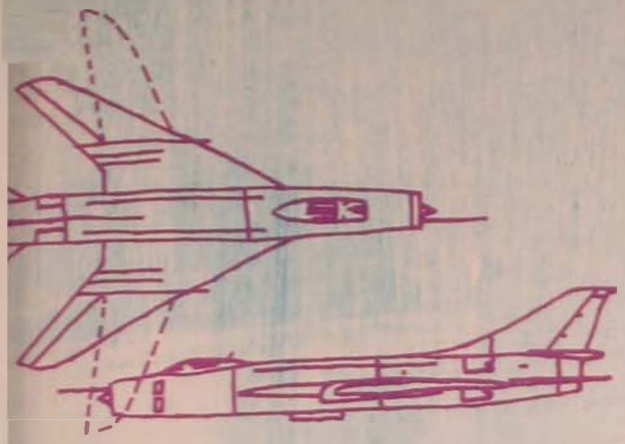

AIR UNIVERSITY review

NOVEMBER-DECEMBER 1972

Air Superiority

AIR UNIVERSITY
review

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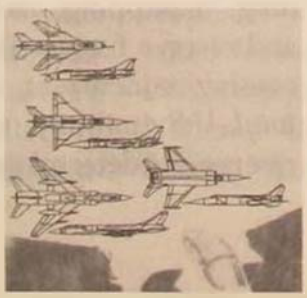


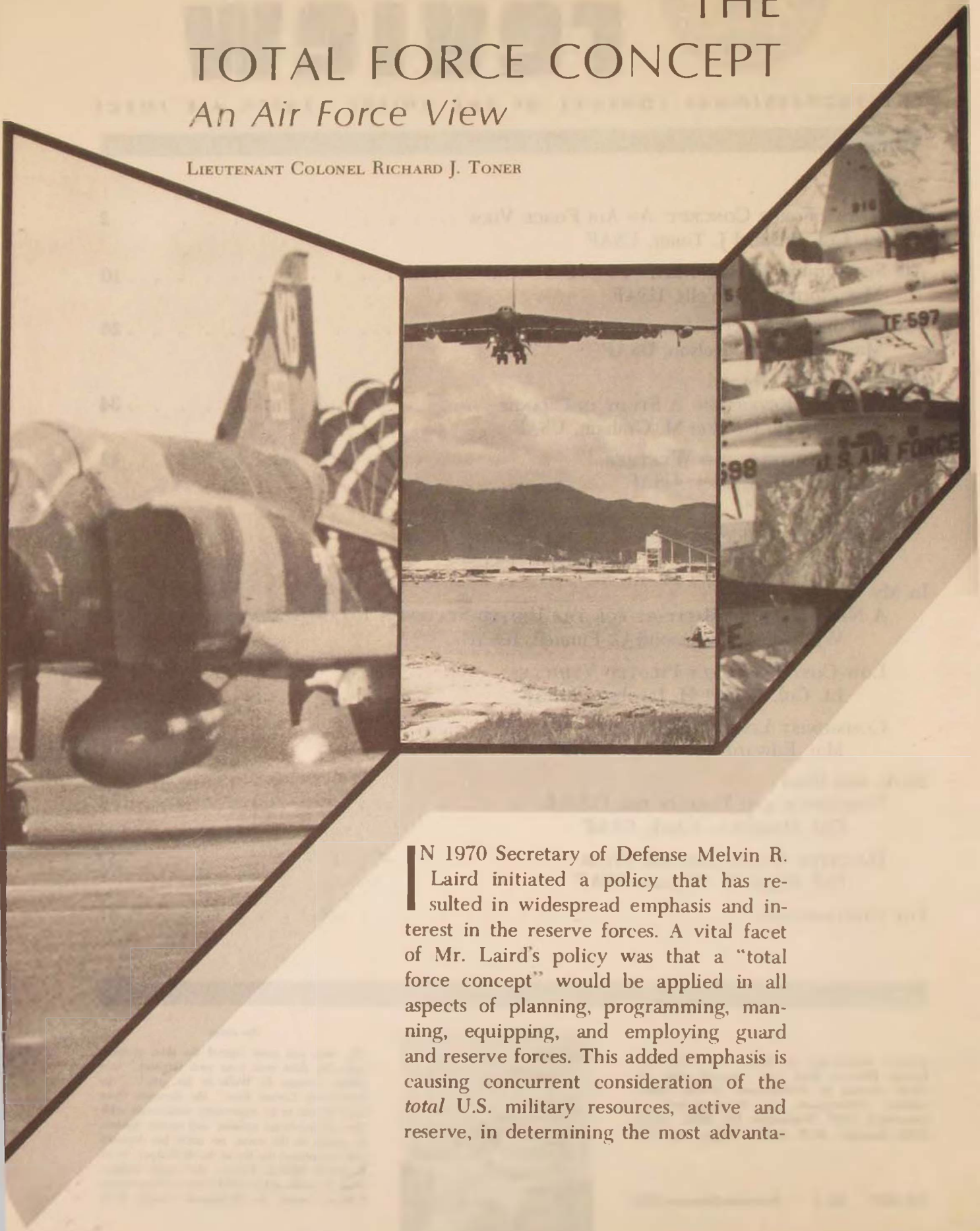
the cover

"To win, you must control the skies—particularly the skies over your own territory," says Major Norman E. Wells in his article, "Air Superiority Comes First." He discusses three basic threats to air superiority: antiaircraft artillery, surface-to-air missiles, and enemy fighters. In profile on the cover, our artist has depicted (top to bottom) the Soviet Su-7B Fishpot, Su-11 Flagon-B, MiG-23 Foxbat, and Tu-28 Fiddler, all in the wake of the USAF's new Air Superiority Fighter aircraft, the McDonnell Douglas F-15.

THE TOTAL FORCE CONCEPT

An Air Force View

LIEUTENANT COLONEL RICHARD J. TONER



IN 1970 Secretary of Defense Melvin R. Laird initiated a policy that has resulted in widespread emphasis and interest in the reserve forces. A vital facet of Mr. Laird's policy was that a "total force concept" would be applied in all aspects of planning, programming, manning, equipping, and employing guard and reserve forces. This added emphasis is causing concurrent consideration of the *total* U.S. military resources, active and reserve, in determining the most advanta-

geous mix of forces to assure our national security. The policy is also resulting in a definite turning toward reliance on the reserve forces, rather than conscription, as the primary means of augmenting the active forces.

For many years prior to this revision in policy, the Air Force advocated and practiced the total force concept in considering the reserve components. In fact, *USAF Planning Concepts, 1969–1984* used the term "total force" and described the concept in much the same words that were later written in the Secretary's memorandum.

Since this initial promulgation, the view and application of the total force concept have broadened significantly. Within the following year the Secretary of Defense expanded upon his previously limited interpretation of the total force concept. For example, he requested the Chairman of the Joint Chiefs of Staff to undertake an integrated assessment of our *total force* capabilities against the Soviet naval threat. He further posed the question: Under the total force concept, would it be possible and sensible to push for increased European contributions to ground and tactical air development programs?

These various references to the concept have resulted in a multiplicity of interpretations of the term. Consequently, it will be the objective of this article to put the total force concept into perspective according to the view of the Air Force. To illustrate this view, some current and projected applications of the concept will be briefly discussed.

a three-dimensional view

In planning to meet the varied threats to our national security, as linked with the security of the free world, we have come to rely increasingly on the total resources available to us. The necessity of this approach is reinforced by the comparative reductions in Defense appropriations, the trend in government spending toward solving domestic problems, and the objective of the all-volunteer military service. Consequently, in our planning and programming activities, we must take a three-dimensional view of the total force: within the Air Force, considering both the active and reserve components; within the U.S. Defense establishment, considering the complementary roles and missions of the individual services; and throughout the free world, where we take into account our total combined Defense resources as well as those of our friends and allies. We might attempt to expand this even further to include industrial capacities, political systems, or national will. However, in the interest of limiting the concept to reasonably manageable proportions, we will restrict this view of the total force to military resources exclusively.

within the Air Force

To begin at the most fundamental level, let us first discuss the concept as it applies to an individual service. The total strength of the Air Force—and the other services as well—is a composite of its active and reserve elements. In order to achieve an appropriate balance in the strength of this dimension of the total force, it is necessary to perform a concerted planning and programming function for each of these principal elements.

The Air Force has developed policies that are specifically designed to maximize total force capabilities. Among these policies are the comparable structuring of units; equal training and evaluation standards for active and reserve forces; and an integrated approach to equipping, supporting, and exercising all units. The success of the partial reserve mobilizations for the Berlin situation in 1962 and the *Pueblo* crisis in 1968 demonstrates the effectiveness of these policies in the past decade.

The added Department of Defense (DOD) emphasis of the past year and a half has provided further impetus for improving the readiness, responsiveness, and capabilities of the Air National Guard (ANG) and Air Force Reserve (USAFR). A major modernization program, span-

ning fiscal years 1971 through 1973, is proceeding toward equipage of the air reserve forces with first-line equipment. Units are converting from obsolete systems, such as the F-84, RF-101, and C-124, to the same aircraft found in the active inventory: the F/RF-4, F-105, A-37, and C-130. Almost two-thirds of our reserve capability will be re-equipped during this conversion period.

Another beneficial outgrowth of the total force view is the increased attention that has been paid to the structure and functions of the reserve forces. Manpower, in both quantity and skill, has been carefully analyzed to assure that the needs of the major contingency plans will be adequately met. The monthly and annual training activities of individual guardsmen and reservists are under continual review. Through this means, many of the less meaningful training requirements have been reduced or eliminated, allowing for primary concentration on direct combat and combat support missions.

Another result has been a notable increase in guard and reserve participation in active missions. The Reserve Associate program has provided a means for 30 percent of the strategic airlift capability to be operated by the USAFR by integrating active and reserve strategic airlift air and ground crews. All Military Airlift Command C-141 and C-9A units now have a major surge capability because reservists are performing the military airlift mission side by side with their active counterparts. Over half the air defense alert force is provided by the ANG in F-101s, F-102s, and soon in F-106s. Guard aircrews and support personnel also provide full-time aerial refueling support in Europe, and both guard and reserve tactical airlift crews are operating on a daily basis in support of the active force. Each of the commands that gain mobilized air reserve forces units has provided a greatly expanded role to these resources in their periodic exercises. These and similar efforts have resulted from a total force orientation and are instrumental in developing a *total* USAF capability designed to meet threats to national security at any level.

An aspect that is applicable to both active and reserve forces is the increased attention being given to the creative application of weapon systems. Development of multiple capabilities for the F-4 is an example. It not only is an excellent attack weapon system but also performs very well in the counterair and nuclear weapon delivery roles. This versatility assures total utilization of these critical resources.

But these accomplishments are not being made without problems. Unit conversions to newer aircraft are causing temporary reductions in combat effectiveness as well as significant training and logistics problems. These problems were anticipated, and special management procedures have helped to reduce the deleterious impact of major conversions taking place simultaneously. In force structuring, we also face the risk of leaning too heavily toward the reserve forces if the sole driving motivation is economy. The most advantageous force mix cannot be based on operating costs alone, despite the exceptional capabilities of the guard and reserve units. Finally, the transition to an all-volunteer Army is expected to have an adverse impact on recruiting for all reserve forces, an impact difficult to assess thus far. Without the pressure of the draft, many young men may be less inclined to enlist in the ANG or USAFR. However, recent favorable legislation and improving recruitment efforts are among the factors that are causing an increasingly positive outlook in this problem area.

In spite of these and other problems, the USAF is becoming collectively more potent and capable as a result of a total force orientation. Contingency planning is being accomplished from a total force viewpoint. The operational commands are vitally concerned with support for and operational readiness of the reserve components. In sum, the Air Force has expanded its resource base through concurrent consideration for planning and programming its total assets.

within the Defense establishment

In the Department of Defense, which is second in our three-dimensional view of the total force concept, the military services are complementary in nature while each performs its own functions. By tradition, the medium in which each service primarily operates—land, sea, and air—has been used to distinguish each as part of a total military force. In recent years, however, the division of functions has also extended across service lines as a means of tailoring forces to meet the spectrum of threats to national security. We now have, for example, strategic offensive and defensive forces, general purpose forces, and other support forces, elements of which are present within each of the services.

In addition to these views of the service functions, the total force concept now adds two other aspects to this perspective: (1) the ability of one service to apply its resources to participate in the primary missions of another service, and (2) expanded application of individual-service weapon systems. For example, a land-based attack fighter is considered the principal weapon system for interdiction and close air support of ground forces. However, the same system, when viewed as an element of the total force, has equal application against the surface naval threat. Consequently, the composition of the Defense establishment is in the process of orientation to take greater cognizance of the flexibility and multiple capabilities of service resources.

The Air Force is taking extensive steps to broaden the conceptual application of its weapon systems and then to validate these concepts. The B-52D system has recently completed a second expansion of its capabilities. The aircraft was originally designed for precision delivery of strategic nuclear weapons. In the mid-sixties, it was modified for use in Southeast Asia to drop large tonnages of conventional bombs. As a result of recent minor modifications, the same aircraft can now be employed for aerial delivery of sea mines as a means of closing off access to enemy harbors. This capability is particularly directed against submarine bases, thus expanding the U.S. anti-submarine warfare (ASW) capability. With each successive addition to the bomber's flexibility, the B-52D has continued to retain its former capabilities, thereby giving an added option to the national command authorities.

The diversified employment of the C-130 is another example of this aspect of total force operations. Originally designed as a medium tactical transport aircraft, it has been very effectively employed in close support and interdiction roles as a gunship, the AC-130. Its predecessors, the AC-47 and AC-119, also demonstrate the potential flexibility of weapon systems when they are creatively applied to conflict situations. Through these and similar exploitations of the inherent flexibility of weapon systems, each service can achieve a greater level of defense without a significant increase in investment of Defense resources.

There are also examples of actual and planned activities which the Air Force is undertaking to assist other services in meeting their primary mission responsibilities. Increased attention is being given to the potential of land-based tactical air in protecting the sea lines of communication approaching and surrounding Europe. Reconnaissance forces are identifying and tracking Soviet naval surface forces in the Mediterranean. An extensive testing of tactical air munitions against surface naval targets is being conducted, and related delivery tactics are under development. By exploiting the expanded capabilities of land-based tactical air, the Navy can be permitted to concentrate more resources on ASW. In addition, a further expansion of B-52D capabilities is under consideration. An analysis is in progress to determine its compatibility with a Navy air-to-surface missile currently under development, the Harpoon. If employed in concert, these systems have the potential to expand U.S. capabilities broadly for convoy escort and long-range interdiction of surface naval forces.

Continued on page 8

The Versatile F-4

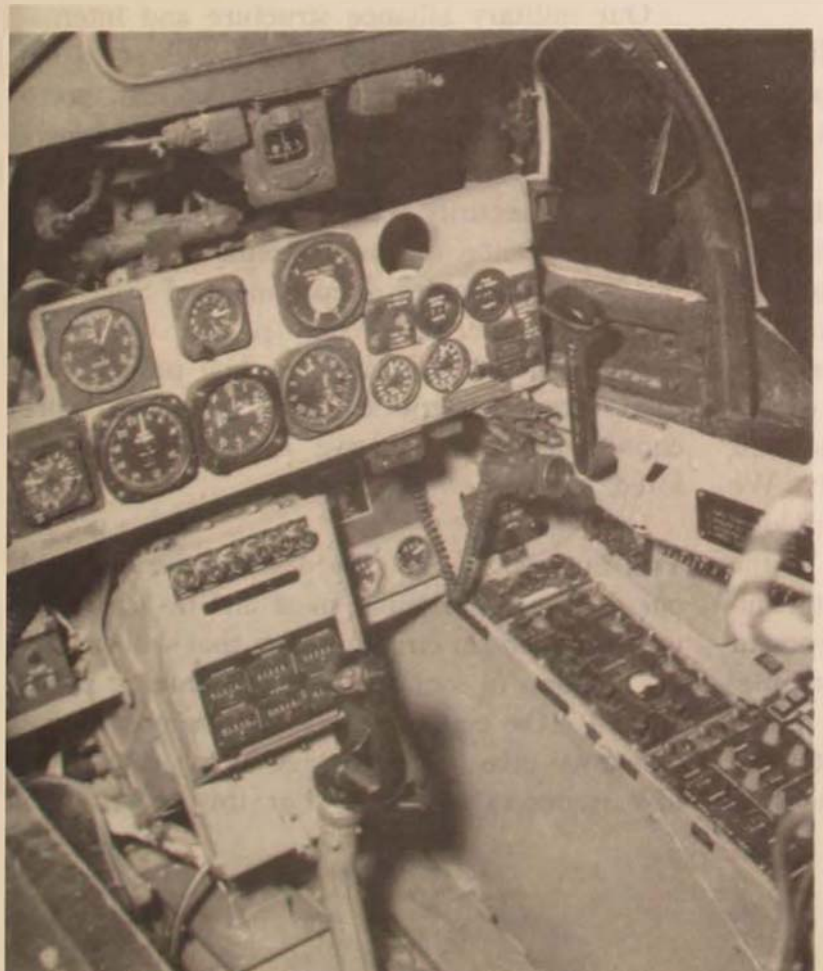
Development of the F-4 to perform multiple missions typifies the continuous effort by the Air Force to make total use of critical resources. This and similar efforts, applied to regular, reserve, and guard forces, help provide a USAF capability to meet any threat to national security. The F-4 not only is an excellent fighter/attack weapon system but also performs well in other roles. . . . F-4Cs in flight over South Vietnam (top right) . . . configured for reconnaissance, an RF-4C at Tan Son Nhut Air Base, SVN . . . a flock of F-4Ds being bedded down for the night at Erding Air Station, West Germany . . . F-4E (opposite), with 3 LAU-3A rocket launchers and 4 M-117 750-lb bombs each wing.

F-4C

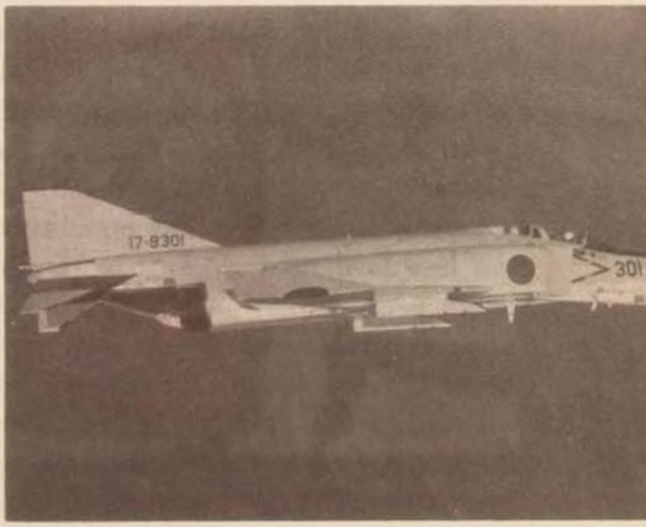
RF-4C

F-4D

F-4E



F-4E cockpit and controls



The first F-4EJ for Japan

The Joint Chiefs of Staff are particularly affected by this dimension of the total force concept. In their role of planning for and managing the employment of U.S. military forces, they are taking major steps to assure total use of U.S. military resources. The application of the total force concept at the JCS level is bringing into reality the full potential of the total U.S. military capability, an approach which should achieve a more substantial return on our limited investment of Defense funds.

within the free world

The Nixon Doctrine is the basis of our current foreign policy, and it would appear that its tenets will remain so for many years to come. At the risk of oversimplifying it, we may view that doctrine as establishing a combination of willingness to negotiate with an objective of mutual strength in partnership with our allies. This is intended as the foundation upon which we will build a generation of peace; and in its broadest application, then, the total force concept becomes the cornerstone of that foundation.

A unique view of our military responsibilities to the free world is embodied in this concept. The maturing political and economic stability of our NATO allies now affords a "fair share" investment in our common defense. Although we cannot expect the same equality of sharing from less developed allies, it is unreasonable to assume a disproportionate expenditure of U.S. manpower resources when these nations are externally threatened. Therefore, we expect sovereign nations, as a minimum, to invest their own manpower in their national security. We expect these nations to develop the technological capability of their military resources to the maximum extent possible. Where their technical resources are limited, as in the development of air power, we will be prepared to supplement the capabilities of a beleaguered nation whose survival is vital to our security interests. We consider each of the nations of the free world to have a share in preserving that freedom and a concomitant responsibility to aid a threatened ally as its resources and its own security interests permit. Beyond the fulfillment of these obligations of partnership, we stand ready to be the deciding influence in deterring any disruption to the generation of peace.

These expectations of the total force concept are expressed in more pragmatic terms than a simple statement of desires. Our military aid and assistance programs are principally oriented toward strengthening the complementary capabilities of the nations of the free world. In military sales endeavors, we are offering hardware that is effective, yet simple to operate and within the budgetary limits of the smaller nations. The International Fighter (F-5E) is an excellent example of a system which provides for free world standardization of munitions, tactics, and ground support at a price that most countries can afford to pay. We are also accomplishing our force structuring and objectives planning with a much broader consideration of the total force capabilities of our friends and allies.

Our military alliance structure and international relations are beginning to adjust to the influences of the total force concept. NATO planning and programming will increasingly reflect the influence of this cooperative approach to security. On an even broader basis, the furtherance of the precepts embodied in this concept requires Department of State and other government agency participation and cooperation as well. As a gradual process, the total force concept should engender a more coordinated and cohesive free world defense force.

THE DEFENSE of the free world in general and our nation in particular must first be assured if we are to live in circumstances that will permit the solution of social and other domestic problems. Yet the cost of defense can be prohibitive unless we take full advantage of the total military resources available. For this reason, the

total force concept is now applied in planning, programming, manning, equipping, and employing our military establishment. For maximum effectiveness, these activities should be regarded at three separate but related levels. Simply stated, the total force concept is applicable at the intraservice, interservice, and international levels. Although various aspects of this concept have been operative over a long period of time, the full dimensions of its potential are just now beginning to be refined. In his fiscal year 1973 Annual Defense Department Report, Secretary Laird captured the trends of future security endeavors when he stated:

> The conceptual thrust of the total force is toward the efficient integration of all relevant free world resources to provide more security for all of us. [It] demands a new order of coordination and cooperation. . . .

By virtue of the inherent adaptability and flexibility of air power, the Air Force has the opportunity to seize the initiative and set the standards for this new order.

Hq United States Air Force

AIR SUPERIORITY COMES FIRST

MAJOR NORMAN E. WELLS

ONE lesson is clear from the epic battles of World War II, Korea, and the Six Day War: To win, you must control the skies—particularly the skies over your own territory. Air power does not guarantee that you will win a war, as in the cases of Korea and Vietnam; but without it, modern armies are destined to lose. In the past, apart from the early days of World War II, U.S. ground and naval forces have usually been able to operate relatively free from enemy air attack. The future carries no such guarantee. Yet with the increasingly destructive weapons carried by modern aircraft, it is imperative that our surface forces be protected from air attack. At the same time, our offensive air power must be able to carry the war far behind the front lines without undue interference and losses. The United States, in other words, must consider overall air superiority as a prime objective.

All military leaders must understand the importance of air superiority and how it is attained. Unfortunately, not all of them do. This article will examine the three basic threats to air superiority—antiaircraft artillery (AAA), surface-to-air missiles (SAM's), and enemy fighters—to see how they can be eliminated or neutralized.

"Counterair" is defined in AFM 2-1 as the destruction or neutralization of the enemy's air offensive and air defense systems to gain and maintain air supremacy and thereby prevent the enemy forces from effectively interfering with friendly surface and air operations. In other words, it is whatever you do to keep enemy aircraft from interfering with your air and surface operations and to keep enemy defenses from hampering your air operations.[1]

importance of air superiority

Air superiority is vital in any conflict because air power has such a tremendous effect on all operations. World War II revealed a remarkable ability of people to survive sustained air attack. However, history makes it clear that most battles and wars were won by the country that gained air superiority. Indeed it is almost a modern military maxim that nations must control the air over their own territory if their forces are to survive and operate effectively. A good example of this occurred in World War II when the defenders of the island of Pantelleria (located between Tunisia and Sicily) surrendered before being invaded, after a month of unopposed bombing. Korea and Vietnam have

indicated that the selective use of air power does not guarantee victory, but it may avert defeat.

To win a war, air superiority must be extended over enemy territory as soon as possible. Otherwise interdiction, close air support, and strategic bombing are likely to incur excessive losses. Even with good defensive firepower, formations of U.S. B-17s suffered losses of more than ten percent on missions over Europe beyond the range of covering fighters. The losses of B-17s to German fighters were reduced by the introduction of the P-51, which could cover the bombers all the way to the target and back.

Prior to the projected invasion of the Continent, General Henry H. Arnold urged his commanders to take the offensive and win air superiority so the landings would be a success. He wrote: "This is a MUST. . . . Destroy the enemy Air Force wherever you find them, in the air, on the ground and in the factories."[2] Our fighters took the offensive, and their search-and-destroy tactics took a large toll of German fighters—800 in February and March 1944. As a result of deception, destruction of airfields, and attrition on missions defending Germany, few enemy fighters were available to oppose the Normandy landings, and only one or two got through the fighter screen, composed of 171 squadrons, to attack the convoys. The Allies flew 14,398 sorties on D-Day to support the invasion.

Ground opposition to the landings was formidable; it might have been overwhelming had not the Germans lost control of the air. Several months later American fighter-bombers took such a heavy toll of one of the largest German columns retreating from southern France that the commander surrendered without any ground action. One of the reasons for the initial German successes in the Battle of the Bulge was the bad weather that precluded Allied air operations. When the weather cleared, air attacks helped defeat the twenty-five German divisions in the Bulge.

Allied air superiority was virtually complete by early 1945. As Germany lost her ability to defend herself on the home front, she also lost much of the ability to support forces in the field. The destruction of most of Germany's oil production led to such a severe fuel shortage that pilots could not be given adequate training before being sent into combat. At the same time German ground attack and logistic operations were strictly limited by the amount of fuel available.

When the Communists attacked in Korea, the United Nations forces used air power to slow their advance and keep the defending, thinly spread troops from taking even greater losses than they did. In the first six weeks of the war, an estimated 110 enemy planes were destroyed, leaving the North Koreans with perhaps 22 aircraft. Our aircraft were then used mostly for interdiction and close support of the army. Thus, North Korea did not pose much of a threat to our air operations until the introduction of Soviet-built MIG-15s in November 1950. Since the MIG's operated from Chinese airfields north of the Yalu River and hence were free from attack on the ground, they had to be destroyed in air-to-air engagements. At the same time, Communist aircraft did not launch large-scale strikes on our airfields from China even though our bombing kept airfields in North Korea unserviceable. The MIG's did manage to intercept some B-29 raids and attack some fighter-bombers. Our troops and airfields remained relatively free from air attack because the United States and its allies had quickly gained and maintained air superiority. This proved essential to counter the overwhelming manpower of the North Korean and Chinese forces. We did not win this war in the classic sense, but air power probably kept us from losing it.

In North Vietnam the enemy had built up his defensive system and had much of it fully operational before we initiated attacks on it. MIG airfields were off limits until 23 April 1967, almost two years after our first losses to MIG's. Surface-to-air missile (SAM) sites were observed

in construction long before our first attack on 27 July 1965, three days after an F-4C was lost to SAM's. By this time the SAM's were so well emplaced that when we tried to take out the sites we lost six aircraft in the process.[3] Still, despite large numbers of MIG's, SAM's, and AAA, we were able to carry out our missions without excessive losses because we had local air superiority over the north most of the time.

The air defense system in areas such as Eastern Europe is much better than that found in Vietnam because of improved technology, sophistication, and better integration of defenses. The U.S.S.R. and Soviet-supported countries have large numbers of fighters, SAM's, and guns that can be expected to inflict prohibitive losses if allowed to operate freely. The Russians are very much interested in defense because of their history of being invaded. (The loss of twenty million people in World War II is a grim reminder.)

Neutralizing the defenses of a nation or target is very difficult unless, as in the Arab–Israeli conflict of 1967, complete surprise on vulnerable targets is achieved. Over 400 Egyptian aircraft were destroyed on the ground during the first few hours of the war. Israeli ground forces were free to operate under an umbrella of almost total air supremacy. The Arabs and Soviets were taught a lesson by the Six Day War, and the present Egyptian defenses indicate that they do not intend to be caught with their defenses down again.

If the battle for air superiority follows more traditional lines, it may take more aircraft to protect the prime attack aircraft from fighters, SAM's, and AAA than are actually required to bomb the target. For example, over 70 aircraft (flak suppression, fighter escort, tankers, rescue, etc.) were once used to support 14 aircraft bombing well-defended targets in North Vietnam.

