth mainland China, Japan is the strongest national entity in Asia. And she has come to this enviable state under the military shield of the United States.

But with the US influence in Asia waning as the war in Vietnam winds down, it will be of vital interest to see whether or not Japan will fulfill her potential, whether she can or will move into the vacuum to provide a mighty bulwark for peace in Asia.



A project officer for many AFA events, Capt. Bill Turk receives AF Commendation Medal from Maj. Gen. H. L. Hogan, III, AF Director of Information. On resigning the service, Bill joined the National Association of Real Estate Boards.

lunar-landing mission will be commanded by Navy Capt. John W. Young, who has under his belt the Apollo-10 and two Gemini flights. Command Module Pilot will be Navy Lt. Cmdr. Thomas K. Mattingly, II, and USAF's Lt. Col. Charles M. Duke will be Lunar Module Pilot. It is the first space trip for each.

Young and Duke will undertake three expeditions in the moon's Descartes area beginning on March 21, four hours after touchdown.

As on the Apollo-15 mission, the lunar roving vehicle will provide ground transportation. Each trip is to last about seven hours.

Splashdown in the Pacific is set for 4:14 p.m. EST, March 29.

In a related matter, Skylab astronauts later this year are scheduled to begin extravehicular training in a Neutral Buoyancy Space Simulator at NASA-Marshall Space Flight Center, Huntsville, Ala.

The simulator is a huge water tank into which Skylab mockup equipment has been built so that astronauts can rehearse space tasks under conditions of weightlessness.

Skylab is being designed to conduct scientific, technological, and biomedical experiments in space, including testing remote sensing equipment and collecting data on the earth's ecology, oceanology, agriculture, forestry, and geology.

Skylab is scheduled for launch into earth orbit in 1973. Crews for the

various missions have not been named as yet.

Pointing up the close similarity of conditions relative to life-support systems existing in both outer and inner space ("inner" meaning under the oceans) is that ten experienced Navy divers have been assigned to NASA for two years to help in the Skylab training program.



It seems these days that a lot of talk is going on between Americans and Russians.

For example, there are the arms-limitation negotiations; also, US and Soviet scientists are discussing various forms of cooperation in space ventures; and, the result of successful chats between the two countries has been reciprocity in commercial airline routes; again, there is intense conversation taking place about the joint development of peaceful uses for atomic energy. Other matters—large and small—are being considered.

One potentially explosive issue that received the supergiants' mutual attention recently was the subject of incidents on the high seas between units of their respective navies.

Meeting in Moscow, representatives of both nations "refrained from raising past incidents and concentrated instead on seeking solutions to avoid" trouble in the future, said US Undersecretary of the Navy John W. Warner, who headed up the US team.

In fact, the two delegations agreed on measures to improve safety at sea that will be submitted for considera-

tion to their respective governments.

Jawboning, history reminds us, has been a major tool of Soviet diplomacy since the days of the czars. And whether any permanent accommodation can be arrived at by all the palaver is problematical. Yet, as Winston Churchill once said: "It is better to jaw, jaw, jaw, than war, war, war."



Well under way at Pease AFB, N. H., is the Category III test program for Strategic Air Command's newest bomber, the FB-111A.

The overall F-111 program initially encountered technological problems in terms of its variable sweepwing and engine inlets. Still, from an operational point of view, much of the criticism lodged against it has been unjustified.

This is being proved by the Category III testing, which is the final step in weapon system acquisition. This current program is a rugged, comprehensive shakedown of the entire FB-111A system in its operational environment. USAF describes it "as one of the most ambitious test programs" it has ever undertaken.

The flight phase of the program will entail as many as 1,000 FB-111A sorties; a large part of the program, too, will take place on the ground, with every organization within the Air Force that had a hand in the aircraft's development taking part either directly or indirectly.

At the conclusion of Category III, and after careful computer analysis of test data, Air Force hopes to know



Responsible for operation of the Air Force Academy Cadet Wing during the fall semester is Cadet Wing Commander William R. Looney, third from left. His staff, from left, Ronald R. Quinton, Peru, Ind.; Jeffrey C. Conklin, Independence, Iowa; Cadet Looney, Las Vegas, Nev.; Floyd M. Stall, Jr., Newport News, Va.; William O. Faucher, Phoenix, Ariz.; and Roy G. Hendrickson, II, Aptos, Calif., Deputy Wing Commander.

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**MOTOROLA**

## Aerospace World

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Air Force Village (see "How Air Force Village Will Work," by Gladys E. Wise, *AIR FORCE Magazine*, August '69), which opened a year ago, now has fifty-five residents. Forty-four of its 248 units are occupied, with twenty-seven more contracted for.

The Village is a housing complex in San Antonio, Tex., operated on a nonprofit basis for widows or female dependents of Air Force officers, and retired couples. It includes a high-rise apartment building, community center, and garden-type apartments, with its own infirmary, chapel, and other facilities.

US Air Force officers wives clubs throughout the world spearheaded the drive for initial funds for the \$5 million complex, which was built by the Air Force Village Foundation.

Gen. John D. Ryan, USAF Chief of Staff, recently remarked that Air Force Village signifies "our genuine concern for the continued well-being of our people."



Miss Patricia R. Muncy, since 1962 AFA's Assistant for Military Relations and more recently Editor of "The Bulletin Board" column, has left the AFA Headquarters Staff to become Administrative Assistant to Rep. Robert H. Mollohan (D-W. Va). During her years with AFA, Miss Muncy became well known to AFA and military leaders, and worked closely with AFA's various advisory councils.





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the T-37, the A-37, was delivered in 1967. It has been operational in Vietnam as the only turbojet aircraft designed specifically for close support and counter insurgency in Southeast Asia.

New from the ground up, the Citation is not a modified version of the over 1,500 jet aircraft designed for the military. However, the same attention to detail—engine selection, handling characteristics, cockpit arrangement, completeness, initial cost, reliability and operating cost—has gone into the Citation.

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Three engine parts make a jet shriek: inlet guide vanes, axial compressors and stators. The Citation doesn't have any inlet guide vanes, only one compressor and one set of stators. So it purrs. In fact, you could be standing next to the Citation's takeoff point and still carry on a conversation in normal tones.

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The Citation can land on almost any kind of runway. It has oversized, low-pressure tires that absorb and disperse shock. Its landing gear has passed arduous stress tests. Its engine inlets are positioned over the wing so they're protected from FOD.

## 7. 83-KNOT TOUCHDOWN: BEST OF ANY CORPORATE JET.

Most corporate jets touch down at over

100 knots. The Citation can come in at under 85. A comforting thing to know if the runway you're landing on is short, wet or icy.

## 8. LOWEST JET OVERHEAD.

Fan jets are less expensive than ordinary jet engines. They burn less fuel and operate more efficiently at a variety of altitudes than ordinary jets. The Citation has fan jets. Fan jets are also easier to maintain than ordinary jet engines. What's more, no other corporate jet has engines as easily accessible for maintenance as the Citation's. Time is saved in troubleshooting and servicing is greatly simplified.

The Citation is completely standardized from nose to tail. Even its avionics. So repairs can be made quickly and at less cost.

## 9. MORE JOBS—FEWER PROBLEMS

Pilots who have flown the Citation rave about its handling characteristics. The Citation has none of the common jet aerodynamic problem symptoms that require sophisticated devices for flight safety—there are no stick pushers, stick shakers, yaw dampers, boosted controls or leading edge wing devices. Uncomplicated systems—uncomplex maintenance. The Citation would make an excellent trainer, transport, or utility aircraft with Category II special mission capability.



# How to prevent decibels from eating up your dollars.



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If you have any questions, please call or write William K. Connor, Sciences & Systems Group, Austin, Texas.



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## Aerospace World

In this age of the machine, the real uses to which technology is being applied far exceed any imaginary concept by science-fiction writers. Witness the myriad applications of the laser in its first few years.

Edgar Ulsamer, of this magazine's editorial staff, has in the recent past reported in detail on the feasibility of developing Remotely Piloted Vehicles (RPVs)—unmanned aircraft that would be guided on a variety of missions—including intercept, recce, and close support—by their ground-based "pilots."

In mid-October, the USAF awarded systems concept and preliminary design contracts for RPVs to two companies—Teledyne Ryan of San Diego, Calif., and Northrop Corp.'s Ventura, Calif., Div.

While operational RPVs are very much in the future, it is interesting to note that they have, indeed, reached the drawing-board stage.

The two companies will assess such required technologies as materials, avionics, manufacturing techniques, and propulsion. Based on this data and USAF-defined missions for the aircraft, the firms then will develop systems concepts and preliminary designs.

The studies will also include functional analyses of remote-control stations, command and control systems, and primary support.

If operational RPVs become reality, we'll have come a long way since people flew airplanes by the seat of their pants.



**NEWS NOTES**—NASA and the US Department of Transportation have established a joint **Office of Noise Abatement**. The Office will attack on a national basis all noise problems associated with current and future transportation systems.

Died: **Mikhail K. Yangel**, sixty, one of the USSR's leading rocket specialists. His high status was reflected in a laudatory obituary, which was signed by more than fifty of the top Soviet leaders.

A top US space scientist, **William C. Steber**, has been named **Deputy Assistant Secretary for Systems Development and Technology** in the Department of Transportation. Previously with North American Rockwell Corp., he'll oversee DOT's R&D effort.

**Lt. Col. Lenora Henson**, a WAF selected for promotion to colonel, has been named **Comptroller** for MAC's McGuire AFB, N. J.

### Senior Staff Changes

**B/G Conrad S. Allman**, from DCS/P, to Cmdr., USAF Recruiting Service, Hq. ATC, Randolph AFB, Tex., replacing **B/G William C. McGlothlin, Jr.** . . . **M/G Joseph J. Cody, Jr.**, from Cmdr., Electronic Systems Div., AFSC, L. G. Hanscom Field, Mass., to Dep. Dir., Contract Administrative Services, Defense Supply Agency, Cameron Station, Va., replacing retiring **M/G Robert H. McCutcheon** . . . **Col. (B/G Selectee) Lawrence A. Fowler**, from Dir., Material Mgmt., Sacramento AMA, AFLC, McClellan AFB, Calif., to IG, Hq. AFLC, Wright-Patterson AFB, Ohio, replacing **Col. (B/G Selectee) Henry Simon** . . . **M/G (L/G Selectee) Glenn A. Kent**, from Ass't C/S, Studies and Analysis, to Dir., Weapons System Evaluation Group, OSD, Washington, D. C. . . . **B/G William C. McGlothlin, Jr.**, from Cmdr., USAF Recruiting Service, Hq. ATC, Randolph AFB, Tex., to Dep. Cmdr., Lackland Military Training Center, ATC, Lackland AFB, Tex., replacing

**B/G August F. Taute** . . . **B/G George Rhodes**, from Ass't DCS/M Mgmt., to DCS/M Mgmt., Hq. AFLC, Wright-Patterson AFB, Ohio, replacing **M/G William W. Snavelly**.

**M/G Albert R. Shiely, Jr.**, from V/C, AFCS, Richards-Gebaur AFB, Mo., to Cmdr., Electronic Systems Div., AFSC, L. G. Hanscom Field, Mass., replacing **M/G Joseph J. Cody, Jr.** . . . **Col. (B/G Selectee) Henry Simon**, from IG, to Ass't DCS/M Mgmt., Hq. AFLC, Wright-Patterson AFB, Ohio, replacing **B/G George Rhodes** . . . **M/G William W. Snavelly**, from DCS/M Mgmt., Hq. AFLC, Wright-Patterson AFB, Ohio, to Ass't DCS/Systems & Logistics, Hq. USAF . . . **B/G August F. Taute**, from Dep. Cmdr., Lackland Military Training Center, Lackland AFB, Tex., to DCS/P, Hq. ATC, Randolph AFB, Tex., replacing **B/G Conrad S. Allman**.

**PROMOTIONS:** To **Lieutenant General:** **Glenn A. Kent**.

**RETIREMENTS:** **B/G John W. Baska**; **B/G David L. Carter**; **M/G Marvin C. Demler**; **B/G Robert F. Long**; **M/G Robert H. McCutcheon**; **M/G David V. Miller**; **M/G Frederick E. Morris, Jr.**; **B/G James G. Silliman**; **B/G Edgar H. Underwood, Jr.** ■

# MSGS HIGH 1972

MAY  
SEPTEMBER  
NOVEMBER  
DECEMBER

—SEE PAGE 119

## What They're Saying . . .

(From time to time, AIR FORCE Magazine will publish in this space excerpts from pertinent speeches that make news, in the reportorial sense of the word.)

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*Dr. John S. Foster, Jr., Director of Defense Research & Engineering, speaking before a National Security Industrial Association (NSIA) meeting in Washington, D. C., on October 20:*

In the last three years, the annual purchasing power of Defense R&D has dropped by almost \$2 billion. In terms of our ability to develop new weapon systems, this amount alone would fund our Fiscal Year 1972 request for the F-15, B-1, AWACS, Fleet Ballistic Missile, F-14, S-3A, SRAM, Minuteman, SAM-D, Hard-Site Defense, LAMPS, ULMS, Surface-Effect Ships, and A-X.

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*Gen. John C. Meyer, Air Force Vice Chief of Staff, speaking before an AFA meeting in Texas on September 29:*

Several of these "smart" weapons have proven themselves in Southeast Asia. These are the antiradiation missiles that home on the radar signals of enemy surface-to-air missile sites, and laser-guided bombs. The laser bombs home on targets that are pinpointed by a pencil-like beam of a laser that can be either airborne or hand-held on the ground. The virtue of these "smart" bombs is that fewer sorties and fewer weapons are needed to knock out troublesome targets. Again, we are using technology to get greater productivity.

And just as was the case with strategic weapons, we will be able to continue to convert advanced technology into greater tactical capabilities. We expect to increase our stable of "smart" bombs, and soon we will field the rocket-powered Maverick missile. The Maverick is just completing its development flight tests and has demonstrated that it can hit just about anything it can see—moving, or not. With this 500-pound missile, a pilot can zap a tank from several miles out.

---

*Assistant Secretary of the Air Force for R&D, Grant L. Hansen, in a speech dealing with the Space Shuttle program before an AFA audience in Bethpage, N. Y., on October 1:*

NASA and the Air Force have also done important work jointly on engine development which is helpful to the Shuttle program in the areas of reusability and higher-pressure engine technology. In this regard, the Air Force supported advanced development efforts on liquid rocket engines in the past, and concluded a hydrogen/oxygen high-performance engine demonstration program. The Air Force work on the hydrogen/oxygen reusable rocket engine, known as the XLR-129, provided the basis for consideration of the reusable high-pressure rocket-engine concept for the Shuttle.

The residual hardware of the XLR-129 program was turned over to NASA for use on the Shuttle Engine De-

velopment Program. I might add here that high-altitude testing of the Shuttle main engine is planned to be conducted at the Air Force Arnold Engineering Development Center. The Air Force is continuing a small effort in FY '72 to develop technology for high-energy/orbit-to-orbit stages, compatible with the Shuttle, to accomplish future maneuvering missions for the late 1970s and early 1980s.

---

*NASA Administrator Dr. James C. Fletcher, speaking before an American Institute of Aeronautics and Astronautics (AIAA) audience in Washington, D. C., on October 7:*

I am concerned that some who use the slogan "new priorities" seem to think that shutting down the space program would help solve pressing social problems. I do not agree. To begin with, this country is already spending forty-two cents of every federal tax dollar for human resources programs and thirty-four cents for national defense, and only 1.4 cents on space.

Diverting space funds to other uses would amount to only a drop in the bucket. But the loss would be great—in terms of a declining economy, a second-rate technology, a dispirited America.

The NASA budget now equals about three-tenths of one percent of the gross national product. I am sure the stimulating effect of the space program on the nation's economy adds much more than that to the GNP.

I just don't believe that the kind of America that would ignore the challenge of space would make much progress in other fields either. The kind of America that said no to space, that said let Russia do it, would be a country on the way out.

---

*Undersecretary of the Air Force John L. McClucas, speaking about the role of Air Force laboratories before an Air Force Systems Command audience in Dayton, Ohio, on October 5:*

We will also be looking into the possibility of selectively drawing on our laboratories for development responsibility of those equipments, systems, and weapons where the technological risks are sufficiently high to need the advanced engineering competence available in our labs. As another consideration in this regard, we should study the feasibility of locating project managers at laboratories where the special competence each may require is immediately available. Such an arrangement would foster useful day-to-day contacts and result in a closer working relationship between the system development people and our laboratories.

In addition to looking at ways to selectively expand the roles of our in-house laboratories, we are studying related personnel policies. The researchers and engineers who are attracted to our laboratories and research centers are motivated by the challenge of the difficult and important problems solved here. High-quality, dedicated people are the most important single ingredient for our continued success. ■



It's our now-famous Projected Map System, one of the first major avionics equipment to pass rigorous reliability demonstration and qualification testing for LTV Aerospace Corporation's Corsair II aircraft.

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# Six of the world's most advanced military airfields.

With every military airfield in the world known and targeted, a nation's strategic freedom is severely limited. Its strike force is vulnerable. Its defence system weakened.

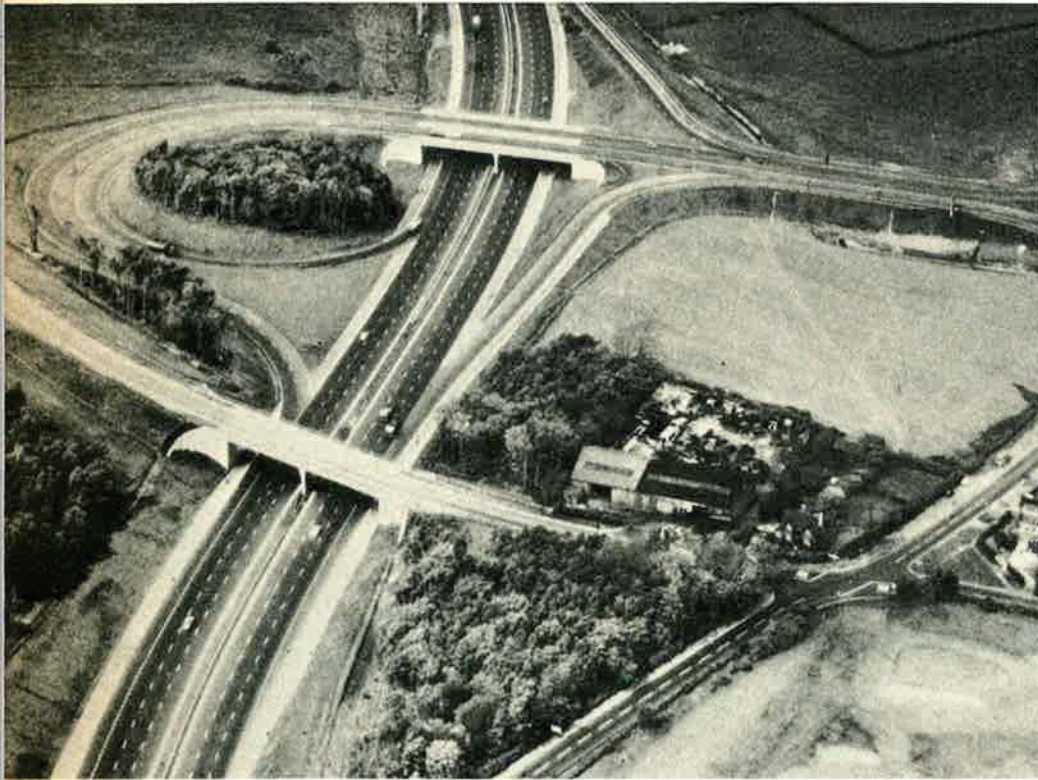
Harrier changes all that.

Its unique V/STOL capability frees it from overt, conventional bases. Harrier doesn't need runways or sophisticated airfield strips.

It can be quickly and easily despatched into any one of a number of pre-selected dispersed sites with minimum advance notice.

It can operate effectively from either unprepared strips or V/STOL sites, whether they're woods, fields, farm or park.

The sites need no air defence, minimum support and are virtually undetectable from the air.



For an opposing battle commander, Harrier presents problems. His tactical knowledge, built on fixed, static bases, is of little use. His enemy now is elusive and unseen.

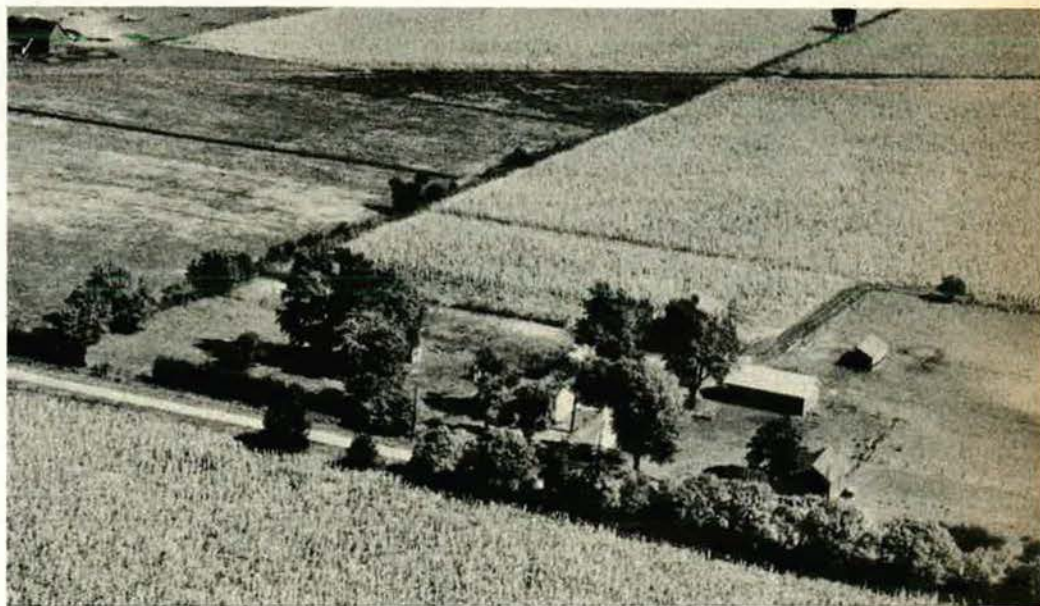
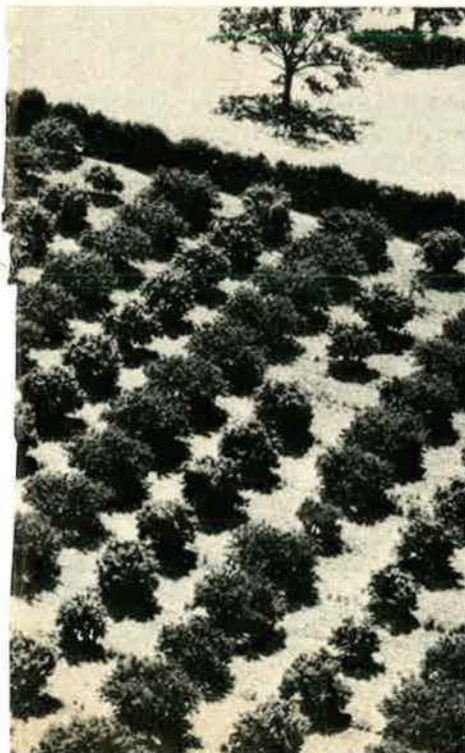
Harrier strikes from out of nowhere, when and as it wants. And the opposing commander has to disperse his force to search for it. The attacker becomes the attacked.

The Harrier is an important breakthrough.

It alters the traditional concept of airpower and its function. And it's already in fully operational service with both the Royal Air Force and US Marine Corps.

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The purpose of the US nuclear strategic weapons is to persuade would-be aggressors that an attack on this country—or its allies—would precipitate a counter-attack of a level of destructiveness unacceptable to any rational government. But credible deterrence presupposes not only the existence of weapons capable of meting out such a counterblow but also the ability of warheads to penetrate even the most sophisticated defense nets. A \$1 billion-plus effort of long standing provides the US with this credibility . . .

# ABRES . . . The Cutting Edge of the US Nuclear Deterrent

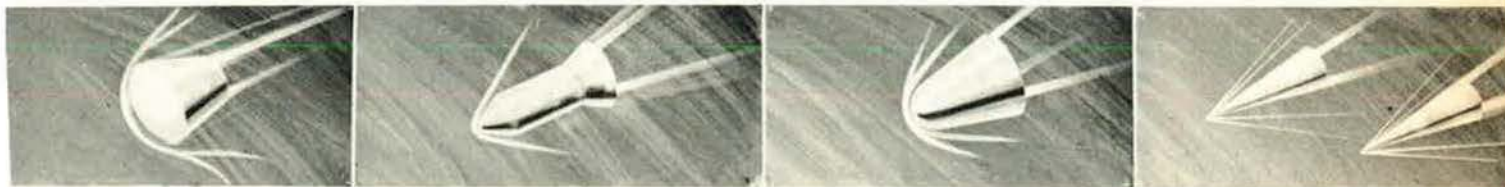
**I**N CAUTIOUS official language, the Advanced Ballistic Reentry System (ABRES) program is defined as “supporting the advanced development of the technology of reentry systems and associated penetration aids and devices to meet the strategic missile needs for all three services.” More bluntly stated, ABRES is a continuous technology effort designed to pro-

vide the means for US land- and sea-based ballistic missiles to penetrate constantly improving enemy area and terminal defense nets with adequate accuracy and large enough payloads to ensure destruction of a variety of targets.

Director of Defense Research and Engineering Dr. John S. Foster, Jr., told this reporter, a key reason why the United States can pursue the Strategic Arms Limitation Talks with the Soviet Union without incurring unacceptable risks.

Many of the advanced technologies developed by ABRES are already in the operational

**By Edgar Ulsamer**  
SENIOR EDITOR  
AIR FORCE MAGAZINE



**HEAT SINK**

**SPHERE-CONE  
CYLINDER-FLARE**

**BLUNT CONE**

**SHARP CONE**

*The shape, ablativ performance, and aerodynamic efficiency of reentry vehicles significantly affect the efficiency and reliability of sea- and land-based ballistic missiles. The ABRES program tests and evaluates various cone configurations to ensure the credibility of the ballistic missile force*

In a practical sense, ABRES is one of the most crucial and productive technology efforts ever undertaken by this country. It is, as DoD's

inventory, including Multiple Independently Targeted Reentry Vehicles (MIRVs) for sea- and land-based ballistic missiles. Another ABRES effort of vital importance to the national strategic deterrence posture involves significant improvements in the so-called *beta* factor—the aerodynamic efficiency of a reentering body. It is the *beta* factor that determines



*Lt. Gen. J. W. O'Neill, AFSC's Vice Commander and former SAMSO head, considers ABRES "an exceptionally valuable program" in terms of national security.*

the terminal speed of a warhead as it penetrates the atmosphere. For instance, higher *betas* have increased terminal speed capabilities more than tenfold over the subsonic warhead of the first intercontinental ballistic missiles. Greater terminal speed translates into a range of crucial advantages—shorter missile flight time, less vulnerability to interception, and reduced dispersion (miss distance). The shorter the period between reentry into the atmosphere and final impact, and the higher the aerodynamic efficiency, the less are the adverse effects of such environmental factors as wind and variations of atmospheric density on warhead accuracy.

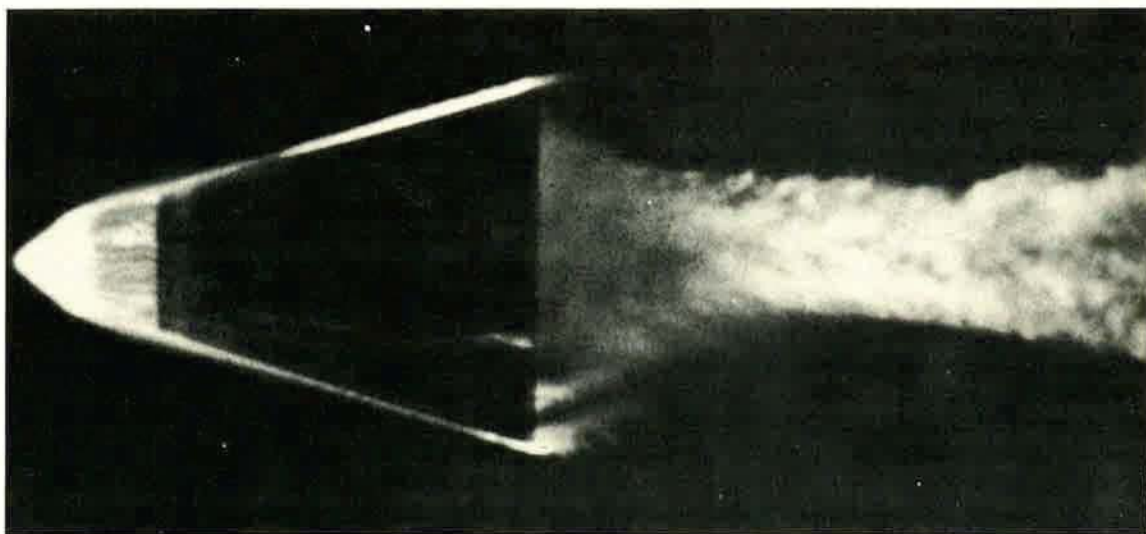
Other advances scored by ABRES that have been incorporated into the nation's ballistic missile forces include reduced radar cross sections, better penetration aids and decoys, improved roll control of RVs (reentry vehicles), hardening (protection against electromagnetic pulse, X-rays, and other side effects of nuclear

As ablative material burns off, however, the contours of the vehicle can change, with the result that stability and accuracy of the reentry vehicle are degraded.

At least as important as ABRES's contribution to the existing ballistic missile force are the options it offers for coping with future threat levels. Although Air Force officials don't discuss this, logical options are believed to involve maneuverable reentry vehicles to penetrate defenses and low-angle reentry (LAR), also called depressed trajectories. Some ABRES projects are being looked at in terms of basic research and advanced development for possible deployment if and when necessary. These ABRES projects can be fully developed and deployed if and when necessary.

### **A Continuous Technology Effort**

Reentry vehicle technology and experimentation dates back to the early days of the ballistic missile program. The current ABRES program was officially launched on May 14, 1963, with the Air Force acting as the DoD agent. Its underlying rationale, according to General O'Neill, is that "we can take almost any booster and, by putting different front ends on it, change the capability of the weapon system in



*Ablation effect of a carbon phenolic nose cone traveling at speed of 11,000 mph is shown in this photograph, taken at the Arnold Engineering Development Center's von Kármán Gas Dynamics Facility.*

blasts set off by the defending forces), and other technologies which protect a reentering warhead and its critical components in terms of detection and interception.

Yet another important ABRES contribution to US deterrence capabilities is, as Lt. Gen. J. W. O'Neill, the Air Force Systems Command's Vice Commander, told this reporter, "a better understanding of the effect of heat-shield ablation of slender RVs on stability and control." Early RVs used heavy metal shielding for protection against the searing heat of reentry. RVs also now use special ablative (designed to burn off slowly) materials to furnish this protection.

very dramatic ways. That's what ABRES is all about."

The ABRES program is a continuous technology effort managed by the Deputy for Reentry Systems, Space and Missile Systems Organization (SAMSO), Air Force Systems Command, with direct participation by the Army and Navy. The Deputy is a member of USAF—at present Brig. Gen. Herbert A. Lyon—with the other services represented by assistant deputies. General systems engineering and technical direction for individual projects are furnished by the Aerospace Corporation under SAMSO supervision. The Massachusetts

Institute of Technology's Lincoln Laboratory, assisted by AFSC's Electronic Systems Division, provides support in the areas of instrumentation development, reentry data analysis, and penetration aid research and development.

The ABRES program staff works closely and on a regular basis with representatives of DDR&E, the three services, the Defense Nuclear Agency, DoD's Advanced Research Projects Agency, and the intelligence community. A semiannual program review involving representatives of these agencies, General O'Neill said, provides the program staff with guidance on what individual projects should

'best estimates' with *reasonable* projections in order to maintain a safe margin," General O'Neill said, adding, "We try not to get hung up in the 'what if' syndrome of postulating unrealistically severe conditions."

Armed with such comprehensive assessments, ABRES seeks out the most promising techniques that can assure the continued ability of



A technologically advanced, slender reentry vehicle is being hoisted for mating with an Atlas 134 ICBM and subsequent test launch.



An ABRES test vehicle, mounted atop an Atlas 134 ICBM, is shown at an undisclosed launch site just prior to test flight.

be pursued. As a rule, ABRES halts its efforts at the preprototype flight demonstration stage to confirm scientific and engineering concepts, with engineering development, production, and deployment assigned to and funded by the R&D organizations of the individual user service. On occasion, General O'Neill said, ABRES may assist a service with the engineering development of a particularly difficult portion of a new system, but efforts of this type usually do not exceed ten percent of the ABRES budget.

ABRES program activities involve two major areas—research involving advanced reentry technology, and hardware support activities, General O'Neill said. The initial step involves in-depth analyses of current and proposed offensive and defensive systems which an adversary has, or might deploy against the US ballistic missile forces. "We evaluate the capabilities of potential adversaries to the extent that they are known to us and augment these

US warheads to penetrate and reach their assigned targets with accuracy and full strategic effectiveness. This phase of a given ABRES project often is confined to paper analyses, but at times may also require a flight-test program to establish the feasibility of a given approach. While a substantial portion of the ABRES activities is of a classified nature, it is known that the following technology categories are being probed:

- **Penetration aids.** These involve decoys and chaff, designed to blind and deceive enemy radar systems. (Chaff is a piece of resonant material, usually aluminum foil, that reflects electromagnetic energy to form a radar echo, thereby creating false targets and masking real ones.) In a general sense, this means techniques for driving chaff down to the lower regions of the atmosphere by delaying the so-called atmospheric sorting—the tendency of chaff to dissipate shortly after it enters the upper reaches of the atmosphere.

In the case of decoys, the basic objective, of course, is to simulate the radar signatures and behavior of the real RV as closely as possible, in order to persuade the enemy defenses to expend ABM interceptors on them. One of the principal difficulties in fabricating credible decoys stems from the fact that any projectile entering the atmosphere creates an "ionized wake," which, by its nature, provides enemy radar with telltale information about the mass and other aspects of the intruding object. Modification of this wake is possible, however. The techniques for accomplishing this are classified, but are believed to involve the use of special chemicals that suppress or in other ways alter the ionization level.

- **Electronic countermeasures.** Also largely of a classified nature, ABRES efforts in this field are quite similar to ECM technologies associated with military aircraft in order to deceive or defeat enemy detection systems.

- **Environmental Protection and Hardening.** The ability to shield critical components of RVs from the various effects of atmospheric reentry and nuclear blasts, according to authoritative defense planners, has reached relatively high levels, on a par with the ability of the vehicle itself to withstand a nearby interceptor warhead detonation. Electronic hardening presumably will become more crucial in case of reentry vehicles which employ on-board computers to perform evasive or other maneuvering actions.



*Reentry behavior of ABRES test vehicles is being recorded at White Sands Missile Range in New Mexico by specially shielded radar systems.*

- **Arming and Fuzing.** Obviously of crucial importance, efforts in this area are believed to involve redundant techniques and protective features.

- **Maneuvering and Guidance.** Sophisticated warning, detection, and computer systems can precisely predict the point of impact of a hostile ballistic missile once its launch is detected. Intensified warning and antiballistic area and terminal defense capabilities on the part of the Soviet Union might require that some or all US ballistic missiles be equipped with the ability to maneuver, and evade. Since such changes of the ballistic trajectory degrade the missile's accuracy, it will probably become necessary to introduce some corrective guidance.

(Dr. Foster told this reporter, in an interview that appeared in the August 1971 issue of this magazine, that one of the "most worrisome threats" involved the possibility that the Soviets "might find a way to design weapon systems that could be used effectively for missile as well as air defense. In such an eventuality, the Soviets could have thousands upon thousands of interceptors deployable against our ballistic system. For this reason it is vital that we continue the ABRES program, which could provide us with the means to negate such a potential Soviet technological breakthrough.")

Another technique to aid in penetrating defense nets involving the exosphere (near-earth space, involving distances of more than 200 miles from the ground) as well as the endosphere (any distance below that) is known as the low-angle-reentry (LAR) system. It is of classified nature and represents an alternative to the maneuverable approach.

### The ABRES Support Function

In the ABRES program, General O'Neill told this reporter, support means hardware demonstration and actual flight tests, involving launches of Athena boosters and sounding rockets at Green River, Utah, which impact at the White Sands Missile Range in New Mexico, and sounding rockets from various launch sites as well as launches of Atlas boosters from Vandenberg AFB, Calif. These efforts, he stressed, are "based on excellent and enthusiastic cooperation by the US Army." In addition to flight tests, ABRES conducts extensive ground testing at such facilities as the



Arnold Engineering Development Center's wind tunnels and ballistic ranges. Facilities of this type are used by ABRES to gain understanding of reentry phenomena.

Other support activities involve operation and maintenance by the ABRES staff of two ABRES radar installations at White Sands, the operation of two TRAP (Terminal Radia-

associated with ABRES from the inception of the program, General O'Neill explained.

#### ABRES—A Billion-Dollar Investment

ABRES, a continuing research and development program in terms of budget, has been funded at a declining rate, down from \$155

The funding history of the ABRES program:

FISCAL YEAR	1964	1965	1966	1967	1968	1969	1970	1971	1972
Amount (Millions)	\$155.0	\$158.3	\$146.0	\$138.0	\$106.5	\$105.0	\$107.0	\$100.0	\$94.7

tion Airborne Measurements Program) KC-135 aircraft, and the reduction of raw test data to a usable form as well as the evaluation of such information. The function of the TRAP aircraft is to evaluate various parts of the electronic frequency spectrum with regard to individual ABRES projects but cannot be described in detail for security reasons.

The ABRES military staff "relies heavily" on MIT's Lincoln Laboratory in determining what test data are required and in their processing and evaluation, General O'Neill, a former SAMSO Commander, stressed. The Aerospace Corporation, in a similar fashion, aids in planning test and demonstration programs, he added. While ABRES is staffed by "excellent military people from the Air Force and the other services, we need the continuity of technical support" provided by the civilian contractors whose key personnel have been

million in FY 1964 to a planned \$94.7 in FY 1972 (see chart on this page). Nevertheless, General O'Neill emphasized that "the funding level is adequate to meet the requirements. We could use more money productively, but we are meeting all vital needs at present."

In the aggregate, the nation has invested more than \$1 billion in the ABRES effort, "an exceptionally valuable program which has provided a handsome payoff to the country, more than justifying the investment the American taxpayer has made in it," General O'Neill pointed out.

If the range of advanced technologies generated and demonstrated by ABRES should indeed help toward successes at the SALT talks and a slowdown of the strategic arms race without jeopardizing the nation's security, General O'Neill's assessment may prove somewhat of an understatement. ■



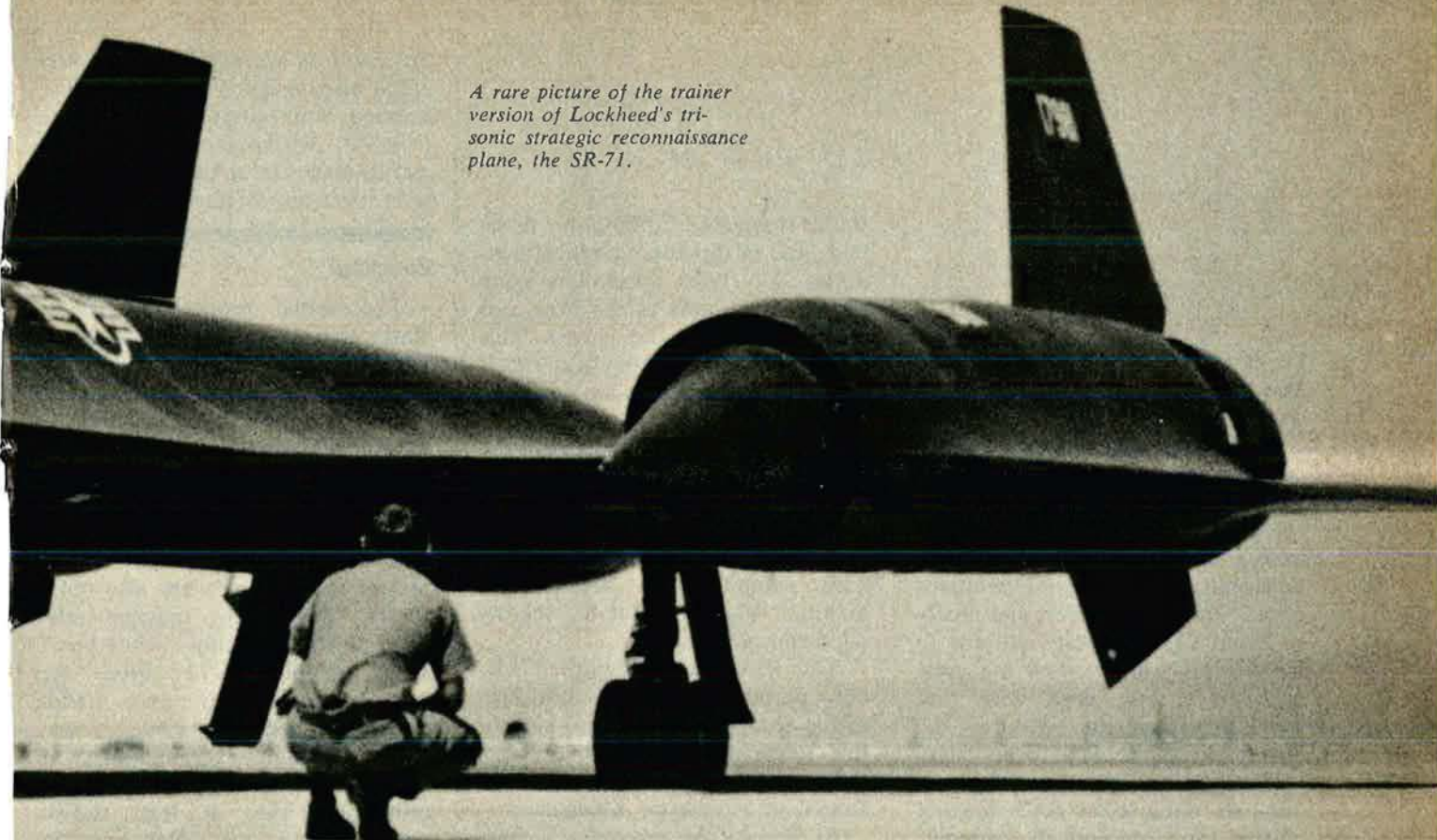
## *More About the SR-71*

*In the September issue, Col. Pat Halloran wrote about supersonic cruise in the SR-71. Here another Blackbird veteran tells how SR-71 crews are selected and trained, and what it's like in the big Mach 3 bird when you're . . . .*

**T**HE SR-71 "Blackbird," a fantastic product of Kelly Johnson's "Skunk Works," flies just as slick as it looks! The SR-71 is a near-perfect aeronautical design, certainly

# **High, Hot, and Heading**

By Lt. Col. G. Abe Kardong, USAF



*A rare picture of the trainer version of Lockheed's tri-sonic strategic reconnaissance plane, the SR-71.*

the most exotic and interesting aircraft in the air today. The faster you go, the faster it wants to go. The bird is like a thing alive, when you're high, hot, and headin' out.

Emotional words from a crusty old pilot who's been around the airfields for nineteen-plus years and many thousands of logbook entries. But don't take my word for it—ask the man who's flown one! There aren't too many around as yet.

Lockheed's Mach III Club is a pretty small group. And they're rather tight-lipped about the accomplishments of this superplane.

Remember the gag about the man who asks, "How's your wife?" And the answer comes back, "Compared to what?" Where airplanes are concerned, I consider myself a fairly hard person to impress, having flown high in B-57s and fast in the B-58. A brief tour in the F-102 makes me at least a barroom expert in the small swifties, but all of the red-line maneuvers in these aircraft seem tame when compared to the SR.

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### The Men

The 9th Strategic Reconnaissance Wing, Beale AFB, Marysville, Calif., is the only SR-71 unit in the Air Force. An appropriate place to start talking about it is with the boss. He sets the pace and the style of the SR crewman. The commander, Col. Harold E. Confer, was one of the first "select" aircraft commanders in the B-58 program.

His credentials include a winner's trophy for the SAC Bombing Competition of 1960, duty as chief of the B-58 Standboard Division, and commander of the world's first supersonic bomber squadron. In January 1961, Colonel Confer and his crew, Col. Richard J. Weir and Lt. Col. Howard S. Bialas, set three world's speed records in a B-58, with speeds of almost 1,300 mph over a precise 1,000-kilometer closed course. This feat won them

**Out**

the coveted Thompson Trophy—the first time the award had ever been won by a bomber crew.

Colonel Confer operates on the premise, "Never ask a man to do something you can't do yourself." He grew up with the SR program, having served as test director, Squadron Commander, Operations Chief, Vice Commander, and finally as Wing CO. He stays current in the SR-71. This assures the crew members at the "doer" level that when they have an "unstart," the boss understands. He's been there.

The prerequisites for SR crew duty, as outlined in SAC Manual 50-71, are deceptively simple: "Pilots must have 1,500 hours of jet time, be a volunteer, under thirty-five years of age, and physically qualified." In point of fact, these are basic requirements, and no one with these minimums has yet entered the program.

A composite picture of an SR pilot would be: age thirty-five; a tour in fighters somewhere in his early career followed by some SAC experience in B-58s, B-52s, or U-2s; 3,800 hours flying time; and a high OER index. These figures are based on the original cadre, who are now mostly lieutenant colonels. The profile for the "new heads" looks something like this: captain or new major, age thirty-one, 2,500 hours, with a completed SEA tour in fighters. A definite accent on youth.

The composite picture of the second man of the two-man crew, the recon systems operator, looks like this: captain, age thirty, SAC experience in B-52s or B-58s as a

Radar Navigator, 2,500 hours flying time, and in top-notch physical condition. He must meet the same physical standards as the front-seat man. That's right, no glasses. This is quite a stab, but physical excellence is a key word in the pressure-suit world.

### Application

The formal application for SR crew duty begins with an AF Form 215, submitted to SAC headquarters, which sets off the following chain of events:

SAC Personnel reviews the OER, crew professional, and medical files of the prospect. Those who survive this screening are sent to Brooks AFB, San Antonio, Tex., to the School of Aerospace Medicine.

At Brooks the prospect is given the physical that was originally devised to select astronaut trainees. This exhaustive examination of the whole man, mind, and body, takes from seven to ten days. It is officially known as the Aerospace Research Test Pilot Physical, and is probably the most shattering experience I've personally survived. "Survive" is the proper word, because a large percentage do not. The extensive series of tests sometimes uncovers defects that probably would never be found in the standard Air Force Annual Flight Physical. This leaves the man healthy, not wealthy, but wiser—and grounded. The loss of flight status is a small price to pay when measured against the prospect of an early cure for a serious physical problem.

When the complete results of the medical tests are in, a medical evaluation board makes a recommendation as to the subject's suitability for the program. The findings of this board are then combined with a complete career brief and forwarded to the 9th Wing Commander at Beale AFB for review. If the Commander feels the prospect is suitable, he is invited to Beale for a personal interview. Only after this

procedure is successfully completed is the man assigned to the Wing for training. This careful screening has paid off. Washouts are very rare, and to make the squad on this team is in itself an accomplishment.

### Checkout

The actual program at Beale starts with a checkout in the T-38, which is used for instrument and pace-chase training by all SR pilots. Whenever an SR is flying, there is a T-38 on ground or airborne alert that could be called upon to provide assistance to an inbound SR with an in-flight emergency. The T-38 flies surprisingly like the SR-71; the approach speeds are also quite similar. Instrument practice missions flown in the little "white bird" save valuable SR-71 sorties for required proficiency and standardization checks.

The academic or ground phase of training consists of 135 hours of instruction, plus at least twelve simulator missions which vary in length from two to four hours "in the box."

The flying phase in the two-pilot trainer version of the SR-71 (either the "B" or "C" model) begins after the completion of simulator mission number five. Four dual rides and a successful check flight find the pilot qualified to solo with his reconnaissance systems operator (RSO) in the "A" model mission airplane. After five rides together, the two-man crew is now "mission ready." Actually, you never really stop learning when you're flying an exotic aircraft. The weapon systems are still young enough for you to encounter a malfunction or high-altitude phenomenon that's never been experienced before. It's sufficient to say that one is rarely bored while flying at thirty-three miles a minute, sixteen miles above the earth. It is Wing tradition that each new crew throws a solo party; they're usually "spirited" occasions to say the least.

### The Machine

A "quantum jump in technology" is the phrase most often used to describe the Blackbird. The razor-



sharp, double-delta fuselage is more than a hundred feet long, and the slide-rule boys say that it actually "grows" several inches during a high, hot leg of a mission. The aircraft is constructed largely of titanium to withstand the temperatures and forces of high-Mach flight. The Pratt & Whitney J58 engine provides the power, with plenty left over.

Practically the entire aircraft is a fuel tank, with ample space in the long, flat forward wing, or "chine," to stow the profusion of photo and electronic sensors.

The '71 is a pilot's airplane. The cockpit layout finds everything in its proper place for a change. Instrumentation is conventional. The average jet jockey would recognize just about all of the buttons, switches, and handles. One stranger will be the triple display indicator or TDI. This instrument gives the pilot a digital readout of Mach number, altitude, and knots equivalent airspeed (KEAS). The standard pressure instruments are of value only as references due to the large errors caused by heating and compression of the air around the vehicle.

Engine inlet controls (spike and bypass door switches) are unique and require an entirely new area of knowledge. In simple terms, these controls provide a manual method of keeping the primary (terminal) shock wave precisely positioned in the engine inlet. While most supersonic birds keep the primary shock wave from entering the inlet duct, the SR-71 "swallows" the prime shock wave and in effect rides on the shock, somewhat like a boat "getting on the step."

At high supersonic speeds the engine actually bypasses a majority of the high-velocity air around the compressor. This bypassed air is compressed by the inlet and ejected from the rear of the engine. The engine now functions essentially as an air pump with a high percentage of the thrust being produced by the inlet itself.

### "Unstart"

This situation sets the stage for a unique aeronautical experience called the "inlet unstart." A variety of malfunctions can cause the primary shock wave to be expelled from the inlet throat. With a sudden loss of most of the thrust, the aircraft attempts to "swap ends" at high supersonic speeds. This violent, mind-boggling experience has been described as like having a midair collision. Until the inlet is "restarted," the pilot's head is sometimes bounced from one side of the canopy to the other and his eyeballs touch all their limit switches. With the advent of automatic restart systems, this situation is now very rare. The possibility of its happening, however, tends to keep the crew alert.

The handling qualities of the plane draw constant praise. Since it is a Mach 3 cruise vehicle, as opposed to the customary brief dash of other aircraft to their Mach limit, all SR-71 systems are optimized at the high Mach number. This fact has not degraded the bird's low-speed handling quality. It is very stable and rides through turbulence with the firm feel of a Cadillac.

While most flying above Mach 3 is on autopilot, because of the precise platform required for the reconnaissance sensors, the pilot does hand fly the machine for practice when in noncritical areas. Several



*After a checkout in the T-38, 135 hours of ground school, at least twelve simulator missions, and four dual rides in the SR-71 trainer version, the "new" Blackbird pilot (already a veteran jet jockey before coming to Beale AFB) is ready to solo with his reconnaissance systems operator.*

volumes could be written about instrument flying in this speed/altitude spectrum. It is sufficient to say we have overrun the capabilities of the present-day cockpit displays with their "propeller-era" response rates and inherent errors. It's fortunate that you rarely find weather above 55,000 feet. The SST program has generated advanced electronic displays of proved reliability that will probably be standard right into the spaceship era.

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### Fueling

In my "big" airplane days, I was a participant in many airborne jousting contests, in which my objective was to wrest enough JP-4 fuel from a reluctant KC-135 tanker to make landfall and the safety of a ground refueling hydrant. It always left me with the feeling that they really had not given the fuel; I had taken it away from them.

Air refueling the SR-71 is a no-sweat operation. The refueling receptacle is some twenty feet behind the pilot's head, so the tanker's pilot-director lights become important. Pilots generally agree that the slot position in formation is the easiest position of all to fly. Fly good slot and the boom operator will do the rest. Inadvertent disconnects are very rare with the '71. Its excess thrust and feather-light control response would gladden the heart of any aviator.

In the traffic pattern, the Blackbird handles like an outsized fighter. The 360-degree overhead landing pattern approximates the size of the F-4 pattern. "Over the fence" speeds average about 180 knots. The big double deltawing floats like a T-bird in ground effect. The pilot really has to work hard to make a bad landing; the aircraft just won't let you.

While most deltawing airplanes are very stable and easy to fly and land, there is one undesirable side effect. The deltawing does not stall

in the classical sense. There is no buffet, vibration, or wing drop. It just lets the unwary pilot fly into the red part of the drag/thrust curve without a whisper of warning. The aircraft flies, feels, and sounds the same throughout the whole speed envelope; therefore, it's a "heads-up" airplane that requires the pilot to stay well ahead and to fly the bird right onto the chocks.

The reconnaissance systems operator's world, in the second cockpit, is largely classified gear. The RSO is really a many-headed monster performing duty as a copilot, flight engineer, systems operator, and navigator. The heart of his system is an astro-inertial navigation system that provides automatic star tracking even in daylight. Since the entire mission is programmed into the aircraft's onboard computer, it frees the RSO to perform his important secondary duties. He reads all checklists, handles communications, fuel, and center of gravity management, makes air refueling rendezvous, and operates the numerous exotic sensors that are the whole reason the airplane flies at all.

It is a physically and mentally demanding job, and requires close coordination between the two-man team. The morale and *esprit de corps* of the Blackbird crewmen has to be just about the greatest there is.

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### Mission

The tradition of the unarmed recon vehicle is carried forward in the SR-71. Mission preparation starts the day prior, with the traditional operations briefing. The pilot and RSO study a 35-mm color film strip, which outlines the route, refueling points, and other pertinent data. This same film strip is used in the moving map displays in both crew positions. The map projectors drive at ground speed and provide the crew with data to make rapid decisions concerning the mission profile.

What's it like to "strap on" an SR? The place to start the story is with the flight surgeon's preflight physical at the Physiological Sup-

port Division (PSD) facility. Even with the two-inch-thick medical report from Brooks AFB, you still take a physical exam before and after every flight. With the flight doc's blessing secured, you report to the kitchen, where the cook prepares steak and eggs to your order. This is a special high-protein, low-residue preflight meal. While you eat, the crew chief briefs you and your recon systems operator on the current status of your aircraft, as well as that aircraft's history of malfunctions.

