AIR UNIVERSITY review

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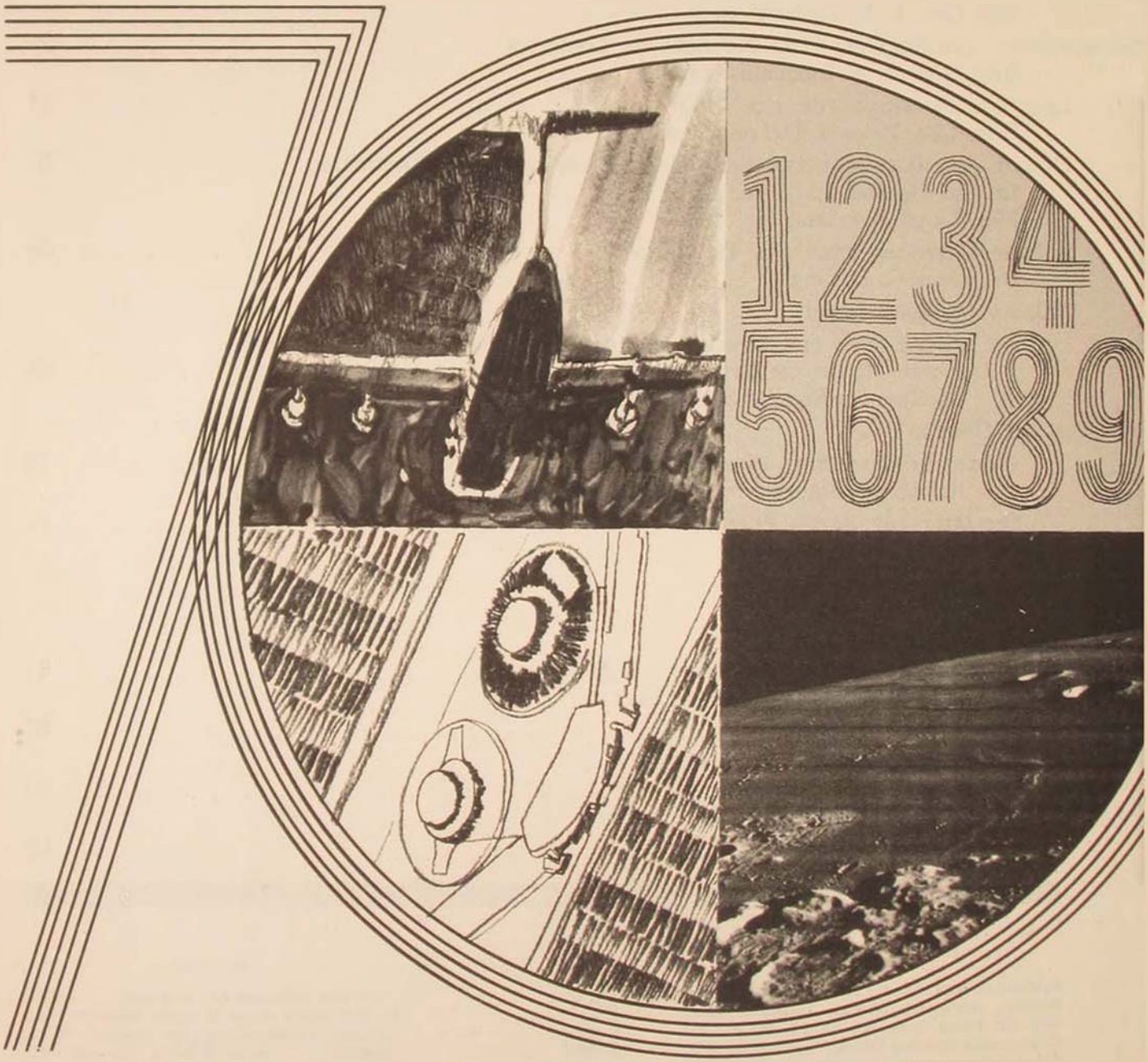
the cover

"The real challenge of the decade . . . will be to find better ways to apply effective management techniques to the solution of our problems . . . to do a better job—and do it with less." Thus, Lieutenant General Harry E. Goldsworthy, Deputy Chief of Staff, Systems and Logistics, summarizes the logistics challenge of the decade, and he and some of his directors at S&L discuss the advancements in management and materiel that will be applied in solving the USAF's logistical problems.

THE LOGISTICS CHALLENGE OF THE SEVENTIES

LIEUTENANT GENERAL HARRY E. GOLDSWORTHY



A NEW age began when man first stepped onto the moon at 2256 EDT on 20 July 1969. Many of the millions who watched the television image of Neil A. Armstrong setting foot on the lunar soil sensed that the earth will never be the same again. Neither will the moon. The moon is no longer merely a disembodied orb, a subject of myth, an abstraction in the sky. It has been visited and is now a place. The epic event perhaps heralded the dawn of interplanetary commerce. Coupled with other rapid developments in technology, it brought new dimensions to space travel.

A new era has also begun in the field of logistics. We have moved into the age of the C-5 and a revolution in airlift. We have reached the threshold of third-generation computer hardware in advanced logistics planning and management. Our vaunted knack for doing the impossible, although it takes a little longer, has enabled us to meet the challenge of providing timely logistics support to our combat forces in Southeast Asia at the end of a 10,000-mile pipeline while concurrently reducing our on-the-shelf stocks.

But that was back in the sixties. Where do we go in the seventies?

Maybe Mars and beyond. Outer space, however, isn't where all the action is going to be. Not by any means. Right here, back on earth, the decade just opening is going to be a lively one. The dimensions of change in the management environment in the seventies may be greater than in any comparable period in history. The future is not all laid out, of course. In the logistics area, though, it is possible to predict at least some of the challenging changes of the coming years. Great chunks of the future have already begun to happen, and some of the developments started during the last decade will come to full bloom in the seventies.

Our changing management environment may beggar predictions, but the trends of today will shape the logistics of the future. A number of these trends seem to me significant.

The first is the trend toward centralization of asset control. We are already well along the road toward centralization, and I think we may reasonably expect to go further in this direction in the next ten years. I base my judgment on such things as the compression of time we are experiencing, the economics involved, the shrinking world that improved communications and transportation have brought about, and the unprecedented growth of computer technology.

• By the compression of time I mean that, in today's military environment, decision and action follow each other more closely than ever before. Since reaction time is shrinking, the logistics manager must have a handle on his capability at all times; he must know what he has, where it is, and what condition it is in—and there is no time to write letters. Hence, control of assets at a level having a broad overview seems not only inevitable but necessary.

• By economics I mean that modern weapons and their support have become increasingly costly so that today, with our changing management environment, inflation, and austerity climate, even tighter control of the development and acquisition process is essential to the economic well-being of the nation. We must—and we do—think in terms of total national capability and pressing domestic needs, rather than in terms of any particular weapon system. This means that the military inventory of the late seventies, and to some extent even that of today, may be determined by budgetary allocations made at ever higher echelons.

• By a shrinking world I mean that the constantly increasing speed of communications and transportation has brought about an increasingly close relationship among political, military, social, and economic objectives. And

none of these can be pursued intelligently in isolation from the others. It is still an axiom of good management that decisions should be made at the lowest level having access to all the facts, and that is the current trend under the present administration of the Department of Defense. But the facts of military life in these days of austerity and budgetary restraints are increasingly also the facts of political life, of social life, of economic life. And the level at which an overview is possible becomes increasingly higher.

• The major development that has made centralized control possible has been computer technology, combined with improved communications. The electronic computer, just past its twenty-third birthday, has come of age, having progressed in a remarkably short time from a scientific curiosity to an essential part of our logistics management operation. In 1951 the Air Force bought its first computer; today we have 1100. In many respects computers have erased time, altered the boundaries and relationships that affect our lives and organizations, and accelerated the rate of change to the point described by someone who once entitled a speech, "The Effect of Computers on Progress or By the Time You've Said It, It's Happened!"

The computer has already become well known in its short life-span for its uncanny ability to store, retrieve, and compare vast amounts of data. Most important to us, of course, the computer carries out its functions at incredible speeds. We can obtain in minutes or hours information which previously took days or weeks to compile. Our officer personnel system and our base supply systems are computerized, and our other systems are fast becoming so. We are looking to computers to forecast inventory requirements, formulate budget and financial plans, conduct wargaming, and tell us (through simulation) what downstream problems we may encounter on new systems. Information is the lifeblood of control, and we look for a vastly expanded use of computer-based information systems in all phases of logistics management. The additional improvements in computers and data automation techniques will be invaluable in providing the management data necessary to support our various aerospace programs logistically in the seventies.

On the basis of these rapid, even revolutionary, advances in computer technology, the late General Thomas P. Gerrity envisioned the need for a single, integrated, closed-loop logistics system exploiting the most modern technology in system engineering, design, data processing, and telecommunications to replace several hundred older and obsolescent systems. He directed the establishment of the Advanced Logistics Systems Center, a separate operating agency of the Air Force Logistics Command (now a function of the AFLC Comptroller) at Wright-Patterson AFB, Ohio. The center is definitizing the design of the Air Force Advanced Logistics System, a twenty-first century logistics system for implementation in the early 1970's, applying electronic data processing (EDP) to the management process in all aspects of logistics.

With this kind of visibility at the top, we will be able to reduce further our support inventory, cut the pipeline inventory through rapid transportation, and generally increase the responsiveness of our logistics support system.

The second trend involves the growing interdependence and interrelationship of all elements of the systems and logistics function. In logistics management today we no longer think in terms of separate functions such as supply, maintenance, procurement, or transportation. We think of all these things as a single integrated logistics process. The logistics manager of the seventies has to be, to some degree, a maintenance man, a supply specialist, a personnel manager, a procurement specialist, an accountant and data processing expert, and, above all, a cost-effective manager.

The requirement for what we call integrated logistics management has been brought about and supported by the revolution in automatic data processing mentioned earlier. For

we in logistics management have long been aware that we could not allow the uncontrolled proliferation of automatic data processing within various functional areas without some effort to integrate all of this capability into a single system. We are still some way from realizing the totally integrated system, but we have taken a number of significant steps in that direction.

In the supply area, for example, we have installed at 150 major Air Force bases around the world a Standard Base Level Supply System utilizing the Univac 1050-II computer. We are already realizing a marked improvement in resource accounting and control, in accuracy and speed of reporting, and in improved logistics reaction time. With this system the Air Force now enjoys real-time requisitioning and inventory status capability. By standardizing computer hardware, data systems, and supply procedures, we have made significant improvements in our logistics system, reduced inventories, improved customer support to tactical units, and reallocated several thousand manpower spaces to other essential functions. We are now in the process of expanding that capability to include munitions, commissaries, and clothing sales store accounts.

This same kind of visibility will be achieved at the wholesale or depot level through a system known as the Air Force Reparable Assets Management System (AFRAMS). This computer-based system will give the inventory manager knowledge of the number, condition, and location of the items he manages. He will apply the AFRAMS system on a worldwide basis to some 85,000 reparable

The speed and capacity of the computer center at Travis AFB, California, enable timely logistic support to allied combat forces at the other end of the 10,000-mile pipeline to Southeast Asia.

items. Through this closed-loop information process, the inventory managers will have the visibility to centrally control these assets globally.

Because this is where the real challenge lies in the logistics area, a very significant effort is now under way in the Air Force to develop the Advanced Logistics System that will further explore the state of the art in communications management and computer science to provide the essential management data required to make the thousands of decisions in the management of logistics requirements, procurement, distribution, transportation, and fiscal matters.