The United States had to fight hard for air superiority in World War II. We quickly ruled the air in Korea. The introduction of SAM's and new MIG tactics in North Vietnam prevented us from having complete air superiority. Control of the air in well-defended areas such as Eastern Europe would be most difficult to achieve. Since air superiority could be essential in such areas, however, it is especially important that we understand the threats and our capabilities and limitations with respect to these threats.

antiaircraft artillery

The MIG's and SAM's get most of the publicity and glamour, but guns get most of the kills. The AAA threat ranges from the rifles of infantrymen to the large guns specifically designed to shoot down aircraft. Sighting systems range from simple optical sights mounted on the smaller guns to sophisticated systems that use radar for tracking the target and a computer for directing fire.

Radar was first used with AAA in World War II. Combined with proximity-fuzed projectiles, it reduced the number of rounds fired per aircraft destroyed by a factor of ten. Radar, however, cannot predict the future position of an aircraft that is rapidly changing course. Moreover, radar can be degraded by electronic jamming. (When the British and American Air Forces in World War II used chaff to degrade the Germans' radar, their number of rounds per kill jumped from 800 to 3000.) Another drawback is that the target aircraft can use an electronic receiver to pick up radar transmissions and begin evasive action or start jamming. Also, specially equipped aircraft can attack AAA radars with bombs or antiradiation missiles (ARM's). Thus, even though radar has limitations, it does provide a night and all-weather capability to AAA systems.

The Russians are well aware of U.S. flak suppression efforts and have discussed counters to them in their *Soviet Military Review*.[4] Basically, the guns are dispersed, dug in, and camouflaged. A gun is a very "hard" target and is difficult to destroy with bombs. The new generation of "smart" bombs makes gun destruction easier. However, because of the great number

While photographing an antiaircraft site in North Vietnam, a USAF reconnaissance jet caught the North Vietnamese guns unattended and returned to base scot-free. . . . An F-105 Thunderchief was not so lucky on a mission against oil storage facilities near Hanoi, but it got home despite battle scars.

of guns in some target areas, it is generally impossible to neutralize all of them. According to one source, there are approximately 6000 large-calibre (37-, 57-, 85-, and 100-mm) antiaircraft guns in North Vietnam.[5]

Since all the guns cannot be destroyed, attackers should try to minimize their effectiveness. The basic thing to remember is that the projectile is unguided after it leaves the gun barrel. The gunner aims at a point ahead of the aircraft so that the bullets and the aircraft arrive at the same place at the same time. Since a gunner is predicting where the aircraft is going to be, the obvious counter is for the pilot to change his flight path and move away from the predicted impact point. This random variation of the flight path is called "jinking" and is very effective in evading fire at medium and high altitudes where the projectiles are aimed at a point a mile or more in front of the aircraft. Crews can also decrease losses to guns (as well as to SAM's and MIG's) by planning their route so the enemy is unaware of their destination. Long, straight runs at the target may be

easier for navigation, but they also make it easier for the enemy to prepare for the attacker's arrival. The element of surprise, a basic principle of war, is lost.

It is, of course, very difficult to achieve surprise with large formations of aircraft that can be detected on radar a long way from the target. Additionally, the time over target is restricted by the requirement for daylight, maintenance and rearming time, and mission length.

A generally accepted method of evading detection by the SAM's and MIG's is to fly at low altitude where enemy radar cannot see the target because of ground clutter (area where reflections from the ground obscure target returns). Low-altitude flight, however, does not preclude visual detection by AAA gunners. Combinations of terrain and gun site location may allow the pilot to surprise the gunner and be gone before he can open fire, but this cannot be expected in a well-defended area or over flat terrain.

There are three serious problems with flying at low altitudes: (1) the aircraft is in the effective range of all guns; (2) the time of flight of the projectile is so short that the gunners can adjust their aim from tracers very quickly and improve their chances of hitting the target, and the short time-of-flight makes jinking less effective; and (3) the projectile has a higher kinetic energy at short range and therefore does more damage when it hits the aircraft.

This does not necessarily mean that one should never fly at low altitude. It may be that low altitude is the only place to fly because SAM's and MIG's make the higher altitudes even more risky. The mission, ordnance, delivery procedures, previous tactics, and enemy defenses all have to be analyzed to decide on the best tactics for hitting a particular target.

surface-to-air missiles

SAM's have had a tremendous effect on our tactics over enemy territory even though they have not destroyed large numbers of planes. SAM's were developed in the post-World War II period because AAA was no longer effective against fast, high-flying aircraft. Early SAM systems were thus designed to intercept bombers at high altitude. They nevertheless had a tremendous impact on our fighter-bomber tactics in Vietnam, for the fighters, which are not too maneuverable at very high altitudes, were forced to fly where denser air increased the possibility of evading the missile. The introduction of SAM's in North Vietnam initially forced the U.S. fighters to try to stay hidden in the ground clutter of the radar. Flying at low altitudes, however, resulted in the loss of many aircraft to AAA when the pilots would normally have flown above the effective range of the guns. Thus, even though the SAM's did not receive credit for the kills, they were indirectly responsible because they forced the fighters to fly where the guns could hit them. Higher altitudes were later used when electronic jamming could be employed or aircraft were capable of evading the SAM's.

SAM's are sometimes misunderstood and are credited with capabilities that they do not really possess. This is not to say that they are ineffective, but there is nothing magic about a SAM. It can be defeated—if it is understood! A typical SAM engagement starts with an acquisition radar getting the first contact and telling the SAM target tracking radar where to look. The SAM radar then searches this area, finds the target, and begins tracking it. Meanwhile, the engagement tactics are determined and the missiles prepared for firing. As the target comes within range, the missile guidance transmitter is turned on and one or more missiles launched. The target tracking radar is used to determine the relative positions of the target and missile so the computer can generate guidance commands, which are then sent to the missile by the missile guidance transmitter. Both the target tracking radar and the missile guidance transmitter must continue transmitting until the SAM's have registered a kill or missed the target aircraft.

Electronic equipment in the target aircraft can receive the tracking radar and missile guidance signals and warn the crew that the aircraft is being tracked or a missile has been launched. Aircrews can employ antiradiation missiles against SAM radars and thus may force the enemy to vary the above sequence.

The exact tactical situation will determine what action is taken against the SAM's; countermeasures can be used to decrease their effectiveness, or they can be attacked and destroyed. Electronic jamming can be used to prevent accurate tracking by the SAM radars. This is generally the tactic used when other targets, such as enemy airfields, have a higher priority than the destruction of SAM sites. It is worth noting, however, that the Soviets have made it very difficult to jam their radars by transmitting on widely different frequencies. *Aviation Week and Space Technology* reports that one version of the SA-2 transmits in the E frequency band and another in the G band, while the SA-3 transmits in the I band.[6] The SA-4 transmits in the H band.[7] This means that in areas where all four of these threats are found, an aircraft must have a jammer that puts out sufficient power on each frequency to protect against them all.

A missile obeys the same laws of aerodynamics as an airplane and therefore can be outmaneuvered. Its speed—approximately Mach 3—can be a disadvantage when maneuvering because it must be able to pull more g's than its slower target. If a missile is fired at the predicted impact point in front of the target, a sudden change of course by the target can force a drastic change in the predicted impact point. This forces the missile to make a hard turn to continue tracking the target.

Missiles also have a certain reaction time. The radar must determine that the target has changed course. The computer then computes the new intercept course and transmits the appropriate commands. The missile then must maneuver to the new trajectory. Even though this time is only a fraction of a second, it may be enough to cause a miss because of the high speeds involved (a 2000-feet-per-second missile against a 900-feet-per-second target, for example). Fighter pilots and engineers have devised evasive maneuvers that capitalize on the limitations of missiles.

Since SAM's cannot always be jammed effectively and a pilot may not accomplish his mission if he has to evade large numbers of them, SAM sites may be attacked and destroyed. A bomb in the radar antenna has been called the ultimate jammer—its effects are permanent! But bombing SAM sites is a hazardous occupation because they are well defended by AAA and the sites are arranged in such a way that they protect each other. Experience has shown, however, that the sites can be successfully destroyed by bombing, which, besides destroying the radar equipment, missiles, and crew, has the effect of intimidating other SAM sites. It takes courage to fire missiles at fighters knowing that they will attack the source of the missiles.

A less hazardous method of suppressing SAM sites is to shoot antiradiation missiles at them. When a SAM site radar comes on the air prior to firing, the commander of an aircraft equipped with ARM's attempts to shoot the SAM radar with an ARM before the SAM can be fired. If this is not possible, he can still try to hit the radar with an ARM before it can go off the air. Best results are usually obtained by following up an ARM attack with bombs to destroy as much of the site as possible. ARM's have forced the enemy to keep his transmissions to a minimum so that the SAM's themselves will not be destroyed. When a SAM site is not transmitting, it is not a threat and some degree of air superiority is gained, at least temporarily.

The introduction of SAM's by the North Vietnamese in 1965 increased U.S. losses, and the threat clearly had to be neutralized. Our initial loss of the six aircraft lent urgency to the need for new tactics in attacking SAM sites. The Air Force Chief of Staff formed a study group to develop a counter to the SAM's, and out of this

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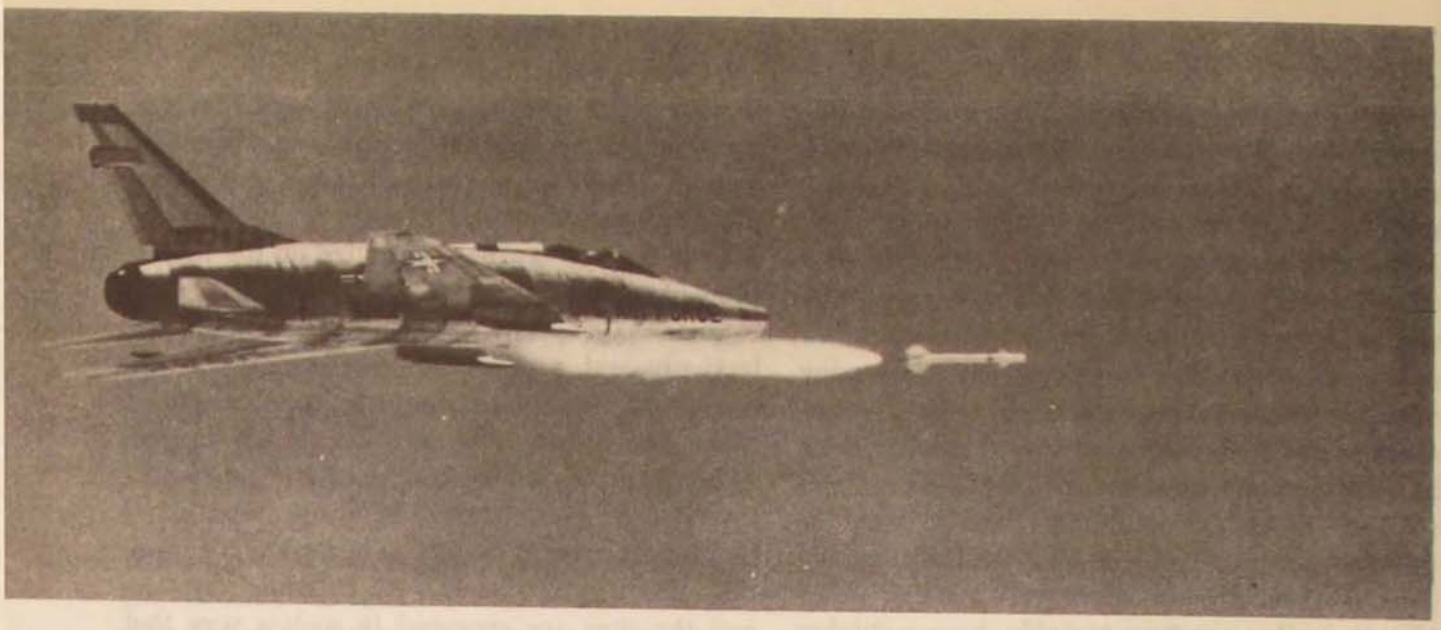

Missile versus Missile

A Sidewinder missile leaps ahead of its supersonic F-100 launcher during a practice mission at Nellis AFB, Nevada (top opposite). Instrumented for sensing radiated heat, the Sidewinder locks on a target rocket previously fired from the same airplane, catches it despite its evasive action, and destroys it. . . . An air-to-surface missile, fired from an F-105 Thunderchief, streaks toward a surface-to-air missile site in North Vietnam (bottom opposite). . . . Target information is gained from aerial photograph of a SAM complex in North Vietnam (above), with detail of one of the missiles shown.

committee came the Wild Weasel concept. Several two-seat F-100Fs were modified with special electronic equipment to receive SAM transmissions and locate the site for attack. The initial Wild Weasel aircraft arrived at Korat RTAFB, Thailand, on 26 November 1965 and soon proved that the system would work. The F-100Fs led flights of F-105s on missions where they provided SAM warnings and attacked active SAM sites. Since the F-100F was slower than the F-105, two-seat F-105Fs were modified to the Weasel configuration. The F-105 Weasels killed many SAM sites in North Vietnam and forced the SAM operators to change to less effective tactics. There are currently F-105F/G and F-4C Wild Weasels operational with specially trained two-man crews consisting of a pilot and an electronic warfare officer.

The United States experience in North Vietnam has proved that surface-to-air missiles can be defeated. However, the SAM's have caused a drastic change in our tactics and, in conjunction with the MIG's, still pose a formidable threat.

enemy aircraft

Enemy aircraft are the greatest threat to our operations. They can attack surface and airborne targets in or over territory controlled by our forces or those of our allies, intercept our strike aircraft a long way from their targets, and generally pose more varied threats than other offensive or defensive systems. The threat of enemy fighters can also force many of our aircraft to be committed to a defensive role, which reduces the number of bombs that can be delivered. On some missions over North Vietnam, approximately one-third of the strike force was used to protect against enemy fighters. Even then, MIG's could concentrate and penetrate the fighter screen. It is preferable, of course, to destroy enemy aircraft on the ground, but this is not always possible, as when the airfields in North Vietnam were off limits for several years. Even if well-defended airfields are approved targets, the aircraft are difficult to destroy when dispersed or protected by hardened hangarettes. Some of the MIG's can operate from sod fields or highway segments. The Soviets are also developing fighters with a V/STOL capability.

The older aircraft in the Soviet inventory (MIG-15, 17, 19, and 21) are primarily day fighter-interceptors, although there are a few all-weather versions. These aircraft are light and maneuverable, but their short range restricts their offensive capability and makes them basically defensive.

The newer Soviet fighters, such as the Su-9 and 11, Foxbat, and Tu-28, have longer range which gives them an improved offensive capability. These aircraft are heavier and less maneuverable than their forerunners, but they have air-intercept radar and therefore an all-weather capability.

U.S. aircraft are capable of performing more missions than Soviet aircraft, which means ours are more sophisticated and thus heavier. In the event of war we might expect to be opposed by superior numbers of Soviet-supplied aircraft in some parts of the world. It is important, therefore, that our aircraft and crews be superior to those of any potential enemy. If we were to lose the air battle, our bases and ground forces would be subject to air attack that could lead to loss of the war.

For all the sophistication of modern fighters, guns remain the basic air-to-air armament. The Soviets use large-caliber (23-, 30-, or 37-mm), low-velocity guns with a slow rate of fire. For example, the 30-mm gun on the MIG-21 fires at a rate of 600 rounds per minute.[8] This makes it difficult for them to achieve a hit because of the long lead required and the low density of the bullets, but their projectiles produce more damage than ours when they do hit. We rely on the 20-mm Gatling gun that has a higher muzzle velocity and much higher rate of fire (6000 rounds per minute) than the Russian guns. The high bullet density makes it easier to hit an opposing aircraft, especially one with a

better turn capability like the older MIG's. It is still difficult to hit such a fighter, however, because normally it is necessary to stay close behind and track (fly so that the gunsight aiming reference is maintained on the enemy aircraft) for several seconds. This is almost impossible against a highly maneuverable aircraft flown by a competent pilot.

Even with the limitations of guns, professional fighter pilots insist on a fighter with a gun because of its flexibility, reliability, invulnerability to countermeasures, and exclusive capability for close-in kills. The 25-mm gun being developed for the F-15 will remove some of the problems with the 20-mm system and provide a more lethal round.

All fighters, both day and all-weather, are more effective with a good ground-controlled intercept (GCI) capability. With this system, a radar operator tracks the target and directs the fighter into the optimum firing position. In both Korea and North Vietnam, we were in the enemy's GCI system, which meant that his fighters knew exactly where we were while we had to search for his. We do have some airborne GCI capability with the EC-121 Airborne Early Warning and Control aircraft in Vietnam. The USAF is presently flight-testing an Airborne Warning and Control System (AWACS) to give us an airborne GCI and command and control system. The Soviets already have an operational AWACS in their Tu-114 Moss aircraft. The Moss and the Tu-28 Fiddler interceptor work closely together and are active in the Arctic monitoring SAC B-52 operations.[9]

Air-intercept (AI) radars assist in target acquisition and are a prerequisite for some air-to-air missiles. The United States has long been superior to the Soviets in this area, but they are improving their systems. AI radars generally have a long-range search mode for target acquisition and a shorter-range track mode for launching missiles. Some aircraft also use radar ranging to compute the necessary lead for firing guns. This lead is displayed on the windscreen in front of the pilot in the form of a circle with a dot (pipper) in the center. If the pilot can fly his aircraft so as to keep the pipper on the enemy aircraft for one or two seconds while he fires the guns, his bullets should hit the target. Of course, the enemy aircraft will try to keep from being tracked. In the missile mode, symbols on the radar display tell the pilot how to fly the aircraft to get in position to fire the missiles. AI radars are necessary for intercepts in weather or at night, but they can be jammed or deceived. Also, targets at a low altitude are hard to see because of the ground clutter on the interceptor's radar.

Air-to-air missiles have made kills possible from other than the rear of the target and have increased the range at which attacks can be made. The best-known type of guidance is infrared, as in the AIM-9 Sidewinder. A seeker in the missile detects and homes on infrared radiation emitted by the engine of the target aircraft. A semiactive radar homing missile (e.g., AIM-7 Sparrow) homes on the radar signals bounced off the target by the firing aircraft. These missiles can be employed from the front, side, and rear of the target and have a longer range than infrared missiles.

Missiles have many advantages, such as long-range and all-aspect attacks, ease of employment, and the ability to kill an enemy without being seen. Indeed, many newer Soviet aircraft rely solely on missiles and have no guns. The gun remains an essential part of a fighter's armament, however, because of the following missile limitations:

(1) Air-to-air missiles can be outmaneuvered, especially when radar warning systems indicate that an aircraft is being tracked.

(2) Countermeasures can be employed against the missile or the aircraft radar. It is possible, for example, to build air-to-air missiles able to home in on the radar carried by enemy fighters.

3) The inherent complexity of missiles makes them less reliable and more expensive than guns.

(4) The long-range capability of missiles can-

not always be utilized because of the necessity to identify the target as hostile before shooting at it. If it is done visually, the MIG can sometimes see us first because our aircraft are often larger and some leave a trail of black smoke. The MIG's thus may have the advantage of either attacking us first or evading our missile attacks by running for home. This problem is magnified if an attacker is not identified until he is in the midst of or attacking his targets. Missiles must be used with care here—if they are used at all—because of the possibility that the missile will shoot down a friendly aircraft. Missiles cannot tell friend from foe and may home on the wrong target.

(5) A missile shot may warn the enemy that he is under attack, which, in turn, may allow him to escape. Or he may take advantage of the fact that you have compromised your position in firing the missile. The best plan is to maneuver for a gun attack and shoot missiles if the opportunity presents itself. If the missiles miss, you should still be able to make a gun kill.

Missiles certainly have their place in aircraft armament systems, but they must be supplemental to a gun system. A proficient and determined pilot making a gun attack is much more difficult to defend against than a missile doing only what it has been programmed to do.

Maneuverability and power are important requirements in a fighter aircraft. Maneuverability provides the capability to defeat a missile or gun attack or to stay behind another maneuverable fighter. Power is necessary for rapid acceleration, high rate of climb, and the ability to sustain hard turns and maneuvers. An air superiority fighter must have a high thrust-to-weight ratio (engine thrust relative to aircraft weight) and be maneuverable, even at low speeds. The F-15 air superiority fighter will be able to turn hard and still accelerate or climb in most parts of its flight envelope.

In the past, enemy tactics have been limited by the defensive nature of their aircraft. Their older aircraft had guns, and their short range forced them to be used mostly for defending the homeland by making close-in gun attacks. GCI-directed MIG-21 attacks on our aircraft in Laos and North Vietnam indicate that the Communists can be expected to make hit-and-run missile attacks from long ranges, where they will be difficult, if not impossible, for the defenders to observe visually. An infrared missile needs no radar lock-on. Therefore, the defender has no warning of the attack other than to observe the attacker or missile visually.

Since some new long-range Soviet aircraft rely exclusively on missiles, we may assume that these aircraft will make missile attacks from beyond visual range. They will probably be directed by GCI and can be expected to avoid close-in (less than one-half mile) engagements. The MIG-23 is reportedly so vulnerable at low altitudes that it is given an escort by MIG-21s as it climbs to altitude for missions over Israel.[10]

United States tactics must be designed to counter the close-in gun attacks from the enemy's older, more maneuverable aircraft as well as the long-range missile attacks by newer interceptors. We must also be able to fight in the enemy's air defense system, where, historically, we have had to face AAA and SAM's in addition to hostile aircraft. Therefore, we must devise tactics and formations that can defeat all three categories of threats simultaneously.

The basic USAF fighting unit is an element of two fighters. The leader is the primary shooter, and the wingman tries to keep both aircraft from being shot down from behind while the leader is attacking. Since fighters are made of very opaque material, visibility directly behind and below the aircraft (six o'clock position) is poor, and the two aircraft must be separated laterally so each can see behind the other. Two elements are combined into a flight of four for missions into enemy territory. The four aircraft are spread both horizontally and vertically so that each element can clear the vulnerable area behind the other and be in a position to sup-

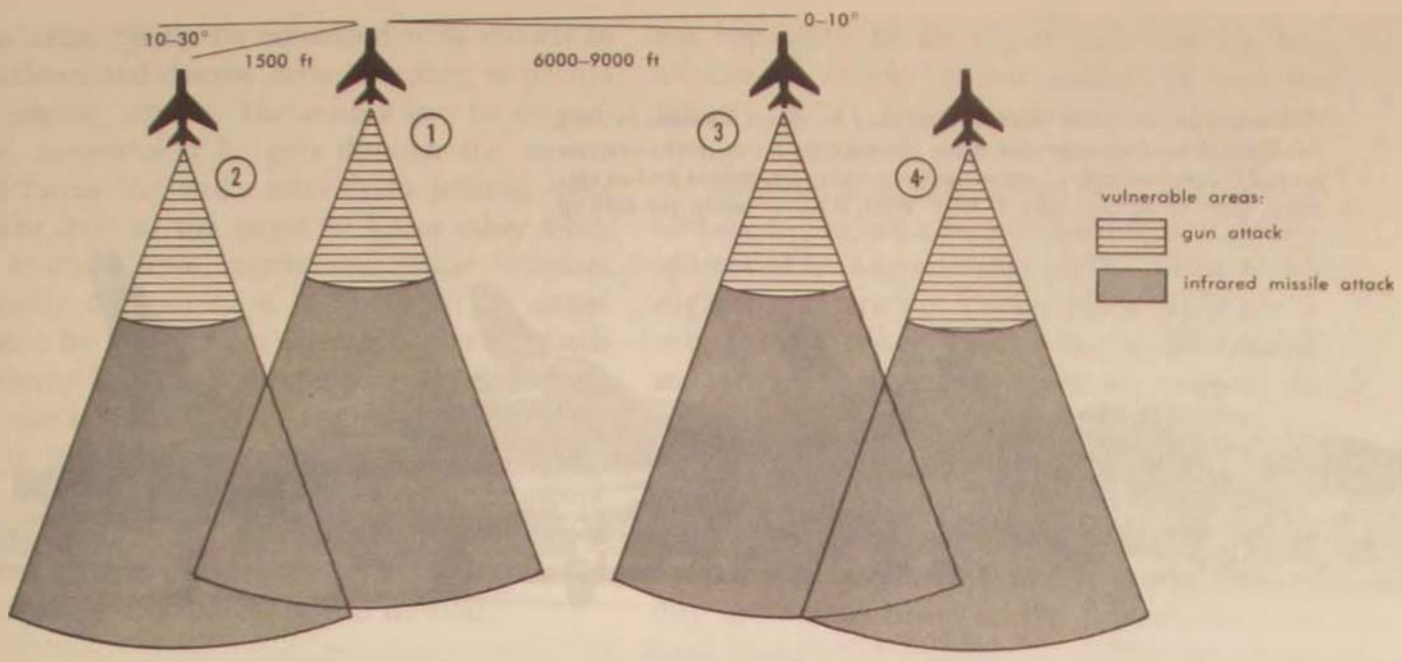

Figure 1. The "fluid four" or "tactical patrol" formation enables defense against both gun and missile attack coming from any quadrant. As the aircrew cannot see the hatched area behind its aircraft, the four aircraft are spread horizontally and vertically so that each element can clear the vulnerable area behind the others and be in position to support if attacked. Aircraft 3 and 4 may fly 1000 feet low to 3000 feet high on aircraft number 1.

port the other if attacked. (Figure 1) This formation, known as "fluid four" or "tactical patrol," can defend against both gun and missile attacks, since the aircraft on opposite sides of the formation can see each other's vulnerable areas. In an actual fight, the flight would split up into two mutually supporting elements. Splitting an element, so that each aircraft is by itself, is not recommended except in special instances, since a single aircraft is extremely vulnerable to MIG's and SAM's. Because of the necessity for mutual support against MIG's and SAM's, a flight of four is the smallest unit normally used in an area where these threats are likely.

AFM 2-1 lists the types of counterair missions:[11]

(1) Counterair strikes. The most effective way to destroy enemy air power is to hit it on the ground. Therefore, strikes on enemy airfields and related facilities should receive first priority. SAM sites and other defenses, such as GCI and command and control systems, should also be attacked early in the conflict. Surprise is paramount in an attack of this sort to keep the enemy fighters from getting airborne. Concentrated attacks on the defenses as well as on offensive aircraft bases can have a tremendous impact on future operations. Follow-on action will be much easier if enemy air offensive capability is wiped out and his defenses weakened. Large losses can be expected if enemy defenses remain intact.

(2) Fighter sweeps. If the enemy cannot be knocked out on the ground, fighter sweeps can be used to seek out and destroy his aircraft in the air. This tactic can be inefficient and yield nothing if the enemy does not want to fight and uses his GCI to keep his aircraft away from our sweeps. When the enemy takes advantage of sanctuaries and political restraints, however, fighter sweeps may be the best way to destroy

To counter surface-to-air missiles, first used by North Vietnam in 1965, the Wild Weasel concept was born: two-seat fighter aircraft were configured to accommodate electronic target-seeking equipment and an electronic warfare officer. Here F-105F Wild Weasels ready for take-off.

enemy aircraft. The most famous fighter sweep of recent times was one conducted by the 8th Tactical Fighter Wing in Thailand on 2 January 1967. Seven MIG-21s were destroyed without any USAF losses in this well-planned operation, which took maximum advantage of surprise.

(3) Screen. A screen is one or more flights of fighters patrolling the airspace between the threat and an aircraft or area being defended. The fighters are to keep enemy aircraft from interfering with friendly operations. Screens are used when operating on the periphery of hostile territory where the enemy must fly through the area of the screen to get to the defended area or aircraft.

(4) Combat Air Patrol (CAP). CAP's are employed to protect a certain area or friendly aircraft in an area. Fighters patrol the airspace (which can be either friendly or hostile) and try to keep enemy aircraft out of it. CAP differs from screening in that screens are imposed anywhere between the threat and the area or force being defended, whereas combat air patrols are positioned over or near the area or force being protected.

(5) Air escort. Fighters escort other aircraft by flying with them on their mission. Escort must stay close to intercept any type of attack and insure that the mission is completed without interference. The escorts, which are configured and ready for an air-to-air engagement, usually engage the enemy fighters and let the aircraft that are less able to defend themselves continue on their mission. Escorts must be careful not to be lured away from their charges by decoys or false attacks prior to the main attack. A sweep

may occasionally be combined with escorts to run down and destroy enemies acting as decoys or feinting attacks. The enemy can be considered successful if he gets through the escorts and forces the strike aircraft to jettison their bombs short of the target or keeps other kinds of aircraft from performing their mission. Friendly GCI can be a big help on an escort mission by warning our aircraft of the approach of enemy fighters. Escorts such as Wild Weasels can also be used to engage ground defenses that are threatening strike aircraft.

(6) Air intercept mission. Fighters or interceptors can be put on air or ground alert to defend against attacks by enemy aircraft. GCI is almost essential for the success of this mission.