After donning your white, long-handled underwear (turtleneck), white socks, and gloves, you report to the flight preparation room for suiting. The full pressure suit consists of two main garments. The inner suit is a rubber "bladder" with several layers of nylon. The gloves and boots are connected to provide the same pressure to the hands and feet. The pressure is a must. At 80,000 feet the ambient air pressure is only one-half pound per square inch. Without pressure, your blood would boil and death would be instantaneous.

The outer garment is made of an aluminum-coated, high-temp nylon and includes the parachute harness



*Feather-light controls make daytime refueling a no-sweat operation. But at night, light reflections on the "fishbowl" visor of the pressure suit helmet "approximate a discotheque light show."*

and the "water-wing" flotation gear. The whole suit weighs about forty pounds. The suiting process requires about eight to ten minutes. Crew members quickly adapt to full pressure-suit flying. The suit is very comfortable and has been "live jumped" from ground level to design altitude and Mach, which is a good endorsement for its reliability.

The helmet has a feeding port through which the crew members may drink from a plastic bottle or eat astronaut-type food from a tube. The food tastes pretty good, but looks ghastly, and few of the troops use it.

White jump boots with "spurs" complete the flight suit. The strap-on spurs are attached to cables that retract the legs firmly against the seat in the event of a bailout.

From the throttle-bender's point of view, there is one negative point about pressure suit flying. The sensations the "fishbowl" visor can generate at night when refueling from a tanker approximate a dis-cotheque light show. This tailor-made vertigo situation requires "steady-on" concentration.

The crew arrives at the aircraft



*The author, Colonel Kardong, has flown some twenty different aircraft since entering the Air Force. After a tour in TAC B-57s in North Africa, he flew SAC B-47s at Lincoln, Neb. He then joined the 43d Bomb Wing at Carswell AFB, Fort Worth, Tex., and flew the B-58 Hustler for four years as a Select Crew commander and instructor pilot. He has been with the Blackbird program since 1967 as an SR-71 pilot and Chief of SR-71 Crew Training and Protocol.*



about forty-five minutes before launch time. The trusty PSD troops make all the required hookups and pull and stow all safety pins. The crew members just stay out of the way. At this point, the man and machine are ready to go to work.

### Takeoff

For a pilot's view of an SR mission, let's pick up the mission as it pulls onto the active runway for takeoff.

Throttles coming up, brakes released—a quick check of the gauges, min-burner—a good, even lightoff is important—max burner. (Burner is lit on the "roll" because the power available in burner can scrub the tires off the wheels.) Line speed check—good, rotation speed, nose up smoothly to about ten degrees Alpha, you're off! Gear up—another quick check of the gauges, the airspeed indicator says 350 knots. Keep the nose coming up!

Passing 50,000 feet I check the tiny, aft-looking periscope in the canopy. The vertical stabilizers are trimmed zero. The contrails have stopped—no water vapor or weather up here. The Mach window numbers on the triple display indicator are spinning. The RSO calls center and reports, "Aspen 23 above FL 600." (Flight level 60,000 feet.)

Navigation lights off and retract—don't want to burn them off. The indicators show that the inlets are as smooth as glass. It's surprisingly quiet inside my fishbowl helmet. My nose suddenly requires scratching. By slumping down slightly, I've learned that I can scratch it on the microphone. That sure feels good.

The earth is falling away rapidly. This must be just a small taste of what the astronauts feel as they "slip the surly bonds."

"Passing FL 700," the RSO snaps. "Start turn point in sixty miles, about two minutes." My projector and digital readouts confirm he's "right on the money."

The RSO checks the CG (center of gravity) and fuel on board and gives me a level-off altitude and power setting. From this point, we start our cruise-climb profile. There's the Mach number we want; power back, want to slip into that cruise profile smoothly. Snap on "George"—he can fly that turn more precisely than I can. Watch that angle of attack!

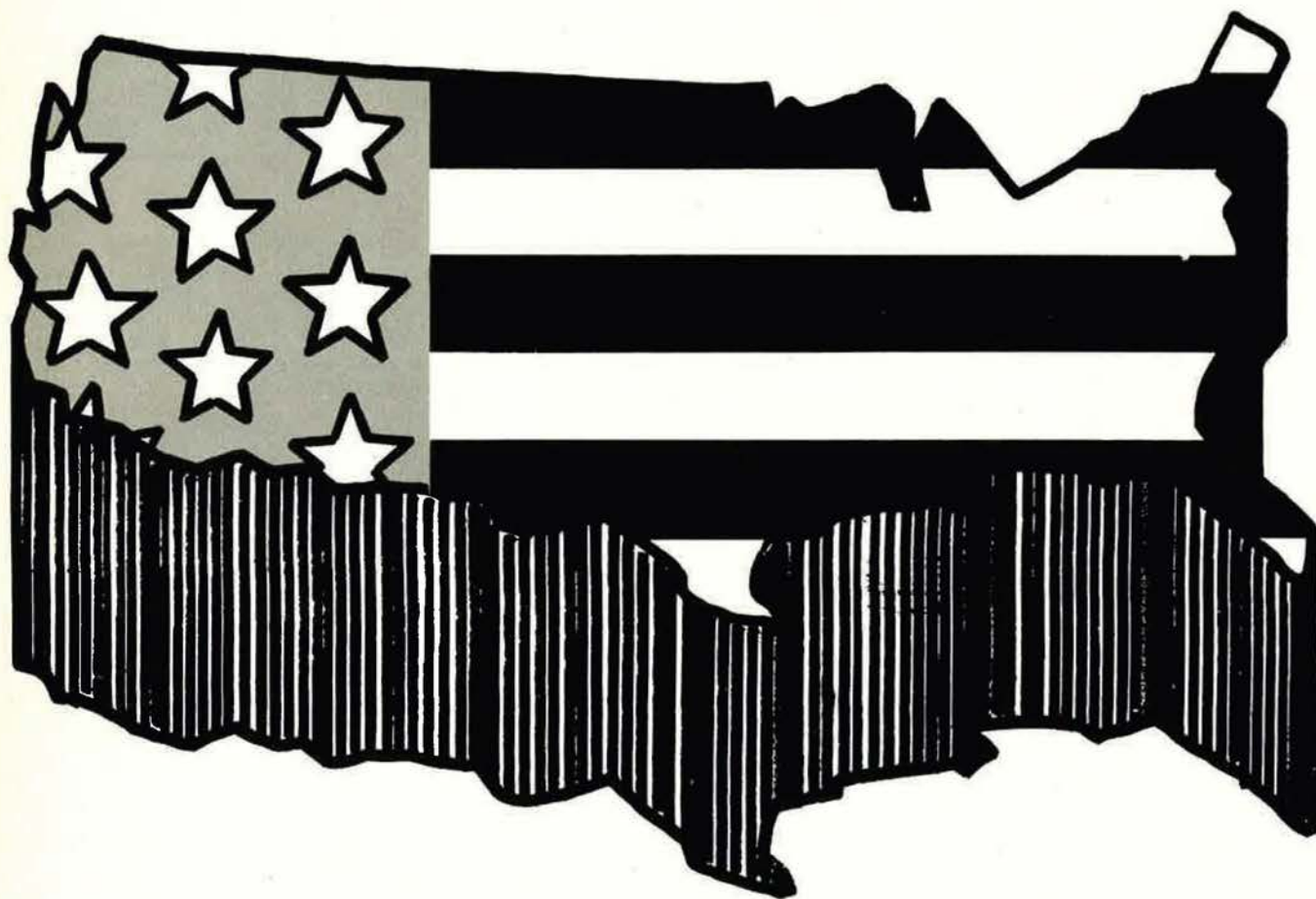
I turn down the cabin cooling rheostat. The windscreens are really hot—many areas of the airplane are over 1,000 degrees Fahrenheit now. (I wonder where that fly is that was walking on my faceplate right after takeoff?)

"The left inlet pressure needle is crowding the 'barberpole,' Nav. If we unstart, that will be the reason." But it doesn't. It's a smooth, beautiful day, the Nav has already raised the tanker on the high-frequency radio. They are in place, on time, and refueling weather is CAVU. We are rushing toward them at thirty-three miles a minute.

It's just one of those times that every flyer has known. That warm feeling that all is right with the world. My mind vaguely recalls a long-forgotten verse from my cadet days.

Who else has seen the un-  
climbed peaks?  
The rainbow's secret?  
The real reason birds sing?  
Because I fly  
I envy no man on earth. ■

*Forgetful of America's contributions to the international community over the years, many rush to judge her harshly. Here—for domestic and foreign consumption alike—a distinguished Canadian rabbi comments on . . .*



## **AMERICA'S CRITICS: A Case of Short Memory**

By Rabbi Reuben Slonim

**T**HE EXTENT of US aid to other nations is unprecedented in the history of any people. But today, when Americans must start looking inward and concentrate on their own troubles, the world resents it.

Some of the strongest detractors and belittlers are to be found in Canada; they can't wait to stick a knife into the falling body politic of our colossal neighbor—on the theory, presumably, that you enhance your own image by smearing the image of your neighbor.

In that smart-alecky tone of the boastful intellectual, one of Toronto's newspapers has come up with a definition of the new economics out of Washington, which it calls Nixonomics: "That's when a government says to the world, 'We got ourselves into this mess—now you get us out!'"

There is no question that much of the American mess today is America's own doing. Vietnam was a grievous mistake to which a succession of administrations—Democrat and Republican—contributed. For the good of everyone, Mr. Nixon should perhaps have made his economic moves six months ago.

But all that is hindsight. We may criticize the Americans for bad judgment; but not for looking to the world to get them out of a fix, as if that fix was solely the doing of Washington and the rest of us were simply bystanders.

It's the easiest thing in the world to condemn America for Vietnam—that it fought the wrong enemy, at the wrong time, in the wrong way, with the wrong weapons.

It's a little harder to remember that the rest of us in the West were grateful because the United States took on the nasty job France had botched. It's not so pleasant to recall the days when Khrushchev was at his height threatening to bury the West, and we sought a champion to check him wherever and whenever he pushed.

Perhaps America bit off more than it could chew when, after World War II, it undertook to fill political or economic vacuums in the Atlantic, Pacific, Mediterranean, and Indian Ocean areas. Surely the economics of the vast bite is the reason for American troubles today.

Why did the United States pile up the moral, political, economic, and military commitments of the last three decades? Because it had grown in power and strength and the world had become more and more interdependent. America was self-interested, no question about that. But it understood, as perhaps no other nation on record, that its own peace and security required an enlightened approach.

The mere recapitulation of the commitments dramatically illustrates how far a single nation has sought a formula for building a world on the principle of live and let live.

Its most binding obligation was to the fourteen other members of the North Atlantic Treaty Organization, assuming a military, political, and moral obligation to defend all nations

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*Rabbi Reuben Slonim, former spiritual leader of Beth Tzedec Synagogue of Toronto and Middle East correspondent for the Toronto Telegram, is now with the national staff of the State of Israel Bond Drive in Canada. A Canadian by birth, Rabbi Slonim was a chaplain in the RCAF during World War II. While occupying a pulpit in the United States, he received the Variety Magazine award for best religious forum on the air. His commentary on America's critics is reprinted with the kind permission of the Toronto Telegram, in which the essay originally appeared.*

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from Norway's North Cape to Turkey's Caucasus.

It even gave economic aid to the old enemy Germany, not only reviving the West German people's prosperity but enriching them to the point of becoming one of the world's four economic giants.

To Canada, America was linked by the North Atlantic Treaty Organization and by special moral ties, by proximity, several bilateral agreements, and friendship, which we welcomed with open arms.

The United States gave assistance and pledged joint resistance against any outside attack to the twenty republics of Latin America. It entered mutual defense arrangements with the Philippines, South Korea, the Chinese Nationalists on Taiwan, Australia, New Zealand, Pakistan, Thailand, and Japan, another former enemy which Washington helped to make the world's third economic colossus.

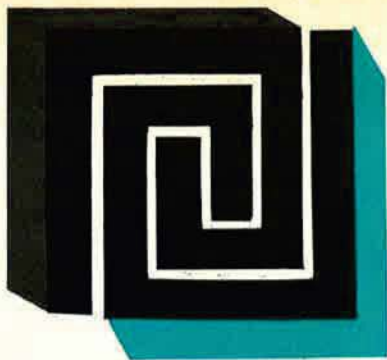
In all, the US is tied by specific treaties of mutual assistance to some half-a-hundred nations, covering almost eighteen million square miles, with populations totaling close to a billion.

No wonder the US is in decline; it was bound to happen. Its dollar was losing value for some time. It has read itself out of the next generation of air transport competition. It has fallen behind Russia and France in arms sales and is lagging in the world trade race vis-à-vis Japan and Germany.

US influence is on the wane in Western Europe, in Latin America, in Western and Southern Asia, in Africa, and in the United Nations.

One wonders whether it will soon be forced to abdicate the role of superpower and whether even China and the Soviet Union will not regret the change, having to view the prospect of dealing with Japan and Germany instead.

America, America, we helped make you what you are. If the world resents you now, it's all in the perversity of human nature. What debtor has ever loved his creditor? ■



## INTRODUCTION

# The Military Balance

### ABBREVIATIONS

AA	Antiaircraft	LST	Landing ship, tank
AAM	Air-to-air missile(s)	MIRV	Multiple independently targetable reentry vehicle(s)
ABM	Antiballistic missile(s)	MR	Maritime reconnaissance
AEW	Airborne early warning	MRBM	Medium-range ballistic missile(s)
AGM	Air-to-ground missile(s)	MRV	Multiple reentry vehicle(s)
APC	Armored personnel carrier(s)	MTB	Motor torpedo boat(s)
ASM	Air-to-surface missile(s)	NATO	North Atlantic Treaty Organization
ASW	Antisubmarine warfare	RCT	Regimental combat team
ATGW	Antitank guided weapon(s)	RL	Rocket launcher(s)
AWX	All-weather fighter(s)	SACEUR	Supreme Allied Commander, Europe
BMD	Ballistic missile defense	SAM	Surface-to-air missile(s)
CENTO	Central Treaty Organization	SAR	Search and rescue
COIN	Counterinsurgency	SEATO	Southeast Asia Treaty Organization
DDG	Destroyer, guided missile	SHAPE	Supreme Headquarters, Allied Powers in Europe
DEG	Destroyer/escort, guided missile	SLBM	Submarine-launched ballistic missile(s)
FGA	Fighter, ground attack	SP	Self-propelled
FPB	Fast patrol boat(s)	SRBM	Short-range ballistic missile(s)
GA	Ground attack	SSBN	Ballistic missile submarine, nuclear
GM	Guided missile	SSM	Surface-to-surface missile(s)
GNP	Gross national product	S/VTOL	Short/vertical takeoff and landing
GW	Guided weapon(s)		
ICBM	Intercontinental ballistic missile(s)		
IRBM	Intermediate-range ballistic missile(s)		
LPH	Helicopter landing platform		

All miles are statute miles (5,280 feet).

For the past several years, AEROSPACE INTERNATIONAL magazine—a publication inaugurated by the US Air Force Association in 1965 and edited specifically to fulfill the information requirements of aerospace leaders around the world—has presented as a year-end bonus “The Military Balance.”

Now, for the first time, AIR FORCE Magazine and AEROSPACE INTERNATIONAL are joining forces to bring “The Military Balance” to their respective readers both in the US and in the international aerospace community.

“The Military Balance” is an authoritative estimate of the makeup and size of the world’s most important military forces. It is prepared annually by the renowned International Institute for Strategic Studies, based in London, and appears exclusively in AIR FORCE Magazine/AEROSPACE INTERNATIONAL through a special arrangement with the Institute. “The Military Balance” should provide an informative and handy guide for military and civilian readers alike.

The International Institute for Strategic Studies was founded in 1958 as a center for research and discussion regarding defense, arms control, disarmament, and related activities. Since then, it has grown in recognition and prestige to become the authority in its field.

John F. Loosbrock, Editor of both AIR FORCE Magazine and AEROSPACE INTERNATIONAL, has been a member of the Institute since its inception.

“The Military Balance for 1971–1972” recognizes the reality of the military status quo as it exists in the world today. Therefore, in the document’s compilation, it presents as a first section a breakdown of the armed forces of the world’s two military superpowers—the United States and the Soviet Union (Chapter I). These two nations constitute, as they have since the conclusion of World War II, the globe’s central major strategic balance.

The second main section of “The Military Balance for 1971–1972” is comprised of the respective forces in Europe: the Warsaw Pact signatories

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# 1971-1972

(Chapter II), the NATO-aligned countries (Chapter III), and the other nations of Europe (Chapter IV).

The military forces of the countries of the Middle East and Mediterranean areas (Chapter V) and the powers in Sub-Saharan Africa (Chapter VI) form the third main section, while China (Chapter VII) and the rest of Asia and Australasia (Chapter VIII) make up the fourth main section.

Chapter IX contains relevant tables, and "The Military Balance" concludes with Chapter X, an essay on "The Military Balance Between NATO and the Warsaw Pact" nations, appearing as the Appendix.

In preparing "The Military Balance for 1971-1972" the Institute sought, and in most cases received, the cooperation of the governments involved. However, since not all countries have been equally cooperative in producing information, some figures represent informal estimates.

The Institute, in its Preface, when this document was originally published in September, also noted that the Latin American nations were omitted from this year's "Military Balance" tabulation, but that coverage of that part of the world would be re-introduced next year.

Manpower figures contained in these pages are those of regular forces, although an indication of the size of paramilitary, militia, and reserve forces has been given for the individual countries.

Except where otherwise stated, naval strengths are those of active fleets, and vessels of less than 100 tons have usually been excluded.

Figures for defense budgets are the latest available and are generally exclusive of military aid.

National currency figures have been converted into US dollars at the prevailing rates, as reported to the International Monetary Fund, except in cases of some European countries that are not members of the IMF. In view of this, the conversion rates listed in each country's section may not always be applicable to commercial transactions.

—THE EDITORS



## Chapter I

# The United States and the Soviet Union

Whatever their other commitments or capabilities, the primary mission of American armed forces remains the deterrence of a strategic attack, necessarily with nuclear weapons, upon the United States. The principal object of that deterrence is the only other "superpower," the Soviet Union, with China as a subsidiary object of potentially increasing importance. Conversely, although less explicitly, Soviet strategic nuclear forces appear to be designed primarily to deter an American strategic attack upon the Soviet Union. The strategic forces and weapons of both superpowers have capabilities that, at least in theory, go beyond reciprocal deterrence, to the point of offering some prospect of limiting the damage either would suffer should a strategic nuclear war occur. They also provide means of deterring lesser nuclear powers. In terms of intentions, however, it seems that deterrence of each other represents the first priority for both countries.

Soviet and American representatives have been engaged since November 1969 in an effort to agree upon the mutual limitation of strategic nuclear forces. These Strategic Arms Limitation Talks (SALT) have not yet produced any formal agreement, although the governments issued a statement on May 20, 1971, in which they spoke of working out an agreement during the remaining months of the year that would limit the deployment of antiballistic missile (ABM) systems and that would also include "certain measures" of limitation on offensive weapons. Meanwhile, the expansion or modernization of strategic nuclear forces has continued on both sides. The Soviet Union, having matched the American total of offensive strategic missiles, has continued to deploy additional intercontinental ballistic missiles (ICBMs) on land, to construct additional ballistic-missile submarines, and to develop more effective weapons for its offensive forces. At the same time, the United States has embarked upon an extensive modernization of its strategic offensive weapons which, over the next four years, will add considerably to the number and effectiveness of the nuclear warheads which its own land- and sea-based forces can deliver. Both countries have also pursued attempts to deploy an effective ABM system: the Soviet Union by improving the small system that it already has, the United States by starting deployment of the *Safeguard* system, which was announced in 1969.

With an estimated total of 1,510 ICBMs (about 100 of which are positioned in MR/IRBM fields, and may, therefore, be intended for possible use against targets other than the United States), the Soviet Union has now surpassed

the United States ICBM force of 1,054. Soviet deployment has, however, slowed down considerably since the beginning of 1970 and may have reached, or be approaching, its planned level. A number of underground silos of a new type have been observed, but it is not clear whether these are intended to fire a new ICBM (of which no other evidence has been reported) or to provide added protection for missiles of existing types, and especially for the large SS-9 missile. If, as seems possible, the latter is the case, this improvement of the silo for the SS-9 system will match the testing of an SS-9 multiple-warhead cluster, containing three reentry vehicles, in which the Soviet Union has been actively engaged since 1968.

The United States has made no effort to increase its total of ICBM launchers. It has, however, continued the replacement of *Minuteman I* missiles with *Minuteman III* missiles, which began in 1970. Over 500 *Minuteman III* launchers, each of which carries three independently targeted warheads, are to be deployed, under present plans, by 1975. This will have the effect of doubling the number of targets at which the total *Minuteman* force can strike.

Although the Soviet Union has continued to launch Y-class ballistic-missile submarines now at a rate of seven or eight a year, it has not yet overtaken the United States in this field. It now has about 350 SLBMs in nuclear-powered sub-



*This short-range Sprint missile is teamed with the long-range Spartan to form the US ABM system that will protect part of the Minuteman ICBM force.*





*The USAF is replacing Minuteman I missiles with the Minuteman III, shown here. Plans call for 500 Minuteman IIIs, each with three independently targeted warheads, to be in place by 1975. The US has no known plans for increasing its land-based ICBM force beyond the 1,054 now operational.*

marines (of which some 320 are in modern Y-class boats), in contrast with the 656 launchers in the parallel American force. In terms of launcher totals, the Soviet Union's construction program continues to bring it closer to the United States at a rate that could produce numerical equality by 1974. Moreover, the Soviet Union has been testing a new SLBM that, with its estimated range of some 3,000 miles, would be comparable to the American *Polaris* vehicle. Meanwhile, the United States has begun to deploy the more advanced *Poseidon* SLBM, with at least ten independently targeted reentry vehicles. The first submarine equipped with *Poseidon* became operational during early 1971; the completion of the planned program for converting thirty-one boats would raise the total number of nuclear warheads deliverable by the American SLBM force from about 1,500 (capable of attacking 656 separate targets) to over 5,400 (capable of attacking some 5,000 separate targets). For the longer term, development work continues on an Undersea Long-Range Missile System (ULMS), which might replace the *Poseidon* submarines themselves at the end of the 1970s.

In contrast with the quantitative reinforcement of their offensive missile forces, the Soviet Union and the United States have continued to allow their strategic bomber forces to dwindle. The number of American B-52 bombers in service has dropped to well below 500, while the Soviet force of MYA-4 *Bison* and TU-20 *Bear* bombers is now estimated at 140 aircraft (with an additional fifty *Bison* tankers). On the American side, however, the effectiveness of the B-52 force is likely to be greatly increased by the introduction of the new Short-Range Attack Missile (SRAM), which has been ordered into production and which is expected to have an operational range of sixty to seventy-five miles. Each B-52 could carry up to twenty-four SRAM, while the proposed B-1 bomber, prototype development of which is under way, would, if produced, be able to carry some thirty-two SRAM when it became operational about 1978. The total number of nuclear weapons deliverable by the American strategic bomber force is thus likely to rise sharply during the next five years. The Soviet Union has shown no apparent interest

in matching this particular effort. The prototype of a new variable-geometry ("swingwing") bomber has been observed, but it is not clear that, even if produced, it would have an effective intercontinental capability, and there have been no reports of any attempt to develop air-to-surface missiles for it (or for existing Soviet bombers) of a type comparable to SRAM.

The Soviet Union, with some 10,000 anti-aircraft missiles (SAM) and 3,000 interceptor aircraft, has devoted a great deal more effort to territorial air defense than the United States, although the latter has continued development of its Over-the-Horizon (OTH-B) radar system, designed to detect attacking aircraft at great range, and of an Airborne Warning and Control System (AWACS), designed to track aircraft flying below the coverage of other radar systems. Both countries have continued to devote efforts to developing means of defense against ballistic missiles. The Soviet Union, which completed deployment around Moscow of sixty-four ABM launchers for its *Galosh* missile in 1970, has been testing an improved ABM missile and may be ready to begin its deployment. It does not appear, however, to have modified the basic orientation of its ABM system, whose missiles and radars are deployed in a manner that suggests a strong bias toward defense against an attack by American ICBMs. The United States has begun work on three sites for its *Safeguard* ABM system, each containing long-range *Spartan* and short-range *Sprint* missiles for the protection of a part of the *Minuteman* force against ICBM or SLBM attack; the first could be operational at the end of 1974. Funds have also been requested for a fourth site, either at an additional *Minuteman* field or at Washington, D. C., as well as for the continuation of development work on an alternative system, known as *Hard Site* (this would replace the *Safeguard* Missile Site Radars (MSR) with a large number of smaller and cheaper radars), for the more economical and less vulnerable defense of *Minuteman*. On both sides, however, continued deployment of ABM launchers now depends heavily upon the outcome of the SALT negotiations.

The manpower strength of American conventional forces has declined from the 1968 peak of over 3.5 million to the "pre-Vietnam" level of 2.7 million and is well on the way toward the 1972 target of 2.5 million. At the same time, withdrawals from Vietnam and South Korea and the rede-



*Two of the USSR's giant SS-9 missiles parade through Moscow's Red Square. Each SS-9 is capable of delivering three five-megaton warheads or a single twenty-five-megaton warhead.*



The US Navy's Poseidon SLBM carries ten independently targeted warheads. Thirty-one subs will have Poseidons.



The US Army's Hawk air defense missile is a solid-propellant, two-stage, mobile system, highly effective against aircraft flying at medium altitude or as low as 100 feet above the ground.

ployment of units from Japan have marked the further contraction of American military deployment in Asia. No parallel manpower reductions or deployment changes have been apparent in the Soviet case. As far as navies are concerned, the American tendency to reduce the active ship strength, while improving its quality, has been generally followed by the Soviet Union. Both navies have reduced overall numbers while continuing with modernization.

## THE UNITED STATES

### General

Population: 208,100,000.

Military service: selective service for two years. (A reform of the selective service system is being worked on. July 1, 1973, has been set as the target date for reaching zero draft calls.)

Total armed forces: 2,699,000.

Estimated GNP 1970: \$977,000,000,000.

Defense budget 1971-72: \$78,743,000,000. (New obligatory authority for FY 1971-72; expected outlay is \$76,000,000,000.)

### Strategic Forces

#### (a) Offensive

ICBM: 1,054 (Strategic Air Command—SAC); 400 *Minuteman I*s; 500 *Minuteman II*s; 100 *Minuteman III*s; fifty-four *Titan II*s.

SLBM: (US Navy) 656 in forty-one SSBMs: four with *Poseidon* (four more are converting); twenty-seven with *Polaris A-3*s; ten with *Polaris A-2*s.

Aircraft (SAC): bombers: 520; seventy FB-111s in four squadrons; 150 B-52C/Fs in ten squadrons (two squadrons of B-52s and about 100 KC-135s are based in Southeast Asia); 210 B-52G/Hs in fourteen squadrons; ninety B-52s in active storage; tankers: 420 KC-135s; strategic reconnaissance: SR-71s; two squadrons.

#### (b) Defensive

North American Air Defense Command (NORAD), with its headquarters at Colorado Springs, Colo., is a joint Canadian-American organization. American forces under NORAD are

Aerospace Defense Command (ADC) and Army Defense Command (ARADCOM); combined strength 80,000.

Aircraft (excluding Canadian). Interceptors: 522. Regular: eleven squadrons with F-106s. National Guard: five squadrons with F-101s; twelve squadrons with F-102s; one squadron with F-104s. AEW aircraft: three squadrons with EC-121s.

SAM. Regular: two battalions with *Hawks*; five squadrons with 170 *Bomarc Bs*. National Guard: twenty-seven batteries with *Nike-Hercules*.

Radar and tracking stations—a chain including: the Ballistic Missile Early Warning System (BMEWS), with stations in Alaska, Greenland, and England; the "forward scatter" Over-the-Horizon radar system (this radar-system can detect ICBMs regardless of the direction or trajectory of their launch); the *Pinetree Line*; the thirty-three-radar Distant Early Warning (DEW) Line. Surveillance and tracking of objects in North American airspace is coordinated by the Semi-Automatic Ground Environment (SAGE) system. Fourteen locations are combined with Backup Interceptor Control (BUIC) stations. A system (474N) of seven radar stations on the East, West, and Gulf Coasts of the United States is designed specifically for the detection of submarine-launched missiles.

Army: 1,107,000.

Three armored divisions; one cavalry division; four infantry divisions (mechanized); two infantry divisions; two airborne divisions; one cavalry brigade; three independent infantry brigades; one airborne brigade; five armored cavalry regiments; five special forces groups; thirty SSM batteries. About 200 independent aviation units with 11,600 aircraft, including 9,000 helicopters. M-48 and M-60 medium tanks; M-60 A1E2 medium and M-551 *Sheridan* light tanks with *Shillelagh*; M-107 175-mm self-propelled guns, M-109 155-mm and M-110 203-mm self-propelled howitzers; *Honest John*, *Sergeant*, and *Pershing* SSMs; *Hawk* and *Nike-Hercules* SAMs; the *Chaparral/Vulcan* air defense system; and the TOW antitank guided weapons system.

Reserves. Army National Guard: 400,000 men capable, in five weeks from mobilization, of providing eight full divi-



A General Sheridan armored reconnaissance vehicle equipped to launch the US Army's Shillelagh missile. The missile, effective against armor, fortifications, or troops, is forty-five inches long and about six inches in diameter.



The 155-mm howitzer, mounted on a US Army M-109 self-propelled vehicle, swings in a full circle and can be elevated from minus three degrees to plus seventy-five degrees. Here it is seen in review at Kitzingen Airfield, Germany.

sions and some smaller units to round out regular formations, and thirty-six SAM batteries with Nike-Hercules. Army Reserves: average paid training strength 260,000, organized in twenty-one brigades. In addition, 48,000 undergo short tours of active duty.

**Marine Corps:** 212,000.

Three divisions (19,000 men), each supported by one tank battalion and one SAM battalion with twenty-four Hawks; M-48 and M-103 tanks; 105-mm SP howitzers; 105-mm and 155-mm howitzers; 175-mm guns. Three air wings, 540 combat aircraft; fourteen fighter squadrons with F-4s (with Sparrow and Sidewinder AAM); twelve attack squadrons, with A-6s and A-4s; one close-support squadron with AV-8A Harriers; three recce squadrons with RF-4Bs and RF-8s; forty-five AH-1 Cobra gunship helicopters; six heavy helicopter squadrons with CH-53As; nine medium helicopter squadrons with CH-46As; three assault transport squadrons with C-130s.

**Reserves.** Average paid training strength 49,500, plus paid training tours for a further 560. They form a reserve division and an associated air wing, which includes four squadrons with F-8s, five squadrons with A-4s, two squadrons with CH-53s, and three squadrons with CH-46s.

**Deployment.** Ground forces, Army and Marines, were deployed as follows at the beginning of July 1971. *Continental United States:* (1) Strategic Reserve—one armored division; one cavalry division; one airborne division; one mechanized infantry division; two Marine divisions; one Marine brigade; one armored cavalry regiment; (2) To reinforce Seventh Army in Europe—one mechanized infantry division (less one brigade; this division is dual based and its heavy equipment is stored in West Germany); one armored cavalry regiment; one Special Forces group; (3) Other—one infantry brigade; one airborne brigade; one armored cavalry regiment; two Special Forces groups. *Hawaii:* one infantry brigade; one Marine division (less one brigade). *Germany:* (1) Seventh Army—two corps include two armored divisions, two armored cavalry regiments, two infantry divisions (mechanized); one infantry brigade (mechanized); (2) West Berlin—one infantry brigade. *Italy:* Task Force with headquarters elements and one SSM battalion. *South Vietnam:* one infantry division; one airborne division; one cavalry



The US Navy's huge nuclear-powered aircraft carrier, USS Enterprise, carries about 100 planes of various types. The Enterprise, equipped with an automated combat direction system for command and control, has contributed much to the air action in Southeast Asia.

brigade; one mechanized brigade. South Korea: one infantry division. Okinawa: one Special Forces group.

**Navy**

**Submarines, attack:** fifty-three nuclear powered (forty with Subroc), and forty-six diesel powered.

**Aircraft carriers.** (1) Attack: fifteen. One nuclear powered (USS Enterprise, 76,000 tons), eight Forrestal- and Kitty Hawk-class (60,000 tons), three Midway-class (52,000 tons), and three Hancock-class (33,000 tons). Each normally carries an air wing of seventy to eighty-five aircraft organized



The US Navy's controversial F-14 fighter, now in its test stage, is shown here with its swingwing fully extended. It is designed as a carrier-based air-superiority fighter.



The US Navy's Fleet ballistic missile submarine USS Stonewall Jackson, is one of the Navy's forty-one nuclear-powered missile-firing submarines, a vital part of the US deterrent.

in two fighter squadrons with F-4s (F-8s in the Hancock-class); two light attack squadrons; one AWX squadron with A-6s; and AEW, tanker, and reconnaissance aircraft. Light attack aircraft include A-4s and A-7s (the A-7s eventually due to replace the A-4s). RA-5Cs are used for reconnaissance (RF-8Gs in the Hancock-class). E-2As and E-1Bs are used for AEW, and a few KA-3Bs as tankers. (2) Antisubmarine: three Essex-class, each with fifty-two aircraft and helicopters, including A-4Cs for air defense, S-2Es for long-range search, and SH-3 helicopters.

**Other surface ships.** One nuclear-powered guided-missile cruiser; three guided-missile cruisers; four guided-missile light cruisers; one gun cruiser; two nuclear-powered guided-missile frigates; twenty-eight guided-missile frigates; twenty-nine guided-missile destroyers; ninety-two gun/ASW destroyers; six guided-missile destroyer escorts; fifty-one destroyer escorts; four radar-picket escorts (guided missiles in service are Tartar, Talos, and Terrier SAMs, and Asroc and Subroc ASWs); eighty-one amphibious warfare ships, including seven helicopter landing platforms (LPH); fifty-two landing craft; forty-two ocean minesweepers; 178 logistics, operational support, and small patrol ships.

**Shore-based aircraft.** Twenty-four maritime patrol squadrons with 216 P-3s. Transports include C-47s, C-54s, C-118s, C-119s, C-130s, and C-131s.

**Deployment.** Fleets: First (Eastern Pacific), Second (Atlantic), Sixth (Mediterranean), Seventh (Western Pacific).

**Reserves.** Average paid training strength 127,000 plus paid training tours for a further 3,500. Training Fleet: Sixteen submarines; thirty destroyers; six ocean minesweepers; thirteen coastal minesweepers; thirty-five squadrons of fixed-wing aircraft including A-4 and A-7 fighters, P-2 and P-3A maritime patrol aircraft, and four helicopter squadrons. **Air Force:** 757,000; 6,000 combat aircraft (figures for manpower include strategic air forces).



F-4 fighter aircraft, used by both the US Air Force and Navy, are deployed in Europe and the Pacific area. This F-4 is refueling from an Air National Guard KC-97 over Germany.

General purpose forces include: (1) Tactical Air Command: 110,000; about 1,000 aircraft normally based in the United States. Twenty-three F-4, four F-105, one A-7D, and four F-111 fighter squadrons; nine tactical reconnaissance squadrons with RF-4Cs; sixteen assault airlift squadrons with C-130Es; four STOL airlift squadrons with C-7s and C-123s; two electronic warfare squadrons; seven special operations squadrons with A-37s, AC-119s, C-123Ks, and AC-130s. (2) US Air Forces Europe (USAFE): 50,000, controlling Third Air Force (Britain), Sixteenth Air Force (Spain), Seventeenth Air Force (West Germany), and a Logistics Group in Turkey. Twenty-one fighter squadrons (and four in USA on call to USAFE) with 475 F-100s, F-4C/D/Es, and F-111Es; five tactical reconnaissance squadrons with eighty-five RF-4Cs; two transport squadrons with C-130s. (3) Pacific Air Forces (PACAF): 120,000, controlling: Fifth Air Force: over 25,000 (bases in Japan, Korea, and Okinawa) with F-4s, RF-4Cs, and C-130s. Thirteenth Air Force: about 32,000 (responsible for the Philippines, Taiwan, and Thailand, and all joint planning under SEATO), with F-4s, F-105s, RF-4Cs, and C-130s (of which 160 F-4s, a few F-105s, and forty RF-4s fly from Thailand). Seventh Air Force: 33,500 (the air component of the Military Assistance Command Vietnam, coordinating the operations of the Vietnamese Air Force); 200 F-4C and A-37 fighter-bombers; forty RF-4 reconnaissance aircraft; 150 A-1E, A-37A, AC-119, AC-130, and C-123 counterinsurgency aircraft; seventy-five C-7A assault airlift aircraft; a large number of observation and liaison aircraft, and helicopters. (4) Military Airlift Command (MAC): 90,000. Eighteen heavy transport squadrons with thirty-five C-133s, 260 C-141s, and twenty-five C-5As; twenty-four medical transport, weather recce, and search and rescue (SAR) squadrons.

**Reserves:** Air National Guard: 89,000; 1,500 aircraft in sixteen fighter-interceptor, twenty-eight tactical fighter and attack, eleven tactical reconnaissance, three tactical air support, four special operations, seven tanker, and twenty-two air transport squadrons.

Air Force Reserve: average paid training strength of 48,400 plus training tours for a further 2,600; 400 aircraft in thirty-six squadrons include two C-119, thirteen C-124, and eighteen C-130 transport squadrons (the others have tactical support, special operations, and SAR roles).

## THE SOVIET UNION

### General

Population: 245,700,000.

Military service: Army and Air Force, two years; Navy and Border Guards, three years.

Total armed forces: 3,375,000.

Estimated GNP 1970: \$490,000,000,000.

Defense budget 1971: 17,854,000,000 rubles or \$39,700,000,000 (0.40-0.50 rubles = \$1).

(The official exchange rate is 0.90 rubles = \$1. The ruble figure represents the declared budget of the Ministry of Defense and does not include certain expenditures such as the cost of nuclear warheads, research and development expenditure on advanced weapons systems, and the military elements of the space program, which are believed to be included in the budget of other ministries. Total military expenditure could be of the order of \$55,000,000,000.)

### Strategic Forces

(a) Offensive (Strategic Rocket Forces [SRF]—350,000). The Strategic Rocket Forces are a separate service, with their own manpower.



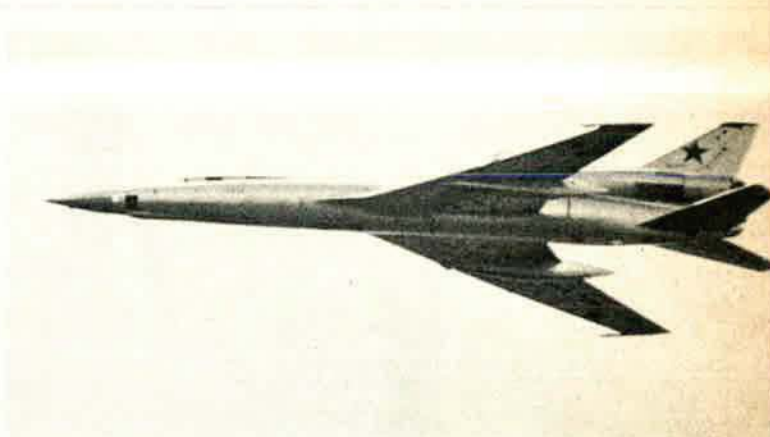
Backbone of the US strategic bomber force is the B-52. The newer H and G models are scheduled to remain in the operational inventory throughout the 1970s. This is a B-52H.



The USAF Strategic Air Command has recently added FB-111s to its operational inventory. Here an FB-111 fires a SRAM missile in a test run at the White Sands Missile Range.



One of the USSR's 5,000-ton Echo II-class nuclear-powered submarines on exercises in the North Pacific. The submarine carries eight cruise missiles and a crew of 100.



The Soviet supersonic TU-22 Blinder bomber, a medium-range aircraft, is capable of reaching targets in North America with refueling. The Soviets have about 200 TU-22s.

ICBM: about 1,510. 220 SS-7s and SS-8s; 280 SS-9s; 950 SS-11s (about 100 have been sited in IRBM/MRBM fields and may have a variable range capability); sixty SS-13s (solid fueled).

IRBM and MRBM: about 700. 100 SS-5 IRBMs; 600 SS-4 MRBMs (IRBMs and MRBMs are sited near the southern, eastern, and western borders of the USSR; about seventy cover targets in China and Japan; and about 630 targets in Western Europe).

SLBM: 440 in sixty-one submarines (Navy). Twenty SSBN each with sixteen SS-N-6 missiles; ten SSBN and sixteen diesel each with three SS-N-5 missiles; twelve diesel each with three SS-N-4 missiles; three diesel each with two SS-N-4 missiles.

Aircraft (Long Range Air Force): About seventy-five percent is based on European USSR, with most of the remainder in the Far East; in addition, it has staging and dispersal points in the Arctic. Long-range bombers: 140, 100 TU-20 Bears and forty MYA-4 Bisons. Tankers: fifty Bison. Medium bombers: 700; 500 TU-16 Badgers and 200 TU-22 Blinders.

(b) Defensive  
Air Defense Command (PVO-Strany) is a separate command of anti-aircraft artillery and surface-to-air missile units, using an early-warning system based on radar, and fighter-interceptor squadrons for identification and interception; total strength 500,000 (250,000 from Army and 250,000 from Air Force).

Aircraft: about 3,200. Interceptors: mostly MIG-19s, MIG-21s, and SU-9s with a few MIG-17s still in service. Newer aircraft include the YAK-28P and TU-28, and more recently, the SU-11 and MIG-23. Many of these aircraft

*A Soviet Navy Kresta-class cruiser with an F-type conventional submarine astern in Hawaiian waters. This cruiser is armed with Goa surface-to-air missiles, antisubmarine rockets and missiles, and a helicopter. It has a speed of thirty-five knots.*



*In foreground is a Soviet destroyer of the 4,000-ton Krupny class, armed with surface-to-surface missiles and antisubmarine rockets and torpedoes. In the middle-distance is a 3,500-ton Soviet destroyer with five-inch guns and surface-to-air missiles. Destroyer in background is the USS Sample.*

carry air-to-air missiles (AAM). AEW aircraft: some modified TU-114s with the designation Moss.

**Antiballistic Missiles (ABM).** Galosh: Sixty-four launchers for these multistage missiles are deployed around Moscow. They are believed to have a range of more than 200 miles and to carry a nuclear warhead in the megaton range.

**SAM.** SA-1: An early vintage AA missile. SA-2: about 8,000. A two-stage boosted AA missile, slant range (from launch to contact with target) about twenty-five miles, effective between 3,000 and 80,000 feet. SA-3: A two-stage missile, probably intended for short-range defense against low-flying aircraft, to supplement SA-2. It has a slant range of about fifteen miles. SA-4: An air-transportable, mobile AA missile with solid-fuel boosters. They are twin mounted on tracked carriers and assigned to ground forces in the field. SA-5: A two-stage boosted missile developed in a long-range AA role. SA-6: A triple-mounted missile on a tracked vehicle. It is entering service as a defense against low-flying aircraft to supplement SA-4 in the field forces.

**Antiaircraft Artillery.** 14.5-mm, 23-mm, 57-mm guns and ZSU-57-2 twin-barrel and ZSU-23-4 four-barrel self-propelled guns on tank chassis.

**Army:** 2,000,000 (including elements in the Air Defense Command).

One hundred and two motorized rifle divisions; fifty-one tank divisions; seven airborne divisions. Tactical nuclear missile units are organic to formations. T-10 heavy tanks; T-62 and T-54/-55 medium tanks; PT-76 amphibious recce light tanks (most Soviet tanks are equipped for amphibious crossing by deep wading, and many carry infrared night-fighting equipment). At full strength, tank divisions have 325 medium tanks and motorized rifle divisions 175. SP assault guns (in airborne divisions only); 100-mm, 122-mm,

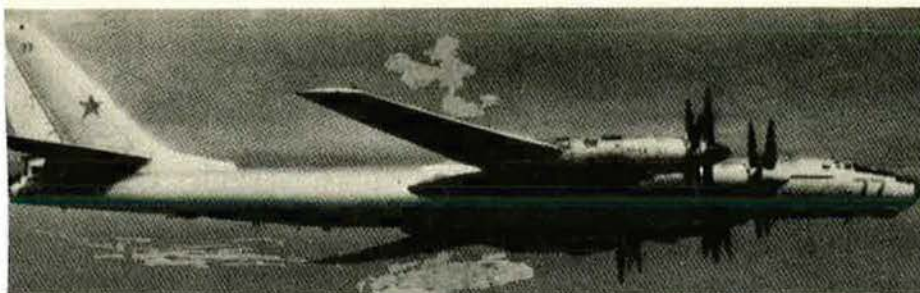
130-mm, 152-mm, and 203-mm guns; 57-mm, 85-mm, 100-mm, 120-mm, and 130-mm antitank guns; Scud Scaleboard FROG SSMs, mounted on modified tank chassis and wheeled launchers; Shaddock cruise SSM; Snapper, Swatter, and Sagger ATGW. The Soviet Army also has a considerable air defense capability, including SAMs.

**Deployment. Central and Eastern Europe:** Thirty-one divisions of which twenty divisions (ten tank) are in East Germany; two tank divisions in Poland; four divisions (two tank) in Hungary; and five divisions in Czechoslovakia. **European USSR:** sixty divisions. **Central USSR** (between the Ural Mountains and Lake Baikal): eight divisions. **Southern USSR** (Caucasus and West Turkestan): twenty-eight divisions.

**Sino-Soviet border area:** Thirty-three divisions (ten tank) include two divisions in Mongolia. The thirty-one divisions in Eastern Europe are maintained at or near combat strength, as are about fifteen of those in the Far East. The other divisions in the Far East are probably in the second category of readiness: below combat strength, but not requiring major reinforcement in the event of war. Most of the remaining combat-ready divisions are in European USSR, while the divisions in central USSR would mostly require major reinforcement, as would ten of the divisions in southern USSR. **Outside the Warsaw Pact area** (mostly as instructors and advisers). 1,000 in Cuba, 15,000 in Egypt, 1,000 in Sudan, 1,000 in Syria, 1,500 in Algeria, and 1,000 in North Vietnam.

**Navy:** 475,000 (including Naval Air Force of 75,000).

**Submarines** (excluding ballistic-missile vessels. **Attack:** Twenty-five nuclear powered; 210 diesel powered. **Cruise-missile:** Thirty-five nuclear powered and twenty-five diesel powered (with four to eight 300-mile-range missiles).



The Soviet TU-95 Bear bomber, though an old aircraft, is still a potent weapon system. It has an unrefueled range of about 8,000 miles with a 25,000-pound bomb load, and an over-the-target speed of 500 miles an hour at 41,000 feet.

The Soviet Kamov KA-25 Hormone helicopter is an advanced antisubmarine craft that can operate from the deck of a Kresta-class missile cruiser. This type also operates from the Soviet helicopter carriers Moskva and Leningrad.



The MiG-23 Foxbat, a Mach 3.2 all-weather fighter, is one of the world's most advanced aircraft. There is also a tactical fighter version.

**Surface ships.** Two ASW helicopter cruisers with SAM, and up to twenty KA-25 helicopters; two Kresta II-class cruisers with (horizon range) surface-to-surface cruise missiles (SSCMs) and SAMs; four Kresta I-class cruisers with SSCMs and SAMs; four Kynda-class cruisers with SSCMs and SAMs; eight Sverdlov-class and two older cruisers (one with SAMs); one Krivak-class destroyer with SSCMs and SAMs; six Kanin-class destroyers with SAMs; three Krupny-class destroyers with SSCMs; four Kildin-class destroyers with SSCMs; seventeen Kashin-class destroyers with SAMs; nine modified Kotlin-class destroyers with SAMs; twenty-three Kotlin-class destroyers; forty Skory- and modified Skory-class destroyers; 105 other ocean-going escorts; 250 coastal escorts and submarine chasers; 110 Osa- and thirty Komar-class patrol boats with SSCMs; 250 fast patrol boats; 180 fleet minesweepers; 125 coastal minesweepers; 105 landing ships and numerous landing craft; some trawlers are used for electronic intelligence. All submarines and the larger surface vessels not fitted with SSCMs are equipped for minelaying. A proportion of the destroyers and smaller vessels may not be fully manned.

**Shore-based aircraft.** Bombers: 500, most based near the northwest and Black Sea coasts of the USSR. 300 TU-16s with Kipper or Kelt ASMs; 100 TU-16 reconnaissance and tanker aircraft (replacement of the reconnaissance version with the TU-22 Blinder has begun); fifty IL-28 torpedo-equipped light bombers; fifty TU-20 long-range naval reconnaissance.

**Other aircraft and helicopters**—500. Seventy-five BE-12 ASW amphibians; twenty-five IL-18 May ASW aircraft; 200 MI-4 and KA-25 ASW helicopters; 200 miscellaneous transports.

**Naval Infantry**—about 15,000.

**Deployment:** Arctic, Baltic, Black Sea, and Far East Fleets. **Air Force:** 550,000; 10,000 combat aircraft.

(1) The Long Range Air Force. (2) Tactical Air Force: altogether about 5,000 aircraft, including light bombers, fighters, helicopters, transport, and reconnaissance aircraft. Some obsolescent MIG-17s, MIG-19s, and IL-28s are still in service. The most notable high-performance aircraft are the MIG-21J and YAK-28P Firebar fighters; the ground-attack SU-7; and the supersonic light-bomber YAK-28. Ground-attack aircraft are equipped with a variety of air-to-ground rockets. The variable-geometry Flogger may be about to enter service. (3) Air Defense Command and (4) Naval Air Force. (5) Air Transport Force: about 1,700 aircraft. IL-14, AN-24, some 800 AN-12 and IL-18 medium transports and ten AN-22 heavy transports.

There are, in addition, civil airliners of Aeroflot, some of which could be adapted to military use; these include about 275 long- and medium-range TU-104s, TU-114s, TU-124s, and TU-134s.

About 800 helicopters in use with the ground forces including troop-carrying MI-6s and MI-8s and the heavy load carrier MI-10. The MI-12, a very heavy load carrier, may soon enter service. The total helicopter inventory is probably around 1,750.

**Paramilitary forces:** 300,000.

125,000 security troops; 175,000 border troops. There are also about 1,500,000 members of the part-time military training organization (DOSAAF) who take part in such recreational activities as athletics, shooting, and parachuting, but reservist training and refresher courses seem to be haphazard and irregular. However, DOSAAF assists in pre-military training being given in schools, colleges, and workers' centers to those of sixteen years and over.



## Chapter II

# The Warsaw Pact

### Treaties

The Warsaw Pact is a multilateral military alliance formed by a "Treaty of Friendship, Mutual Assistance, and Cooperation" signed in Warsaw on May 14, 1955, by the governments of the Soviet Union, Albania, Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, and Romania (Albania denounced the pact in September 1968). According to East European documentary sources, the pact is committed to the defense of only the European territories of the member states.

The Soviet Union is also linked by bilateral treaties of friendship and mutual assistance with Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, and Romania. All present members of the Warsaw Pact also have similar bilateral treaties with each other. The Soviet Union concluded status-of-forces agreements with Poland, East Germany, Romania, and Hungary between December 1956 and May 1957, and with Czechoslovakia in October 1968; all these remain in effect except the one with Romania, which lapsed in June 1958 when Soviet troops left Romania. The essence of East European defense arrangements is not, therefore, dependent on the Warsaw Treaty as such.

### Organization

The Organization of the Warsaw Pact has two main bodies. The first, the Political Consultative Committee, consists, in full session, of the First Secretaries of the Communist Party, heads of government, and the Foreign and Defense Ministers of the member countries. It met twice in the year up to July 1971, at which point there had been seventeen meetings in all. (Some of these meetings have been entitled Meetings of Ministers.) The Committee has a Joint Secretariat, headed by a Soviet officer, consisting of a specially appointed official from each country, and a Permanent Commission, whose task is to make recommendations on general questions of foreign policy for pact members. Both these bodies are located in Moscow.

The second body, the Joint High Command, is directed, according to the Treaty, "to strengthen the defensive capability of the Warsaw Pact, to prepare military plans in case of war, and to decide on the deployment of troops." The Command consists of a Commander in Chief (CinC), a Defense Committee, made up of the six Defense Ministers of the pact, which acts as an advisory body, and a Military

Council. This body, which is modeled on a similar organization in the Soviet Armed Forces, meets under the chairmanship of the CinC, and includes the Chief of Staff (CS) and permanent military representatives from each of the allied armed forces. (It seems to be the main channel through which the pact's orders are transmitted to its forces in peacetime, and through which the East European forces are able to put their point of view to the CinC.) The pact also has a Military Staff, which has been enlarged by additional non-Soviet senior officers. The posts of CinC and CS of the Joint High Command have, however, always been held by Soviet officers, and most of the key positions are still in Soviet hands. In the event of war, the forces of the other Pact members would be operationally subordinate to the Soviet High Command. The Command of the air defense system covering the whole Warsaw Pact area is centralized in Moscow and directed by the CinC of the Soviet Air Defense Forces.

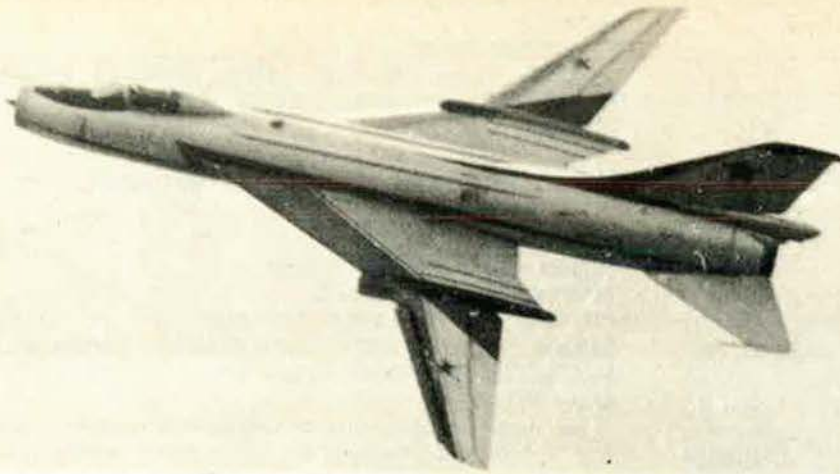
The Soviet forces in the Warsaw Pact area are organized as the Northern Group of Forces, with headquarters at Legnica in Poland; the Southern Group of Forces, with headquarters at Budapest; the Group of Soviet Forces in Germany, with headquarters at Zossen-Wünsdorf, near Berlin; and the Central Group of Forces, consisting of five divisions in Czechoslovakia, with headquarters at Milovice, north of Prague. Soviet tactical air forces are stationed in Poland, East Germany, Hungary, and Czechoslovakia.