Currently, we have some 397 individual data subsystems that are loosely interrelated and interfaced with other systems. They run on some 130 small, medium, and large computers. These types of data system work and are effective, but they are not efficient enough for the modern logistics support job. They are the results of doing business "as best we can" on second-generation computers, which are currently saturated.

The new system, as it is being planned, will use third-generation computers with capabilities far in excess of what we now have. New concepts will be incorporated to provide real-time visibility and on-line decision-making. It will be a closed-loop system, linking bases, depots, and contractors served by a common super data bank. The many functional, vertically oriented systems we have today will become one system, with integrated processes, to give us the management visibility we need to meet the logistic challenges of the seventies.

In the maintenance area, we are developing an improved Maintenance Management Information and Control System (MMICS). This is also computer-based and will be a major step toward consolidating and improving the various procedures of data gathering, reports, controls, and scheduling necessary to the base and depot maintenance functions. MMICS will commit all equipment historical data, Time Compliance Technical Orders (TCTO), and maintenance actions to computer storage for immediate call-up and display when required in the maintenance management process. Aircraft schedules, shop workloads, training schedules, etc., will be printed upon request in accordance with preprogrammed requirements. While we do not anticipate that MMICS will revolutionize our maintenance operations, it is expected to improve significantly our maintenance management capability at base level and modernize our maintenance data collection, processing, and dissemination capabilities.

These developments are indicators of the direction of our efforts toward integrated logistics management. With the aid of the abundant logistics information which computers can supply, the logistics manager will be able to make decisions spanning the entire scope of logistics.

Another area which seems worthy of mention involves our participation in the common defense market. Under the Military Sales Program, three significant things are happening:

The first is that free world nations are buying—not surplus equipment—but first-line items from the same production lines that are supplying the U.S. The F-5, C-130, and F-4 are cases in point. The result is a degree of uniformity in hardware.

The second fact is that, under cooperative logistics arrangements, these same nations are buying into our service and support capability up to agreed dollar levels. This support is provided by the same depots and facilities that support our own military units.

Third, under the Training Sales Program, we have trained more than 12,000 foreign students in the use of equipment which the nations are buying from us. At any given time, there are 1500 foreign students undergoing training in the United States. This combination of first-line equipment, first-line support, and first-line training can only enhance our defensive position through commonality of military equipment and training.

Another significant trend is in space logistics. So much has been written and said on the subject since the successful Apollo

moon missions that it will suffice merely to point out that logistics will be a pacing factor in sustained space operations—so much so that logistics will largely determine the success or failure of space missions in the coming decade.

We are on the verge of a revolution in air logistics. It is being brought about primarily by a greatly increased airlift capability represented by such developments as the C-5 Galaxy. This capability is resulting in a reduction in ton-mile costs that puts airlift in direct competition with other forms of transportation. It means that, as costs come down, more and more items will become eligible for airlift. Conservative projections show that the approximately 500 million ton-miles of normal outbound channel cargo per year (which we carried in FY 64, prior to Southeast Asia) could increase several-fold. There are two factors supporting this: (1) the Southeast Asia conflict has shown the value of airlift in the routine resupply of deployed forces; and (2) more commodities should become air-eligible as lower tariff rates are realized through more efficient operation of the airlift system and reduced costs to operate the C-141/C-5 fleet. Excluding bulk items and those not normally carried by air, such as automobiles and household goods, we expect to be able to ship a much larger percentage of our Air Force tonnage by air in the seventies.

Delivery to Military Airlift Command (MAC) of the first Galaxy last December 17 (the 66th anniversary of the Wright brothers' first flight) keynoted the airlift modernization program that began five years ago. Commenting on the significance of the occasion, General John D. Ryan, Air Force Chief of Staff, said: "This modernization will result in an airlift force that—with fewer aircraft—will be almost four times more productive than the force we had just five years ago." Teamed with the C-141 Starlifter, the C-5 will enable MAC to airlift not only the complete personnel complement of an Army division but virtually all the equipment it needs to sustain combat operations as well. The C-5 will be able to fly to any point in the world on short notice at jet speeds with a payload of 265,000 pounds; to carry 50 tons 5600 miles, or 110 tons 3050 miles, at more than 500 miles an hour.

The air vehicle is, of course, the pacing factor in improved airlift capability, but we should not overlook the fact that there have been concurrent supporting developments over the whole spectrum of transportation. There are in existence, for example, a number of greatly improved materials handling systems, one of which is the 463L. We are also attempting to standardize, internationally, an intermodal shipping container compatible with all means of transportation. And our continued implementation of the "bare base" concept means greater use of airlift.

If we put together all these factors of rapid communication, automatic data processing, increased lift capability, greater speed, standardized packaging, and the reduction of losses due to breakage in handling, there is a basis for an optimistic outlook for logistics.

New weapon systems acquisition programs will provide some of the real challenges in the seventies, for austerity, today and in the foreseeable future, will require us to do more with less. Not only will we face pressures which will force somewhat greater curbs in spending than some might deem desirable, but we will also have to recognize the responsibility for reducing the defense share of the tax dollar in order to help curb inflation and free resources for urgent domestic needs. We are equally aware of the need to maintain defense readiness at a sufficient level and push forward vigorously with development of the weapons, equipment, and logistics support necessary to meet the requirements of our mission.

New weapon systems like the F-15 Air Superiority Fighter and the B-1 Advanced Manned Strategic Aircraft (AMSA) will be costly and complex. They are being designed for maintainability, reliability, and serviceability. Aerospace ground equipment (AGE) and support equipment will be common,

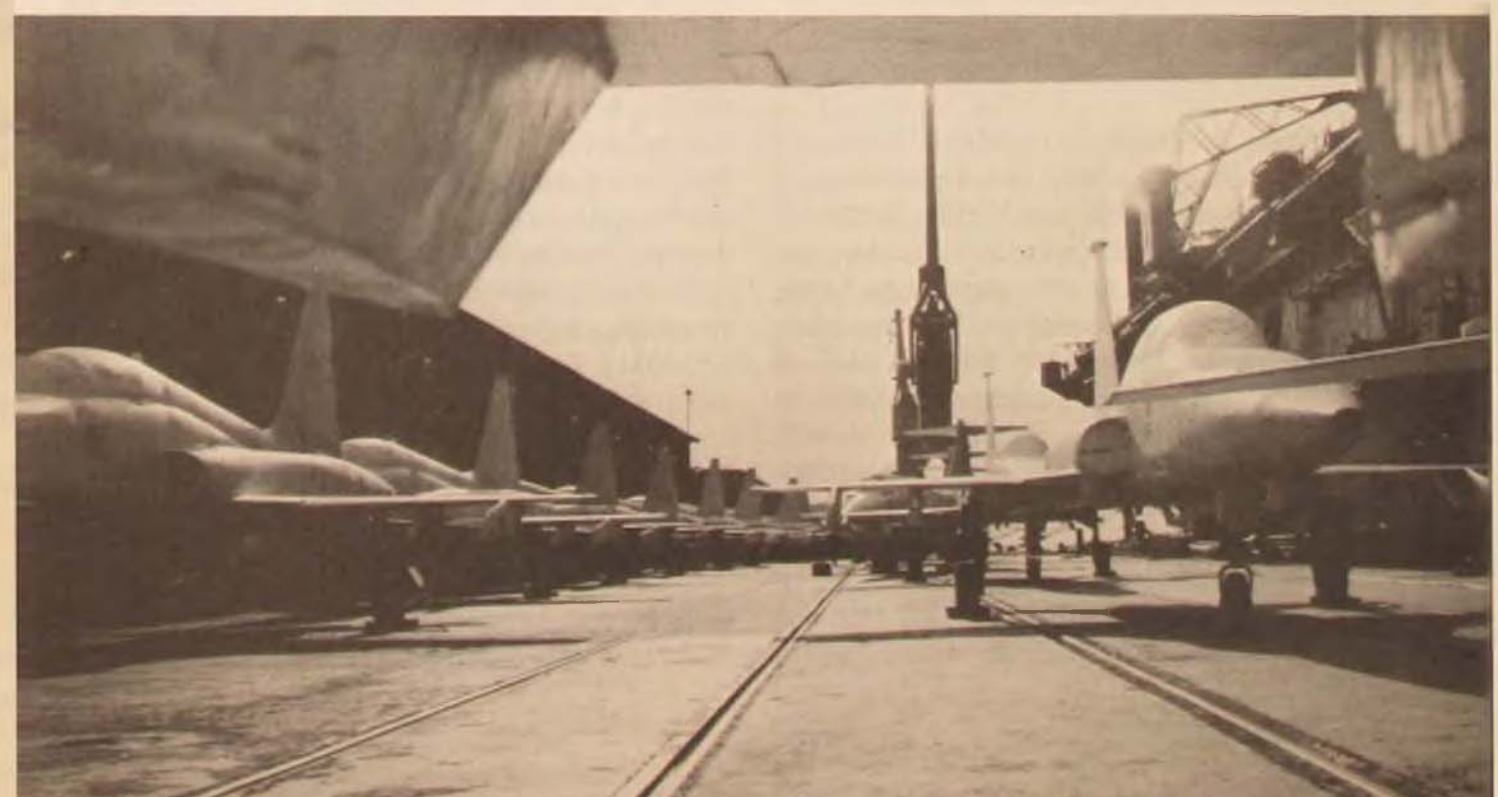
Global Logistics

A Turkish Air Force captain gets a flying suit fitted, preparatory to flying an F-5 from McClellan AFB, California, to Incirlik Air Base in Turkey. . . . A squadron of F-5s, sold to Turkey through the Military Assistance Program for $20.2 million, were decocooned and test-flown at Cigli AB, then to their base at Bandirma. . . . Korean Air Force technicians load missiles on F-5, as taught by USAF Advisers.

standardized, and designed early in the planning as part of the weapon system, not as an afterthought.

Cost growth avoidance will be another of the challenges in the seventies. Both Congress and the public expect us to give more precise estimates of what our new weapons will cost. And they expect us to see to it that the cost stays within those estimates.

One way we are attacking this problem is through the milestone approach. The F-15 contract awarded to McDonnell-Douglas, for example, incorporates a series of well-defined and demonstrable milestones by which we can measure the contractor's progress. The milestone concept will allow us to ensure that the contractor has actually accomplished the agreed upon development at certain points in time and cost. In the event the required progress is not attained, we will then be able to adjust schedules, thereby reducing the overlap between the engineering and production phases which has caused problems in the procurement of other systems. The milestone approach will also allow us to avoid committing large sums to production without the quantitative data which a development and test program should provide. We are convinced



that the streamlined program management approach instituted for the F-15 will permit us to take immediate action as problem areas arise and maintain the emphasis we have placed on the development of this important weapon system.

PRECISELY what the scope and nature of the changes in the new decade will be is a matter of conjecture, but this much we can predict with accuracy: that with the ever increasing cost of weapon systems, we will have to find better, more efficient, and more economical ways of doing the logistics job. In this environment, our ability to attract young men into the Air Force logistics field will present a continuing challenge. A recent survey, made by the Air Force Personnel Center at Randolph AFB, Texas, indicates that over 50 percent of the officers who entered the service in 1966 and are now serving in logistics career fields plan to leave the service at the end of their commitment.