THE WAR over North Vietnam has not had the air-to-air combat that occurred in Korea. The USAF is credited with 109 kills in Vietnam (as of 29 August 1972) compared with 900 in Korea. Even though the enemy has not used his fighters as much as he could, he still maintains the capability to do so, as indicated by his hit-and-run attacks on our aircraft in Laos in January 1972. We must remember that the enemy has and will continue to have a capability for aerial attack. It would thus be a serious mistake to neglect air-to-air training and development of ordnance during periods when aerial engagements are not taking place. This could only lead to heavy losses when a determined and proficient enemy is again encountered in air battles.

The USAF must continue to control the air as we have in the past to keep our surface forces from being subjected to enemy aerial attack. This could be disastrous in those areas where they are outnumbered on the ground. We also must insure that friendly air forces can complete their missions without large losses due to enemy defenses. Failure to control the air over friendly or enemy territory could well mean the loss of a war. That is why air superiority comes first.

Alexandria, Virginia

Notes

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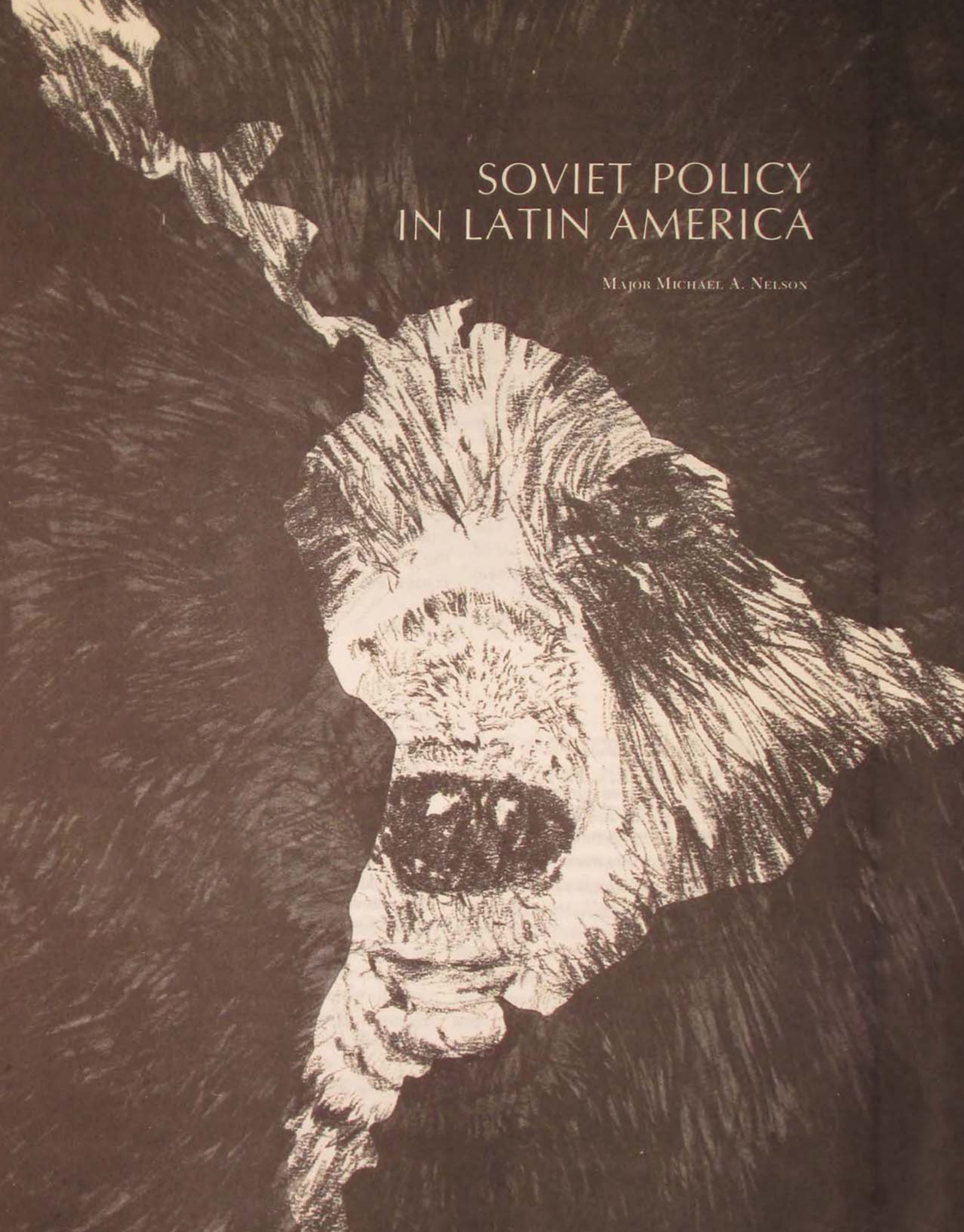
This article has been adapted from a paper prepared by Major Wells as part of his academic work while a student in the 1972 class of Air Command and Staff College.



SOVIET POLICY IN LATIN AMERICA

Major Michael A. Nelson

THE SPEED and ease of Fidel Castro's march to power in Cuba startled almost all of the world community. Even the Soviet Union, which inherited a windfall revolution there, must have been surprised that an almost unknown nation, in an area conceded to be within the influence of the United States, could so swiftly upset the established order and become a Marxist ally.

In the United States and in much of Latin America, the trauma of the Cuban conversion triggered deep concern that the Soviet Union would follow up Castro's initiative with waves of revolutionary activity throughout the hemisphere. Indeed, the Cuban Communists began almost at once to prepare for such operations. After a dozen years, though, it has become obvious that despite awakened Soviet interest in the region the massive Soviet support that was expected by many Westerners has not materialized. In fact, soon after the revolution an ill-concealed rift developed between Havana and Moscow over the advisability of exporting violent revolution to Latin America, the Kremlin contending that Guevarian insurgency amounted to risky and hopeless "adventurism."

Although Castro has been more or less restrained by financial realities and by the success of the counterinsurgency effort, it is not safe to say that Soviet policies in Latin America are benign. On the contrary, evidence suggests that the Soviet Union now believes more firmly than ever that its legalistic policies in Latin America are correctly suited to the conditions there and are more likely to achieve Soviet objectives than a multitude of violent insurgencies. There is a growing but cautious Soviet interest and optimism about the potential of Latin America as a pawn in the global power struggle. It is therefore critical that the Soviet strategy, along with the historical background and positive and negative considerations that shape it, be accurately recognized and understood.

the past

Although conditions that normally excite Communist interest were present in Latin America at the time of the Russian revolution, Latin America remained a backwater of Kremlin policy until the 1960s. Such ingredients as poverty, a landed oligarchy, and a growing working class were present, as was an influential and active group of intellectuals, but the Bolsheviks showed little interest.[1] The Kremlin apparently regarded the Latin American nations as, in essence, U.S. colonies and because of the hopelessness of the situation gave Latin American Communist parties little support. Not discouraged, small Communist parties sprouted in nearly every Latin American country in the 1920s. Although they obediently offered their services to the Comintern, neither they nor their home region seemed of any great consequence to the Soviet Union, so they were not taken very seriously. Until the late 1930s these parties faithfully followed the approved hard-line policy in which cooperation with other leftist organizations was prohibited and revolutionary activities were encouraged. Needless to say, official Latin American relations with the government of the U.S.S.R. were cool at best during this time.[2] Then, as the specter of fascism was forming in Europe before World War II, the party line changed to encourage Communists to join other leftist groups in a united front against the reactionary foe. Open participation in revolutionary activities was forsaken, and in the wave of goodwill that followed, thirteen Latin American nations established diplomatic relations with Moscow.[3]

Following World War II, however, the beginning of the cold war served to chill relations once again. Between 1947 and 1952 five Latin American nations ended their diplomatic ties with the Soviet Union as their leaders allied themselves with the West in the emerging bi-

polar world. Although the Communist parties did not return completely to their pre-World War II radicalism, they rejuvenated their strident attitude toward "U.S. imperialism" and toward the existing economic and social order in Latin America. In reaction to the internal threat and the growing international competition, the governments adopted countermeasures largely keyed toward the proscription of legal Communist party activities. Thus, the situation remained one of official and unofficial mutual hostility until after the Cuban revolution.

The long-standing Soviet indifference toward Latin America had two significant consequences. First, the Communist parties in the region suffered serious damage to their own credibility and effectiveness.[4] Because it was obvious to most Latin Americans that the Communists were reacting to policy directives unrelated to the Latin American situation, the Marxists became highly suspect—frequently ludicrous—in the eyes of their fellow citizens. Second, the leaders of the Soviet Union remained grossly uninformed about Latin America and therefore ill-equipped to make intelligent decisions about it. Their policies, which were at the same time transparent, contemptuous, and ineffective, showed their ignorance.

conditions encouraging to the Kremlin

In recent years several conditions have contributed to a new Soviet interest in Latin America and a much more perceptive attitude about the area. In the first place, the global nuclear standoff and the immovable lines of demarcation in Europe have resulted in a shift of Soviet activity to the Third World. In Latin America, the Soviet Union has come to see an area of vital economic interest to the U.S., a long-neglected soft and strategic underbelly in the Caribbean, and a critical logistics bottleneck at the Panama Canal. Since the stakes of international superpower competition cannot now be fought over directly, these indirect targets have become crucially important.

But it is doubtful that the Soviets would have raised much dust in Latin America had it not been for the Cuban experience. Realizing as a result of their surprise there that they were in no position to predict or influence events in Latin America, the Kremlin leaders ordered a new Latin America program aimed at getting smarter about the area and at the same time demonstrating to the Latin Americans that the Soviet Union was not indifferent to their problems and importance. In 1962 the Ministry of Foreign Affairs opened for the first time a full-time Latin American department. The same year the Soviet Academy of Science organized a Latin American Institute to study the region and train cadres for official duties there.[5]

A surge of anti-Americanism in Latin America in recent years also fits well into Soviet plans. There is, of course, a long history of sentiment against the giant from the north. Most Latin American politicians have traditionally made anti-Yankeeism a regular part of their rhetoric. But politicians in power have generally been more cordial to the U.S., recognizing the economic and strategic advantages of friendly relations. Since the late 1960s, however, evidence has been growing that many Latin American leaders are willing to pull the feathers of the American eagle as well as shout at it. An example of the mouse-and-lion dramas being enacted with increasing frequency in the area is the difficulties attendant on the claim of several Latin American governments to a 200-mile territorial waters limit. Another example is the expropriation without compensation of the U.S.-owned International Petroleum Company from Peru in 1968. This action, taken by an ardently nationalistic military government, was a precursor to a strong campaign in Peru against any vestige of domination by the U.S.[6]

The election of Marxist Salvador Allende to the presidency of Chile resulted in yet another determinedly independent and frequently antagonistic government. Indeed, the practice of demonstrating national autonomy may have

become *de rigueur* in Latin America. The editors of a recent collection of articles on Soviet relations with Latin America suggest that establishing diplomatic and trade relations with the Soviet Union is now a status symbol in Latin America, much as the building of a Russian steel mill used to be in other parts of the Third World.[7] It confirms for everyone that the national destiny is controlled internally, not externally, and that even certain risks will be accepted to establish that fact.

Another condition that has encouraged the Soviet Union to reconsider Latin America is the readjustment of U.S. interests from a global scope to more limited areas. The Vietnam conflict demanded the focus of U.S. attention as the 1960s unfolded. Then internal pressures of domestic problems arose to compete for attention. Under the circumstances it was natural that President Nixon should undertake the reassessment of our international strategy. Governor Nelson Rockefeller's fact-finding trip in Latin America in 1969 produced a landmark report to the President in which he urged that the U.S. adopt a less active attitude toward the internal affairs of Latin American governments. His report accurately reflected the new tenor of U.S. foreign policy as well as the basic realities of a changed and changing hemisphere.

Still another impetus for the Soviet Union has been the initial stirrings of Communist Chinese activity in Latin America. Although official Chinese interest has been modest and not widely received thus far, it carries with it the threat to the Soviet Union of competition for Communist leadership in yet another area of the world. By virtue of their support for the Castro-style revolutionary activity, the Chinese inherited an antagonist's role in the conflict between the peaceful and violent factions of the Communist movement. Having little choice, the Soviets have accepted the challenge.

problems for the Kremlin

Although conditions in recent years have enticed and compelled the Russians to give more attention to Latin America, their options are obviously not unrestricted. In order to understand the nature of Soviet policy in Latin America today, it is also important to understand the restraining influences that affect it.

The most obvious of these is the ubiquitous and powerful presence of the United States. Despite the trend toward more independence from the U.S., the penetration of Latin America by the North Americans is still considerable. Over the years U.S. businessmen have invested heavily in Latin America. This investment has generally been to the mutual benefit of the participants, although many Latin Americans would argue that the balance of earnings has been heavily in favor of the U.S. investors. The primary consumer of Latin American products, such as coffee, bananas, copper, and tin, is and will probably continue to be the United States. The U.S. has extended loans and grants to its southern neighbors over a long period of time, this activity reaching especially great heights in the early, hopeful days of the Alliance for Progress. Additionally, the Latin American armed forces are generally equipped with U.S. hardware (although there is a trend toward Europe in this regard) and trained under the guidance of U.S. advisers. Even culturally the penetration of Latin America by the U.S. has been long and deep. So the sum of U.S. hegemony in this hemisphere is a formidable obstacle to Soviet penetration, for although U.S. influence may be weakening, by comparison with that of any other nation, including the U.S.S.R., it is awesome.

Another restraint for the Soviet Union (as for the U.S.) is its preoccupation with other matters. Although the Kremlin is becoming more active in Latin America, it still must reckon with international problems having a higher priority. The maintenance of its own hegemony, especially in East Europe, is one such concern. So important is this consideration that the Soviet leaders are probably unwilling to pose too great an overt threat to the U.S. in the

western hemisphere lest their own backyard become contested. Moreover, the problems of the Middle East and China demand more study and attention than does Latin America. In fact, in the Third World it is generally agreed that both Asia and Africa continue to occupy higher priorities for the U.S.S.R., partly because of their geographic proximity and partly because they offer more promise of success.[8] It seems certain, generally speaking, that Soviet leaders are unwilling to risk a direct confrontation with the U.S. over Latin America. Their experience in the Cuban missile crisis no doubt reinforced this reluctance.

The Latin Americans themselves limit Soviet options to a certain degree. The previously mentioned expressions of independence vis-à-vis the U.S. do not necessarily mean increasing alliance with the principal U.S. opponents. By and large, the Latin Americans are as wary of potential Communist imperialism as of domination by the U.S. They recall the bewildering dancing of the local Communist parties to Russian tunes. Consequently, while there is courtship on an official scale, the Latin Americans are eager to ensure that the Kremlin understands the level of acceptable interaction. There are, in addition, powerful anti-Communist forces in Latin America, primarily the Catholic Church and the military, which must be taken into account. A long-standing cultural and economic tradition of anti-Communism also tends to dampen the Soviet effort. Thus, it is obvious the Soviets have both official and unofficial hurdles to overcome in dealing with Latin America.

There is yet another restraint. Cuba, although a source of stimulation for the Soviet Union, has also brought a measure of misery to the Kremlin. Forced to accept the Cubans as Marxist brethren and unable to allow Castro to fail, the U.S.S.R. found itself with both a financial burden and a political embarrassment. Most estimates put the Soviet subsidy of Cuba at one million dollars a day, with only marginal prospects for improvement. At the same time, Castro has not always been the politically subservient comrade the Soviet Union would like him to be—indeed believes him obligated to be—ideologically and financially. While the Soviet leadership has been preaching the correctness of the peaceful revolution and approaching Latin American governments with an olive branch, Castro has been exhorting leftists throughout the area to initiate and pursue a course of violent insurgency. For the weary decision-makers in Moscow, the attractions of added Communist governments in Latin America are at least partially offset by the burdensome experience in Cuba.[9] While they seek sympathetic and cooperative governments in the region, they may secretly fear additional liabilities.

Thus, it can be seen that the temptations of Latin America are balanced to some extent by certain impediments. From the weighing and balancing of these positive and negative factors, the Soviet leaders have devised their strategy, to which we shall now turn.

Soviet policy in Latin America

Soviet policy in Latin America can only be understood in the light of its relationship to the United States. Its primary goal is to weaken U.S. influence in Latin America and to sever the labyrinth of interconnecting ties between the Yankee and his neighbors; at present it is *not* designed primarily to establish Communist governments in Latin America. In fact, the governments of Latin America are not the objects of Soviet interest; they are only a means to an end: the increasing isolation of the United States from its allies, their resources and their markets.[10]

Based on the imperatives previously discussed in this article, it should be obvious that Soviet policy cannot involve unrestrained overt subversion and in fact does not do so. It is basically legal, being founded on modes of intercourse accepted among nations of the international system. The Soviet Union could be engaging in some covert illegal activities, but

there is comparatively little of the provocative incitement of previous policies. As will be pointed out later, the Soviet Union may even be attempting to play a moderating role with leftist extremists, so important is the image of legalism.

What is more, Soviet policy is extremely pragmatic and not tied necessarily to the ideological tenets of its own political religion. Because the goal is anti-Americanism, Soviet leaders are willing to be flexible about everything else. Even military governments, once anathema for Soviet foreign policy, are acceptable if they pursue a more independent path. The case of Peru is instructive in this regard. The coup in October 1968, which placed the current regime in power, originally met with such typical Communist contempt as calling it an American-inspired plot carried out by Peruvian "gorillas" (the name usually given to Latin American military men).[11] After the expropriation of the International Petroleum Company, however, the tune began to change, so that in 1972 a Communist writer could make the remarkable charge that the Americans were engaged in perpetuating "the traditional distrust of the military" in Peru.[12]

Soviet pragmatism also extends to another old antagonist, the Church. As elements of the Church have become more radical and as the Church has modified its traditional anti-Communist position, the Soviet Union has sought a limited accommodation with the Holy See. This new situation has been reflected in a more conciliatory approach to the Church in Latin America.[13] The same impact holds true in Soviet opinions of Church-related political parties, primarily the Christian Democrats, which are loci of growing power in several countries.

As one might expect, a legal and pragmatic approach, while it scores points in the host nations, is likely to play havoc with the ideological commitment of the national Communist movement. In fact, the Communist parties have been forsaken where it has been advantageous to do so, with very little more than a nod to the holy purity of Marxism-Leninism. They have been instructed to support "national democracies" and abandon subversive insurgencies. In fact, the Soviet Union, once the most active of the fomenters of revolution, is now exerting a moderating pressure on local Communist parties, eager to avoid the accusation that the Soviet approach is two-faced and dangerous.[14] The Kremlin is even willing to conduct normal diplomatic relations with countries that have outlawed the activities of local Communist parties (Argentina, Bolivia, Brazil, Costa Rica, Ecuador).

The conflict of policy with ideology is also evident in Soviet support for economic development *before* the triumph of Communism. Perhaps influenced by their experience in Cuba, the Soviet leaders have gone so far as to suggest that the present capitalist-oriented systems might be effective in the development process if, of course, the Latin Americans could run their own affairs and accept the assistance of the Soviet Union.[15]

The paradoxes of policy and ideology in Latin America have created some severe headaches for Soviet propagandists and theoreticians. Less troublesome has been the development of the tactics with which to implement the policy. There are three successful tools in use (in addition to the local Communist party)—diplomatic relations, trade, and cultural exchanges—and each deserves some comment.

In 1960 only three Latin American governments had diplomatic relations with the Soviet Union (Argentina, Mexico, and Uruguay). Today there are twelve, and six of these have been initiated since 1968. The Soviet diplomatic missions to Latin America are also increasing in skillfulness. Members of the mission frequently speak Spanish or Portuguese, and they are personable, friendly, and unassuming. They studiously avoid political harangues. In all, the image the Soviet diplomats seek is one of innocence and genuine concern (although there is evidence that Soviet espionage has matched the expanded diplomatic presence[16]).

Advances have been made in trade as well. The Soviets offer very attractive terms to their trading partners, including low interest rates and large credits. As one might guess, Soviet successes have primarily been with nations that have been most active in attacking the interests of U.S. businesses.[17] This is entirely in line with the Soviet policy that economic intercourse with the Third World is supposed to support specific political goals. The total trade value in 1972 is expected to be $200 million, which is twice that of 1971. Outstanding credits extended by the Soviet Union have doubled in the last two years and should go over the $1 billion mark in 1972. In addition, the people being sent out to wheel and deal in Latin America are following the example of the Soviet diplomats in improving their skills and therefore the marketability of their products. Although Soviet–Latin American trade is small as yet, it is rapidly becoming an alternative to what has until now been virtually a one-market world for the Latin Americans.

Culturally there has also been an expansion of interest and activity. The program includes scientific as well as artistic displays, concerts, sporting events, and radio broadcasts emanating from the Soviet Union.[18] Students from Latin America have been going to the Soviet Union in increasing numbers, up from 144 in 1960 to over 1000 in 1968. There has also been an increase in the number of Soviet publications dealing with Latin America. An especially effective Soviet tactic in publishing has been to print suitable books written by Latin Americans; the works selected are flattering to Communism and the Soviet Union, but they avoid the stigma of being foreign propaganda. Still, the overall cultural program has not been extremely successful. There are simply too many cultural differences between the two societies to enable significant rewards soon.

an assessment

What is the result of the policy of legalism and pragmatism? By and large, it has resulted in a receptiveness among the Latin Americans that did not exist while the U.S.S.R. was openly pressing for revolution. It is too early to conclude that it will succeed in its goal of damaging U.S. interest, but it surely has more potential for such success than the previous policy of incognizance and belligerence. It is perhaps more dangerous for the U.S. because of its virginal purity and apparent harmlessness. While it is relatively easy to identify an insurgency and organize the will and forces to combat it, the legal approach is much more difficult to deal with effectively. The real success for the Kremlin's policy so far has been that it has opened doors that the threat and visibility of subversion had previously kept tightly closed.

Not all of Moscow's efforts have been successful, it should be pointed out. Having diplomatic relations does not necessarily mean the participants live together happily. As recently as 1971 the Mexican government threw out five Soviet diplomats when the Mexicans uncovered Soviet support of guerrilla training for Mexican dissidents. The same month the new Soviet ambassador to Ecuador got in hot water over some ill-considered remarks about Ecuador's 200-mile territorial water claim, a question on which the Soviet Union is strangely allied with the U.S. Three Soviet embassy officials in Quito were expelled for meddling in domestic labor problems. There are hitches in the trade field, too. Soviet equipment has frequently been of poor quality, and spare parts deliveries have not always been timely.[19] Still, there is an obvious effort on the part of the Soviet Union to avoid this kind of unfavorable exposure, and it does not seem to have reversed the fortunes of the Kremlin in the region.

the future

The brief forecast is for more of the same but in greater amounts. Having suffered no significant reverses, the Soviet leaders must be cautiously optimistic about their Latin Ameri-

can policy. The area probably will never replace Asia or Africa on the Soviet list of priorities, but it may close the gap. Eventually, if the united front/nationalistic democracy/peaceful revolution approach pays off, one could expect to see more open support of local Communist parties, which will undoubtedly attempt to penetrate and dominate legitimate progressive governments. No doubt Castro will feel increasing pressure both from Latin America and from the Kremlin to support this position, and it seems obvious that, to whatever extent he embraces the idea, Cuba will become more deeply involved in the Latin American equation.

Still, in spite of their attempt to generate a friendly image, the Communists probably will never completely abandon their fascination with and engagement in extralegal activities; that particular threat will always be ready to emerge from the wings should the Soviet leaders become unhappy with their current moderation.

In the meantime, it seems apparent that the Russian bear will continue to take Spanish lessons and practice his Latin etiquette. The realities of the region eliminate most other alternatives, leaving this as probably the most productive tactic the U.S.S.R. can follow in Latin America in competition with the North American rival.

Air Command and Staff College

Notes

1. For a documentary approach to the history of Soviet-Latin American relations, see Stephen Clissold, ed., *Soviet Relations with Latin America, 1918–1968* (New York: Oxford University Press, 1970). Also helpful is Luis E. Aguilar, ed., *Marxism in Latin America* (New York: Alfred A. Knopf, 1968).

2. Only Mexico (1924), Uruguay (1926), and Colombia (1935) had established diplomatic relations before World War II. Of these, Mexico and Uruguay broke off relations while the hard-line policy was still in effect (1930 and 1935 respectively).

3. Argentina, Bolivia, Brazil, Chile, Costa Rica, Cuba, Dominican Republic, Ecuador, Guatemala, Mexico, Nicaragua, Uruguay, and Venezuela.

4. Victor Alba, "The Impact of Ideologies," *Problems of Communism*, XIX, July-August 1970, p. 56.

5. Jacinto Almeida, *Latin American Policy of the Kremlin*, Joint Publications Research Service No. 16350, 26 November 1962.

6. While the reaction to perceptions of economic and/or political domination is primarily aimed at the U.S., nationalistic Latin Americans would no doubt apply it equally to any foreign power.

7. J. Gregory Oswald and Anthony J. Strover, eds., *The Soviet Union and Latin America* (New York: Praeger, 1970).

8. See, for instance, Wynfred Joshua and Stephen P. Gibert, *Arms for the Third World* (Baltimore: the Johns Hopkins Press, 1969), pp. 79–80; or W. Raymond Duncan, "Soviet Policies in Latin America Since Khrushchev," *Orbis*, XV, Summer 1971, p. 647.

9. Wolfgang W. Berner, "The Place of Cuba in Soviet Latin American Strategy," *Studies on the Soviet Union*, VIII, 2 (1968), 93.

10. On this point see Tad Szulc, "Impressions of the Soviet Impact on the Iberian World," *Studies on the Soviet Union*, VIII, 2 (1968), 24–29. Also Duncan, *op. cit.*; and Joshua and Gibert, p. 81.

11. For example, see *International Affairs* (Moscow), No. 12 (1968), p. 93.

12. Juan Cobo, "Peru Today," *New Times* (Moscow), February 1972, p. 29.

13. Roger P. Hamburg, "Soviet Foreign Policy: The Church, the Christian Democrats, and Chile," *Journal of Inter-American Studies*, XI (October 1969), 605–7.

14. Duncan, p. 647.

15. Joshua and Gibert, p. 81.

16. *New York Times*, 7 December 1970, p. 1.

17. *Montgomery Advertiser*, 7 March 1972, p. 5.

18. Bayram Riza and Catherine Quirk, "Cultural Relations between the Soviet Union and Latin America," *Studies on the Soviet Union*, VIII, 2 (1968), 30–39.

19. *New York Times*, 20 March 1971, p. 58; 28 March 1971, p. 23; *Christian Science Monitor*, 10 July 1971, p. 1.

This article has been adapted from a paper prepared by Major Nelson as part of his academic work while a student in the 1972 class of Air Command and Staff College.

Military Affairs Abroad

OKINAWA REVERSION

A Study in Change

LIEUTENANT GENERAL GORDON M. GRAHAM

Naha Air Base, Okinawa

IN November 1969, President Nixon and Prime Minister Sato of Japan announced in a joint communiqué the intentions of both the U.S. and the Japanese governments to "immediately enter into consultations regarding specific arrangements for accomplishing the early reversion of Okinawa without detriment to the security of the Far East including Japan." These words initiated a process of administrative change that led to Okinawa's becoming a prefecture of Japan on 15 May 1972.

The reversion of Okinawa, or, more generally, the Ryukyu Islands, involved many changes. These included fundamental changes in the political administration of the islands, the status of U.S. military forces on Okinawa, and major aspects of the economic system. Also involved were other changes in such prosaic but important daily activities as driving on the left side of the road, the language of the road signs, and the currency used throughout the islands.

Okinawa, which has been called a keystone of the western Pacific, was placed under the administrative control of the United States late in World War II. From the end of fighting until 1950, Okinawa had the status of occupied territory. In 1950 a U.S. Civil Administration, Ryukyus, was established, and two years later an indigenous government of the Ryukyu Islands. However, overall administrative authority, granted to the U.S. by Article 3 of the 1951 Treaty of Peace with Japan, remained with the U.S. Civil Administration, headed by a High Commissioner of the Ryukyus. That position was filled by a military officer appointed by the Secretary of Defense.

Because of its strategic location and the continued U.S. involvement in the Far East since the war, Okinawa became a major U.S. military stronghold. With the large concentration of U.S. Army and Marine forces and the major Air Force and Navy establishments at Kadena and Naha Air Bases, Okinawa has been densely populated with military forces. On an island short of arable land, with a civil population of one million, this dense military concentration led to some difficult administrative problems.

Solutions to these problems were the product of the close working relationship between the U.S. Civil Administration and the local island government. This government, organized into legislative, executive, and judicial branches, slowly grew in importance and authority until, in 1968, provisions were made to allow the Ryukyuan Chief Executive to be elected by popular vote.