The Soviet Union has deployed tactical nuclear missiles in Eastern Europe. Most East European countries have displayed short-range SSM launchers, but there is no evidence that nuclear warheads for these missiles have been supplied to these countries. Soviet MRBMs (and other strategic weapons) are based in the Soviet Union and remain under Soviet control.

### BULGARIA

Population: 8,555,000.  
Military service: Army and Air Force, two years; Navy, three years.  
Total regular forces: 148,000.  
Estimated GNP 1970: \$8,900,000,000.  
Defense expenditure 1970: 324,000,000 leva or \$279,000,000 (1.16 leva = \$1).





*The Soviet-built SU-7 Fitter is a supersonic fighter, first flown in the early 1960s, and used primarily as a close-support fighter. Outside the Warsaw Pact area, the SU-7 has been made available to several countries, including Cuba, Egypt, India, and North Vietnam. The SU-7 has a relatively short combat radius, varying from 200 to 300 miles, depending on weapons load and mission profile.*

**Army:** 117,000.

Eight motorized rifle divisions (three cadre); five tank brigades; thirty JS-3 and T-10 heavy tanks; about 1,900 medium tanks, mainly T-54s, with some T-34s, T-55s, and T-62s; PT-76 light tanks, and BTR-40P scout cars; BTR-50, BTR-60, and BTR-152 armored personnel carriers; more than 500 85-mm, 122-mm, 130-mm, and 152-mm guns; SU-100 and JSU-122-mm self-propelled guns; FROG and SCUD SSMs; 57-mm, 85-mm, and 100-mm antitank guns;

Snapper, Swatter, and Sagger antitank guided weapons; ZSU-57 self-propelled AA guns; SA-2 SAMs.

**Navy:** 9,000.

Two submarines; two escorts; eight coastal escorts; two minesweepers; two minehunters; four inshore minesweepers; twelve motor torpedo boats (eight less than 100 tons); fourteen landing craft; a small Danube flotilla.

**Air Force:** 22,000; 252 combat aircraft (twelve aircraft in a combat squadron).

## AEROSPACE GROUND SUPPORT EQUIPMENT



### STANDARD MANUFACTURING COMPANY, INC.

4012 W. ILLINOIS AVE. P. O. BOX 5811 DALLAS, TEXAS 75222

**Representation in:**

Australia, Belgium, Canada, England, Ethiopia, Germany, Iran, Japan, Korea, Republic of China, Saudi Arabia, Scandinavia, South American, Thailand.



*The L-29, a jet trainer designed and built in Czechoslovakia, has become the principal trainer for the Warsaw Pact air forces. More than 2,500 have been built. Shown here is the L-29A, a single-seat acrobatic version.*

Six fighter-bomber squadrons with MIG-17s; four interceptor squadrons with MIG-21s; three interceptor squadrons with MIG-19s; five interceptor squadrons with MIG-17s; one reconnaissance squadron with IL-28s; two reconnaissance squadrons with MIG-17Cs; four LI-2, six AN-2, and ten IL-14 transports; about forty MI-4 helicopters; one parachute regiment.

**Paramilitary forces:**

15,000, including border security troops; a volunteer People's Militia of 150,000.

**CZECHOSLOVAKIA**

Population: 14,700,000.

Military service: Army twenty-four months; Air Force twenty-seven months.

Total regular forces: 185,000.

Estimated GNP 1970: \$30,300,000,000.

Defense expenditure 1970: 15,000,000,000 crowns or \$1,765,000,000 (8.5 crowns = \$1).

Army: 145,000.

Four tank divisions; eight motorized rifle divisions; one airborne brigade (all about seventy percent of strength except two cadre motorized rifle divisions at thirty percent strength); about 100 JS-3 and T-10 heavy tanks; about 3,400 medium tanks, mostly T-55s and T-62s, with some T-54s and T-34s; OT-65 and FUG-1966 scout cars; BTR-50P, BTR-152, OT-62, and OT-64 armored personnel carriers; SU-100, SU-122, JSU-152 self-propelled guns; 82-mm and 120-mm mortars; FROG and SCUD SSMS; 57-mm, 85-mm, and 100-mm antitank guns; Snapper, Swatter, and Sagger antitank guided weapons; 47-mm twin self-propelled and 30-mm AA guns; SA-2 SAMs.

**Air Force:** 40,000; 504 combat aircraft (fourteen aircraft in a combat squadron).

Twelve ground-support squadrons with IL-28s, SU-7s, MIG-15s, and MIG-17s; eighteen interceptor squadrons with MIG-17s, MIG-19s, and MIG-21s; six reconnaissance squad-

rons with MIG-15s and L-29s; about fifty LI-2, IL-14, and IL-18 transports; about ninety MI-1, MI-4, and MI-8 helicopters.

**Paramilitary forces:**

Border troops (*Pohranicki straz*): 35,000; a part-time People's Militia of about 120,000 is being increased to 250,000.

**GERMAN DEMOCRATIC REPUBLIC**

Population: 17,150,000.

Military service: eighteen months.

Total regular forces: 126,000.

Estimated GNP 1970: \$34,000,000,000.

Defense budget 1971: 7,200,000,000 Ostmarks or \$2,124,000,000 (3.39 ostmarks = \$1).

Army: 90,000.

Two tank divisions; four motorized rifle divisions; about 100 T-10 and JS-3 heavy tanks; about 2,200 medium tanks, mostly T-54s and T-55s, with some T-34s and T-62s; about 125 PT-76 light tanks; SK-1 armored cars; BTR-40P scout cars; about 650 BTR-50P, BTR-60P, and BTR-152 armored personnel carriers; SU-100 SP guns; 85-mm, 122-mm, 130-mm, and 152-mm guns; FROG and SCUD SSMS; 57-mm and 100-mm antitank guns; Snapper, Swatter, and Sagger antitank guided weapons; ZSU-57-2 self-propelled, 57-mm, and 100-mm AA guns.

**Navy:** 16,000.

Four destroyer escorts; twenty-five coastal escorts; forty-seven minesweepers; twelve Osa-class patrol boats with Styx SSMS; seventy motor torpedo boats (less than 100 tons); eighteen landing craft; sixteen MI-4 helicopters.

**Air Force:** 20,000; 290 combat aircraft (sixteen aircraft in a combat squadron).

Two interceptor squadrons with MIG-17s; sixteen interceptor squadrons with MIG-21s; thirty transports, including AN-2s, IL-14s, and LI-2s; plus twenty MI-1, MI-4, and MI-8 helicopters; an anti-aircraft division of 9,000 (five regiments), with about 120 57-mm and 100-mm AA guns and with SA-2 SAMs.

**Paramilitary forces:**

46,000 border troops (*Grenzschutztruppe*), including a Border Command separate from the regular army; 20,000 security troops; 350,000 in armed workers' organizations (*Betriebskampfgruppen*).

**HUNGARY**

Population: 10,320,000.

Military service: two to three years.

Total regular forces: 103,000.

Estimated GNP 1970: \$14,400,000,000.

Defense expenditure 1970: 8,900,000,000 forints or \$511,000,000 (17.4 forints = \$1).

Army: 90,000.

Two tank divisions; five motorized rifle divisions; two SAM battalions with SA-2s; T-10 heavy tanks; about 1,600 medium tanks, mainly T-55s, with some T-34s, T-54s, and T-62s; fifty PT-76 light tanks; FUG-A armored cars; OT-65 scout cars; OT-64, OT-66, and BTR-152 armored personnel carriers; SU-100 and JSU-122 self-propelled guns; about 400 76-mm, 85-mm, and 122-mm guns, and 122-mm howitzers; FROG SSMS; 57-mm antitank guns; Snapper, Swatter, and Sagger antitank guided weapons; ZSU-57 self-propelled AA guns; SA-2 SAMs.

**Navy:** 500.

There is a Danube flotilla of forty minesweepers and twenty patrol craft.

**Air Force:** 12,500; 130 combat aircraft (twelve aircraft in a combat squadron).

One fighter-bomber/recce squadron with MIG-17s; ten

*The MIG-21 Fishbed is used principally as an interceptor. It is one of the most widely exported of all Soviet-built aircraft, both within and outside the Warsaw Pact. Since it was first seen in 1956, the MIG-21 has undergone many modifications. Some versions are equipped for air-to-ground use. The aircraft shown here is a MIG-21 bearing Polish Air Force markings.*



interceptor squadrons with MIG-19s and MIG-21s; about twenty-five AN-2, IL-14, and LI-2 transport aircraft; about six MI-1 and MI-4 helicopters.

**Paramilitary forces:**

27,000 security and border guard troops; 250,000 workers' militia.

**POLAND**

Population: 33,200,000.

Military service: Army and Air Force, two years; Navy and special services, three years; internal security forces, twenty-seven months.

Total regular forces: 265,000.

Estimated GNP 1970: \$42,500,000,000.

Defense expenditure 1970: 35,300,000,000 zloty or \$2,220,000,000 (15.9 zloty = \$1).

**Army:** 190,000.

Five tank divisions; eight motorized rifle divisions; one airborne division; one amphibious assault division (divisions are at seventy percent of strength, except those in the Warsaw Military District, which are at thirty to fifty percent of strength); thirty JS-3 and T-10 heavy tanks; 3,400 medium tanks, mostly T-54s and T-55s, with some T-34s and T-62s; about 150 PT-76 light tanks; FUG-A armored cars; BTR-40P scout cars; OT-62, OT-64 (Skot-2), and BTR M-1967 armored personnel carriers; ASU-57, SU-100, JSU-122, and JSU-152 self-propelled guns; FROG and SCUD SSMs; 57-mm, 85-mm, and 100-mm antitank guns; Snapper, Swatter, and Sagger antitank guided weapons; SA-2 SAMs.

**Navy:** 20,000 (including 1,000 marines).

Five submarines; two destroyers; thirty coastal escorts/submarine chasers; twenty-four fleet minesweepers; twenty-seven inshore minesweepers; twelve Osa-class patrol boats with Styx SSMS; twenty torpedo boats (less than 100 tons); twenty-two landing ships; forty-five naval aircraft, mostly MIG-17s, with a few IL-28 light bombers, and some helicopters; Samlet cruise missiles for coastal defense.

**Air Force:** 55,000; 730 combat aircraft (twelve aircraft in a combat squadron).

Six bomber/recce squadrons with IL-28s; twelve fighter-bomber squadrons with MIG-17s and SU-7s; forty intercep-

tor squadrons with MIG-17s, MIG-19s, and MIG-21s; three reconnaissance squadrons with MIG-15s and MIG-17s; about forty-five AN-2, AN-12, IL-12, IL-14, IL-18, and LI-2 transports; forty helicopters, including MI-1s and MI-4s.

**Paramilitary forces:**

65,000 security and border troops, including armored brigades of the Frontier Defense Force, and operating twenty small patrol boats.

**ROMANIA**

Population: 20,400,000.

Military service: Army and Air Force, sixteen months; Navy, two years.

Total regular forces: 160,000.

Estimated GNP 1970: \$21,400,000,000.

Defense Budget 1971: 7,500,000,000 lei or \$798,000,000 (9.4 lei = \$1).

**Army:** 130,000.

Two tank divisions; seven motorized rifle divisions; one mountain brigade; one airborne regiment (all at about ninety percent of strength); a few JS-3 and T-10 heavy tanks; 1,700 T-34, T-54, T-55, and T-62 medium tanks; about 900 BTR-40, BTR-50P, and BTR-152 armored personnel carriers; SU-100 and JSU-122 self-propelled guns; 76-mm, 122-mm, and 152-mm guns; about seventy-five FROG SSMS; 57-mm, 85-mm, and 100-mm antitank guns; Snapper, Swatter, and Sagger antitank guided weapons; 37-mm, 57-mm, and 100-mm AA guns; SA-2 SAMs.

**Navy:** 9,000.

Six coastal escorts; four minesweepers; twenty-two inshore minesweepers; five Osa-class patrol boats with Styx SSMS; twelve motor torpedo boats (less than 100 tons); eight landing craft.

**Air Force:** 21,000; 230 combat aircraft (twelve aircraft in a combat squadron).

Eighteen interceptor squadrons with MIG-17s, MIG-19s, and MIG-21s; one reconnaissance squadron with IL-28s; one transport squadron with IL-14s and LI-2s; ten MI-4 helicopters.

**Paramilitary forces:**

40,000, including border troops; a militia of 500,000.



## Chapter III

# The North Atlantic Treaty

### Treaties

The North Atlantic Treaty was signed in 1949 by Belgium, Britain, Canada, Denmark, France, Iceland, Italy, Luxembourg, the Netherlands, Norway, Portugal, and the United States; Greece and Turkey joined in 1952 and West Germany in 1955. The treaty unites Western Europe and North America in a commitment to consult together if the security of any one member is threatened, and to consider an armed attack against one as an attack against all, to be met by such action as each of them deems necessary, "including the use of armed force, to restore and maintain the security of the North Atlantic area."

The Paris Agreements of 1954 added a Protocol to the treaty, strengthening the structure of NATO, and revised the Brussels Treaty of 1948, which now includes Italy and West Germany in addition to its original members (Benelux countries, Britain, and France).

The Brussels Treaty signatories are committed to give one another "all the military and other aid and assistance in their power" if they are the subject of "armed aggression in Europe."

Since 1969, members of the Atlantic Alliance can withdraw on one year's notice; the Brussels Treaty was signed for fifty years.

### Organization

The Organization of the North Atlantic Treaty is known as NATO. The governing body of the alliance, the North Atlantic Council, which has its headquarters in Brussels, consists of the Ministers of the fifteen member countries, who normally meet twice a year, and, in permanent session, of ambassadors representing each government.

In 1966, France left the integrated military organization, and the fourteen-nation Defense Planning Committee (DPC), on which France does not sit, was formed. It meets at the same levels as the Council and deals with questions related to NATO's integrated military planning and other matters in which France does not participate. The Secretary-General and an international staff advise on the politico-military, financial, economic, and scientific aspects of defense planning.

Two permanent bodies for nuclear planning were established in 1966. The first, the Nuclear Defense Affairs Committee (NDAC) is open to all NATO members (France, Iceland, and Luxembourg do not take part); it normally meets at Defense Minister level once or twice a year, to associate nonnuclear members in the nuclear affairs of the alliance. The Secretary-General is Chairman of the NDAC.

The second, the Nuclear Planning Group (NPG), derived from and subordinate to the NDAC, has eight members, and is intended to go further into the details of topics raised there. The members in June 1971 were Britain, Canada, Germany, Italy, the Netherlands, Norway, Turkey, and the United States (Belgium, Denmark, and Greece had participated earlier). The Secretary-General also chairs the NPG.

The Council's military advisers are the Military Committee, which gives policy direction to the NATO military commands. The Military Committee consists of the Chiefs of Staff of all member countries, except France, which maintains a liaison staff, and Iceland, which is not represented; in permanent session, the Chiefs of Staff are represented by Military Representatives who are located in Brussels together with the Council. The Military Committee has an independent Chairman and is served by an integrated, international military staff. The major NATO Commanders are responsible to the Military Committee, although they also have direct access to the Council and heads of governments.

The principal military commands of NATO are Allied Command Europe (ACE), Allied Command Atlantic (ACLANT), and Allied Command Channel (ACCHAN).

The NATO European and Atlantic Commands participate in the Joint Strategic Planning System at Omaha, Neb., but there is no Alliance Command specifically covering strategic nuclear forces. As for ballistic-missile submarines, the United States has committed a small number and Britain all hers to the planning control of SACEUR, and the United States a larger number to SACLANC.

The Supreme Allied Commander Europe (SACEUR) and the Supreme Allied Commander Atlantic (SACLANT) have always been American officers; and the Commander in Chief Channel (CINCCCHAN) and Deputy SACEUR and Deputy SACLANT British. SACEUR is also Commander in Chief of the United States forces in Europe.

### ALLIED COMMAND EUROPE (ACE)

Allied Command Europe has its headquarters, known as SHAPE (Supreme Headquarters, Allied Powers in Europe), at Casteau, near Mons, in Belgium. It is responsible for the defense of all NATO territory in Europe, excluding Britain, France, Iceland, Portugal, and all of Turkey. It also has general responsibility for the air defense of Britain.

The European Command has some 7,000 tactical nuclear warheads in its area. There is a very wide range in the kiloton spectrum. The number of delivery vehicles (aircraft,

missiles, and howitzers) is about 2,250, spread among all countries, excluding Luxembourg. The nuclear explosives themselves, however, are maintained in American custody. Tactical nuclear bombs and missile warheads are all fission. The average yield of the bombs stockpiled in Europe for the use of NATO tactical aircraft is about 100 kilotons, and of the missile warheads, twenty kilotons.

About sixty division equivalents are available to SACEUR in peacetime. The Command has some 2,900 tactical aircraft, based on about 150 standard NATO airfields and backed up by a system of jointly financed storage depots, fuel pipelines, and signal communications. The majority of the land and air forces stationed in the Command are assigned to SACEUR while the naval forces are earmarked.

The Second French Corps of two divisions (which is not integrated in NATO forces) is stationed in Germany under a status agreement reached between the French and German governments. Cooperation with NATO forces and commands has been agreed between the commanders concerned.

The ACE Mobile Force (AMF) has been formed as a NATO force with particular reference to the northern or south-eastern flanks. Formed by eight countries, it consists of eight infantry battalion groups, an armored reconnaissance squadron, and ground-support fighter squadrons, but has no air transport of its own.

The following commands are subordinate to Allied Command Europe:

(a) **Allied Forces Central Europe (AFCENT)** has command of both the land forces and the air forces in the Central European sector. Its headquarters are at Brunssum, Netherlands, and its commander (CINCENT) is a German general.

The forces of the Central European Command include twenty-one divisions assigned by Belgium, Britain, Canada, West Germany, the Netherlands, and the United States, and about 1,700 tactical aircraft.

The Command is subdivided into Northern Army Group (NORTHAG) and Central Army Group (CENTAG). NORTHAG, responsible for the defense of the sector north of the Göttingen-Liège axis, includes the Belgian, British, and Dutch divisions, four German divisions, and is supported by Second Allied Tactical Air Force (ATAF), composed of Belgian, British, Dutch, and German units. The American forces, seven German divisions, and the Canadian battle group are under the Central Army Group, supported by the Fourth ATAF, which includes American, German, and Canadian units, and an American Army Air Defense Command.

(b) **Allied Forces Northern Europe (AFNORTH)** has its headquarters at Kolsaas, Norway, and is responsible for the defense of Denmark, Norway, Schleswig-Holstein, and the Baltic approaches. The commander has always been a British General. Most of the Danish and Norwegian land, sea, and tactical air forces are earmarked for it, and most of their active reserves assigned to it. Germany has assigned one division, two combat air wings, and her Baltic fleet.

(c) **Allied Forces Southern Europe (AFSOUTH)** has its headquarters at Naples, and its commander (CINCSOUTH) has always been an American admiral. It is responsible for the defense of Italy, Greece, and Turkey, and for safeguarding communications in the Mediterranean and the Turkish territorial waters of the Black Sea. The formations available include fourteen divisions from Turkey, twelve from Greece, and seven from Italy, as well as the tactical air forces of these countries. Other formations from these three countries have been earmarked for AFSOUTH, as have the United States Sixth Fleet, and naval forces of Greece, Italy, Turkey, and Britain. The ground-defense system is based on two separate commands: Southern, comprising Italy and the approaches to it, under an Italian commander,

and Southeastern, comprising Greece and Turkey, under an American commander. There is, however, an overall air command and there is a single naval command (NAV-SOUTH), responsible to AFSOUTH, with its headquarters in Malta.

A special air surveillance unit—Maritime Air Forces Mediterranean (MARAIRED)—is now operating Italian, British, and American patrol aircraft from bases in Greece, Turkey, Sicily, Malta, and Italy. French aircraft are participating in these operations. Its commander, an American rear admiral, is immediately responsible to CINCSOUTH.

The Allied On-Call Naval Force for the Mediterranean (NAVOCFORMED) has consisted of at least three destroyers, contributed by Italy, Britain, and the United States, and three smaller ships provided by other Mediterranean countries, depending upon the area of operation.

## ALLIED COMMAND ATLANTIC (ACLANT)

Allied Command Atlantic has its headquarters at Norfolk, Va., and is responsible for the North Atlantic area from the North Pole to the Tropic of Cancer, including Portuguese coastal waters.

In the event of war, its duties are to participate in the strategic strike and to protect sea communications. There are no forces assigned to the command in peacetime except Standing Naval Force Atlantic (STANAVFORLANT), which normally consists, at any one time, of four destroyer-type ships. However, for training purposes and in the event of war, forces which are predominantly naval are earmarked for assignment by Britain, Canada, Denmark, Netherlands, Portugal, and the United States. There are arrangements for cooperation between French naval forces and those of SACLANT. There are five subordinate commands: Western Atlantic Command, Eastern Atlantic Command, Iberian Atlantic Command, Striking Fleet Atlantic, and Submarine Command. The nucleus of the Striking Fleet Atlantic has been provided by the American Second Fleet with up to six attack carriers; their nuclear role is shared with the missile-firing submarines.

## ALLIED COMMAND CHANNEL (ACCHAN)

Allied Command Channel has its headquarters at Northwood near London. The wartime role of Channel Command is to exercise control of the English Channel and the southern North Sea. Many of the smaller warships of Belgium, Britain, and the Netherlands are earmarked for this Command, as are some maritime aircraft. There are arrangements for cooperation with French naval forces.

### Policy

The political and strategic guidance laid down in 1967 includes the concept of political warning time in a crisis, and the possibility of distinguishing between an enemy's military capabilities and his political intentions. The strategic doctrine defined by the DPC in December 1967 envisaged that NATO would meet attacks on its territory with whatever force levels were appropriate. In June 1968, at the Ministerial Meeting at Reykjavik, the Council called on the countries of the Warsaw Pact to join in discussions of mutual force reductions, reciprocal and balanced in scope and timing, and repeated this invitation at their meeting in Rome in 1970.

## BELGIUM

Population: 9,800,000.

Military service: twelve months.

Total armed forces: 96,500.

Estimated GNP 1970: \$24,900,000,000.



*Britain's Hawker Siddeley Harrier is the world's first operational fixed-wing V/STOL aircraft. It can operate from clearings the size of a tennis court, away from permanent base facilities and large concrete runways.*



*The British Army, faced with recruiting and retention problems, now numbers 185,300. By year's end, Far East deployment will be limited to Hong Kong, plus one battalion group in Singapore and a Gurkha battalion in Brunei.*



*The Chieftain tank, mounting a 120-mm gun, is used exclusively by Great Britain. The first of the Chieftains was issued to the Army in 1965. British armored capability relies on the Chieftain and the smaller Centurion, 900 of them in all.*



*The new Hawker Siddeley Seadart adds muscle to the British Navy's firepower. An area defense weapon, Seadart can also be used on ships large enough to house its magazines, radar, and guidance gear. A beam-rider with proximity fuzing, Seadart's hit probability at long range is almost 100 percent. Powered by a ramjet engine, its maximum speed probably exceeds Mach 3.*

Defense budget 1971: 29,700,000,000 francs or \$594,000,000 (fifty francs = \$1).

**Army:** 71,500.

Two mechanized divisions of two brigades each; one paracommando regiment; two SSM battalions with *Honest Johns*; two SAM battalions with *Hawks*; four squadrons with *Alouette IIs* and *DO-27s*; 330 *Leopard* and 175 *M-47* medium tanks; 135 *M-41* light tanks; *M-75* and *AMX-VTT* armored personnel carriers; *M-108* 105-mm, *M-44*, and *M-109* 155-mm, and *M-55* 203-mm self-propelled howitzers; 203-mm howitzers.

**Reserves:** one mechanized brigade and one motorized brigade.

**Navy:** 5,000.

Five fleet minesweepers/minehunters; two fleet minesweepers; ten coastal minesweepers/minehunters; ten inshore minesweepers; two support ships; two *S-58* and three *Alouette III* helicopters.

**Reserves:** 3,000 trained.

**Air Force:** 20,000; 175 combat aircraft (a combat squadron has eighteen to twenty-five aircraft).

Two fighter-bomber squadrons with *F-104Gs*; two fighter-bomber squadrons with *F-84Fs*; two all-weather fighter squadrons with *F-104Gs*; one reconnaissance squadron with *RF-84Fs* (the *F-84F* and *RF-84F* are being replaced by *Mirage-VBs*); thirty-three *C-119* and eighteen *C-47*, *Pembroke*, and *DC-6* transports; eleven *HSS-1* helicopters; eight SAM squadrons with *Nike-Hercules*.

**Paramilitary forces:**

13,500 *Gendarmerie*.

## BRITAIN

Population: 56,000,000.

Voluntary military service.

Total armed forces: 380,900 (including 16,300 enlisted outside Britain).

Estimated GNP 1970: \$121,000,000,000.

Defense budget 1971-72: 2,545,000,000 pounds or \$6,108,000,000 (one pound = \$2.40).

**Strategic Forces.**

Four SSBNs each with sixteen *Polaris A-3* missiles. The Ballistic Missile Early Warning System (BMEWS) station at Fylingdales provides early warning of missile threats.

**Army:** 185,300 (including 14,200 enlisted outside Britain).

Twelve armored regiments; five armored car regiments; forty-three infantry battalions; three parachute battalions;

six Gurkha battalions; one special air service (SAS) regiment; three regiments with *Honest John* SSMs and 203-mm howitzers; twenty-four other artillery regiments; one SAM regiment with *Thunderbirds*; fourteen engineer regiments; fifty-nine of the above units are organized in two armored, twelve infantry, one parachute, and one Gurkha brigades.

**Equipment.** 900 *Chieftain* and *Centurion* medium tanks; 105-mm *Abbot* and M-107 175-mm self-propelled guns; M-109 155-mm self-propelled howitzers; 203-mm howitzers; *Honest John* SSMs; *Vigilant* and *Swingfire* antitank guided weapons; light aircraft and thirty *Scout* helicopters.

**Deployment.** The *Strategic Reserve*—includes one division of three air-portable brigades and two parachute battalions of the United Kingdom Mobile Force (UKMF), and the SAS regiment.

**Germany**—British Army of the Rhine (BAOR), of 54,900, includes three division headquarters, one mechanized and five armored brigades, two armored car regiments, two artillery brigades, and the *Thunderbird* SAM regiment. In Berlin there is one 3,000-strong brigade.

**Far East** (excluding Hong Kong)—By the end of 1971 the force will be reduced to one battalion group in Singapore, and one Gurkha battalion in Brunei.

**Hong Kong**—five infantry battalions, one artillery regiment.

**Persian Gulf**—two infantry battalions and support units (until end of 1971).

**Cyprus**—UNFICYP: one infantry battalion and one air-portable recce squadron. Garrison: one infantry battalion and one armored car squadron.

**Malta**—one infantry battalion and one company group.

**Gibraltar**—one infantry battalion.

**The Caribbean**—one company group and engineering detachment.

**Reserves:** 118,200 regular reserves; 49,000 volunteer reserves.

**Navy:** 84,600 (including Fleet Air Arm and marines).

**Submarines, attack:** two nuclear powered (SSN) (two more are due to enter service in 1971–72); seventeen diesel powered. **Surface ships:** two aircraft carriers; two commando carriers; two assault ships; one guided missile (GM) cruiser with *Seacat* SAMs; one GM destroyer with *Seadart* SAMs; six GM destroyers with *Seaslug* and *Seacat* SAMs; two other destroyers; twenty-nine general purpose (GP) frigates; nineteen ASW frigates; four AA and three aircraft direction frigates; forty-seven mine countermeasures ships. **Ships in reserve or undergoing refit or conversion include** (in addition to the above): two SSNs, nine diesel submarines, one commando carrier, two GM cruisers, one GM destroyer, one other destroyer, six GP frigates, three ASW frigates, one aircraft direction frigate.

**The Fleet Air Arm:** ninety-six combat aircraft. Two strike squadrons with *Buccaneers*; two air defense squadrons with F-4Ks; four air defense squadrons with *Sea Vixens* (a combat squadron has twelve aircraft); eight squadrons with *Wessex* helicopters; three *Sea King* helicopter squadrons; three *Wasp* and *Whirlwind* helicopter squadrons.

**The Royal Marines** total about 8,000 men, and include four 800-man commandos.

**Reserves** (naval and marines): 24,200 regular and 7,800 volunteers.

**Air Force:** 111,000; about 500 combat aircraft (a combat squadron has six to twelve aircraft).

Eight medium bomber squadrons with *Vulcans*; two light bomber squadrons with *Canberras*; three strike squadrons with *Buccaneers*; six strike/attack/reconnaissance squadrons with F-4Ms; one ground-attack squadron with *Hunters*; four close-support squadrons with *Harriers*; nine air defense squadrons with *Lightnings*; one air defense squadron with F-4Ks; one reconnaissance squadron with *Victor IIs*; four reconnaissance squadrons with *Canberras*; two maritime

patrol squadrons with *Nimrods*; six maritime patrol squadrons with *Shackletons*; three tanker squadrons with *Victors*; four strategic transport squadrons with VC-10s, *Belfasts*, and *Britannias*; eight tactical transport squadrons with *Hercules* and *Argosy* aircraft; two light communication squadrons with *Andovers*; seven *Wessex* and *Whirlwind* helicopter squadrons (SA-330 *Pumas* are entering service). There are eleven ground defense and air defense squadrons of the Royal Air Force Regiment, some with *Bloodhound* and *Tigercat* SAMs, and L-40/70 AA guns (*Rapier* SAMs are being introduced).

**Deployment.** The Royal Air Force includes two operational home commands—Strike Command and Air Support Command, and four smaller overseas commands—RAF Germany, Near East Air Force, Air Force Gulf, and Far East Air Force. Squadrons are deployed overseas as follows:

**Germany:** 8,600. Four F-4s; one *Buccaneer* (a second is due to form during 1971); two *Canberras*, two *Lightnings*; two *Harriers* (a third is due to form by the end of 1971); one *Wessex*.

**Near East:** (a) Cyprus—two *Vulcans*; one *Lightning*; one *Hercules*. (b) Malta—*Shackleton* (converting to *Nimrod*); one *Canberra*.

**Gulf:** one *Hunter*; one *Shackleton*; one *Argosy*; one *Andover*; one *Wessex* (until the end of 1971).

**Far East:** (a) mid-1971—one *Lightning*; one *Shackleton*; one *Hercules*; one *Whirlwind*. (b) after 1971—some *Nimrod* aircraft and *Whirlwind* helicopters, based at Singapore.

**Reserves:** 32,800 regular; about 400 volunteer.

## CANADA

Population: 21,700,000.

Voluntary military service.

Total armed forces: 85,000.

Estimated GNP 1970: \$US 78,200,000,000.

Defense budget 1971–72: \$Can. 1,822,500,000 or \$US 1,687,500,000. (\$Can. 1.08 = \$US 1). The exchange rate has been allowed to fluctuate since June 1, 1970.

The Canadian Armed Services have been unified since



The Canadianair CL-89 reconnaissance system is fired from a mobile launcher. The Canadian Armed Forces, unified since 1968, now number 85,000. Land and air units are deployed in Europe, and Canada maintains a complement of 460 in small units on the island of Cyprus.



The CF-5, tactical close ground-support aircraft for Canada's Armed Forces, can also be used for aerial reconnaissance, air-to-air combat, or as a tactical fighter or trainer.



The de Havilland Canada Buffalo is powered by two General Electric T64s. This 41,000-pound STOL transport has a ground roll of only 800 feet for takeoff, 710 feet for landing.

February 1968, but for purpose of comparison with other countries, are presented here in traditional form.

**Army (Land):** 33,000.

*In Canada:* Mobile Command. One airborne regiment; three combat groups each comprising three infantry battalions, one reconnaissance regiment, and one reduced light artillery regiment (of two batteries); support units. One group is intended for operations in Europe, while part of it, an air-transportable battalion group, is assigned to Allied Command Europe (ACE) Mobile Force. The other groups contribute to North American ground defense, and UN commitments.

*In Europe:* One mechanized battle group of about 2,800 men, with thirty-two Centurion tanks, 375 M-113 armored personnel carriers (APCs), and eighteen M-109 155-mm self-propelled howitzers.

*In Cyprus (UNFICYP):* 460 men.

**Reserves:** about 18,000.

**Navy (Maritime):** 15,000.

Four submarines; nine helicopter destroyer escorts; eleven ASW destroyer escorts; six coastal minesweepers; one ASW hydrofoil; three support ships. The Maritime Air Element consists of: four maritime patrol squadrons with Argus; one maritime patrol squadron with Tracker aircraft; one ASW squadron with Sea King helicopters.

**Reserves:** about 2,900.

**Air Force (Air):** 37,000; 162 combat aircraft.

*In Canada:* Mobile Command: two CF-5 tactical fighter squadrons; six helicopter squadrons. Air Defense Command: three interceptor squadrons with CF-101s (due to be replaced in 1971 by F-101Cs); two SAM squadrons with Bomarc Bs; twenty-eight surveillance and control radar squadrons (the above are assigned to NORAD); one CF-100 electronic warfare training squadron. Air Transport Command: one squadron with Boeing 707-320C transport/tankers; two squadrons with C-130E Hercules; two squadrons with CC-115 Buffaloes and CC-138 Twin Otters; two squadrons with Buffalo and CH-113 Labrador helicopters; one squadron with CC-106 Yukons; one squadron with CC-109 Cosmopolitans and Falcons.

*In Europe:* two strike-attack and one reconnaissance squadrons, with CF-104s (a squadron has six to eighteen aircraft).

**Reserves:** 800.

## DENMARK

Population: 4,990,000.

Military service: twelve months.

Total armed forces: 40,500.

Estimated GNP 1970: \$16,000,000,000.

Defense budget 1971-72: 3,077,100,000 kroner or \$410,300,000 (7.5 kroner = \$1).

**Army:** 24,000.

Four armored infantry brigades; one battalion group; three artillery battalions; Centurion medium tanks; M-41 light tanks; M-113 armored personnel carriers (APCs); M-109 155-mm self-propelled howitzers; 203-mm howitzers; Honest John SSMs (there are no nuclear warheads on Danish soil); twelve Hughes 500M helicopters.

**Reserves:** 40,000—two armored infantry brigades and support units to be formed from reservists within seventy-two hours. Local defense units form fifteen infantry battalion groups and fifteen artillery batteries. Volunteer Home Guard of 52,000.

**Navy:** 6,500.

Six submarines; two fast frigates; four helicopter frigates (fishery protection); four coastal escorts; sixteen fast torpedo boats; sixteen patrol boats (seven less than 100 tons); four fleet minelayers; three coastal minelayers; eight coastal minesweepers; four inshore minesweepers; nine seaward defense craft; eight Alouette III helicopters.

**Reserves:** 3,000. Volunteer Home Guard of 4,000 with small patrol boats.

**Air Force:** 10,000; 112 combat aircraft (a combat squadron has sixteen aircraft).

One fighter-bomber squadron with F-35XD Drakens; two fighter-bomber squadrons with F-100D/Fs; two interceptor squadrons with F-104Gs; one interceptor squadron with Hunters; one reconnaissance squadron with RF-84Fs (con-



In its fourth flight—and four days after its maiden flight—the French Mirage G8 reached speeds of Mach 2.03 with wings in the fully swept configuration. The flight was in May 1971.





*The new Dassault Mirage F-1 is a multipurpose aircraft. Its primary role is all-weather interception. It can also be used for supersonic low-altitude attack missions.*

verting to RF-35 *Drakens* during 1971); one transport squadron with C-47s and C-54s; one SAR squadron with S-61 helicopters; four SAM squadrons with *Nike-Hercules*; four SAM squadrons with *Hawks*.

**Reserves:** Volunteer Home Guard of 8,000.

## FRANCE

Population: 51,225,000.

Military service: twelve months.

Total armed forces: 501,500.

Estimated GNP 1970: \$148,000,000,000.

Defense budget 1971: 28,873,000,000 francs or \$5,202,000,000 (5.55 francs = \$1).

### Strategic Forces

**IRBM:** the first nine-missile squadron became operational on August 2, 1971.

**SLBM:** the first sixteen-missile SSBN is due to become operational during 1971. Five SSBNs are due to be built in all.

**Aircraft:** Bombers: thirty-six *Mirage IVAs* in nine squadrons. Tankers: nine KC-135Fs in three squadrons.

**Army:** 329,000.

Five mechanized divisions; one parachute division (two brigades); one air-portable motorized brigade; two Alpine brigades; four armored car regiments; two motorized infantry regiments; one parachute battalion; twenty-five infantry battalions; five SSM battalions with *Honest Johns*. (The nuclear warheads held under double-key arrangements with the USA were withdrawn in 1966. The tactical nuclear SSM *Pluton* is due to enter service in 1973.) Three SAM regiments with *Hawks*; M-47 and about 575 AMX-30 medium tanks; AMX-13 light tanks; EBR heavy and AML light armored cars; VTT-AMX armored personnel carriers; self-propelled AMX 105-mm guns and 155-mm howitzers; 30-mm twin self-propelled AA guns; SS-11/*Harpon* antitank guided weapons.

**Deployment.** **Strategic Reserve:** permanent element includes the parachute division and the air-portable brigade.

**Germany:** About 62,000, including two mechanized divisions; four SSM regiments with *Honest Johns*; about 1,700 in West Berlin.

**French Territory of the Afars and Issas:** two battalions.

**Elsewhere in Africa:** about 4,000.

**Pacific Territories:** two battalions.

**Caribbean:** one battalion.

The remaining troops are stationed in France for local defense (DOT). Their peacetime strength is about 61,500 men, including thirty-five battalions (infantry, light armor, artillery, and engineer).

**Reserves:** Mobilization would bring the DOT up to a total

of eighty infantry battalions, five armored car regiments, and support units.

**Navy:** 68,500 (including Naval Air Force).

Nineteen attack submarines; two aircraft carriers; one helicopter/aircraft carrier; one helicopter carrier; two assault landing ships; one anti-aircraft/command cruiser; sixteen destroyers (four guided missiles with *Tartar* SAMs); three GM frigates with *Malafon* ASW missiles (two with *Masurca* SAMs); twenty-seven frigates; fourteen coastal escorts; fourteen fleet minesweepers; sixty coastal minesweepers; fifteen inshore minesweepers; five landing ships; twelve landing craft.

**Naval Air Force:** 12,000; 200 combat aircraft. Three fighter-bomber squadrons with *Etendard IV-Ms*; two interceptor squadrons with F-8Fs; three reconnaissance squadrons with *Etendard IV-Ps*; three ASW squadrons with *Alizés* (all the above can be flown from aircraft carriers); five maritime recce squadrons with *Atlantics* and P-2s; one ASW helicopter squadron with *Super-Frelons*; two helicopter squadrons with *Alouette II/IIIs*.

**Air Force:** 104,000; 500 combat aircraft.

Air Defense Command (CAFDA) has: three interceptor squadrons with *Mirage IIICs*; two all-weather fighter interceptor squadrons with *Vautour IINs*; three interceptor squadrons with *Super-Mystère B2s* (coordination is by the automatic STRIDA II air defense system).

Tactical Air Force (FATAC) has: two subordinate Tactical Air Commands—First CATAC and Second CATAC—and includes: eight fighter-bomber squadrons with *Mirage IIIEs*; one fighter-bomber squadron with *Mirage IIIBs*; two fighter-bomber squadrons with F-100Ds; two fighter-bomber squadrons with *Mystère IVAs*; three tactical recce squadrons with *Mirage IIIR/RDs*.

Air Transport Command (COTAM) has: three tactical transport squadrons with *Transalls*; four tactical transport squadrons with *Noratlas*; one heavy transport squadron with DC-6 and BR-765 *Saharas* and two mixed transport squadrons; four squadrons with H-34 and *Alouette II* helicopters.

**Deployment:** one squadron of A-1Ds and one mixed transport squadron are stationed in the French Territory of the Afars and Issas.

### Paramilitary forces:

65,000 Gendarmerie and 85,000 reserves (subordinate to the Ministry of Defense); 15,000 CRS (*Compagnies Républicaines de Sécurité*), subordinate to the Ministry of the Interior.

## FEDERAL REPUBLIC OF GERMANY

Population: 60,000,000 (excluding West Berlin).

Military service: eighteen months. (A government commission has proposed a reduction to 16 months.)

Total armed forces: 467,000.

Estimated GNP 1970: \$185,000,000,000.

Defense budget 1971: DM 21,816,000,000 or \$5,961,000,000 (DM 3.66 = \$1. The exchange rate has been allowed to fluctuate since May 1971.).

**Army:** 327,000 (including the 35,000 Territorial Force).

Twelve armored brigades; one armored regiment; thirteen armored infantry brigades; three rifle brigades; two mountain brigades; three airborne brigades; eleven SSM battalions with *Honest Johns*; four SSM battalions with *Sergeants*; 1,050 M-48A2 *Patton* and 2,250 *Leopard* medium tanks; 1,770 HS-30 and 3,140 M-113 armored personnel carriers; 1,100 tank destroyers with 90-mm guns or antitank missiles; 250 105-mm, 375 155-mm, 150 175-mm, and seventy-five 203-mm self-propelled guns; 500 self-propelled 40-mm AA guns; about 460 Bell-47, UH-1D *Iroquois*, and *Alouette II* helicopters, and eighty DO-27 light aircraft.

**Reserves:** 540,000 on immediate recall.

**Navy:** 36,000 (including Naval Air Arm).



The German Leopard tank is classed by NATO standards as a medium battle tank. Its excellent armament, mobility, and armor give it all-around battlefield capabilities.



German Air Force F-104 Starfighters holding excellent formation. The F-104, originally designed as a high-altitude interceptor, has been less successful in close-support work.



Greek Air Force mechanics perform nose-to-tail maintenance on a dismantled Lockheed F-104 fighter. As in all air forces, maintenance is the key to operational success.

Eleven coastal submarines; three guided missile destroyers with Tartar SAMs; nine destroyers; six fast frigates; two frigates; five fleet utility vessels; thirteen escort and support ships; twenty-four coastal minesweepers/minehunters; thirty fast minesweepers; eighteen inshore minesweepers; two minelayers; forty fast patrol boats; two landing ships; twenty-two landing craft.

**Naval Air Arm:** 6,000; 100 combat aircraft. Four fighter-bomber/recce squadrons with F-104Gs; two maritime reconnaissance squadrons with BR-1150 Atlantics; twenty-three S-58 SAR helicopters, being replaced by SH-3Ds.

**Reserves:** 36,000 on immediate recall.

**Air Force:** 104,000; 504 combat aircraft. (Fighter, fighter-bomber, reconnaissance, and light-strike squadrons have fifteen to twenty-one aircraft, and transport squadrons up to eighteen.)

Ten fighter-bomber squadrons with F-104Gs; four light ground-attack/strike squadrons with G-91s; four interceptor squadrons with F-104Gs; four heavy reconnaissance squadrons with RF-104Gs (replacement with RF-4E Phantom

IIs has started); four reconnaissance squadrons with G-91s; six transport squadrons with C-160 Transalls; four helicopter squadrons with UH-1Ds; three SSM battalions with Pershings; twenty-four SAM batteries with Nike-Hercules; thirty-six SAM batteries with Hawks.

**Reserves:** 87,000 for immediate recall.

**Paramilitary forces:**

18,500 Border Police with Saladin armored cars and coastal patrol boats.

## GREECE

Population: 8,960,000.

Military service: twenty-four months.

Total armed forces: 159,000.

Estimated GNP 1970: \$9,200,000,000.

Estimated defense expenditure 1971: 10,138,000,000 drachmas or \$337,900,000 (thirty drachmas = \$1).

**Army:** 118,000.

Eleven infantry divisions (three close to full strength); one armored division; one commando brigade; two SSM battalions with Honest Johns; one SAM battalion with Hawks; 200 M-47, 220 M-48, and 50 AMX-30 medium tanks; M-24, M-26, and M-41 light tanks; M-8 and M-20 armored cars; M-3 scout cars; M-2, M-59, and M-113 armored personnel carriers; 105-mm, 155-mm, and M-107 175-mm self-propelled guns; 105-mm, 155-mm, and 203-mm howitzers; 40-mm, 75-mm, and 90-mm AA guns.

**Navy:** 18,000.

Two submarines (four more to be delivered by West Germany); eight destroyers; four destroyer escorts; seven coastal patrol vessels; two minelayers; twenty coastal minesweepers; twelve fast torpedo boats (less than 100 tons); four fast patrol boats, with Exocet SSMs, are on order from France, the first due for delivery in 1971); eight tank landing ships; six medium landing ships; one dock landing ship; eight landing craft; eight HU-16 maritime patrol aircraft.

**Air Force:** 23,000; 216 combat aircraft (a combat squadron has up to eighteen aircraft).

Three fighter-bomber squadrons with F-84Fs; two fighter-bomber squadrons with F-104Gs; four interceptor squadrons with F-5As; one interceptor squadron with F-102As; one photo-reconnaissance squadron with RF-5s; one reconnaissance squadron with RF-84Fs; thirty C-47s and C-119Gs, and twenty-five Noratlas transports; one helicopter squadron with twelve H-19s and six AB-205s; one helicopter squadron with ten Bell 47Gs; one SAM battalion with Nike-Hercules.

**Paramilitary forces and Reserves:**

25,000 Gendarmerie; 200,000 reserves.

Population: 54,000,000.

Military service: Army and Air Force, fifteen months; Navy, twenty-four months.

Total armed forces: 414,000 (excluding Carabinieri).

Estimated GNP 1970: \$93,200,000,000.

Defense budget 1971: 1,657,000,000,000 lire or \$2,651,000,000 (625 lire = \$1).

**Army:** 295,000.

Two armored divisions; five infantry divisions; one independent cavalry brigade; four independent infantry brigades; five Alpine brigades (of 5,000 men each); one parachute brigade; one SSM brigade (including four battalions with *Honest Johns*); four SAM battalions with *Hawks*; 800 M-47 and 200 M-60 medium tanks (deliveries of 800 *Leopards* have started); M-24 light tanks; M-113 armored personnel carriers; M-44, M-56, M-107, and M-109 self-propelled guns; M-42 self-propelled AA guns.

**Navy:** 45,000 (including air arm and marines).

Nine submarines; three guided missile (GM) cruisers with *Terrier* SAM and ASW helicopters (one with ASROC ASW missiles); two GM destroyers with *Tartar* SAMs; two destroyer leaders; seven ASW destroyers; ten destroyer escorts; sixteen coastal escorts; four ocean minesweepers; thirty-seven coastal minesweepers; twenty inshore minesweepers; seven fast patrol boats; seven motor torpedo boats (less than 100 tons); one command ship; three landing ships; two marine infantry battalions.

**Naval Air Arm:** Three maritime patrol squadrons with S-2 (due to be replaced by *Atlantics* by mid-1972), HU-16A SAR aircraft, and 50 Bell-47, SH-34, AB-204, and SH-3D SAR helicopters.

**Air Force:** 74,000; 300 combat aircraft. (A combat squadron—"gruppo"—has twelve to eighteen aircraft and a transport squadron has sixteen.) Three fighter-bomber squadrons with F-104Gs; one fighter-bomber squadron with G-91Ys; one fighter-bomber squadron with F-84Fs; four light attack squadrons with G-91Rs; four AWX squadrons with F-104Gs; two AWX squadrons with F-104Ss; one AWX squadron with F-86Ks; three recce squadrons with RF-84Fs and RF-104Gs; three transport squadrons with C-119s (delivery of fourteen C-130E *Hercules* is due to begin in 1971); one transport squadron with C-47s, Convair 440s, and DC-6s; six SAM groups with *Nike-Hercules*.

**Paramilitary forces and Reserves:**

80,000 Carabinieri Corps; about 650,000 trained reservists.

## LUXEMBOURG

Population: 342,000.

Voluntary military service.

Total armed forces: 550.

Estimated GNP 1970: \$910,000,000.

Defense budget 1971: 429,600,000 francs or \$8,592,000 (fifty francs = \$1).

**Army:** 550.

A light infantry battalion (four companies); some anti-tank guns and mortars.

**Paramilitary forces:**

350 Gendarmerie.

## NETHERLANDS

Population: 13,175,000.

Military service: Army, sixteen to eighteen months; Navy and Air Force, eighteen to twenty-one months.

Total armed forces: 116,500.

Estimated GNP 1970: \$31,300,000,000.

Defense budget 1971: 4,203,000,000 guilders or \$1,161,



*Fiat G-91 lightweight ground support and attack fighters of the Italian Air Force can operate from sod fields. The Italian Air Force has some 300 combat aircraft and a personnel strength of 74,000.*

000,000 (3.62 guilders = \$1. The exchange rate has been allowed to fluctuate since May 1971.).

**Army:** 76,000.

Two armored brigades; four armored infantry brigades; two SSM battalions with *Honest Johns*; 400 *Centurion* (with 105-mm guns) and 200 *Leopard* medium tanks (285 more *Leopards* are being delivered); 120 AMX-13 light tanks; M-106, M-113, and M-577 amphibious armored personnel carriers; AMX-VTT and YP-408 armored personnel carriers; AMX-105, M-109 155-mm, M-107 175-mm, and M-110 203-mm self-propelled howitzers.

**Reserves:** one infantry division, and the remaining corps troops, including one independent infantry brigade, are to be completed by call-up of reservists.

**Navy:** 19,000, including 2,900 marines and 2,000 naval air force.

Five submarines (two more due to become operational in



*The Netherlands frigate Isaac Sweers, under way off Newport, R. I., during a training exercise by units of the naval force of the North Atlantic Treaty Organization. Navy is the smallest of the Netherlands armed forces.*

1971/72); two cruisers (one guided missile with *Terrier* SAMs); six GM frigates with *Seacat* SAMs; twelve destroyers; six corvettes; six support escorts; five patrol vessels; thirty-six coastal minesweepers and minehunters; sixteen inshore minesweepers; one fast combat support ship.

**Naval Air Arm:** five *Atlantic*, and about thirty P-2 and S-2 maritime reconnaissance aircraft; fifteen *Wasp*, *SH-34J*, and *AB-204B* ASW helicopters.

**Air Force:** 21,500; 126 combat aircraft (a combat squadron has eighteen aircraft).

Two fighter-bomber squadrons with F-104Gs; two fighter-bomber squadrons with NF-5As; two interceptor squadrons with F-104Gs; one photo-reconnaissance squadron with RF-104Gs; one transport squadron with F-27s; three observation and communication squadrons (under Army command) with *Alouette III* helicopters, and *Super-Cub* and *Beaver* light aircraft; eight SAM squadrons with *Nike-Hercules*; nine SAM squadrons with *Hawks*.

**Paramilitary forces:**

3,200 Gendarmerie (Royal Marechaussée).

## NORWAY

Population: 3,915,000.

Military service: Army, twelve months; Navy and Air Force, fifteen months.

Total armed forces: 35,900.

Estimated GNP 1970: \$12,460,000,000.

Defense budget 1971: 2,932,000,000 kroner or \$410,640,000 (7.14 kroner = \$1).

**Army:** 18,000.

The peacetime establishment includes one brigade group in northern Norway, independent battalions, and supporting elements and training units. *Leopard* and M-48 medium tanks; M-24 light tanks and M-8 armored cars; M-113 and BV-202 armored personnel carriers; M-109 155-mm self-propelled howitzers; L-18 and L-19 light aircraft.

**Reserves:** mobilization would produce eleven regimental combat teams (brigades), supporting units, and territorial forces totaling 157,000.

**Navy:** 8,500 (including 800 coastal artillery).

Fifteen coastal submarines; five frigates; two coastal escorts; ten coastal minesweepers; five minelayers; twenty-one gunboats (refitting with *Penguin* SSMs); six torpedo boats; twenty torpedo boats (less than 100 tons); two armed depot and training ships; a number of coastal artillery batteries.

**Reserves:** 12,000.

**Air Force:** 9,400; 121 combat aircraft.

Five light attack squadrons each with sixteen F-5As; one all-weather fighter squadron with twenty F-104Gs; one photo-reconnaissance squadron with sixteen RF-5As; one maritime patrol squadron with five P-3Bs; one transport squadron with six C-130s and four C-47s; two helicopter squadrons with UH-1s; four SAM batteries with *Nike-Hercules*.

**Reserves:** 10,600, providing twelve airfield defense light AA battalions; Home Guard (all services): 75,000.

## PORTUGAL

Population: 9,730,000.

Military service: Army, twenty-four months; Air Force, thirty-six months; Navy, forty-eight months.

Total armed forces: 218,000 (about 60,000, including those locally enlisted, are in Angola, 45,000 in Mozambique, and 25,000 in Portuguese Guinea).

Estimated GNP 1970: \$6,100,000,000.

Estimated defense expenditure 1970: 11,444,000,000 escudos or \$398,100,000 (28.75 escudos = \$1).

**Army:** 179,000.

Two tank regiments; eight cavalry regiments and battalions; thirty-five infantry regiments and battalions; seventeen coastal artillery regiments and battalions; M-47 and M-4 medium tanks; M-41 light tanks; Humber Mark IV and EBR-75 armored cars; AML-60 scout cars; FV-1609 and M-16 half-track armored personnel carriers; 105-mm and 140-mm howitzers.

**Deployment:** Some of the above units form two infantry divisions, at or below half strength, in Portugal; about twenty-five infantry regiments and supporting units are in the provinces in Africa.

**Navy:** 18,000 (including 3,300 marines).

Four submarines; eleven frigates; six corvettes; fourteen coastal patrol vessels; four ocean minesweepers; twelve coastal minesweepers; forty-one patrol launches (less than 100 tons); five landing craft (LCT-type); fifty-eight small landing craft (less than 100 tons).

**Air Force:** 21,000; 150 combat aircraft (a combat squadron has ten to twenty-five aircraft).

Two light bomber squadrons with B-26 *Invaders* and PV-2s; one fighter-bomber squadron with F-84Gs; two light-strike squadrons with G-91s; one interceptor squadron with F-86Fs; six counterinsurgency flights with armed T-6s; one maritime patrol squadron with P-2 V5s; twenty-two *Noratlans*, sixteen C-47, eleven DC-6, and fifteen C-45 transports; thirteen T-33, twenty-five T-37, and thirty-five T-6 reconnaissance/trainers. Other aircraft include eleven DO-27 and about eighty-five *Alouette II/III* and SA-330 *Puma* helicopters; one parachute regiment of 4,000.

**Deployment:** One parachute battalion in each of the African provinces; one G-91 squadron in Mozambique.

**Paramilitary forces and Reserves:**

9,700 National Republican Guard; 500,000 reserves.