What attracts a young man to a particular field of endeavor? Lieutenant General Thomas S. Moorman, Superintendent of the Air Force Academy, answered the question this way: "The young man of today wants responsibility. He wants challenge . . . he wants a feeling of accomplishment . . . and he wants recognition of his efforts." This is a basic and universal desire. The Air Force has been, and still is to a degree, successful in attracting a sufficient number of young men to join the service ranks on the basis that they can fulfill their personal ambitions and desires. The problem of retaining the cream of the crop, so to speak, is becoming more difficult, though. Initially, the general image of federal service does not appeal to many qualified young men. The experience of some of those who do join the ranks is far from satisfactory.

We must assure the young officer, airman, and civilian that he will be given every opportunity to demonstrate his initiative, industry, professional competence, and drive to his superiors. He must be convinced that the degree of his involvement in performing and managing essential logistics functions will be determined primarily by his own ability, dedication, and initiative.

The logistician of the seventies will have to be more of a specialist and a professional logistician. He will have to be highly skilled in new, improved management techniques

and qualified to cope with the varied and complex logistics problems of the new decade.

To help prepare our logisticians to meet these challenges of the seventies, we have expanded the program of continuing education for logistics managers. The Defense Logistics Management Training Catalogue now lists 144 individual courses that are available to Air Force students. These are identifiable with 17 subject areas. Just about all logistics functional fields and several peculiar management techniques or skills are covered. The courses are taught by Air Force, Army, and Navy schools. In addition, the Air Force Institute of Technology School of Systems and Logistics offers 35 courses, ranging in length from one to nine weeks. Twenty of the courses are joint, or DOD-designated, and 15 are peculiar to the Air Force.

We encourage qualified officers, of all ranks, to enter the graduate course. We believe that one of the real challenges of the seventies, if we are to retain our logistics personnel, is to closely monitor assignments of the graduates to ensure that they are given responsible jobs which will challenge their newly acquired skills.

Clearly, today's logistics management trends will shape the future of logistics in the new decade. But we cannot predict the future. Our transistorized crystal ball is no more up-to-date than the silent shimmer of the fortune-teller's glass was in the halcyon precomputer days. Nevertheless, I think we can safely say the sixties will be remembered as the decade in which the old "tried and true" method of logistics management had its finest and final hour.

As we move ahead in the new decade, with the C-5 coming into the inventory, the F-15 (now in the acquisition phase), and, hopefully, the B-1 AMSA replacing our aging B-52s, there will be a greater premium on quality of forces, people, and equipment. Present budget restraints and the austere outlook on the national scene would seem to indicate that.

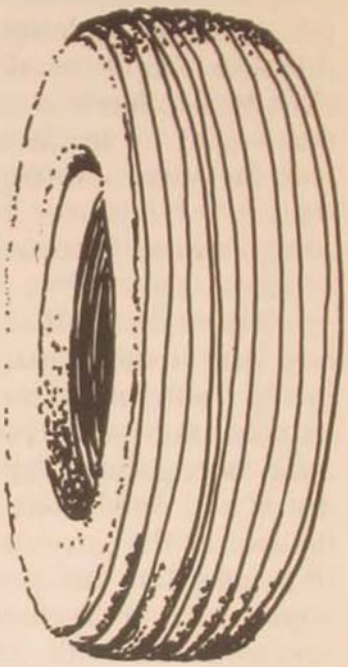
We may face some lean years ahead in the seventies, but our responsibilities in the logistics area will not diminish. If anything, they will continue to increase in view of the pace of technological progress.

The real challenge of the decade just starting will be to find better ways to apply effective management techniques to the solution of our problems. In short, we will just have to do a better job—and do it with less. That's a huge order. But I am confident that by using the new, improved management techniques and with our force of motivated, highly dedicated professional logisticians we can—and will—meet the logistics challenge of the seventies.

Hq United States Air Force

MILITARY PROCUREMENT— TODAY AND TOMORROW

BRIGADIER GENERAL JAMES O. LINDBERG



THE combined impact of rapidly advancing technology and mounting defense costs has confronted military procurement with unprecedented challenges over the past few years. Some have been met. Others are yet to be resolved. Congressional thinking as reflected in reports of committee hearings and public reaction as reflected in the press provide tangible evidence that much remains to be done. Prolonged criticism of the military-industry complex, stimulated in part by cost growth in weapon system acquisition programs (cost overruns in the public mind) and charges of shortfalls in contractor performance, has undermined Congressional and public confidence in military procurement to such an extent as to suggest that essential defense programs may be in jeopardy. This is one of the major challenges that must be met without delay. Another major challenge to military procurement is to develop new techniques to cope with the technological and economic uncertainties of weapon system development and acquisition.

Since procurement means different things to different people, a brief review of this part of the logistic process should serve to put the problems in better perspective.

Military procurement is a vast and com-

plex process, having much in common with procurement in private enterprise but unique in many respects that set it apart from its industry counterpart.

The magnitude of Air Force procurement is manifest in the fact that in fiscal year 1969 alone approximately 10,000 people in about 235 buying offices obligated $11.5 billion under some 1,900,000 procurement actions. But numbers alone do not fully convey the magnitude of the task. The procurements in question range from extremely complex research and development contracts for sophisticated weapon systems, through high-dollar contracts for ancillary equipment and critical spares, down to simple purchase orders for off-the-shelf items. Services contracts run the gamut from complex maintenance and overhaul of weapon systems, through operation and maintenance of offshore installations and equipment, down to base maintenance and custodial services.

The unique characteristics that set military procurement apart from procurement in private enterprise stem from the statutory authorizations and limitations under which it must be conducted and the policies, procedures, and regulations designed to protect the interest of the government while at the same time affording all potential suppliers equal opportunity to secure government business commensurate with their capabilities.

the contracting officer's responsibilities

The military contracting officer is an agent of the government, formally authorized to commit the expenditure of public funds. While his performance of duty is subject to varying degrees of review and audit, both before and after contract award, he is nevertheless personally responsible for insuring that the terms and conditions of his contracts are strictly in accordance with statutory authority and established policies and procedures.

The contracting officer is nobody's darling. His job is to translate requirements into goods and services of the highest available quality, at the lowest possible price, and in the shortest possible time. He must be patient with his impatient customers who cannot understand why he must move so slowly under the statutory and regulatory restraints of government procurement. Since he is obligated by law to obtain competition, or explain why he cannot, he must constantly be on guard against inadvertent or deliberate efforts of user agencies to acquire favored products or services by restrictive or inadequate specifications. He must honor the rights and interests of small business to ensure that this essential segment of private enterprise receives the maximum government business that it is capable of handling. He must stay abreast of labor surplus areas and discharge his responsibility to that unfortunate sector of the national economy. Along somewhat the same vein, he is required to put his best efforts behind a new program, established by Presidential Executive Order, to increase the involvement of minority group contractors in government business by providing procurement opportunities under special procedures. When he finds it necessary to reject bids or proposals for what to him are good and sufficient reasons, he must be prepared to placate the aggrieved suppliers. Failing that, he must then defend his actions and decisions before higher authority, which could mean Air Force Headquarters, the General Accounting Office, or, on occasion, Congress. While engrossed in all this, he must stay up-to-date on policy and procedural changes and Comptroller General decisions which establish precedents and provide guidance in resolving controversial issues.

The military contracting officer does not work alone. He gets professional support—legal, financial, audit, engineering—and anything else he may need in developing sound contracts. This is of particular significance when he is engaged in developing and negotiating complex and high-dollar contracts for weapon system development and acquisition. In this situation, his support evolves into a highly organized team effort, including also support drawn from appropriate organizational elements of the Air Force Systems Command, Air Force Logistics Command, and the using command.

Contracting officers and their buyers and clerical people are human beings. They are not infallible. With all their training, professional competence, and dedication, they still can and do make mistakes. Their actions and decisions are open to public inspection and performance evaluation, and the public evaluators have not been notable for their gentleness.

bad purchases bring disfavor

Government procurement people, particularly in the military services, have fallen into public disfavor. This is unfortunate because the outstanding performance of many is degraded by the mistakes or errors of judgment of a few. It is unfortunate because such an environment is discouraging to the high-caliber professionals needed to shoulder the heavy responsibilities of multibillion-dollar government procurements. It is unfortunate because loss of Congressional and public confidence in military procurement people readily translates into loss of confidence in the whole system of military requirements determination and acquisition. However damaging this may be in terms of denial or restriction of funding for essential programs, from the point of view of the public it is at least understandable. Since the public at large cannot be expected to be familiar with the complexities of government procurement, a bad buy is a bad buy and should not have happened.

Bad buys undeniably have occurred in the past, and it is inevitable that some will happen in the future. This is not an excuse for a debacle in the small-purchases area, which justifiably arouses a storm of public indignation and protest when the military services fail to detect gross overcharges by unethical suppliers of what should have been low-cost items. Neither is it a defense for substantial cost growth far above original cost estimates for multibillion-dollar weapon system acquisition programs, even though such cost growth is not in itself indicative of a bad buy. The inevitability of future bad buys is a simple fact of life based on statistics and the fallibility of human nature. With thousands of people engaged in processing millions of procurement actions each year within the Air Force alone, it is unrealistic to expect that every action will be beyond reproach or criticism. If they achieve 99 percent accuracy in processing two million procurement actions, that would still leave twenty thousand actions potentially subject to criticism in varying degree. Under the circumstances, it is significant that there have been relatively few mistakes or errors of judgment on the part of the dedicated professionals who daily demonstrate their ability to discharge their heavy responsibilities in the interest of the government.

Restoring Congressional and public confidence in military procurement will require a great deal more than a showing that bad buys are the exception and not the rule. Even if the critics of defense procurement were disposed to recognize and accept the fact that bad buys comprise no more than a small percentage of total annual procurement actions, any unwarranted expenditure of taxpayers' dollars is subject to criticism regardless of the amount. Responsible military procurement officers share their critics' view that there is no such thing as an acceptable bogey on this score. In the face of obvious and prolonged Congressional and public disenchantment with military procurement, and with the costs of defense competing for the nation's resources with the urgent demands of social and economic ills, it is evident that defense programs have entered upon a new and difficult era. Only those proposed procurements which can withstand the most searching scrutiny and challenge will be approved, and then only on the basis of demonstrable evidence that they can be carried out in the best interest of the government.

The attention of military procurement officials has been concentrated on developing new techniques to deal with new problems, while at the same time developing more effective management disciplines and controls commensurate with the scope and complexity of multibillion-dollar development and production programs extending over many years. These techniques and disciplines are being worked out and tested on the basis of thorough

assessment of both past experience and current and future technological and economic problems.

unforeseen problems despite ground rules

As to past experience, comprehensive ground rules for shaping and guiding the buyer-seller relationship in weapon system acquisition have long been spelled out in statutory procurement authority, the Armed Services Procurement Regulation, and formalized source selection procedures. Notwithstanding these ground rules, it was recognized that unforeseen problems inevitably would arise. They arise because of the complexity and magnitude of weapon system acquisition and because of uncertainties inherent in advanced technological development. The contractual relationship between buyer and seller in weapon system acquisition is not unique in this respect. For example, the far less complex automobile production is confronted with unexpected problems, as evidenced by periodic recall of cars and trucks to correct defects. If the manufacturers of cars and trucks cannot anticipate and prevent costly problems in the design and production of their comparatively simple machines, it should not be surprising that those who design and develop high-performance weapon systems encounter situations which they could not foresee. Program delays or cost increases which then may ensue give rise to charges that the buyer demanded too much in the way of performance or that the seller promised more than he could deliver.