This popular election was a milestone in the evolving U.S. decision to return Okinawa to Japan. The seeds for this decision had been present since the end of the war, and as Japan developed into our strongest Far Eastern economic and political ally, the actual reversion came closer to reality. To support the new direction of our foreign policy in the Far East as summarized in the Nixon Doctrine, a close long-term U.S. relationship with Japan became crucial to our efforts to help other Asian nations develop in peace. Thus Japan's long-sought reversion of Okinawa assumed great political importance by the late sixties.

planning for change

By establishing that Okinawa would be returned to the jurisdiction of Japan, the Nixon–Sato communiqué launched a long and complex process of preparation. The great changes could not have been accomplished without thoughtful planning, detailed research, and considerable negotiation. The planning had to address political considerations, efficient administrative changeover, and—of great importance to the U.S.—the operational flexibility of its Far Eastern military forces. In the planning process U.S. political and military leaders faced many major issues: How could the political decision be translated into reality, particularly from a military viewpoint? Who would establish the priorities and timing to insure meeting the projected reversion date in 1972? Who would develop the positions, from a mili-

tary viewpoint, to be used in negotiations? What military issues would require negotiation, and how would these negotiations be accomplished?

The organization of committees and groups formed to answer these questions and begin planning was complex and multilayered. These agencies combined the political and military expertise necessary to tackle the broad task of transferring administration of Okinawa from one country to another.

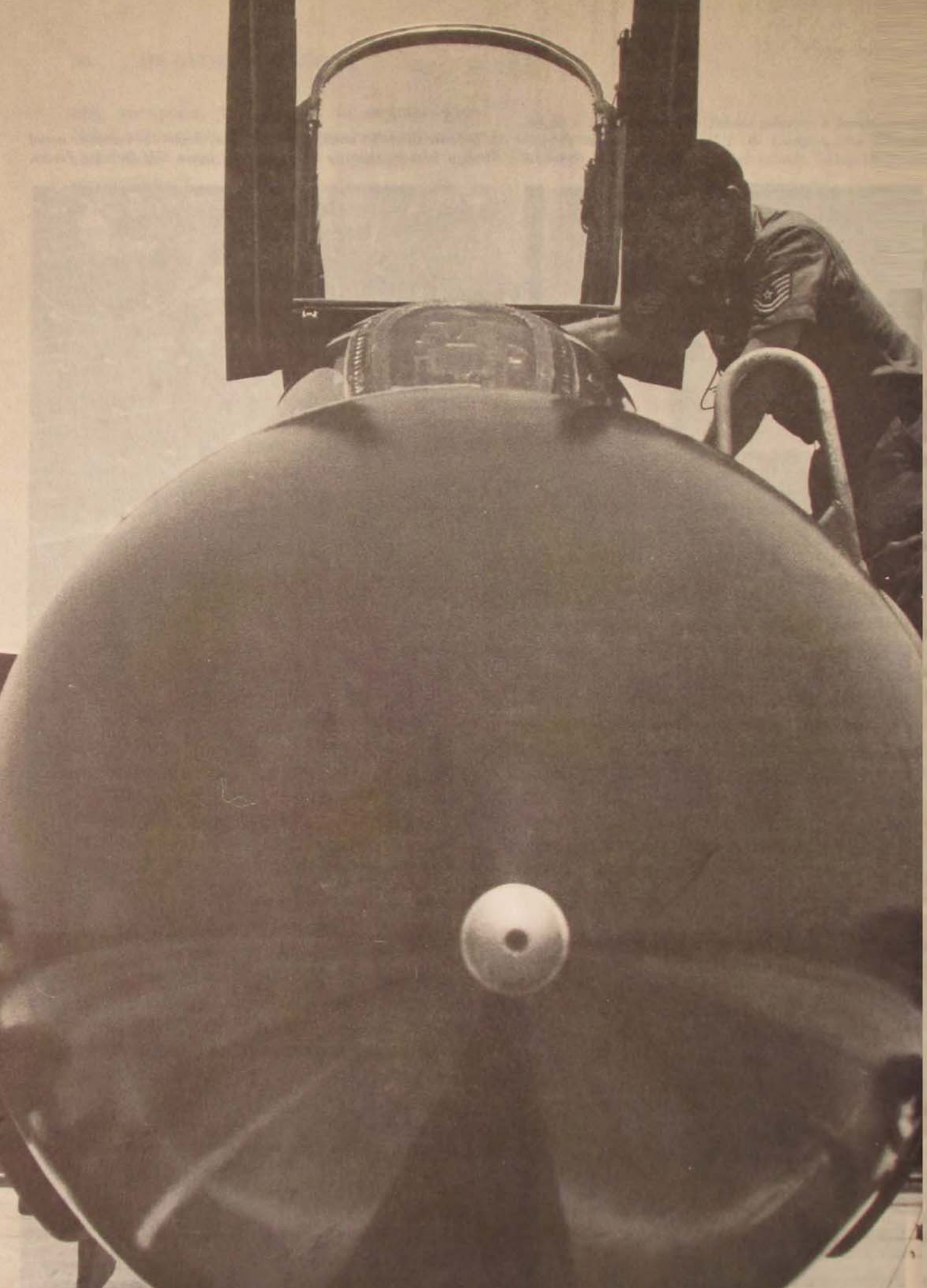
The Consultative Committee, comprised of the U.S. Ambassador to Japan and the Japanese Foreign Minister, established broad guidance and set up the basic government-to-government negotiating machinery. Other groups began developing specific issues and U.S. positions that would be required in later negotiations with the Japanese government. On Okinawa, for example, the Preparatory Commission and the Reversion Coordination Group began local Okinawan preparations for reversion.

Of more direct concern to the military, however, were the agencies that processed the military issues and recommended positions. The on-scene military agent for the Department of Defense and Joint Chiefs of Staff was the U.S. Military Representative to the Okinawa Negotiating Team, which acted as the negotiating focal point and planning monitor for military affairs. Also working in support of the U.S. negotiating team was the Status of Forces Agreement (SOFA) Task Group. This body was created to conduct working-level discussions concerning the application of the U.S.-Japan SOFA to U.S. forces on Okinawa after reversion. The U.S. membership on the Task Group included technical experts from U.S. Forces Japan, U.S. component services in Japan, and the High Commissioner. The first two agencies also provided support to the Military Representative concerning direct military issues, such as the local defense of Okinawa and the postreversion interface of U.S. and Japanese military forces on Okinawa. Fifth Air Force, as the USAF headquarters in Japan, represented the Air

Japanese Ambassador Jiro Takase presents a Japanese flag to Lieutenant General J. B. Lampert, the last High Commissioner of the Ryukyu Islands, 7 May 1972.

A USAF master sergeant at Naha Air Base explains distribution system to a member of the advance team preparing for the 15 May take-over.

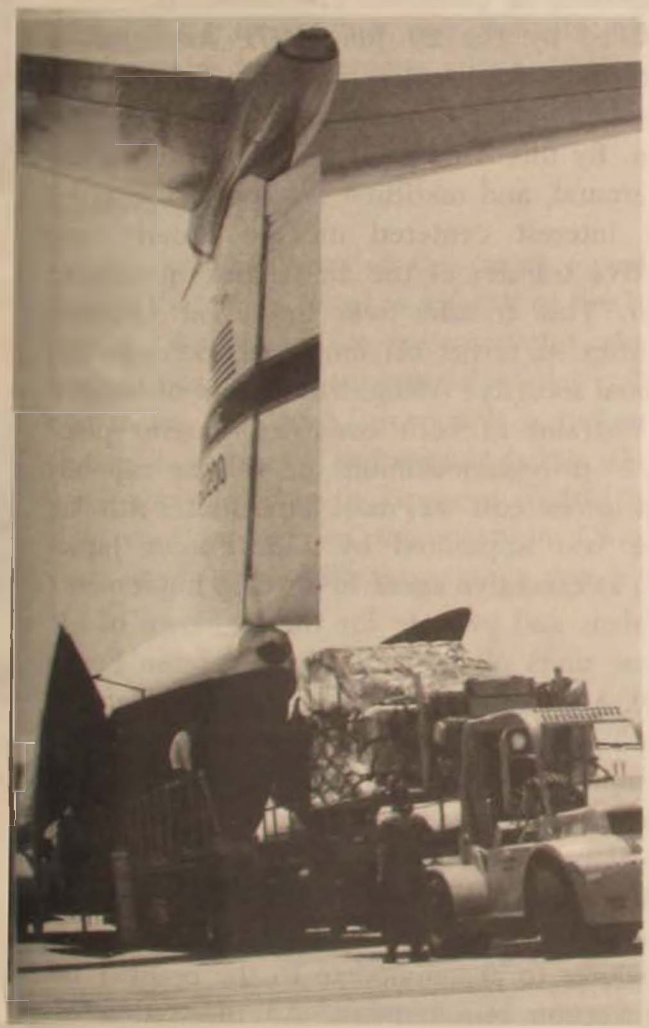
Status boards in the Air Defense Control Center, Naha Air Base, depict the complete aerial situation around the Ryukyu Islands, recently taken over by Japan Self Defense Forces.



Force interest and developed detailed positions on such matters as Okinawa air defense and air traffic control. Other groups, principally subunits of the organizations mentioned, provided technical expertise during the complex and detailed negotiations and subsequent planning.

The detailed negotiations by the U.S. reversion organization and its Japanese counterparts culminated in June 1971 with the widely publicized signing of the Okinawa Reversion Agreement. Also concluded in June were subsidiary agreements that concerned the military, such as the *Arrangement Concerning Assumption by Japan of the Responsibility for the Immediate Defense of Okinawa* and working agreements concerning facilities, labor, telecommunications, and air traffic control. These subsidiary agreements became the basis upon which the military continued to plan for implementation of reversion.

A U.S. Air Force maintenance man makes preflight inspection of an F-4 Phantom of the 18th Tactical Fighter Wing at Kadena Air Base. . . . A C-141 Starlifter of the Military Airlift Command delivers cargo to Kadena, a major refueling point.



USAF planning

Two major planning areas were of particular interest to the USAF in Japan and Okinawa: status of forces application and air defense. Although all component services were interested in these topics, I will concentrate on the USAF role and interests.

Status of Forces Application. The four main topics addressed by the SOFA Task Group were facilities, labor, telecommunications frequencies, and air traffic control.

Of great importance to the U.S. military on Okinawa was the disposition of our facilities there. Article II of the SOFA grants the U.S. use of those facilities and areas in Japan required by U.S. forces for the security of Japan and maintenance of international peace and security in the Far East. The problem was to identify the facilities and areas on Okinawa that would be required by the U.S. after reversion. Furthermore, to retain U.S. military flexibility, it was imperative to describe accurately the conditions of use for those areas. Then, arrangements had to be made to release to Japan any

facilities and areas excess to U.S. needs. Development of complete lists of facilities for retention and for release entailed a thorough screening of our requirements and considerable planning for proposed postreversion activities. These lists were developed by our component services in Japan and the Reversion Coordination Group on Okinawa and were incorporated into a Memorandum of Understanding concerning facilities, which was signed in June 1971.

Another important SOFA issue was labor. In Japan, U.S. forces use a central indirect-hire arrangement to employ Japanese labor. By this arrangement the government of Japan acts as the legal employer and is reimbursed by the U.S. This procedure is advantageous to the U.S. because the Japanese government acts as a buffer in dealings with powerful employee labor unions. By contrast, administration of the labor force on Okinawa had previously been by direct hire, and the U.S. as employer was faced with all the attendant problems of determining wages and conditions of employment as well as bargaining with the local labor unions. Agreement was reached to incorporate Okinawa labor into the Japan indirect-hire system; however, transition to the new system posed sizable problems for both Okinawan and Japanese authorities.

The issue of telecommunications frequencies focused on obtaining guaranteed Japanese protection for the U.S. military communications network on Okinawa after reversion. The U.S. objective was to protect U.S. communications facilities against physical and electromagnetic interference and to provide for frequencies required by existing and future U.S. military forces on Okinawa. The realization of this position required a vast amount of technical work, and the issue was satisfactorily resolved.

Finally, of great military importance was the issue of air traffic control (ATC). Prior to reversion the Okinawa ATC system was administered and operated by the USAF. After reversion the Japanese government, through the Japan Civil Aviation Bureau (JCAB), assumed this responsibility. Considerable negotiation and planning were required to carry out the transfer of air traffic control responsibility. Both U.S. and Japanese government representatives devoted careful study and planning to such matters as the lack of ATC facilities that could be transferred intact to the JCAB, the close proximity of the major Okinawa airfields, and the need for a single approach control in the high-density Okinawa terminal area. Both the U.S. and Japan had as their prime objectives air safety within the Okinawa Flight Information Region and the smooth integration of both nations' ATC requirements in order to provide maximum flexibility and service to all using parties.

Air Defense. The second major area of military interest concerned the defense of Okinawa. The Nixon–Sato communiqué provided that after reversion Japan would gradually assume the defense of Okinawa. The communiqué was amplified by the 29 June 1971 *Arrangement Concerning Assumption by Japan of the Responsibility for the Immediate Defense of Okinawa.* By this *Arrangement* Japan assumed the air, ground, and maritime defense of Okinawa. USAF interest centered on the orderly and effective transfer of the air defense mission to Japan. This transfer was important to both countries in terms of immediate defense and regional security. Within the climate of budgetary restraint in both countries, careful planning to provide maximum air defense capability at lowest cost was most important. Fifth Air Force was appointed by U.S. Forces Japan (USFJ) as executive agent to develop implementing plans and provide for the beddown of air defense units of the Japan Self Defense Force (JSDF). A bilateral U.S. Forces–JSDF Air Defense Planning Group, chaired by Fifth Air Force, developed these detailed plans.

Okinawa reversion negotiations and planning took place over a period of more than a year. In the interim, U.S. military forces on Okinawa were looking toward reversion and adapting procedures to accommodate to the realities of postreversion requirements. An illustration of

this accommodation (a minor point in itself but typical of a host of similar actions) concerned the issuance of landing permits at Naha Air Base, one of the two major USAF bases on Okinawa. Naha became a Japanese civil airport after reversion, with the JSDF jointly using the airfield. In the prereversion period, however, Naha remained a USAF installation and thus was subject to USAF regulations governing the use of Air Force bases by civil aircraft. Normally, civil aircraft are issued landing permits at USAF bases only for official business and subject to very restrictive conditions. This tight control is necessary to insure noninterference with the military mission. However, with Japan requiring increasingly greater air access to Okinawa to make plans for reversion, the USAF relaxed the restrictions on use of Naha Air Base. This was clearly in the interest of both countries for reversion preparation and further provided evidence of U.S. willingness and desire to achieve a smooth and harmonious administrative and military transition.

lessons of change

I have outlined some of the major aspects of change that came about as a result of the reversion of Okinawa. From governmental administrative change, to change in day-to-day military operations, to such everyday activities as change in currency and driving habits, the reversion of Okinawa to Japanese control had a significant impact on the USAF in Okinawa. Planning to cope with this change was a valuable experience for us because the major aspects of reversion demanded that civil and military leaders identify and analyze reversion issues, anticipate future requirements, and then develop sound and effective plans. From the vantage point of my dual role as Commander of USFJ and Fifth Air Force, I was able to observe directly the many unique requirements in the preparation for reversion. Unilateral, joint, interdepartmental, and binational channels merged into a complicated medium in which to plan for implementation of the reversion decision. Cooperation and close coordination were needed at every level of decision-making to insure that the best interests of the U.S. were preserved. Throughout the spectrum, from Fifth Air Force and USFJ action officer to the embassy negotiator, the development and maintenance of harmonious working relationships were essential, to prevent misunderstandings and develop effective plans in a complex environment. The reversion preparations provided a rare opportunity for the military services to gain this valuable experience.

The changes imposed by Okinawa reversion provide an excellent study of how the military services must gain and apply knowledge across a broad range of disciplines to do their job well. To meet the needs of U.S. foreign policy in the world, particularly in the Far East in the seventies and eighties, the military services must continuously be alert to the need for adapting to change while retaining maximum flexibility and operational capability.

Hq Fifth Air Force

AEROSPACE SYSTEMS AND WEATHER

MAJOR JOHN H. MANLEY

A sun flare invades the camera lens as Apollo 11 orbits the earth prior to lunar insertion.

FOR CENTURIES military commanders have recognized that weather can be decisive in determining the outcome of battles, sometimes even wars. Frozen German soldiers on the Russian front during World War II and drowned Spanish sailors after the defeat of the Spanish Armada in 1588 provide mute testimonials to the disastrous effects weather can have on military forces.

Weather is a constant threat to aerospace operations. Experienced aviators know that even sunny and cloudless skies can unleash violent forms of clear air turbulence (CAT) that are capable of destroying or severely damaging an aircraft. Solar activity produces "space weather" that can present both serious radiation hazards to astronauts orbiting in the exosphere and also disruption of high-frequency radio communications on the earth's surface.

This article explores weather as a factor affecting all aerospace operations and focuses on the critical question: What can be done to minimize its effects on our aerospace systems of the future?

the "all-weather" myth

To set the stage properly for a rational discussion of weather effects on aerospace vehicles, it is important to dispel first the "all-weather" myth. This myth is largely the result of a process that causes the literal meaning of a term such as "all weather" to become generally accepted as unquestioned truth through frequent usage. For example, an "all-weather" aerospace system might logically be defined as a system that would be usable 24 hours a day regardless of the prevailing weather; that is, under conditions of daylight or darkness, fair or adverse weather.

A major drawback to using this terminology occurs when we advocate the acquisition of all-weather military systems. Obviously we do not envision building aircraft strong enough to fly through tornados, at least not at a reasonable cost. Likewise, less violent forms of weather, such as hurricanes, typhoons, and sleet storms, are undoubtedly considered unsuitable environmental conditions for any conventionally designed aerospace vehicle.

Since we do not generally think in terms of operating in severe weather, except under the most dire emergency conditions, why do many authoritative speakers and writers continue to use the term "all weather" so loosely as if it had real meaning?

I believe that references to "all-weather" aerospace systems are merely intended to connote systems that can operate under *certain* "adverse-weather" conditions—but here again some semantic difficulties appear. The *U.S. Air Force Glossary of Standardized Terms* defines "adverse weather" as:

> Weather in which military operations are generally restricted or impeded.[1]

Attempts to define "adverse weather" more rigorously can be easily thwarted by counter definitions. For instance, zero-zero fog conditions might be an ideal environment for an attacking sapper force, whereas a clear, sunny day might be "adverse" for paradropping supplies to intelligence collection units operating behind enemy lines.

On the other hand, if "adverse weather" is defined in terms of specific systems or operations, rather than in absolute terms, other difficulties are encountered. For example, the common "weather minimum" for airfield operations has a standardized Air Force definition:

> The worst weather conditions under which aviation operations may be conducted under either visual or instrument flight rules. Usually prescribed by directives and standing operating procedures in terms of minimum ceiling, visibility or specific hazards to flight.[2]

All aviators will readily agree that "minimums" are not really fixed criteria but vary with location, operating agency, and operational considerations.

The main point of this discussion is simply this: The term "all weather" is very misleading and should *not* be used with reference to mili-

tary systems. Even though weather can adversely affect virtually any military operation, it would not be cost effective (even if technically feasible) to design truly *all*-weather systems; and to continue to think, speak, or write in such terms only perpetuates the myth.

no altitude limits of adverse weather

When one looks beyond the clouds into near space, it becomes readily apparent that physical altitude limits cannot be set on adverse weather. In space there exists a diversity of environmental threats to a wide variety of aerospace mission functions. These higher altitude environmental threats might be loosely termed "space-weather" effects.

"Space weather" was first highlighted by commercial television commentators during the early U.S. orbital space flights when occasional ionospheric storms affected the high-frequency (HF) radio communication used by military recovery forces deployed worldwide. During a more recent moon exploration mission, Apollo XII, solar flares created "weather" that temporarily blacked out all communication with the astronaut crew on numerous occasions.

Air Force ballistic missile detection and warning systems are also affected by changes in the ionosphere. When a solar flare erupts, the flux of charged particles, X rays, and extreme ultraviolet and radio waves surges to levels as much as a millionfold stronger than normal. These bursts of electromagnetic radiation cause almost instantaneous energy changes in the ionosphere. Physical particles also travel earthward from the sun and arrive from 15 minutes to 18 hours later; less-energetic solar winds take up to several days to reach the earth. These relatively late-arriving particles give rise to the aurora borealis and ionospheric storms, which can confuse and even temporarily disrupt some of our missile detection systems. In fact, inconstancy of the ionosphere is the principal environmental threat to over-the-horizon (OTH) detection systems.

Solar activity not only affects the ionosphere but can also produce sudden changes in the density of the outermost levels of the atmosphere. This can create serious problems in certain military space operations where a satellite must be accurately positioned in a low-altitude orbit. Sudden density changes can cause the satellite to speed up or slow down unexpectedly, thus placing it in the wrong orbital position. This space-weather effect can sometimes negate the entire mission objective, especially if the satellite is not equipped with thrusters to enable correct repositioning.

Finally, as we look forward to an operational space transportation system (STS) with its accompanying routine man-in-space operations, the exposure of astronauts, solar cells, optical materials, and electronic components to fluctuating levels of electromagnetic radiation and waves of dangerous energetic particles arriving from the sun represents space-weather hazards of potentially serious consequence that must be taken into consideration by aerospace planners.

It is clear that we should no longer declare some relatively low altitude to be the upper limit of weather phenomena, as we did before the space age. We must expand our conceptual thinking and planning to include the entire atmosphere out to the bleakness of near space.[3]

the central problem

Weather has been defined to extend from the surface of the earth outward into near space. Whenever any of its various components reach magnitudes that hinder normal system operation, we can say that adverse weather exists for that system, at that location, at that point in time.

Since adverse weather is an environmental condition that generally restricts or impedes a military operation, the military commander faces a choice of either succumbing to adverse weather or doing something about it. The central problem and thesis of this article involve

the second choice: What can be done about adverse weather?

Three general courses of action are open to aerospace decision-makers, each of which is already being pursued to some degree.

First, the techniques used to forecast weather might be refined to the point where adverse weather will no longer be a surprise to a military commander. Ideally, if forecasting can become so precise that adverse weather can be formally entered into the battlefield planning process, the commander should be able to take military advantage of it with a high degree of confidence.

A second course of action requires continued scientific investigation into methods for changing or modifying the weather to eliminate undesirable adverse components such as thunderstorms, hurricanes, fog, and the like. The utopian state to strive for would include the capability to change adverse weather to fair weather at will.

The third general course of action would place emphasis on designing future aerospace systems to operate more effectively within adverse weather. Following this course to its ideal end would provide systems totally impervious to adverse weather.

improving weather forecasting

Air Force mission statistics generated during World War II, in Korea, and lately in Southeast Asia have shown that adverse-weather effects on tactical bombing are sizable and of major importance. Of greater interest is the fact that adverse-weather effects on tactical operations *can be reduced* by improving the quality of weather information and the capability of operators to use that information.

Because of the relatively recent requirement for space-weather forecasting, little evidence exists to support a need for improvements in this area; what is really needed is virtually a brand-new capability. The principal deficiency in space-weather forecasting concerns our limited ability to forecast solar events, especially those that evoke geophysical responses.

A number of scientific efforts are in progress to improve forecasting:

• The SOLRAD (solar radiation) satellites sponsored by the Department of Defense are gathering information on solar emissions. This activity is contributing to research aimed at developing better techniques for predicting and assessing space-environment disturbances.

• The Air Force has implemented AFCRL-developed computer programs for the Space Forecasting System at the Air Weather Service (AWS) Global Weather Center. The ultimate goal of this system is to predict bursts of radiation and energetic particles from the sun and the effects of these bursts on the earth's atmosphere.

• Joint Air Force–Atomic Energy Commission Vela nuclear testing surveillance satellites are providing, as a side benefit, valuable information to scientists on the nature of solar X rays, the solar wind, and other natural phenomena.

• Within the Department of Commerce, the National Oceanic and Atmospheric Administration (NOAA) administers several subelements that provide probably the most important contributions to atmospheric weather forecasting:

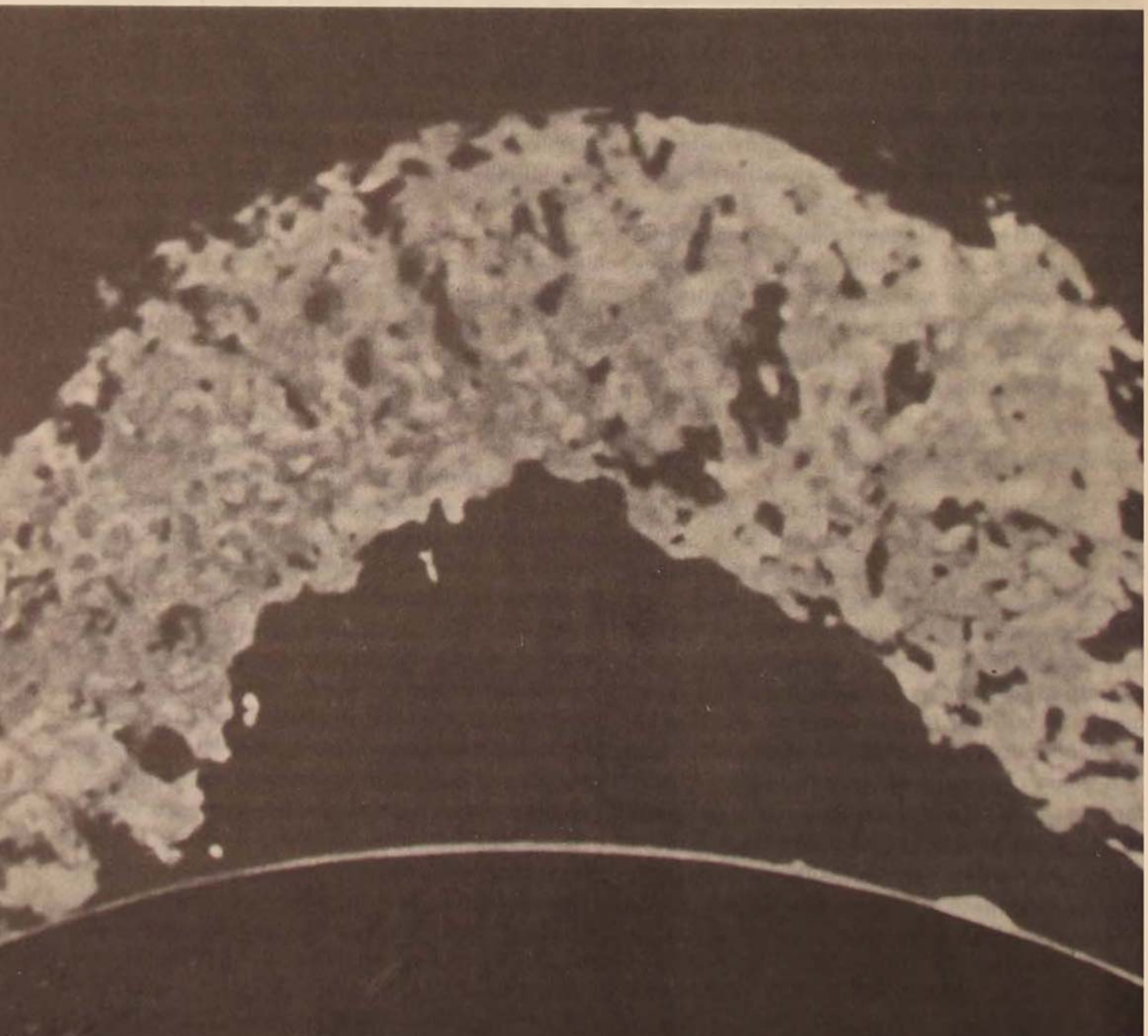
a. The National Environmental Satellite Service (NESS) controls the Nimbus, ITOS, ESSA, and ATS satellites as follow-ons to the original and well-known National Aeronautics and Space Administration TIROS satellite. These satellites continuously monitor the earth's environment (particularly cloud cover) to warn against impending environmental hazards such as hurricanes, local storms, and other forms of severe weather. NESS provides U.S. satellite data to the U.S.S.R., in exchange for the Soviets' Meteor series satellite data, to further enhance our global surveillance capability.

b. The National Weather Service (NWS) serves and is served by the aerospace programs. It receives data from the Air Force Air Weather Service, for example, and provides

Continued on page 48

Nimbus, the Weather Sentry

Photographs taken and transmitted to earth by Nimbus satellites, like the one of cloud cover (below), provide scientific data that enable more accurate routine weather forecasts as well as more timely warning of severe weather conditions. . . . A montage of 14 photographs (right), taken by NASA's Nimbus II from 700 miles high during several relatively cloudless days, shows the entire continental United States. The 912-pound satellite met the test objective of two months' continuous operation. . . . Florida has been outlined on a photo (right, below) made by Nimbus from 400 miles, a comparatively low altitude.