## TURKEY

Population: 36,100,000.

Military service: twenty months.

Total armed forces: 508,500.

Estimated GNP 1970: \$13,700,000,000.

Defense budget 1971-72: 6,695,000,000 liras or \$446,000,000 (fifteen liras = \$1. Before August 9, 1970, nine liras = \$1).

**Army:** 420,000.

One armored division; twelve infantry divisions; four armored brigades; four armored cavalry brigades; one mechanized infantry division; three mechanized infantry brigades; two parachute battalions; M-47 and M-48 medium tanks; M-24, M-26, and M-41 light tanks; M-36 tank destroyers; M-8 armored cars; M-59 and M-113 armored personnel carriers; 105-mm and 155-mm self-propelled guns; 105-mm, 155-mm, and 203-mm howitzers; 40-mm, 75-mm, and 90-mm AA guns; *Honest John* SSMs.

**Navy:** 38,500.

Twelve submarines; ten destroyers; six coastal escorts; eleven motor torpedo boats (two less than 100 tons); ten motor launches; fifteen coastal minesweepers; four inshore minesweepers; one fleet minelayer; five coastal minelayers; a number of landing craft.

**Air Force:** 50,000; 360 combat aircraft (a combat squadron has ten to twenty-five aircraft).

Two fighter-bomber squadrons with F-104Gs; four fighter-bomber squadrons with F-100s; four fighter-bomber squadrons with F-5s; four interceptor squadrons with F-5s; two interceptor squadrons with F-86s (in store); two all-weather fighter squadrons with F-102As; two reconnaissance squadrons with RF-84Fs; four transport squadrons including fifty C-47s, three C-54s, and five C-130s; two SAM battalions (six batteries) with *Nike-Hercules*.

**Paramilitary forces:** 75,000 Gendarmerie (including three mobile brigades).



## Chapter IV

# Other European Countries

### ALBANIA

Population: 2,190,000.

Military service: Army, two years; Air Force, Navy, and special units, three years.

Total regular forces: 42,000.

Estimated GNP 1970: \$900,000,000.

Estimated defense expenditure 1971: 580,000,000 leks or \$116,000,000 (five leks = \$1).

**Army:** 35,000.

One tank brigade; six infantry brigades; some light shore batteries; seventy T-34 and fifteen T-54 medium tanks; twenty BA-64, BTR-40, and BTR-152 armored personnel carriers; SU-76 self-propelled guns; 122-mm and 152-mm guns and howitzers; 45-mm, 57-mm, 76-mm, and 85-mm anti-tank guns; 37-mm, 57-mm, and 85-mm AA guns; a few SA-2 SAMs.

**Navy:** 3,000.

Four submarines; four ASW patrol vessels; thirty motor torpedo and patrol boats (less than 100 tons); eight inshore minesweepers; some SSMs deployed around the ports of Durazzo and Valona.

**Air Force:** 4,000: seventy-two combat aircraft (a combat squadron has twelve aircraft).

Three fighter squadrons with MIG-17s; two fighter squadrons with MIG-15s; one interceptor squadron with MIG-19s; one transport squadron with AN-2s and IL-14s; about eight MI-1 and MI-4 helicopters.

**Paramilitary forces:**

37,500, consisting of an internal security force of 12,500, and a frontier force of 25,000.

### AUSTRIA

Population: 7,445,000.

Military service: nine months (to be reduced to six months during 1971).

Total armed forces: 48,350.

Estimated GNP 1970: \$14,300,000,000.

Defense budget 1971: 4,283,000,000 schillings or \$170,138,000 (24.75 schillings = \$1. Before May 9, 1971, twenty-six schillings = \$1.).

**Army:** 44,000.

Four reduced strength infantry brigades; three reduced strength mechanized brigades; three tank battalions; three independent air defense battalions; 150 M-47 and 120 M-60 medium tanks; forty M-41 and sixty AMX-13 light tanks; 400 G1-2K armored personnel carriers; 105-mm and 155-mm howitzers, and 155-mm guns; JPz-4K self-propelled antitank guns; 84-mm Carl Gustav antitank guided weapons; 130-mm rocket launchers; thirty-eight M-42 self-propelled AA guns;

20-mm and 35-mm Oerlikon and 40-mm Bofors AA guns. **Air Force:** 4,350; twenty-three combat aircraft.

Austrian air units are an integral part of the Army but for purposes of comparison have been listed separately.

Seventeen SAAB 105 fighter-bombers; six J-29F *Tunnan* fighter-bombers; thirty-five *Magister*, *Vampire*, and *Sufir* trainers; nineteen Cessna L-19 light reconnaissance aircraft; one transport squadron with three *Beavers* and two *Skyvans*; twenty-two AB-204, twenty-three *Alouette*, and twelve AB-206 helicopters.

**Paramilitary forces:**

12,000 Gendarmerie.

### FINLAND

Population: 4,600,000.

Military service: eight to eleven months.

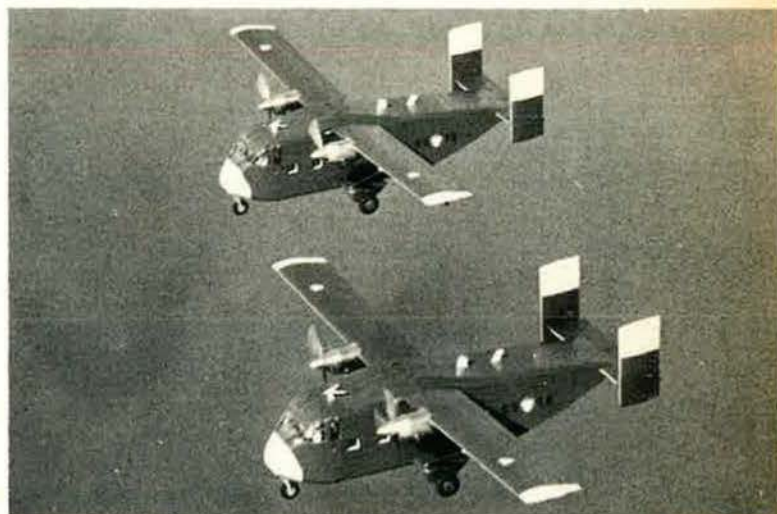
Total armed forces: 39,500.

Estimated GNP 1970: \$10,300,000,000.

Defense budget 1971: 646,000,000 markkaa or \$153,800,000 (4.2 markkaa = \$1).

**Army:** 34,000.

One armored brigade (at about half strength); six infantry brigades (at about thirty-five percent strength); eight independent infantry battalions; two coastal artillery regi-



*The Austrian Air Force took delivery of these two Short Skyvan light turboprop transports in 1969. It was the first military order for the Skyvan STOL aircraft.*

ments; three coastal artillery battalions; one anti-aircraft regiment; four anti-aircraft battalions; T-54, T-55, and *Charioteer* medium tanks; PT-76 light tanks; BTR-50P armored personnel carriers; 105-mm, 122-mm, and 130-mm guns; 122-mm and 152-mm howitzers; 81-mm and 120-mm mortars; *Vigilant* and SS-11 antitank guided weapons; ZSU-57, 35-mm Oerlikon, and 40-mm Bofors AA guns.

**Navy:** 2,500.

Three frigates (one used as training ship); two corvettes; one patrol boat with Mk 66 SSM; fifteen fast patrol boats (less than 100 tons); two coastal minelayers; five patrol boats (ex-inshore minesweepers).

**Air Force:** 3,000; forty-eight combat aircraft.

Three fighter squadrons with MIG-21Fs and Gnat Mark 1s; twelve *Magister* armed trainers; about 100 other trainers, including seventy *Magister*, thirty *Safir*, and a few MIG-15/MIG-21 UT1s; about ten C-47 and *Beaver* transports; *Hound*, *Alouette II*, and four AB-204B helicopters.

**Paramilitary forces and Reserves:**

3,000 frontier defense troops; 650,000 reserves.

## SPAIN

Population: 33,600,000.

Military Service: eighteen months.

Total armed forces: 301,000.

Estimated GNP 1970: \$32,300,000,000.

Defense budget 1971: 47,724,000,000 pesetas or \$681,000,000 (seventy pesetas = \$1).

**Army:** 220,000.

One armored division; one mechanized infantry division; one motorized infantry division; two mountain divisions; twelve independent infantry brigades; one armored cavalry brigade (all above are about seventy percent strength); one high mountain brigade; one air-portable brigade; one parachute brigade; two artillery brigades; one SAM battalion with *Hawks*; M-47 and M-48 medium tanks; M-24 and M-41 light tanks; *Greyhound* armored cars, AML-60/90 and M-3 scout cars; M-113 armored personnel carriers; 105-mm and 155-mm self-propelled guns; 105-mm, 155-mm, and 203-mm howitzers; 90-mm self-propelled antitank guns.

**Navy:** 47,500 including 6,000 marines.

Three submarines; one helicopter carrier; one cruiser; sixteen ASW destroyers; three destroyers; eight frigates; six frigate-minelayers; six corvettes; one ASW patrol vessel; three torpedo boats; thirteen fleet minesweepers; twelve coastal minesweepers; eight landing ships; three ASW helicopter squadrons; one light helicopter squadron.

**Air Force:** 33,500; 221 combat aircraft.

Twelve *Mirage IIIE* fighter-bombers; fifty F-5 fighter-bombers; fifty-five HA-200 fighter-bombers (thirty-six F-4C fighter-bombers are being delivered); twenty-one F-104G interceptors; forty-eight F-86F interceptors; twenty-five T-6 armed trainers; one ASW squadron with eleven HU-16Bs; about 150 transport aircraft and helicopters, including C-47s, C-54s, twelve *Caribou*, and twenty Azors.

**Paramilitary forces:**

65,000 *Guardia Civil*.

**Deployment** (outside mainland Spain): Strength: 41,000, including mechanized and commando formations of the Spanish Foreign Legion, and elements of other units.

Balearic Islands: 6,000.

Canary Islands: 8,000. Ceuta: 8,000, including one regiment of the Foreign Legion. Melilla: 9,000, including one regiment of the Foreign Legion. Spanish Sahara: 10,000, including two regiments of the Foreign Legion.

## SWEDEN

Population: 8,125,000.

Military service: Army and Navy, nine to fifteen months; Air Force, nine to fourteen months.

Total armed forces: 23,000 regulars and 50,300 conscripts (total mobilizable strength 750,000).

Estimated GNP 1970: \$31,200,000,000.

Defense budget 1971-72: 6,165,000,000 Swedish kronor or \$1,192,000,000 (5.17 kronor = \$1).

**Army:** 12,500 regulars; 36,500 conscripts; 100,000 reservists called up each year for eighteen to forty days' training.

Seven armored regiments; fifteen infantry regiments; seven artillery regiments; six anti-aircraft artillery regiments; one parachute training unit (all in cadre form); one SAM battalion with *Hawks*; *Centurion* and STRV-103 medium tanks; STRV-74 light tanks; IKV-91 amphibious tanks; Pbv-301/-302 armored personnel carriers; 105-mm and 155-mm self-propelled howitzers; 155-mm self-propelled guns; 105-mm and 155-mm guns; 75-mm, 105-mm, and 155-mm howitzers; 90-mm antitank guns; SS-11, *Bantam*, *Carl Gustav*, and *Miniman* antitank guided weapons; 57-mm self-propelled, 20-mm, and 40-mm AA guns; *Redeye* SAMs.

**Navy:** 4,700 regulars; 7,400 conscripts.

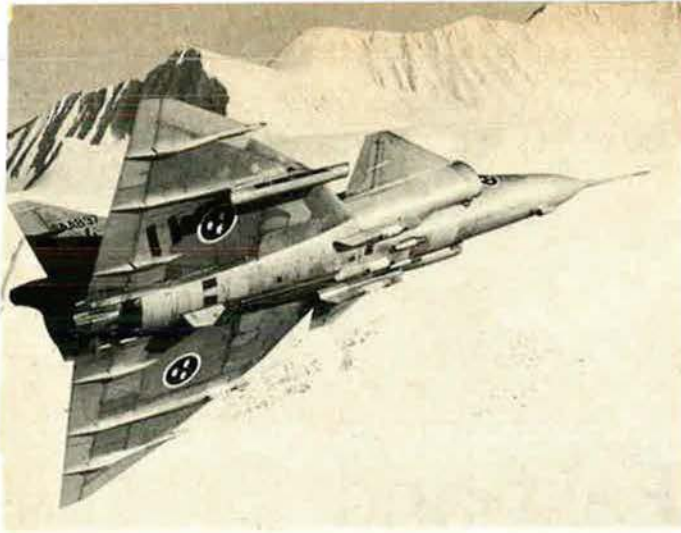
Twenty-three submarines; two GM destroyers with Rb-08 SSMs; four GM destroyers with *Seacat* SAMs; two other destroyers; seven fast antisubmarine frigates; seventeen heavy torpedo boats; twenty-five torpedo boats (less than 100 tons); one minelayer/submarine depot ship; eighteen coastal minesweepers; seventeen inshore minesweepers (eight less than 100 tons); five coastal artillery regiments



The CASA 207, which carries the Spanish Air Force designation T-7, has been built in both troop and military cargo transport versions. Passenger capacity is thirty to forty.



In production for the Swedish Air Force is Scottish Aviation Ltd.'s Bulldog. The prototype shown here made its first flight last February.



Swedish Air Force attack squadrons will receive AJ-37 Viggens as replacements for their A-32A Lansens. The STOL single-seater is built by SAAB.



The Hawker Hunter, now employing Sidewinder air-to-air missiles, has been in service for the Swiss Air Force since 1958, and shares the interceptor role with Mirage IIIs.

with 75-mm, 105-mm, 120-mm, 152-mm, and 210-mm guns; Rb-08 and Rb-52 (SS-11) SSMs; ten Vertol and ten AB-206A helicopters.

**Air Force:** 5,800 regulars; 6,400 conscripts; 650 combat aircraft (a combat squadron has up to eighteen aircraft).

Ten attack squadrons of A-32A Lansens with Rb-04 ASMs (replacement by the AJ-37 Viggen is due to start in 1971); thirteen all-weather fighter squadrons with J-35 Draken Fs; eight all-weather fighter squadrons with J-35 Draken A/Ds; two recce/fighter squadrons with S-32Cs; three recce/day-fighter squadrons with S-35Es; one transport squadron with two C-130Es and seven C-47s; one heavy helicopter squadron with ten Vertol-107s; six SAM squadrons with Bloodhound IIs. There is a fully computerized, fully automatic, control and air surveillance system, Stril 60, coordinating all air defense components.

**Paramilitary forces:**

Voluntary defense organizations of 325,000, including 90,000 women.

### SWITZERLAND

Population: 6,375,000.

Military service: four months' initial training, followed by reservist training of three weeks a year for eight years, two weeks for three years, and one week for two years.

Total armed forces: 5,500 regulars and 24,000 conscripts (total mobilizable strength 600,000; reservists can be fully mobilized within forty-eight hours).

Estimated GNP 1970: \$20,500,000,000.

Defense budget 1971: 1,909,200,000 francs or \$459,000,000 (4.08 francs = \$1. Before May 9, 1971, 4.3 francs = \$1.).

**Army:** 2,500 regular training cadre; 17,000 conscripts; 530,500 reservists.

The militia-style Army is organized into four corps. One corps, for the defense of the Alps, consists of three mountain divisions; the other three corps, for the defense of the plain, consist of an armored division and two infantry divisions each. There are also seventeen frontier, fortress, and "redoubt" brigades, and forty-eight artillery battalions; 300 Centurion and 150 Pz-61 medium tanks; 200 AMX-13 light tanks; 1,000 M-113 armored personnel carriers; 155-mm self-propelled howitzers; 105-mm guns and howitzers; 81-mm and 120-mm mortars.

**Air Force** (including air defense troops): Swiss Air Force and air defense troops are an integral part of the Army, but are listed here separately for purposes of comparison.

3,000 regular; 7,000 conscripts; 40,000 reservists (maintenance by civilians); 315 combat aircraft (a combat squadron has fifteen aircraft); thirteen ground support squadrons with Venom FB 50s; two interceptor squadrons with Mirage IIIs. Five interceptor squadrons with Hunter F-58s (with Sidewinder AAMs); one reconnaissance squadron with Mirage IIIRs; twenty transports including three JU-52/3s and six DO-27s; eighty helicopters including sixty Alouette II/IIIs; forty AA batteries with Oerlikon twin 35-mm cannons; two SAM battalions with Bloodhound IIs.

### YUGOSLAVIA

Population: 20,800,000.

Military service: eighteen months.

Total armed forces: 233,000.

Estimated GNP 1970: \$11,800,000,000.

Defense budget 1971: 8,838,000,000 dinars or \$596,000,000 (fifteen dinars = \$1. Before Jan. 23, 1971, 12.5 dinars = \$1).

**Army:** 195,000.

Nine infantry divisions; fourteen armored brigades; thirty-one independent infantry brigades; one airborne brigade; one marine infantry brigade; T-54/55, T-34, M-47, and 650 M-4 medium tanks; PT-76 and thirty-five AMX-13 light tanks; M-3, BTR-50, BTR-60P, and BTR-152 armored personnel carriers; SU-100 self-propelled guns; 105-mm and 155-mm howitzers; 50-mm, 57-mm, 75-mm, and 76-mm anti-tank guns; SU-57 self-propelled AA guns; SA-2 SAMs.

**Navy:** 18,000.

Five submarines; one destroyer; three patrol vessels; sixteen submarine chasers; four coastal minesweepers; twenty inshore minesweepers (twelve less than 100 tons); ten Osa-class patrol boats with Styx SSMs; sixty-seven motor torpedo boats (fifty-five less than 100 tons); thirty-five landing craft; twenty-five coastal artillery batteries.

**Air Force:** 20,000; 330 combat aircraft (a combat squadron has fifteen aircraft).

Ten GA squadrons with F-84s, Kraguj and Jastrebs; ten fighter/interceptor squadrons with F-86D/Es and MIG-21F/PFs; two reconnaissance squadrons with RT-33s; sixty Galeb trainers; twenty-five LI-2, Beaver, C-47, and IL-14 transports; fifty Whirlwind, MI-4, and some Alouette III helicopters; eight SAM batteries with SA-2s.

**Paramilitary forces:**

19,000 frontier guards; 1,000,000 territorial defense force (planned to increase to 3,000,000).



## Chapter V

# The Middle East and the Mediterranean

### Multilateral Agreements

The members of the Central Treaty Organization (CENTO) are Britain, Iran, Pakistan, and Turkey, with the United States as an associate. All sit on the Military, Economic, and Counter-Subversion Committees, and on the Permanent Military Deputies Group. The Treaty provides for mutual cooperation for security and defense, but has no international command structure, nor forces allocated to it. For the local powers, the economic organization of Regional Cooperation for Development (RCD), which arose out of CENTO, may today be more important.

### Bilateral Agreements

A number of external powers have military arrangements with countries in the region. The United States has varying types of security assistance agreements and provides significant military aid on either a grant or credit basis to Greece, Turkey, Portugal, Spain, Morocco, Tunisia, Lebanon, Jordan, Saudi Arabia, and Israel. It provides, in addition, a significant amount of military equipment on a cash sales basis to many countries, notably Israel, Spain, and Jordan. For grant military assistance purposes Greece and Turkey are considered forward defense areas and Spain is considered a base rights country. Communication bases are maintained in Morocco under informal arrangements.

The Soviet Union has a military assistance agreement, concluded in December 1970, and a fifteen-year treaty of friendship and cooperation, signed in May 1971, with the UAR. Important military assistance is also provided to Algeria, Iraq, Sudan, and Syria, which may be covered by more informal arrangements.

The People's Republic of China has supplied arms to Albania, and has a treaty of friendship with the Yemen.

Britain has defense commitments to Cyprus, Gibraltar, and Malta, and has proposed defense arrangements with the lower Gulf States after her withdrawal from the Persian Gulf at the end of 1971. Britain is also an important arms supplier for the Gulf Sheikdoms, Saudi Arabia, and Jordan.

France has a pilot training agreement with Morocco but no other formal commitments in the region. The facilities provisions of the Evian agreements with Algeria lapsed at

the end of 1970 with the return of the Bou-Sfer airbase to Algeria. France sells arms to a number of countries, notably to Libya.

### Arrangements within the region (between Arab states)

Algeria, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Saudi Arabia, South Yemen, Sudan, Syria, Tunisia, the UAR, and Yemen are members of the League of Arab States. Among its subsidiary bodies are the Arab Defense Council set up in 1950 and the Unified Arab Command organized in 1964.

Defense agreements were concluded by the UAR with Syria in November 1966 and Jordan in May 1967, to which Iraq later acceded. These agreements provided for the establishment of a Defense Council and a Joint Command. The loosely associated Eastern Front Command, comprising Iraq, Jordan, the Palestine Liberation Army, and Syria, was reorganized in December 1970 into separate Jordanian and Syrian commands. Iraq and Syria concluded defense pacts in May 1968 and July 1969. The proposed Union of Arab Republics, announced by Libya, Syria, and the UAR in April 1971, would provide for a common defense policy and a Federal Defense Council. Sudan has announced its intention to join.

## ALGERIA

Population: 14,150,000.

Military service: limited conscription.

Total armed forces: 60,250.

Estimated GNP 1970: \$4,400,000,000.

Defense budget 1971: 490,000,000 dinars or \$99,200,000 (4.94 dinars = \$1).

Army: 53,000.

Four motorized infantry brigades; one parachute brigade; three independent tank battalions; fifty independent infantry battalions; twelve companies of desert troops; five independent artillery battalions; 200 T-34, 200 T-54, and fifty T-55 medium tanks; AMX-13 light tanks; 350 BTR-152 armored personnel carriers; twenty-five SU-100 and six JSU-152 self-propelled guns; 85-mm guns, 122-mm, and 152-mm



howitzers; 140-mm and 240-mm rocket launchers.

**Navy:** 3,250.

Six coastal escorts; two fleet minesweepers; one coastal minesweeper; eight Komar- and one Osa-class patrol boats (Styx surface-to-surface missiles); eight P-6 torpedo boats.

**Air Force:** 4,000; 142 combat aircraft.

Twenty-four IL-28 light bombers; twenty MIG-15s, forty MIG-17 ground attack fighters; thirty MIG-21 interceptors; twenty-eight Magister armed trainers; eight AN-12 and three IL-18 transports; three MI-1, forty MI-4, seven Hughes-269A, and two SA-330 helicopters; one SAM battalion with SA-2s.

**Paramilitary forces:**

8,000. Gendarmerie with fifty AML armored cars.

## IRAN

Population: 29,500,000.

Military service: two years.

Total armed forces: 181,000.

Estimated GNP 1970: \$10,900,000,000.

Defense budget 1971-72: 77,500,000,000 rials or \$1,023,000,000 (75.75 rials = \$1).

**Army:** 150,000.

Three armored divisions; three infantry divisions; four independent infantry brigades; one SAM battalion with Hawks; 400 M-47 and 460 M-60A1 medium tanks; 100 M-24 light tanks; 100 M-8 and 140 M-20 armored cars; 300 M-113, 270 BTR-50, and 300 BTR-60 armored personnel carriers; 75-mm, 105-mm, and 155-mm howitzers; 40-mm, 57-mm, and 85-mm AA guns; eight Huskie helicopters (further helicopters are being delivered).

**Navy:** 9,000.

One destroyer; one frigate (four with Seacat SAMs are being delivered); four corvettes; four patrol boats; four coastal minesweepers; two inshore minesweepers; eight SRN-6 and two Wellington hovercraft (less than 100 tons); four landing craft.

**Air Force:** 22,000; 140 combat aircraft.

Two fighter-bomber squadrons with F-4Ds, with Sidewinder and Sparrow air-to-air missiles; (thirty-two F-4Es are on order); five fighter-bomber squadrons with F-5s; twenty F-86 all-weather fighters (being phased out); nine RT-33 reconnaissance aircraft; transports include ten C-47s, twenty-six C-130Es, and six Beavers (thirty C-130Hs are being delivered); helicopters include ten Huskies, forty-five AB-205s, and sixteen Super-Frelons (further helicopters are being delivered); Tigercat SAMs (Rapier SAMs are on order).

**Paramilitary forces:**

40,000. Gendarmerie with thirty AB-206 helicopters.

## IRAQ

Population: 9,250,000.

Military service: two years.

Total armed forces: 95,250.

Estimated GNP 1970: \$3,120,000,000.

Estimated defense expenditure 1970-71: 84,700,000 dinars or \$237,160,000 (one dinar = \$2.80).

**Army:** 85,000.

Two armored divisions; four infantry divisions (each of four brigades); 800 T-54 and T-55, and sixty T-34/85 medium tanks; forty-five PT-76 light tanks; 115 AML armored cars; sixty Ferret scout cars; BTR-152 armored personnel carriers; artillery includes 300 Soviet 120-mm and 130-mm guns.

**Navy:** 2,000.

Three submarine chasers; twelve motor torpedo boats (less than 100 tons); ten patrol boats (less than 100 tons).

**Air Force:** 8,250; 220 combat aircraft.

Nine TU-16 medium bombers; twelve IL-28 light bombers;

forty-eight SU-7 fighter-bombers; thirty-five Hunter ground attack fighters; sixteen T-52 Jet Provost light-strike aircraft; eighty-five MIG-21 interceptors; fifteen MIG-17 fighters; thirty-five MI-4, twelve MI-8, and nine Wessex helicopters; two AN-2, eight AN-12, ten AN-24, two TU-124, and two Heron transports.

**Paramilitary forces:**

20,000, including 10,000 national guard and 4,000 security troops, forming one mechanized brigade.

## ISRAEL

Population: 3,040,000.

Military service (Jewish population only): men, thirty-six months; women, twenty months.

Total armed forces: 75,000 regular cadre and conscripts (can be raised to 300,000 by mobilizing reservists within forty-eight to seventy-two hours).

Estimated GNP 1970: \$5,400,000,000.

Defense budget 1971-72: 5,193,000,000 Israeli pounds or \$1,483,700,000 (3.5 Israeli pounds = \$1).

**Army:** 11,500 regular, 50,000 conscripts (275,000 when fully mobilized).

Four armored brigades; four infantry brigades; one parachute brigade; 300 M-48 (with 105-mm guns), 250 Ben Gurion (Centurion with French 105-mm gun), 200 Centurion, 200 Isherman (with 105-mm gun) and Super Sherman, 100 TI-67 (T-54/55 with 105-mm gun), and twenty-five M-60 medium tanks; AML-60, fifteen AML-90 and some Staghound armored cars; about 1,000 M-2 and M-3 half-tracks; M-113 armored personnel carriers; twenty-four M-109 155-mm self-propelled howitzers; 155-mm howitzers on Sherman chassis; about 300 self-propelled 105-mm howitzers, 120-mm and 160-mm mortars on AMX-chassis; 90-mm self-propelled antitank guns and 106-mm jeep-mounted recoilless rifles; Cobra and weapons carrier-mounted SS-10/11 antitank guided weapons; 20-mm, 30-mm, and 40-mm



Israel is strengthening its tactical air capacity with more A-4 Skyhawks. Unconfirmed reports say Israel has developed and test-flown a prototype air-superiority fighter.



*Helicopters—such as the French SA-321 Super Frelon assault craft, shown here patrolling the Negev—provide mobility for the Israeli armed forces.*

AA guns (the MD-660 280-mile-range surface-to-surface missile may become operational during 1971).

**Reserves:** would increase above formations to ten armored, nine infantry, and four parachute brigades.

**Navy:** 3,500 regular, 1,000 conscripts (8,000 when fully mobilized).

Three submarines; one destroyer (used as a training ship); twelve fast patrol boats (with *Gabriel* surface-to-surface missiles); nine motor torpedo boats (less than 100 tons); eight patrol boats (less than 100 tons); ten landing craft (four less than 100 tons); 500 naval commandos.

**Air Force:** 8,000 regular, 1,000 conscripts (17,000 when fully mobilized); 374 combat aircraft.

Ten *Vautour* light bombers; seventy-five F-4E fighter-bomber/interceptors; sixty *Mirage III*C fighter-bomber/interceptors (some with R-530 air-to-air missiles); seventy-two A-4E/H fighter-bombers (eighteen more are due to be delivered during 1971); twenty-seven *Mystère IV*-A fighter-bombers; thirty *Ouragan* fighter-bombers; nine *Super Mystère* interceptors; six RF-4E reconnaissance aircraft; eighty-five *Magister* armed trainers; ten *Stratocruiser* transports/tankers; fifteen *Noratlas*, ten C-47, and four C-46 transports; twelve *Super Frelon*, eight CH-53, twenty-five AB-205, and twenty *Alouette* helicopters; eight SAM batteries with forty-eight *Hawks*.

**Paramilitary forces:**

10,000. Militia providing regional border defense units.

## JORDAN

Population: 2,225,000.

Military service: two years.

Total armed forces: 60,250.

Estimated GNP 1970: \$640,000,000.

Defense budget 1971: 32,300,000 dinars or \$90,440,000 (one dinar = \$2.80).

**Army:** 58,000.

One armored division; one mechanized division; one infantry division; one Royal Guards battalion (armored); three artillery regiments; one SAM regiment with *Tigercats*; 150 M-47 and M-48, and 140 *Centurion* medium tanks; 125 *Saladin* armored cars; 140 *Ferret* scout cars; 250 M-113 and 100 *Saracen* armored personnel carriers; twenty-five-pounder guns; thirty 105-mm and 155-mm howitzers; a few 155-mm and 203-mm guns; M-42 self-propelled AA guns.

**Navy:** 250.

Eight small patrol craft.

**Air Force:** 2,000; thirty-three combat aircraft.

Two ground-attack squadrons with eighteen *Hunters*; one interceptor squadron with fifteen F-104As; four C-47 and

two *Dove* transports; helicopters include seven *Alouette III*s.

**Paramilitary forces:**

37,500, consisting of 7,500 Gendarmerie, and 30,000 National Guard.

## LEBANON

Population: 2,775,000.

Voluntary military service (proposals have been made to introduce compulsory military training).

Total armed forces: 15,250.

Estimated GNP 1970: \$1,560,000,000.

Defense budget 1971: 166,200,000 Lebanese pounds or \$51,100,000 (3.25 Lebanese pounds = \$1).

**Army:** 14,000.

Two tank battalions; one motorized battalion; nine infantry battalions; forty *Charioteer* medium tanks; forty AMX-13 and twenty M-41 light tanks; M-706, M-6, and AEC Mark-3 armored cars; M-113 and M-59 armored personnel carriers; 155-mm howitzers; fifteen M-42 self-propelled AA guns.

**Navy:** 250.

One patrol vessel; four small patrol boats (less than 100 tons); one landing craft.

**Air Force:** 1,000; twenty-one combat aircraft.

Twelve *Hunter* ground-attack fighters; one interceptor squadron with *Mirage III*Cs (negotiations have taken place for their resale to France, and they are not thought to be operational) with R-530 air-to-air missiles; five transports; one helicopter squadron with four *Alouette II*s and six *Alouette III*s. Some radar of a *Crotale* SAM system have been delivered.

**Paramilitary forces:**

2,500 Gendarmerie. A National Guard of 5,000 is being formed.

## LIBYA

Population: 2,000,000.

Military service: eighteen months.

Total armed forces: 22,000.

Estimated GNP 1970: \$4,000,000,000.

Defense budget 1971-72: 30,000,000 Libyan pounds or \$84,000,000 (one Libyan pound = \$2.80).

**Army:** 20,000.

Four armored battalions; five infantry battalions; three artillery battalions; two AA artillery battalions; six *Centurion V*, 100 T-54/55, and fifteen T-34/85 medium tanks; *Saladin* armored cars; *Shorland* and *Ferret* scout cars; *Saracen* armored personnel carriers; 122-mm guns, 105-mm,



*The clear skies of the Middle East make it possible for the Israeli Air Force to dispense with some of the F-4 Phantom's nav-aid gear and add weaponry to the aircraft.*

and 155-mm howitzers; L40/70 Bofors AA guns (an order for 188 *Chieftain* tanks from Britain is in abeyance).

**Navy:** 1,000.

One corvette; three fast patrol boats with SS-12(M) surface-to-surface missiles; one fleet minesweeper; two inshore minesweepers; one logistic support ship; twelve small patrol craft; one fast frigate is due for delivery during 1971.

**Air Force:** 1,000; seven combat aircraft.

One interceptor squadron with seven F-5s; eighteen *Mirage III* and three T-33 trainers; eight C-130E and nine C-47 medium transports; two AB-206, three OH-13, four *Alouette III*, and six *Super Frelon* helicopters (thirty more of the total order of 110 *Mirages* and eight F-5s are due to be delivered during 1972).

## MOROCCO

Population: 16,000,000.

Military service: eighteen months.

Total armed forces: 57,500.

Estimated GNP 1970: \$3,340,000,000.

Defense budget 1971: 491,000,000 dirham or \$97,000,000 (5.06 dirham = \$1).

**Army:** 52,000.

One armored brigade; three motorized infantry brigades; one light security brigade; one parachute brigade; twelve independent infantry battalions; two camel corps battalions; three desert cavalry battalions; four artillery groups; 120 T-54 medium tanks; 120 AMX-13 light tanks; some EBR-75, and fifty AML-245 and M-8 armored cars; forty M-3 half-track and ninety-five Czech armored personnel carriers; twenty-five SU-100 and AMX-105, and fifty M-56 90-mm self-propelled guns; 75-mm and 105-mm howitzers; six *Alouette II/III* helicopters.

**Navy:** 1,500.

One frigate; two coastal escorts; one patrol boat (less than 100 tons); two landing ships.

**Air Force:** 4,000; thirty-eight combat aircraft.

Ten F-5A and four F-5B interceptors; twenty-four *Magister* armed trainers; forty-five T-6 and twenty-five T-28 trainers; ten C-47 and eleven C-119 transports; OH-13, twenty-four AB-204, twelve AB-205, and six HH-43 helicopters (twelve MIG-17 fighter-bombers are in storage).

**Paramilitary forces:**

23,000. 2,250 Gendarmerie, including two mobile security battalions; 750 Royal Guards; 20,000 Auxiliaries.

## SAUDI ARABIA

Population: 7,400,000.

Voluntary military service.

Total armed forces: 41,000.

Estimated GNP 1970: \$4,100,000,000.

Defense budget 1970-71: 1,723,000,000 riyals or \$383,000,000 (4.5 riyals = \$1).

**Army:** 35,000.

Four infantry brigades; ten SAM batteries with *Hawks*; twenty-five M-47 medium tanks; 60 M-41 light tanks; 200 AML-60s and AML-90s; some *Staghound* and *Greyhound* armored cars; *Ferret* scout cars.

**Deployment:** 1,000 in Jordan; 2,000 in UAR.

**Navy:** 1,000.

Three torpedo boats; one patrol vessel; two fast patrol boats; eight SRN-6 hovercraft; twenty smaller patrol boats are being delivered.

**Air Force:** 5,000; seventy-five combat aircraft.

One fighter-bomber squadron with fifteen F-86s; two ground-attack squadrons with twenty BAC-167s; two interceptor squadrons with twenty *Lightnings*; ten C-130E transport aircraft; four *Alouette III*, one AB-204, three AB-205, and fourteen AB-206 helicopters; about thirty-five *Hunter*,

*Lightning*, and T-33A trainers; two SAM regiments with thirty-six *Thunderbirds*.

**Paramilitary forces:**

30,000. National Guard (formerly known as the "White Army"); lightly armed tribal levies with *Vigilant* antitank guided weapons.

## SUDAN

Population: 16,050,000.

Voluntary military service (proposals for compulsory service have been made).

Total armed forces: 37,100.

Estimated GNP 1970: \$1,830,000,000.

Defense budget 1970-71: 46,400,000 Sudanese pounds or \$133,200,000 (one Sudanese pound = \$2.87).

**Army:** 35,000.

One armored brigade; six infantry brigades; one independent infantry battalion; one parachute regiment; three artillery regiments; one engineer regiment; twenty T-34/85, fifty T-54, and fifty T-55 medium tanks; fifty *Saladin* and forty-five *Commando* armored cars; sixty *Ferret* scout cars; BTR-40, BTR-152, and *Saracen* armored personnel carriers; fifty-five twenty-five-pounders, forty 105-mm, and some 122-mm guns and howitzers; twenty 120-mm mortars; eighty Bofors 40-mm and some Soviet 85-mm AA guns.

**Deployment:** 2,000 in Egypt.

**Navy:** 600.

Six coastal patrol boats; two landing craft.

**Air Force:** 1,500; 32 combat aircraft.

Sixteen MIG-21 interceptors; five BAC-145 Mk 5, eight *Jet Provost* Mk 52, and three *Provost* Mk 51 light attack aircraft; three *Pembroke*, three F-27 *Troopship*, six AN-12, and five AN-24 transports; ten MI-8 helicopters.

**Paramilitary forces:**

3,000. 1,000 Gendarmerie; 2,000 Frontier Police.

## SYRIA

Population: 6,200,000.

Military service: thirty months (Jewish population exempted).

Total armed forces: 111,750.

Estimated GNP 1970: \$1,460,000,000.

Estimated defense expenditure 1970: 670,000,000 Syrian pounds or \$176,000,000 (3.8 Syrian pounds = \$1).

**Army:** 100,000.

One armored division; two mechanized divisions; two infantry divisions; one parachute battalion; five commando battalions; seven artillery regiments; eight SAM batteries with SA-2s; about thirty JS-3 heavy tanks; 150 T-34, and 600 T-54/55 medium tanks; some PT-76 light tanks; 100 SU-100 self-propelled guns; 500 BTR-152 armored personnel carriers; 800 Soviet-made guns including 122-mm, 130-mm, and 152-mm.

**Navy:** 1,750.

Two minesweepers; two coastal patrol vessels; six *Komar*-class patrol boats, with *Styx* surface-to-surface missiles; twelve motor torpedo boats (less than 100 tons).

**Air Force:** 10,000 men; 210 combat aircraft.

Eighty MIG-15 and MIG-17 fighter-bombers; thirty SU-7 fighter-bombers; 100 MIG-21 interceptors; eight IL-14 and six C-47 transports; four MI-1, eight MI-4, and some MI-8 helicopters.

**Paramilitary forces:**

6,500. 5,000 Gendarmerie; 1,500 Internal Security Camel Corps.

## TUNISIA

Population: 5,050,000.

Military service: one year (selective).



*USSR-supplied MIG-21s are first-line interceptors for five Arab states. The total in the Middle East is thought to exceed 500. Newer J models are Soviet-operated.*

Total armed forces: 21,550.

Estimated GNP 1970: \$1,240,000,000.

Estimated defense expenditure 1971: 10,509,000 dinars or \$20,020,000 (one dinar = \$1.905).

**Army:** 20,000.

One armored battalion; six infantry battalions; one commando battalion; one artillery group; one Sahara patrol group; about fifteen AMX-13 and M-41 light tanks; twenty *Saladin* and some M-8 armored cars; 105-mm self-propelled and 155-mm guns; 40-mm Bofors AA guns.

**Navy:** 800.

One corvette; one coastal escort; two patrol boats with SS-12 (M) surface-to-surface missiles; ten patrol boats (less than 100 tons); four fast patrol boats and six coastal patrol boats due to be delivered in 1971.

**Air Force:** 750; twelve combat aircraft.

Twelve F-86 fighters; eight MB-326, twelve T-6, and fourteen SAAB 91-D trainers; three *Flamant* light transports; eight *Alouette II* helicopters.

**Paramilitary forces:**

10,000. 5,000 Gendarmerie organized in six battalions; 5,000 National Guard.

## UNITED ARAB REPUBLIC (UAR)

Population: 34,150,000.

Military service: three years.

Total armed forces: 318,000.

Estimated GNP 1970: \$6,430,000,000.

Defense budget 1971-72: 650,000,000 Egyptian pounds or \$1,495,000,000 (one Egyptian pound = \$2.30).

**Army:** 275,000.

Three armored divisions; four mechanized infantry divisions; five infantry divisions; two parachute brigades; sixteen artillery brigades; twenty commando battalions; fifty JS-3 and T-10 heavy tanks; 1,200 T-54/55 and 250 T-34/85 medium tanks; 150 PT-76 light tanks; 850 BTR-40, BTR-50P, BTR-60P, OT-64, and 350 BTR-152 armored personnel carriers, about 150 SU-100 and JSU-152 self-propelled guns; about 1,500 122-mm, 130-mm, and 152-mm guns and howitzers, and forty 203-mm howitzers; 57-mm, 85-mm, and 100-mm

antitank guns; *Snapper* antitank guided weapons; twenty-four FROG-3 and twenty-five *Samlet* short-range surface-to-surface missiles; ZSU-23-4 and ZSU-57 self-propelled AA guns.

**Navy:** 14,000 including coast guards.

Twelve submarines (including six ex-Soviet W-class and six ex-Soviet R-class); five destroyers (including four ex-Soviet *Skory-class*); two corvettes; ten submarine chasers; four fleet minesweepers; two inshore minesweepers; twelve *Osa-class* and eight *Komar-class* patrol boats with Styx surface-to-surface missiles; thirty motor torpedo boats (less than 100 tons); twenty landing craft.

**Air Force:** 25,000; 523 combat aircraft.

Eighteen TU-16 medium bombers; twenty-five light bombers; 200 MIG-21 interceptors; 110 SU-7 fighter-bombers; 200 MIG-17 fighter-bombers; 150 MIG, YAK, and L-29 trainers (some can be armed); about forty IL-14 and twenty AN-12 medium transports; 140 MI-1, MI-4, MI-6, and MI-8 helicopters. Air defense is provided by 37-mm, 57-mm, 85-mm, and 100-mm guns; up to seventy sites with six launchers each of SA-2 SAMs; a radar network and six squadrons of MIG-21 interceptors. Coordinated with this defense are up to 150 MIG-21J and possibly MIG-23 aircraft—all Soviet operated. There are also up to sixty-five Soviet-controlled sites with four launchers each of SA-3s (and possibly SA-4s).

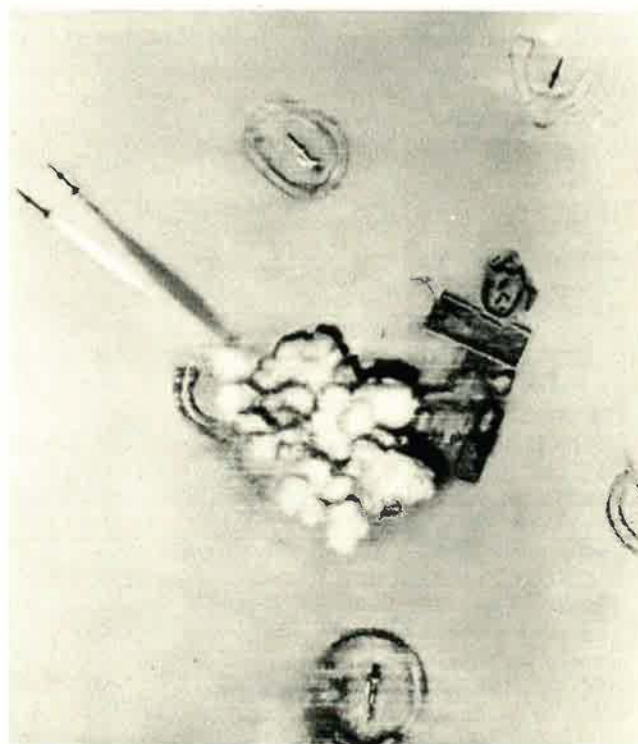
**Deployment:** elements in Sudan.

**Missile Command:** 4,000.

This is separate from the Army and the Air Force and its numbers include civilian technicians. Fresh development work may have started on the 1,000-pound warhead, 235-mile-range *Al Zafir*, the 375-mile-range *Al Kahir*, and the 440-mile-range *Al Raid*, stated to be able to carry a one-ton scientific probe, but these ranges are probably overoptimistic. The first two missiles were designed to be mobile; none is thought to have achieved any operational capability.

**Paramilitary forces:**

National Guard of about 120,000.



*Israeli authorities released this photo, which they say shows an Egyptian missile site in the Suez Canal area, under Israeli air attack in 1970.*



## Chapter VI

# The Nations of Sub-Saharan Africa

### Multilateral Agreements

The Organization of African Unity (OAU), constituted in May 1963, includes all internationally recognized independent African states except South Africa. Its Defense Commission is responsible for defense and security cooperation, and the defense of the sovereignty, territorial integrity, and independence of its members.

There is a regional defense pact among France, Congo (Brazzaville), the Central African Republic, and Chad, and there is a five-party defense agreement among France, Dahomey, Ivory Coast, Niger, and Upper Volta, which has set up the "Conseil de défense de l'Afrique équatoriale."

### Bilateral Agreements

A number of external powers have military arrangements with countries in the region. The United States has varying types of security assistance agreements and provides significant military aid on either a grant or credit basis to Ethiopia, Liberia, and Congo (Kinshasa). For grant military assistance purposes, Ethiopia, where the United States has a large communications center, is considered a base rights country.

The Soviet Union and China are not known to have defense agreements with countries in the region, but Soviet military assistance has been given to Guinea, Mali, and Mauritania.

Britain maintains defense agreements with Kenya and Mauritius, and an agreement with South Africa, made in June 1955 and revised in January 1967, covering the use of the Simonstown naval base. France has defense agreements with Cameroun, Gabon, Malagasy Republic, Mauritania, Senegal, and Togo; technical military assistance agreements with Cameroun, the Central African Republic, Chad, Congo (Brazzaville), Dahomey, Gabon, Ivory Coast, Malagasy Republic, Mauritania, Niger, Senegal, Togo, and Upper Volta; and mutual facilities agreements with Dahomey, Gabon, Ivory Coast, Mauritania, and Niger.

Portugal directly assures the defense of Angola, Mozambique, and Portuguese Guinea, and Spain of Spanish Sahara, Ceuta, and Melilla. All of these are administratively regarded as overseas provinces, except Ceuta and Melilla, which are treated as integral parts of Spain.

With a few important exceptions, only countries with

armed forces over 5,000 strong are included. Though in some African states they have a considerable internal security role, civil police forces have not been included. Details of civil police forces of African States and of the armed forces of countries not included here may be found in The International Institute for Strategic Studies' Adelphi Paper No. 67—*The Armed Forces of African States, 1970*. The amount of military equipment shown may not necessarily be that which can be used. In some of the developing nations, maintenance facilities and skills may pose problems, and spare parts may not be readily available.

### CONGO (Kinshasa) (Democratic Republic of the Congo)

Population: 21,300,000.

Voluntary military service.

Total armed forces: 46,000.

Estimated GNP 1970: \$1,900,000,000.

Estimated defense expenditure 1970: 42,000,000 zaires or \$84,000,000 (one zaire = \$2).

**Army:** 45,000.

Fourteen infantry battalions; seven parachute battalions; one heavy weapons battalion; four other battalions. The above, together with support units, form seven brigade groups and one parachute division. About eighty AML armored cars: M-3 and Ferret scout cars (less than half operational).

**Navy:** 150.

Seven river gunboats; one patrol boat.

**Air Force:** 850; thirty-two combat aircraft.

Seventeen MB-326GB, eight T-6G, and five T-28D armed trainers; ten C-47, four C-54, and three C-130 transports; eight SF-260M trainers; one *Alouette II*, four *Alouette III*, and seven SA-330 *Puma* helicopters.

**Paramilitary forces:**

Six National Guard and seven Gendarmerie battalions.

### ETHIOPIA

Population: 25,800,000.

Voluntary military service.

Total armed forces: 42,750.



The Congo (Kinshasa) Air Force has several of these SA-330 Puma helicopters. Built by Westland and Aero-spatale, Puma is used by both France and the UK.

Estimated GNP 1970: \$US 1,750,000,000.  
 Defense budget 1970-71: \$E 89,100,000 or \$US 35,640,000  
 (\$E 2.50 = \$US 1).  
**Army:** 39,000.

Four infantry divisions: 8,000 men in each (including Imperial Guard); one tank battalion; one airborne infantry battalion; one armored car squadron; four artillery battalions; five air defense batteries; two engineer battalions; fifty-five M-41 medium tanks; fifteen M-24 light tanks; about fifty armored personnel carriers.  
**Navy:** 1,500.

One training ship (ex-seaplane tender); five patrol boats; two motor torpedo boats; four gunboats (less than 100 tons); four landing craft (less than 100 tons).  
**Air Force:** 2,250; forty-eight combat aircraft.

One bomber squadron with four Canberra B-2s; one fighter-bomber squadron with eleven F-86Fs; one ground-attack squadron with thirteen T-28s; one ground-attack squadron with eight SAAB-17s; one fighter squadron with ten F-5As; one reconnaissance squadron with two T-33s; one transport squadron with four C-47s, two C-54s, four C-119Gs, three Doves, and one IL-14; three training squadrons with twenty Safirs, fifteen T-28As, and eleven T-33s; four Alouette II and two MI-8 helicopters.

**Paramilitary forces:**

13,750. 6,000 Territorial Army—active strength; 6,800 mobile emergency police force; 1,500 frontier guards.

## GHANA

Population: 9,050,000.  
 Voluntary military service.  
 Total armed forces: 18,600.  
 Estimated GNP 1970: \$2,570,000,000.  
 Defense budget 1970-71: 45,300,000 cedi or \$44,400,000  
 (1.02 cedi = \$1).  
**Army:** 16,500.

Two brigades comprising seven infantry battalions and support units; two reconnaissance squadrons; *Saladin* armored cars; *Ferret* scout cars; heavy mortars.  
**Navy:** 1,000.

Two corvettes; one coastal minesweeper; two inshore minesweepers; two seaward defense vessels; three P-class patrol boats (less than 100 tons). (There is a substantial shortage of spares for all naval craft.)  
**Air Force:** 1,100; no combat aircraft.

One transport squadron with seven Otters; one transport squadron with eight Caribous and three Herons; one communications and liaison squadron with eleven Beavers; three Whirlwind, two Wessex, and three Hughes 269 helicopters; six MB-326 and nine Chipmunk trainers.

**Paramilitary forces:**

A workers brigade.

## GUINEA

Population: 4,075,000.  
 Military service: two years.  
 Total armed forces: 5,350.  
 Estimated GNP 1970: \$700,000,000.  
 Defense budget 1966-67: 2,338,000,000 Guinea francs or \$9,470,000 (278 Guinea francs = \$1).  
**Army:** 5,000.

Five infantry battalions; one armored battalion; three engineer companies; T-34 tanks; BTR-152 armored personnel carriers; 105-mm and 85-mm guns.

**Deployment:** about 200 in Sierra Leone.

**Navy:** (Coast Guard) 150.

Six ex-Soviet patrol boats (less than 100 tons).

**Air Force:** 200; five combat aircraft.

Five MIG-17 fighters; two IL-18 and four IL-14 transports; YAK-18 and MIG-15 trainers.

**Paramilitary forces:**

7,500. 900 Gendarmerie; 1,600 Republican Guard; 5,000 militia.

## IVORY COAST

Population: 4,375,000.  
 Military service: two years.  
 Total armed forces: 4,400.  
 Estimated GNP 1970: \$1,440,000,000.  
 Estimated defense expenditure 1970: 6,350,000,000 CFA francs or \$22,800,000 (278 CFA francs = \$1).  
**Army:** 4,000.

Three infantry battalions; one armored squadron; one parachute company; two artillery batteries; one engineer company; about five AMX-13 light tanks; some armored cars, scout cars, 105-mm guns, mortars, 40-mm AA guns.  
**Navy:** 100.

Three patrol vessels (one less than 100 tons); two landing craft (less than 100 tons).

**Air Force:** 300; no combat aircraft.



The Ghanaian Air Force is equipped mainly with transport aircraft such as this Canadian-built DHC-4 Caribou, designated by the US Air Force as the C-7.



*Small numbers of the venerable, but still effective, English Electric Canberra bombers are to be found in the operational forces of several African nations.*

Three C-47 medium, and one Mystère 29, one Commander 500, and five MH-1521 Broussard light transports; five Alouette helicopters and six light aircraft.

**Paramilitary forces:**

2,000 Gendarmerie.

**KENYA**

Population: 11,525,000.

Voluntary military service.

Total armed forces: 7,170.

Estimated GNP 1970: \$1,580,000,000.

Estimated defense expenditure 1970: 175,000,000 shillings or \$24,500,000 (7.143 shillings = \$1).

**Army:** 6,300.

Four infantry battalions; one support battalion with a parachute company; *Saladin* armored cars; *Ferret* scout cars; 81-mm and 120-mm mortars; 120-mm recoilless rifles.

**Navy:** 250.

One seaward defense boat; three patrol boats.

**Air Force:** 620; six combat aircraft.

Six BAC-167 ground-support aircraft; one transport squadron with four *Caribous*; one light transport squadron with seven *Beavers*; one training squadron with five *Chipmunks* and three *Beavers*; three *Alouette II* and two H-269 helicopters; five *Bulldog* armed trainers are due to be delivered by mid-1972.

**Paramilitary forces:**

1,800 in general service units (including Presidential escort).

**MALAGASY REPUBLIC**

Population: 7,200,000.

Military service: eighteen months.

Total armed forces: 4,100.

Estimated GNP 1970: \$820,000,000.

Defense budget 1969: 3,450,000,000 MG francs or \$13,450,000 (278 MG francs = \$1).

**Army:** 3,700.

Two infantry regiments; one parachute company; one armored squadron; one artillery battery; one engineer regiment.

**Navy:** 200.

One patrol vessel; one training ship; one tender; one marine company.

**Air Force:** 200; no combat aircraft.

Five C-47 medium and three MH-1521 light transports; two MD-315 *Flamant* light aircraft.

**Paramilitary forces:**

4,100 Gendarmerie.

**NIGERIA**

Population: 62,000,000.

Voluntary military service.

Total armed forces: 252,000.

Estimated GNP 1970: \$9,100,000,000.

Defense budget 1971-72: 87,000,000 Nigerian pounds or \$243,600,000 (one Nigerian pound = \$2.80).

**Army:** 240,000.

Three infantry divisions; three reconnaissance regiments; three artillery regiments; *Saladin* and twenty AML-60/90 armored cars; *Ferret* scout cars; *Saracen* armored personnel carriers; twenty-five-pounder, 76-mm, 105-mm, and 122-mm guns.

**Navy:** 5,000.

One frigate (refitting); three ex-Soviet fast patrol boats (less than 100 tons); six seaward defense boats; one landing craft; two corvettes are due to be delivered by mid-1972.