As to future technological and economic problems, how far to go in demanding unprecedented performance in developing new weapon systems is a matter of judgment—collective judgment on the part of the military services, who view the problem in terms of a specific hostile threat to be countered, and the contractors, who view the problem in terms of their capability to develop and produce the sophisticated hardware required and end with a profit.

The military planners are faced with the task of striking a fine balance between two unacceptable alternatives. If they set their sights too low, they may wind up with a fully operational system capable of doing everything it was designed to do but still incapable of coping with the situation for which it was developed. If they set their sights too high, they risk winding up with no really operational system at all.

For their part, the contractors are in no more enviable position. They know what they have done in the past, and they think they know what they can do in the future. In a nation whose wealth and power are built on the foundation of private enterprise and unfettered technological initiative, they must reconcile the opposing demands of their directors and stockholders for profits and the requirement of the marketplace to submit the lowest responsible offer in order to get the business. While the military services do not lack means of assessing technological feasibility and predicting the approximate costs thereof, it follows that industry's participation in such assessments is essential, since industry will have the burden of proof.

milestones newly applied

Against this background, one of the most promising "innovations" for injecting better management discipline in weapon system acquisition programs is a new application of an old technique—milestones. Common sense, if not good management, dictates that any project or program of consequence should be visualized as a series of logical steps or phases which, if accomplished according to plan, will yield the desired results. The milestone technique has been incorporated in the procurement of the new F-15 Air Superiority Fighter and will be used also in the Advanced Manned Strategic Aircraft (AMSA) when that program reaches the appropriate point.

The technique is being applied with a new twist, however. In addition to establishing milestones as a means for measuring progress, we will also use road blocks to the extent necessary. That is to say, the contractor will be required to demonstrate positive accomplishment at each milestone, in accordance with the terms of his contract, before he is per-

mitted to proceed to the next. The milestones, which may vary for different programs, include such critical development stages as preliminary design review, engine/airframe compatibility test, first flight, and airborne avionics performance. Under the terms of the contract, the government will have a unilateral right to determine whether or not the contractor has successfully accomplished a milestone. The net result of this approach will be that high dollar commitments downstream will be avoided and the government's obligation will be tied directly to the contractor's performance at each milestone. Considering that weapon system production costs historically have far exceeded development costs, the milestone technique should prove an effective instrument for program cost control and at the same time provide a better guarantee of contractor performance from a technical standpoint. The F-15 research and development program is designed so that production commitments will not be made until the government is satisfied that the F-15 weapon system will meet its technical and operational requirements.

Another prolific source of cost growth—contract changes—also is being given close attention. While changes in many cases are essential in weapon system programs stretching over a period of five years or more, experience has shown that too often contractors have been directed to proceed with changes which, however justified from a technical or operational standpoint, had not been priced before they were incorporated in the program. The predictable result was inadequate control of program cost growth, partial or complete renegotiation of contractual pricing agreements, and a snowballing effect of increased complications in programming, budgeting, funding, and negotiation. Targets for management improvement in this area now under consideration include:

—use of change orders only when the urgency of the situation precludes issuance of a fully definitized contractual document;

—approval of change orders, prior to issuance, only by the appropriate level of command in accordance with established dollar thresholds;

—inclusion of a "not-to-exceed" price agreement in all contractor-initiated change proposals;

—no alteration, by commanders or program directors, of basic performance goals, milestones, or other changes unless properly authorized by the appropriate program authorization document, such as a System Management Directive, which will include the necessary financial resources to accomplish the change.

other approaches to better procurement

Turning to a more sophisticated approach to contract pricing, the faculty of the Air Force Academy has been devoting its considerable talents to development of improved methods for pricing contractors' indirect costs and adapting the improved methods to take advantage of high-speed computer capability on a real-time basis. The technique under development involves a standard indirect cost classification system and a model of a contractor's indirect cost accumulation process which would be similar to that now available for direct costs. This statistically sound basis for evaluating historical costs and projecting future costs, in conjunction with a cost model, offers the potential of significant improvement in our ability to predict indirect costs on a constant dollar basis.

Many other approaches to better procurement are under way or being explored. For instance, life cycle costing is showing considerable promise. Under normal competitive procedures, we specify minimum acceptable reliability and buy the lowest-priced item that meets the specifications. Under life cycle costing we quantify logistic support costs for the item, operating costs, and, when applicable, training costs, and we add these costs to the bid price to find the lowest total cost over the life of the item. Using this technique, we have bought aircraft tires on the basis of lowest cost per landing instead of lowest cost per tire, and we have bought expensive electronic tubes on the basis of lowest cost per operating hour instead of lowest cost per tube. In both cases we pay a higher price for each item,

but the items last longer and the operating costs are substantially lower.

With respect to contractor performance, we are refining and using warranty and "correction of deficiency" provisions, to make it clear to our suppliers that we expect them to stand behind their products and make good on defective items delivered to the government.

We are expanding our efforts to develop better independent cost estimates, in connection with high dollar procurements, for use in assessing contractor cost proposals. The estimates are developed by cost study teams comprising knowledgeable and experienced specialists in cost analysis, engineering, and procurement, and the end result of their efforts provides a basis for establishing program base lines as well as a tool for evaluating contractor cost proposals. We believe that these techniques, when fully developed and properly applied, will make a substantial contribution in the pricing area.

We in Air Force procurement are keenly aware of the tremendous pressures being placed on the defense budget and the consequent need for even greater economy and more efficient management. With respect to procurement management, we are concerned with improperly defined specifications, delays in delivering government-furnished equipment, and too much concurrency between research and development and production.

To better define specifications, steps are being taken to improve the definition of operational performance requirements. Greater emphasis will be placed on the validation process, to assure that the technology is at hand and the major risk areas are assessed and made manageable before proceeding to full-scale development. Greater reliance will be placed on competitive prototyping and hardware demonstration of systems, subsystems, and components as appropriate. Full consideration, however, must be given to cost and schedule requirements. In major systems acquisitions, increased use will be made of the demonstration milestone concept to measure contractor progress.

Schedule adjustments to further reduce the overlap of the development and production phases will be made when necessary. Improved validation and use of the milestone approach will place in better perspective the desirability of concurrency or the existence of too much concurrency. The ability to make sounder decisions will be more readily at hand. While program changes will be necessary to take advantage of technological advances and for other reasons, such changes will be kept to a minimum. Emphasis will be on approving contract changes only from the standpoint of essentiality rather than desirability.

Concerted attention is being given, during the planning stage, to decisions as to whether equipments are to be government-furnished or contractor-furnished. In a system requiring substantial system and subsystems integration efforts, provisions for total system performance responsibility and correction of deficiencies are being incorporated in the contract, to fix responsibility for the ultimate performance of the total weapon system and for quality assurance.

We are well aware that the contractual instrument must be geared to the risk assessment, to provide the latitude and flexibility needed for responsive and responsible management actions. The contract must also afford the contractor the flexibility and incentive to innovate on both the technological and managerial fronts.

The extreme competition being engendered between contractors has resulted in optimistically low target prices. And the competition between programs within the services for scarce dollars has had similar effects. Steps have been taken to stress the importance of exercising cost realism in budget estimates as well as in evaluating contractor cost proposals. The effects of inflation are being recognized and taken into account in cost estimates of programs that run for many years. The current contract for the Air Force F-15 Air Superiority Fighter is an example of this recognition.

performance can be controlled

The Air Force is firmly convinced that

cost and contractor performance in weapon system acquisition must be and can be brought under better control. We are equally convinced that this can be done without compromising the principle of free enterprise through imposition of progressively more stringent government controls which ultimately would be tantamount to a creeping form of nationalization of industry. When we award a contract for development and production of a major new weapon system, we are buying the contractor's technical and management capability, not his factory. The more we are forced to impose controls over him, the more we dilute his responsibility for producing an operational system. We do not propose to do his job for him. If we could do that, we would not have hired him in the first place. We do propose to develop an optimum balance between the government's need for cost/progress visibility and the contractor's responsibility for managing the program in accordance with the terms of his contract. We expect the complete cooperation of industry in developing that balance, if for no reason other than the fact that failure to resolve the problem can only lead to greater public and Congressional pressure for additional statutory authority over private enterprise.

Industry at large is a substantial factor in the power base essential to national security. The question is not whether we should have such a power base but rather how we should use and control it. The genius of our scientific and industrial resources was never more vividly dramatized than when we sat before our television screens and watched men walk about on the surface of the moon. The technology which made that incredible achievement possible is the same technology that helped bring the nation to its present preeminence as a world power. When that technology is called upon to support national security requirements, it must be subjected to no more restraint than is demonstrably necessary to guide and direct it toward established goals and to ensure that the goals are attained. Conversely, industry must be willing and able to help establish and to accept the discipline fundamental to a viable government-industry relationship.

Hq United States Air Force

MAINTENANCE IN THE SEVENTIES

MAJOR GENERAL L. F. TANBERG

THE zealous application of hardware and management technology to system support factors by industry and Air Force personnel in the sixties is destined to bring systems to fruition in the seventies which have the potential for radically changing Air Force maintenance concepts and procedures. The opportunity for vastly improved maintenance support is inherent in this potential for change. The degree of improvement will in great part be directly proportional to the degree to which commanders and maintenance personnel exploit these advanced capabilities. The need for more responsive, more efficient, and more cost-effective system support has never been more pressing. This need, coupled with the maintainability-oriented capabilities of these forthcoming systems, portends a decade of opportunity, of challenge for maintenance personnel throughout the Air Force—truly a decade for imaginative exploitation.

After making such a prognosis, the usual (and most prudent) thing for one to do is follow it up with various conditional stipulations. In this instance, however, the momentum behind the influencing factors is so great and the need so urgent that provisos are unnecessary. The C-5 is already entering the inventory; the F-15 is in the acquisition phase; and the B-1 will, hopefully, replace the weary B-52s late in the decade. The high cost of these systems is well publicized. The need for improved productivity to offset the reduced force resulting from increased costs is painfully evident. Improved system support is the solution. Increased maintenance effectiveness is the key.