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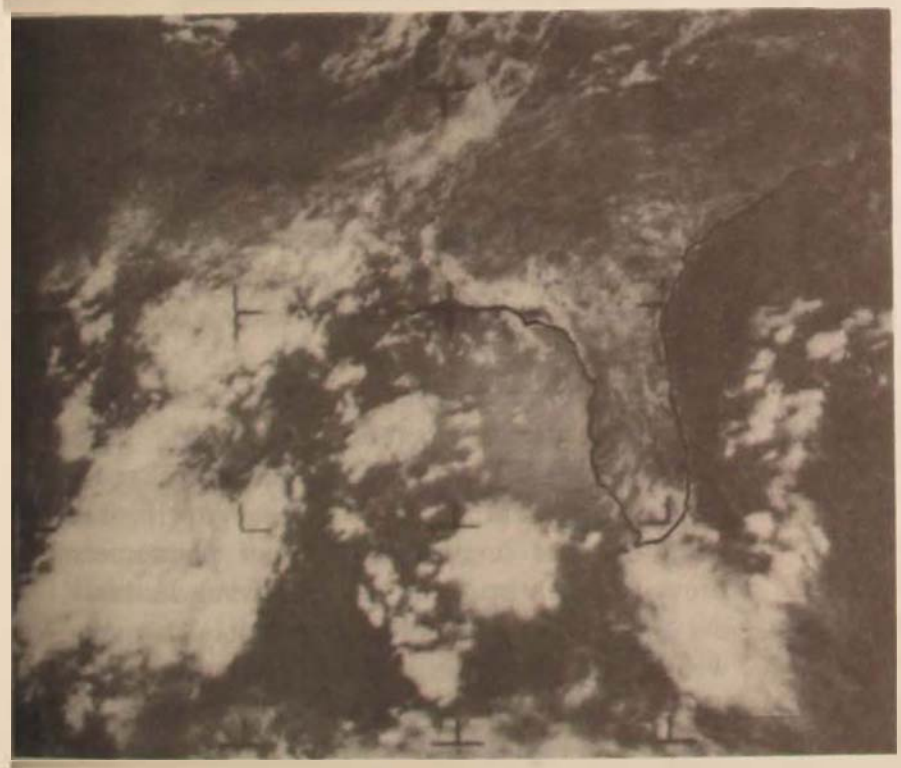


observations and forecasts in return, including specialized reports prepared at its National Hurricane Center, Miami, and the National Severe Storms Forecast Center, Kansas City.

c. The Environmental Data Service collects, processes, stores, publishes, and disseminates environmental data gathered on a global scale. Of particular importance is the National Climatic Center (NCC), which preserves meteorological data received from the NWS, NESS, AWS, Naval Weather Service Command, and foreign meteorological services.

• Air Force Systems Command is currently developing an improved environmental data collection capability called the Airborne Weather Reconnaissance System. A WC-130 aircraft is being outfitted with an improved hurricane weather reconnaissance radar plus better weather-sensing instruments to enhance the quality of storm-reconnaissance information used by both the military and NOAA.

In spite of these extensive scientific programs, however, the basic problem of the real *unpredictability* of weather still remains. Can we afford to increase the number of our operational weather-sensing stations, satellite observatories, and so forth, to the point where we can predict the buildup of a single cumulonimbus cloud over a specific target, at a specific time, over enemy territory? Of course not! However, research must continue into the physics of meteorology to improve increment by increment the scientific knowledge base that is needed, in turn, to support more accurate forecasting methods. On the other hand, we must not be so naive as to expect that intensive efforts in this direction will produce an infallible weather forecasting technology within the foreseeable future.

changing the weather

Since it appears that meteorologists will always have difficulty even predicting the weather, what are the possibilities for changing it?

AFSC's Cambridge Research Laboratories have been conducting programs aimed at learning how to modify the weather. The Air Force has been moderately successful in dissipating supercooled fog at Air Force bases in Alaska and Europe. These programs have proved conclusively that supercooled fogs can be modified to allow aircraft to land in conditions that would otherwise be below minimums. In fact, a prototype Cold Fog Dissipation (CFD) System, which can turn cold fog into snow by spraying it with a mist of colorless, ordorless liquid propane, is now under Air Force contract for production and testing by late fall 1972.

Efforts at rainmaking through the seeding of cumulus clouds and experiments at taming hurricanes have been well publicized, but, for the near future, environmental modification efforts of operational significance will probably be limited to

—dissipating supercooled fog (and possibly a few types of warm fog) for the purpose of opening up socked-in airfields to normal operations;

—making small holes in thinly layered clouds to permit selected tactical air strikes (or reconnaissance runs) on obscured targets;

—altering individual cumulus clouds to cause precipitation, reduce their physical size, or cause them to grow into thunderstorms.

Each of these effects could be used for a variety of military purposes. For example, if torrential rains could be produced over a suitable battlefield, it might be possible to bog down enemy armor in a sea of mud, possibly even providing tactical air forces with a shooting-gallery situation.

Although weather modification has a great deal of theoretical potential, significant progress will probably be hindered primarily by the dangers inherent in the process itself. The complexity of large-scale weather phenomena prevents scientists from sufficiently understanding the possible long-term results of major weather modification such as climate control. There is a distinct danger that large-scale atmospheric experiments could lead to irrevers-

ible changes in the environment, such as melting a portion of the ice cap, for example, which might prove harmful to mankind.[4]

The problems inherent in even simple cloud-seeding operations appear to be not so much technical as social and political. Public outcries similar to those generated by our defoliation operations in Southeast Asia might result from battlefield weather modification activities. This is simply because man would once again be altering the natural environment and hence might harmfully disrupt the ecological balance of nature. For example, if moisture is continually drained from most passing clouds in an attempt to maintain good visibility over a specified area, desert-like conditions might ultimately be created downwind. Although this may sound somewhat implausible, it is a scenario easily created by antimilitary activists to bolster their position.

Thus, temporary small-scale weather modifications on the battlefield seem to provide worthwhile objectives to strive for. On the other hand, large-scale weather modification schemes are not likely to provide any near-term solutions to the aerospace commander's adverse-weather problems. They are simply too risky technically, legally, and morally at the present time to be seriously considered.

the need for adverse-weather-resistant systems

Perhaps this discussion has suggested an explanation of why many military planners still advocate "all-weather" systems. Since meteorologists have difficulty forecasting adverse weather and scientists cannot significantly modify it, it would seem reasonable for planners to call for aerospace weapon systems to operate within it. Before proceeding, however, let's reflect for a moment on the question: Are adverse-weather-resistant systems really necessary?

A partial answer to this question can be derived from the lessons being learned in Southeast Asia. For example, the North Vietnamese regularly exploit the seasonal monsoon cloud cover to step up their infiltration activities. As U.S. tactical interdiction capabilities developed over the past few years so as to produce an excellent day-strike capability, the enemy countered these efforts by moving his supplies under cover of darkness and bad weather, thus forcing operations into adverse environmental conditions. This tactic has created problems for some of the most sophisticated weaponry we have. For example, guided or "smart" bombs having electro-optical, laser, or infrared (IR) guidance systems are limited to use under visual conditions.[5]

The April 1972 offensive by North Vietnam was launched from the demilitarized zone (DMZ) under cover of adverse weather. This tactic precluded effective use of U.S. air power, which in turn contributed to the initial 20-mile retreat by defending South Vietnamese ground forces during the first few days of the battle. Thus, it seems obvious that we can use as much of a tactical adverse-weather capability as we can get.

In the area of space systems, can a ballistic missile be successfully launched upward through a thunderstorm if required? Would its warhead still operate if it encounters hail during the final stages of re-entry over a target area? Can our early-warning systems detect an enemy sea-launched ballistic missile (SLBM) attack during periods of severe ionospheric disturbance? Here again we can probably use as much strategic adverse-weather capability as we can get.

designing adverse-weather systems

It has been indicated that the United States really needs effective adverse-weather-resistant aerospace weapon systems—but strictly from a *requirements* viewpoint. If all future systems were designed to satisfy every documented adverse-weather specification, they would obviously be too expensive to build. The design engineer is thus faced with the very complex trade-off problems of weighing increased ad-

verse-weather performance capabilities of future systems against the increased costs they will impose.

Air Force Systems Command scientists are addressing the problem of determining the most cost-effective adverse-weather specifications in cooperation with staff meteorologists assigned to AFSC by the Air Weather Service. They are assisting program managers in analyzing environmental limitations of equipment whose applications are being studied and in establishing aerospace environmental design criteria and standards. Final specifications are determined for developed systems and prototypes through actual testing by AFSC engineers in such facilities as the world's largest climatic hangar at Eglin Air Force Base, Florida.

Additional progress in designing improved adverse-weather aerospace systems is being made in industry. For example, an extensive lightning research program has been initiated in connection with the B-1. Work is aimed at establishing low impedance paths within the new bomber to divert lightning away from critical crew, weapons, and avionics areas.[6]

The problem with most of the work being done in this area, however, is that the "all-weather syndrome" has caused designers to push for maximum allowable adverse-weather specifications within existing budget constraints. But do we really need the entire aerospace force to consist of adverse-weather-resistant vehicles, or can some fraction of the force also include relatively inexpensive "fair weather" systems? For example, do we need as many adverse-weather F-15s as we think we do, or can some be traded off for larger quantities of relatively sophisticated fair-weather, lightweight fighters?

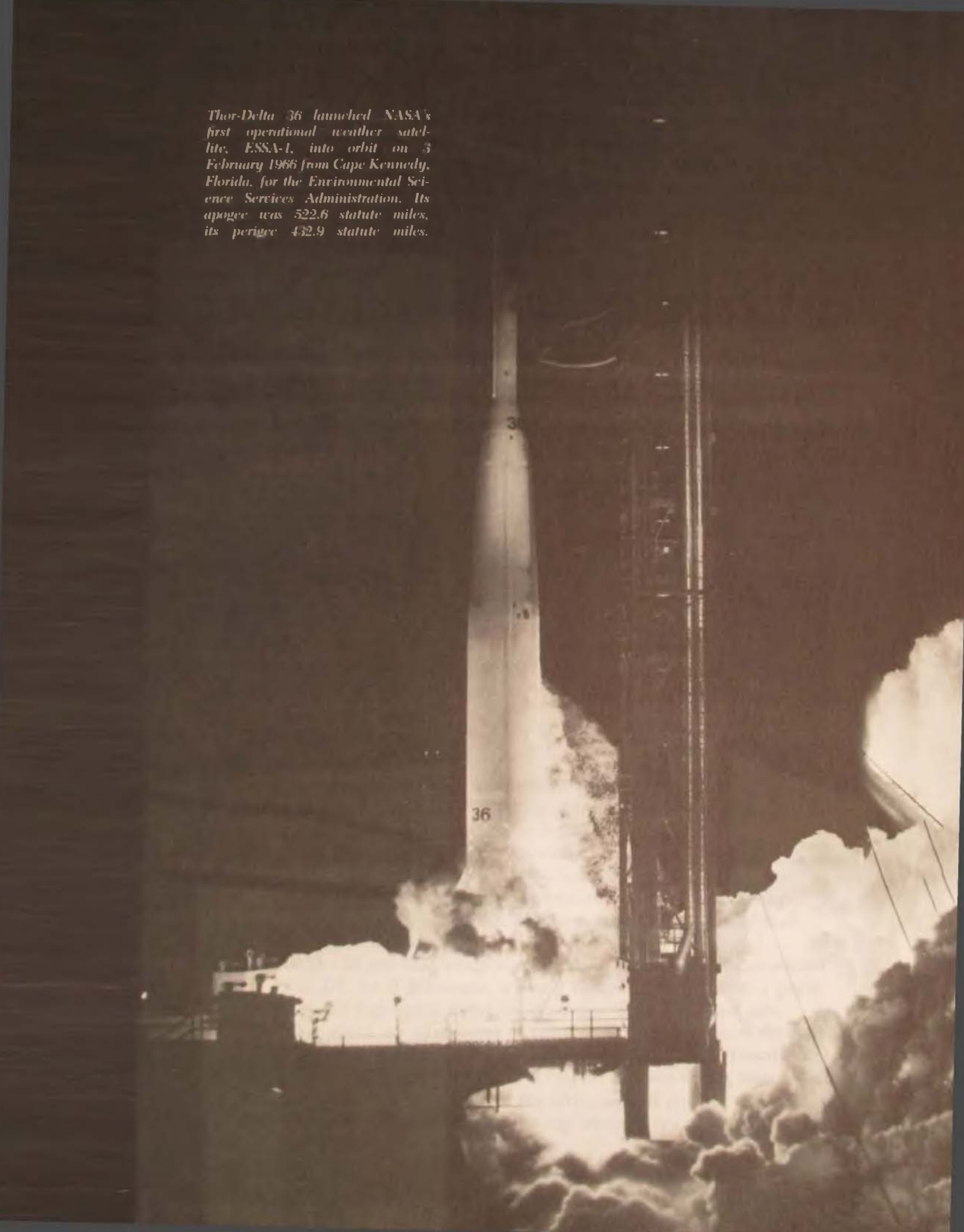
Adverse-weather warplane cost/performance and force-mix problems in the context of adverse weather have been considered by the RAND Corporation in a series of studies.[7] Although their conceptual labor is only now beginning to bear fruit, the pioneering work of RAND scientists has pointed the way toward a new approach to the adverse-weather problem. I believe we should follow the RAND lead and devote more of our analytical resources in the development planning area toward defining adverse-weather specifications for future systems. These specifications should be based upon the climatological conditions they will be operating in as well as the forecast military threat environment. The precise types of adverse-weather components that systems should be designed to live with should be made as explicit as possible in concert with the mission objectives for the system and the force mix projected to exist during its envisioned lifetime. All of the vast stores of climatological and meteorological knowledge should be brought to bear on this problem. We cannot afford to rely solely on improving our forecasts or modifying the weather. We must also design superior but cost-effective adverse-weather weapon systems.

The enemy has his problems, too.

Of some consolation to the commander is the fact that the same environmental factors that affect his aerospace systems also affect the enemy's systems. For example, if the weather becomes too bad for tactical interdiction because of hurricane or monsoon conditions, surface conditions would probably be too bad for the enemy to move his supplies, troops, or armor over unimproved roads also. Both opposing forces would probably wait for better weather to resume active fighting.

Scenarios such as this can be easily invented for all forms of military engagements under conditions of storms at sea, severe winters, blowing sand in the deserts of the world, and electromagnetic disturbances in space. The point is that we are not alone in seeking solutions to weather problems. We must also keep in mind that whoever finds the answers first can gain a distinct military advantage.

THE ENVIRONMENT has been both enemy and friend to military commanders for centuries.



Thor-Delta 36 launched NASA's first operational weather satellite, ESSA-1, into orbit on 3 February 1966 from Cape Kennedy, Florida, for the Environmental Science Services Administration. Its apogee was 522.6 statute miles, its perigee 432.9 statute miles.

Attempts to predict its idiosyncrasies or change its course have never been and probably never will be completely successful.

Aerospace operations are particularly susceptible to adverse environmental effects on the ground, in the air, and now in space. Even the sun, our unfailing source of energy for life on this planet, has been found to play havoc frequently with some of our newer aerospace systems.

Therefore, until reasonable and cost-effective solutions can be found to counter most of weather's deleterious effects on our aerospace operations, we must continue our search for new and better methods to predict its course, to modify it, and to design systems that can operate more effectively within it.

Let us spend our resources more wisely in our quest for improvements. We should supplement those activities aimed at developing optimum forecasting methods and "all-weather" warplanes by taking a fresh look at how we might do more with less in our perpetual battle with Nature.

Hq Air Force Systems Command

Notes

1. *Administrative Practices: U.S. Air Force Glossary of Standardized Terms*, AF Manual 11-1, vol. 1 (Washington, D.C.: U.S. Government Printing Office, January 1972), p. 4.

2. *Ibid.*, p. 218.

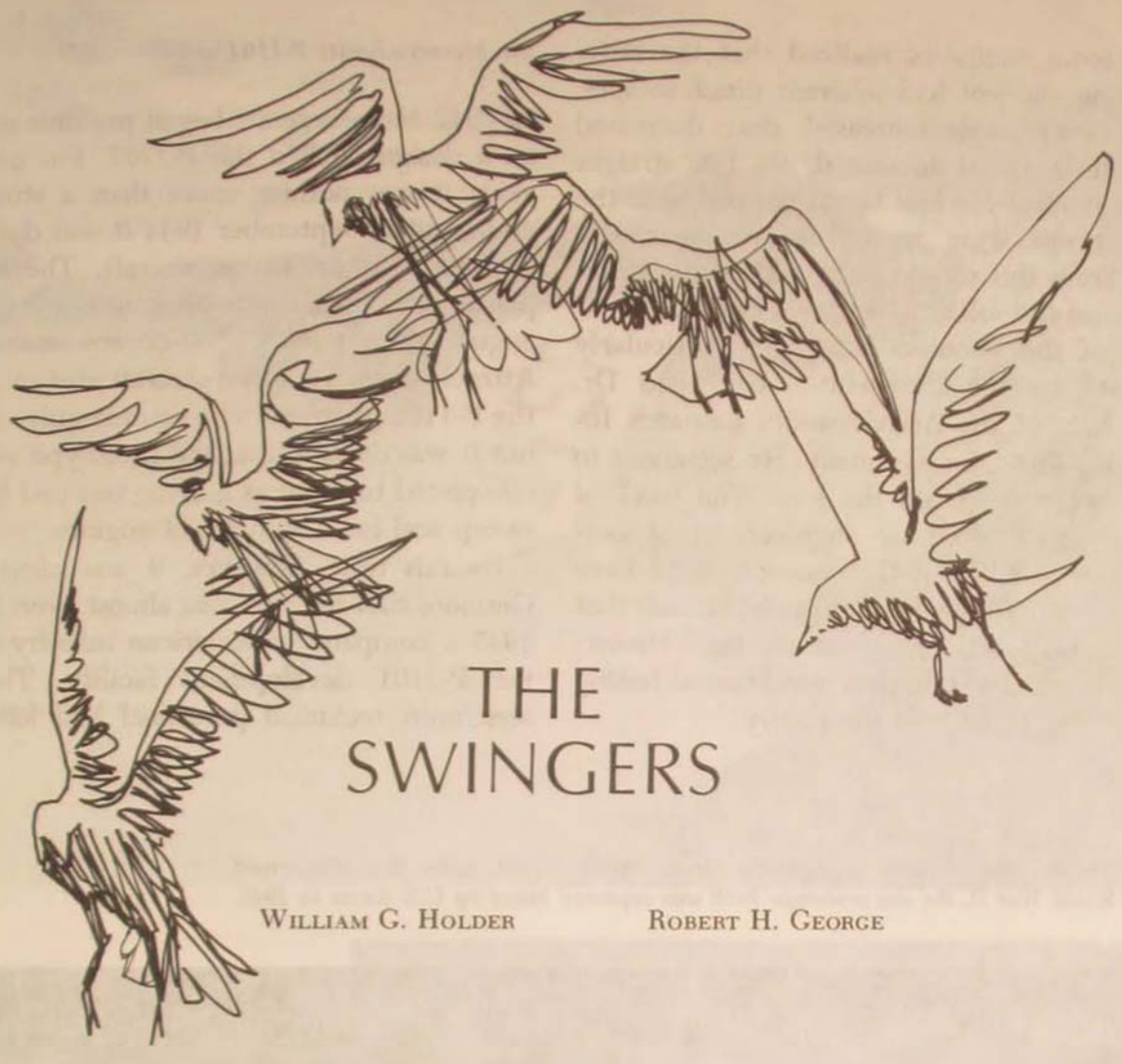
3. For a more detailed treatment of "space-weather" effects on military operations, see "Guide to Solar Geophysical Activity," *4th Weather Wing Pamphlet 105-1* (Ent AFB, Colorado: Hq 4th Weather Wing [MAC], February 1970).

4. For a more extensive discussion, see S. M. Greenfield, "Weather Modification Research—A Desire and an Approach," P-4027 (Santa Monica, California: The RAND Corporation, February 1969); "Weather Modification Progress and the Need for Interactive Research," RM-5835-NSF (Santa Monica, California: The RAND Corporation, October 1968); and *Report on Research at AFCRL: July 1967-June 1970* (Bedford, Massachusetts: Air Force Systems Command Cambridge Research Laboratories, December 1970).

5. Lieutenant Colonel P. B. Hopkins, Jr., "Interdiction at Night in Adverse Weather," *USAF Tactical Air Warfare Center Quarterly Report*, January 1972, p. 8.

6. *Aviation Week and Space Technology*, vol. 96, no. 1 (January 3, 1972), p. 9.

7. See, for example, R. E. Huschke, "Use of Weather Information in Determining Cost/Performance and Force-Mix Tradeoffs: Weather and Warplanes I," R-740-PR (Santa Monica, California: The RAND Corporation, June 1971).



THE SWINGERS

WILLIAM G. HOLDER ROBERT H. GEORGE

AIRCRAFT designers have long watched the flight of birds and the way they move their wings in flight. "If only an aircraft could be built to do this!" was the thought in the designers' minds.

For many years, even before the Wright brothers' epic flight, inventors have been working on moving wings for airplanes, wings that increased and decreased their length and width, wings that oscillated longitudinally, wings that flapped like birds' wings. Some of these contraptions were actually built, and some of them even flew—sort of.

The *practical* idea of movable wings was introduced at a scientific convention in Rome in 1935. Dr. Adolf Busemann, a young German designer, read a paper on aircraft wings and high-speed flight. Dr. Busemann's paper started aero engineers thinking about the advantages of movable wings. They found that one of the greatest advantages of sweptwings was the reduction of aerodynamic drag at high speeds. Research has since established that an airplane having zero sweep (wings at right angles to the centerline of the airplane) will produce the same drag at 540 miles per hour as an airplane having wings swept at 60 degrees flying at over a thousand miles per hour.

But some engineers realized that the movable wing concept had inherent disadvantages. When sweep angle increased, drag decreased but stalling speed increased. So the straight wing was ideal for low landing speed, and the highly swept wing was ideal for supersonic flight. From this simple statement of the problem comes the solution—variable sweep.

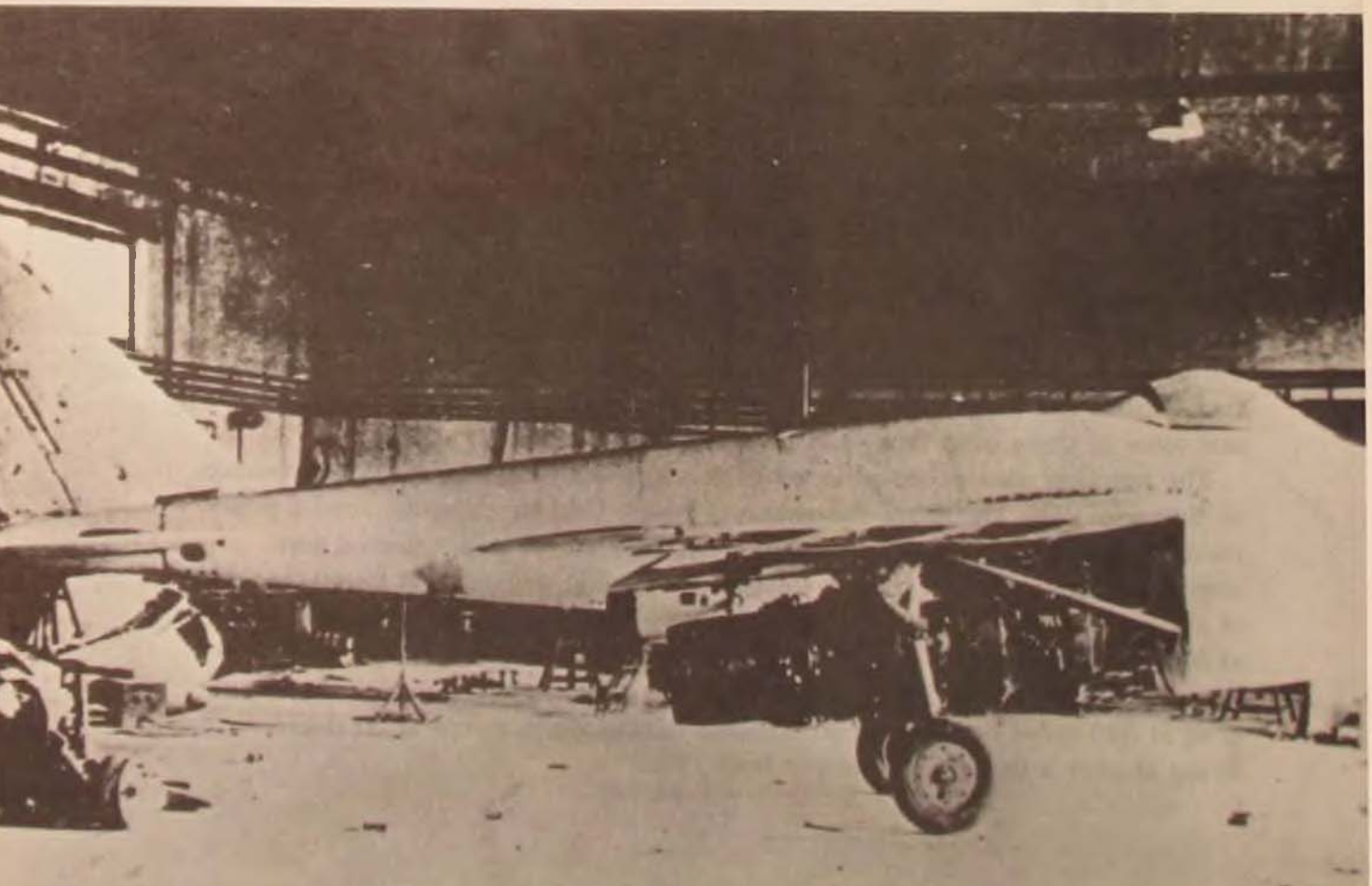
One of the scientists who was particularly impressed by the Busemann theory was Dr. Albert Betz of the Aerodynamics Research Institute at Göttingen, Germany. He set about to do further research on the idea. The work of Dr. Betz was noted by engineers at Messerschmitt, who felt that the concept might have an application to several high-speed aircraft that the company was then considering. Messerschmitt conducted extensive wind-tunnel testing to insure the validity of the theory.

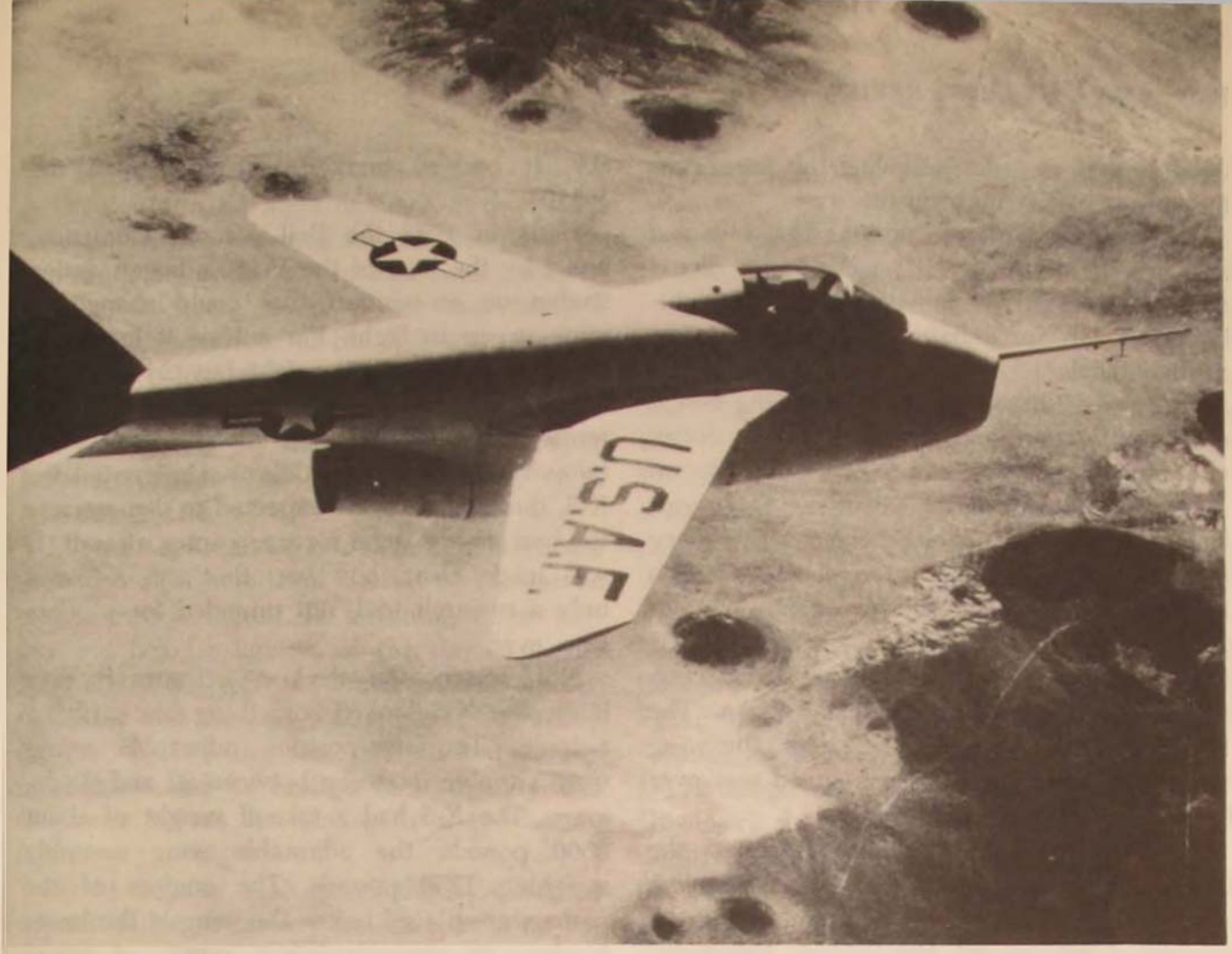
the Messerschmitt P-1101

In 1942 Messerschmitt began preliminary work on a design dubbed the P-1101. For over two years it was nothing more than a study program, but in September 1944 it was decided to produce one prototype aircraft. The German plans called for a single-place, mid-wing, single-engine aircraft with a 40-degree wing sweep. Attractiveness of other aircraft designs caused the P-1101 program to be considerably cut back, but it was decided that the prototype would be completed to serve as a flying test-bed for wing sweep and for new turbojet engines.