**Air Force:** 7,000; thirty-two combat aircraft.

Six IL-28 medium bombers; eight MIG-17 fighter-bombers; eight L-29 *Delfin* and ten P-149D armed trainers. Other aircraft include six C-47 transports; twenty DO-27/28 communication/liaison aircraft; eight *Whirlwind* and *Alouette II* helicopters.

**RHODESIA**

Population: 5,425,000 (250,000 white population).

Military service: twelve months (white population).

Total armed forces: 4,600.

Estimated GNP 1970: \$1,440,000,000.

Estimated defense expenditure 1970-71: \$R 17,879,000 or \$US 25,031,000 (\$R 1 = \$US 1.40).

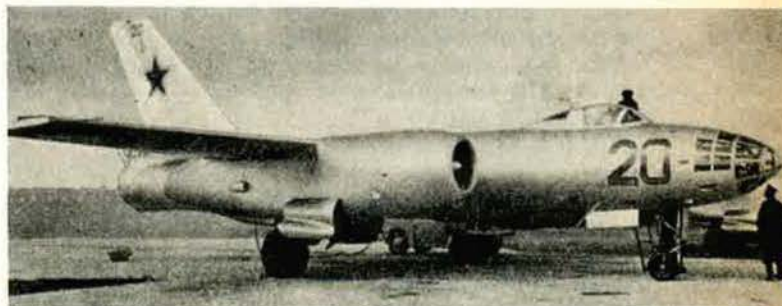
**Army:** 3,400.

Two infantry battalions (one has *Ferret* scout cars); one Special Air Service squadron; one artillery battery.

There is an establishment for three brigades, two based on regular infantry battalions, which would be brought up to strength by calling out the Territorial battalions referred to below.

**Air Force:** 1,200; fifty-five combat aircraft.

One light bomber squadron with eleven *Canberras*; one fighter/ground-attack squadron with twelve *Hunters*; one fighter/ground-attack squadron with twelve *Vampires*; one reconnaissance squadron with thirteen T-52 *Provosts*; one armed trainer squadron with seven AL-60s; one transport squadron



*The Nigerian Air Force operates six IL-28 Soviet-built bombers. First seen in 1950, the IL-28 was for many years the standard twin-jet bomber of the Soviet Air Force.*

*A South African Air Force Hawker Siddeley Buccaneer on a low-level run. It is a low-altitude, high-speed, strike aircraft.*



*The air forces of Rhodesia and South Africa fly a few of these De Havilland Vampires, a now obsolete jet fighter.*



including C-47s; one helicopter squadron with eight Alouette IIIs.

**Reserves:** 8,000. The white population completing military service is assigned for three years part-time training to Territorial units, which include active Territorial battalions based on the cities and reserve Territorial battalions based on country districts. The establishment of the Army Reserves is eight infantry battalions and one field artillery battery. The majority of ground personnel servicing regular Air Force units are Air Force reservists or nonwhite civilians employed by the Air Force.

**Paramilitary forces:**

6,400 active; 28,500 reservists. The British South African Police (BSAP) have some military equipment such as small arms and would be responsible for much of the internal security of Rhodesia in the event of civil disturbances or a military threat from outside. The white population forms only about a third of the active strength, but nearly three-quarters of the Police reserves.

## SENEGAL

Population: 3,950,000.

Military service: two years.

Total armed forces: 5,900.

Estimated GNP 1970: \$72,000,000.

Defense budget 1969-70: 4,461,000,000 CFA francs or \$18,060,000 (278 CFA francs = \$1).

**Army:** 5,500.

Three infantry battalions; two parachute companies; two commando companies; one reconnaissance squadron; one engineer battalion; support units include transport and signal company; Greyhound and AML-245 armored cars.

**Navy:** 200.

One coastal escort; two submarine chasers; one patrol boat (less than 100 tons).

**Air Force:** 200; no combat aircraft.

Four C-47 medium and four MH-1521 light transports; two Bell-47G helicopters.

**Paramilitary forces:**

1,600 Gendarmerie.

## SOMALI DEMOCRATIC REPUBLIC

Population: 2,900,000.

Voluntary military service.

Total armed forces: 15,000.

Estimated GNP 1970: \$180,000,000.

Defense budget 1969: 64,320,000 Somali shillings or \$9,005,000 (7.143 Somali shillings = \$1).

**Army:** 13,000.

Four tank battalions; nine mechanized infantry battalions; one commando battalion; about 150 T-34 medium tanks (only about one quarter are serviceable); five Ferret scout cars; over 200 BTR-40, -50, and -152 armored personnel carriers; 100-mm guns.

**Navy:** 250.

Six patrol boats (less than 100 tons).

**Air Force:** 1,750; twenty combat aircraft.

Twenty MIG-15/MIG-17 fighters; two MIG-15/MIG-17 UTI and three P-18 trainers; transports include one C-45 and three C-47s; three AN-2s and one AN-24.

**Paramilitary forces:**

500 border guards.

## SOUTH AFRICA

Population: 20,550,000 (3,900,000 white population).

Military service: nine to twelve months in Citizen Force.

Total armed forces: 44,250.

Estimated GNP 1970: \$17,600,000,000.

Defense budget 1971-72: 316,000,000 rands or \$442,400,000 (one rand = \$1.40).

**Army:** 32,000 (10,000 regular; 22,000 Citizen Force).

100 Centurion Mark Vs, 100 Sherman, and forty Comet medium tanks; 500 AML-60 and AML-90, and fifty M-3 armored cars; 200 Ferret scout cars; Saracen armored personnel carriers.

**Reserves:** 23,000 trained reserves in Citizen Force.

**Navy:** 4,250 (3,000 regular; 1,250 Citizen Force).

One submarine (two more due for delivery by mid-1972); two destroyers with Wasp ASW helicopters (reports suggest that both destroyers and one frigate are temporarily in reserve); six ASW frigates; one escort minesweeper; ten coastal minesweepers; five seaward defense boats; one fleet replenishment tanker.

**Reserves:** 4,750 trained reserves in Citizen Force.

**Air Force:** 8,000 (5,000 regular; 3,000 Citizen Force); 163 combat aircraft.

One bomber squadron with sixteen Canberra B-12s; one light bomber squadron with fifteen Buccaneer Mark 50s; one fighter-bomber squadron with twenty Mirage IIIEZs (with AS-20 and AS-30 ASM). (Mirage aircraft are to be built in South Africa under license); one interceptor squadron with sixteen Mirage IIICZ (with R-530 air-to-air missiles). Other aircraft include four Mirage IIIRZs, thirty F-86s, five Vampire FB-5s, and at least fifty MB-326 Impalas; one maritime recce squadron with seven Shackletons; nine Transall, thirty C-47, four C-54, seven C-130B/E, and one Viscount medium and nine P-166 light transports; 106





*The South African Air Force has some forty Mirage IIIs in various configurations for use as fighter-bombers and in an interceptor role.*

Alouette II/III, eight Wasp, and sixteen Super Frelon helicopters (deliveries of twenty SA-330 Pumas have begun); a Cactus air defense missile system is being installed, but the Crotale SAMs have not yet been delivered.

**Reserves:** The Citizen Air Force operates eight squadrons with fifty Impalas, about 120 Harvard armed trainers, and C-47 transports.

**Paramilitary forces:**

78,000. 75,000 Kommandos organized and trained on the same lines as the Citizen Force. 3,000 police with antiterrorist training whose equipment includes eighty Saracen armored personnel carriers on loan from the army.

**TANZANIA**

Population: 13,600,000.

Voluntary military service.

Total armed forces: 11,100.

Estimated GNP 1970: \$1,100,000,000.

Defense budget 1968-69: 190,300,000 shillings or \$26,640,000 (7.143 shillings = \$1).

**Army:** 10,000.

Four infantry battalions; fourteen Chinese T-62 light tanks; some BTR-40 and -152 armored personnel carriers; Soviet field artillery and Chinese mortars.

**Navy:** 600.

Five fast patrol boats; eight patrol boats (less than 100 tons).

**Air Force:** 500; no combat aircraft.

One AN-2, six Beaver, and four Caribou transports; seven P-149 trainers.

**Paramilitary forces:**

A police marine unit.

**UGANDA**

Population: 10,025,000.

Voluntary military service.

Total armed forces: 9,000.

Estimated GNP 1970: \$1,060,000,000.

Defense budget 1968-69: 120,540,000 shillings or \$16,875,000 (7.143 shillings = \$1).

**Army:** 8,550.

Two brigades each of two infantry battalions with supporting services; two border guard battalions; one mechanized battalion; one parachute/commando battalion; one artillery regiment; five M-4 medium tanks; sixteen Ferret scout cars; twenty BTR-40 and BTR-152, and twelve OT-64B armored personnel carriers (perhaps half are operational).

**Air Force:** 450; nineteen combat aircraft.

One fighter squadron with seven MIG-15s and MIG-17s; twelve Magister armed trainers; one transport squadron with six C-47s and one Caribou; two AB-206 and two Scout helicopters; four Piaggio P-149 and twelve L-29 Delfin trainers, and seven Piper light aircraft.

**ZAMBIA**

Population: 4,250,000.

Voluntary military service.

Total armed forces: 5,500.

Estimated GNP 1970: \$1,580,000,000.

Defense budget 1966: 12,600,000 kwachas or \$17,640,000 (one kwacha = \$1.40).

**Army:** 4,500.

One brigade of three infantry battalions and one recce squadron; one artillery battery; one engineer squadron; a signals squadron and supporting services; Ferret scout cars; 105-mm guns.

**Air Force:** 1,000; 12 combat aircraft.

Four Jastreb light attack aircraft; eight SF-260MZ armed trainers; one transport squadron with two C-47s and four Caribous; one communications/liasion squadron with six Beavers and two Pembrokes; four AB-205 helicopters; two Galeb and six Chipmunk trainers; twelve MB-326 ground-attack aircraft are on order.

**Paramilitary forces:**

Two police mobile battalions.



*A few MIG-15s of Korean vintage are still in use by African air forces that fly Soviet-built aircraft. MIG-17s also are flown by the same air forces.*



## Chapter VII

# China

China's dominant strategic concept is People's War, in which most of the population is allotted a military role. This entails a peacetime program of rudimentary military training for civilians. The People's Liberation Army (PLA) is heavily involved in the political and military administration of the country.

China's large manpower pool allows great selectivity in manning the 2,900,000-strong regular forces. The vast bulk of the manpower lies in the land forces, specifically in the infantry and artillery. Out of a total of 140 divisions, only five are armored. The Navy and Air Force account for little more than ten percent of the personnel, compared with about thirty percent in the Soviet Union.

The PLA is not equipped on the scale of major industrial countries, including the Soviet Union, and its mobility is limited. However, China's military production is improving steadily in quantity and quality. She now produces the TU-16 medium bomber, the MIG-21, the T-59 medium tank, the (Chinese) T-62 light tank, and armored personnel carriers, which improve the mobility of the PLA; also a new Chinese twin-engined fighter is being developed. In the Navy, the buildup of fast guided-missile patrol boats is continuing, along with its own version of the R-class medium-range, diesel-powered submarine. At least one nuclear-powered submarine appears to be under construction; it is probably an attack vessel.

The PLA is organized in eleven Military Regions, and to some extent its equipment and logistics support reflect this regional character. Its deployment is uneven, with major concentrations along the littoral, the Canton-Wuhan railway, and in the northeast. During 1969-70, there were some shifts of forces from the south of China to the northern half of the country, but little movement has been reported since. In July 1971, there were thought to be 15,000-20,000 railway engineers, construction engineers, and protecting troops in North Vietnam and Laos.

China has a thirty-year Treaty of Alliance and Friendship with the Soviet Union, signed in 1950, with mutual defense obligations, the validity of which must be in doubt. China has a mutual defense agreement with North Korea dating from 1961, and it is probable that she has well-defined defense commitments toward North Vietnam. China has in the past year continued to provide military assistance to Pakistan and Tanzania, and to Albania, with whom she has been cooperating on defense matters.

### **Nuclear weapons program**

China conducted only one nuclear test in the past year, the eleventh since 1964. As with at least three of the previous tests, the 1970 explosion involved a fusion (thermo-

nuclear) device with a yield of some three megatons. China has significant resources of natural uranium and its own plant for uranium enrichment. It may now have sufficient fissionable material for a total of about 120 fission and fusion weapons, although the availability of deuterium and/or tritium may constrain production of fusion weapons.

For air delivery of nuclear weapons China had until recently only a few old TU-4 bombers. At least thirty TU-16s, a medium bomber with an operational range of about 1,500 miles, have now been produced, and estimated production capacity is some five a month.

China, which has been testing MRBMs since the mid-1960s, has apparently deployed, mainly in northwestern and northeastern China, about twenty operational missiles with a range of up to 1,000 miles (the 230-kilogram second earth satellite was launched, in March 1971, by a booster of IRBM capability). During 1970-71, a new missile-testing site was also brought into use in Manchuria, allowing ballistic flights of up to 2,000 miles into the Sinkiang desert. One test from this site in late 1970 may have been connected with the development of an IRBM, or components for an ICBM. Full-range testing of an ICBM would require the use of impact areas and tracking facilities in the Indian or Pacific Oceans.

There is no clear evidence to show what "mix" of missile forces China is seeking to develop. The design of any Chinese ICBM would have to take into account the fact that the urban areas on the northwestern coast of the United States are some 6,000 miles from Chinese territory.

The responsibility for operational Chinese missile forces is believed to have been assigned to the "Second Artillery Command." It is not clear whether this Command is autonomous (as are the Soviet Strategic Rocket Forces) or is subordinate to the Army.

### **General**

Population: 760,000,000. (No official population figures have been published since January 1, 1958, when the total was 646,530,000. The figure quoted here is based on the latest estimate published by the United Nations. Other estimates range from 720,000,000 to 850,000,000.)

Selective military service: Army, two years; Air Force, three years; Navy, four years.

Total regular forces: 2,880,000 (including railway engineer troops).

Estimated GNP 1970: \$80,000,000,000 to \$90,000,000,000. (The Chinese Prime Minister has mentioned, as the gross value of industrial, transport, and agricultural production, a figure of \$120,000,000,000. This suggests that the GNP is higher than a recent Japanese estimate of \$75,000,000,000.)



*Until recently, China had only old TU-4s for air delivery of nuclear weapons, but at least thirty of these TU-16 Badgers have now been produced.*



*Its military production capability improving, China is building the MIG-21 Fishbed. The Chinese also have substantial numbers of MIG-15s, -17s, and -19s.*

Estimated defense expenditure 1970: \$7,600,000,000 to \$8,055,000,000. (This is based on an American estimate that China is spending about 9½ percent of her GNP on defense, since the Chinese government has not made public any budget figures since 1960.) (2.46 yuan = \$1.)

**Army:** 2,550,000 (including railway engineer troops).

Five armored divisions; 110 infantry divisions; three cavalry divisions; two airborne divisions; about twenty artillery divisions. These are supported by signals, engineer, railway engineer, and motor transport units.

Heavy equipment consists of Soviet items supplied up to 1960, including JS-2 tanks and 152-mm and 203-mm artillery. Soviet T-34 and T-54, and Chinese T-59 (version of T-54) medium tanks; Chinese T-62 light tanks, and armored personnel carriers; self-propelled artillery includes SU-76s, SU-100s, and JSU-122s.

Heavy field-engineering equipment, heavy self-propelled artillery and motor transport are in short supply. The army is, however, adequately equipped with infantry weapons, mortars, rocket launchers, recoilless rifles, and light and medium artillery, all produced in China.

**Deployment:** China is now divided into eleven Military Regions (MR), as Inner Mongolia has been incorporated in the Peking MR, and Tibet in the Chengtu MR. The military commander of each Region commands the regular air and naval forces assigned to it, and the civilian militia. The MRs are in turn divided into Military Districts (MD), with usually two or three Districts to a Region.

It is believed that basically one Army is assigned to each MD, giving a total of about thirty Armies. An Army generally consists of three infantry divisions, three artillery regiments, and, in some cases, three armored regiments. Of the five armored divisions in the PLA, two or three are probably kept in the Peking and Shenyang Regions. The geographical distribution of the divisions (excluding artillery) is believed to be:

**North and northeast China** (Shenyang and Peking MR): thirty-three divisions. (There are, in addition, two or three divisions of border troops in each of these MRs.)

**East and southeast China** (Tsinan, Nanking, and Foochow MR): twenty-five divisions.

**South-central China** (Canton [includes Hainan Island] and Wuhan MR): thirty-one divisions.

**Midwest China** (Lanchow MR): eleven divisions.

**West and southwest China** (Sinkiang, Chengtu [these two MRs also have several divisions of border troops each], and Kunming MR): twenty divisions.

**North Vietnam and Laos:** one railway engineer division

and some construction engineer troops, in all 15,000–20,000 men.

**Navy:** 150,000 (including Naval Air Force and 28,000 marines).

One submarine, G-class, with ballistic missile tubes (China is not known to have any missiles for this boat); thirty-two fleet submarines (also about ten older training vessels); three coastal submarines; four destroyers; four destroyer escorts; eleven patrol escorts; twenty-four submarine chasers; fifteen missile patrol boats; thirty minesweepers; forty-five auxiliary minesweepers; 220 MTB and hydrofoils (less than 100 tons); 320 motor gunboats; and 530 landing ships/landing craft (many less than 100 tons).

**Deployment:**

**North Sea Fleet:** 240 vessels. The main bases are at Tsingtao and Lushun. It is deployed along the coast from the mouth of the Yalu River in the north to Lienyunkang in the south.

**East Sea Fleet:** 700 vessels. Bases are at Shanghai and Chou Shan. It is deployed along the coast from Lienyunkang in the north to Chaoan Wan in the south.

**South Sea Fleet:** 300 vessels. Bases are at Huangpu and Chanchiang. It is deployed from Chaoan Wan in the north to the North Vietnamese frontier in the south.

**Naval Air Force:** 16,000; about 450 shore-based combat aircraft, including up to 100 IL-28 torpedo-carrying light bombers and substantial numbers of MIG-15 and MIG-17 fighters. Though under Navy command, the fighters are fully integrated into the air defense system.

**Air Force:** 180,000 (including 85,000 air-defense personnel); about 2,800 combat aircraft.

About thirty TU-16 and a few TU-4 medium bombers; 150 IL-28 light bombers; about 1,700 MIG-15s and MIG-17s; up to 800 MIG-19 and a growing number of MIG-21 fighters; some AN-2, IL-14, and IL-18 transports; and MI-4 helicopters (these could be supplemented by about 350 aircraft of the Civil Air Bureau). There is an air-defense system, initially developed to defend the eastern seaboard of China and now greatly expanded, based on early warning/control radar, interceptor aircraft, and some SA-2 SAMs.

**Paramilitary forces:**

About 300,000 security and border troops, including nineteen infantry-type divisions and thirty independent regiments stationed in the frontier areas; the public security force and a civilian militia with an effective element of probably not more than 5,000,000; production and construction corps in a number of MRs, including those adjoining the northern frontier.



## Chapter VIII

# Other Asian Countries and Australasia

### Multilateral Agreements

In 1954, the United States, Australia, Britain, France, New Zealand, Pakistan, the Philippines, and Thailand signed the Southeast Asia Collective Defense Treaty, which came into force in 1955 and brought into being SEATO. They committed themselves to consult with a view to joint defense in the event of direct or indirect aggression against a member country or against the so-called "protocol states" of Cambodia, Laos, and South Vietnam. However, since 1955 and 1956 respectively, Cambodia and Laos have not accepted the protection of SEATO.

The treaty area is the general area of Southeast Asia and the Southwest Pacific, below latitude twenty-one degrees thirty minutes north.

SEATO has no central command structure and forces remain under national control.

In 1969, Britain ceased to declare ground forces to the contingency plans for the Organization, and France has no forces declared. Pakistan has announced her progressive disengagement from the Alliance. All remain members.

The United States, Australia, New Zealand, and Thailand have troops serving in South Vietnam. This intervention was not the result of a decision by the SEATO Council, but these countries have, for the most part, justified this action in terms of their SEATO obligations.

Australia, New Zealand, and the United States are the members of a tripartite treaty known as ANZUS, which was signed in 1951 and is of indefinite duration. Under this treaty each agrees to "act to meet the common danger" in the event of armed attack on either metropolitan or island territory of any one of them, or on armed forces, public vessels, or aircraft in the Pacific.

Australia, Malaysia, New Zealand, Singapore, and Britain have agreed to Five-Power defense arrangements relating to the external defense of Malaysia and Singapore, which became effective on November 1, 1971. Britain, Australia, and New Zealand maintain forces in Malaysia and Singapore, with the land and naval components based in Singapore and Australia's air contribution mainly at Butterworth in the Malay Peninsula. Until November 1, 1971, the British commitment was governed by the Anglo-Malaysian Defense Agreement but this was replaced after that date by new Five-Power political arrangements. These arrangements envisage that in the event of any armed attack or threat of attack externally organized or supported against Malaysia or Singapore, the five governments would consult together for

the purpose of deciding what measures should be taken, jointly or separately.

### Bilateral Agreements

The United States has bilateral defense treaties with Japan (either party may terminate the treaty by giving one year's notice to the other), the Republic of China (Taiwan), the Republic of Korea, and the Philippines. It has a number of military arrangements with other countries of the region. It provides significant military aid on either a grant or credit basis to the Republic of China, Cambodia, India, Indonesia, the Republic of Korea, Laos, Malaysia, Pakistan, Singapore, Thailand, and South Vietnam. It sells military equipment to many countries, notably Australia, the Republic of China, and Japan. For grant military assistance purposes, Cambodia, the Republic of Korea, and the Republic of China are considered forward defense areas. Laos, Cambodia, Thailand, and South Vietnam receive grant military assistance direct from the US Department of Defense budget, the only countries in the world to do so. There are military facilities agreements with Australia, Japan, the Republic of Korea, and the Philippines. Major bases maintained in the region include Okinawa and Guam.

The Soviet Union has treaties of friendship, cooperation, and mutual assistance with Mongolia and the Democratic People's Republic of Korea. The validity of a similar treaty with the People's Republic of China must be in doubt. Military assistance agreements with Ceylon and the People's Democratic Republic of Vietnam reportedly exist. Important Soviet military aid is also given to Afghanistan and India and, on a small scale, to Pakistan. On August 9, 1971, the Soviet Union and India signed a twenty-year Treaty of Peace, Friendship, and Cooperation in which each undertook to come to the assistance of the other in the event of a conflict with a third country.

China has nonaggression treaties with Burma, Afghanistan, and Cambodia, a treaty of friendship, cooperation, and mutual assistance with North Korea; and a treaty of friendship with North Vietnam, which is thought to contain defense arrangements.

### AFGHANISTAN

Population: 17,600,000.  
Military service: two years.  
Total armed forces: 83,000.

Estimated GNP 1970: \$1,400,000,000.

Estimated defense expenditure 1970: 1,400,000,000 afghanis or \$31,100,000 (forty-five afghanis = \$1).

**Army:** 80,000.

One armored division; two infantry divisions; one infantry brigade (Royal Bodyguard); ten independent motorized battalions; ten independent infantry battalions; T-34 and T-54 medium tanks and *Snapper* antitank guided weapons.

**Air Force:** 3,000; 100 combat aircraft.

Three light bomber squadrons with IL-28s; two interceptor squadrons with thirty MIG-21s; one interceptor squadron with twelve MIG-19s; four fighter-bomber squadrons with MIG-15/17s; one IL-18, twenty-five IL-14, ten AN-2, two *Twin Otter*, and five *Anson* transports; MI-1 and MI-4 helicopters.

**Paramilitary forces:**

13,000 Gendarmerie.

## AUSTRALIA

Population: 12,775,000.

Two years' selective military service.

Total armed forces: 88,280.

Estimated GNP 1970: \$US 34,400,000,000.

Defense budget 1970-71: \$A 1,149,000,000 or \$US 1,261,120,000 (\$A 1 = \$US 1.12).

**Army:** 47,760.

One tank regiment; one cavalry regiment; nine infantry battalions; two battalions of the Pacific Islands Regiment (PIR); one Special Air Service (SAS) regiment; four field artillery regiments; one light anti-aircraft regiment; one aviation regiment; five signals regiments; one logistic support force; 140 *Centurion* medium tanks; 265 *Ferret* scout cars; 675 M-113 armored personnel carriers; 235 105-mm howitzers; about fifty *Sioux* and *Alouette III* helicopters; twenty-five light aircraft.

**Deployment:** A task force of 7,000 in South Vietnam (including two infantry battalions and supporting services), although announced withdrawals will reduce this figure to 6,000 by the end of 1971; one battalion group and one



*An RAAF MK-20 Canberra bomber seen through the bombardier's compartment of another Canberra as they return from a mission in Vietnam. Australia, like the US, is phasing down its 7,000-man task force assigned to combat duty in Southeast Asia.*



*The Royal Australian Navy operates forty-seven vessels, including one aircraft carrier. Shown here is the Australian-built frigate HMAS Derwent.*

signal regiment in Singapore; two PIR battalions in Papua and New Guinea.

**Reserves:** The Citizen Military Force of 36,000 is intended to form twenty-four infantry battalions with supporting arms and services.

**Navy:** 17,820.

Four submarines; one aircraft carrier (ASW); three guided missile destroyers with *Tartar* SAMs; five destroyers; six destroyer escorts; two minehunters; four coastal minesweepers; twenty patrol boats; one fast troop transport; one destroyer tender; carrier-borne aircraft include: one fighter-bomber squadron with A-4G *Skyhawks*, one ASW squadron with S-2E *Trackers*, and one helicopter squadron with *Wessex*.

**Reserves:** Navy Citizen Military Force; 4,330.

**Air Force:** 22,700; 210 combat aircraft.

One bomber squadron with *Canberra* B-20s; two fighter squadrons with F-4Es; four interceptor/strike squadrons with *Mirage III*Os; one maritime reconnaissance squadron with ten P-3B *Orions* and one maritime reconnaissance squadron of twelve P-2H *Neptunes*; sixty-four MB-326 trainers; twenty-four C-130, ten HS-748, twenty-four *Caribou*, and twenty-two C-47 transports; two helicopter squadrons with *Iroquois*.

**Deployment:** two *Mirage* squadrons in Malaysia/Singapore; one helicopter squadron in Vietnam.

**Reserves:** 950 Citizen Air Force.

## BURMA

Population: 28,175,000.

Military service: two years.

Total armed forces: 143,500.

Estimated GNP 1970: \$3,200,000,000.

Defense budget 1970-71: 480,000,000 kyat or \$100,600,000 (4.77 kyat = \$1).

**Army:** 130,000.

Five regional commands; three infantry divisions. The army is largely an infantry force, with some artillery, engineer, and signals regiments. It is organized chiefly for counterinsurgency and internal security duties. *Comet* medium tanks; *Humber* armored cars; *Ferret* scout cars; mainly American, British, and Yugoslav light arms.

**Navy:** 7,000.

One frigate; one escort minesweeper; two coastal escorts; five motor torpedo boats (less than 100 tons); thirty-four river and patrol gunboats; seven motor gunboats (less than 100 tons); forty landing craft (less than 100 tons).

**Air Force:** 6,500; eighteen combat aircraft.

Twelve AT-33 and six *Vampire* armed trainers; four C-45,

twelve C-47, eight Otter, and two Bristol 170 transports; six Sioux, ten Huskie, eight Alouette III, and ten Shawnee helicopters.

**Paramilitary forces:**

25,000.

## CAMBODIA

Population: 7,000,000.

Voluntary military service (conscription is authorized but not yet in force).

Total armed forces: 179,000.

Estimated GNP 1970: \$910,000,000.

Defense budget 1971: 18,650,000,000 riels or \$336,000,000 (55.5 riels = \$1).

**Army:** 175,000.

200 infantry and commando battalions; one tank regiment; one armored car battalion; three parachute battalions; M-24 and AMX-13 light tanks; M-8 and M-20 armored cars; M-3 scout cars; BTR-152 armored personnel carriers; 105-mm howitzers and Soviet 76-mm and 122-mm guns; 40-mm, 57-mm, 85-mm, and 100-mm AA guns.

**Navy:** 1,600 (including 150 marines).

Two patrol vessels; two support gunboats; two motor torpedo boats (less than 100 tons); six patrol boats (less than 100 tons); four landing craft.

**Air Force:** 2,400; seven combat aircraft.

Seven T-28 Trojan ground-attack aircraft; five C-47, five AN-2, and one IL-14 transports; three MIG-15 UTI, eleven Horizon, and four YAK-18 trainers; four Alouette II, one MI-4, and two H-34 helicopters.

**Paramilitary forces:**

150,000.

## REPUBLIC OF CHINA (TAIWAN)

Population: 14,575,000.

Military service: Army two years; Navy and Air Force three years.

Total armed forces: 540,000.

Estimated GNP 1970: \$5,500,000,000.

Estimated defense expenditure 1971: 24,500,000,000 new Taiwan dollars or \$601,250,000 (40.7 new Taiwan dollars = \$1).

**Army:** 390,000.

Two armored divisions; fourteen infantry divisions; six light divisions; three armored cavalry regiments; one SAM battalion with Hawks; one SAM battalion and one SAM battery with Nike-Hercules; two airborne brigades; four Special Forces groups; M-47 and M-48 medium tanks; M-24 and M-41 light tanks; M-18 tank destroyers.

**Deployment:** 60,000 on Quemoy; 20,000 on Matsu.

**Navy:** 35,000.

Ten destroyers; six destroyer escorts; twelve frigates; twelve submarine chasers; twelve patrol vessels; three fleet minesweepers; fifteen coastal minesweepers; two inshore minesweepers; twenty-one landing ships; nine medium landing ships; thirty landing craft.

**Marine Corps:** 35,000.

Two divisions.

**Air Force:** 80,000; 385 combat aircraft.

Eighty F-100A/D fighter-bombers; seventy F-5A tactical fighters; forty-five F-104G interceptors; 150 F-86F interceptors; eight RF-104G and four RF-101 recon aircraft; about ninety-five C-46, C-47, and C-119 transports; ten UH-19 helicopters.

## INDIA

Population: 557,000,000.

Voluntary military service.

Total armed forces: 980,000.

Estimated GNP 1970: \$49,000,000,000.

Defense budget 1971-72: 12,420,000,000 rupees or \$1,656,000,000 (7.5 rupees = \$1).

**Army:** 860,000.

One armored division; two independent armored brigades; thirteen infantry divisions; ten mountain divisions; six independent infantry brigades; two parachute brigades; about twenty AA artillery units; 200 Centurion Mk 5/7, 250 Sherman, 450 T-54 and T-55, and 300 Vijayanta medium tanks; 150 PT-76 and 100 AMX-13 light tanks; OT-62 and Mk 2/4A armored personnel carriers; about 3,000 artillery pieces, mostly twenty-five-pounders, but including about 350 100-mm and 140 130-mm guns; and SS-11 and Entac antitank guided weapons.

**Navy:** 40,000.

One 16,000-ton aircraft carrier; four submarines (ex-Soviet F-class); two cruisers; three destroyers; nine destroyer escorts (including five ex-Soviet Petya-class); one general-purpose frigate; five antisubmarine frigates; three anti-aircraft frigates; ten patrol boats (four less than 100 tons); four coastal minesweepers; four inshore minesweepers; one landing ship; two landing craft; nine seaward defense boats (six less than 100 tons). The naval air force includes thirty-five Sea Hawk attack aircraft, twelve Alizé maritime patrolers, and two Sea King and ten Alouette III helicopters. Ten Sea Hawks, five Alizés, and two Alouettes can be carried on the aircraft carrier at any one time.

**Air Force:** 80,000; 625 combat aircraft (eight to twenty-five aircraft in a combat squadron).

Three light bomber squadrons with Canberras B(1); five fighter-bomber squadrons with SU-7s; two fighter-bomber squadrons with HF-24 Marut 1As; six fighter-bomber squadrons with Hunter F-56s; two fighter-bomber squadrons with Mystère IVs; seven interceptor squadrons with MIG-21s; eight interceptor squadrons with Gnats; one reconnaissance squadron with Canberra PR-57s; one maritime recon squadron with L-1049 Super Constellations. Transports include about fifty-five C-47s, sixty C-119s; twenty IL-14s; thirty AN-12s; twenty-five Otters, twelve HS-748s, and fifteen Caribous. Helicopters include about eighty MI-4s, 150 Alouette IIIs, ten Bell-47s, and a few MI-8s; about fifty SA-2 SAM complexes.

**Paramilitary forces:**

About 100,000 in Border Security Force.

## INDONESIA

Population: 114,500,000.

Selective military service.



The 40,000-man Indian Navy operates some fifty ships, including one small aircraft carrier. Here, part of the fleet steams along the Indian coast.



Japanese Air Force combat aircraft now are principally F-86s, shown here, and F-104Js. The latter are to be replaced by F-4EJs, assembled in Japan under license. Japan also is designing and producing its own aircraft, including Mitsubishi's XT-2 supersonic jet trainer.

Total armed forces: 319,000.  
 Estimated GNP 1970: \$11,600,000,000.  
 Estimated defense expenditure 1970: 103,000,000,000 rupiahs or \$272,000,000 (378 rupiahs = \$1).  
**Army:** 250,000.

Fifteen infantry brigades, formed from about 100 infantry battalions; eight armored battalions; one paracommando regiment. The Strategic Reserve Command consists of about six brigades and includes paratroops and armor, artillery, and engineers. About one-third of the army is engaged in civil and administrative duties. *Stuart*, AMX-13, and PT-76 light tanks; *Saladin* armored cars; *Ferret* scout cars; *Saracen* and BTR-152 armored personnel carriers; artillery includes Soviet 57-mm AA guns and associated radar.

**Navy:** 34,000, including 14,000 marines (it is thought that only about one-third of the Navy is operational).

Twelve submarines (ex-Soviet W-class); one cruiser (ex-Soviet *Sverdloy*-class); four destroyers (ex-Soviet *Skory*-class); eleven frigates (including seven ex-Soviet *Riga*-class); eighteen coastal escorts (fourteen ex-Soviet, four ex-USA); twelve *Komar*-class patrol boats with Styx surface-to-surface missiles; eight patrol boats; thirty motor torpedo boats; six fleet minesweepers; fifteen coastal minesweepers; eighteen motor gunboats; twenty-five seaward defense boats (less than 100 tons); six landing ships; seven landing craft. The marines form two brigades.

Naval Air Arm: twenty MIG-19 and MIG-21 interceptors; five HU-16 and PBV-5A ASW aircraft; about twelve S-55, S-58, and MI-4 helicopters.

**Air Force:** 35,000; 122 combat aircraft (only about eighty aircraft are thought to be fully operational).

Twenty-two TU-16 bombers, some with *Kenel* ASMs; ten IL-28 light bombers; five B-25 light bombers; ten F-51D light strike aircraft; about twenty MIG-15, forty MIG-17, and fifteen MIG-21 interceptors (mostly in storage); about sixty transports, including IL-14s, C-130Bs, C-47s, AN-12s, and Skyvans; about thirty helicopters, including MI-4s, MI-6s, *Alouette IIs*, and Bell-204s; at least three SA-2 sites.

#### Paramilitary forces:

A police Mobile Brigade of about 20,000; about 100,000 militia.

## JAPAN

Population: 104,600,000.  
 Voluntary military service.  
 Total armed forces: 259,000.  
 Estimated GNP 1970: \$195,000,000,000.  
 Defense budget 1971-72: 670,900,000,000 yen or \$1,864,000,000 (360 yen = \$1).  
**Army:** 179,000.

One mechanized division; twelve infantry divisions (7,000-9,000 men each); one airborne brigade; one artillery brigade;

one signal and five engineer brigades; one helicopter brigade; three SAM groups with *Hawks*; 380 Type 61 and 120 M-4 medium tanks; M-24 and 140 M-41 light tanks; Type 60 armored personnel carriers; thirty M-52 105-mm and ten M-44 155-mm self-propelled howitzers; 203-mm howitzers; Type 60 twin 106-mm self-propelled recoilless rifles; Type 64 antitank guided weapons; 120 aircraft and 220 helicopters.

**Reserves:** 36,000.

**Navy:** 38,300.

Eleven submarines; one guided missile destroyer with *Tartar* SAMs; thirty-seven ASW destroyers; one frigate; twenty submarine chasers; five motor torpedo boats (two less than 100 tons); two minelayers; thirty-seven coastal minesweepers; three tank landing ships; one medium landing ship; six landing craft; forty-two small landing craft (less than 100 tons).

Naval air component: 140 combat aircraft. Four maritime recon squadrons with two PS-1s, sixty P-2Js, and P-2V-7s; three maritime recon squadrons with fifty-five S-2F-1s; three helicopter squadrons with HSS-2s and HSS-1Ns.

**Air Force:** 41,700; 375 combat aircraft (eighteen to twenty-five aircraft in a combat squadron).

Seven fighter-bomber squadrons with F-86Fs; seven interceptor squadrons with F-104Js; one reconnaissance squadron with RF-86Fs (deliveries of F-4EJs are due to begin during 1971); three transport squadrons with thirty C-46s and ten YS-11s; twenty helicopters, including S-62s and V-107s; 360 trainers, including T-1s, T-33s, T-34s, and F-104-DJs; four SAM battalions with *Nike-Hercules* (100 launchers);



The Japanese Air Force Kawasaki P-2J patrol aircraft is built in Japan, based on the design of the Lockheed P-2V, a US Navy patrol bomber.



*In addition to F-5 fighter-bombers, the trainer version of which is shown here, the Republic of Korea Air Force is equipped with F-4 fighter-bombers, and F-86s in both fighter-bomber and interceptor configurations, as well as RF-86F reconnaissance aircraft.*

a Base Air Defense Ground Environment with twenty-four control and warning units.

### KOREA—DEMOCRATIC PEOPLE'S REPUBLIC (NORTH)

Population: 13,975,000.

Military service: Army three years; Navy and Air Force four years.

Total armed forces: 401,000.

Defense budget 1971: 2,183,000,000 won or \$849,400,000 (2.57 won = \$1).

**Army:** 360,000.

Two armored divisions; twenty infantry divisions; five independent infantry brigades; 15,000 men in "special commando teams"; 750 T-34 and T-54 medium tanks; PT-76 light tanks; 950 BA-64, BTR-40, and BTR-152 armored personnel carriers; 200 SU-76, SU-100, and ZSU-57 self-propelled guns; 2,000 AA guns; 6,000 other guns and mortars up to 152-mm caliber; about thirty SA-2 SAM sites (about 180 launchers).

**Navy:** 11,000.

Three submarines (ex-Soviet W-class); six Komar- and nine Osa-class FPB with Styx surface-to-surface missiles; three torpedo boats; forty high-speed torpedo boats (less than 100 tons); ten fleet minesweepers; twenty-two patrol vessels (four less than 100 tons); eleven motor gunboats.

**Air Force:** 30,000; 555 combat aircraft.

Seventy IL-28 light bombers; 380 MIG-15 and MIG-17 fighter-bombers; 100 MIG-21 interceptors; five MIG-19 interceptors; about forty AN-2, LI-2, IL-12, and IL-14 transports; twenty MI-4 helicopters; seventy YAK-11, YAK-18, MIG-15, and IL-28 trainers.

**Paramilitary forces:**

25,000 security forces and border guards; a civilian militia with a claimed strength of 1,250,000.

### KOREA—REPUBLIC OF KOREA (SOUTH)

Population: 32,700,000.

Military service: Army/Marines, 2¾ years; Navy/Air Force, three years.

Total armed forces: 634,250.

Estimated GNP 1970: \$8,300,000,000.

Estimated defense expenditure 1971: 129,000,000,000 won or \$411,000,000 (314 won = \$1).

**Army:** 560,000.

Twenty-nine infantry divisions (ten in cadre only); two armored brigades; eighty artillery battalions; one surface-to-surface missile battalion with *Honest Johns*; two SAM battalions with *Hawks* and one with *Nike-Hercules*; M-4 and M-48 medium tanks; *Stuart* and M-24 light tanks; M-10 and M-36 tank destroyers; M-8 armored cars and M-113 armored personnel carriers; guns up to 155-mm.

**Deployment:** two infantry divisions and some engineer units are in South Vietnam.

**Navy:** 16,750.

Three destroyers; three destroyer escorts; four frigates; six escort transports; eleven coastal escorts; seventeen patrol boats; twelve coastal minesweepers; twenty landing ships.

**Marine Corps:** 33,000.

Five brigades.

**Deployment:** one brigade in South Vietnam.

**Air Force:** 24,500; 235 combat aircraft.

Eighteen F-4 fighter-bombers; 110 F-86F fighter-bombers; seventy-seven F-5 tactical fighters; twenty F-86D all-weather fighters (with *Sidewinder* air-to-air missiles); ten RF-86F reconnaissance aircraft; thirty-five transports including C-46s; C-47s, and C-54s; helicopters include six H-19s.

**Paramilitary forces:**

A local defense militia with a strength of one to two million is being formed.

### LAOS

Population: 3,030,000.

Estimated GNP 1970: \$200,000,000.

**Royal Lao Forces**

Military service: conscription.

Total strength: 55,000.

Estimated defense expenditure: 10,800,000,000 kip or \$21,600,000 (500 kip = \$1).

**Army:** 52,600.

Fifty-eight infantry battalions; one artillery regiment of four battalions; M-24 and PT-76 light tanks; M-8 armored cars; M-3 scout cars; BTR-40 and M-113 armored personnel carriers; 85-mm guns and 75-mm, 105-mm, and 150-mm howitzers.

**Navy:** about 400.

Four river squadrons consisting of thirty-six patrol craft and lighters, ten landing craft (all under 100 tons, most not operational).



**Air Force:** 2,000; seventy-five combat aircraft.

About seventy-five T-28 light strike aircraft; twenty C-47 and AC-47 transports and gunships; about eight helicopters.

**Paramilitary forces and irregulars:**

36,000.

#### Pathet-Lao Forces

Total strength about 45,000 men (including dissident neutralists). PT-76 light tanks; BTR-40 armored cars; 105-mm howitzers. The Pathet-Lao are believed to be integrated with about 75,000 regular North Vietnamese combat and logistics troops, and have received arms and ammunition of Soviet and Chinese origin. The Pathet-Lao and North Vietnamese control all the eastern half of Laos.

## MALAYSIA

Population: 11,200,000.

Voluntary military service.

Total armed forces: 50,000.

Estimated GNP 1970: \$3,950,000,000.

Defense budget 1971: \$570,000,000 Malaysian dollars or \$US 186,000,000 (3.06 Malaysian dollars = \$US 1).

**Army:** 43,000.

Seven infantry brigades, consisting of twenty-four battalions; three reconnaissance regiments; three artillery regiments; one Special Service unit; three signal regiments; engineer and administrative units; Ferret scout cars; 105-mm howitzers.

**Reserves:** about 50,000.

**Navy:** 3,000.

Two ASW frigates (one with Seacat SAMs); four fast patrol boats (less than 100 tons); twenty-four patrol boats (less than 100 tons); six coastal minesweepers.

**Reserves:** 600.

**Air Force:** 4,000; thirty combat aircraft.

Ten CA-27 Sabre fighter-bombers; twenty CL-41G Tebuan light training and strike aircraft; eight Herald and twelve Caribou transports; five Dove, two HS-125, and two Heron liaison aircraft; twenty-four Alouette III and ten S-61A helicopters (one squadron of Mirage IIIs is on order).



The McDonnell Douglas A-4K and its two-seat version, the TA-4K, are the primary combat aircraft of the Royal New Zealand Air Force. RNZAF also has some Vampire fighters.



One of the small, but efficient, Royal New Zealand Navy's frigates, the Waikato, maneuvers at sea. The RNZN has about 3,000 men.

**Paramilitary forces:**

50,000—fourteen battalions of field police.

## MONGOLIA

Population: 1,315,000.

Military service: two years.

Total armed forces: 29,000.

Estimated GNP 1970: \$630,000,000.

Estimated defense expenditure 1971: 90,000,000 tugriks or \$22,500,000 (four tugriks = \$1).

**Army:** 28,000.

Two infantry divisions; forty T-34 and 100 T-54/55 medium tanks; ten SU-100 tank destroyers; forty BTR-60 and fifty BTR-152 armored personnel carriers; 130-mm guns and 152-mm guns/howitzers.

**Air Force:** 1,000 men; no combat aircraft.

Operates in support of the Army, and employs some Soviet technical advisers.

Thirty AN-2, IL-14, and AN-24 transports; YAK-11, YAK-18, and MIG-15 UTI trainers; ten MI-1 and MI-4 helicopters; one SAM battalion with SA-2s.

**Paramilitary forces:**

About 18,000 security police.

## NEW ZEALAND

Population: 2,880,000.

Voluntary military service (supplemented by selective national service of fourteen weeks for the Army).

Total armed forces: 12,750.

Estimated GNP 1970: \$US 5,770,000,000.

Defense budget 1971-72: \$NZ 110,450,000 or \$US 123,704,000 (\$NZ 1 = \$US 1.12).

**Army:** 5,600.

One infantry battalion; one artillery battery. Regular troops form the nucleus of a Combat Brigade group, a Logistic group, and a Reserve Brigade group. These units would be completed by the mobilization of Territorials. Ten M-41 light tanks; nine Ferret scout cars; forty M-113 armored personnel carriers; twenty-eight 105-mm howitzers.

**Deployment:** One infantry battalion (less one company) in Singapore; one infantry company in South Vietnam.

**Reserves:** 11,300 Territorials.

**Navy:** 2,900.

One general purpose frigate with Seacat SAMs (a second



*C-123B transports of the Thai Air Force. Also in its inventory of support aircraft are C-47s and a variety of helicopters.*



*In addition to nearly sixty combat ships, the Thai Navy has one maritime reconnaissance squadron equipped with helicopters and Grumman S-2s, shown above.*

is due to be delivered in 1971); two ASW frigates with Seacat SAMs; two escort minesweepers; twelve patrol craft (less than 100 tons); two Wasp helicopters (one operates from the GP frigate).

**Reserves:** 600 men, five patrol craft (less than 100 tons).

**Air Force:** 4,250; twenty-seven combat aircraft.

One fighter-bomber squadron with ten A-4K and four TA-4K Skyhawks; one fighter-bomber squadron with eight Vampire FB-5s; five P-3B Orion maritime reconnaissance aircraft; five C-130 Devon and nine Bristol Mark 31 medium transports; fourteen Iroquois and thirteen Sioux helicopters.

**Deployment:** One transport squadron in Singapore.

## PAKISTAN

Population: 126,300,000.

Two years selective military service.

Total armed forces: 392,000.

Estimated GNP 1970: \$16,000,000,000.

Defense budget 1971-72: 3,400,000,000 rupees or \$714,000,000 (4.76 rupees = \$1).

**Army:** 365,000 (including 25,000 Azad Kashmir troops).

Two armored divisions; twelve infantry divisions (two more being raised); one independent armored brigade; one air defense brigade; 100 M-47, 100 M-48, 100 T-54, fifty T-55, and 225 T-59 medium tanks; 200 M-24, seventy-five M-41, and twenty PT-76 light tanks; 300 M-113 armored personnel carriers; about 900 twenty-five-pounder guns, 105-mm and 155-mm howitzers; 200 130-mm guns; Cobra anti-tank guided weapons; twenty H-13 helicopters.

**Navy:** 10,000.

Four submarines; one light cruiser/training ship; two destroyers; three destroyer escorts; two fast frigates; four patrol boats; eight coastal minesweepers; two small patrol boats (less than 100 tons); two UH-19 air-sea helicopters.

**Air Force:** 17,000; 285 combat aircraft.

One light bomber squadron with IL-28s; two light bomber squadrons with B-57Bs; two fighter-bomber squadrons with Mirage IIIEs; eight fighter-bomber/interceptor squadrons with F-86s; four interceptor squadrons with MIG-19s; one interceptor squadron with six F-104As; one recce squadron with four RT-33As and two RB-57s (with the exceptions noted, combat squadrons have sixteen aircraft); transports include eight C-130Bs and one F-27; forty Sioux, Huskie, Alouette III, and MI-8 helicopters.

**Paramilitary forces:**

280,000, including 30,000 frontier corps; 250,000 militia.



*This T-6 trainer is used to train Thai pilots in low-level counterinsurgency work. The Thai Air Force also has T-28s and OV-10s for COIN operations.*

A new force is being raised—the East Pakistan Civil Armed Force.

## PHILIPPINES

Population: 39,800,000.

Selective military service.

Total armed forces: 34,600.

Estimated GNP 1970: \$5,900,000,000.

Defense budget 1971-72: 871,000,000 pesos or \$135,500,000 (6.43 pesos = \$1. Before February 21, 1970, 3.9 pesos = \$1.).

**Army:** 17,600.

Two light infantry divisions (understrength); two infantry brigades; fifteen engineer construction battalions; M-4 medium tanks; M-24 and M-41 light tanks; M-113 armored personnel carriers.

**Navy:** 8,000 (including naval engineers).

One destroyer escort; four coastal escorts; seven patrol vessels; forty-seven patrol boats (less than 100 tons); two coastal minesweepers; eleven landing ships; one marine battalion; five engineer construction battalions.

**Air Force:** 9,000; fifty-seven aircraft.

Twenty F-5 fighter/ground-support aircraft; eight T-28 ground-support aircraft; twenty-six F-86F day fighters; three

T-33 armed trainers; transports include twenty-eight C-47s and one F-27; about sixteen helicopters, including UH-1Hs and H-34s.

**Paramilitary forces:**

23,500 Philippine Constabulary and about 400 armed civilian self-defense units.

### SINGAPORE

Population: 2,100,000.

Military service: twenty-four to thirty-six months.

Total armed forces: 16,000.

Estimated GNP 1970: \$US 1,820,000,000.

Defense budget 1971-72: \$484,000,000 Singapore dollars or \$US 158,170,000 (3.06 Singapore dollars = \$1).

**Army:** 14,000.

Two brigades, which include one armored regiment, six infantry battalions, one artillery battalion, one engineer battalion, one signals battalion (a third brigade is being formed); fifty AMX-13 tanks; M-706 *Commando* armored personnel carriers; twenty-five-pounder guns; 120-mm mortars; thirty-two 106-mm recoilless rifles.

**Reserves:** a planned total of 9,000 by the end of 1971.

**Navy:** 500.

One seaward defense boat. Three fast patrol boats (three more on order).

**Air Force:** 1,500; thirty-six combat aircraft.

One ground attack squadron with sixteen BAC-167s and four *Hunters*; one interceptor/recce squadron with sixteen *Hunters*; one transport/liasion squadron with eight Cessna-172s and two *Airtourers*; one helicopter squadron with four *Alouette IIIs*; twenty-eight *Bloodhound* SAM launchers.

**Paramilitary forces:**

Two police companies.

### THAILAND

Population: 35,000,000.

Military service: two years.

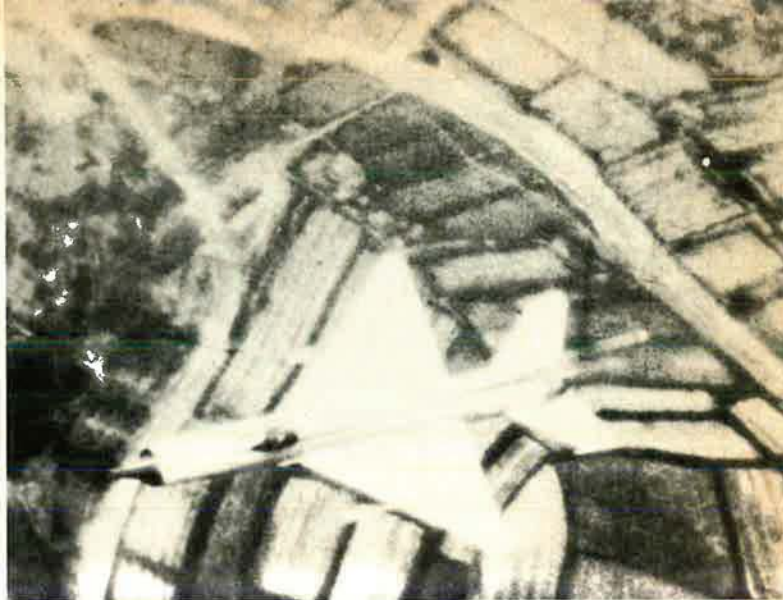
Total armed forces: 175,000.

Estimated GNP 1970: \$6,100,000,000.

Defense budget 1970-71: 5,413,800,000 baht or \$260,300,000 (20.8 baht = \$1).



*The North Vietnamese Air Force, small by comparison with that of South Vietnam, is equipped with Soviet-designed aircraft. These MIG-17s were photographed near Hanoi.*



*Most modern of North Vietnam's fighters is the MIG-21. This one, flying at Mach 2, was photographed by a USAF reconnaissance plane.*

**Army:** 130,000.

Four infantry divisions (including three tank battalions); one regimental combat team; one SAM battery with *Hawks*; M-24 and M-41 light tanks; M-2 and M-16 armored half-tracks; M-8 armored cars; M3A1 scout cars; about 200 M-113 armored personnel carriers; 105-mm and 155-mm howitzers; sixteen FH-1100 and six OH-23F helicopters.

**Deployment:** 11,250 in South Vietnam (all due to be withdrawn by February 1972).

**Navy:** 21,500 (including 6,500 marines).

One destroyer escort; three frigates (and three on order); one escort minesweeper; seventeen submarine chasers; four coastal minesweepers; two coastal minelayers; eleven gunboats (one less than 100 tons); three patrol gunboats; eight landing ships; eight landing craft; one maritime recce squadron with HU-16s and S-2s.

**Air Force:** 23,500; 144 combat aircraft.

Eleven F-5A and F-5B fighter-bombers; twenty F-86F day fighters; two RT-33A reconnaissance aircraft; fifty-five T-28D, forty T-6, and sixteen OV-10 COIN aircraft; twenty-five C-47 and thirteen C-123B transports; about sixty helicopters, including thirty-five CH-34s and twenty-three UH-1Hs; four battalions of airfield defense troops.

**Paramilitary forces:**

10,000 Volunteer Defense Corps; 8,000 Border Police.

### VIETNAM—DEMOCRATIC REPUBLIC (NORTH)

Population: 22,675,000.

Military service: three years minimum.

Total armed forces: 492,000.

Estimated defense expenditure 1970: 2,150,000,000 dong or \$584,000,000 (3.68 dong = \$1).