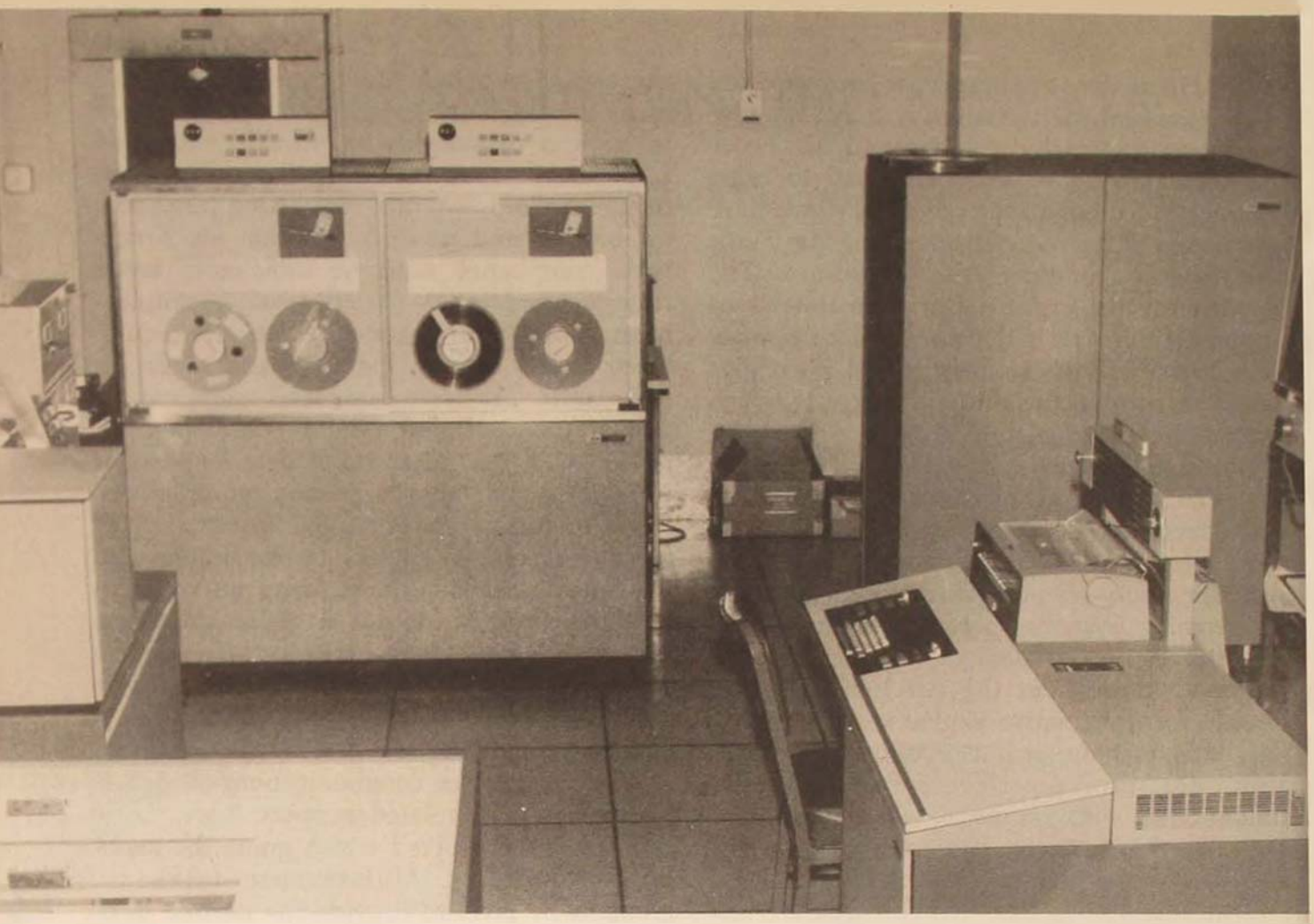
Before moving into a more thorough discussion of the factors involved, I want to recap the maintenance mission and summarize the basic concepts which guide Air Force maintenance today.

The primary requirement toward which all maintenance effort must be oriented is the operational mission at hand. This, of course, entails two aspects: operational readiness and direct support of the combat/training effort. Whatever the nature of the mission, maintenance must be dedicated to the timely satisfaction of these operational requirements. All maintenance must be planned and executed in such a manner as to provide maximum responsiveness to operational needs. Each maintenance policy and supporting procedure established and promulgated for Air Force-wide compliance must be sufficiently broad to accommodate the varied missions, employment concepts, and associated mission equipment of the unified, specified, and major air commands. A system-oriented maintenance support concept and plan is developed for each new system to accommodate its peculiar capabilities and unique mission requirements.

In addition to providing direct support to the operational mission, maintenance also has an obligation to the logistics system. This takes the form of component repair, modification, calibration, and checkout. These two separate but interrelated obligations comprise the maintenance mission.

In maintaining our worldwide inventory of aircraft, missiles, communications-electronic equipment, and related support items, basic concepts have evolved which guide the maintenance process. Maintenance tasks are grouped by level to provide the desired flexibility, responsiveness, and control. Organizational, intermediate, and depot, the three established levels of maintenance, are a function of the operational concept, aircraft requirements, logistics capabilities, personnel skills, support equipage, and cost factors. Component repair is accomplished at bases (intermediate level) or specialized repair facilities—AMA/contractor (depot level), dependent upon various factors relative to task grouping. An organic capability to overhaul our primary mission essential equipment is vested in our AFLC Air Materiel Areas (AMA's). These depot capabilities are augmented with contractual support.

While these concepts are basic to today's maintenance process, they are by no means sacred or immutable. We may be approaching a point in time when distinctly different systems employed in vastly different roles may demand more individualistic support concepts, policies, and procedures. The high cost of



C-5 Maintenance

Ground processing equipment (above) at each C-5 base provides the base maintenance officer two-way communication with the central data bank (CDB) via punched cards or tape, magnetic tape, and keyboard. . . . An inquiry terminal keyboard, video display, and printer (left) give remote command headquarters, engine manager, and system manager access to C-5 maintenance data from the CDB, including a preprinted work order within 30 minutes after the information from the C-5 in flight is processed.

future systems, in conjunction with reduced buys, makes it imperative that the support concept enhance system utilization in its assigned role to the maximum degree possible.

The scope of the operation encompassed by the maintenance function will provide some feel for the magnitude of the payoff to be realized through innovation and exploitation of new capabilities. First, the maintenance function employs nearly one-third of the Air Force's people, with an annual payroll of nearly $1.5 billion. It expends or significantly influences the expenditure of nearly one-third of the Air Force's budget. These resources are applied against some 14,000 active aircraft, 24,000 end items of communications-electronic-meteorological (CEM) equipment, and literally thousands of missiles (when all types and varieties are tallied). Maintenance personnel operate and maintain nearly $2 billion worth of aerospace ground equipment (AGE) in direct support of aircraft and a like amount of missile support equipment. Additionally, over 3.5 million units valued at approximately $9.8 billion were repaired by maintenance repair functions in FY 69. The cost of depot maintenance totaled approximately $1.5 billion in FY 69. The magnitude of resource application in this area suggests the potential for returns that can be anticipated from major improvements in maintenance effectiveness. Contributions which not only reduce resource expenditures but also improve system availability are particularly attractive. With this understanding of potential benefits to be reaped, let us look at some of the factors which make the coming decade, figuratively speaking, a veritable smorgasbord of opportunity.

Aside from the operational demands growing out of the Vietnamese conflict, there is every indication that our forces will continue to be called upon to maintain the same high degree of operational readiness demanded in the past. No respite in training/proficiency requirements can be expected. Mobility requirements will be more demanding than ever before experienced. In view of the escalating cost of maintaining system performance superiority, it now appears that force inventories of future aircraft systems can be expected to be smaller. Requirements will have to be met through increased utilization.

FORTUNATELY, not all the increased cost of forthcoming systems is attributable to the requirement for greater combat performance. Life cycle costing studies undertaken by both industry and Air Force personnel have indicated that money applied to maintainability characteristics of a system during design and development is an investment—an investment which pays off in increased systems availability. Maintainability considerations run the gamut from quick-operating panel latches to sophisticated on-board monitoring, troubleshooting, and recording devices. While many considerations have been pursued by research and development personnel during the sixties, three areas appear to offer such potential that aircraft so equipped may well represent a new generation of aircraft: (1) optimum use of line replaceable units (LRU's) that can be replaced on the flight line with minimum equipment, (2) built-in test points (BIT's), and (3) aircraft integrated data system (AIDS). Foremost among these developments, when considered from a standpoint of maintenance impact, is the integrated data system. One such system, called MADARS (for Malfunction Detection, Analysis and Recording Subsystem), is installed on the C-5.

Each C-5 has equipment installed which provides the means for rapid detection and isolation of equipment malfunctions as well as for the continuous recording of C-5 performance information on magnetic tape. The system collects data from more than 800 test points and compares the data with computer stored limits. When deviations occur, the system alerts the flight engineer and assists him in locating the trouble by displaying sequences of diagnostic and remedial information retrieved from a film-pac. In all, the flight engineer can monitor 1800 line-replaceable units through on-board equipment. Performance checks accomplished, trend data, failures, and diagnostic results are all automatically recorded. Much information such as takeoff

time, landings, etc., can be entered for computer storage by the flight engineer. The magnetic tapes will be removed from the aircraft at each C-5 base and the data transmitted via high-speed communication lines to a central computer for processing, analyzing, correlation, dispersal to the bases, and storage.

Each C-5 base will have input/output devices and data formatting equipment to communicate with the central computer, from which a variety of maintenance data will be available. Each C-5 base will have real-time access to the information stored in the central computer regarding aircraft health and maintenance requirements. For example, the computer/communications system will provide preprinted work orders to the C-5 base within 30 minutes after the magnetic tape is processed. Command headquarters, the engine manager, and system manager will all have inquiry terminals to obtain required management information relative to fleet condition, results of analysis, and current configuration from the central computer.

The benefits of such a system to base-level maintenance can be numerous. Reduced troubleshooting time will allow accelerated ground turnaround. Manual data recording requirements and the associated paper work will be reduced. Data completeness and accuracy will most certainly be improved. Equipment performance trends will facilitate failure prediction and result in less unscheduled maintenance and allow more effective maintenance workload scheduling.

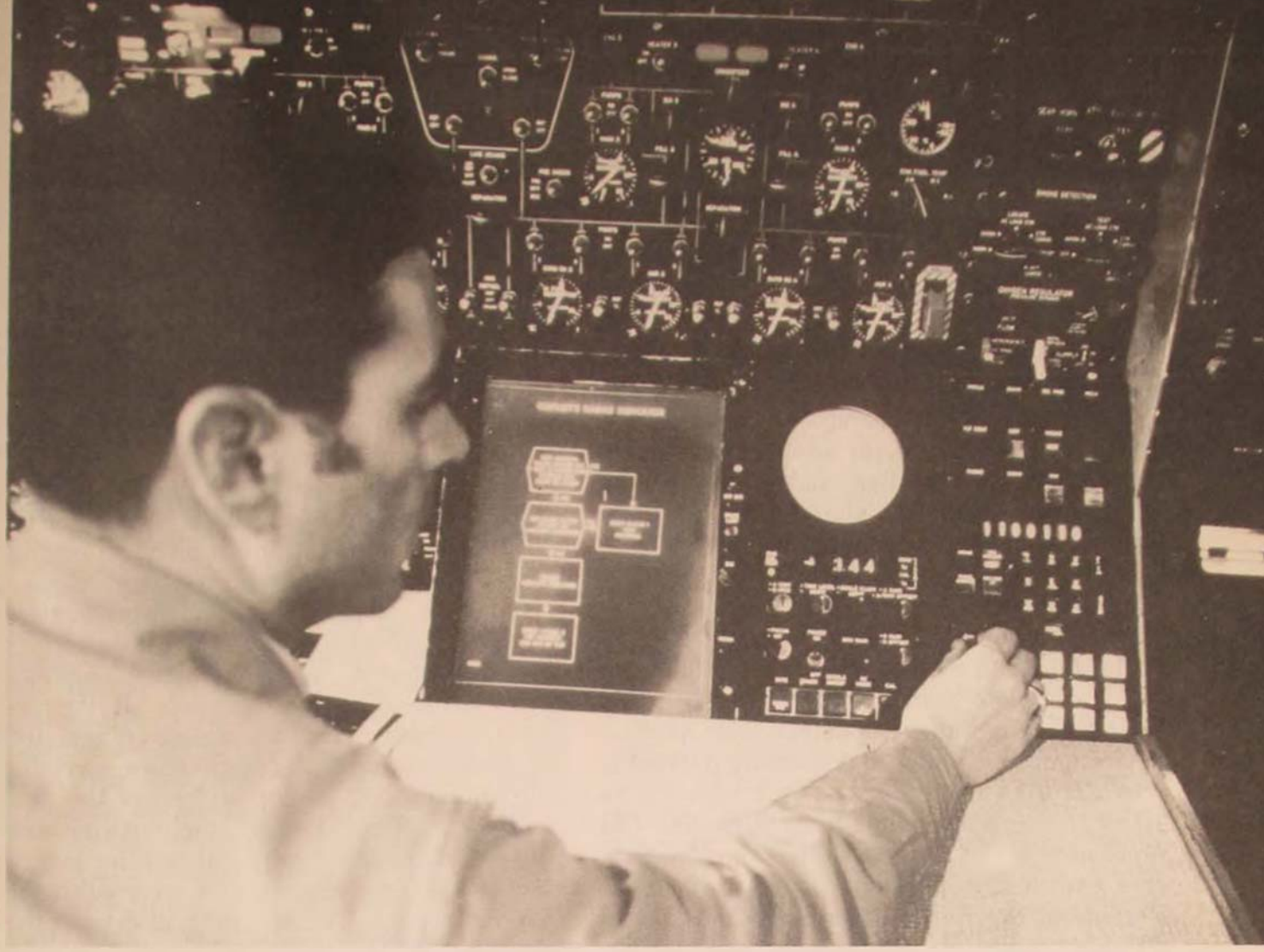
The potential benefits are not limited to base level. Failure trends, configuration characteristics, and reliability data have never been so readily available to the supporting depots. Logistics planning associated with spares positioning and component repair will be simpler and more precise because of the vastly enhanced ability to use more comprehensive and accurate data relative to component condition and bench check analysis results. Configuration management (the method of reporting and controlling changes to the hardware and/or components of each serial-numbered weapon system or major subsystem), one of our most complex tasks today, will be simplified considerably. Managers at all levels will have accurate information on fleet performance, configuration, and condition available to them more quickly than ever before. Experience data files can be established to provide decision-making inputs to maintenance, logistics, and operations managers.