By this time, however, it was clear to the Germans that the war was almost over. In early 1945 a company of American infantry overran the P-1101 development facility. The Messerschmitt technical personnel had left every-

The world's first variable-wing aircraft, the Messerschmitt P-1101, never flew. Conceived early in World War II, the one prototype built was captured intact by U.S. forces in 1945.





The Bell X-5, first U.S. variable-wing aircraft, was used as a test-bed. Varying between 20 and 60 degrees, its wings moved forward or back to compensate for shift in pressure or center of gravity.

thing in perfect order, allowing the Americans to continue the swingwing research.

Although the basic engineering drawings and calculations for the P-1101 were never recovered, the aircraft was moved intact to Wright-Patterson Air Force Base, Ohio, where it was publicly displayed in 1945. Many observers considered the P-1101 a freak of engineering design and of little practical value. This, of course, would in future years prove to be very erroneous.

The P-1101 was truly an advanced aircraft for the time of its development. Its two-piece wing had steel spars, with wooden ribs, and a 40-degree sweep. The pressure cabin was located well forward in the upper part of the fuselage, followed by the fuel tanks, undercarriage retraction space, and a tail cone. The 1101's wing span was some 27 feet, the wing area 170 square feet. The top speed was over 600 miles per hour at altitude.

Thus, the end of the war prevented the Germans from completing their first swingwing aircraft. There was one other aircraft using the movable wing concept, the P-1114. This novel design incorporated a provision for moving the entire wing assembly fore and aft along the fuselage to compensate for center of lift movement as flight speed increased.

Why the swingwing concept did not receive more attention cannot be definitely determined, but one main reason for the lack of interest was that engines were not powerful enough to propel the aircraft to the speeds at which variable sweep would make important contributions to performance. Also, the advanced German designers seemed to be more intrigued with the delta-wing design.

the Bell X-5

One hot morning in June 1951, a potbellied little white airplane streaked along the desert runway at Edwards Air Force Base, California. Then the skilled hands of Bell's chief test pilot guided the tiny plane into the air, and America's first swingwing aircraft had taken to the sky. It bore a marked resemblance to the P-1101.

Early in 1948 the Bell Aircraft Company, aided by the loan of the P-1101, began design studies on an aircraft that could change its wing sweep in flight. For a time it looked as though the Air Force might buy 24 of them, but an unfavorable evaluation by the Air Materiel Command reduced the program to a two-aircraft research endeavor. Designated the X-5, these planes were expected to demonstrate the best sweep angle for interceptor aircraft. It was made clear, however, that the X-5 was only a research tool, not intended for production, ever.

Not exactly the sleekest jet aircraft ever built, the X-5 looked something like a flying tadpole. The two-position adjustable wings were variable in sweep between 20 and 60 degrees. The X-5 had a takeoff weight of about 9500 pounds, the adjustable wing assembly weighing 1350 pounds. The engines of the plane were placed below the wing in the lower fuselage, to accommodate a variety of power plants and to have the engine out of the way of the sweep mechanism.

The mechanism for operating the sweep variation was truly an engineering masterpiece. The wings were mounted on hinges just outboard of each side of the fuselage. Inside each wing, near the leading edge, was attached one end of a ball-bearing screw jack. Shafts were then passed through the interior of the wings and into the fuselage, where they were driven by a gearbox. When the motors of the mechanism were operated, the screws rotated the wings on their pivots, changing the angle of the sweep. But the wings did more than just sweep when they were operated. In order to compensate for changes in pressure and center of gravity, it was necessary to slide the wings along rails mounted in the fuselage. At 20 degrees sweep, the entire wing assembly slid forward on the rails until, at 60 degrees sweep, they were about 27 inches forward of their starting positions. The sweeping and position-

ing actions took place simultaneously.

On the fifth test flight of the X-5, the sweep mechanism was operated for the first time. By the ninth flight, the sweep had been operated through its total limits. About that time, a strange characteristic of the X-5 was noted in the tests. At low speeds, almost all the available elevator action was required to level out the X-5 for landing. It had to be accelerated just before touchdown to keep from flying right into the ground.

Even though the X-5 had several deficiencies, a good deal of high-level interest was shown in it as a tactical fighter. Its advantages over bigger and heavier fighters of the day (e.g., the F-86 and F-89) were its much greater maneuverability and the fact that it could be carried in the C-119. But its complicated sweep mechanism and its limited fuel capacity and firepower led to its demise as a production fighter.

On 13 October 1953 one of the X-5s crashed when it failed to recover from a spin at 60 degrees sweep. The other now rests safely at the Air Force Institute of Technology, on loan from the Air Force Museum.

the Grumman XF10F

Even though the X-5 had been eliminated from consideration, it did not end the immediate history of the swingwing. Shortly thereafter, another strange airplane rolled out at the Flight Test Center. This was a great-grandson of the famous F4F Wildcat, and it featured two-position, inflight-variable swept wings.

The Grumman XF10F Jaguar was powered by a Westinghouse J40 engine generating 11,600 pounds of thrust. Its variable-sweep wings were mounted high on the fuselage. The wings were held straight for landings but could be swept back to 40 degrees for high-speed flight. The Jaguar featured a delta-shaped horizontal tail mounted atop the vertical fin. This replaced the conventional swept surface originally used.

The first of two XF10F prototypes flew in May 1953. For a time, it was thought that 30 of these might be ordered, but the XF10F proved to be a disappointment.

the Convair F-111

The Air Force's newest fighter-bomber, the F-111, and its strategic counterpart, the FB-111, were the next of the swingwing aircraft. Several versions of this multimission aircraft have been built, including the bomber version FB-111 which has longer wings than the fighter version. The F-111 began life in 1959 when the Air Force defined an operational requirement for an advanced fighter (the TFX), which would later become the F-111.

Much of the technology involved with the F-111 design evolved from the X-5 and XF10F. However, with the F-111 sweep design, a slightly different approach was employed. In this aircraft the wing would sweep on its own pivot, well outboard of the fuselage. With this technique, the aerodynamic center remained relatively stationary throughout the wing's full sweep.

Fully extended to 16 degrees sweep, the wing creates maximum lift, allowing short takeoffs and landings. As the speed increases and drag grows, the span and surface area are decreased by sweeping the wings to a maximum of 72.5 degrees. The wingtips come quite close to touching the leading edges of the tail. In the "folded position" the F-111 can move along at Mach 2.5 at altitude and supersonic on the deck. The wings can be placed in any intermediate position to perform any specific mission requirement.

Each wing pivots around an 8.5-inch-diameter steel pin, while the wing sweep is controlled by a hydraulic actuator. Working much like an automobile jack, large screws extend to determine the position of the wings. A pistol grip in the cockpit is the pilot's control device. In the event damage occurs to the primary hydraulic system, a utility system will automatically cut

Continued on page 60

out flow to nonessential subsystems in order to furnish power for the wing sweep and flight controls.

The F-111's variable-sweep wing is going to play an important part in some aerodynamic testing. Shortly, an F-111 will be fitted with the so-called "supercritical" wing, which is specially designed to reduce high-speed drag. Equipping the F-111 with this wing is expected to greatly increase maneuverability and increase transonic performance without affecting the aircraft's handling characteristics. The results of this testing should be very important to the F-111 and high-performance aircraft of the future.

the B-1 strategic bomber (North American Rockwell)

For over a decade the Air Force has been looking for an aircraft to replace the B-52 bomber. The FB-111 is now partially fulfilling the manned bomber requirement caused by the phase-out of early-model B-52s and the B-58 fleet.

The so-called AMSA (Advanced Manned Strategic Aircraft) was the paper project for an advanced bomber (B-1). The AMSA also was to employ a swingwing. In November 1969 the Air Force released its request for proposals for the B-1 to interested bidders of the aerospace industry. The airframe contract was won by North American Rockwell, and General Electric won the engine contract.

Recently, North American displayed a full-scale mockup of the B-1. The "Big White Bird" is, indeed, a beautiful piece of airplane. The construction of the mockup was a big step toward possible future production of the B-1.

The B-1 will be able to fly at treetop level at almost 700 miles per hour and more than 1400 miles per hour at altitude. With its swingwings, it will be able to land on very short runways—quite amazing for an aircraft in the 350,000- to 400,000-pound weight class. The B-1's swingwing mechanism is considered by engineers to be the most complicated system in the aircraft. As many as 35 different swingwing designs were examined before North American Rockwell decided on the present truss-type wing-pivot design.

So as to compensate for shifts in pressure and center of gravity, the B-1 uses a complex fuel system that transfers fuel within the fuselage to maintain aircraft stability. To maintain proper balance, fuel will be used from the mid-fuselage tanks first, from the wing tanks second, and from the forward and aft fuselage tanks last. Fuel can be pumped from the forward and aft fuselage tanks to the mid-fuselage tanks as the wings swing. An on-board computer will normally handle this intricate transfer, but it can be controlled manually from the cockpit. The sweep rates are geared to particular flight conditions and are slow enough to allow the fuel transfer to maintain the center of gravity.

The B-1's wings can be swept or extended normally with only two of the four hydraulic systems. The wings can be swept from 15 degrees for takeoff and landing to sharply swept back at 67 degrees for high-speed flight. While engineers consider it highly unlikely that the wings might jam, the B-1 *can* be landed with wings fully swept—but, needless to say, it would be a much "hotter" landing.

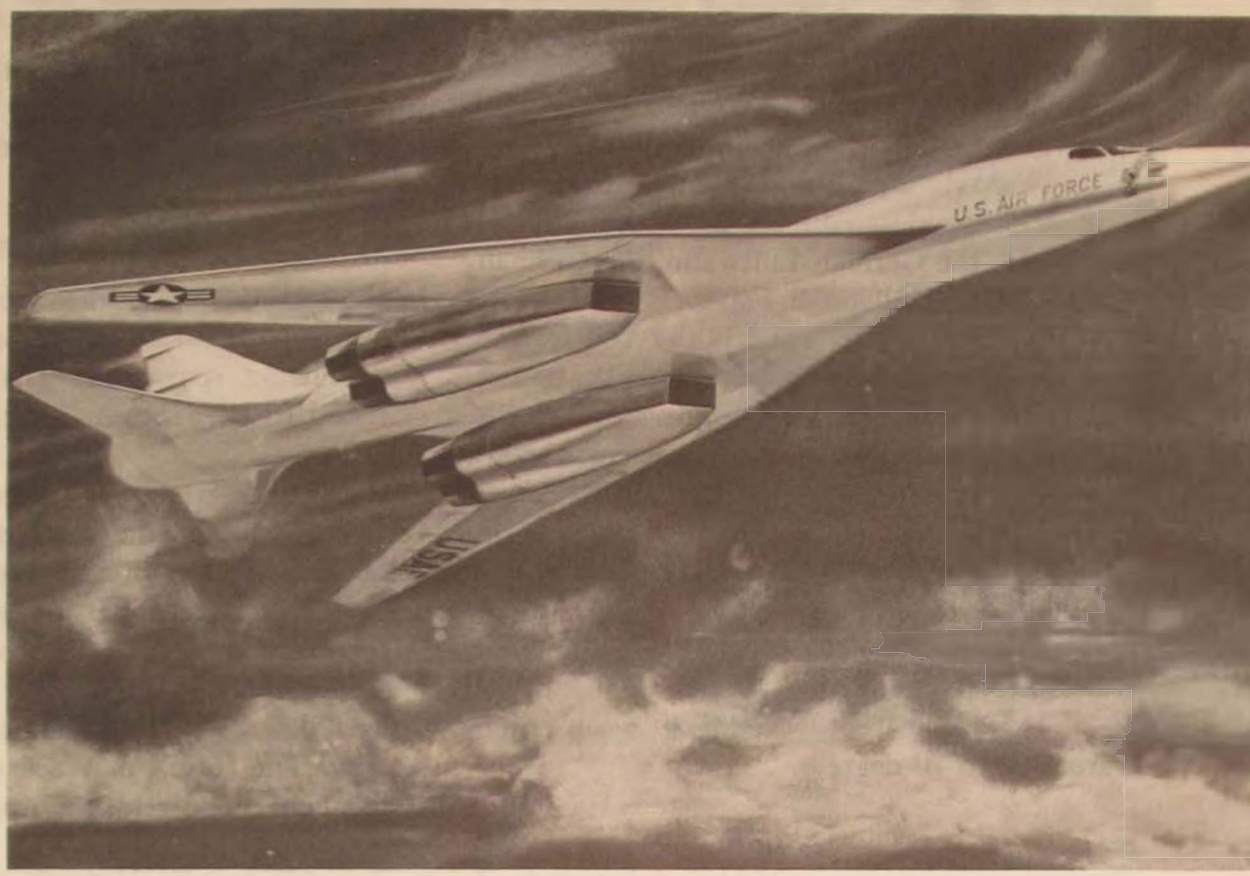
The B-1's first test flight is presently scheduled for the spring of 1974, with operational status in the late seventies. The B-1, engineers say, will last the rest of the twentieth century. It is, therefore, very possible that the entire Strategic Air Command fleet will be swingwing in the eighties, with the FB-111 and the B-1.

the Grumman F-14 Tomcat

When the Navy canceled procurement of the F-111B, they found themselves in need of another aircraft to replace the F-4 Phantom. Once again the Navy went for another swingwing design in the F-14 Tomcat. The plane is being built by Grumman, long a manufacturer of Navy aircraft.

The F-14's variable-sweep wing is the result

The proposed B-1 or advanced manned strategic aircraft (AMSA) will use a complex fuel transfer system to compensate for shifts in atmospheric pressure and center of gravity. The wings will sweep from 15 to 67 degrees. (artist's drawing)



of a tremendous amount of research work. One of the most advanced F-14 developments is "glove vanes," which extend automatically from the leading edge near the fuselage at Mach 1, offsetting the shift in the F-14's aerodynamic center. This leaves the horizontal stabilizer free for maneuvering, minimizing trim drag penalties and increasing combat agility. Also, flap activation is coordinated with the automatic wing sweep for maximum performance. The F-14's maximum sweep is 68 degrees (from a minimum of 20 degrees), when the wing and tail surfaces are, for all practical purposes, one.

The F-14's sophisticated Mach-sweep programmer provides for fully automatic wing sweep as a function of speed and altitude. Therefore, the pilot can obtain the maximum performance under any flight condition. As is true with the B-1, the F-14 pilot can manually control the wing sweep, but even then the programmer will maintain limited control on the pilot's actions.

With its swingwing and powerful engines, the F-14 may make a formidable addition to the Navy's striking power.

the Mirage G8 and the Panavia 200

Our report on swingwing aircraft would not be complete without mentioning the swingwing aircraft of Europe.

The presently flying French Mirage G8 is the culmination of Mirage's experience in swingwing aircraft, having built the G1 and G4 prior to the present G8 configuration. At full sweep

the wings and tail have only a slight slit of space between them. It is powered by two engines and has a top speed of Mach 2.5.

Indications are that the G8 might well be the first variable-geometry aircraft to be ordered by the French Air Force. It could be a replacement for the Mirage III in the late seventies.

During the same period the British-German-Italian Panavia 200, the new multimission aircraft, is designed to enter service with the Royal Air Force, the German Luftwaffe, the German Navy, and the Italian Air Force.

The variable-sweep wing is the key feature that gives the 200 such a wide diversification of capabilities. Swept forward, it provides high lift capability, giving STOL performance from semi-prepared fields and a very long loiter time. Swept fully back, it gives a low-drag, high-speed capability with very good response at low levels.

Powered by two Rolls-Royce RB-199 engines of advanced technology design, the 200 is capable of Mach 2+ at altitude. Wing sweep range is from 20 to 70 degrees.

Boeing's initial SST

The first design of Boeing's supersonic transport (SST) might have been the biggest swinger of them all.

When the sides were being formed for the battle to decide who would build the SST, it came down to two different SST concepts—the delta-wing design of Lockheed and Boeing's swingwing. Boeing won and went about the job of building the largest swingwing ever. But that was not to be. The decision was made in 1969 to abandon the swingwing and go with a fixed, double-delta shape. Now the whole SST program has been scrapped.

One of the main reasons for the switch from the swingwing design was the tremendous weight penalty incurred by the swingwing mechanism. It was quoted that the weight penalty for the variable geometry was over 40,000 pounds, about 6 percent of the gross weight.

swingwing in space—the Lockheed FDL-5

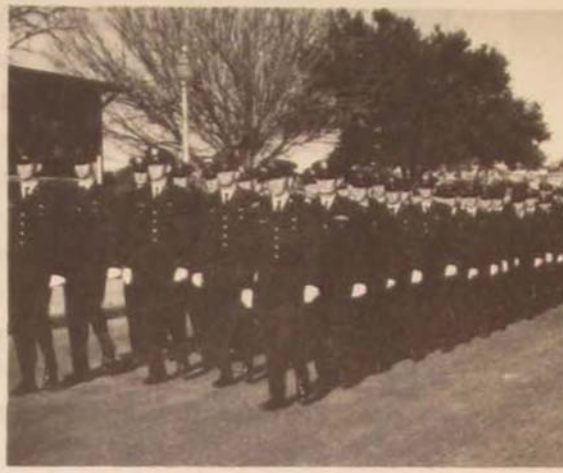
In the late 1960s, Lockheed and the Air Force Flight Dynamics Laboratory conducted tests on a swingwing spacecraft. The spacecraft was designed to be a model for a reusable launch vehicle.

The triangular-shaped spacecraft has a small vertical tail with a movable rudder. The small delta wings swing into the airstream from the sides of the vehicle, about halfway down its length. The wings would be used after the spacecraft had re-entered the atmosphere and slowed down for a conventional aircraft-type landing. The future may see some application of this concept in returning space vehicles.

THOSE early experimenters who strapped contraptions on their backs and to their arms and jumped from precipices and bridges, frantically flapping their arms, knew the birds had something. While this review has shown that the swingwing has a firm hold on its domain of aeronautics, it is not as sophisticated as our bird imitators—it doesn't flap; it merely swings. But it does fly!

Air Force Systems Command

In My Opinion



A NEW STYLE OF MILITARY FOR THE UNITED STATES: A RECOMMENDATION

WING COMMANDER RAYMOND G. FUNNELL, RAAF

I am tempted to believe that what we may call necessary institutions are often no more than institutions to which we have grown accustomed. In matters of social constitution, the field of possibilities is much more extensive than men living in their various societies are ready to imagine.

ALEXIS DE TOCQUEVILLE

TODAY, in America, the popularity of the military is at one of its periodic low points. The problem is indeed serious when the President of the country admits: "It is open season on the armed forces. . . . The military profession is derided in some of the so-called best cir-

cles of America."[1] Adam Yarmolinsky describes society's attitude as one in which "The military is regarded . . . as a wicked, greedy aggressor conspiring with other vested interests to subvert the American Dream."[2] The U.S. military feels this deeply. Even a casual perusal of military periodicals of the last five years will reveal the often bitter reaction of military men to society's attitude. Ward Just in his recent book, *Military Men*, quotes one senior officer at West Point: " 'The Army's the only goddam thing holding this country together,' one of them said, believing it, believing that the Army was the only solid foothold in a country gone soft."[3]

The division between society and the military must be of great concern to America. Conversely it must be a source of rejoicing for all who wish America ill. If America is to remain the major military power of the world or even an effective counterbalance to ideologically opposed forces in the international system, reconciliation between the U.S. military and U.S. society is imperative.

Society's attitude has obviously been influenced by recent events such as the intervention in the Dominican Republic, the Vietnam war, My Lai, and the Cambodian incursion. However, these are hardly the root cause of the present division. For that we must look at the problems associated with operating an authoritarian, conservative military system within a liberal democracy; and the solutions to those problems lie with the military. Society may retreat somewhat from its freewheeling, minimally restrained position of the present, but to imagine the U.S.A. as anything less than an open, liberal society is an exercise in fiction. So long as society's emphasis is on individual freedom and self-fulfillment, so long will there be basic conflict between society at large and any conservative subsystem within it. If one takes history as a guide, the logical long-term projection is for an even more liberal society. To this the military must accommodate. To place the burden on society is to fly in the face of reason and history.

The Military Ethic

The ethos of the military has been built around its purpose, its successful armed defense of the nation, and those behavioral characteristics that support that purpose. The military ethic may therefore be said to comprise the values, attitudes, and perspectives that inhere in the successful accomplishment of the battlefield task. Samuel P. Huntington in his classic work, *The Soldier and the State*, describes the man of the military ethic as "essentially the man of Hobbes."[4] To Professor Huntington, the military ethic stresses the evil in man, the weakness of man, and the importance of force. It also emphasizes the supremacy of the group and the importance of order. "It is, in brief, realistic and conservative." [5]

If one leaves aside the issues of numbers of troops and their equipment, the combat effectiveness of a military force will depend on the degree to which its combat troops adhere to this ethic. In past centuries, when almost all troops had a combat function, the requirement for adherence throughout the armed forces was valid, and equally valid was the requirement that military practices and military training support the ethic. Today, when only about ten percent of the uniformed military specialize in combat skills and about twenty men are required to support each combatant, the validity of the requirement is questionable. Morris Janowitz, among others, has questioned the requirement that all military men in all their functions should adhere to the "combat standard."[6]

An excellent example of the pervasiveness of the combat standard is provided by the Air Force. The combat soldiers of the air are the aircrews,* who provide a very small percentage of uniformed airmen. Nevertheless, the requirements of the battlefield influence the whole Air Force structure. The *Air Officer's*

*The role of strategic missile crews places them in a different category. Although in an objective sense they are "combat troops," the circumstances of their combat is unlike the traditional battlefield from which the military ethic is derived.

Guide implores Air Force officers: "Officers will impress upon the young airmen lessons of patriotism and loyalty, and above all will impress upon them the necessity of obedience in the service. These lessons will be repeated again and again."[7] The necessity for such action is easily lost on a young airman working in a support function with only the remotest of connections to the battlefield.

The basic problem is that of reconciling the combat ethic of the military with the liberal value system of U.S. society. Professor Huntington takes the view that society must become more conservative and there must be "widespread acceptance by Americans of values more like those of the military ethic."[8] He further implies that, if this does not occur, the professional military must stand fast as a conservative enclave within the system. However attractive this might be for the military, it is more descriptive of a pre-World War I America than that which now exists. The traditionally low retention rates of the U.S. military produce a military in which most of its uniformed members are only temporary soldiers—they were recently civilians and soon will be civilians again. The intrusion of the civilian ethic is continuous and unrelenting. In an all-volunteer force in which retention rates will probably be higher, the effects will be mitigated, but they will not be removed. The task for the military is reduced to that of changing its value system to one that is more compatible with that of society. A perfect match is unnecessary and undesirable—the imperatives of the battlefield dictate otherwise. Majority rule has no place on the battlefield.

A New Military

The task of describing in detail the type of military society that could function in harmony with U.S. society, while still being fully effective and efficient in performing its prime functions, is beyond the scope of this article. Nevertheless, a conceptual framework can be erected, which could be used as a basis for further study and development.

The focus of the new military must be the combat soldier.* Irrespective of how smoothly a combat unit of whatever size operates, it is of little use unless it can perform its combat function. The requirement for group solidarity, social cohesion, rational authority, and obedience in the combat unit will not change. Consequently the problems associated with adapting an individual from a liberal society into an effective combat soldier will still confront the military. However, if the primacy of position of the combat soldier is clearly recognized, his education should be different from that received by noncombat recruits. It should be directed at the combat situation and be sufficiently deep and comprehensive to ensure that the soldier's obedience to authority in combat is the product of a rational faith in both his leaders and their doctrine, based on personal observation and individual thinking. To the educated recruit of today and the better educated recruit of tomorrow, anything less would be insufficient.

For soldiers who are not involved in combat and for combat soldiers when not involved in combat or combat training, the opportunities are legion for changing military practices to bring them closer to those of civilian society. There exists no functional reason for doing otherwise if the combat function is performed effectively. The traditional military concept has been that noncombat functions must support fully the values and attributes required for effective combat performance. The necessity for this in a modern military force is, at the very least, arguable. More important, it is irrelevant. The traditional military practices that support the combat ethic have been rejected by U.S. society. To continue to invoke them will only exacerbate the serious tensions that already exist within the military and between the

*"Soldier" is used generically to describe all military personnel. "Combat soldier" describes one who actually participates in combat or whose duties place him on the "battlefield."

military and society. In shaping the new military, the nation must aim to create an effective military arm of a liberal society, not to produce one that is suited to an authoritarian society.

The concept of applying the combat ethic only to the combat situation and to combat training places many traditional aspects of military service in an entirely new perspective. Rules, regulations, and customs concerning personal appearance, off-duty activities, ceremonialism, saluting, the relations between supervisors and those they supervise, discipline, and dissent come instantly to mind as some things that would need to be altered in a changed military.

An argument that would be raised against the precise focus on the combat soldier is that an elite group would be formed within the military society. *Elite* is a word that is subject to both negative and positive connotations in the military. To some, it conjures up images of the Praetorian Guard—the reaction is about as outmoded as the image it produces. Elite groups already exist in the military, either by intention or by accident. Their combat performance has been excellent; examples include the airborne units in World War II and the special forces in Vietnam. More general elite groups are the aircrews of the three armed services. Although not officially designated as elites, they are recognized as such by the military and the public. Their education and training are oriented towards performance of their combat function and characterized by an informal and nonauthoritarian form of discipline that relies heavily on individual intelligence and self-discipline. Significantly, there have been few if any reports of breakdowns in the combat discipline of these groups in the continuing war in Vietnam.

Some evidence indicates that the Army is focusing more attention on combat soldiers and on elite groups. General Westmoreland, while Chief of Staff of the Army, in testimony before Congress referred to the specializing of the missions of various divisions:

> It would increase the personal challenge to the individual soldier by fostering the sort of *elan* which has been so conspicuous and successful in other elite elements of the Army—airborne troops, for example, or our Special Forces. This might contribute materially to Service attractiveness and our volunteer Army goal.[9]

This raises the obvious point of whether sufficient men could be recruited for a new military force of the type described. With respect to noncombat troops, the realignment of the military along more liberal lines would remove many of the so-called irritants of military life and improve both recruitment and retention. In this respect the new perspective of the military might also change the military's perception of noncombat functions and lead to the conversion from military to civilian of many noncombat positions and functions. Professor Janowitz has pointed out that "the profession seems only dimly aware that the elimination of many of these research and supply operations would, in effect, unify the military establishment and reduce the strains on authority."[10] The usual argument against such action is that the overseas commitments of the U.S. military, particularly in remote locations, necessitate the use of military personnel rather than civilians in many noncombat positions. This in turn requires that military men occupy similar jobs in the U.S. as a rotation base from which the overseas posts can be filled. The continuing reduction in U.S. military forces overseas would allow greater civilian employment in these noncombat positions.

With combat forces, recruitment and retention would rely heavily on their elite nature and the professional's pride in accomplishment. The true professional soldier would be the member of the combat unit irrespective of rank. The aim of combat training would be to foster the professional spirit as it pertains to the profession of arms and to engender the *esprit de corps* so often referred to in the military, yet so seldom achieved except in elite groups. Whether this will be sufficient to attract enough recruits to the combat elements of the

armed forces is extremely difficult to predict. Certainly a smaller total military establishment would help, while an all-volunteer force would ensure that those who did enlist had the necessary initial motivation. Intuition suggests that enough numbers would be available to support current U.S. foreign policy. However, in the absence of substantive data on which to base a forecast, the question of attracting sufficient numbers must remain an open one. The use of coercive methods to achieve a numerical quota remains as an unattractive alternative—it erodes the very basis on which a combat force of true professional soldiers is formed.