**Army:** 480,000.

Fourteen infantry divisions (infantry divisions normally total about 12,000 men, including three infantry and one support regiment); one artillery division (of ten regiments); two armored regiments; about twenty independent infantry regiments; fifty T-34 and sixty T-54 medium tanks; 300 PT-76 light tanks; BTR-40 armored personnel carriers, SU-76 and JSU-122 self-propelled guns; 75-mm, 105-mm, 122-mm,



*A South Vietnamese gunner fires a Minigun from a VNAF UH-1 helicopter during a training mission. The VNAF now has 230 UH-1s.*



*The Vietnamese regular army includes one airborne division of three brigades. These Vietnamese paratroopers are training at Tan Son Nhut Air Base.*

130-mm, and 152-mm artillery; 57-mm, 75-mm, 82-mm, and 107-mm recoilless rifles; 82-mm, 100-mm, 107-mm, 120-mm, and 160-mm mortars; 107-mm, 122-mm, and 140-mm rocket launchers; 6,000 37-mm, 57-mm, 85-mm, and 100-mm AA guns; thirty-five SAM battalions (each with six SA-2 launchers).

**Deployment:** about 90,000 in South Vietnam, 75,000 in Laos, and 40,000 in Cambodia.

**Navy:** 3,000.

Two coastal escorts (ex-Soviet); four motor gunboats, ex-Chinese; about twenty-four gunboats (less than 100 tons), ex-Chinese; about three motor torpedo boats (less than 100 tons), ex-Soviet; about twelve small patrol boats (less than 100 tons).

**Air Force:** 9,000; 165 combat aircraft.

Ten IL-28 light bombers, ex-Soviet; forty MIG-21F/PF interceptors with Atoll air-to-air missiles; twenty-five MIG-19 interceptors, ex-Chinese; sixty (ex-Chinese) and ten (ex-Soviet) MIG-17 interceptors; ten (ex-Chinese) and ten (ex-Soviet) MIG-15 interceptors; eight AN-2, three AN-24, ten IL-14, and twenty LI-2 transports; twenty MI-4 and two MI-6 helicopters.

**Paramilitary forces:**

20,000 Frontier, Coast Security, and People's Armed Security Forces; about 425,000 regional armed militia.

## **VIETNAM—REPUBLIC OF VIETNAM (SOUTH)**

Population: 18,800,000.

Military service: two years minimum.

Total armed forces: 500,000.

Estimated GNP 1970: \$4,000,000,000.

Estimated defense expenditure 1971: 155,000,000,000 piastres or \$564,000,000 (275 piastres = \$1. Before October 4, 1970, 117.5 piastres = \$1.).

**Army:** 414,000. (With normally three regiments, each of four battalions, to an infantry division, there are some 150 infantry battalions in the regular army, but most units are below establishment; the actual strength of a battalion averages 500, and a regiment 2,000.)

Ten infantry divisions; one airborne division (three brigades); six independent armored cavalry regiments; three independent infantry regiments; eighteen Ranger battalions; one Special Forces group; thirty-five battalions; M-24, 200 M-41, and forty AMX-13 light tanks; 250 Commando and Greyhound armored cars; M-3 scout cars; M-59 and M-113 armored personnel carriers; 105-mm and 155-mm self-propelled guns.

**Deployment:** about 23,000 in Cambodia.

**Navy:** 31,000.

One destroyer; three destroyer escorts; six patrol escorts; two patrol vessels; three coastal minesweepers; seventy fast patrol boats; twenty motor gunboats; twenty-three landing ships; about 200 landing craft and about 600 river patrol boats (most less than 100 tons); about 350 motorized coastal defense junks.

**Marine Corps:** 15,000.

One division.

**Air Force:** 40,000; 275 combat aircraft (combat squadrons have from fifteen to twenty aircraft).

One tactical fighter squadron with F-5s; six fighter-bomber squadrons with A-37s; three fighter-bomber squadrons with Skyraiders; some RC-47 reconnaissance aircraft; eighty O-1 armed light aircraft; twenty AC-47 armed transport aircraft; twenty-five C-47 and twenty-five C-119 transports; thirty-five Choctaw, 230 UH-1, and ten CH-47 helicopters.

**Paramilitary forces:**

555,000.

Regional Forces—285,000, forming about 1,700 rifle companies, at the disposal of the provincial governors. Popular Forces—250,000, a home guard of about 7,500 platoons, with light arms. Police Field Force—20,000, including special internal security units with armored vehicles and helicopters. There is also a People's Self Defense Force of about 1,500,000.



*Vietnamese Air Force security police train for air base defense, using an M-113 armored personnel carrier. These men are stationed at Pleiku Air Base.*



# Chapter IX

## Tables

### 1. ESTIMATES OF COMPARATIVE STRATEGIC STRENGTHS\*

(A) Nuclear Strike Forces

NOTE: Figures in brackets are approximate.

UNITED STATES AND SOVIET UNION

Category	United States		Soviet Union		
	Type	Number	Type	Number	
Land-based missiles	ICBM	LGM-25C <i>Titan 2</i>	54	SS-7 <i>Saddler</i>	220
		LGM-30B <i>Minuteman 1</i>	900	SS-8 <i>Sasin</i>	280
		LGM-30F <i>Minuteman 2</i>	100	SS-9 <i>Scarp</i>	950 <sup>b</sup>
		LGM-30G <i>Minuteman 3</i>		SS-11	60
	IRBM			SS-13 <i>Savage</i>	
MRBM			SS-5 <i>Skean</i>	100	
SRBM			SS-4 <i>Sandal</i>	600	
Sea-based missiles	SRBM	MGM-31A <i>Pershing</i>	(250)	SS-1b-d <i>Scud A-B</i>	(300)
		MGM-29A <i>Sergeant</i>	(500)	SS-12 <i>Scaleboard</i>	
	Cruise missiles			SS-1 <i>Shaddock</i>	(100)
	SLBM (nuclear subs)	UGM-27B <i>Polaris A2</i>	160	SS-N-5 <i>Serb</i>	30
		UGM-27C <i>Polaris A3</i>	432	SS-N-6	320
UGM-73A <i>Poseidon</i>	64				
SLBM (diesel subs)			SS-N-4 <i>Sark</i>	42	
			SS-N-5 <i>Serb</i>	48	
Cruise missiles (subs)			— <i>Shaddock</i>	310	
Cruise missiles (surface vessels)			— <i>Shaddock</i>	48	
Aircraft	Long-range bombers <sup>d</sup>	B-52 C-F	150	Mya-4 <i>Bison</i>	40
		B-52 G/H	210	Tu-20 <i>Bear</i>	100
	Medium-range bombers <sup>d</sup>	FB-111	70	Tu-16 <i>Badger</i>	500 <sup>e</sup>
	Strike aircraft (land-based) <sup>d</sup>	F-105D	(1200)	Tu-22 <i>Blinder</i>	(1,500)
		F-4		Yak-28 <i>Brewer</i>	
F-111A/E	Su-7 <i>Fitter</i>				
A-7D	MiG-21 <i>Fishbed</i> <sup>f</sup>				
Strike aircraft (carrier-based) <sup>d</sup>	A-4	(900)	Il-28 <i>Beagle</i>		
A-6A					
A-7A					
RA-5C					

OTHER NATO AND WARSAW PACT COUNTRIES

Category	NATO Countries		Warsaw Pact Countries	
	Type	Number	Type	Number
IRBM	S-02 SSBS (France)	9 <sup>g</sup>		
SRBM	MGM-31A <i>Pershing</i> (West Germany)	(75)	SS-1b-d <i>Scud A-B</i> <sup>h</sup>	
	MGM-29A <i>Sergeant</i> (West Germany)	(100)		
SLBM	<i>Polaris A-3</i> (Britain)	64		
Medium-range bombers	<i>Yulcan</i> (Britain)	56		
	<i>Canberra B(1)</i> <sup>h</sup> (Britain)	24		
Strike aircraft (incl. short-range bombers)	<i>Mirage IVA</i> (France)	36	Il-28 <i>Beagle</i> <sup>i</sup>	(150)
	<i>Buccaneer S2</i> (Britain)	80		
	F-4 <sup>j</sup>	(60)		
	F-104	(400)		
			Su-7 <i>Fitter</i> <sup>k</sup>	(200)

### (B) Growth of ICBM/SLBM Strength, 1961-1971 (mid years)

		1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
USA	ICBM	63	294	424	834	854	904	1,054	1,054	1,054	1,054	1,054
	SLBM	96	144	224	416	496	592	656	656	656	656	656
USSR	ICBM	50	75	100	200	270	300	460	800	1,050	1,300	1,510 <sup>l</sup>
	SLBM	some	some	100	120	120	125	130	130	160	280	440

\* China is not included in this table. Her ability to deliver nuclear weapons appears to be limited to some Tu-16 and Tu-4 medium-range bombers, Il-28 short-range bombers and a few MRBM.

<sup>b</sup> Including those in IRBM/MRBM fields.

<sup>c</sup> In addition, there are about 300 Tu-16 *Badgers* in the Naval Air Force, configured for attacks on shipping, which could deliver nuclear weapons.

<sup>d</sup> These aircraft are dual-capable and could have a non-nuclear role.

<sup>e</sup> These became operational on 2 August 1971.

<sup>f</sup> These missiles and aircraft are operated by a number of countries but may have non-nuclear roles.

2. NUCLEAR DELIVERY VEHICLES 1971\*

(A) Long and Medium Range

MISSILES (USA)

Category <sup>a</sup>	Type	Propellant <sup>b</sup>	Max. range <sup>c</sup> (Statute miles)	Estimated warhead yield <sup>d</sup>	In service
ICBM	LGM-25C Titan 2	SL	7,250	5-10 MT	1962
	LGM-30B Minuteman 1	S	7,500	1 MT	1962
	LGM-30F Minuteman 2	S	8,000	1-2 MT	1966
	LGM-30G Minuteman 3	S	8,000	3 x 200 KT	1970
SLBM	UGM-27B Polaris A2	S	1,750	800 KT 1 MT 3 x 200 KT	1962
	UGM-27C Polaris A3 <sup>e</sup>	S	2,880		1964
	UGM-73A Poseidon	S	2,880		1971

MISSILES (USSR)

Category <sup>a</sup>	Type <sup>f</sup>	Propellant <sup>b</sup>	Max. range <sup>c</sup> (Statute miles)	Estimated warhead yield <sup>d</sup>	In service
ICBM	SS-7 Sapper	SL	6,900	5 MT	?1961
	SS-8 Sasin	SL	6,900	5 MT	1963
	SS-9 Scarp	SL	7,500	20-25 MT <sup>g</sup>	1965
	SS-11	SL	6,500	1-2 MT	1966
	SS-13 Savage	S	5,000	1 MT	1968
IRBM <sup>h</sup>	SS-5 Slean	SL	2,300	1 MT	1961
MRBM <sup>i</sup>	SS-4 Sandal	L	1,200	1 MT	1959
SLBM	SS-N-4 Sark <sup>j</sup>	SL	350	MT range	1961
	SS-N-5 Serb	SL	750	MT range	1964
	SS-N-6	? <sup>k</sup>	1,750	MT range	1969

AIRCRAFT (USA)

Category <sup>d</sup>	Type	Max. range <sup>m</sup> (Statute miles)	Max. speed (Mach. no.) <sup>n</sup>	Max. weapons load (lb.)	ASM <sup>o</sup> carried	In service
Long-range bomber	B-52 C-F	11,500	0.95	60,000	Hound Dog	1955
	B-52 G/H	12,500	0.95	75,000	2 x Hound Dog	
Medium-range bomber	FB-111	3,800	2.2	37,500	—	1970
Strike aircraft	A-4	2,300	0.9	10,000	2 x Bullpup	1956
	A-6A	3,200	0.9	18,000	2 x Bullpup	1963
	A-7A/D	3,400	0.9	15,000	4 x Bullpup	1966
	RA-5C	3,000	2.0	13,500	2 x Bullpup	1964
	F-104C/G <sup>p</sup>	1,300	2.2	4,000	2 x Bullpup	1958
	F-105D	2,100	2.25	16,500	4 x Bullpup	1960
	F-111A/E	3,800	2.2/2.5	25,000	4 x Bullpup	1967
	F-4	1,600	2.4	16,000	4 x Bullpup	1962

\* Listed by countries of origin. SAM and ASW missiles are not included.

AIRCRAFT (USSR)

Category <sup>d</sup>	Type <sup>e</sup>	Max. range <sup>m</sup> (Statute miles)	Max. speed (Mach. no.) <sup>n</sup>	Max. weapons load (lb.)	ASM <sup>o</sup> carried	In service
Long-range bomber	Tu-20 Bear	7,800	0.78	40,000	1 x Kangaroo	1956
	Mya-4 Bison	6,050	0.87	20,000	—	1956
Medium-range bomber	Tu-16 Badger	4,000	0.8	20,000	2 x Kelt <sup>r</sup>	1955
Strike aircraft (incl short-range bomber) <sup>j</sup>	Tu-22 Blinder	3,000	1.5	12,000	1 x Kitchen	1962
	Il-28 Beagle	2,500	0.81	6,000	—	1950
	Yak-28	1,750	1.1	4,400	—	1962
	Brewer Su-7 Fitter	1,250	1.7	4,500	—	1959
	MiG-21 Fishbed <sup>l</sup>	900	2.2	2,000	—	1970

MISSILES (OTHER COUNTRIES)

Country	Category	Type	Propellant	Max. range (Statute miles)	Estimated warhead yield	In service
FRANCE	IRBM	S-02 SSBS	S	1,875	150 KT	August 1971

AIRCRAFT (OTHER COUNTRIES)

Country	Type	Max. range <sup>m</sup> (Statute miles)	Max. speed (Mach. no.) <sup>n</sup>	Max. weapons load (lb.)	ASM <sup>o</sup> carried	In service
BRITAIN	Vulcan B2	4,000	0.95	21,000	1 x Blue Steel	1960
	Canberra B(1)8	3,800	0.83	8,000	—	1955
	Buccaneer S2	2,000	0.95	8,000	—	1965
FRANCE	Mirage IVA	2,000	2.2	8,000	—	1964

(B) Short Range Missiles and Artillery

USA

Category <sup>a</sup>	Type	Propellant <sup>b</sup>	Max. range (Statute miles)	Estimated warhead yield <sup>d</sup>	In service
SRBM	MGM-31A Pershing	S	460	KT range	1962
	MGM-29A Sergeant	S	85	KT range	1962
Unguided rockets	MGR-1B Honest John	S	25	KT range	1953
Tube artillery	M-109 155mm SP how	HE	10	2 KT	1964
	M-110 203mm (8in.) SP how	HE	10	KT range	1962
	M-115 203mm (8in.) towed how	HE	10	KT range	1950s

USSR

Category <sup>d</sup>	Type <sup>f</sup>	Propellant <sup>b</sup>	Max. range (Statute miles)	Estimated warhead yield <sup>d</sup>	In service
SRBM	SS-1b Scud A	SL	50	KT range	1957
	SS-1c Scud B	SL	150	KT range	1965
	SS-12 Scaleboard	SL	500	MT range	1969
Cruise missiles	SSC-1 Shaddock	J	290	KT range	1962
Unguided rockets	W FROG 1-7	S	15-40	KT range	FROG 1 1957; FROG 7 1965
Tube artillery	M-55 203mm gun-howitzer	n/a	18	KT range	late 1950s

NOTES

<sup>a</sup> ICBM=inter-continental ballistic missile (range 4,000+ miles); IRBM=intermediate-range ballistic missile (range 1,500-4,000 miles); MRBM=medium-range ballistic missile (range 500-1,500 miles); SRBM=short-range ballistic missile (range under 500 miles); SLBM=submarine-launched ballistic missile.  
<sup>b</sup> L=liquid; SL=storable liquid; S=solid; J=ram- or turbojet; HE=high explosive.  
<sup>c</sup> Operational range depends upon the payload carried; use of maximum payload may reduce range by up to 25 per cent below maximum.  
<sup>d</sup> MT=megaton=million tons of TNT equivalent (MT range=1 MT or over); KT=kiloton=thousand tons of TNT equivalent (KT range=less than 1 MT).  
<sup>e</sup> The majority of Polaris A3 missiles, if not all, have been modified to carry three warheads of about 200 KT each.  
<sup>f</sup> Numerical designations for Soviet missiles (e.g. SS-9) are of US origin; names (e.g. Scarp) are of NATO origin.  
<sup>g</sup> SS-9 missiles have also been tested (i) with three warheads of 4-5 MT each, (ii) with a modified payload for use as a depressed trajectory ICBM (DTCBM) or fractional orbit bombardment system (FOBS).  
<sup>h</sup> A mobile IRBM (SS-XZ Scrooge) has been displayed and tested but is not known to be deployed operationally.

<sup>A</sup> A mobile solid-propellant missile (SS-14 Scapout), apparently with MRBM range, has been displayed and tested but is not known to be deployed operationally.  
<sup>B</sup> Launched only from the surface.  
<sup>C</sup> Possibly small propellant.  
<sup>D</sup> Long-range bomber=maximum range over 6,000 miles; medium-range bomber=maximum range 3,500-6,000 miles, primarily designed for bombing missions.  
<sup>E</sup> Theoretical maximum range, with internal fuel only, at optimum altitude and speed. Ranges for strike aircraft assume no weapon load. Especially in the case of strike aircraft, therefore, range falls sharply for flights at lower altitude, at higher speed or with full weapons load (e.g. combat radius of A-7, at operational height and speed, with typical weapons load, is approximately 620 miles).  
<sup>F</sup> Mach 1 (M=1.0)=speed of sound.  
<sup>G</sup> ASM=air-to-surface missile.  
<sup>H</sup> F-104 are no longer in active service as strike aircraft with the US Air Force but remain in service with other NATO air forces.  
<sup>I</sup> Names of Soviet aircraft (e.g. Bear) are of NATO origin.  
<sup>J</sup> Naval Air Force versions of the Tu-16 carry 2 x Kelt or 2 x Kennel ASM for anti-ship use.

### 3. DEFENCE EXPENDITURE AND NATIONAL ECONOMIES

Country	Defence Expenditure* 1970-71 (US\$ million)		Defence Expenditure per capita \$	Defence Expenditure as a percentage of GNP**			
	1	2		3	4	5	6
	1970	1971	1970	1967	1968	1969	1970
United States .. .. .	76,507	78,743	373	9.5	9.3	8.7	7.8
USSR*** .. .. .	53,900	55,000	222	10.6	11.1	11.0	11.0
<b>WARSAW PACT</b>							
Bulgaria .. .. .	279	n.a.	33	3.0	2.9	2.8	3.1
Czechoslovakia .. .. .	1,765	n.a.	122	5.7	5.7	5.6	5.8
Germany (East) .. .. .	1,990	2,124	116	3.7	5.7	5.9	5.9
Hungary .. .. .	511	n.a.	49	2.6	2.9	3.4	3.5
Poland .. .. .	2,220	n.a.	68	5.4	4.8	5.0	5.2
Romania .. .. .	750	798	37	3.1	3.0	2.9	3.5
<b>NORTH ATLANTIC TREATY</b>							
Belgium .. .. .	688	594	71	2.9	2.9	3.0	2.8
Britain .. .. .	5,950	6,333	107	5.7	5.4	5.0	4.9
Canada .. .. .	1,931	1,687	90	2.8	2.7	2.4	2.5
Denmark .. .. .	368	410	74	2.7	2.8	2.6	2.3
France .. .. .	5,982	5,202	118	5.0	4.8	4.4	4.0
Germany (West)† .. .. .	6,188	5,961	104	4.3	3.6	3.6	3.3
Greece .. .. .	453	338	51	4.4	4.9	5.1	4.9
Italy .. .. .	2,599	2,651	48	3.1	3.0	2.7	2.8
Luxembourg .. .. .	8	9	24	1.2	1.0	0.9	0.9
Netherlands .. .. .	1,106	1,161	85	3.8	3.6	3.6	3.5
Norway .. .. .	376	411	97	3.5	3.7	3.6	2.9
Portugal .. .. .	398	n.a.	41	7.2	7.4	6.7	6.5
Turkey .. .. .	503	446	14	4.4	4.5	4.2	3.7
† Excluding financial assistance to West Berlin which included would make the entry read:							
	7,067	6,860	119	4.7	4.2	4.2	3.8
<b>OTHER EUROPEAN COUNTRIES</b>							
Austria .. .. .	169	170	23	1.3	1.2	1.2	1.2
Finland .. .. .	145	154	31	1.6	1.6	1.5	1.4
Spain .. .. .	627	681	19	2.3	2.2	2.1	2.0
Sweden .. .. .	1,146	1,192	143	3.9	3.9	3.9	3.7
Switzerland .. .. .	436	459	69	2.4	2.4	2.2	2.1
Yugoslavia .. .. .	638	596	31	5.2	6.0	5.6	5.4
<b>THE MIDDLE EAST AND THE MEDITERRANEAN</b>							
Algeria .. .. .	174	99	13	3.9	4.7	4.4	4.0
Iran .. .. .	779	1,023	27	4.9	5.6	5.0	7.1
Iraq .. .. .	294	30	30	9.1	9.1	9.6	9.4
Israel .. .. .	1,429	1,484	483	11.5	15.4	24.1	26.5
Jordan .. .. .	105	90	47	11.1	14.7	21.0	16.4
<b>THE MIDDLE EAST AND THE MEDITERRANEAN—continued</b>							
Libya .. .. .	84	84	43	1.5	1.6	1.4	2.1
Morocco .. .. .	84	97	5	2.7	2.8	2.5	2.5
Saudi Arabia .. .. .	387	383	53	11.9	8.9	8.8	9.4
Sudan .. .. .	109	133	7	3.4	5.0	5.7	6.0
Syria .. .. .	176	n.a.	29	10.7	12.1	11.6	12.1
Tunisia .. .. .	18	20	4	1.7	1.5	1.4	1.5
UAR (Egypt) .. .. .	1,262	1,495	38	12.7	12.5	13.0	19.6
<b>AFRICA</b>							
Ethiopia .. .. .	37	36	1	2.5	2.2	2.2	2.1
Nigeria .. .. .	308	244	5	n.a.	5.9	5.9	5.6
Rhodesia .. .. .	24	25	5	1.8	1.9	2.0	1.7
South Africa .. .. .	458	459	23	2.7	2.5	2.4	2.6
<b>ASIA AND AUSTRALASIA</b>							
Australia .. .. .	1,261	n.a.	100	4.9	4.6	4.0	3.6
Burma .. .. .	104	101	4	4.0	3.7	3.8	3.3
China (Taiwan) .. .. .	482	601	33	7.9	7.2	9.2	8.8
India .. .. .	1,535	1,656	3	3.3	3.6	3.5	3.4
Indonesia .. .. .	272	386	2	2.3	1.8	2.3	2.3
Japan .. .. .	1,640	1,864	16	0.9	0.8	0.8	0.8
Korea, South .. .. .	333	411	10	3.9	4.2	4.0	4.0
Malaysia .. .. .	183	186	17	4.1	3.9	3.6	4.6
New Zealand .. .. .	115	124	41	1.7	2.0	1.9	2.0
Pakistan .. .. .	605	714	4	3.6	3.4	3.4	3.8
Philippines .. .. .	110	135	3	1.7	1.6	1.5	1.9
Singapore .. .. .	106	158	52	2.2	2.1	4.9	5.8
Thailand .. .. .	240	260	7	2.5	2.5	3.7	3.9
Vietnam, South .. .. .	1,028	564	56	8.8	n.a.	n.a.	n.a.
<b>LATIN AMERICA</b>							
Argentina .. .. .	477	n.a.	20	2.6	2.0	2.2	2.3
Brazil .. .. .	579	n.a.	6	2.9	2.6	n.a.	n.a.
Chile .. .. .	n.a.	n.a.	n.a.	2.1	2.1	n.a.	n.a.
Colombia .. .. .	n.a.	n.a.	n.a.	2.8	2.8	n.a.	n.a.
Mexico .. .. .	210	n.a.	4	0.6	0.6	0.6	n.a.
Peru .. .. .	n.a.	n.a.	n.a.	3.3	3.3	n.a.	n.a.
Venezuela .. .. .	200	n.a.	19	2.3	2.2	n.a.	n.a.

\* Column 1 represents the estimated out-turn of defence expenditure in 1970. Column 2 represents planned defence expenditure for the current year, in most cases according to the budget statements of national governments.  
\*\* The GNP figures are estimated at current market prices and the percentages may differ from those

published by national governments and international organizations.  
\*\*\* The valuation of the Soviet GNP and the rate of exchange used for the defence expenditure were explained in *The Military Balance 1970-1971*, pp. 10-11, n.a.=not available.

### 4. COMPARATIVE DEFENCE EXPENDITURE, GROSS NATIONAL PRODUCT AND MANPOWER FIGURES 1951-1970

Year	Defence Expenditure (in \$ million)*					
	USA <sup>b</sup>	Japan	West Germany <sup>b</sup>	France <sup>b</sup>	Britain <sup>b</sup>	USSR
1951	33,059	86	—	1,785	3,217	27,800
1952	47,598	164	—	2,538	4,371	31,400
1953	49,377	170	1,475	2,808	4,707	31,800
1954	42,786	206	1,497	2,372	4,399	29,000
1955	40,371	241	1,758	2,232	4,388	32,400
1956	41,513	278	1,717	2,975	4,522	29,600
1957	44,159	281	2,134	3,160	4,407	27,900
1958	45,096	335	1,632	3,356	4,455	27,000
1959	45,833	377	2,640	3,631	4,449	27,800
1960	45,380	421	2,885	3,881	4,640	27,000
1961	47,808	503	3,268	4,131	4,785	35,800
1962	52,381	586	4,308	4,493	5,079	38,700
1963	52,295	688	4,981	4,628	5,236	40,200
1964	51,213	780	4,888	4,918	5,600	38,400
1965	51,827	848	4,979	5,125	5,855	37,000
1966	63,572	959	5,063	5,415	6,028	38,700
1967	75,465	1,075	5,352	5,856	6,259	41,900
1968	80,732	1,172	4,827	6,117	5,597	48,200
1969	81,444	1,344	5,486	6,184	5,496	51,100
1970	76,507	1,640	6,188	5,982	5,950	53,900

\* Exchange rates used are the same as in the GNP table below except for the USSR, which are calculated on the basis used in the country section (pp. 5-7) and explained in *The Military Balance 1970-1971*, pp. 10-12.  
\* NATO definition of defence expenditure has been used.

### Gross National Product AT CURRENT MARKET PRICES AND EXCHANGE RATES (\$ billion)

Year	USA	Japan	West Germany	France	Britain	USSR <sup>a</sup>
1951	331	14	28	25	41	86
1952	350	16	32	29	44	90
1953	370	19	35	31	48	95
1954	365	20	37	32	50	102
1955	399	23	43	35	54	109
1956	420	25	47	39	58	116
1957	444	28	51	43	62	125
1958	455	32	56	50	65	142
1959	484	33	60	54	67	151
1960	511	39	71	60	72	161
1961	520	51	81	65	77	170
1962	560	59	89	74	81	183
1963	590	68	94	83	86	188
1964	632	80	103	93	93	201
1965	685	88	115	99	100	215
1966	748	102	123	108	107	230
1967	794	120	124	116	110	251
1968	865	142	135	127	103	271
1969	931	166	151	142	110	291
1970	977	195	185	148	121	312

\* Net Material Product converted at a constant exchange rate of 0.9 roubles = \$1. The UN accounts definition has been used. This consists of: individual and collective consumption, net fixed capital formation, and net exports of goods and productive services.

### Total Armed Forces (in thousands)

Year	USA	Japan	West Germany	France	Britain <sup>d</sup>	USSR
1951	3,250	74*	—	610	841	4,600
1952	3,550	114*	—	645	890	4,600
1953	3,480	119*	—	695	902	4,750
1954	3,350	146*	15	600	840	4,750
1955	3,049	178	20	568	800	5,000
1956	2,857	188	66	785	760	4,500
1957	2,800	202	122	836	700	4,200
1958	2,637	214	175	797	615	4,000
1959	2,552	215	249	770	565	3,900
1960	2,514	206	270	781	520	3,623
1961	2,572	209	325	778	455	3,800
1962	2,827	216	389	742	445	3,600
1963	2,737	213	403	632	430	3,300
1964	2,687	216	435	555	425	3,300
1965	2,723	225	441	510	424	3,150
1966	3,123	227	455	500	418	3,165
1967	3,446	231	452	500	417	3,220
1968	3,547	235	440	505	405	3,220
1969	3,454	236	465	503	383	3,300
1970	3,066	259	466	506	373	3,305

\* National Police Reserve,  
\* Security Force.

\* Self Defence Forces.  
\* Excluding forces enlisted outside Britain.

5. MAJOR IDENTIFIED ARMS AGREEMENTS, JULY 1970-JUNE 1971

(A) WESTERN EUROPE

Recipient	Primary Supplier	Approximate Date of Agreement	Name of System	Approximate Numbers	Primary Role	Approximate Cost to Recipient (\$m)	Expected Date of Delivery
Belgium	France	1970	<i>Alouette III</i>	3	helicopters	n.a.	n.a.
	United States	3.71	C-130H	12	transports	55	1972-73
	Italy	1970	SF.260 MX	36	trainers	n.a.	n.a.
	Britain	5.71	<i>Swingfire</i>	n.a.	ATGW system	n.a.	n.a.
Britain	France	6.71	<i>Exocet</i>	300	naval SSM	54	n.a.
Denmark	United States	1970	Hughes 500M (OH-6A)	12	observation helicopters	n.a.	1971
Germany	France	1970	<i>La Combattante II</i>	20	patrol boats	240	1973-75
	United States	3.71	<i>Exocet</i> F-4E(F)	n.a. 175-220	naval SSM interceptor/fighter	n.a. 1,180	n.a. 1974-75
	Britain	12.70	Westland SH-3D	22	bombers ASW helicopters	n.a.	1971
Greece	France	8.70	AMX-30	50	medium tanks	33	1970-71
Italy	United States	8.70	C-130	14	transports	60	1971
	United States	10.70	CH-47C <i>Chinook</i>	8	medium helicopters	n.a.	1972
	West Germany	1970	<i>Leopard</i>	200*	medium tanks	n.a.	n.a.
Netherlands	United States	11.70	P-3C <i>Orion</i>	1	maritime patrol	n.a.	n.a.
	West Germany	9.70	SP guns on <i>Leopard</i> chassis	100	anti-aircraft	180	1971-
Norway	Britain	2.71	Westland SH-3D	10	helicopters	16.8	1972
Portugal	United States	1971	Boeing 707	2	troop transport	18	1971
Spain	France	1970	AMX-30	19	medium tanks	n.a.	n.a.
	United States	1970	F-4C	36	fighter	104	1971-
			KC-130 <i>Hercules</i>	2	tankers	n.a.	n.a.
			P-3 <i>Orion</i>	3	maritime patrol	n.a.	n.a.
			Sikorsky SH-3D	4	ASW helicopters	n.a.	1971
			Bell 209 <i>Huey</i>	4	attack helicopters	n.a.	1971
			<i>Cobra</i>	2	SP guns	n.a.	n.a.
			M-107 175mm	6	transport	n.a.	n.a.
			C-130 <i>Hercules</i>	6	medium tanks	n.a.	n.a.
			M-48	58	SP howitzers	n.a.	n.a.
			M-108 105mm	48	SP howitzers	n.a.	n.a.
			M-109 155mm	18	APC	n.a.	n.a.
			M-113	49	submarines	n.a.	n.a.
			<i>Guppy</i> -class	2	escorts	loan	1971
		Destroyers	5	MCM	loan	1971-72	
		<i>Agile</i> -class	4	LST	loan	1974-72	
		Landing ships	3		loan	1971-72	
Sweden	Britain	12.70	Westland SH-3D	4	ASW helicopters	n.a.	n.a.
	Japan	1971	KV-107	7	ASW helicopters	1.25	1973-74
Switzerland	Britain	1970	<i>Hunter</i>	30	fighter-bombers	14.4	1972-74

(B) MIDDLE EAST AND NORTH AFRICA

Abu Dhabi	Britain	12.70	<i>Hunter</i>	n.a.	fighter	n.a.	n.a.
Egypt	Soviet Union	1970-71	MiG-21	100	interceptors	n.a.	1970-71
	Soviet Union	1970-71	SU-7	25	fighter-bomber	n.a.	1970-71
	Soviet Union	1970-71	MiG-15/17	55	fighters	n.a.	1970-71
	Soviet Union	1970-71	Mi-8	70	helicopters	n.a.	1970-71
	Soviet Union	1970	203mm		artillery	n.a.	1970
	Soviet Union	3.71	SA-2, SA-3		SAM	n.a.	3.71
	Soviet Union	1970	ZSU-23/4		anti-aircraft guns	n.a.	1970
Iran	Britain	1971	<i>Chieftain</i>	700-800	medium tanks	168-192	n.a.
	United States	12.70	C-130H	30	transports	122	1970
Israel	United States	10.70	M-60, M-48	180	medium tanks	36	1970
	United States	9.70	F-4E	16-18	fighter-bomber	n.a.	1971
	United States	11.70	A-4E	18	fighter-bomber	n.a.	1970
Libya	Soviet Union	7.70	Field artillery	75		n.a.	1970
			T-54, T-55	200	medium tanks	n.a.	1970
			amphibious vehicles	36		n.a.	
Muscat and Oman	Britain	10.70	<i>Skyvan 3M</i>	5	transport	2.4	1970
	Canada	1970	<i>Caribou</i>	3	transport	n.a.	1970
Syria	Soviet Union	1970-71	MiG-17/21	n.a.	fighters	n.a.	1971
	Soviet Union	1970-71	Su-7	5	fighter-bombers	n.a.	1971
	Soviet Union	1970-71	Mi-8	22	helicopters	n.a.	1971

(C) SOUTH ASIA

Ceylon	Britain	4.71	<i>Bell Jetranger</i>	6	helicopters	n.a.	1971
	Soviet Union	4.71	MiG-17	6		n.a.	1971
India	New Zealand	5.71	<i>Canberra</i>	10	bombers	n.a.	n.a.
	Britain	12.70	Westland SH-3D	2	ASW	n.a.	1970
Pakistan	France <sup>b</sup>	3.71	<i>Mirage III-E/V</i>	30	fighter-bombers	n.a.	1973
	France <sup>b</sup>	1970	<i>Alouette III</i>	24	helicopters	n.a.	n.a.
	United States <sup>b</sup>	11.70	B-57	7	bombers	n.a.	n.a.
	United States <sup>b</sup>	1.71	F-104	6	fighters	} value of total deal	n.a.
	United States <sup>b</sup>	10.70	M-113	300	APC		n.a.
	United States <sup>b</sup>	11.70	patrol boats	4	coastal patrol	n.a.	n.a.
	United States <sup>b</sup>	3.71	T-37	4		n.a.	1971
	Sweden	1971	Saab 105	4	trainers	n.a.	n.a.

n.a.=not available.

\* Another 600 are to be built under licence in Italy.



## (D) SOUTH-EAST ASIA

Australia	United States	2.71	<i>Huey Cobra</i>	11	helicopters	13.8	1974
	France	11.70	<i>Mirage III-D</i>	6	trainers	12.4	1973
	United States	1970	CH-47C <i>Chinook</i>	12	helicopters	41	n.a.
	United States	1970	F-4E	24	fighter-bombers	60*	n.a.
Brunei	Britain	11.70	HS 748	1	transport	n.a.	1970
Indonesia	Malaysia	2.71	<i>Pioneer</i>	12	utility transport	n.a.	n.a.
Malaysia	France	8.70	patrol boats/ <i>Exocet</i>	7	SSM patrol boats	22.5	n.a.
	France	6.71	<i>Mirage V</i>	1 sqn	fighters	n.a.	n.a.
	Britain	5.71	<i>Bulldog</i>	15	trainers	0.8	n.a.
	United States	3.71	Sikorsky S-61	6	helicopters	n.a.	1971
Nepal	Britain	12.70	<i>Skyvan 3M</i>	1	transport	n.a.	n.a.
New Zealand	Britain	1970	BAC-167	10	fighters	8.4	1972
Singapore	New Zealand	12.70	<i>Air tourer</i>	2	trainers	n.a.	1970
Thailand	Britain	10.70	<i>Shorland MK3</i>	32	armoured cars	0.48	1971
	United States	9.70	helicopters	5		n.a.	1970
	United States	9.70	<i>HAWK</i>	1 battery	SAM	n.a.	n.a.

## (E) LATIN AMERICA

Argentina	France	10.70	<i>Mirage III-D/E</i>	12	trainer/fighter	49	n.a.
	Britain	12.70	Short <i>Skyvan 3M</i>	5	patrol, search/rescue	24	n.a.
	United States	5.71	Hughes 500	6	helicopters	n.a.	n.a.
	United States	9.70	C-130E <i>Hercules</i>	3	transport	n.a.	n.a.
Brazil	Britain	9.70	frigates	6	ASW	283	n.a.
	Britain	1970	<i>Seacat</i>	n.a.	SAM	n.a.	n.a.
Chile	United States	11.70	<i>Beech 99A</i>	9	trainers	n.a.	n.a.
Colombia	France	1970	<i>Mirage III-B/R</i>	4	fighters	n.a.	n.a.
	France	1970	<i>Mirage V</i>	14	fighters	n.a.	n.a.
Ecuador	France	1970	light armoured vehicles	27		n.a.	n.a.
	France	1970	AMX-13	41	light tanks	n.a.	n.a.
	Britain	1.71	<i>Skyvan 3M</i>	1	transport	n.a.	1971
	United States	10.70	T-41D	12	trainers	n.a.	11.70
Guyana	Britain	1.71	<i>Islander</i>	2	communication	n.a.	1971
Peru	Canada	1.71	<i>Twin Otter</i>	8	transport	4.8	1971
Uruguay	United States	6.71	<i>Friendship FH-227B</i>	2	transport	n.a.	1971
Venezuela	United States	2.71	C-130H	4	transport	n.a.	1971
	United States	6.71	Cessna 182 <i>Skylane</i>	12	transport/trainer	n.a.	1971

## (F) AFRICA - SOUTH OF THE SAHARA

Congo (Kinshasa)	France	1970/71	SA-330 <i>Puma</i>	30	helicopters	n.a.	1971-
	Italy	1970	SF-260	12	trainers	n.a.	1970
	United States	1.71	C-130	8	transport	17	n.a.
Gabon	France	8.70	<i>Alouette II</i>	1	helicopter	n.a.	n.a.
Ivory Coast	France	9.70	SA-330 <i>Puma</i>	1	helicopter	n.a.	9.70
Kenya	Britain	10.70	BAC-167 <i>Strikemaster</i>	6	fighters	n.a.	n.a.
	Britain	10.70	<i>Bulldog</i>	5	trainers	0.24	1972
Niger	France	12.70	<i>Noratlac</i>	4	transport	n.a.	n.a.
South Africa	Britain	11.70	Hawker Siddeley 748	3	transport	n.a.	n.a.
Tanzania	China	6.71	medium tanks	16		n.a.	n.a.
	China	1970-71	patrol boats	2		n.a.	1971
Togo	France	8.70	<i>Alouette II</i>	1	helicopters	n.a.	n.a.
Uganda	Israel	1970	<i>Sherman</i>	10	tanks	n.a.	1970
	Britain	1971	<i>Saladin</i>	30	armoured cars	n.a.	1971-
Zambia	Italy	1.71	SF 260	8	trainers	n.a.	n.a.
	Italy	3.71	MB 326	12	fighters	n.a.	n.a.
	Britain	12.70	Hawker Siddeley 748	1	transport	n.a.	n.a.
	Yugoslavia	1970	<i>Galeb</i>	2	trainers	n.a.	1971
	Yugoslavia	1970	<i>Jastreb</i>	4	light attack aircraft	n.a.	1971

## (G) NORTH AMERICA

Canada	United States	4.71	Boeing 707	1	transport	n.a.	1971
	United States	5.71	Bell COH-58A	74	light observation hel.	11	1971
	United States	3.71	<i>Beech Musketeer</i>	25	trainers	0.825	1972
	United States	11.70	P-3C <i>Orion</i>	30	maritime patrol	n.a.	n.a.
	United States	9.70	F-101 <i>Voodoo</i>	58+8	fighters	66	1971
	United States	10.70	CUH-1N	124	helicopters	n.a.	1971
United States	Britain	1971	AV-8 <i>Harrier</i>	18	ground support	64	1971

n.a. = not available. \* France has since banned deliveries and the United States is holding action on these deals in abeyance. \* Cost of leasing for 4 years.

## NOTES

This table lists major agreements on a firm-to-government and on a government-to-government basis, and covers both credit and cash sales. Costs to recipients may include spares, support, etc., and reflect the value of goods taken in part-exchange where applicable. Payees

may include sub-contractors in the purchasing country, as well as prime contractors in the supplying country. No licensing agreements are included.

American, Soviet and Chinese military aid to Vietnam, Cambodia, Laos and Korea, and Soviet deliveries to members of the Warsaw Pact are excluded.



## Chapter X

# APPENDIX

# The Military Balance Between NATO and the Warsaw Pact

Any assessment of the military balance between NATO and the Warsaw Pact involves comparison of the strengths of both men and equipment, consideration of qualitative characteristics such as geographical advantages, deployment, training and logistic support, and differences in doctrine and philosophy. These are the factors—and there are others as well, including notably the performance of weapons systems—that are at the heart of military security and will have to be taken into account by both sides when considering Mutual and Balanced Force Reductions (MBFR), so as not to be placed, as a result of changes, at a disadvantage. (MBFR has historical antecedents in the various arms control plans of the 1950s and 1960s, but more recently a precise proposal was made at the NATO Ministerial Meeting in Reykjavik in June 1968. In Spring 1971 there were indications of willingness by the Soviet Union to discuss the proposal.) Most of these factors are variables and may change over time, but the geographical asymmetry is not: This point is critical to any negotiations.

Military considerations are, however, only part of the problem; political questions are of first importance. These include the extent to which reductions should consist of stationed or indigenous forces and their equipment; the impact on confidence of the measures for verification and control of force reductions; and the effect on relationships within alliances of any agreements reached. While the appraisal which follows touches on many matters central to MBFR, drawing attention as it does to asymmetries which now exist, it is military only and thus one-dimensional. It should be regarded as primarily a quantitative guide since there are difficulties in giving values, in so short a space, to qualitative factors and deciding on their relevance. Furthermore, the situation is not a static one: any single presentation must have inadequacies. The comparisons necessarily oversimplify what is by its nature a complex problem.

### Land and Air Forces

The three NATO major subordinate commands—Northern, Central, and Southern Europe—at first seem to offer a convenient basis for making a direct comparison with the opposing forces of the Warsaw Pact, but there are problems. The Northern European Command covers not only Norway but also the Baltic area including Denmark, Schleswig-Holstein, and the Baltic approaches. It is not possible to make precise calculations as to the Soviet formations that would be committed to the Baltic area rather than toward the NATO Central European Command. In both land and air forces there is a considerable degree of flexibility to do either: for the Warsaw Pact this sector is a coherent front. For this reason, Northern and Central Europe are grouped together in the tables which follow and Southern Europe is shown separately. Such a grouping conceals, however, a marked imbalance in north Norway.

GROUND FORMATIONS

Category	Northern and Central Europe <sup>a</sup>			Southern Europe <sup>b</sup>		
	NATO	Warsaw Pact	(of which USSR)	NATO	Warsaw Pact	(of which USSR)
Ground forces available to commanders in peacetime (in division equivalents)						
- armoured .. ..	8	28	19	7	9	3
- infantry, mechanized and airborne .. ..	16	37	22	30	21	4

<sup>a</sup> Includes, on the NATO side, the commands for which AFCENT and AFNORTH commanders have responsibility (see introduction to NATO section). France is not included nor are any allied ground forces in Portugal or Britain. On the Warsaw Pact side it includes the command for which the Pact High Commander has responsibility, but excludes the armed forces of Bulgaria and Rumania. Soviet units normally stationed in western USSR and such troops as might be committed to the Baltic theatre of operations have, however, been included on the Warsaw Pact side.

<sup>b</sup> Includes, on the NATO side, the Italian, Greek, and Turkish land forces (including those in Asian Turkey) and such American and British units as would be committed to the Mediterranean theatre of operations, and on the Warsaw Pact side, the land forces of Bulgaria, Hungary and Rumania, and such Soviet units normally stationed in Hungary and southern USSR as might be committed to the Mediterranean theatre.

If French formations (not part of NATO's integrated commands) are included they would add two mechanized divisions to the NATO totals (these are the two divisions stationed in Germany. There are four more in France). The appropriate forces of all of the Warsaw Pact countries are included, though the military values of some of them may be suspect for political reasons.

In Norway, there are only Norwegian forces in peacetime, a brigade group being located in the north. The Soviet forces facing them or which could be brought against them from northwestern Russia probably amount to at least four divisions. This wide disparity highlights the problem of the defense of north Norway against surprise attack. To meet this difficulty, a system of self-defense, based on a powerful Home Guard and rapid mobilization, has been designed to take maximum advantage of the ruggedness of the country and the poor road and rail communications, but it is clear that defense against attack of any size depends on timely external assistance.

Two further imbalances are worth noting. The first, a legacy from the postwar occupation zones, is a certain maldeployment in the NATO Central European Command, where the well-equipped and strong American formations are stationed in the southern part of the front, an area which geographically lends itself to defense, while in the north German plain, across which the routes to allied capitals run, where there is little depth and few major obstacles, certain of the forces are less powerful. The second is that the whole of the Italian land forces, which are included in the table under Southern Europe, are stationed in Italy and thus are at some distance from the areas of potential confrontation.

**Manpower**

A comparison of formations is not by itself sufficient, however, since NATO formations are much larger than those of the Warsaw Pact. It is necessary to take account of this difference in size and also of the combat troops in formations higher than divisions and those men who directly support them. Figures calculated on this basis—and the calculation can only be an approximate and arbitrary one—give the following comparison for forces in peacetime (figures are in thousands):

Category	Northern and Central Europe			Southern Europe		
	NATO	Warsaw Pact	(of which USSR)	NATO	Warsaw Pact	(of which USSR)
Combat and direct support troops available .. ..	580	960	588	525	385	90

If French forces are counted, including those stationed in France, the NATO figure for Northern and Central Europe might be increased by perhaps 120,000.

### Reinforcements

The mobilization of first-line reserves and the movement of reinforcements to the theater would materially alter the above figures. The immediate mobilization capacity of the Warsaw Pact is greater than that of the West: It has been estimated that the force of thirty-one Soviet divisions in Central Europe might be increased to seventy in well under a month, if mobilization were unimpeded. The Soviet Union, a European power and operating on interior lines, can bring up reinforcements overland, with heavy equipment, far faster than can the United States across the Atlantic. American ability to bring back quickly by air the dual-based brigades whose equipment is in Germany has been demonstrated and the C-5 aircraft, the first of which are now in service, will greatly increase the airlift. But this lift depends on a secure air environment, safe airfields to fly into, and the willingness to reinforce in a crisis situation at the risk of heightening tension by doing so. And reinforcing divisions would need sealift to move their heavy equipment.

Implicit in Western defense plans is the concept of political warning time, that there will be sufficient warning of a possible attack to enable NATO forces to be brought to a higher state of readiness and for reinforcement and mobilization to take place. Advantage here will always lie with an attacker, who can start mobilization first, hope to conceal his intentions and achieve some degree of tactical surprise. The point of attack can be chosen and a significant local superiority built up. The defender is likely to start more slowly and will have to remain on guard at all points.

A fair summary of the reinforcement position might be that the Warsaw Pact is intrinsically capable of a faster buildup in the early stages, particularly if local or general surprise is achieved; that NATO can only match such an initial buildup if it has, and takes advantage of, sufficient warning time; that the subsequent rate of buildup favors the Warsaw Pact unless the crisis develops slowly enough to permit full reinforcement; in this last case, the West would be in a position much more resembling equality. Alliance countries maintain more men under arms than the Warsaw Pact. For Army/Marines the figures (in thousands) are: NATO, 3,409 (including France, 329); Warsaw Pact, 2,778. Of course, large numbers of these men are outside Europe, as for example American forces in Asia and Soviet forces on their Far Eastern frontier.

### Equipment

In a comparison of equipment, one point stands out: The Warsaw Pact is armed almost completely with Soviet or Soviet-designed material and enjoys the flexibility, simplicity of training, and economy that standardization brings. NATO forces have a wide variety of everything from weapons systems to vehicles, with consequent duplication of supply systems and some difficulties of interoperability.

As to numbers of weapons, there are some notable differences, of which tanks are perhaps the most significant. The relative tank strengths are as follows:

Category	Northern and Central Europe			Southern Europe		
	NATO	Warsaw Pact	(of which USSR)	NATO	Warsaw Pact	(of which USSR)
Main battle tanks in operational service - in peacetime <sup>a</sup>	5,500	16,000	10,000	2,250	5,700	1,600

<sup>a</sup> These are tanks with formations and exclude those in reserve or storage.

It will be seen that NATO has little more than a third as many operational tanks as the Warsaw Pact in Northern and Central Europe, though NATO tanks are generally more modern (except for the T-62, now in service in the Pact forces in some numbers). This relative weakness in tanks reflects NATO's essentially defensive role and is offset to some extent by a superiority in ground antitank weapons. NATO probably also has more effective airborne antitank weapons, such as the missiles carried by fighter aircraft and helicopters. In conventional artillery, both sides are about equal in strength; NATO is, though, likely to have superior firepower because of the greater lethality of its ammunition and the logistic capability to sustain higher rates of fire. This capability stems from a significantly higher transport lift, about half as high again in a NATO division as compared with a Warsaw Pact one. NATO has, however, an inflexible logistic system, based almost entirely on national supply lines with little central coordination. It cannot now use French territory and has many lines of communication running north to south, near the area of forward deployment.

## Aircraft

If NATO ground formations are to be able to exploit, by day as well as by night, the mobility they possess, they must have a greater degree of air cover over the battlefield than they now have. Such cover is provided by a combination of rapid warning and communications systems, surface-to-air weapons, and fighter aircraft. In much of this ground-air environment NATO is well prepared, but in numbers of aircraft it is markedly inferior:

Categories	Northern and Central Europe			Southern Europe		
	NATO	Warsaw Pact	(of which USSR)	NATO	Warsaw Pact	(of which USSR)
Tactical aircraft in operational service						
- light bombers .. ..	150	280	200	—	30	30
- fighter/ground attack ..	1,150	1,400	1,100	450	150	50
- interceptors .. ..	300	2,100	1,100	275	900	450
- reconnaissance .. ..	400	400	300	125	100	40

The division into the categories shown is only approximate since some aircraft can be adapted to more than one kind of mission. In general, NATO has a higher proportion of multipurpose aircraft of good performance over their full mission profiles, especially in range and payload. Both sides are modernizing their inventories, but the Warsaw Pact has recently introduced new types, such as the MIG-23, possibly superior to any interceptor that NATO has in operational service. The two air forces have, however, different roles: long range and payload may have lower priority for the Warsaw Pact. NATO, for example, has maintained a long-range, deep-strike tactical aircraft capability; the Soviet Union has chosen to build an MRBM force which could, under certain circumstances, perform analogous missions.

The Warsaw Pact also enjoys the advantage of interior lines of communications, which make for ease of command and control and logistics. They have a relatively high capability to operate from dispersed natural airfields serviced by mobile systems, have far more airfields with more shelters and the great advantage of standard ground support equipment which stems from having only Soviet-designed aircraft. These factors make for much greater flexibility than NATO, with its many national sources of aircraft and wide variety of support equipment. NATO probably has some superiority in sophistication of equipment, the capability of its aircrews, which have in general higher training standards and fly more hours, and the versatility of its aircraft. The NATO countries also have a worldwide inventory of aircraft far greater than that of the Warsaw Pact and in a situation where total reinforcement can be taken into account would have the greater capability. With all these different factors, the relative capabilities are not measurable in precise terms, but the Warsaw Pact advantage in numbers remains a very real one.

## Theater Nuclear Weapons

NATO has some 7,000 nuclear warheads, deliverable by a variety of vehicles, some 2,250 in all, aircraft, short-range missiles, and artillery. These nuclear weapons are, in general, designed for use within the battlefield area or directly connected with the maneuver of combatant forces, which could be described

as a "tactical" use. The figure of 7,000 warheads includes, however, a substantial number carried by, for example, aircraft such as the F-4 or F-104, which could be delivered on targets outside the battlefield area or unconnected with the maneuver of combatant forces and thus be put to "strategic" use. There is inevitably some overlap when describing delivery vehicles, aircraft, and missiles, capable of delivering conventional or nuclear warheads, as "tactical" or "strategic." The total of 7,000 also includes nuclear warheads for certain air-defense missiles. There are also nuclear mines. Yields are in the kiloton range. The ground-based missile launchers and guns are in formations down to divisions and are operated both by American and allied troops, but in the latter case warheads are under double key. The figure for Soviet warheads is probably about 3,500, delivered by roughly comparable aircraft and missile systems. Some of the delivery vehicles, but not the warheads, are in the hands of non-Soviet Warsaw Pact forces.

This comparison of nuclear warheads must not be looked at in quite the same light as the conventional comparisons preceding it, since on the NATO side the strategic doctrine is not and cannot be based on the use of such weapons on this sort of scale. These numbers were accumulated to implement an earlier, predominantly nuclear, strategy and an inventory of this size now has the chief merit of affording a wide range of choice of weapons, yield, and delivery system if controlled escalation has to be contemplated. A point that does emerge from the comparison, however, is that the Soviet Union has the ability to launch a battlefield nuclear offensive on a massive scale if it should choose, or to match any NATO escalation with broadly similar options.

### Changes Over Time

The comparisons above are not very different from those of a year ago, but over a longer time-span the effect of small and slow changes can be marked and the balance can alter. In 1962, the American land, sea, and air forces in Europe totaled 434,000; now the figure is 300,000. There were twenty-six Soviet divisions in Eastern Europe in 1967; now there are thirty-one. The numbers and quality of surface-to-air missiles in the Warsaw Pact forces have steadily grown, presenting now a most formidable defense, and Soviet tactical aircraft numbers have grown with them. The general pattern over the years has been a gradual shift in favor of the East.

### Naval Forces

To compare the maritime strengths of the two sides, particularly on a regional basis, offers many difficulties. Naval power is highly flexible; ships move between fleets, fleets move over great distances; strategic and tactical functions are often speedily interchangeable. It is far from easy and often inappropriate to set ships off against each other numerically. The requirement for destroyers, for example, is not related to the numbers of enemy destroyers but to the need to escort surface vessels against submarine or air threat; in antisubmarine warfare, surface vessels, submarines, and maritime aircraft must all be seen together as combined teams.

Given these and many other reservations, some touched on later, the relative strengths of the more significant ships in the North Atlantic, Baltic, and Mediterranean/Black Sea areas are listed below. The figures must not be regarded as indicating any fixed or optimum fleet dispositions, but simply a typical strength; transfers to and from the Soviet or American Pacific fleets can and do take place (though the size of the Soviet Pacific Fleet will be dictated not only by the number of American ships in that area but also by the navies of China and Japan).