While MADARS is installed only on the C-5 today, contractors have been asked to give increased consideration, consistent with operational employment concepts, to maintainability requirements in the design of the F-15 and the B-1. It is conceivable that by the end of this decade the majority of our first-line air fleet will be equipped with equal or more advanced capabilities.

It is illogical, however, to impose maintainability requirements on a contractor to design his system so that an engine can be changed in, say, thirty minutes, whereas the local base management and control system requires nearly that long to retrieve and research the engine record file for pertinent engine change data. Therefore, early in 1967, development of an improved, modernized maintenance management and control system got under way at the Air Force Data Systems Design Center. This system, termed MMICS (for Maintenance Management Information and Control System), is scheduled to be placed in operation worldwide during the seventies. MMICS is being programmed for base-level B 3500 third-generation computers and is to be fully compatible with MADARS.

The current Maintenance Management and Data Collection System has remained basically unchanged over the past ten years. Data collection requirements in the meantime have increased greatly due to system complexity and other factors. Modifications to the system have been made on a piecemeal basis, and the resultant system is a complicated conglomerate that does not completely satisfy any of the requirements placed upon it. Similarly, data processing equipment during the past ten years has made giant strides forward, but the Maintenance Management and Data Collection System still remains basically a punch-card system.

MMICS will commit all equipment histor-



Aboard a C-5, a flight engineer monitors control panel of MADARS (malfunction detection, analysis and recording subsystem), which displays on screen and records on tape any malfunction information.

ical data, time compliance technical order (TCTO) compliance, and maintenance actions to computer storage for immediate call-up and display when required in the maintenance management process. Aircraft schedules, shop workloads, training schedules, etc., will be printed upon request in accordance with preprogrammed requirements. MMICS is not intended to revolutionize maintenance operations, but it will greatly enhance maintenance management capability at base level and modernize maintenance data collection, processing, and dissemination capabilities.

Non-Destructive Inspection (NDI) techniques, while evolutionary in their development, do have potential for revolutionizing current inspection/overhaul concepts. The USAF Non-Destructive Inspection Program was established in March 1964 to increase accuracy and timeliness of equipment condition determination. It emphasizes before-the-fact inspection to minimize weapon system downtime, reduce maintenance manpower cost, and increase weapon system reliability and safety.

Although some Non-Destructive Inspection techniques such as visual optics, dye penetrants, and magnetic particle have been in use for many years, little progress was made in developing new equipment between World Wars I and II. Today, however, eddy current, ultrasonic, radiographic, and infrared devices made possible by our advancing technology have made Non-Destructive Inspection a more exact science, one that is paying ever increasing dividends. There are strong indications

that we have only scratched the surface of NDI potential. A composite condition mosaic of NDI results, on-board condition monitoring reports, and failure trends will provide the maintenance manager far greater insight into overall system condition and structural health than was ever before possible.

Automated technical data presentation, a subject which has been under intensive study and experimentation for several years, is another area wherein major advances are being made. One such system makes microfilmed maintenance technical data and logic tree trouble analysis diagrams immediately available for display and/or print-out. The printing of selected information permits the maintenance technician to have the required data at the work site without the necessity of carrying a complete manual. Film cartridges are updated as equipment changes occur. Another device, portable and also employing microfilm, provides a two-page side-by-side view on its 10-by-15-inch screen or a magnified view (24 times normal) of the area under consideration. It is a manually operated, rugged device with a print-out capability. There are other systems offering similar capabilities, using state-of-the-art hardware. The final product will undoubtedly undergo many refinements before acceptability to maintenance personnel is fully realized and maintenance expedited through its use. But whether it takes the form of a specialist-oriented pocket-sized microfilm display device, a hard copy print-out, or a built-in display on-board the aircraft, an improved means of displaying technical data will be in the hands of the maintenance specialists in the not-too-distant future.

I have mentioned only four developments—AIDS, MMICS, NDI, and improved technical data display. The acronyms may change, but the capabilities represented by them are certain to cause significant changes in the conduct of Air Force maintenance during the seventies.

LET'S examine a few envisioned changes here. I encourage the reader to extend his imaginative exploration to evoke others.

Aircraft turnaround, with all its frenzy, is a familiar pattern. The aircraft lands, the aircrew records discrepancies and completes debriefing, maintenance control is advised of discrepancies, hopefully the past associated discrepancies are researched, specialists are dispatched, troubleshooting commences, the discrepant unit is isolated, a replacement unit is ordered, unit is delivered, etc. In this time frame the capabilities will exist to change the scene drastically. Equipment deviations will either be relayed to control via satellite or be recorded during flight and radioed to control before landing. Control will pass the deficiencies to the responsible specialist function, which will call up that portion of the aircraft's history pertinent to the situation, identify TCTO's involved, order parts, etc. If the on-board equipment has not already pinpointed the discrepant unit, the appropriate specialist will troubleshoot, isolate, and order the necessary parts. Upon landing, the parts, personnel, and necessary equipment will be assembled at a designated point to accomplish the required repairs. The aircrew will deposit the micro-pac in the input receptacle, and the flight becomes a part of the aircraft history for future analysis. Repair actions will be relayed to the recorder in control, which will make input to the computers; parts consumption will be similarly recorded, recoverable parts alert notices automatically printed out in the appropriate work centers, and the discrepancy cleared on control's display.

In many instances, however, this whole procedure would be quite unnecessary, since component performance analysis over the past 60 days indicated failure could be anticipated on one of the last three flights, allowing the failing line-replaceable unit to be preordered and held in the appropriate shop. Had the impending failure unit not been a fly-to-fail item, it would have been changed when performance dropped below the acceptable go/no-go threshold. Or the component might well have been replaced early if failure was predicted to occur during a forthcoming cross-country.

I appreciate that much of this—research

of records, preorder of known requirements, TCTO's pending, etc.—is already accomplished in efficient maintenance functions; however, forthcoming capabilities will make it quite routine and far easier to achieve within the time and personnel limitations imposed. Unfortunately, there is little on the horizon that promises to reduce the ever present need for skilled, dedicated specialists and managers, but the capability will exist to allow each specialist to spend the majority of his time rendering aircraft flyable rather than attempting to interpret confusing technical data, troubleshoot entire subsystems, and record endless actions manually on the appropriate forms. For the manager, we are rapidly approaching the day when all management levels will have even more information than currently exists in that little notebook in the flight supervisor's fatigue pocket, and it can be displayed in less time than it takes to extract that little notebook from a fatigue pocket.

Manual TCTO accounting and reporting, now a burdensome task to say the least, will exist only in the memory of old-timers by the close of this decade. Control of TCTO accomplishment will in all probability pass in large measure to the depot exercising system management over the system. Compliance, other than for safety of flight items requiring immediate grounding and accomplishment, will be scheduled with related work on an individual system basis. TCTO requirements will become a routine call-up item each time unscheduled maintenance is performed by a specialist shop. Compliance will be recorded through the onboard recorder or flight-line input device. Monthly configuration reporting from the using activity will be unnecessary, since the supporting depot will have the same data record, updated as the action occurs.

In all likelihood the greatest payoff in resource expenditure, however, will come in the area of Inspect and Repair as Necessary (IRAN) and scheduled inspections through the application of advanced monitoring and inspection techniques. In theory, the only time we should repair an item is when it needs repair. The only time restorative maintenance should be performed is when failure is imminent and restorative action is required. We are rapidly approaching the point in time when we simply cannot afford the aircraft downtime or resource expenditure associated with one IRAN or one scheduled inspection that is not absolutely essential to the continued safe operation of the equipment. The calendar intervals by which IRAN's, for the most part, are now scheduled need thorough study. The "magic" associated with a 24-month or 36-month interval is in need of further examination. These maintenance procedures, traditionally a part of our way of doing business, are being overtaken by new detection and inspection techniques. The capability to monitor equipment health will hopefully provide sufficient insight into overall equipment condition to warrant abolishing a fixed inspection/overhaul schedule. System-oriented NDI programs, including multiple NDI probe point checks of critical structural members, should provide the structural status information necessary to allow individual scheduling of aircraft into maintenance facilities for needed restorative and repair actions. Servicing requirements and periodic probe checks will necessitate scheduled inspections for some time to come, but major repair and restorative needs, for the most part, will be accomplished only as needed for continued safe operation.

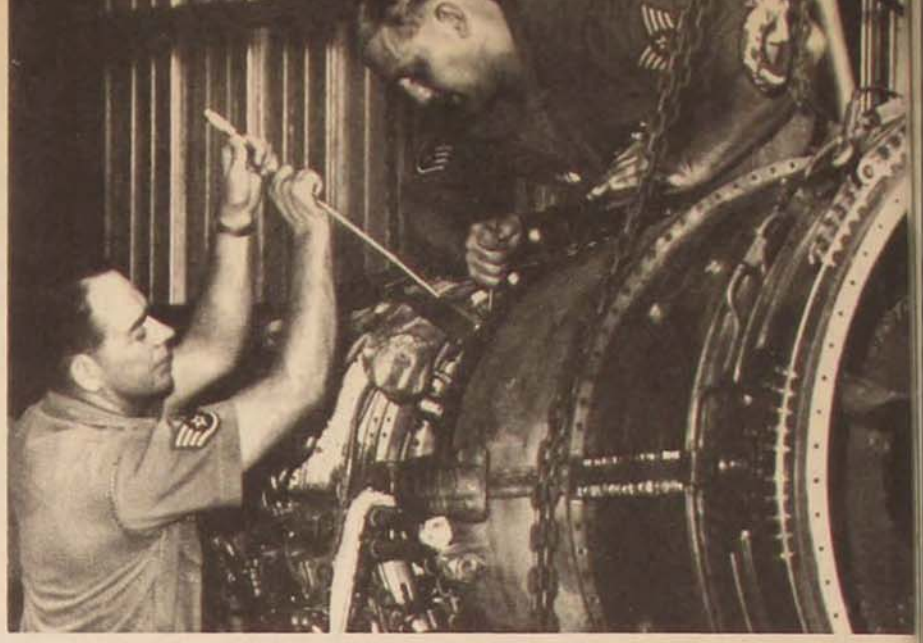
Only a few of the more obvious possibilities have been mentioned here. Some of these capabilities require a good deal more developmental work, others merely require refinement and adaptation, but every one of them is well within the current state of the art.