My recommendation, then, is to retain the combat ethic for the combat situation and to liberalize military practices in all other areas. For the continued security of the nation, the combat ethic cannot change, but there is no longer any good reason why it should pervade all military life and influence all military practices. The type of military force that is needed is one in which the normal and most visible practices of the military approximate those of the society from which it draws its members but in which its combat forces, in combat and in combat training, still adhere to the practices on which military success is based.

Regardless of whether this recommendation or some variant of it is accepted, a new type of military force is needed. Military leaders must, therefore, have a very clear conception of the type of military force that is necessary and viable for America and the patience, flexibility, and fortitude to introduce it.

Amberley, Queensland, Australia

Notes

1. President Richard M. Nixon, "U.S. Military Strength Source of Freedom's Strength," a speech given at the Air Force Academy commencement exercises 4 June 1969, as quoted in *Air Force Policy Letter for Commanders*, Supplement 7, July 1969, p. 26.
2. Adam Yarmolinsky, *The Military Establishment* (New York: Harper and Row, 1971), p. 408.
3. Ward Just, *Military Men* (New York: Alfred A. Knopf, 1970), p. 47.
4. Samuel P. Huntington, *The Soldier and the State* (New York: A Vintage Book, Random House, 1957), p. 83.
5. *Ibid.*, p. 79.
6. Morris Janowitz, *The Professional Soldier: A Social and Political Portrait* (Glencoe, Illinois: The Free Press, 1960), pp. 38–51.
7. *The Air Officer's Guide* (Harrisburg, Pennsylvania: The Stackpole Company, 1970), p. 183.
8. Huntington, p. 458.
9. *Department of Defense Appropriations for 1972*, Hearings before a Subcommittee of the Committee on Appropriations, House of Representatives, Ninety-second Congress, First Session, Part 1, Washington, GPO, 1971, p. 553.
10. Janowitz, p. 424.

LOW-COST REMOTELY PILOTED VEHICLES

LIEUTENANT COLONEL ROBERT H. JACOBSON

THE POTENTIAL for providing low-cost tactical remotely piloted vehicles (RPV's) should be considered and emphasis given to the development of an unconstrained innovative approach in establishing their logistic and maintenance support systems. Choice of the appropriate logistic and maintenance characteristics can significantly influence the overall design of RPV's and their support aerospace ground equipment (AGE). Critical examination of various design and support system options is in order, with the goal of initiating changes in the expensive methods currently used to obtain military hardware.

The RPV's discussed here are primarily ground-launched, controlled from a ground station even when they are a long distance away (e.g., more than 100 miles), and returned for recovery and reuse; however, most of the ideas expressed are also applicable to other possible variants of RPV's, such as expendable vehicles and those launched and controlled from aircraft (for example, Condor). Indeed, a low-cost philosophy should be adopted for all kinds of RPV's.

Requirements for RPV's should direct that low life-cycle costs be provided for these new tactical weapon systems as well as define the expected mission performance goals. The motivation to reduce costs—not only the initial investment costs but also those associated with operation, maintenance, and logistics—should dominate the actions taken by the research and development (R&D) community in response to operational requirements. Specifically, this means that a new maintenance and logistics approach should be taken for the support of RPV's; the kinds of systems now used to support military aircraft should *not* be envisioned as satisfying RPV requirements. We should insist on simplified support systems, those that can provide the lowest life-cycle costs. As one example, we should strive for RPV system concepts that will require a minimum number of skilled personnel, since manpower constraints on military systems may be much more severe in the future than in the past.

Costs of an unmanned flying vehicle can be reduced in many ways. A principal method is to establish practical yet minimal performance requirements for the vehicle's maximum airspeed, payload, versatility, and the environmental conditions under which it must operate. Strike RPV's will usually be flown below 20,000 feet; they should not be required to operate at 40,000 or 50,000 feet. We must keep in mind that RPV's are not expected to survive a large number of sorties, since they will be used primarily—perhaps solely—in the most heavily defended environments. They will not be expected to fly more than 10 to 20 sorties. Many subsystems will be required to operate perfectly at all times; an occasional failure of an essential subsystem may cause a catastrophic loss. Therefore, higher operational losses can be expected for RPV's than for manned aircraft losses caused by accidents other than losses related to hostilities. Since man-rated qualities do not have to be designed into the remotely piloted vehicles, an entirely different philosophy of design can be accepted than that applied to manned aircraft.

If we consider all RPV's as expendable, those that can be recovered and flown again may be called "reusable expendables." They may be categorized as a nonaircraft class of military hardware—similar to a round of ordnance or other weapon—and an appropriate design phi-

losophy followed. Because many RPV's will be necessary to be effective in an important conflict, we should think in terms of automated fabrication and high production rates, like those of the automobile and ordnance industries.

Cost advantages could accrue from designing RPV's in modular form, that is, from major components that can be easily and rapidly removed and replaced when necessary. Some components can be considered throwaway items; when they fail or are damaged, they can be replaced easily by either new components or usable ones from salvaged vehicles. Cannibalizing, though inappropriate for manned aircraft, could be acceptable in RPV maintenance procedures. The major components could be assembled at a staging area close to the launch site, having been withdrawn from storage and shipped by air or other means to the staging area. The assembling process must be simple, merely installation of bolts or screws and attachment of electrical connections, fuel lines, hydraulic lines, etc. The engine pod should be a single module that can be replaced without excessive time or skill. The necessary maintenance skills should be limited, perhaps to the use of torque wrenches and safety wiring. This will require much imagination and innovation in the design of RPV airframes. The potential of a modular concept cannot be ascertained without design and evaluation of low-cost components that allow only minimal repairs, if any.

Combat elements will need replacement RPV's frequently during intense conflicts extending over weeks or months; the loss rate may be as high as 10 or 20 percent. Thus the modular approach looks attractive as a way to facilitate getting many replacement RPV components to the operating theater. Also, it may be highly appropriate to keep the physical size of the vehicle small. If a modular approach is introduced, the Air Force could conceivably get wings from one contractor, fuselages from another, and so on, with an effective systems integration management organization. (Perhaps electronic companies can be the RPV prime contractors!) This modular approach may be vital if RPV's are deployed to small airfields suitable only for small cargo aircraft or if they are transported by trucks to remote sites. Considerable transportation support may be needed, but the resources spent on logistics of this kind will be less costly than providing many skilled mechanics to repair and recondition a limited number of RPV's. The transportation problem will exist to some degree regardless of the maintenance and design concepts adopted because of the expected RPV loss rate when they are used in combat.

The RPV components must have a long shelf life. An efficient packaging technique is needed, such as using plastic bags to protect the RPV components from salt spray, moisture, or other severe environment. Once an RPV is assembled, it is expected to be operational for only a short time, so the severe requirement for corrosion resistance need not apply.

Design of RPV avionics is another area in which large savings could be made. RPV's will have many electronic components, comprising perhaps 30 to 50 percent of the total cost, so considerable attention must be given to making them inexpensively. While they must have some reliability, the reliability we should be thinking of is in terms of flying the vehicle 10 to 20 sorties rather than for thousands of hours. Where practical, the concept of throwaway electronic equipment should be encouraged, like that used for inexpensive transistor radios and integrated circuit designs. If an avionic unit does not check out, one black box should be replaced by another; resources should not be expended to repair bad ones. Again it is clear that requirements established by military specifications and standards should not be applied to RPV electronic components; and if commercial-quality elements are used, the price can be greatly reduced—by at least a factor of 10 and perhaps by a factor of 100. Costs may be substantially reduced if more optimum temperature and pressure environments are

provided for electronic units in the design of RPV airframes. We could then expect satisfactory performance from many low-priced commercial-quality electronic components.

The RPV system should be designed to permit testing of various components before the vehicle is committed to the launch pad. Automatic go-no-go tests for the RPV electronic components should be possible using aerospace ground equipment rather than equipment in the RPV. Also, the engine could be checked by measuring the pressure ratio of the compressor at a given rpm. This may be accomplished without starting the engine by using an external power source to rotate it to the desired rpm. A simple check of the condition of bearings can be made by timing the period required to slow down between two rpm values.

Care must be taken, however, for the essential functions of the vehicle to have some degree of redundancy or an alternate way of operating without forcing costs too high or adding too much to the RPV's size and weight. As an example, the autopilot should have a self-contained mode of operation; then if loss of radio contact occurs, the RPV could still fly to the starting point or other pre-programmed location.

Two major elements of RPV systems should not be compromised as far as quality is concerned. These are long-lifetime elements: the relay aircraft and the control centers. The relay aircraft for most tactical combat scenarios using RPV's must be able to support a number of RPV's at the same time. It would be impractical in most cases to provide a drone relay for a single RPV, as a drone would reduce the reliability and increase the operating cost of the overall system. Therefore, a highly reliable manned aircraft should be used for the relay aircraft, committed to service a number of RPV's. One relay station may be designed to handle concurrently three or four RPV's at the target, transmitting television signals or other imagery, and, in addition, eight or ten others en route, sending data using a narrow bandwidth and time-multiplex techniques. Thus a dozen or more remotely piloted vehicles can be airborne at the same time under the control of a single control center and through one relay aircraft. While the electronics in this relay aircraft would probably be complex and expensive, it would be unwise to chance losing it for noncombat reasons. The relay aircraft probably will remain behind the forward edge of the battle area (FEBA) at a very high altitude to reduce its vulnerability and provide a long line-of-sight range without horizon cutoff so that RPV's can be flown at distances of 200 to 250 nautical miles from the relay aircraft. A U-2 or an RB-57F may be appropriate, or, if more payload and volume are required, perhaps a C-141 or other jet cargo aircraft having a loiter altitude of at least 40,000 feet should be used. The relay aircraft may need to remain on station for long periods, as much as 8 or 10 hours; thus one aircraft could conceivably support a hundred RPV's during the station period.

The other major element of the RPV system that needs special attention for efficient design is the ground control center. It should contain a general-purpose computer to provide versatility through appropriate software as changes occur in the control center functions or RPV designs. A number of control stations should be required within a center: three or four where the remote pilots control RPV's by imagery from on-board sensors, and another station with three or four people to monitor and control eight or ten other RPV's going to and from targets. There may also be a station for launch and recovery of RPV's. Therefore, a control center can be envisioned consisting of three or more trailers compatible with bare base or 407L equipment and transportable in a C-130 or other airlift aircraft.

The development and design of future RPV systems should not be skimped on with regard to cost or quality. Large overall savings can be made if sufficient R&D money is provided early in development and directed to finding ways to reduce costs and provide the basis for an appropriate logistics and maintenance system

such as the one mentioned earlier. Experiments to realize throwaway components should be supported. Automated production techniques should be developed so that the Air Force will have the capability to mobilize quickly after a production run on an RPV design has been discontinued. We should experiment with different materials and fabrication techniques to reduce the labor costs in the construction of the vehicles. Various types of plastics and perhaps epoxy and paper structures may be acceptable and most economical in certain areas.

Different techniques should be tried for launching and recovering all unmanned vehicles. Programs should be initiated to develop and evaluate new techniques in order to incorporate the best launch and recovery capabilities for future RPV designs. One way to save money on RPV operations is to reduce the requirement for support aircraft. The only aircraft needed in an RPV strike or strike support system is a relay aircraft. Ground launch and some type of ground recovery by a horizontal landing are predicted to be the least expensive and the most desirable methods, especially if many sorties are required of each vehicle in a short period of time. Unless unique requirements exist, tactical RPV's should not be limited to launch from DC-130s and recovery by helicopters. The present techniques place excessively restrictive limitations on future RPV system designs.

The opportunity exists to obtain viable new tactical weapon systems at very low life-cycle costs. All methods that can force the costs down should be investigated as compared to costs of present aircraft methods and procedures. RPV's will have a short expected lifetime and will not require the reliability of man-rated systems. Therefore, today's aerospace standards, specifications, and practices and Air Force aircraft management procedures do not necessarily apply to RPV's. Large cost savings can be obtained if commercial-quality components and materials are used and automated production techniques are developed. This approach can lead to throwaway components, which in turn can revolutionize the maintenance and support required and effect a large reduction in life-cycle costs.

Santa Monica, California

COMMUNIST LESSONS LEARNED

MAJOR EDWARD VALLENTINY

IN the current debate within the United States concerning the advisability of continuing the American participation in Southeast Asia, a fairly detailed investigation of U.S. decisions and methodology in waging that conflict has resulted. In the armed services, numerous groups and agencies have studied and are studying closely the successes and failures of the tactics, strategies, organizations, and equipment utilized in Vietnam for the purpose of improving them and garnering as many lessons as possible from our decade-long military involvement. Still, the findings of these studies and debates cannot be complete, cannot be truly meaningful, without some understanding of the effect the struggle has had on the enemy. To borrow a phrase from the late Sir Basil Henry Liddell Hart, we need "the view from the other side of the hill."

Unfortunately, detailed enemy accounts of the scope and depth of the Communist involvement are not readily available to us, and they likely will never become so. No Moscow, Peking, or Hanoi studies have been exposed to open publication to rival the "Pentagon Papers." To help bridge this gap in our knowledge, we have devoted some effort to the study and determination of various goals the enemy has pursued in the conflict. Without doubt this examination has been worthwhile in that it has helped in a general way to evaluate whether our responses have been appropriate or wide of the mark in coping with enemy intentions and thrusts. However, this approach has yielded only a part of the information we really need in order to gain the proper perspective and lessons that we seek from our Southeast Asia involvement. A slightly different viewpoint is required to interpret the experience more fully. In short, we must attempt to define the lessons the Communists have learned from the struggle.

Lessons learned by the other side have not been pressing issues in most U.S. struggles in the past, primarily because our successes have brought military victory in the usual sense and the enemy threat has been largely dispelled. But who would argue today that, if the current conflict were satisfactorily concluded in the near future, the Communist threat to us and the free world would vanish? Therefore, we must assume that, just as we learn lessons from our experience and attempt to apply them to our organizations and methodology, the enemy will do the same. If we fail to grasp this thought, we may prepare ourselves for a reinstitution of the last war—but not for the next one. What is more, the lack of understanding of the impact of the Southeast Asia war on future Communist goals and courses of action may lead to an unnecessary continuation of the harmful exercise of excessive self-flagellation coming from some quarters concerning our participation in the struggle.

In the interest of carrying forward this proposal for an examination of the impact of the Southeast Asia war on the enemy, an example of the understanding and perspective that might be achieved is offered in subsequent pages. Obviously, an in-depth study of a topic as broad and complex as the full range of enemy lessons learned would be an impossibility in the few pages of this article. Nevertheless, if properly narrowed and kept within strict bounds, some contribution can be made—at least a beginning.

The most significant subject that might be addressed, of course, would deal with the

effects of the Vietnamese struggle on Communist goals. However, considerable difficulty is encountered at once in trying to define completely the intentions of the parties involved. For example, there existed no common, all-inclusive set of desires equally attributable to each of the primary powers involved, the Soviet Union, Communist China, and North Vietnam. A basic reason for this divergence is clear if one reflects on the possible effects or ramifications of success or failure in the Southeast Asia struggle. The Soviets were patently less vitally concerned than the Chinese, whose interests were less crucial than those of the North Vietnamese. Furthermore, the Southeast Asia conflict was begun and carried out during the time of open confrontation between the Communist giants, Russia and China; and the desires of each of these powers in Vietnam were manipulated according to their beliefs as to what was best for themselves and the Communist bloc. In the middle of the squabble, Hanoi was forced to jockey first to one side and then the other to avoid a split, garner support from both factions, and yet gain advantages in its own right.

Nevertheless, while the degree of interest in certain objectives may have varied within the Communist camp, other objectives were accorded considerable attention by each of the major "cooperating" nations. One of these concerned the principle of support for wars of national liberation.

Background

Serious thought about the possibility of marshaling and utilizing the energies of restive people as a vehicle to help the spread of Communism was identifiable in the time of Lenin. The relatively recent re-emphasis of this expansionist ploy was attributable primarily to the Communist Chinese and apparently began to receive concentrated attention from them in the latter half of the 1950s. The reasons for the resurrection of the principle of wars of national liberation in Communist theory were manifold, a function of the cold war conditions existing at the time.

To begin with, the Chinese had grown dissatisfied with developments within the Communist bloc and the relatively secondary role accorded them. In the years following World War II the grouping together of Communist nations was essentially a monolithic thing, almost wholly responsive to the wishes of the Soviet Union. But by the late 1950s the Chinese had cause to resent the pre-eminent position of the Soviets. Among the irritating points, the emphasis on de-Stalinization by Moscow had fostered considerable personal resentment within the Chinese Communist leadership, who believed that this policy had created insecurity and disruption within the bloc and had robbed Communism of much of its dynamism. Foot-dragging by the Soviets in assisting China's entry into the nuclear "club" was another issue. Furthermore, the evolving Russian policy of "peaceful coexistence" in the face of mounting U.S. nuclear might, while appealing to a relatively satiated and secure Soviet Union, was not attractive to the Chinese.

Peaceful coexistence had real applicability in the primary sphere of Russian interest, Europe, with its tenuous but relatively stable East/West balance between Warsaw Pact and NATO nations; it had much less pertinence to the situation confronting the Chinese in Asia. In that area in the late fifties, the opposing elements were anything but stable. In particular, the most important free world nation, the United States, was especially active in forging certain defensive arrangements and developments to which Peking was extremely sensitive. For example, the continuing development of South Korea, the rapid resurrection of Japan with a small but increasingly capable Self Defense Force, the growing U.S. association with Taiwan, the creation of SEATO, and the apparently deepening American moral commitment to South Vietnam were interpreted by the

Chinese as very important to their present and future interests.

However, the principle of wars of national liberation as the proper course for Communists to follow had greater appeal to the Chinese than would a simple alternative to an inapplicable Russian path in Asia. The policy offered Communist China special advantages; it accorded China more apparent prestige and influence than its capabilities warranted. By fostering, supporting, and hopefully dominating the leadership in certain revolutionary movements throughout the world, the Chinese could enhance their power through relatively minor contributions of equipment, personnel, and training. Equally important, this mode of activity promised success at small risk of significant retaliation by the free world against the Chinese.

Furthermore, the Chinese believed that a bold move in support of wars of national liberation, while low in risk and cost, would also offer the Communists renewed capabilities and opportunities at lower levels in the spectrum of violence—in situations less than general or limited war. And with U.S. military efforts organized and concentrated at upper levels almost exclusively in the late fifties, the anticipated inability of the U.S. to respond adequately and rapidly to the "new" principle was an appealing vision.

The concept of support for wars of national liberation expounded by the Chinese was enthusiastically endorsed by North Vietnam's leaders. The acceptance was more than the normal reaction one might expect of a relatively minor Communist state nestled in the shadow of a giant Communist neighbor; it offered very definite advantages to Hanoi in its own ambitions in Southeast Asia.

The North Vietnamese had expected that South Vietnam would naturally fall under their domination as a result of the tenets of the 1954 Geneva Agreements, which ended the French Indochina War. Beyond that, it could be surmised that dominion over the entire Southeast Asian peninsula was a distinct possibility. However, the expectation concerning South Vietnam had not materialized. On the contrary, U.S. influence and determination to maintain a free and independent South Vietnam were growing, and the North Vietnamese had been unable to muster meaningful support within the Communist bloc for their desires. As a result, Hanoi had been forced to put aside expansionist dreams in the mid-1950s and turn inward to work on internal developments. The Chinese proposition served to rekindle North Vietnamese hopes and promised a low-risk alternate road to domination over the South—with added incentive of significant bloc support.

In retrospect, the Soviet reaction to excited emphasis placed on the concept by its Asian allies appears rather subdued. The Russian leadership was aware of the possibilities and potentialities of the idea; however, subtle and selective support offered in the past had not convinced Moscow that the principle offered the Communists the panacea envisioned by the Chinese. A very important consideration to the Soviets was the difficulty of maintaining effective control over revolutionary movements after they were successful. Recent Soviet experiences in Africa had indicated that successful revolutions, even when substantially aided by the U.S.S.R., did not guarantee expanded Russian influence—and might generate just the opposite effect. Nevertheless, while the Chinese proposal constituted insufficient reason for the Soviets to abandon their policy of peaceful coexistence, a measure of Soviet support was accorded the principle.

The Soviet combination of the policy of peaceful coexistence with support for the principle of wars of national liberation was clearly indicated to the United States at the Kennedy/Khrushchev meetings in Vienna in the spring of 1961. Among the topics discussed were Laos and Vietnam. In the Laotian crisis, the Soviets and Americans were directly involved, and an open confrontation between the two was a distinct possibility in 1961. To avoid

such a clash, the Russians seemed willing to cooperate in finding a solution to the situation, and finally in 1962 one was worked out. In the Vietnamese problem, however, the Russians were not directly engaged, and support for the principle of wars of national liberation seemed applicable in a successful effort. Therefore, Moscow declined to work with the U.S. in the search for peace, preferring to allow that "civil war" to run its course.

The Vietnamese Case

The pre-1961 background of the insurgency in Vietnam offered the Communists an almost ideal model in which to test their concept of support for wars of national liberation. In that nation, a diverse mixture of scattered groups (of which the Communists had been only one) who opposed the Diem government since its inception in 1955 had been coalesced about the better-equipped and -organized Communist core into the formidable Viet Cong fighting units and political organization that began to threaten seriously the survival of the Diem regime. Furthermore, although for all intents and purposes Communists directed the opposition movement, the façade of broader support and participation had not been stripped away. In particular, the ever tightening web of control emanating from North Vietnam was not readily discernible to the unsuspecting observer.

The belief of U.S. policy-makers that the Communists conceived of the Vietnamese situation as a test case for their "new" concept, with worldwide ramifications, was amply demonstrated by certain American measures taken in 1961. With a revived interest in Special Operations Forces and conventional capabilities and in the face of continued erosion of the situation of the Diem government, the United States agreed to sharply increased assistance to South Vietnam and sent additional advisers to assist that nation. A new U.S./South Vietnamese plan was developed to combat the insurgency, and significant strides were made in this endeavor through most of 1962 until a combination of South Vietnamese inflexibility and ineptness, along with enemy adaptations, once more turned the tide in favor of the Viet Cong.

Nevertheless, by 1962 the United States had come to the realization that the primary source of support and leadership of the extensive Viet Cong operations was North Vietnam. Thereafter, despite difficulties with the Diem and successor governments and a continuing lack of significant battlefield victories, the U.S. refused to abandon the South Vietnamese to the externally directed and supplied insurgency. Not even the sharp escalation begun by the enemy in 1964 and the twin strategies of attacks on U.S. personnel and equipment, along with the input of North Vietnamese fighting units into South Vietnam, were sufficient to cause the Americans to withdraw.

Importantly, these enemy actions apparently constituted a miscalculation by Hanoi of U.S. resolve and may have been taken over the counsel of the Chinese. In retrospect, it seems clear that the Chinese saw little to be gained from provoking U.S. participation in an escalated struggle almost at China's doorstep. In addition, the principle they urged called for support on a wide-ranging basis to *insurgent,* not conventional, warfare in order to dissipate free world strength—not provide a focal point for it. The result has been a serious impairment of their bright vision of support for wars of national liberation that had been prevalent at the beginning of the last decade.

Some Possible Communist Lessons Learned

1. *The United States will honor its written and moral commitments to assist friendly nations in developing and in resisting even cloaked Communist efforts at expansion.* This has been amply demonstrated by the Vietnamese experience. This stand has not been modified by current planning under the new

Nixon Doctrine, although, over the long range, efforts by the nation directly concerned will, of necessity, be substantially greater.

2. *Through improved mobility and flexibility, greatly enhanced by the Southeast Asia experience, U.S. political leadership and military forces can effectively respond to Communist efforts even at lower levels of the spectrum of violence.* New developments in U.S. command and control arrangements, tactics, weapons, and organizational structures have permitted better and faster responses to Communist incursions in the future.

3. *The Communist concept of support for wars of national liberation has been exposed as less an interest in the legitimate aspirations of indigenous people for freedom than as a means to extend Communist control over people and territory and gain leverage in the free world/Communist bloc struggle.* It is not likely that the methodology the Communists practiced in taking over and manipulating the dissident movement in South Vietnam will be lost to non-Communist revolutionaries throughout the world. It may be expected to have serious repercussions in any similar attempts the Communists may try in the future.

4. *Without detailed control of wars of national liberation, their course, if left in the hands of indigenous Communists (who aspire to nationalism), can be erratic and even dangerous.* In the Vietnamese case, certain rash moves by North Vietnam provoked determined U.S. responses that could have been extremely serious for the survival of the bloc, had it not been for the stringent and continual efforts of the United States to keep the war within the confines of Southeast Asia. It might be an error to expect similar U.S. restraint in the future.

5. *A policy of support of wars of national liberation is not an inexpensive proposition.* In comparison with the large losses in men and wealth incurred by the U.S. in a decade of involvement, materiel and manpower costs to the Communists, especially for the North Vietnamese, have also been high. Although too little is yet known about the disruptions caused by the war effort and the bombing, North Vietnam's progress in industrial, agricultural, and technological development has been impaired. To rebuild and restore that nation will be an expensive operation (and the limitations on future North Vietnamese courses of action, in order to secure the needed external aid in the restoration, are still unknown).

6. *Serious external support for wars of national liberation is not a riskless course.* As a result of the destructive bombing campaign against North Vietnam, the U.S. has served notice that an instigator or propagator of wars of national liberation may not be accorded immunity from retaliation in future conflicts.

As THE STUDY of our activities in Southeast Asia is pressed forward, a complementary effort should be expended to try to determine the effects of the war on the Communists. It is hoped that the foregoing brief discussion of one of the many aspects of the free world/Communist bloc confrontation in Southeast Asia will help illuminate the possibilities of this course. Without more attention to the "other side," we may run the risk of learning only a portion of the lessons available—and without broader and deeper study, many of those may be distorted by one-sidedness.

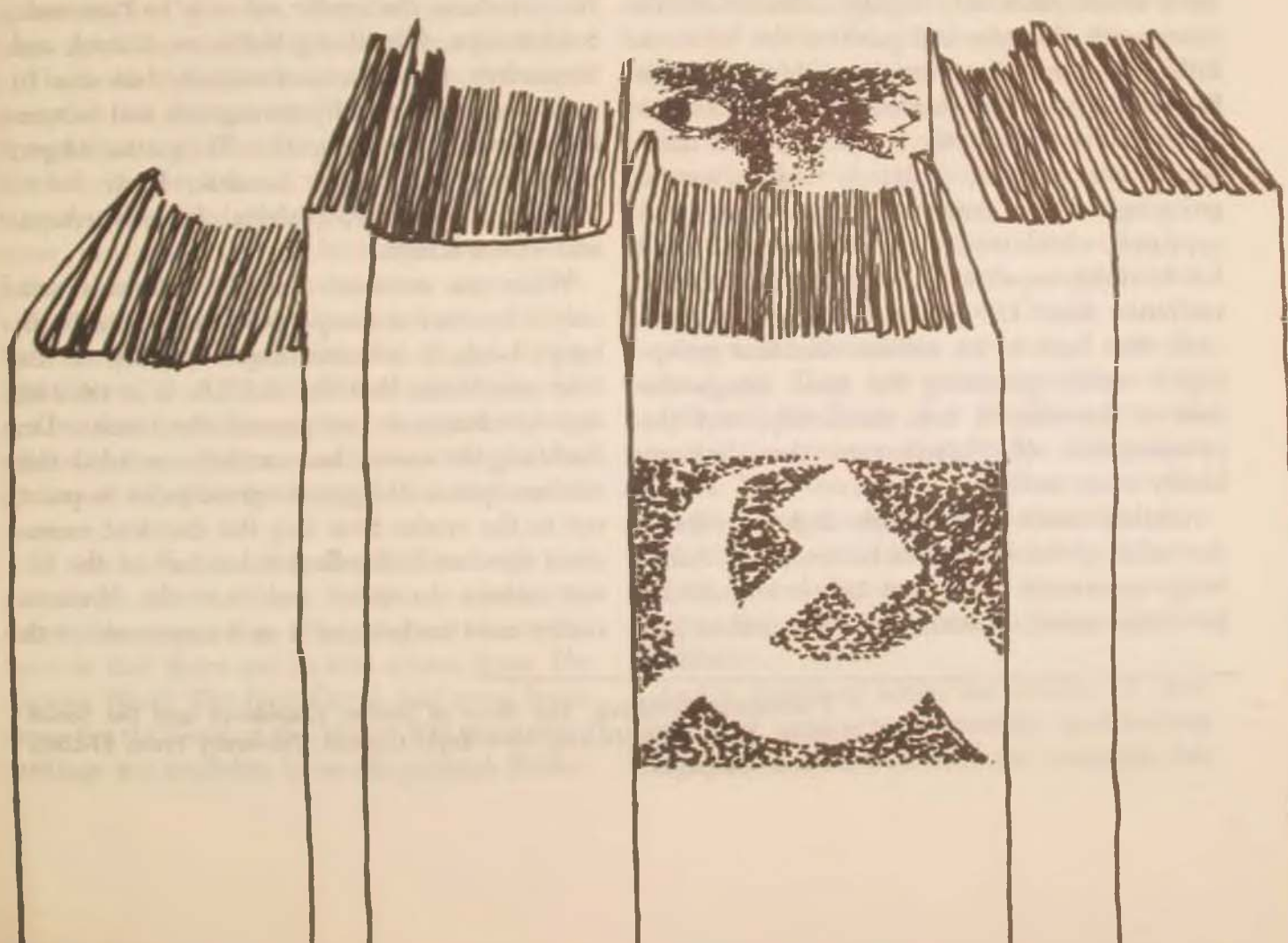
Maxwell AFB, Alabama

Books and Ideas

DISSIDENCE AND FEAR IN THE U.S.S.R.