The figures do not include the French Navy, which is a substantial force and quantitatively stronger than the Soviet Mediterranean squadron normally is.

Category	NATO	Warsaw Pact	Remarks
Attack carriers .. .. .	10	—	Attack carriers have 70-100 aircraft embarked
ASW carriers .. .. .	4	2	
Surface attack - cruisers/destroyers <sup>a</sup> .. .. .	6	15	Warsaw Pact boats generally have SSM
Anti-submarine - destroyers/frigates/escorts <sup>b</sup> .. .. .	276	150	
Motor torpedo/gun boats .. .. .	136	161	
Attack submarines:			
- nuclear .. .. .	33	20	
- diesel, long/medium range .. .. .	90	160	
short range .. .. .	30	22	

<sup>a</sup> These ships have significant anti-ship weapons, in the Soviet case long-range SSM.

<sup>b</sup> The missiles carried by these ships are primarily or exclusively for air defence (SAM).

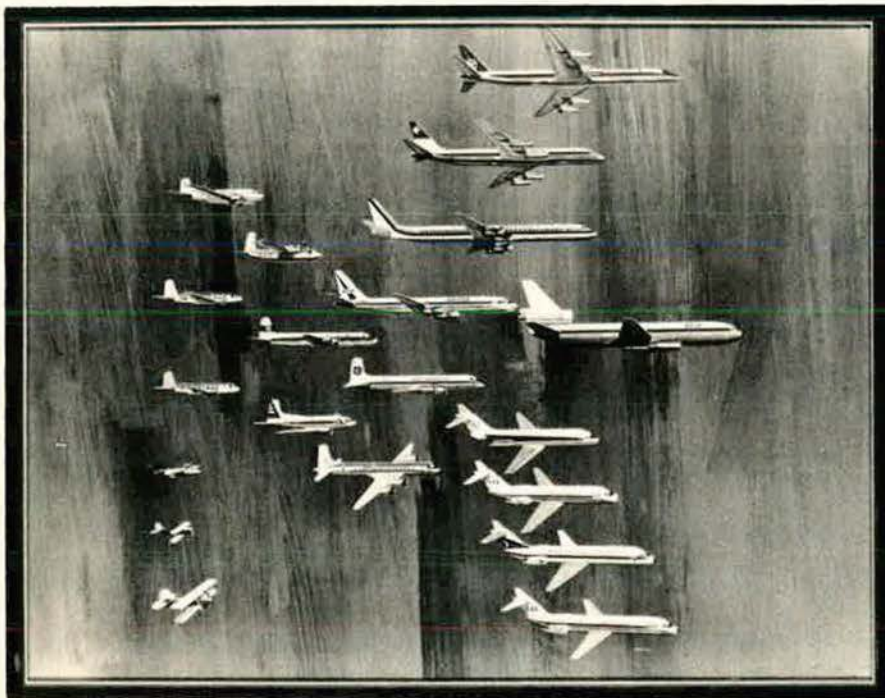
The comparisons show marked and well-known asymmetries. The United States Navy has powerful carrier strike forces, with aircraft and missiles for air defense and antisubmarine warfare, and with long-range aircraft for the strike role against surface vessels and land targets, nuclear armed if appropriate. The Soviet Navy, by contrast, has no attack carriers and relies on land-based aircraft for both air cover and strike, supplemented by shipborne SAM and, of course, by the long-range SSM, which a large number of Soviet vessels carry and for which there is no Western equivalent. This lack of carrier-borne aircraft would in war or in time of tension effectively limit the radius of action of Soviet surface fleets, despite the fact that they are in other ways becoming increasingly self-sufficient, and means that they do not have a true worldwide maritime capability.

The Soviet Union has had to develop a counter to the strategic threat posed by strike carriers and missile submarines in the Atlantic and Mediterranean and has built large numbers of submarines for this purpose. Because of this, the West has paid great attention to antisubmarine warfare and is probably ahead in this field, but this does not offset the sheer numbers of submarines that the Soviet Union deploys; to find and engage nuclear-powered boats is particularly difficult. This imbalance is the more important because the West depends on major naval surface ships on the carriage by sea of basic commodities: it is more vulnerable to submarine attack than is the Soviet Union.

The long-range SSMs on Soviet cruisers, destroyers, and submarines have some limitations, and the horizon-range systems now entering service present a more serious problem. The short-range SSM on the patrol boats are most effective and are backed up by missiles carried by more aircraft and in shore batteries. The SSM systems pose a particular threat to naval forces without carriers, dependent for their own long-range strike on land-based aircraft.

Any assessment of an overall balance is difficult to make. The differing roles in wartime must be taken into account: The Soviet fleets would be largely strategically defensive, meeting the threat posed by Western carrier strike forces and missile submarines (though there would be large numbers of Soviet submarines left available for offensive purposes). The nature of the main deployment areas must also be considered. In the Mediterranean, for example, Soviet resupply and reinforcement to and from the naval squadron could be extremely difficult. Of great importance would be the degree of availability to the Soviet Union of airfields in the Mediterranean countries. In the North Atlantic, the United States can readily draw on reinforcements from the home base; the Soviet Union, by contrast, is much more limited in its strategic movement.

The biggest imponderable is that of the nature and duration of any future conflict. If extended, then Soviet submarine strength would be a menace to Western shipping, worldwide, whereas the Soviet Union is much more self-sufficient. If short, then, naval action is unlikely to be dominant; the outcome would be decided on land. There are too many variables to allow comprehensive judgments, but it seems fair to say that while the sea is still an area in which the West has superiority, the Soviet fleets are now able to offer a challenge at every level of military or politico/military action.



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## New Construction

This challenge has emerged in recent years and is the result of a Soviet shift to a more forward deployment rather than more rapid naval building in the East than the West. The following table, which lists the deliveries of new ships over 1,000 tons, of major conversions, and of ocean-going submarines in the last ten years, to the Warsaw Pact (in fact the Soviet Union, since the other Warsaw Pact countries received no new ships in the period) and NATO navies, excluding France, helps to show this. It certainly brings out the Soviet emphasis on building submarines, particularly marked since 1968, but, as far as surface naval vessels are concerned, it also shows that the NATO countries have generally been outbuilding the Warsaw Pact, quantitatively and often qualitatively. Whether, under pressure from rising costs, each will continue to devote the same proportion of resources to their navies is another matter. Furthermore, the ships to be delivered in the next few years will be the result of decisions taken some years ago and shipbuilding in individual NATO countries tends, in any case, to be somewhat of a cyclical affair. The pattern revealed by this table may not necessarily be maintained.

NAVAL DELIVERIES 1961-70

Category											Totals	
	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	Last 10 yrs	Last 5 yrs
A Attack Carriers NATO	3			1	1			1			6	1 <sup>a</sup>
B Cruisers (SAM conversions) WP NATO	1	1	1								1	
C ASW Cruisers WP NATO	1	2	1				1		1		2	2 <sup>c</sup>
C SAM Cruisers WP NATO									1		5	1
D SSM Ships WP		1	2	1			2	2	1	2	11	7 <sup>b</sup>
E ASW Destroyers WP NATO	1	2	2	3	4	2	3	6	5	6	34	22
E DLG/DDG/DEG WP NATO	10	11	14	8	3	7	11	3	3	3	73	27 <sup>d</sup>
F Escorts WP NATO	4	8	8	8	8	8	8	8	8	12	80	44 <sup>e</sup>
F Destroyers/escorts WP NATO	9	8	13	11	10	15	20	9	12	16	123	72
G Amphibious ships WP NATO	1	3	2	1	4	2	2	2	2	2	10	10 <sup>f</sup>
G NATO							3	2	6	1	25	14
H Submarines, attack, nuclear WP NATO	4	3	6	5	6	5	5	3	6	7	50	26 <sup>g</sup>
H NATO	4	2	2	4		4	8	5	10	6	45	33
I diesel WP NATO	9	6	6	6	6	2		4			39	6
I NATO	4	4	2	4	2	2	2				20	4 <sup>h</sup>
J Submarines, ballistic missile nuclear WP NATO	2	2					1	4	5	7	21	17 <sup>i</sup>
J NATO	3	3	7	13	4	5	3	2	1	1	42	12
K diesel WP	6	4									10	

### NOTES

<sup>a</sup> The Soviet Navy has no attack carriers. The *Moskva* class (see below) is an ASW cruiser.

<sup>b</sup> *Kynda*, *Kresta* and *Krupnyi* classes. There is no comparable cruiser in NATO fleets.

<sup>c</sup> *Moskva* class. One of the NATO SAM cruisers has a similar but smaller capability but the remainder are not really comparable.

<sup>d</sup> This NATO category covers a wide range of destroyers, the largest of which, the DLG, is classified by some navies as a light cruiser.

<sup>e</sup> The small size of these Soviet escorts limits their world-wide value. Of the NATO ships compared here

the greater proportion qualify in many respects for the heavier category E.

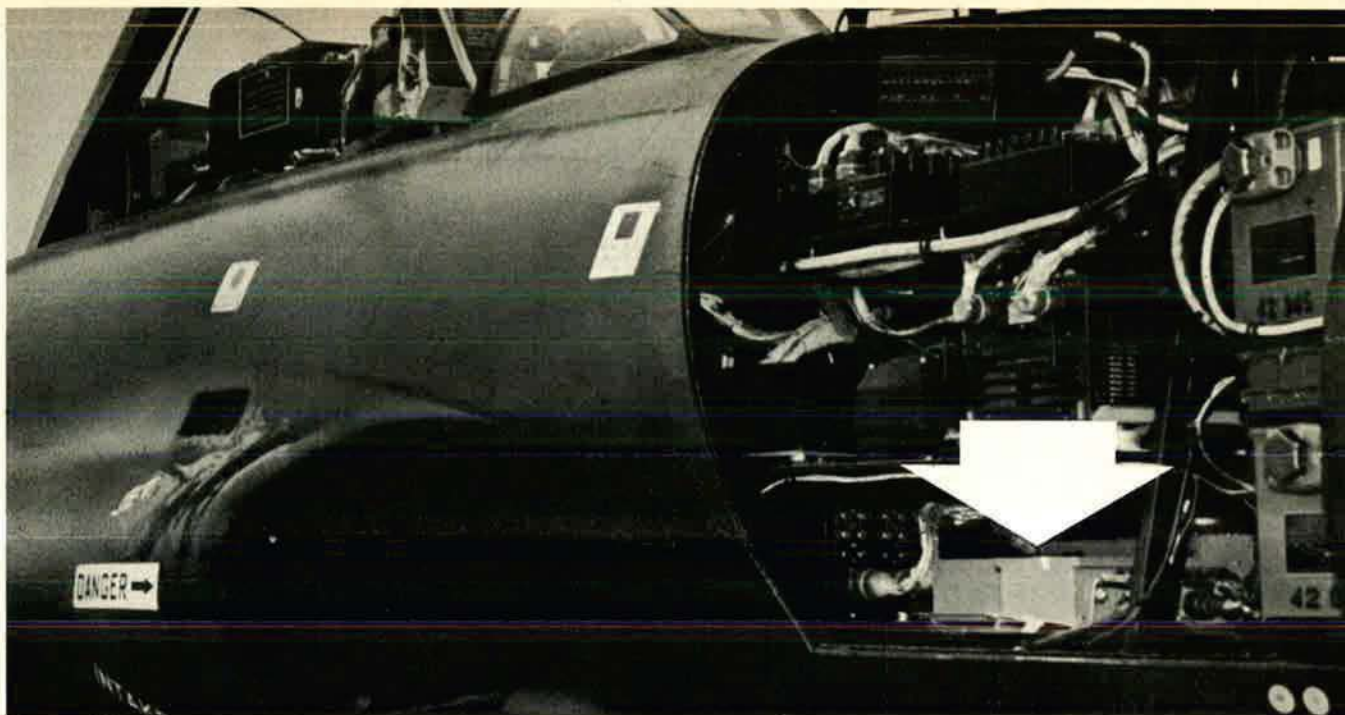
<sup>f</sup> Soviet ships are much smaller and hardly comparable.

<sup>g</sup> The Soviet building rate is now about 7 a year; the US figure is 6.

<sup>h</sup> Over 700 tons only. NATO has built a further 35 between 450-600 tons. About 25 of the Soviet submarines carry cruise missiles, usable against ships or land targets.

<sup>i</sup> The Soviet building rate is about 7-8 a year. The US *Polaris* programme ended in 1967.





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## Realism Revisited

*The Rivals: America and Russia Since World War II*, by Adam B. Ulam. Viking Press, New York, N. Y., 1971. 405 pages with index. \$10.95.

In view of the current American fascination with China and things Chinese, it is worth bearing in mind that the Soviet Union remains the only country in the world that can physically destroy the United States. This harsh reality underlies Adam Ulam's latest book, a convincing and very readable critical history of the past twenty-five years of Soviet-American relations.

*The Rivals* can probably best be described as a personal tour of the highlights in Soviet-American relations since the end of World War II. Purely as history, it is a brief and accurate refresher, but it lacks detail and skips over a number of major events. However, one suspects that the author's real purpose is more to remonstrate against a state of mind that has regrettably characterized much of American foreign policy: the fascination with idealism and the sense of a moral role for America, which have led time and again, to believe Mr. Ulam, to what he calls the "immorality of unrealism." Unfortunately, it is difficult to dispute this contention.

The author's major concern seems to be to reveal how, through the obscuration of national interest by ideology, this mentality has resulted in lost opportunities for both the United States and the Soviet Union. His conclusions in specific instances will no doubt ruffle some feathers among former policy-makers, and stir up considerable academic disagreement, as, for example, his idea that the introduction of Soviet missiles into Cuba in 1962 was part of a Khrushchevian grand design to force Communist China into signing the nuclear non-proliferation agreement. But such historical analyses as this are a necessary first step in the process of reorienting American foreign policy toward its goal of "realistic deterrence."

*The Rivals* concludes with a negative but refreshingly different assessment of the American involvement in Vietnam. Mr. Ulam does not deny, as many would, any American interest

in Indochina; rather, he contends that the stated reason for American involvement—to deter Chinese expansion in the area—was unrealistic, since the Chinese had neither the ability nor the desire to do so, given the heightened tensions along the Sino-Soviet border. More significantly still, our ability to play off the parties to that dispute against each other was effectively neutralized by providing them with a common interest in Vietnam.

While *The Rivals* is not a definitive history of the period, it is a serious and scholarly attempt to learn from that history, and it deserves the attention of academic and layman alike.

—Reviewed by Capt. John S. Kelsey, USAF, Department of Political Science, USAF Academy.

## Catastrophe

*Disaster at Bari*, by Glenn B. Infield. Macmillan, New York, N. Y., 1971. 301 pages with appendix, bibliography, and index. \$7.95.

Bari, Italy—the port city on the Adriatic, at the top of the heel of the boot, about where a spur would be. Bari, in late November 1943, was a beehive. The Allies had won the war in North Africa, had taken Sicily, and had made good their landing on Italy. Newly conquered Foggia was being readied as the base for Jimmy Doolittle's Fifteenth Air Force, and supplies and men were being funneled through the port city of Bari, seventy miles southeast of Foggia.

On the night of December 2, 1943, the harbor at Bari was teeming with ships. All that cargo was urgent to someone, and Bari was, after all, far from the front lines and the Germans were holding back what remained of their Luftwaffe to counter the impending invasion across the Channel. So it was that the ships were close packed, waiting their turn at the docks. So it was that the city and harbor blazed with light. So it was that the anti-aircraft and fighter defenses were off guard.

That was the moment the Germans chose to strike.

German reconnaissance had been watching the buildup in Bari's harbor. The Germans knew well that the sup-

plies pouring into Bari would soon be used against them as the British Eighth Army drove up the east coast of Italy and as Doolittle got his new air force into action. Field Marshal Albert Kesselring, the German commander in chief in Italy, watched and waited. And then came the night of December 2.

On that night, against that fat, complacent target, Kesselring unleashed 105 Junkers Ju-88 twin-engine light bombers from his carefully hoarded force, based in northern Italy and Yugoslavia. The pilots were ordered to come in low, from the east, skimming the water and attacking just at dusk.

The pilots obeyed their orders. The results were stunning.

In minutes, seventeen Allied ships were totally destroyed and eight others badly damaged. Casualties were heavy.

Unknown to the Germans—and to all but a handful of the Americans at Bari—one of those ships, the merchantman *S. S. John Harvey*, was loaded with 100 tons of mustard gas. The gas was destined for storage in Italy, for retaliation in case the Germans, in desperation, resorted to gas warfare.

The *John Harvey* exploded. The mustard impregnated the water of the harbor, already fouled by floating fuel oil. The gas filled the air, already choked with smoke from ruined and burning ships. Men died and did not know what killed them. Others, treated for shock and immersion, lingered for days and then mysteriously worsened and died.

The account of the bombing of Bari and its aftermath is told in great detail in Glenn Infield's newest book. Perhaps most fascinating is the medical detective work conducted in the days and weeks after the German raid, when US medics struggled against staggering odds to learn why apparently uninjured victims were still dying.

And once the chemical agents were identified, some at first thought the Germans had gassed Bari. Retaliation was a near thing.

Little was said officially about what happened at Bari, at the time or later. Infield's book remedies that. The author, a former major and USAF pilot, also wrote *Unarmed and Unafraid*, a history of aerial reconnaissance, which was reviewed on p. 22

of the January '71 issue of AIR FORCE Magazine.

—Reviewed by Richard M. Skinner, Managing Editor of this magazine.

## A Liberal Look

*The USA Astride the Globe*, by Merlo J. Pusey. Houghton Mifflin, Boston, Mass., 1971. 247 pages. \$5.95.

American foreign policy is undergoing searing reexamination. Where should we be heading in our relations with other nations? What are our real interests? Vietnam is the catalyst. It has called our foreign and military policies into question.

Merlo J. Pusey, the distinguished Associate Editor of the Washington Post, in *The USA Astride the Globe*, continues his attack on American foreign policy and the way it is made. Almost polemically, he argues that we have become the world's policeman, "a sort of global guardian against Communism." President Nixon renounced this goal, but the tendency is "to go ahead with the policing." We are still overextended militarily.

Pusey champions NATO as a "genuine collective defense arrangement," but is turned off by our involvement in SEA as an example of excessive reliance on a military solution to a complex political problem.

Previously associated with such benevolent enterprises as the Marshall Plan, the US is now identified "with the war in Korea, the occupation of the Dominican Republic, the Bay of Pigs, the war in Vietnam, the secret war in Laos, and the invasion of the Cambodian sanctuaries."

Pusey is not completely in the revisionist school that charges America with starting and perpetuating the cold war. But he seems to underestimate the seriousness and urgency of the situation after World War II which triggered our response to the Soviets in eastern and central Europe.

Were we wrong in drawing the line, in stepping in when western Europe was prostrate? Was Korea a mistake? To some observers, in the backlash of Vietnam, it may seem that way. But surely that is vindictive hindsight. Western Europe did come back strongly and South Korea was saved.

Pusey is on more solid ground when he says that the power to make war has swung too far to the Presidency. There are, of course, compelling reasons for this, primarily the fact that in the nuclear age the Executive may have to make a decision quickly. But this was not so with Vietnam, a war which built up over a

long period, dragged on, and put a terrific strain on this nation. Although it is difficult to generalize about Vietnam, it seems certain that future Presidents will be exceedingly careful about involving the nation in this kind of conflict without the solid support of the citizenry.

Pusey agrees that we need a nuclear deterrent, but says that we have gone too far, that we have overkill. But he falls into the trap of assuming that we can calculate precisely how many warheads will deter and that once having that many, then that is all it takes. Such erroneously simplistic calculations—based on a McNamara formula that he approvingly quotes—mar Pusey's analysis of military and foreign affairs. It seems that part of the steep price that we have paid for Vietnam is the loss of our strategic nuclear superiority.

Interestingly, among people who now deplore "globalism" the most vehemently are to be found those who were in the vanguard of the containment movement in the late 1940s and 1950s. Even assuming that a so-called "cold war view"—whatever that may mean—is wrong now, it does not follow that it was in any way incorrect in 1947. Events continue to play strange, if nevertheless revealing, tricks on our experts and poohbahs. Contrary to much contemporary rhetoric, history holds no simple lessons.

It will always be so.

—Reviewed by Herman S. Wolk,  
Office of Air Force History.

## Annual Miracle

*Jane's All The World's Aircraft, 1971-72*, edited by John W. R. Taylor. Distributed by McGraw-Hill, New York, N. Y., 1971. 774 pages with index. \$55.00.

To our many readers who are familiar with this monumental and authoritative publication, produced by London-based Jane's Yearbooks, it is sufficient to say that the 1971-72 edition is no doubt the finest in its sixty-two-year history. Of the nations with aircraft and aerospace industries, only the products of Bulgaria and China are absent, and that by the choice of those countries.

There is much new information on Soviet air- and spacecraft, and, for the first time, noise data and turn radius information on a number of leading jet aircraft.

Another innovation is the presentation of a full range of piloted and pilotless reconnaissance vehicles. And Editor John W. R. Taylor's Foreword is the most succinct discussion of

worldwide trends in the aerospace industry that one could hope for.

Those who have not had the pleasure of acquaintance with this annual publication should know that it is the standard reference work on the general, commercial, and military aircraft of all nations, with the two exceptions noted above. It includes pictures, plan-views, and detailed data on hundreds of aircraft as well as helicopters, research rockets, spacecraft, military missiles, drones, engines, and sailplanes.

Also included are official records, first flights made during the period since last publication, and a tabulation of US and USSR satellite and spacecraft launches for an approximate twelve-month period prior to closing of this edition in July 1971. The Soviets had more than three times as many launches as did the US.

*Jane's All The World's Aircraft*, in the hackneyed phrase of the used-car dealer, "must be seen to be appreciated." It remains a unique contribution to aerospace information.

## 1927—The Transatlantic Year

*Flight Fever*, by Joseph Hamlen. Doubleday, New York, N. Y., 1971. 372 pages. \$7.95.

Joseph Hamlen has written a very readable, often exciting, story of the airmen who attempted the nonstop flights from New York to Paris in 1927. Among them were some of the world's most famous air heroes—many of them all but forgotten today.

For those who are too young to remember the "dream flight," the excitement which aborted attempts, failures, and Lindbergh's successful flight created is well-nigh impossible to imagine. The author has recaptured much of the drama of that remarkable year in aviation history. For some readers, it will be pure nostalgia; for others, history brought to life.

Three new titles in Ballantine's "Illustrated History of the Violent Century" series are: *Schweinfurt: Disaster in the Skies*, by John Sweetman; *Opening Moves: August 1914*, by John Keegan; and *Carpathian Disaster: Death of an Army*, by Geoffrey Jukes. Each volume 160 pages. \$1 each, paperback.

*The Naval War Against Hitler*, by Donald Macintyre. This is a carefully researched account of the war at sea against the German surface and submarine fleets. Well illustrated and with plenty of good maps. Charles Scribner's Sons, New York, N. Y., 1971. 376 pages with index. \$10. ■

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## Progress Report

AFA's Aerospace Education Foundation, headed by a new president, intensifies its role as interface between civilian and Air Force education. Its goal is to see more school systems benefit from USAF expertise.

**D**R. LEON M. Lessinger, a distinguished educator, and a former Associate Commissioner of the U. S. Office of Education, is the new President of AFA's Aerospace Education Foundation.

"Sooner or later, and the sooner the better," he says, "all elements of society must become not merely supporters of, but active participants in, the educational process. This means, to begin with, a close working relationship between the educational community—especially the student—industry and the professions, civic leaders, and government—local, state, and national. The Aerospace Education Foundation already has established this working relationship. And the perennial barriers to action in advancing education concepts and practices are happily missing in this organization. The Aerospace Education Foundation represents a new avenue toward the total involvement of our society in education."

Dr. Lessinger is particularly interested in the Foundation's pioneering work with the educational concepts, techniques, and course materials developed by the US Air Force. He views the Air Force's contributions in developing advanced teaching techniques, including its work in programmed instruction, as a vast reservoir of valuable experience and validated data.

The main thrust of Foundation activities in recent years has been to tap this "vast reservoir" that the Air Force has been willing to share with the civilian education community. Here are the highlights of those activities.

### The Utah Project

This continuing program centered in an eighteen-month study conducted by the Foundation under a grant from the U. S. Office of Education. Air Force course materials, selected by Utah administrators and teachers, were tested in five Utah schools to determine their

# Sharing Air Force's Educational Know-How

By Michael J. Nisos

MANAGING DIRECTOR  
AEROSPACE EDUCATION FOUNDATION

effectiveness in a civilian setting. Portions of three courses tested included electronics principles, aircraft pneudraulics, and medical laboratory technician (nurse's aides).

Evaluations, by an independent source, proved that students taking the Air Force courses generally scored higher in post tests and retention tests than those taught the conventional way; further, both students and teachers preferred the Air Force courses to the conventional ones.

This was the first attempt to explore systematically the feasibility of applying military training to civilian education. It prompted the state of Utah, on its own but working through



*Dr. Lessinger, new Aerospace Education Foundation president, is now Calloway Professor of Urban Education, Georgia State University. Formerly, he was Associate Commissioner, United States Office of Education.*

the Foundation, to incorporate additional Air Force training materials into the public school system after the experiment had been concluded. For example, Utah, with its own funds, has purchased the entire Air Force Electronic Principles course, amounting to 540 hours of instruction, including some 240 hours of motion picture film. Additionally, Utah purchased an electronics course package for use in a mobile research center that travels throughout the state to circulate the materials to isolated areas.

Thus, Utah has become a demonstration laboratory where teachers and administrators may see Air Force materials, concepts, and techniques in action.

Late in June 1971, the U. S. Office of Education sent a three-man review team to Utah to reevaluate Foundation projects in the state. This team reported that the Air Force instructional system being used in Utah has the fol-

technical courses that might be used by civilian school systems. It is an encyclopedia of eighty-two Air Force courses covering twenty-six major career areas. This represents more than 26,083 hours of instruction and includes 419 hours of motion picture film, 30,973 units of still visuals, fifty-six hours of audio tapes, and 198,471 pages of printed material.

All Air Force course offerings were screened for preliminary evaluation, and these results were measured against the Department of Labor's "Dictionary of Occupational Titles" to determine courses with civilian applications. On-site visits were made to all Air Force Training Command bases that offer potentially useful courses, and detailed interviews were held with the instructors who taught these courses. The findings were double-checked with instructors and administrators personally experienced in civilian vocational-technical education. The final evaluation of the courses indicated that, of the total Air Force material inventoried, eighty-one percent are considered to be civilian related.

The Foundation's final report to the U. S. Office of Education represented the first complete inventory of Air Force vocational-technical instructional systems, including concepts, techniques, course materials, and equipment requirements. The entire effort was structured toward the transfer of these materials to civilian school systems. This project represented, therefore, the first broad-scale attempt to offer the American taxpayer a civilian dividend on his investment in military education and training.

Since the resource of vocational-technical material was inventoried and arranged in a format lending itself to collection, reproduction, and dissemination for civilian use, the Foundation made the following recommendations:

- That this vast resource be made available in the most effective way possible to all interested school systems.
- That plans be formulated for a central clearinghouse to facilitate the collection, reproduction, and dissemination of this resource.
- That every effort be made to establish this central clearinghouse as an effective nonprofit venture.
- That all these efforts be used as models for the expanded transfer of educational experience from all military departments and governmental agencies into the civilian classrooms of the nation.

As this issue goes to press, the Foundation is negotiating with the U. S. Office of Education



*Aerospace Education Foundation projects will benefit schools throughout the nation as the vast educational resource of the US Air Force is made available on an increasing scale.*

lowing advantages over a conventional course:

- It allows the instructor more time for individualized attention to students;
- It permits students self-tutoring and self-pacing for their work;
- It increases teacher production;
- It generates a faster learning pace;
- It provides greater retention;
- It serves as a positive factor in unifying secondary and post-secondary school curriculums.

#### **Inventory of Air Force Materials**

As a result of the Foundation's experience in Utah, and under contract to the U. S. Office of Education, the Foundation has produced an inventory of all Air Force vocational-

regarding plans for a mechanism to make available this Air Force resource to the civilian educational community.

### Teacher-Administrator Training Courses

As the final report on the Utah Project was completed, a supplemental report was developed and submitted to the U. S. Office of Education several months later. This report was prompted by evidence that the Air Force materials were not being used under optimal conditions. Of particular importance was the relationship of specific performance objectives, as set by the Air Force, to the broader goals used in conventional teaching.

In the report it was recommended that practical guidelines for teachers be formulated on how to implement criterion-referenced courses (*i.e.*, courses dealing with prespecified outcomes), drawing fully on procedures developed and utilized by the Air Force, and on other sources—these guidelines to provide step-by-step instructions for classroom use.

Subsequent analysis of the problem indicated that, in lieu of guidelines, courses should be developed for both teachers and administrators on the subject. This was proposed to the Office of Education and the Foundation received a grant for the development of a course for teacher-administrator orientation and training on the effective use of the criterion-referenced approach to education.

As far as can be determined, this will be the first course developed in this country dealing with the effective use of criterion-referenced instruction. The purpose of the course is to teach teachers and administrators how to manage and operate a criterion-referenced curriculum. The student knows what the teacher wants him to do because every unit of instruction has a specified objective. The course is designed to assist each qualified student to achieve the outcome identified. While regular courses generally teach as much as possible about a given subject in whatever time is available, the criterion-referenced course attempts to assure that each student will achieve the objectives selected for him.

The initial tryout of this course took place in Utah, August 3–20, 1971, under the monitorship of the Foundation's Director of Research, Dr. Robert F. Mager. The objectives of the tryout were met, and a written survey of participants, conducted about a month after the tryout, indicated that the course was a success. A sampling of their comments follows:

"This workshop reached the specified objective better than any workshop I've attended."

"Criterion-referenced instruction properly

applied could bring about a revolution in the educational field. It appears to be the mechanism whereby we can implement what we know we should have been doing all along."

"This is the most productive workshop that I have participated in during my twenty years of teaching."

"Excellent. More effective than any other workshop."

Our final report to the U. S. Office of Education on this course will be submitted in April 1972.

### Acknowledgements

The various projects described in this report were a direct result of the Utah Project,



*Utah students use Air Force electronics instructional system. The study guide, workbook, and bread-board circuit trainer in foreground are all part of the USAF system.*

which was inspired by a group of civic-minded citizens of that state—the Utah Air Force Association. The projects also involved many members of the Air Force Association, the civilian educational community, industrial representatives, and numerous members of the United States Air Force, from the Chief of Staff in Washington, D. C., to officers and airmen throughout the Air Force. Dozens of faculty members and administrative personnel in the training establishment of the US Air Force—the Air Training Command—participated actively in these projects. Many people, to whom credit is due, must go nameless. The Aerospace Education Foundation expresses its deep appreciation for the superb cooperation and assistance it has received from these people during these past years. ■

# Air Force F-15



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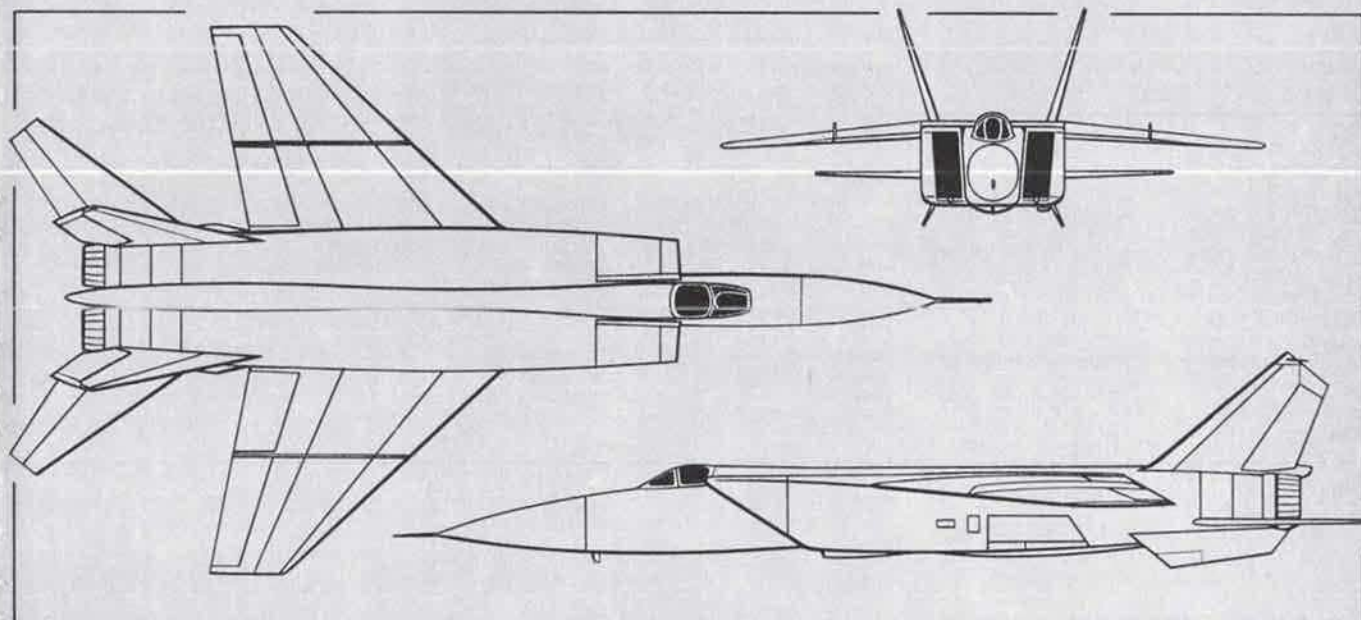
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# JANE'S

## ALL THE WORLD'S AIRCRAFT SUPPLEMENT



Three-view drawing of the Mikoyan MiG-23

### MIKOYAN ARTEM MIKOYAN, USSR

Photographs which have appeared recently in Soviet publications have revealed important details of the MiG-23 combat aircraft that was developed under the leadership of the late Colonel-General Artem I. Mikoyan. In particular, the wings now appear to have constant leading-edge sweep, whereas photographs taken at Domodedovo during the 1967 Soviet Aviation Day display suggested the use of compound sweep. The aircraft depicted in the latest photographs also appear to have dispensed with the large dark-coloured nose radome fitted earlier.

The following revised entry on the MiG-23 embodies this, and other, new information:

### MIKOYAN MiG-23 (E-266) NATO Code Name: "Foxbat"

First news of the existence of this aircraft came in a Soviet claim, in April 1965, that a twin-engined aircraft designated E-266 had set up a 1,000-km closed-circuit speed record of 1,251.9 knots (1,441.5 mph; 2,320 km/h), carrying a 2,000-kg payload. The attempt was made at a height of 69,000–72,200 ft (21,000–22,000 m) by Alexander Fedotov, who had earlier set up a 100-km record in the E-166 (described in 1967–68 *Jane's*).

The same pilot set up a new payload-to-height record of 98,349 ft (29,977 m) with a 2,000-kg payload in the E-266, on 5 October 1967, after a rocket-assisted take-off. This qualified also for the record with a 1,000-kg payload. Photographs of the E-266 issued officially in the Soviet Union identified it

subsequently as the twin-finned Mikoyan single-seat fighter of which four examples took part in the Domodedovo display in July 1967 and which is now known to be designated MiG-23 in the Soviet Air Force.

Its performance in level flight was demonstrated further on 5 October 1967, when M. Komarov set up a speed record of 1,608.83 knots (1,852.61 mph; 2,981.5 km/h) over a 500-km closed circuit. On 27 October, P. Ostapenko set up a 1,000-km closed-circuit record of 1,576.00 knots (1,814.81 mph; 2,920.67 km/h) in an E-266, carrying a 2,000-kg payload and qualifying also for records with 1,000-kg payload and no payload.

On three of the aircraft shown at Domodedovo, the cut-off line of the dielectric nose-cone was vertical in side elevation; on the fourth aircraft the nose-cone was cov-



Mikoyan MiG-23s

ered with paint, giving a sloping cut-off line. This, and detail differences in equipment such as antennae, may indicate that the aircraft were from a pre-production or early production series.

The comparatively low aspect ratio cropped delta wings are mounted high on the fuselage, and have anhedral over the full span. The aircraft seen in 1967 were fitted with slim wingtip fairings which could carry small triangular endplates, presumably to improve stability. These fairings are not fitted to the aircraft shown in the latest photographs.

The twin tail fins were almost certainly adopted as being preferable to the single large and tall fin that would otherwise have been essential with such a wide-bodied supersonic design. The fins incline outward, as do the large ventral fins.

The basic fuselage is quite slim, but is blended into the two huge rectangular air intake trunks, which have wedge inlets of the kind used on the North American Rockwell A-5 Vigilante. The inner walls of the intakes are curved at the top and do not run parallel with the outer walls; hinged panels form the lower lip of each intake, enabling the intake area to be varied.

The landing gear is a retractable tricycle type, also similar to that of the Vigilante, with the main wheel retracting into the air intake trunks.

The power plant of the MiG-23 consists of a pair of large afterburning turbojet engines (each rated at 24,250 lb = 11,000 kg st), mounted side-by-side in the rear fuselage. To each side of the jet nozzles are low-set all-moving horizontal tail surfaces of characteristic MiG shape.

No pictures of the MiG-23 have yet been released showing it with external stores, and no weapons were visible on the aircraft in the fly-past at Domodedovo. The fact that

the commentator referred to these as high-altitude all-weather interceptors confirms the probability that the MiG-23 was designed to intercept fast strike aircraft, possibly with "snap-down" missiles to deal with low-flying raiders. His claim that this design has a Mach 3 performance is supported by the speed records.

There is sufficient room between the engines and intake ducts for an internal weapon bay or recessed nuclear weapon, as on the Mirage IV; but the only visible weapon attachments are four underwing hard-points, presumably for air-to-air guided weapons.

MiG-23s were reported to be operational with Soviet Air Force units in Egypt in the Spring of 1971, having been airlifted to that country in An-22 transports. Others have been reported in Algeria.

**DIMENSIONS (estimated):**

Wing span 40 ft 0 in (12.20 m)  
Length overall 69 ft 0 in (21.00 m)

**WEIGHTS (estimated):**

Basic operating weight 34,000 lb (15,425 kg)  
Max T-O weight 64,200 lb (29,120 kg)

**PERFORMANCE (estimated):**

Max level speed at height Mach 3.2  
Service ceiling 73,000 ft (22,250 m)  
Time to 36,000 ft (11,000 m) with afterburning 2 min 30 sec  
Normal combat radius 610 nm (700 miles; 1,130 km)

**NORTHROP**

**NORTHROP AIRCRAFT DIVISION OF NORTHROP CORPORATION; Head Office: Beverly Hills, California 90212, USA**

**NORTHROP F-5E**

Under the International Fighter Aircraft (IFA) programme, the US government sought a supersonic fighter aircraft as a successor to the Northrop F-5, of which some 650 are being supplied under the Military Assistance Program to America's allies. Eight airframe companies were invited to tender, but since the design submission had to be based on an existing fighter aircraft, only four of those companies (LTV, Lockheed, McDonnell Douglas, and North-

rop) were expected to attain the final selection stage.

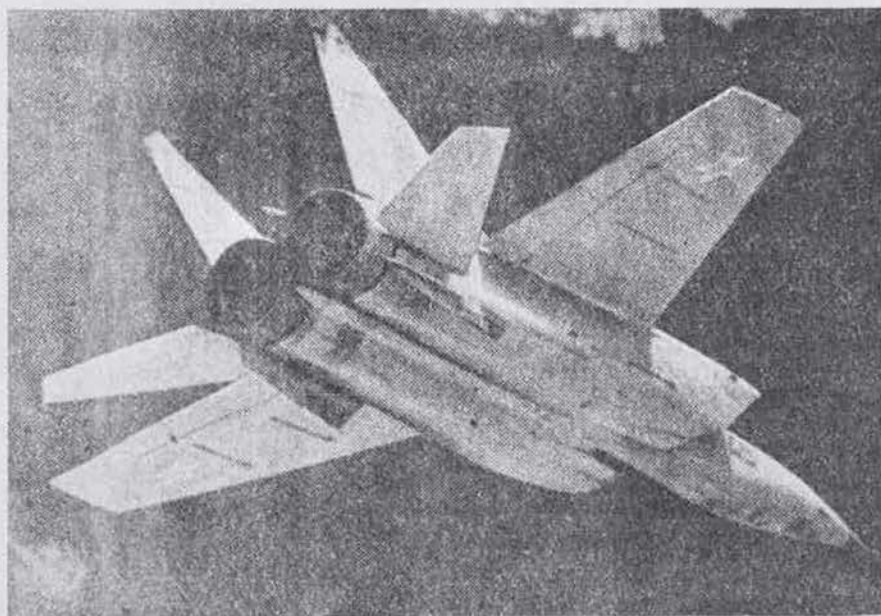
Northrop had proposed an advanced version of the F-5 early in 1969, before investigation of the IFA programme, and an F-5B re-engined with two General Electric YJ85-GE-21 turbojet engines flew on 28 March 1969. More than 70 flights were made with this aircraft, and Northrop was able to explore the flight envelope, including operation at altitudes up to 50,000 ft (15,240 m), a maximum speed of Mach 1.6, and aerial combat manoeuvres. This YF-5B-21 made Northrop the only contender for the IFA contract to have flown a prototype similar to its final design submission.

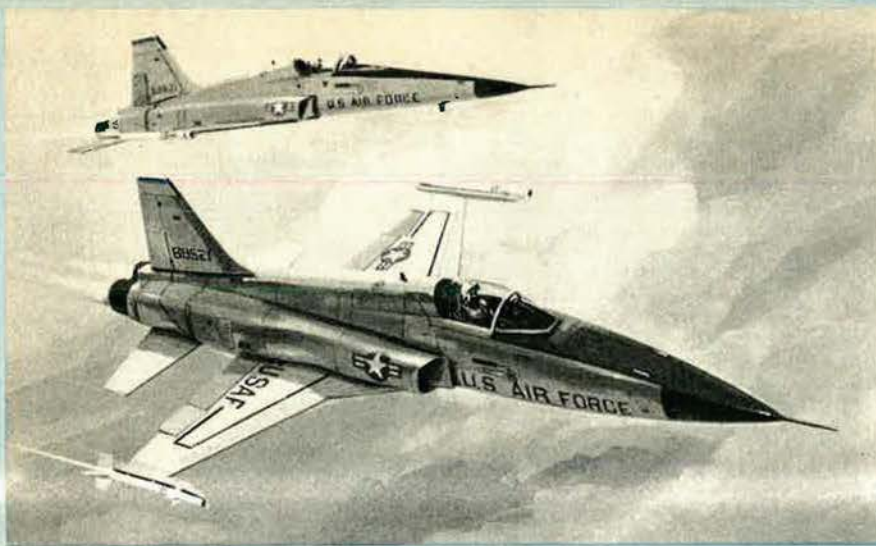
On 20 November 1970, the Northrop design was selected as the winner, and the USAF announced that the aircraft would be built under a fixed-price-plus-incentive contract with an initial value of \$21 million. This programme may cover production of up to 325 aircraft under the designation F-5E, at a cost of \$1.6 million each.

The F-5E will be powered by two General Electric J85-GE-21 turbojet engines, each of which provides 5,000 lb (2,267 kg) st. Fuselage modifications to cater for the larger engines include an increase in length of about 1 ft 3 in (0.38 m) and increase in width of about 1 ft 4 in (0.41 m). The greater airflow required by these engines will be met by enlarged inlet ducts and provision of auxiliary suck-in doors on each side of the fuselage. Inlet duct lips will have anti-icing provisions as developed for the Norwegian Air Force's F-5s. The "stretched" fuselage will also allow greater internal fuel capacity, increasing from about 3,790 lb (1,719 kg) in the F-5A to 4,360 lb (1,978 kg) in the F-5E. For additional range three 275-US gallon (1,041-litre) auxiliary tanks, as developed for the NF-5, can be carried on underwing and fuselage centre-line pylons.

With an emphasis on manoeuvrability rather than high speed, the F-5E will be equipped with manoeuvring flaps, as developed for the Netherlands Air Force's NF-5As and NF-5Bs, comprising both leading-edge and trailing-edge flaps. A selection switch mounted on the throttle lever enables the pilot to change the flap settings

*Reproduction from a Soviet publication of the latest MiG-23 photograph, showing important new features of this Mach 3 fighter (Red Star)*





Artist's impression of Northrop F-5E (two General Electric J85-GE-21 afterburning turbojet engines)

from the normal position, in which they form a symmetrical aerofoil with the wing. Set in the "Cruise" position, the trailing-edge flaps droop 8 degrees to form a slight camber along the wing. An "Intermediate" setting, which would be used primarily for air combat at speeds of up to Mach 0.95, retains the 8-degree setting of the trailing-edge flaps and droops the leading-edge flaps 12 degrees. The "Full Flaps" selection, used for take-off and landing, droops the leading-edge flaps to 24 degrees and the trailing-edge flaps to 20 degrees. Northrop engineers are considering an additional setting, between "Intermediate" and "Full", to enhance the versatility of the manoeuvring system. Wing area is increased to 186.2 sq ft (17.30 m<sup>2</sup>), principally as a result of the widened fuselage, which also increases wing span. The tapered areas between the in-board leading-edge and fuselage have been modified and enlarged slightly.

The F-5E will incorporate other features developed for the Canadian, Dutch, and Norwegian F-5s. These include two-position nose-wheel gear, which increases wing angle-of-attack on the ground by 3° and which, in conjunction with the more powerful engines, is expected to improve F-5E take-off performance some 30% by comparison with earlier F-5s. JATO provision and arrestor gear will permit operation from short runways, and an anti-icing windshield will be used in cold weather environments.

Armament is likely to be similar to that of earlier F-5s, but the integrated fire control system proposed for the F-5E is expected to enhance considerably its combat effectiveness. Elements of this system include lightweight X-band fire-control radar being developed by the Electronics and Space Division of Emerson Electric Company; a General Electric lead-computing optical sight with head-up display unit, and a central air data computer. These will provide target detection and range tracking, lead computation for guns, in-range envelope computation for missiles, and a roll-stabilised aiming reference for use with guns, bombs, and rockets against ground targets.

In both the missile and gun modes, the lead-computing sight will integrate target range and range rate signals from the radar; airspeed and angle-of-attack information from the computer; and turn rate and

acceleration data from a gyro lead computer, presenting an aiming reference on the head-up optical sight. Used in a manual mode, the sight will provide a roll-stabilised aiming reticle to permit bomb delivery at other than wings-level attitudes.

Intended primarily to provide America's allies in Southeast Asia with an air-to-air superiority over the most advanced aircraft likely to be deployed against them, the F-5E will remain basically a VFR aircraft, with only limited all-weather or night capability. This has been dictated by the need to produce an uncomplicated aircraft capable of comparatively inexpensive maintenance and operation.

Roll-out of the first F-5E is anticipated in July 1972, with the first flight following in September. USAF Tactical Air Command, with assistance from Air Training Command, has been assigned responsibility for training pilots and technicians of user

countries, and first deliveries of the F-5E to the USAF's 425th Tactical Fighter Squadron are scheduled for May 1973. Ten training aircraft are to be supplied to the USAF before deliveries to foreign governments begin.

The following weights and performance figures are estimated:

**WEIGHTS:**

- Weight empty, equipped 8,660 lb (3,928 kg)
- Design T-O weight, air-to-air mission 15,660 lb (7,103 kg)
- Design T-O weight, maximum 21,818 lb (9,896 kg)

**PERFORMANCE:**

- Max level speed, without external armament Mach 1.6
- Max level speed, with two Sidewinder missiles Mach 1.49
- Rate of climb at S/L (no external armament, 50% fuel) 31,600 ft (9,630 m)/min
- Combat ceiling 53,500 ft (16,305 m)
- T-O run, at 15,660 lb (7,103 kg) AUV 1,900 ft (580 m)
- T-O run, at 21,818 lb (9,896 kg) AUV 4,000 ft (1,220 m)
- Combat radius, max internal fuel, with two Sidewinder missiles 155 nm (178 miles; 286 km)
- Combat radius, max internal fuel and jettisonable under-fuselage auxiliary fuel tank, with two Sidewinder missiles 377 nm (434 miles; 698 km)
- Ferry range, with auxiliary fuel 1,385 nm (1,595 miles; 2,567 km)

**LOCKSPEISER**

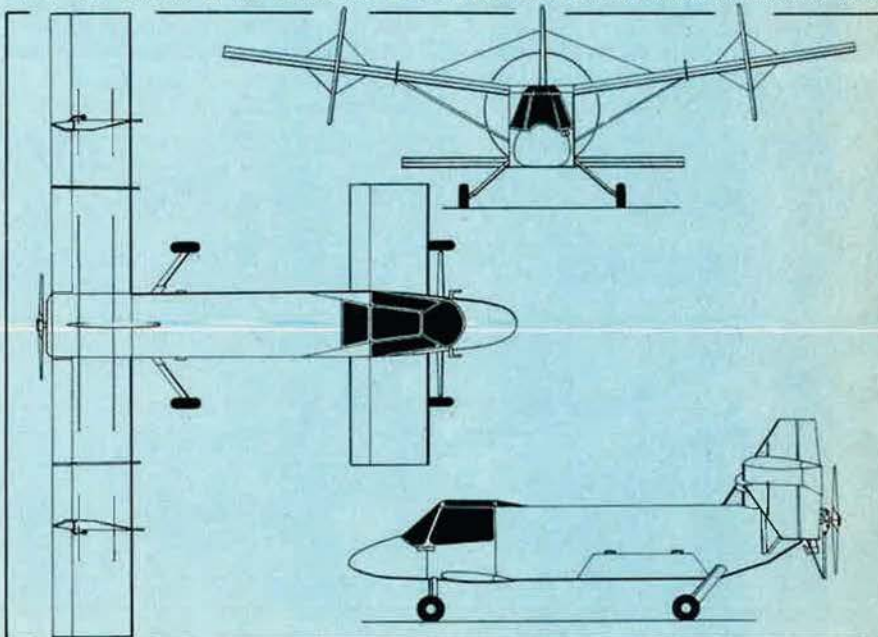
*LOCKSPEISER AIRCRAFT; Address: 14 Manette Street, London W1V 5LB, England*

**LOCKSPEISER LDA-01**

Mr David Lockspeiser has designed a new utility aeroplane known as the LDA, or Land Development Aircraft, the production version of which is intended for operation as a passenger, freight, or vehicle transport, as an agricultural, ambulance, survey, or fire-fighting aircraft, or for other duties.

A 70% scale prototype, registered G-AVOR and known as the LDA-01, was

Three-view drawing of the Lockspeiser LDA-01 single-seat utility aircraft as originally flown



flown for the first time by Mr Lockspeiser on 24 August 1971, when it took off in less than 300 ft (91 m).

The basic concept of the LDA is that of an "aerial Land-Rover", offering a wide variety of applications, low initial cost, and economy of operation, and capable of being easily assembled, inspected, and repaired. To this end the structure has been kept as simple as possible. Many of the major components are interchangeable; the aircraft is designed to carry a complete set of its own spares, including wings and foreplane, and to be capable of licence assembly by semi-skilled labour in underdeveloped countries or in factories with limited facilities.

A canard configuration was chosen as combining simplicity with functional efficiency, offering safe low-speed and stall characteristics and, because of a wide, non-critical CG movement, being unusually tolerant of variations in load distribution. Although the full fuselage volume is available for payload, a special feature of the LDA design is the use of a flush-fitting, removable ventral container which serves as an interchangeable "mission pack" and facilitates the quick conversion of the aircraft from one rôle to another. The landing gear is designed to permit easy manoeuvring of the aircraft on the ground, to pick up a pre-loaded container.

Although built essentially to prove the basic soundness of the concept, the LDA-01, to which the description below applies, is also considered to be a potential production aircraft in its own right. One suggested version, powered by a 235 hp Lycoming O-540 engine with a shrouded three-blade propeller, would be able to carry a 1,000-lb (454-kg) payload or 100 Imp gallons (454 litres) of liquid chemical.

**TYPE:** Single-seat general utility aeroplane.

**WINGS:** Canard surfaces, consisting of strut-braced main wings at rear and cantilever foreplane at front. Main wings and foreplane are of constant NACA 23012 section and constant chord. Dihedral 8° on main wings, 0° on foreplane. Main wing incidence 0°, foreplane 2° (adjustable on ground). Conventional all-metal construction, with parallel main and rear spars and pop-riveted stressed-skin covering. Built in three basically identical and interchangeable units, two forming the main wings and the third being used as the foreplane. Each panel has four strong-points at the centre. These serve as attachment points to the fuselage when the panel is positioned as a foreplane; when it is positioned as a port or starboard mainplane they serve as fin-post attach-

ments or as lift-strut and picketing points. They can also be located on a "luggage rack" under the fuselage when a panel is carried as a spare by an aircraft of the same type. Main wings have trailing-edge flaps inboard and ailerons outboard; in addition to their normal function these can be operated in unison to perform the function of an elevator. The foreplane is fitted with a screwjack-operated flap which, in addition to its conventional function, also doubles as a pitch trimmer. This system of control, as distinct from one employing an elevator on the foreplane, gives greater safety at the stall. The foreplane is fitted with leading-edge breaker strips and is designed to stall before the main wings. A single fence is fitted on each main wing, at approx one-third span, to contain vortex disturbance from the foreplane tips.

**FUSELAGE:** Conventional box-shaped structure, consisting of a space-frame built of 3/4 in (1.9 cm) square 22 gauge T.35 steel, welded on a flat jig and covered with an easily removable fabric bag. Nose-cone and cowling panels are of glass-fibre. Ventral detachable payload container, which fits flush with the basic structure, is of welded steel and light alloy.

**TAIL UNIT:** Twin wire-braced fins and twin rudders, above and below main wings, of welded steel-tube construction with fabric covering. A third, central fin was fitted as a precautionary measure for initial test flights, but was not intended as a permanent feature and has since been removed.

**LANDING GEAR:** Non-retractable type, with two separate cantilever legs at front and two at rear. Single wheel, with low-pressure tyre, on each unit. Rear legs are inclined forwards. Rubber shock-absorbers. Hydraulic brakes on rear wheels; Ackerman steering on front wheels. Provision for alternative float or ski gear.

**POWER PLANT:** One 85 hp Continental C85-12 four-cylinder horizontally-opposed air-cooled engine, installed at rear of fuselage and driving a 5 ft 6 in (1.68 m) diameter two-blade fixed-pitch metal pusher propeller of 38 in (96.5 cm) pitch. It is intended eventually to fit a shrouded propeller, to increase propeller efficiency and aircraft stability and to give added protection for ground crew. Fuel tank in fuselage, capacity 15 Imp gallons (68 litres).