WHILE most of the preceding discussion has been specifically oriented to aircraft maintenance, the role of the CEM maintenance man is also changing as his equipment moves into a new generation of sophistication. Fault isolation equipment and remove-and-replace concepts will allow the operator to do more "on-equipment" maintenance while the maintainer becomes a systems analyst, mechanic, or skilled technician working in a near-depot environment.

Continued on page 28

Of Men and Maintenance

Jet engine mechanics at Cam Ranh Bay Air Base, Vietnam, repair a 17,000-lb-thrust J-79-15 engine used in the F-4C Phantom.



An aircraft electrician squeezes into the forward section of an F-4C, in the maintenance hangar at Ogden Air Materiel Area, Utah, for inspection and repair as necessary (IRAN).

After the Seventh Air Force F-105 has been released by maintenance section, quality control technicians recheck the work performed on the airframe to insure greater safety.

In Vietnam, after the maintenance technicians have finished their work, armament specialists add the decisive payload—like a 500-pound bomb attached to the bomb rack of an F-4C.

There are no indications to suggest that the current ground swell of interest in maintainability is going to abate, for life cycle cost studies have highlighted system support as a lucrative area for cost reduction. Early capabilities show it to be an area ripe for innovation through the application of advanced technology. Capability advancements will come rapidly; but the acceptance, reliance upon, and support of these unique capabilities by commanders and maintenance personnel will in all probability come much more slowly.

New disciplines, new procedures and rules, and fresh outlooks will be required. Old hardware is easily replaced, but old concepts and practices do not die easily. How can computerized, on-call aircraft historical data assist in the troubleshooting process if it is not used? No benefit can accrue from an improved technical data display unless it is used by the specialist. Failure to use or heed NDI results could be particularly disastrous in the environment envisioned. Of what value is a multimillion-dollar aircraft integrated data system if it is not employed full-time to the very limit of its capability? How reliable are failure trends, configuration status reports, and spares positioning guidance going to be if based upon intermittent AIDS operation? No, the system is not essential to the safe operation of the aircraft, but many decisions in the logistics process will be based upon AIDS data. Fortunately, because of the vision of Air Force leaders over the past decade, we have the educational base not only to adapt to these new capabilities but to extend them.

We have explored what appear to be the predominant factors influencing maintenance support in the seventies. We appear to be "locked in" to a decade characterized by more costly, more complex systems wherein at least a part of that increased cost and complexity was generated to simplify and expedite the maintenance task. The high cost of these systems has necessitated a smaller buy. Reduced inventories demand higher utilization rates to meet unchanged operational requirements. These are the demands confronting us.

On the plus side of the ledger, we will enjoy the benefits of equipment condition and performance monitoring, malfunction detection, and automatic troubleshooting capabilities to a greater degree than ever before experienced. More data, collected and disseminated in less time and with less chance of error, will be available in a more usable form at all levels of maintenance management. A greater percentage of flight-line replaceable units, requiring minimum equipment in order to effect replacement, will characterize future systems. Improved technical data display methods will be available. Greater visibility over serviceable and reparable components will be provided, thus allowing better control over the repair and disposition of such components. These are the tools available to meet the increased utilization demands confronting us.

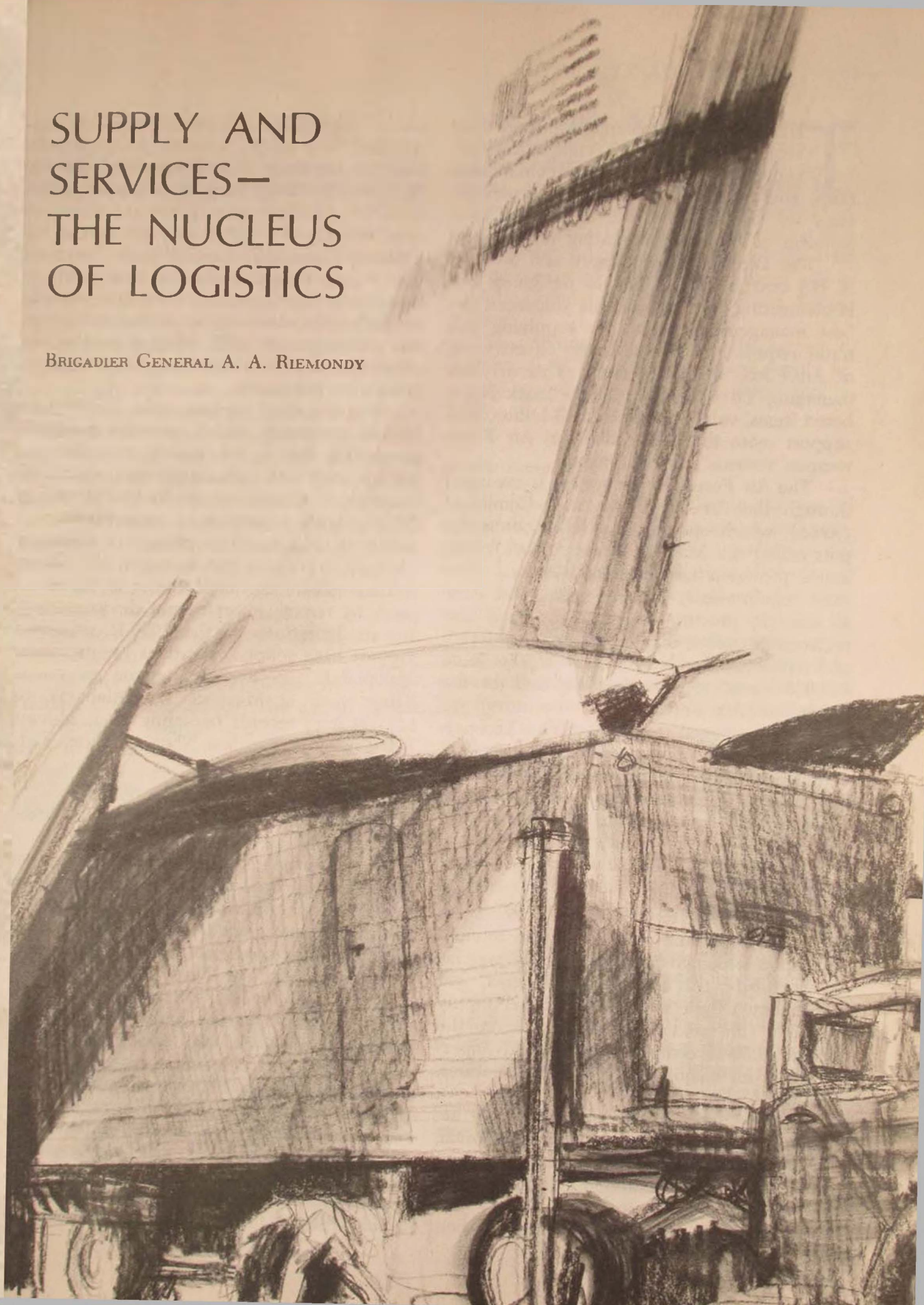
Our personnel are well schooled in the very sciences which gave birth to these new capabilities. An austere budget serves to accelerate and intensify our actions. The need has never been more pressing, the consequences of failure never more far-reaching. No less than Air Force mission accomplishment may be at stake.

I call upon maintenance personnel at all levels to accept the challenge and—true to maintenance tradition—make the difficult easy.

Hq United States Air Force

SUPPLY AND SERVICES— THE NUCLEUS OF LOGISTICS

BRIGADIER GENERAL A. A. RIEMONDY



THE more things change, the more they remain the same. Technological improvements in computers, communications, and transportation merely sharpen the tools we use to solve the age-old military problem of supplying operating units.

The Directorate of Supply and Services in Hq USAF is responsible for designing and implementing, within available resources, the best management system for supplying materiel required to maintain the effectiveness of Air Force weapon systems. This involves managing 1.8 million Federally Stock Numbered items, valued at almost $13 billion, that support more than $38 billion in Air Force weapon systems and equipment.

The Air Force supply system is managed through the Air Force Logistics Command (AFLC), which operates five large CONUS depots called Air Materiel Areas (AMA's). The AMA's provision new weapon systems, compute requirements, procure, store, and issue all centrally procured supply items. They also redistribute assets, dispose of excess materiel, and repair items coded for depot repair. Some 940,000 items, representing the bulk of the $13-billion Air Force supply inventory, are centrally managed by the AMA's. Through stock fund procedures, Hq AFLC monitors acquisition of the other 860,000 items from Department of Defense wholesalers, the General Services Administration, or local purchase.

Standard Base Level Supply System

To standardize the supply function at Air Force bases and establish a firm foundation upon which to build the supply systems of the future, this Directorate designed and implemented the Standard Base Level Supply System. The system, programmed on the Univac 1050-II computer, is presently operating at all major Air Force installations, worldwide.

In 1962 most Air Force base supply accounts were managed by a mix of manual, punch-card, or computerized inventory control systems. Eleven different systems were in use, each designed autonomously by the major commands to fit the peculiarities of their accounting equipment. Proliferation of nonstandard base supply systems, designed with minimal Hq USAF control, restricted the Air Staff in establishing meaningful supply policy. Lack of standardization prevented measurement of support effectiveness, diluted the Air Training Command's capability, and required base supply organizations that were costly in manpower. The decision to develop a centrally controlled standard supply inventory system was announced in 1962, when it became obvious that the Air Force had outgrown first-generation computers.

The resultant system uses the Univac 1050-II computer, which provides real-time processing; that is, information stored within it is updated with each supply transaction and therefore is always current. Its building-block design allows expansion or reduction of capacity to accommodate changing workload. The system was the first in DOD to offer direct and immediate customer access to the computer by remote input/output devices. Varying configurations of the 1050-II computer support base supply operations ranging from 32,000 item records operating on an 8-hour 5-day week at Maxwell AFB, Alabama, to 123,000 item records operating on a 24-hour 7-day week at Tan Son Nhut Air Base, Vietnam.

Four major advantages accrued from adoption of the Standard Base Level Supply System:

• Central development and control of system design, implementation, and operation. Central control makes it possible to change a computer program simultaneously at all bases to implement a policy decision or improve system design. The Air Force recently, with a single program modification, changed procedure at all Air Force bases to establish a stock level for stock fund items on the fourth rather than third demand. An accompanying benefit of central control was reduction of personnel required to develop inventory control systems. Prior to standardization nine major commands maintained development groups, each as large as the supply portion of the Air Force Data Systems Design Center which replaced them.

• Standard supply organization. The number of different supply organizations paralleled the systems in existence prior to 1963. A single standard organization with standardized operations, system products, forms, and training now serves all bases.

• Reduction in supply manning. Frequently, when a manual management system is converted to automated data processing equipment, additional personnel are required to use the computer's voluminous output. The opposite was true in our mechanization of the base supply operation. From 1957 to 1962, during the major command change from manual to "interim" computers, Supply Unit Manning Documents were reduced by 2500 manpower spaces. Acquisition of the Univac 1050-II system resulted in 862 fewer base supply personnel; later an additional 290 spaces were eliminated through system improvement. The installation of the standard supply organization led to development of engineered manning standards for 39 base work centers, resulting in reduction of another 3020 positions.