COLONEL DONALD L. CLARK

THE SOVIET musical *"Moi Bezumni Brat"*[1] is a vicious assault on the United States, using every known cliché of Soviet propaganda to paint life in the West as vile and base. Yet, in the two and a half hours of the play there is *one* line that makes the whole mishmash worth sitting through. The line comes late in the show when the antagonist, a wealthy American banker who planned to start a third World War, finds himself suffering the fate he had planned for his twin brother as inmate of an insane asylum. He joins a group of real patients, who are arguing over who owns a large rubber inflatable bunny. The argument is about to lead to violence when one of the demented group suggests a solution. His words go something like this, "Why are we fighting over personal ownership like dirty capitalists? Why can't we all share this bunny?" Amazed by his wisdom, the rest decide that is the solution. Then the man clasping the bunny steps forward



and dryly says to the audience, "Yes, only in a crazy house can you successfully have a communal bunny." The audience roars.

Dr. Abraham Rothberg in his book *The Heirs of Stalin*† has done us all a great favor by extracting those marvelous one-liners—or several pages—that make Soviet films, poems, essays, articles, letters, books, etc., worth reading and placing them all under one cover. For this he is to be congratulated and admired. One has only to read a few issues of *Pravda* or an article or two out of *Komunist* to be convinced that the close and detailed examination of Soviet writings is dull, dreary, and seldom very edifying. But to examine this carefully selected collection of jewels is another story and well worth the effort.

Like any raw jewel, however, this book is not without flaws. It is often difficult reading, and the reader is hard pressed to keep his interest at a high peak. This result can only be blamed on the author, not on the promising material. He has made the mistake of describing the same events with only slightly different words in separate chapters and parts of the book. A little better overall editorial polishing and this flaw could have been buffed away. The author also chose to divide the story of Soviet dissidence into artistic, political, and scientific groupings rather than use the chronological approach, which would have obviated the need for so much repetition and given the story a smoother flow. Dr. Rothberg makes it quite clear that each of his various dissident groupings is really protesting the same things—the lack of the rule of law, censorship, and the re-emergence of Stalinism—so the divisions hardly seem needed.

Another minor flaw (which slightly reduces the value of the book) can be traced to Rothberg's apparently sincere but too obvious dislike for Communism, Russian style. The author has a way of coloring events, acts, and people so as to make them sound ominous, faulty, or underhanded even when the accuracy of his insinuation is in doubt. For example, he frequently refers to a distinguished author and expert on Soviet affairs as an "apologist," yet he quotes the man on several occasions as being critical of an act by the Communist party. Could it be that this specialist, unlike Dr. Rothberg, has only maintained the proper objectivity of an observer?

But enough about the flaws. Even a marred precious jewel is worth a great deal, and so is this book. Although it appears to have been written primarily for other scholars and serious students of Soviet studies, it deserves a wider reading audience. Dr. Rothberg's list of sources alone is outstanding. Anyone interested in learning more about Soviet dissidence, Soviet literature, *samizdat*,[2] or even a relatively obscure Soviet author, artist, or scientist of merit is very likely to find a source among Dr. Rothberg's bibliography that will satisfy his thirst. He introduces the reader not only to Pasternak, Solzhenitsyn, Ehrenburg, Sakharov, Daniel, and Sinyavskiy, the famous dissidents, but also to many lesser yet equally courageous and outspoken men and women, like Margarita Aliger, Olga Beggolts, Andrei Amalrik, Pyotr Yakir, Vladimir Bukovsky, Valeria Novodvorskaya, and Viktor Krasin.

When one considers that this list deals with only a fraction of the people discussed in Rothberg's book, it is quite simple to jump to the false conclusion that the U.S.S.R. is in trouble, that revolution is just around the corner. Dr. Rothberg, however, has carefully avoided this misconception. He goes to great pains to point out to the reader how tiny the dissident movement is, what little effect it has had on the Soviet masses to date, and that the Western reader must understand it as a movement (with

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† Abraham Rothberg, *The Heirs of Stalin: Dissidence and the Soviet Regime, 1953-1970* (Ithaca, New York: Cornell University Press, $14.50), xiii and 450 pages.

few exceptions) to reform Communism and not to overthrow it.

The book carefully and repeatedly constructs its case that the Communist party of the U.S.S.R. still contains the seeds of the ruthlessness of the Stalin era and has recently shown signs that under the right circumstances the party could return to that rule of terror. Rothberg obviously believes that Khrushchev erred—at least from the party point of view—when he castigated Stalin and started the first thaw. He posits that Khrushchev started de-Stalinization in order to weaken his enemies and win some allies in his bid for the top leadership. Later, Khrushchev himself apparently recognized that he had opened a Pandora's box, and he spent the better part of the rest of his reign trying to put the lid back on without breaking the jar or labeling himself as one of Stalin's heirs. Khrushchev's successors, according to Rothberg, recognized the mistake of the thaw even better than the former Premier did; and although the dissident movement has grown under their rule, they have on occasion been much more ruthless in dealing with it.

The book then goes on to describe the mini-war that has been waged since the thaw was first authorized. The narrative breathes some life into the heroes and villains of the real-life tragedy. Sprinkled throughout the pages are some marvelous quotes from poems, science fiction, novels, court testimonies, KGB interviews, and even from the running squabbles between rival journals like the liberal *Noviy Mir* ("New World") and *Oktyabr* ("October")—quotes that go far to explain the basic failings of Soviet Communism as a system and the real greatness of that two-legged creature called man.

In this book one man's words shine forth and rise above all the others, the words of Alexander Solzhenitsyn. One of my regrets about the book is that there are so few quotes from *The Cancer Ward, The First Circle,* and even fewer from *For the Good of the Cause.* But since these writings are available to us all, perhaps Professor Rothberg was wise to select quotations from writings less available. One quotation that I think is most revealing about the Soviet system is in Solzhenitsyn's epilogue to his book *August 1914,* a story about Russia and her people of that time. The Nobel laureate says:

> This book cannot at the present time be published in our native land except in Samizdat because of censorship objections . . . and which, in addition, demand that the word God be unfailingly written without a capital letter. To this indignity, I cannot stoop. (p. 358)

Another timely and revealing quotation comes from the words of the party Secretary General, Leonid Brezhnev, a man who today is attempting through treaties, conferences, and propaganda to create an image of the U.S.S.R. as the shining example of a peace-loving, free, and democratic nation. He said to the party elite in 1968, "Our Party has always warned that in the field of ideology there can be no peaceful coexistence." (p. 236)

As one reads these pages, a seed is planted, and finally an unexpected truth begins to take form: the truth that the leaders of this great and powerful Communist party—a small elite with terrifying reputations, who took a relatively weak nation and changed it into a military and industrial superpower—are men who are somehow unsure and very much afraid. In fact, they have a giant inferiority complex. They fear the word "God" with a capital letter. They fear the truth about the Stalin era, the Lenin era, the Khrushchev era, indeed even the current era. They fear contact between their people and the West. And they fear any man who has the courage to refuse to follow their dictates. That fear, in spite of their power and strength, often overrides their rationality. As a result they have to strike out, silence, ridicule, and somehow dispense with anyone or any thought that challenges their stubborn claim to infallibility.

As Dr. Rothberg notes, the number of dissidents and even their *samizdat* publications have grown: the *Chronicle,* for example, has

been published like clockwork every two months for several years, with stories and articles of protest, but still the dissonant impact on the mass society is negligible.[3] Most Soviets have never heard of the majority of the dissidents, have never seen their essays or heard their protest statements. When the worker or peasant does hear, he usually rejects such people as troublemakers and schemers. But in spite of this attitude of the masses, the leaders continue to fear the protesters. Dr. Rothberg asks why. Is it because they remember how small a group the Communists were in 1917 and yet they overthrew the mighty czar? Is it because the rebels are mostly from the intelligentsia and potentially can influence more people? Is it because more and more scientists and skilled technicians are entering the movement and such men are becoming ever more important as the Soviet Union enters the cybernetic, superindustrial, technotronic age? Or is it simply a fear based on the evils of the past? The Politburo members and *apparatchiki* are insecure and must seek constant praise and acceptance; in their minds they magnify the slightest resistance so that it appears as the beginning of the end. The author leaves it to us to answer these questions, but he leads us to believe that the answer is that irrational fear.

Professor Rothberg also asks the "why" of the dissidents themselves. His indicated answer here disappoints me. He suggests that most of the dissidents suffered some severe tragedy under Communism; that some dear relative died in a purge or a labor camp, that they or some close loved one suffered indignities, innocent imprisonment or disgrace and that this crime and suffering is the basis for their resistance. Yet, if this is so, the movement should be much larger because, as Rothberg notes, millions died in the Stalinist purges, and almost every family in the U.S.S.R. suffered in one or more of the purges or KGB iniquities.[4] Therefore, to single out that suffering in their past as the key to their protest now seems to me a bit too anodyne.

In my opinion the dissidents speak out because they are men and women who must. Such people exist in every country, and they cannot help it if the accident of their birth places them in a land where such acts still lead to imprisonment or confinement in a mental institution. Rothberg quotes Valeriy Tarsis as saying that maybe the party is right in placing so many in insane asylums, since, after all, anyone who speaks against the system in the U.S.S.R. must know his ultimate fate and must be a little crazy or he would remain silent. Rothberg quotes Andre Amalrik eloquently addressing that dilemma in these words:

> When I was writing my books and intending to hand them over for publication I realized that I was risking imprisonment, and I was ready for it and am ready for it now. But I thank God for every day of freedom which is given to me and which I spend at home with my wife . . . I think that the people in the KGB are reasonably sensible from the police point of view, and they will arrest me when the fuss abroad has died down, and interest in me and my books has fallen away; and they will not try me for my books but will trump up some minor pretext . . . As far as the date of my arrest is concerned, a bureaucratic regime does not hurry by its very nature and because it knows that no one will escape it. (p. 266)

Such men do not speak because of previous imprisonments or the death or suffering of a loved one. They speak because something inside them has to be said. They cannot be silenced.

There is another weakness in the book that needs to be noted. The author pays proper attention to the famous essay of Dr. Andrei Sakharov and other protest notes, acts, and movements which he has initiated, but in my opinion Dr. Rothberg mislabels Sakharov's most famous essay: he frequently refers to it as a "convergence essay." I agree that the article speaks of a democratized U.S.S.R. and a socialized U.S., but I think much more important points are made in its several thousand words. It is perhaps one of the most important documents to come out of the U.S.S.R. since 1917, and it should be read by anyone who wants to have a better understanding of the current

thinking of some of the best minds in the Soviet Union. To label it simply as an essay on "convergence" is to do the author an injustice and might cause many who have rejected that oversimplified theory (and most of the leading authorities on the U.S.S.R. have rejected it) to ignore the Sakharov essay. It is far more than a comment on convergence; it is a moving and eloquent plea for world peace, understanding, and cooperation. It is an incredibly well-informed appraisal of current events produced by men who should have been prevented by their government's policies from knowing such facts, reaching such conclusions, and above all from discussing, writing, and publishing such shocking ideas of liberty, equality, and alleged fallibility of the dictatorship of the few. Yet it was written.

There *is* a special brand of dissidence afoot in the U.S.S.R., but in my opinion *The Heirs of Stalin* fails to give it adequate coverage. While pointing out this or that incident, Dr. Rothberg frequently alludes to the problem between the "fathers and sons," the generation gap of the U.S.S.R., yet somehow the real impact of that dilemma on Soviet society does not come across. The basic problem of the generation gap in the U.S.S.R. is the disillusionment of the youth. It is a disillusion similar to the one so often described in the West, yet remarkably leading to almost the opposite result. American youth are rejecting what they feel was the overemphasis of their fathers on material wealth, and they seek in its stead a human philosophy, a better style rather than standard of living. The youth of Soviet Russia, on the other hand, are rejecting the idealism of Communism that their fathers accepted and are seeking in its stead material improvements in the standard of living, the "good" life. While American youth are demonstrating for much the same ideals that young Bukovsky went to jail for (pp. 197–99), he is an exception among youth in the U.S.S.R. His contemporaries are saying "To hell with all that philosophy garbage. We want a better life: cars, radios, cameras, leisure time, good books, better jobs—all those things they have in the West." And they add "Now, not after another generation of building Communism but now, now; yesterday would have been better, and tomorrow is too late."

The disaffection of Soviet youth, although not nearly so well documented as the problem in our Western world, may well prove more damaging to the Communist side than the revolt of Western youth can ever be to our democracies. Democracy may resist but always eventually accommodates to change. The youth movement in the West, dramatic as it has been, *may* lead to certain fundamental changes, like a volunteer military force; but in the U.S.S.R. *it has already led* to a new draft law—a knee-jerk reaction by the party leaders designed to draft more of the youth but for a shorter period, in the frail hope that Red Army discipline can overcome their lack of Communist zeal.[5] The effect on their Communist zeal may be in doubt, but the effect on the Soviet military's readiness is not. Militarily in this complex and technical era it is far better to keep a man for a longer period and give him experience than to expose greater numbers to lessened training and proficiency. Therefore, over the long haul, the generation gap in the U.S.S.R. may actually damage her military capability, and the Soviet youth's estrangement may prove even more destructive than the open protests of men like Sakharov and Solzhenitsyn.

One day at Sheremetevo airport outside Moscow I asked a young Soviet acquaintance what he thought was the difference between life in the U.S.S.R. today and under Stalin. His reply brought a laugh, but a scary laugh, from both of us. He said under Stalin everyone lived in fear of the knock on the door in the middle of the night—it meant terror, disappearance, and tragedy. "Today it's much better—they knock on the door in the daytime."

Abraham Rothberg's book is a confirmation of that youth's statement. The Soviet Union of today is different from that of the thirties. This is proven by the very existence of the squabbles

over the decision or requirement to reveal the crimes of Stalin that are presented in the *Noviy Mir, Yunost, Oktyabr,* and *Pravda* selections in *The Heirs of Stalin.* The difference is also substantiated by the intermittent thaws and freezes, the retirement of party leaders versus their previous public confession and death. It is exposed in the press comments on the generation gap—the disillusionment of Soviet youth. But somehow all of these signs, when interlaced like the control of party and government in the U.S.S.R., also turn out to be signs that Soviet society is only a sunset away from the Stalin era. Proof of this can be found in *The Heirs of Stalin,* even if the going is occasionally tough. Read this book, and somewhere along the line—if only by osmosis—you will begin to understand better the conundrum of that other superpower.

Washington, D.C.

Notes

1. The English title of the musical would be "My Crazy Brother." It was a fairly popular production shown throughout the U.S.S.R. in 1968. In the story a rich American banker attempts to start World War III in order to destroy the U.S.S.R. and enable the U.S. to enslave the world. He expects some nuclear retaliation and tries to keep his family safe. His twin brother, the good guy, hearing of the plot, passes himself off as the banker, sends the villain to an insane asylum, and averts the war.

2. "*Samizdat*" is a Russian word describing the underground publication of a book, mainly typewritten, which often numbers several thousand copies. It comes from the Russian words "*sam*" meaning "self" and "*izdat*" meaning "to publish."

3. *Chronicle of Current Events,* authors unknown, a journal published via *samizdat* every two months in the U.S.S.R., containing news of the dissidents, including who has been jailed, where, and for what. The first consistently anti-party publication inside Russia in modern Soviet times.

4. Robert Conquest's *The Great Terror* (New York: Macmillan, 1968) probably carries the most accurate account of these slaughters. It is very authoritatively referred to in Dr. Andrei D. Sakharov's essay, *Progress, Coexistence, and Intellectual Freedom* (New York: W. W. Norton, 1968).

5. *Zakon SSSR O Vseobshchei Voinskoi Obyazannosti* (Moscow, U.S.S.R.: Military Press, 1967), Ministry of Defense. It reduced military service in all services by one year.

DICTATOR STALIN AND MR. HYDE

COLONEL GLENN E. WASSON

ACCORDING to H. Montgomery Hyde, there are more published works on Stalin than any other figure in history, including Christ and Napoleon. What further contribution, then, could he expect to make to a subject already overworked? One might expect him either to possess unshakable confidence in his ability to restate the familiar so distinctively that the reader would not recognize it or to have access to information hitherto unpublished.

This versatile author combines an element of both these qualifications in his recent book, *Stalin.*† His previously published works include more than forty books, which demonstrate an impressive span of competency in subjects ranging from *Cases That Changed the Law* to *A History of Pornography*. Certainly he is not reluctant to tackle a wide range of unrelated topics or compete with authorities in their own narrow areas of specialization. Although there has never been a shortage of English-language biographies of Stalin, few comprehensive studies of him have been written in recent years. In addition to the revelations about Stalin since his death—by his daughter Svetlana, Khrushchev in his "secret speech," Alexander Solzhenitsyn in his popular novels, Milovan Djilas in his *Conversations with Stalin*, among others—there was a growing body of information about Russia's wartime premier that had not been integrated with previous knowledge into a recent biography. The timely appearance of Hyde's book fills this gap, and its easy narrative style should appeal to a wide readership.

No stranger to the Soviet Union, Mr. Hyde has visited the country ten times since 1933. During his latest trip he visited Stalin's birthplace near Tiflis in Georgia, the seminary from which he was expelled for propagating Marxist doctrine, and various places associated with the Soviet dictator's career. Hyde reported that Soviet authorities were generally cooperative in granting his requests to view specific sites but were unwilling to take him to view the grave of Stalin's second wife, Nadezhda Alliluyeva, who committed suicide in 1932. He was informed that "she was a person of no public interest whatsoever" and that he'd have to find the grave himself.[1] As an indication of his meticulous research, he eventually found the grave unaided and photographed the tombstone for posterity and his book.

Most of Hyde's documentary research for the book was done at Stanford's Hoover Institution and the Trotsky archives in Harvard's Houghton Library. This research digs deeply into archival material that until recently was unknown even to the Soviets, and the bibliography should be useful to any student of Soviet affairs. Unfortunately, the greatest treasure trove of memorabilia is in the Stalin collection in the Archives of the Central Committee of the Communist Party in Moscow and is closed to native and foreign historians alike. The final definitive history of Stalin's era will not be written until that source is opened.

Joseph Vissarionovich Djugashvili (who, mercifully, called himself Stalin) was a double apostate. On his mother's urging he won a scholarship to the Tiflis Theological Seminary in 1894 and spent several years there gaining a

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† H. Montgomery Hyde, *Stalin: The History of a Dictator* (New York: Farrar, Straus, and Giroux, 1972, $12.95), 679 pages.

classical education in preparation for the priesthood. His exposure to seditious literature smuggled into the seminary led to a growing reputation as "a person who harboured views dangerous to Tsarism" (p. 33), and he was finally expelled in 1899. After a few tumultuous years, the former theological student was the leader of the world's largest atheistic movement.

Stalin made no secret of his early association with the church, but he desperately tried to cover up his activities as a double agent in the Okhrana and czarist secret police. As might be imagined, all available evidence linking Stalin to the archenemy of the early Bolshevik party was eradicated. Old comrades who might have had any slight knowledge of Stalin's double life were eliminated by the purges. Nevertheless, Hyde cites enough surviving documentation and testimony of emigrés to sustain the belief that Stalin was indeed a double agent.

Hyde succeeds no better than other biographers in unlocking the secret of Stalin's triumph over abler men who stood in his way or in explaining his prolonged perversion of a highly idealistic revolution to his personal aims. Accounts of Stalin's early contributions to his party were often disparaging and usually indicated that he was overshadowed by other revolutionaries. He was described as speaking "haltingly, with a strong Georgian accent: his speech was dull and dry, and entirely devoid of color and witticism." (p. 124) He rarely entered into conversation with intellectuals, and when he did he was usually cut off with brief or contemptuous remarks. Hyde cites John Reed, who recorded the October revolution with newsreel clarity in his *Ten Days That Shook the World* and described Stalin as a "grey blur, looming up now and then dimly and not leaving a trace." (p. 141) On one quality all were agreed: Stalin was ruthless. But this was not an uncommon quality among revolutionary zealots, and it cannot in itself explain his later success.

By the time he was later sought out by foreign intellectuals and dignitaries for interviews as the head of state, a remarkable transformation appears to have taken place. He was now witty, charming, and possessed of omniscient political perspective. George Bernard Shaw wrote after an interview with him:

> Unlike other dictators, Stalin had an irrepressible sense of humour. There is an odd mixture of the Pope and Field Marshal in him: you might guess him to be the illegitimate soldier-son of a cardinal. I should call his manners perfect if only he had been able to conceal the fact that we amused him enormously. (p. 247)

In the same interview Shaw recalls an exchange between Lady Astor and Stalin when the latter asked about politicians in England. To this Lady Astor replied, "Chamberlain is the coming man."

"What about Churchill?" queried Stalin.

"Oh he's finished!"

"If your country is ever in trouble," Stalin retorted, looking hard at Lady Astor, "he will come back." (p. 248) This perspicacious observation was shared by few statesmen in 1931.

Anthony Eden noted after a conference with Stalin: "I have never known a man handle himself better in conference. Well informed at all points that were of concern to him, Stalin was prudent but not slow. Seldom raising his voice, a good listener, prone to doodling, he was the quietest dictator I have ever known, with the exception of Dr. Salazar. Yet the strength was there, unmistakably." (p. 319)

To visiting foreign dignitaries Stalin may have appeared benign, but to the Russian people he was a reincarnation of Ivan the Terrible. His slaughter of Soviet subjects exceeded that of all the czars combined. In one of his more intimate wartime conversations with Churchill, he indicated that most of ten million Kulaks resisting collectivization did not survive.[2] As he consolidated his power, he instituted a series of purges against party members and army officers that virtually eliminated middle and senior officer ranks. Anyone who at any time had opposed Stalin or whom he suspected of being a potential adversary was purged. Soviet law made children over age 12 subject to the death

penalty as accomplices in the treasonable acts of their parents. When thousands of starving children jammed railroad stations during the famine of 1932, Stalin issued secret orders that any children caught stealing food were to be dispatched. Hyde provides a thorough treatment of the purge trials of the losers, the internecine maneuvering within the party, the methods of interrogation and prosecution, and the human devastation that resulted.

In comparison with most Western historians, Hyde is more charitable towards Stalin in treating the short-lived and ill-fated pact between Nazi Germany and the Soviet Union. In Hyde's view, Stalin realized that war was eventually to be inevitable, but he sought the treaty because it would allow Russia to acquire two things: buffer territory (eastern Poland and the Baltic states) and—more important—time. Stalin's strange refusal to respond to numerous warnings of the impending German invasion is explained by Hyde as a ploy to mollify the Nazis until the last possible hour in an effort to delay the invasion. The author offers little new information on this puzzling matter, and his interpretation is not convincing.

As an ex-member of the British Parliament, Hyde would be expected to emphasize Stalin's relations with British leaders and diplomats, and it is in this area that his book is best. Much has been written of Churchill's wartime meetings with Generalissimo Stalin, but Hyde proves that the subject is not yet exhausted. Churchill had been the most articulate antagonist of Bolshevism since its inception, and there was a residue of mutual suspicion to be overcome before the two men could work together to defeat Hitler. Hyde's anecdotal account vividly chronicles this thawing process, which ultimately reached the following degree of liquid mellowness:

> After dinner, when the President [Roosevelt] and most of the guests had left, Stalin lingered for a final drink with Churchill. "England is becoming a shade pinker," observed the Prime Minister.
>
> "That is a sign of good health," replied Stalin. Then after this remark had been translated, he added: "I want to call Mr. Churchill my friend."
>
> "Call me Winston," said the Prime Minister. "I call you Joe behind your back."
>
> "No," said Stalin. "I want to call you my friend. I'd like to be allowed to call you my good friend."
>
> The two clinked glasses for the umpteenth time.
>
> "I drink to the proletarian masses," Churchill proposed.
>
> "I drink to the Conservative Party," replied Stalin. (pp. 498–99)

One might assume that a book of 679 pages would offer a reasonably balanced coverage of the various phases of Stalin's life. However, the reader who expects to gain some insight into Sino-Soviet relations during his reign will discover that the entire subject occupies no more than three pages. Chiang Kai-shek is not even listed in the large index of proper names, although a few fleeting references to him are in the text. Considering Stalin's ill-fated meddling in the internal affairs of China during the 1920s and the defection of Chiang Kai-shek and his Kuomintang party following his stewardship in Moscow, the omission is inexplicable. Indeed, Trotsky had virtually predicted that Stalin's tactics would end in a fiasco for Communism in China, and this turn of events was an important factor in Trotsky's growing split with Stalin. Stalin could not afford to have him claim, "I told you so." Hyde gives little more than a passing reference to Stalin's relationship with Mao Tse-tung and adds nothing to existing literature on the subject.

Without offering a specific political judgment, Hyde makes it quite clear, through the selective use of the memoirs of participants in the wartime conferences, that President Roosevelt was both naïve and needlessly generous in his negotiations with Stalin. As early as October 1943 Stalin gratuitously informed Secretary of State Cordell Hull that the Soviet Union would join the Allies in attacking Japan soon after Germany was defeated. Stalin volunteered this pledge to Roosevelt and Churchill again at Teheran the following month, without attaching any political preconditions. However, at Yalta in February 1944 Roosevelt agreed to

Stalin's demand for considerable Soviet territorial aggrandizement as a price for attacking Japan, some of it at the expense of their wartime ally, China. Roosevelt had previously expressed the view: "I think if I give [Stalin] everything I possibly can and ask nothing from him in return, *noblesse oblige*, he won't try to annex anything and he will work with me for a world of democracy and peace." (p. 452) Hyde's account of the wartime summit meetings and their tragic aftermath should be required reading for all U.S. officials who expect to bargain with the Soviets.

For anyone attempting to understand the Soviet system of government and its chief decision-makers, this book has considerably more value than could be expected from the usual biographical/historical study. There is little similarity between the continuity of the Soviet system, which develops and grooms promising party members for positions of leadership over a lifetime of service, and the American two-party system, which sweeps out its policy-makers each time the presidency is captured by a rival party. However, the advantages of the inherent stability of the Soviet system were more than offset by the vagaries of Stalin, who increasingly personalized and obscured the decision-making process.

Despite the fact that Stalin has been succeeded by Malenkov, Khrushchev, and Brezhnev, the present Soviet leadership was nurtured under the tutelage of Stalin. Both Brezhnev and Kosygin were protégés of Stalin and survived some of the worst aberrations of the aging dictator. Shortly after World War II, Kosygin was admitted to the Politburo as a member of a troika of bright young party members noted for their managerial talents. Stalin had the other two members of this troika, Vosnesensky and Kuznetsov, shot for some vague misdoing in the so-called "Leningrad affair." For some time Kosygin was terrified that he too might be marked for extinction, as there was little difference between his activities and those of his executed comrades. Khrushchev, in recounting Stalin's excesses (in his "secret speech"), considered Kosygin's survival nothing short of miraculous. (p. 576) Although not explicitly stated by Hyde, the conclusion is inescapable that no individual could survive such a traumatic experience without being influenced for life.

Because some of the unspeakable terrors of the Stalin era are no longer practiced, there is a tendency to ascribe greater enlightenment to the present Kremlin leadership. But how does a man survive the Byzantine intrigues of a lifetime of Stalinism without becoming a part of it? Hopefully, the present regime represents a break with the past and is one with which we can work out humanitarian solutions to mankind's problems; but the fact that today's Soviet leaders are deeply rooted in the Stalinist past is strongly evident in Hyde's book. The invasion of Czechoslovakia in 1968 under the present leadership was pure Stalinism.

Undoubtedly this book will be superseded by future biographies of Stalin as additional revelations come to light, but this is unlikely for the next decade at least. Anyone with historical interest in Stalin and his times, or seeking a framework for understanding today's Soviet leadership, would do well to seek this book out of the multitude written on these subjects.

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Notes

1. *Publishers Weekly*, February 28, 1972, p. 36.
2. Winston Churchill, *The Hinge of Fate* (Boston: Houghton Mifflin Co., 1950), pp. 498–99.

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AWARD

The Air University Review Awards Committee has selected "Defense Dollars for Deterrence: A Matter of Priorities" by Lieutenant Colonel Edward Stellini, USAF, as the outstanding article in the September-October 1972 issue of *Air University Review*.

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