**ACCOMMODATION:** Single seat for pilot, in fully-enclosed cabin. Removable payload container in lower centre of fuselage. Production version will have a gantry running along the fuselage roof for hoisting and

carrying items not suitable for carriage in the ventral container, and access via the roof so that conventional loaders can be used when the aircraft is employed in an agricultural rôle.

**DIMENSIONS, EXTERNAL (LDA-01):**

Main wing span	29 ft 0 in (8.84 m)
Foreplane span	13 ft 0 in (3.96 m)
Main wing chord, constant	3 ft 9 in (1.14 m)
Foreplane chord, constant	3 ft 9 in (1.14 m)
Main wing aspect ratio	7
Foreplane aspect ratio	4.5
Length overall	22 ft 6 in (6.86 m)
Fuselage: Max width	3 ft 0 in (0.91 m)
Max depth	3 ft 6 in (1.07 m)
Height overall	9 ft 6 in (2.90 m)
Wheel track, inside of wheels	6 ft 8 in (2.03 m)
Wheelbase	9 ft 4 in (2.84 m)
Propeller ground clearance	2 ft 4 in (0.71 m)
Removable payload container:	
Length	6 ft 6 in (1.98 m)
Width	3 ft 0 in (0.91 m)
Depth	1 ft 3 in (0.38 m)

**DIMENSION, INTERNAL:**

Centre fuselage: total internal volume	60 cu ft (1.7 m <sup>3</sup> )
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**AREAS:**

Main wings, gross	108.8 sq ft (10.11 m <sup>2</sup> )
Foreplane, gross	48.8 sq ft (4.53 m <sup>2</sup> )

**WEIGHTS:**

T-O weight, early test flights	1,300 lb (590 kg)
Max design T-O weight	1,400 lb (635 kg)

**PERFORMANCE:** Up to the end of September 1971 no detailed performance figures had been made available, but the aircraft had been flown at a level speed of 72 knots (83 mph; 133.5 km/h) during its initial test flights. With only 85 hp then available, the aircraft was underpowered, but as the airframe is stressed to 5.5 g it is able to accept a larger engine.

**IAI**

**ISRAEL AIRCRAFT INDUSTRIES LTD;**  
Head Office and Works: Lod Airport,  
Israel

**IAI-201 MILITARY ARAVA**

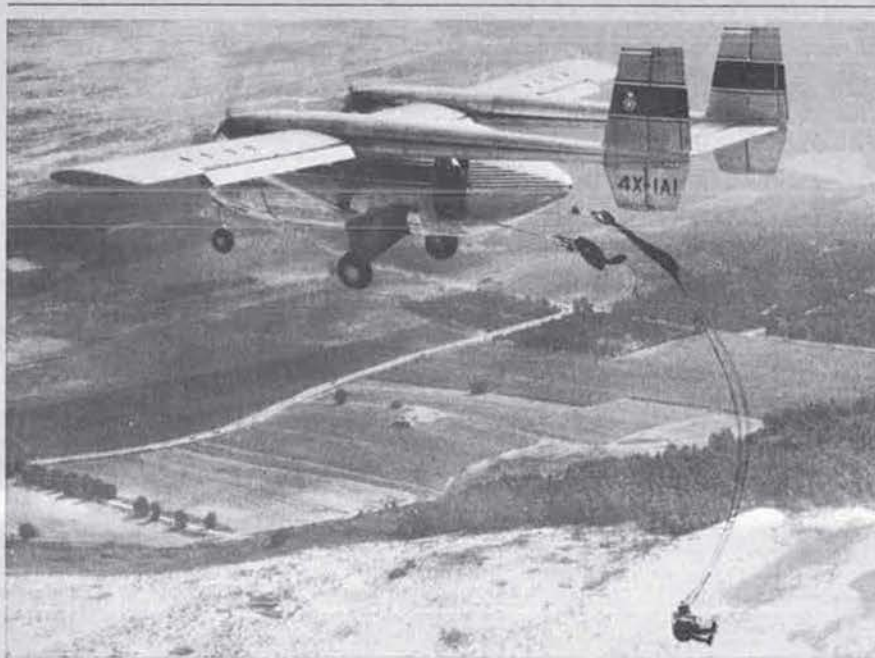
The IAI-201 is a military troop/paratroop transport version of the IAI-101 commercial Arava, to which it is essentially similar except in the following respects:

**POWER PLANT:** Two 783 eshp Pratt & Whitney (UACL) PT6A-34 turboprop engines, each driving a Hartzell HC-B3TN three-blade hydraulically-actuated fully-feathering reversible-pitch metal propeller of 8 ft 6 in (2.59 m) diameter. Fuel system and capacity as for IAI-101 commercial Arava.

**ACCOMMODATION:** Crew of one or two on flight deck, with door on starboard side. Main cabin has folding inward-facing metal-framed fabric seats along each side, and three jump-seats in the forward part of the aisle, and can accommodate 20 fully-equipped troops or 16 paratroops and a dispatcher. Access via inward-opening door at rear of cabin, opposite which, at floor level, is an emergency exit door/cargo door on the starboard side. Aft section of fuselage is hinged to swing sideways through more than 90° to provide unrestricted access to main cabin. For air-dropping of cargo pallets, this can be interchanged with a special opening fairing. Alternative interior configurations available for ambulance rôle (eight litters and three sitting patients/medical attendants), or as all-freight transport carrying (typically) a jeep-mounted recoilless rifle and its four-man crew.

The prototype Lockspeiser LDA-01 (85 hp Continental C85-12 engine)





The ability of the Arava to be used for pinpoint paratropping of men and light cargoes has already been demonstrated by the prototype

**DIMENSIONS, EXTERNAL:** As IAI-101, except:  
 Passenger door (rear, port):  
 Height 5 ft 7 in (1.70 m)  
 Width 2 ft 11½ in (0.90 m)

**WEIGHTS AND LOADINGS:**

Weight empty, equipped (paratroop layout) 7,787 lb (3,532 kg)  
 Max payload 5,570 lb (2,526 kg)  
 Max T-O weight 14,500 lb (6,577 kg)  
 Max landing weight 13,700 lb (6,214 kg)  
 Max zero-fuel weight 13,500 lb (6,123 kg)  
 Max wing loading 30.84 lb/sq ft (150.6 kg/m<sup>2</sup>)  
 Max power loading 9.32 lb/eshp (4.23 kg/eshp)

**PERFORMANCE (at max T-O weight):**

Max level speed at 10,000 ft (3,050 m) 176 knots (203 mph; 326 km/h)  
 Max permissible diving speed 215 knots (247 mph; 397 km/h)  
 Max cruising speed at 10,000 ft (3,050 m) 172 knots (198 mph; 319 km/h)  
 Econ cruising speed at 10,000 ft (3,050 m) 168 knots (193 mph; 311 km/h)  
 Stalling speed, flaps up 80 knots (92.5 mph; 149 km/h)  
 Stalling speed, flaps down 62 knots (71.5 mph; 115 km/h)  
 Max rate of climb at S/L 1,564 ft (477 m)/min  
 Rate of climb at S/L, one engine out 348 ft (106 m)/min

Service ceiling 26,575 ft (8,100 m)  
 Service ceiling, one engine out 11,200 ft (3,415 m)  
 STOL T-O run 730 ft (223 m)  
 STOL T-O to 50 ft (15 m) 1,180 ft (360 m)  
 STOL landing from 50 ft (15 m) 930 ft (283 m)  
 STOL landing run 390 ft (119 m)  
 Range with max fuel, 45 min reserves 700 nm (806 miles; 1,297 km)  
 Range with max payload, 45 min reserves 175 nm (201 miles; 323 km)

**PIPER**

**PIPER AIRCRAFT CORPORATION;**  
 Head Office and Works: Lock Haven, Pennsylvania 17745, USA

**PIPER PA-34 SENECA**

On 23 September 1971, Piper announced a new twin-engined light aircraft which has the company designation PA-34 and, following Piper tradition, has the Indian name Seneca. It is being built at Piper's Vero Beach, Florida, factory.

The Seneca is, in effect, a twin-engined version of the Cherokee Six and has a counter-rotating (C/R) engine and propeller installation similar to that introduced on

the Twin Comanche in February 1970. The retractable landing gear is operated by an electro-hydraulic system and includes an emergency extension system which allows the wheels to free-fall into the down and locked position. A dual-vane stall warning system provides warning by horn and flashing light well in advance of the stall in either "clean" or gear/flaps-down configuration. Standard seating consists of six individual reclinable seats with a 10 in (25.4 cm) centre aisle, with a seventh (three-abreast centre) seat optional. Cabin climate is controlled by six silent fresh-air outlets, six cool/warm-air outlets, including two defrosters, and two exhaust vents to ensure circulation of fresh air.

**TYPE:** Six/seven-seat twin-engined light aircraft.

**WINGS:** Cantilever low-wing monoplane. Single-spar wings, plain ailerons, and wide-span slotted flaps, of light alloy construction. Glass-fibre wingtips. Aileron and rudder interconnect systems. Flaps manually operated.

**FUSELAGE:** Light alloy semi-monocoque structure. Glass-fibre engine cowlings.

**TAIL UNIT:** Cantilever structure of light alloy. One-piece all-moving horizontal surface with combined anti-balance and trim tab. Trim-tab in rudder.

**LANDING GEAR:** Hydraulically-retractable tricycle type. Steerable nose-wheel. Emergency free-fall extension system.

**POWER PLANT:** Two 200 hp Lycoming IO-360 four-cylinder horizontally-opposed air-cooled fuel-injection engines, driving Hartzell two-blade metal constant-speed fully-feathering propellers, diameter 6 ft 4 in (1.93 m). Fuel in two tanks in wings, with a total capacity of 100 US gallons (378 litres), of which 95 US gallons (359 litres) are usable.

**ACCOMMODATION:** Enclosed cabin, seating six people in pairs on individual seats with 10 in (25.4 cm) centre aisle. Optional seventh seat between two centre seats. Dual controls standard. Two forward-hinged doors, one on starboard side at front, the other on port side at rear. Large optional door adjacent to rear cabin door provides an extra-wide opening for loading bulky items. Passenger seats removable easily without tools to provide different seating/luggage/cargo combinations. Space for 100 lb (45 kg) baggage at rear of cabin, and for 100 lb (45 kg) in nose compartment with external access door on port side.

**SYSTEMS:** Electro-hydraulic system for landing gear retraction. Electrical system powered by dual 12V 60A alternators. Dual engine-driven vacuum pumps for flight instruments.

**ELECTRONICS AND EQUIPMENT:** Factory-installed radio packages offer many combinations including dual VHF communications, dual VOR/ILS navigation, ADF, DME, transponder and HF equipment. Piper AltiMatic IIB-1 or Piper Auto-Control III automatic flight systems optional. Standard equipment includes individual reading lights, headrests, shoulder harness, and ashtrays.

**DIMENSIONS, EXTERNAL:**

Wing span 38 ft 10¼ in (11.85 m)  
 Length overall 28 ft 6 in (8.69 m)  
 Height overall 9 ft 10¼ in (3.02 m)  
 Wheel track 11 ft 1¼ in (3.38 m)  
 Wheelbase 7 ft 0 in (2.13 m)

**AREA:**

Wings, gross 206.5 sq ft (19.18 m<sup>2</sup>)

**WEIGHTS AND LOADINGS:**

Weight empty 2,479 lb (1,124 kg)  
 Max T-O weight 4,000 lb (1,814 kg)  
 Max wing loading 19.4 lb/sq ft (94.7 kg/m<sup>2</sup>)  
 Max power loading 10.0 lb/hp (4.5 kg/hp)

Piper PA-34 Seneca (two 200 hp Lycoming IO-360 engines)



**PERFORMANCE** (at max T-O weight, except where detailed otherwise):

Max level speed at S/L	170 knots (196 mph; 315 km/h)
Cruising speed:	
75% power at 6,000 ft (1,830 m)	162 knots (187 mph; 301 km/h)
65% power at 9,000 ft (2,745 m)	160 knots (185 mph; 298 km/h)
55% power at 13,300 ft (4,055 m)	156 knots (180 mph; 290 km/h)
45% power at 18,300 ft (5,580 m)	148 knots (171 mph; 275 km/h)
Stalling speed, wheels and flaps down	58 knots (67 mph; 108 km/h)
Rate of climb at S/L	1,460 ft (445 m)/min
Single-engine rate of climb at S/L	230 ft (70 m)/min
Service ceiling	20,000 ft (6,100 m)
Single-engine absolute ceiling at 4,000 lb (1,814 kg) A/UW	6,600 ft (2,010 m)
Single-engine absolute ceiling, mid-range at 3,600 lb (1,633 kg) A/UW	9,900 ft (3,020 m)
T-O run	750 ft (229 m)
T-O to 50 ft (15 m)	1,140 ft (347 m)
Landing from 50 ft (15 m)	1,335 ft (407 m)
Landing run	705 ft (215 m)
Accelerate/stop distance	1,860 ft (567 m)
Range, at optimum altitude:	
At 75% power	747 nm (860 miles; 1,384 km)
At 65% power	834 nm (960 miles; 1,545 km)
At 55% power	929 nm (1,070 miles; 1,721 km)
At 45% power	1,007 nm (1,160 miles; 1,867 km)

#### METEOR

**METEOR SpA COSTRUZIONI AERONAUTICHE ED ELETTRONICHE; Head Office: 25/A via Po, Rome, Italy**

#### METEOR GUFO

On the basis of more than ten years' experience of developing and producing pilotless aircraft and systems, Meteor has evolved the Gufo tactical reconnaissance system to meet anticipated military requirements during the period 1970-80. The system is claimed to be particularly suitable for use in mountainous country. In its operational form it enables nearly 55 lb (25 kg) of sensors to be carried at 400 knots (460 mph; 740 km/h) to target areas up to 110 nm (125 miles; 200 km) from the launch-site. Recovery can be within a radius of 330 ft (100 m) from a pre-determined spot.

The Gufo system utilises two different drones, as follows:

**Gufone.** Standard operational vehicle, based on the American Northrop Ventura NV-105 Chukar (MQM-74A) target drone. Modified by Meteor to carry new guidance equipment and sensors, together with inflatable bags to cushion the landing shock. Equipment for day and night operations can include a variety of infra-red sensors and cameras using 50, 70, or 75 mm film to photograph a strip of terrain more than 55 nm (63 miles; 102 km) long and, respectively, 3,280 ft (1,000 m), 6,560 ft (2,000 m), or 9,840 ft (3,000 m) wide, respectively from altitudes of 1,000 ft (305 m), 2,000 ft (610 m), or 3,000 ft (915 m). For night operations, the Gufone can carry 14 wingtip flares which are dropped at pre-selected time intervals. At take-off, the 121 lb (55 kg) st turbojet engine is supplemented by two Meteor 8785/CNS solid-propellant jettisonable boosters, providing a total thrust of 5,730 lb (2,600 kg) for 0.7 seconds.

**Gufetto.** Low-cost version of Gufone with reduced speed, payload, ceiling, and range. Intended for short-penetration operational use and for training.

A military unit deploying the Gufo system, with the Gufone vehicle, is made up of four sections: the launching section; the guidance and control section; the sensor recovery, interpretation and headquarters section; and the vehicle recovery and preparation section.

The launching section is equipped primarily with two launch trucks (LTK), each towing a launch trailer (LTR) on which a Gufone is mounted, ready for flight. Each LTK is supported by a Jeep or Land-Rover towing another Gufone on an LTR. When the first drone has been launched, the Jeep couples up to the LTK the second LTR and tows the empty LTR to the vehicle recovery and preparation section. It returns with a further LTR carrying a Gufone ready for flight. Maximum launch rate from each LTK is at ten-minute intervals.

The guidance and control section is equipped with a medium-size truck carrying the drone control centre (DCC). The DCC contains a guidance station, tracking and plotting system, and computer. Since it can control only one drone at a time, and the Gufone has an endurance of approximately one hour, the first-line equipment needed for a 24-hour continuous surveillance of enemy territory comprises one DCC, two LTKs, two LTRs, and 24 new or recovered and reconditioned Gufones. In addition, the sensor recovery, interpretation, and headquarters section will normally utilise a film processing and interpretation truck, one or

more headquarters vehicles and, if required, a "receiver" truck for telemetered data, plus land vehicles or aircraft to transport sensors between recovery areas and the processing truck. The vehicle recovery and preparation section consists of a mobile workshop, a gasoline truck, an "explosives" truck, a vehicle to carry spares, and means for collecting and transporting drones.

The Gufo system is designed to overcome the problem of poor accuracy that sometimes mars results when pre-programmed drones are used over ranges of more than 30 nm (35 miles; 55 km). The Gufone can be launched in any direction and normally makes the first part of its flight under guidance over friendly territory. This permits the effects of factors such as wind and engine performance to be calculated, so that the Gufone can be directed very precisely on to the first stage of its programmed flight to the target. Once it has been put on course, it becomes "deaf" to all friendly or enemy electronic signals until it approaches the end of its return flight and comes under command guidance for recovery.

Provision is made for an intermediate pre-programmed guidance phase between the guided and "deaf" phases. In this case, the drone will accept only specially-coded commands of very short duration, for the sole purpose of correcting its course.

#### DIMENSIONS (Gufone):

Wing span	5 ft 6 3/4 in (1.69 m)
Length overall	11 ft 10 in (3.61 m)
Height overall	2 ft 5 in (0.73 m)

#### WEIGHTS (Gufone):

Sensors (max)	60 lb (27 kg)
Max launching weight:	300 lb (136 kg)

#### PERFORMANCE (Gufone):

Max level speed	400 knots (460 mph; 740 km/h)
Max cruising height	35,000 ft (10,670 m)

#### BEECHCRAFT

**BEECH AIRCRAFT CORPORATION; Head Office and Main Works: Wichita, Kansas 67201, USA**

#### BEECHCRAFT MODEL A36 BONANZA (MILITARY VERSIONS)

Military versions of the Beechcraft Model A36 Bonanza have been built or are being proposed for evaluation to meet specialised US Air Force requirements. The two principal versions are described below; in addition, other variants have been projected by Beech for aircrew and weapons delivery training, casualty evacuation (two litters plus attendant), or light personnel transport duties.

At left, below, Meteor Gufone tactical surveillance drone on its launcher, towed by a launch truck (LTK). Right, below, photo shows the Gufone's recovery 'chute and the air-bags which cushion the landing shock



**Pave Eagle version.** A number of specially-built Model A36 Bonanzas have been equipped by the Univac Division of Sperry Rand at Salt Lake City, Utah, for a special USAF Southeast Asia infiltration surveillance programme known as Pave Eagle. Some of these aircraft, designated **QU-22B**, have been reported in operation over South Vietnam, operating from USAF bases in Thailand, where they are partly filling the role previously undertaken by the larger and more heavily manned Lockheed EC-121R.

These aircraft are modified by Univac to enable them to operate as drone aircraft collectors of infiltration data, although it is understood that those which have been used to date on operations in Southeast Asia have been manned. Data receiving equipment in the aircraft is manufactured by Radiation Inc. Future aircraft of this type, capable of pilotless operation, are to be operated under control of a Univac microwave command guidance system. Max T-O weight of the manned version has been estimated at approx 5,200 lb (2,358 kg).

The Pave Eagle aircraft differ from the standard commercial A36 Bonanza chiefly in having the 285 hp Continental IO-520-B six-cylinder engine replaced by a 375 hp Continental GTSIO-520 engine, driving a three-blade large-diameter Hartzell W10178H-11 slow-turning quiet propeller through the medium of a reduction gear. A larger-output engine-driven alternator, reportedly of 28V DC, is fitted on the starboard side of the engine; a second, belt-driven AC alternator is installed above the propeller reduction gearing in a prominent bulged fairing above the engine.

Other modifications include extended-span wings, with wingtip auxiliary fuel tanks, and deletion of the aft pair of cabin windows on each side. There are numerous small antennae beneath the wings and above and below the fuselage. Reports indicate that the QU-22B is normally flown as a single-seater, the area aft of the pilot's seat being occupied by electronics equipment. The full-depth double doors to the cabin, aft of the wing trailing-edge on the starboard side, are retained to give access to the electronics compartment.

**Pave Coin version.** The US Air Force's Pave Coin competition, for which evaluation flight testing began at Eglin Air Force Base, Florida, in the Spring of 1971, is being conducted to select counter-insurgency aircraft in three categories for supply, if funding is approved, to America's allies under the Military Assistance Program (MAP). Known and probable candidates up to the Autumn of 1971 included the Fairchild Industries Peacemaker (a military version of the turboprop Porter) and a turboprop version of the Helio Stallion in the utility category; the Cessna O-1, U-17 or O-2 in the FAC (forward air control) category; and the Piper PE-1 Enforcer, Cessna A-37, and Beechcraft A36 Bonanza in the close-support strike category. Other categories (e.g., troop transport and trainer) may be introduced later.

The Beechcraft close-support entry, known as the Model PD 249, will be a two-seat, armed version of the Model A36 Bonanza, probably very similar to the Strike Debonair which was entered in a similar competition held by the USAF Combat Applications Group at Eglin AFB in 1965. Since that time, Beech has continued to use the latter aircraft as a flying testbed for various ordnance systems. Weapons evaluated so far in connection with this aircraft have included the SUU 11A gun pod with 7.62 mm General Electric Minigun; LAU 32BA launcher with 2.75 in FFAR rockets; LAU 10 launcher with four 5 in Zuni



*Beechcraft QU-22B version of the Model 36 Bonanza utilised under the USAF's Pave Eagle reconnaissance project*

rockets; CBU 14 bomb dispenser with 114 small bombs; 250 lb BLU 10B napalm bombs; 250 lb AN M57A1 general-purpose bombs; and 300 lb Mk 81 Snakeye general-purpose bombs. Possible demonstration loads in the current competition will total approx 1,180 lb (535 kg) under the wings, and may include 3.2 in rockets manufactured by the Pace Division of Ambac Industries Inc. The airframe will be stressed to withstand +6 g and -3 g at max T-O weight.

In its production form, the Beech Pave Coin aircraft would utilise the A36 Bonanza airframe, which is 10 in (0.25 m) longer than the F33A Bonanza (present designation of the former Debonair), and would have the standard 285 hp IO-520-B engine replaced by a GIO-520 engine, rated at 350 hp. Crew accommodation would be armour-protected underneath, the inboard wing fuel tanks would be self-sealing against projectiles of up to 0.50 in calibre, and all tanks would be protected against gunfire and explosion by a reticulated foam filling. There would be provision for installing auxiliary fuel tanks in the fuselage, aft of the front seats.

**PERFORMANCE** (estimated, at max T-O weight):

- Max permissible diving speed  
240 knots (276 mph; 444 km/h)
- Max cruising speed, clean aircraft  
180 knots (207 mph; 333 km/h)
- Max cruising speed, full ordnance load  
135 knots (155 mph; 250 km/h)
- T-O run, clean aircraft 870 ft (265 m)
- T-O run, full ordnance load  
1,590 ft (485 m)
- Combat radius, full ordnance load, internal fuel 275 nm (315 miles; 510 km)
- Combat radius, 540 lb (245 kg) ordnance load, internal fuel  
407 nm (470 miles; 755 km)

Ferry range with auxiliary fuselage tanks  
2,600 nm (2,995 miles; 4,820 km)

#### **GRUMMAN**

**GRUMMAN AEROSPACE CORPORATION;** Head Office and Works: South Oyster Bay Road, Bethpage, New York 11714, USA

#### **GRUMMAN TOMCAT**

**US Navy designation: F-14**

Grumman announced on 15 January 1969 that it had been selected as winner of the design competition for a new carrier-based fighter for the US Navy. Known as the VFX during the competitive phase of the programme, this aircraft is now designated officially F-14.

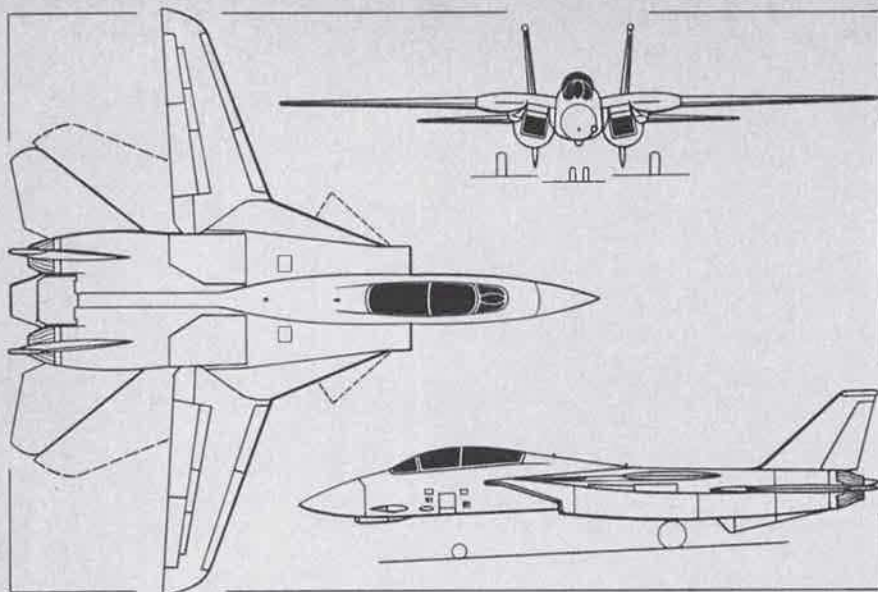
Requests for proposals had been sent originally to five aerospace companies on 21 June 1968. One month later, on 17 July, the US Navy awarded contracts to initiate the contract definition phase of the VFX programme. Proposals were requested by 1 October for evaluation by Naval Air Systems Command, and on 17 December the Source Selection Authority announced that the Grumman and McDonnell Douglas entries had been chosen for final consideration.

The two competing designs were then modified to incorporate further technical refinements and were re-submitted to the Naval Air Systems Command in early January 1969. This led to selection of the Grumman design and initiation of the development programme.

First flight of the F-14A Tomcat prototype took place on 21 December 1970, more than a month ahead of schedule. During landing approach on its second flight, on 30 December, the aircraft crashed due to

*Grumman F-14A Tomcat (two Pratt & Whitney TF30-P-412 afterburning turbofan engines)*





Grumman F-14A Tomcat two-seat carrier-based multi-rôle fighter

a complete hydraulic failure. Both pilots ejected successfully at a height of 50 ft (15 m) by means of their Martin-Baker ejection seats. Flight testing was resumed on 24 May 1971 with the second prototype, and on 2 September, at Grumman's Calverton airfield, the Tomcat was flown for the first time with the wings in the fully-swept position. Initial operational capability with the fleet is scheduled for 1973.

Emphasis has been placed on producing a comparatively small, lightweight, high-performance aircraft offering a significant advantage over the current F-4 Phantom II and the latest Soviet combat aircraft. In terms of airframe design, the F-14 uses advanced constructional techniques and titanium for optimum strength/weight ratio. Structural strength and a high thrust/weight ratio will enable it to combine a maximum speed in excess of Mach 2 with great agility in close-in air-to-air combat. Development time and risk are reduced by use of an already-existing avionics system, a landing gear evolved from that of the A-6 Intruder, and proven high-performance engines in the initial version. Armament includes an M61 multi-barrel gun.

The Pratt & Whitney F401-PW-400 afterburning turbofan engine is under development for the F-14B and is expected to produce 28,000-30,000 lb (12,700-13,600 kg) st. Weighing some 600 lb (272 kg) less than the Pratt & Whitney TF30-P-412 engines which power the prototype and early production models, it is anticipated that the new engine could be available for installation in the mid-1970s.

The configuration of the F-14 is unique, with variable-geometry wings, small foreplanes which are extended as the wings sweep back to control centre-of-pressure shift, leading-edge slats and manoeuvring flaps, which create lower effective wing loading, and twin outward-canted fins and rudders. The engines are mounted in ducts under the fixed inner wings, with simple inlets and straight-line airflow for maximum efficiency over a wide range of altitudes and Mach numbers. The ducts have multiple-shock ramp systems for good pressure-recovery at high Mach numbers.

The F-14 is designed to fulfil three primary missions. The first of these, fighter sweep/escort, involves clearing contested air-space of enemy fighters and protecting

the strike force, with support from E-2 Hawkeye early-warning aircraft, surface ships and communications networks to coordinate penetration and escape.

Second mission is to defend carrier task forces via Combat Air Patrol (CAP) and Deck Launched Intercept (DLI) operations. Third rôle is secondary attack of tactical targets on the ground, supported by electronic countermeasures and fighter escort.

Three versions of the F-14 were projected:

**F-14A.** Initial version, as described in detail below.

**F-14B.** Airframe and avionics basically the same as those of the F-14A, but powered by Pratt & Whitney F401 turbofans. Expected to be capable of acceleration from Mach 0.8 to Mach 1.8 in 1.27 minutes.

**F-14C.** Development of the F-14B, with new avionics and weapons. This version not now under development.

Under the initial contracts, Grumman was required to provide the Navy with a mock-up of the F-14A in May 1969, and to build 12 research and development aircraft. Subsequently, the US Navy ordered an initial series of 26 production F-14As, and has plans to acquire eventually a total of 313 Tomcats.

All available details of the F-14A follow:  
**TYPE:** Two-seat carrier-based multi-rôle fighter.

**WINGS:** Variable-geometry mid-wing monoplane, with 20° of sweep in the fully-forward position and 68° when fully swept. Wing position is programmed automatically for optimum performance throughout the flight régime, but manual override is provided. A short movable wing section, needing only a comparatively light pivot structure, results from utilisation of a wide fixed centre-section "glove", with pivot points 8 ft 11 in (2.72 m) from the centre-line of the airframe. The inboard wing sections, adjacent to the fuselage, arc upward slightly to minimise cross-sectional area and wave drag, and consist basically of a one-piece electron beam-welded titanium assembly, 22 ft (6.70 m) in span, made from Ti-6Al-4V titanium alloy. Small canard surfaces, known as glove vanes, swing out from the leading-edge of the fixed portion of the wing as sweep of outer panels

is increased. Stabilisation in pitch, provided by the canard surfaces, leaves the tailplane free to perform its primary control function. Trailing-edge control surfaces extend over almost entire span. Leading-edge flaps.

**FUSELAGE:** The centre-fuselage section is a simple, fuel-carrying box structure; forward fuselage section comprises cockpit and nose. The aft section has a tapered aerofoil shape to minimise drag, with a fuel dump pipe projecting from the rear. A speed brake is located on the upper surface, between the bases of the fins.

**TAIL UNIT:** Twin vertical fins, mounted at the rear of each engine nacelle; a small pod at the top of each houses electronic countermeasures equipment. Outward-canted ventral fin under each nacelle. The all-flying horizontal surfaces have skins of boron-epoxy composite material.

**LANDING GEAR:** Retractable tricycle type. Twin-wheel nose unit retracts rearward. Single-wheel main units retract forward and upward. Arrestor hook under rear fuselage, housed in ventral fairing. Nose-tow catapult attachment on nose unit.

**ENGINE INTAKES:** Straight two-dimensional external compression inlets. A double-hinged ramp extends down from the top of each intake, and these are programmed to provide the correct airflow to the engines automatically under all flight conditions. Each intake is canted slightly away from the fuselage, from which it is separated by some 10 in (0.25 m) to allow sufficient clearance for the turbulent fuselage boundary layer to pass between fuselage and intake without causing turbulence within the intake. Engine inlet ducts and aft nacelle structures are designed and manufactured by Rohr Corporation. The inlet duct, constructed largely of aluminium honeycomb, is about 14 ft (4.27 m) long; the aft nacelle structure, of bonded titanium honeycomb, is about 16 ft (4.88 m) in length.

**POWER PLANT:** Two Pratt & Whitney TF30-P-412 turbofan engines with afterburning, mounted in ducts which open to provide 180° access for ease of maintenance.

**ACCOMMODATION:** Pilot and missile control officer seated in tandem on Martin-Baker GRU-7A rocket-assisted zero-height zero-speed ejection seats, under a one-piece bubble canopy, hinged at the rear and offering all-round visibility. Provision for internal attachment of armour plate for crew protection.

**ARMAMENT:** One General Electric M61-A1 Vulcan multi-barrel gun in port side of forward fuselage. Four Sparrow air-to-air missiles mounted partially submerged in the under-fuselage. Two wing pylons, one under each fixed wing section, can carry both drop tanks and four Sidewinder missiles, the latter being mounted one on either side of each pylon. For Phoenix and later missiles, Grumman has developed a concept in which removable pallets can be attached to the present Sparrow missile positions, the missiles then being attached to the pallets.

**ELECTRONICS:** Hughes AN/AWG-9 weapons control system. Kaiser Aerospace AN/AVA-12 vertical and head-up display system.

**DIMENSIONS, EXTERNAL:**

Wing span: unswept	64 ft 1.5 in (19.54 m)
swept	33 ft 2.4 in (10.12 m)
overswept	32 ft 11.5 in (10.05 m)
Length overall	61 ft 10.6 in (18.86 m)
Height overall	16 ft 0 in (4.88 m)
Tailplane span	32 ft 8.4 in (9.97 m)

**WEIGHTS (estimated):**

Weight empty	36,000 lb (16,330 kg)
Max T-O weight, with four Sparrow missiles	53,500 lb (24,262 kg)



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By Don Steele

AFA AFFAIRS EDITOR

## THE HAWAII CHAPTER

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



*Philip N. Whittaker, Assistant Secretary of the Air Force (Installations & Logistics), gives the featured address at a recent Nation's Capital Chapter luncheon meeting. Head-table guests included, from left, Chapter Councilman James Ashworth; Chapter Counsel Donald Dawson; Lt. Gen. John O'Neill, Vice Commander, Air Force Systems Command; and Chapter President Robert J. Schissell.*

During recent months, AFA's **Hawaii Chapter** sponsored two outstanding luncheon programs. The first, which attracted some 170 members and guests, featured an address by **John Moore Allison**, former Ambassador to Japan, Indonesia, and Czechoslovakia.

Ambassador Allison spoke on "Post-war Japan's Role in Asia and Its Significance for Us."

Distinguished guests included **Vice Adm. David C. Richardson**, Deputy Commander in Chief, Pacific Fleet; **Lt. Gen. B. J. Webster**, Adjutant General, State of Hawaii; **Dr. Hung Wo Ching**, Board Chairman, Aloha Airlines; **Edwin K. Hastings**, Senior Vice President, Hilton Hotel Corp.; **David G. Barr**, British Consul General; **Ambassador Kew Sung Lee**, Korean Consul General; and **Edward Tsu-Yu Wu**, Consul General from Taiwan.

The second luncheon featured an address by **Gen. Lucius D. Clay, Jr.**, Commander in Chief, Pacific Air Forces. General Clay spoke on "The Role of Airpower in Southeast Asia Today."

Among the more than 250 who attended were **Mrs. Clare Booth Luce**, former Ambassador to Italy; **Vice Adm. David C. Richardson**; **Lt. Gen. William K. Jones**, Commanding General, Fleet Marine Force, Pacific; **Rear Adm. Paul G. Prins**, Commander, 14th Coast Guard District; and **Ambassador Allison**.

*Distinguished guests at the Hawaii Chapter's recent luncheon included, from left, Mrs. Clare Booth Luce, former Ambassador to Italy; Gen. Hunter Harris, USAF (Ret.), Chapter President; and Gen. Lucius D. Clay, Jr., Commander in Chief, Pacific Air Forces, and the event's featured speaker.*



In recognition of these two outstanding programs, we are proud to name the Hawaii Chapter as "AFA's Unit of the Month" for December.

A recent luncheon meeting of the **Nation's Capital Chapter** featured an address by the **Hon. Philip N. Whittaker**, Assistant Secretary of the Air Force for Installations & Logistics.

"I salute you," Mr. Whittaker said, "for the outstanding support you have provided and are continuing to provide to the United States Air Force mission. Without the help of groups such as this, I know it would be difficult—if not impossible—to communicate with the public at large concerning the vital role which airpower has to play in our national defense structure. Today, and in the recent past, the easiest game in town to play

has been called 'kick the military.' Hardly a day goes by where you can't find some sort of derogatory statement about the military in the press."

Later in his speech, he said, "... the Air Force alone takes some 2,300,000 procurement actions every year. If we were to make an error just once every thousand times, this would still yield 2,300 potential horror stories a year; so you can see what I mean about 'the easiest game in town.' And again, that's why the support of groups such as the Air Force Association is so important in helping to ensure that a balanced picture of the Air Force is presented to the public."

The balance of Mr. Whittaker's speech concentrated on four topics: First, the Air Force's accomplishments in the general area of facilities im-

provement and modernization; second, the building of a viable and self-sufficient Air Force in the Republic of Vietnam; third, significant actions to improve systems acquisition; and, finally, the initial steps the Air Force has taken to provide essential equipment modernization.

Held in the Rayburn House Office Building, the luncheon drew more than 200 members and guests, including leaders of the Air Force and aerospace industry. Many Congressmen had planned to attend the luncheon, but an untimely quorum call required them to report to the Capitol.

AFA leaders attending the luncheon included National Directors **A. Paul Fonda** and **Maj. Gen. Winston P. Wilson, ANG (Ret.)**.

Chapter President **Robert J. Schissell** presided, and **Tom Turner**, Chairman of the Program Committee, served as Master of Ceremonies.

More than 300 persons attended the **Wright Memorial Chapter's** annual dinner dance observing the twenty-fourth anniversary of the establishment of the Air Force as a separate service. The function was held in the Wright-Patterson AFB Officers' Club.

During the program, **Maj. Gen. Douglas T. Nelson**, B-1 Program Director, AFSC's Aeronautical Systems Division, Wright-Patterson AFB, Ohio, received the Wright Memorial Chap-

*Maj. Gen. Douglas T. Nelson, B-1 Systems Program Director (ASD), receives the Wright Memorial Chapter's Aerospace Power Award from Chapter President Gerald Kaufhold during the Chapter's observance of USAF's twenty-fourth anniversary.*



ter's 1971 "Aerospace Power Award."

General Nelson was cited for his continued and effective direction of the development of the B-1, and also for his many public appearances on behalf of the B-1 program.

Others honored included **Morris Ribbler**, who received an AFA Life Membership, and **Edward Nett** and **Joseph Somers**, Chapter Vice Presi-

dents, who received Presidential Citations. Mr. Ribbler, a charter member of the Wright Memorial Chapter, served several terms as Chapter and Ohio AFA President. All awards were presented by the Chapter President, **Gerald Kaufhold**.

More than fifty guests and members attended the **Monterey Bay Area**

*William Clapp, left, Louisiana AFA Vice President, presents the Alvin Callender Chapter Trophy to Cadet Col. Humbert Brocato of the Holy Cross School's AFJROTC. The trophy, which was designed and handmade by Mr. Clapp, is presented annually for scholarship and leadership excellence.*



*AFA National Secretary Nathan H. Mazer, right, greets Apollo-15 Astronaut James Irwin and his wife at a reception honoring the Apollo-15 crew, recently cosponsored by AFA's Salt Lake Chapter and the Utah Section of the American Institute of Aeronautics and Astronautics. More than 800 persons attended the reception and dinner at the University of Utah.*

Rufus R. Rand, the last surviving member of the Lafayette Escadrille, died on October 15, 1971, at the Lafayette Club in Minnetonka Beach, a suburb of Minneapolis. He was seventy-nine years old.

A prominent civic and business leader in the Minneapolis area during the 1920s and 1930s, Mr. Rand served in both World Wars and was decorated by the French government for his service with the Escadrille, a group of volunteer American aviators who formed a separate fighting unit in France's air force in 1916.

Mr. Rand was one of the twelve founders of the Air Force Association present at the first meeting, held in New York on October 12, 1945. Also, he was a member of AFA's first Board of Directors.

AFA extends its deepest sympathy to Mr. Rand's five daughters and sixteen grandchildren.

## AFA News

Chapter's Honors Night dinner observing USAF's twenty-fourth anniversary.

During the awards portion of the program, the Chapter's "Man of the Year" award went to **Stanley J. Hyrn**, Chapter Secretary, who is also Vice President of the California AFA.

Many AFA units have a "patient wife" award; the Monterey Bay Area Chapter went one step further, however, and presented "Award of Merit Certificates" to the wives of three Chapter officers: **Mrs. Ben Snell**, **Mrs. Stanley Hyrn**, and **Mrs. Louis Peresenyi**, citing their continued efforts on behalf of the Chapter and the State AFA. Chapter Past President **Gerald Anderson** presented the awards.

In support of the USAF's B-1 bomber program, the **Santa Monica, Calif., Chapter** recently sponsored a luncheon at which **Maj. Gen. Douglas**

*Award recipients at the Monterey Bay Area Chapter's Honors Night dinner included, from left, Edna Snell, Bernice Hyrn, and Mary Ann Peresenyi. The three, wives of Chapter officers, were cited for their efforts on behalf of AFA at the Chapter and state levels.*



**T. Nelson** was the featured speaker. General Nelson spoke on the necessity for a strong national defense posture and the vitally needed B-1 as a part of the Triad.

Distinguished guests included **Gen. Samuel E. Anderson**, USAF (Ret.);

**Lt. Gen. Samuel C. Phillips**, Commander, SAMSO; **Gen. John Gerhart**, USAF (Ret.); **Lawrence Hyland**, Vice President and General Manager, Hughes Aircraft Co.; **John Alison**, Vice President, Northrop Corp., and an AFA National Director; **Lt. Gen.**



At Cape Canaveral Chapter's dinner observing AFA's Silver Anniversary, cake cutting by **Brig. Gen. E. O. Martin**, Commander, 42d Air Division, McCoy AFA President, and Chapter President **Callahan**, USAF (Ret.), left, Florida AFA President, and Chapter President **George Burrus**.



*Alexander E. Harris, left, newly elected Vice President for AFA's South Central Region, pins an AFA lapel pin on Mrs. Gordon P. Oates, a new member of AFA and a newly elected member of the David D. Terry, Jr., Chapter's Council. Chapter President James D. Pruitt, Jr., looks on.*

*Air Force and AFA officials visit informally at a recent meeting of AFA's Faith Chapter. From left, Texas AFA President **John Allison**; Faith Chapter President **Doug Taylor**; **Maj. Gen. Jerry D. Page**, Commander, Sheppard Technical Training Center; and **Joe Higgins**, the "Safety Sheriff" of TV fame and guest speaker for the event. Joe is a Past President of AFA's Los Angeles Chapter.*



# 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.

## 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 principles of freedom and equal rights for all mankind.

## 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.

**Servive Members** (nonvoting, nonofficeholding): US citizens on extended active duty with any branch of the United States armed forces—\$10 per year.

**Cadet Members** (nonvoting, nonofficeholding): US citizens enrolled as Air Force ROTC or JROTC Cadets, Civil Air Patrol Cadets, Officer Trainees, or Cadets of a United States Service Academy—\$5 per year.

**Associate Members** (nonvoting, nonofficeholding): Non-US citizens who support the aims and objectives of the Air Force Association and whose application for membership meets AFA Constitutional requirements—\$10 per year.

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## State Contacts

Following each state name, in parentheses, are the names of the localities in which AFA Chapters are located. Information regarding these Chapters, or any place of AFA's activities within the state, may be obtained from the state contact.

**ALABAMA** (Auburn, Birmingham, Huntsville, Mobile, Montgomery, Selma, Tuscaloosa): John H. Haire, 2604 Bonita Circle, Huntsville, Ala. 36111 (phone 453-5499).

**ALASKA** (Anchorage, Fairbanks, Kenai): Gordon Wear, Box 777, Fairbanks, Alaska 99701 (phone 452-4411).

**ARIZONA** (Phoenix, Tucson): William F. Barns, 5409 E. Camelot Dr., Phoenix, Ariz. 85108 (phone 267-2357).

**ARKANSAS** (Blytheville, Fort Smith, Little Rock): Alex E. Harris, 3700 Cantrell Rd., Apt. 612, Little Rock, Ark. 72202 (phone 664-1915).

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**COLORADO** (Boulder, Colorado Springs, Denver, Pueblo): Roy A. Haug, Mt. Bell 1st Nat'l Bank Bldg., Rm. 402, Pikes Peak at Tejon, Colorado Springs, Colo. 80903 (phone 867-3740).

**CONNECTICUT** (Torrington): Cecil H. Gardner, 21 Field Rd., Cos Cob, Conn. 06807 (phone 869-3146).

**DELAWARE** (Wilmington): Vito A. Panzarino, Greater Wilmington Airport, Bldg. 1504, Wilmington, Del. 19720 (phone 328-1208).

**DISTRICT OF COLUMBIA** (Washington, D.C.): Robert J. Schissell, 4707 Connecticut Ave., N.W., #614, Washington, D. C. 20008 (phone 363-5944).

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**GEORGIA** (Athens, Atlanta, Savannah, St. Simons Island, Valdosta, Warner Robins): H. L. Everett, 822 Capt. Kell Dr., Macon, Ga. 31204 (phone 929-3035, ext. 5509).

**HAWAII** (Honolulu): Hunter Harris, Jr., 2003 Kalia Rd., Honolulu, Hawaii 96815 (phone 949-5941).

**IDAHO** (Boise, Burley, Pocatello, Twin Falls): Carl W. Tipton, 1511 Juanita, Boise, Idaho 83706 (phone 344-0348).

**ILLINOIS** (Champaign, Chicago, Elmhurst, Deerfield, O'Hare Field): M. Lee Cordell, 1901 Kenilworth Ave., Berwyn, Ill. 60402 (phone 679-8700).

**INDIANA** (Indianapolis): Oliver K. Loer, 268 S. 800 W., Swayzee, Ind. 46986 (phone 922-7136).

**IOWA** (Cedar Rapids, Des Moines): Ric Jorgensen, 4005 Kingsmen, Des Moines, Iowa 50311 (phone 255-7656).

**KANSAS** (Wichita): Don C. Ross, 10 Linwood, Eastborough, Wichita, Kan. 67201 (phone 686-6409).

**LOUISIANA** (Alexandria, Baton Rouge, Bossier City, Monroe, New Orleans, Ruston, Shreveport): Ralph F. Chaffee, 4731 Fern Ave., Shreveport, La. 71105 (phone 865-7084).

**MARYLAND** (Baltimore): Richard Boyd, 2101C Town Hill Rd., Baltimore, Md. 21234 (phone 661-7271).

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**NEVADA** (Las Vegas): Barney Rawlings, 2617 Mason Ave., Las Vegas, Nev. 89102 (phone 735-5111).

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**OKLAHOMA** (Altus, Enid, Oklahoma City, Tulsa): Edward McFarland, Suite 1100, Shell Bldg., Tulsa, Okla. 74119 (phone 583-1877).

**OREGON** (Corvallis, Portland): Robert Ringo, 605 S.W. Jefferson St., Corvallis, Ore. 97330 (phone 753-4482).

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**RHODE ISLAND** (Warwick): Matthew Puchalski, c/o 143 SOG RIANG, T.F. Green Airport, Warwick, R.I. 02886 (phone 737-2100, ext. 27).

**SOUTH CAROLINA** (Charleston, Columbia, Myrtle Beach, Sumter): James F. Hackler, Jr., Box 2065, Myrtle Beach, S.C. 29577 (phone 449-3331).

**SOUTH DAKOTA** (Rapid City, Sioux Falls): Don Hedlund, 2701 W. 24th St., Sioux Falls, S.D. 57105 (phone 336-1376).

**TENNESSEE** (Memphis, Nashville, Tullahoma): James W. Carter, Williamsburg Rd., Rt. 3, Brentwood, Tenn. 37027 (phone 834-2008).

**TEXAS** (Ablene, Austin, Big Spring, Corpus Christi, Dallas, Del Rio, El Paso, Fort Worth, Houston, Lubbock, San Angelo, San Antonio, Sherman, Waco, Wichita Falls): John Allison, P. O. Box 5116, Waco, Tex. 76708 (phone 754-3318).

**UTAH** (Brigham City, Clearfield, Ogden, Salt Lake City, Provo): Glen L. Jensen, 1293 W. Fifth South, Salt Lake City, Utah 84104 (phone 359-4485).

**VERMONT** (Burlington): R. F. Wissinger, 158th CAM Sd, Burlington International Airport, Vt. 05401 (phone 863-4494).

**VIRGINIA** (Arlington, Danville, Harrisonburg, Langley AFB, Lynchburg, Norfolk, Richmond, Roanoke): Richard C. Emrich, 6416 Noble Dr., McLean, Va. 22201 (phone 426-3020).

**WASHINGTON** (Bellevue, Port Angeles, Seattle, Spokane, Tacoma): Leslie D. Kelsner, 828 E. 4th, Apt. 101, Port Angeles, Wash. 98362 (phone 457-6571).

**WISCONSIN** (Madison, Milwaukee): Lyle W. Ganz, 1536 N. 69th St., Wauwatosa, Wis. 53213 (phone 444-4442).

**WYOMING** (Cheyenne): Fred Milam, Box 745, Cheyenne, Wyo. 82001 (phone 634-2134).

**Austin Davis**, USAF (Ret.), Vice President, North American Rockwell Corp.; **Charles E. Hunter**, Vice President, Thiokol Chemical Co.; and **Robert K. Dornan**, TV news commentator and a very active participant in the MIA/POW program.

Following General Nelson's speech, the 375 members and guests adjourned to the North American Rockwell plant to tour a B-1 mockup and watch a film on the B-52. General Nelson supplied the commentary.

The Chapter's President, **Maj. Gen. Arno Luchman**, USAF (Ret.), and his committee—**Brig. Gen. William Hamrick**, USAF (Ret.), **Don Carlson**, and **Harold Boston**—are to be congratulated on a most enjoyable program and a great effort on behalf of the B-1 program.

**CROSS COUNTRY . . .** The new nominee for Associate Justice of the Supreme Court, **Lewis Powell, Jr.**, of Richmond, Va., is a charter member



*Brig. Gen. Jeanne M. Holm, Director of WAF, is escorted by Dr. Clayton Gross, a Past President of the Oregon AFA, after her arrival home in Portland, Ore., to attend a banquet in her honor cosponsored by AFA's Portland Chapter and the Portland Chamber of Commerce. The honor guard is made up of women cadets from the Oregon Wing, Civil Air Patrol.*

of AFA and a current member of the **Richmond Chapter**. Also, he was one of the authors of the Supplemental Report of the Defense Blue Ribbon Panel, which was reported on in the August '71 issue of AIR FORCE Magazine (p. 46).

**TSgt. Morris L. Broussard**, USAF's Savannah Area Recruiter, received a Certificate of Merit from the **Georgia AFA** for his outstanding production of enlistments for the USAF during Fiscal Year 1971. Sergeant Broussard was tops among twenty-six recruiters

of his detachment, which covers some ninety counties in Florida, Georgia, and South Carolina. Georgia AFA Vice President **Don Devlin** made the presentation.

At a luncheon recently held at the Intermountain School, Brigham City, Utah, members of the **Utah AFA** officially launched the 1971 version of its award-winning "**Project Navajo**." During the luncheon, Utah AFA President **Glen L. Jensen, Jr.**, outlined the project that is to provide food, clothing, and other items to the 140,000 Indians living on the 25,000-square-mile Navajo reservation in Utah, Colorado, New Mexico, and Arizona. This year, some of the goods will be delivered for Thanksgiving and the balance for Christmas. We extend our best wishes to the Utah AFA for another successful program.

**Jaye Bigda**, President of the Pennsylvania AFA's **Steel Valley Chapter**, and other ladies of the Chapter recently participated in the Duquesne Village celebration of "Ethnic Day." The ladies manned a booth in which they sold baked goods and flowers to raise funds for the Chapter.

Congratulations to the **Mifflin County Chapter** of Lewistown, Pa., for its role in sponsoring the city's Memorial Day services. Members of each of the city's veterans' organizations and the Chamber of Commerce participated in the services. Judge **John Brosky**, Vice President for AFA's Northeast Region, was the featured speaker.

**Franklin Fisher**, President of the **Eglin Chapter** of Fort Walton Beach, Fla., reports that all twenty-three **Directors** of the City's Chamber of Commerce have joined AFA and affiliated with the Chapter. **Dr. Malcolm Crotzer**, President of the Chamber, says he is shooting for 100 percent AFA membership of the entire Chamber of Commerce. Good luck, Dr. Crotzer, and, Frank, keep up the good work! ■

# WOMEN'S RIGHTS

1972

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SEPTEMBER  
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-SEE PAGE 119

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Bob Stevens'

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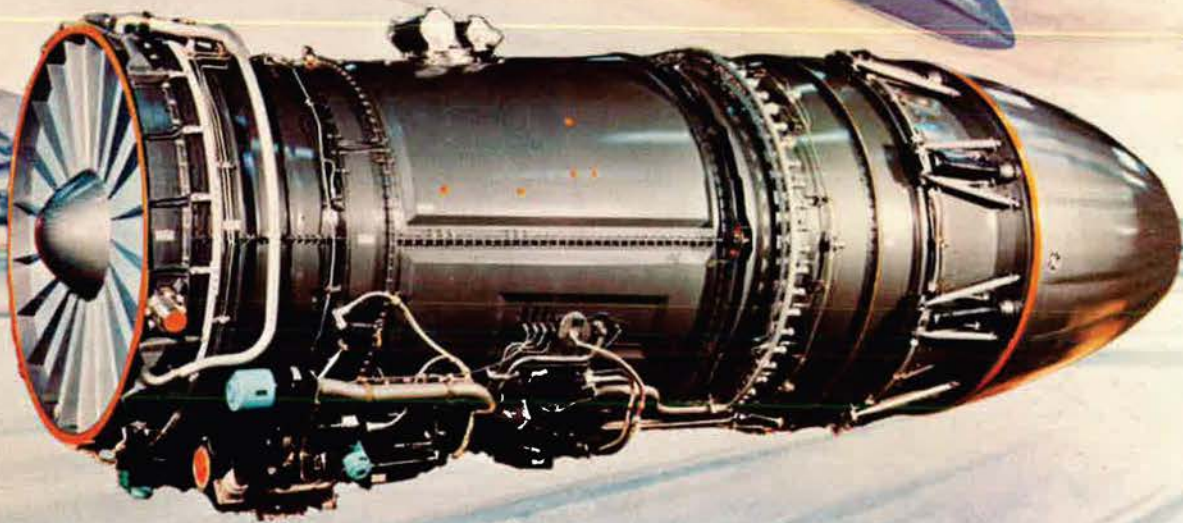
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But if his finger's slightly nervous,  
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A STRAY, BATTLE-DAMAGED F-4 HEADED FOR HOME SPOTS A TANKER-





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