• More effective instruction by the Air Training Command (ATC). The eleven different inventory control systems in existence prior to 1962 diluted base supply training offered by ATC; personnel trained by ATC had to be retrained in the specifics of the system used by their command. With the introduction of the Standard Supply System, ATC assumed total system training and presented a complete course of instruction. Of approximately 49,000 military personnel in the Air Force supply career field, about 38,000 have received formal training in the Standard Base Level System.

satellite bases

Our standard system supports many different sizes and varieties of Air Force bases. However, there are 45 bases whose supply accounts have insufficient items or too few monthly transactions to qualify for assignment of a computer. To benefit from real-time computer operation and the accompanying manpower savings at these smaller bases, a "satellite system" was developed. The supply accounting records of the satellite base are maintained on a host-base supply computer, and immediate access is provided through a remote device located at the satellite base. All supply functions, other than posting accounting records, are performed at the satellite base. By the end of FY 70 the last satellite base will be converted, and all active bases will be operating under the Standard Base Supply System.

In addition, we have jointly agreed to convert all 92 Air National Guard supply accounts to our satellite system, beginning in 1970.

mobile computer

A feasibility study exploring the use of a "mobile" 1050-II supply computer was completed in June 1966. At that time it was intended primarily for installation at Southeast Asia (SEA) bases. A poll of the major commands suggested other uses and resulted in expanding the concept. Now the mobile computer serves as a worldwide backup for temporarily inoperative systems or those destroyed by enemy action, fire, or natural disaster.

The mobile computer comprises an entire Univac 1050-II installed in three vans. Completely self-sufficient, carrying its own power supply and air-conditioning equipment, it can be operational within six hours after delivery. It is air-transportable in three C-141s or four C-130s and can be shipped by rail on flat cars or by tractor over roads.

A mobile computer is presently stationed at Clark Air Base in the Philippines. It has twice been deployed successfully, providing computerized base supply operations at U-Tapao Air Base, Thailand, and Osan Air Base, South Korea, when the local base computers were shut down for major modifications. The need to provide computerized supply capability for deploying forces and the proven value of the mobile 1050-II computer have resulted in our requesting additional sets.

war readiness materiel

Combat aircraft of the present-day Air

Force are hungry machines that devour huge amounts of bombs, bullets, fuel, and other war consumable items in carrying out their combat assignments. The bomb load of the B-52, for example, exceeds the bomb load of a squadron of World War II B-17s, and the firepower of the modern fighter plane is awesome. Providing materiel to keep this modern force effective and "ready to go" calls for imaginative thinking and detailed planning to develop sound management techniques.

One of the techniques that contributes to the combat readiness of our modern Air Force is the procurement and stockpiling of war materials in advance of their need. This concept, as old as military history, has to keep pace with advancing technology.

The current concept of stockpiling war materiel dates back to the end of World War II, when vast amounts of materiel were on hand and "excess" to any foreseeable requirement. Much of this materiel was identified, packed, and stored on the East and West coasts.

When the strategic concept of massive retaliation was dominant in the early fifties, primary emphasis was placed on supplying the Strategic Air Command (SAC) with prepacked, air-transportable materiel to support a "short" war, generally 30 to 90 days.

In 1952 we started stockpiling war materiel at selected bases to enable Air Force units to become operational immediately after deployment, rather than waiting for delivery of supplies and equipment by surface shipping. "Seaweed," "Nightlife," "Big Top," and "Fly-away Kits" identified the various coded programs for stockpiling war materiel.

In 1959 the term "war readiness materiel" (WRM) was adopted, covering the entire spectrum of war reserve stocks in the Air Force. In the late fifties and early sixties the doctrine of flexible response replaced that of massive retaliation. Flexible response required a force structure capable of rapidly responding to the outbreak of a limited war, contingency, or insurgency while retaining the capability to support a general nuclear or nonnuclear war. This change precipitated the storage of war readiness materiel at specific locations where

An all-too typical storage area at an operational site in Southeast Asia, during the early period of U.S. combat operations, pointed up the requirement for a better system of controlling the Air Force inventory of supplies and equipment.

likelihood of need could be anticipated. Our national defense policy continues to stress flexible response, with increasing emphasis on controlled response and nonnuclear options.

The current USAF war readiness materiel program, with an investment of more than $2 billion in materiel, has an impact on every operational command and practically every air base in the free world. It furnishes the initial wartime punch for our combat forces, assuring them of sufficient supplies and equipment until normal supply channels can be established.

Items set aside for WRM, the quantities required for a specified period of time, and the locations for prepositioning them are determined by a series of planning documents. The Joint Chiefs of Staff (JCS) is the focal point for military planning, and two JCS plans provide the basis for the WRM program. The Joint Strategic Objectives Plan, published annually, projects the forces and strategies for countering the threat to our national security over an eight-year period. The Joint Strategic Capabilities Plan, also published annually, looks one year into the future in depicting the capability of available forces. The services are required to publish plans to support the JSOP and the JSCP.

The USAF War and Mobilization Plan (WMP), published in ten volumes, covers the period of the USAF Five-Year Defense Program and directly supports the JSCP for the following year. Volume 4 (WMP-4) establishes the approved USAF and major command coordinated position on operational use of bases in wartime through five years. It lists time-phased wartime aircraft activity for USAF forces. Volume 5 (WMP-5) shows approved USAF planning factors for expenditure of war consumables and includes missile requirements. The war consumable requirements for each planned operating base are published in the USAF War Consumable Distribution Objectives (WCDO). This document, derived quarterly from WMP-4 and WMP-5, informs base commanders of changing requirements in war consumables stockage objectives.

The acquisition phase of the WRM program originates with an annual Logistics Guidance Letter forwarded by the Secretary of Defense to all services. It sets general parameters upon which we compute requirements and submit budgets to attain WRM acquisition objectives. We implement this by publishing an annual Air Force letter pertaining to buying/budget and related policies for wartime logistics support.

WRM categories

War consumables are expendable items aggregated in the general categories:

Airmunitions
Petroleum, oil, and lubricants (POL)
Tanks, adaptors, racks, and pylons
Film, chaff, in-flight rations, and other miscellaneous items.

War consumables comprise the largest portion of our war readiness materiel—about 75 percent of the total cost—but we also have the following important categories of materiel in the program:

- War readiness spares kits (WRSK's)—air-transportable collections of spare parts and related technical items, stored and maintained by using activities, to provide initial support upon deployment
- Station sets – limited supply of ground support equipment maintained at selected bases for initial support of deploying units
- Housekeeping sets–equipment to provide billet and messing support for base augmentation, including bare-base sets
- Field rations – prepositioned rations to ensure support of base augmentation forces.

WRM management

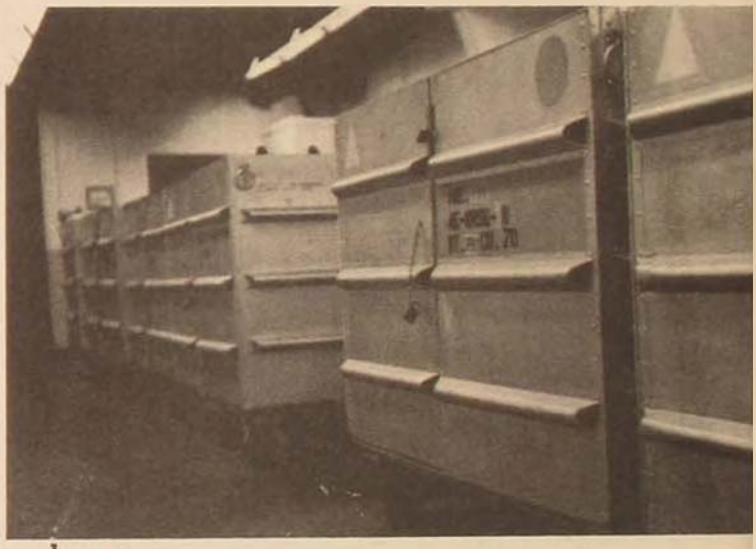
A two-pronged reporting system is used to manage the WRM program. All bases responsible for storing WRM consumables submit monthly war consumable asset reports to their parent major command. The reports list, by item, what is currently authorized, the stock on hand, and where it is stored. Major com-

mands review and consolidate the reports and forward them to Hq AFLC and Hq USAF. At Hq USAF we publish the reports in various formats, including one for maintaining an up-to-date data base in our command and control computers. This greatly enhances our ability to support unplanned contingencies. For example, WRM prepositioned in the Pacific area was available for immediate use during the 1968 *Pueblo* crisis. Our computer program, coupled with the WRM data base, enabled us to quickly determine support requirements for the tailored deployment forces and move necessary assets into position.

The WRM Capabilities Report, commonly referred to as the "M-rating" report, provides commanders with a standard measurement tool to determine the ability of their war readiness materiel to support WMP combat requirements. WRM assets are assigned to separate categories by type of materiel, and each category is assigned an M-rating by the bases or units responsible for its management. Standard percentage factors are established for assigning M-ratings, but commanders may alter the rating if the percentage factors are not truly representative of actual capabilities. Each rating change must be explained.

WRSK Program

The concept of the War Readiness Spares Kit has solved the problem of stockpiling sufficient consumables to feed the hungry machines produced by advancing technology, thus enabling Air Force units to deploy and operate from any location on short notice. (a) WRSK bins on wheels for easy movement . . . (b) Bins moving to flight line . . . (c) Palletized WRSKs ready for air transport . . . (d) At Travis AFB, California, WRSK trailers and a built-up propeller ready for installation . . . (e) A WRSK bin on flight line at Seymour Johnson AFB, North Carolina.



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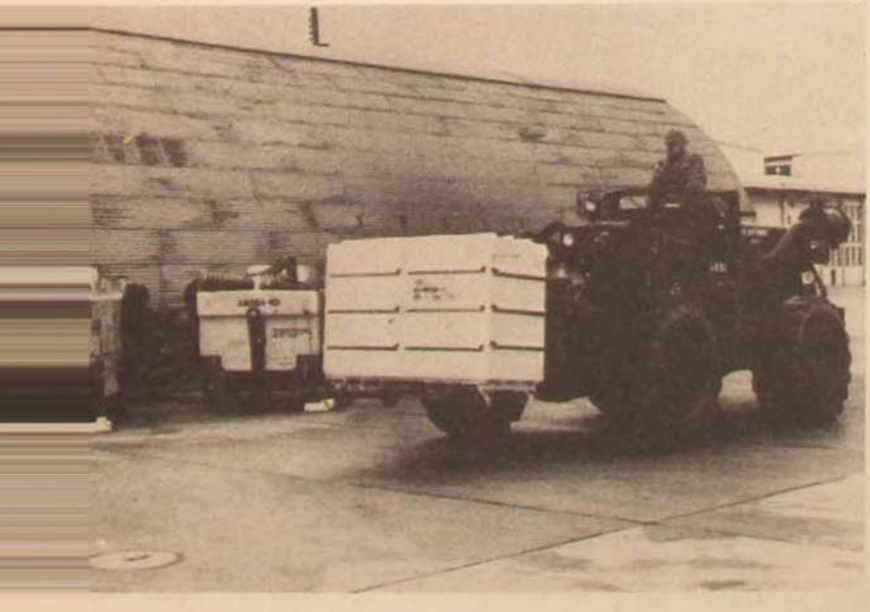

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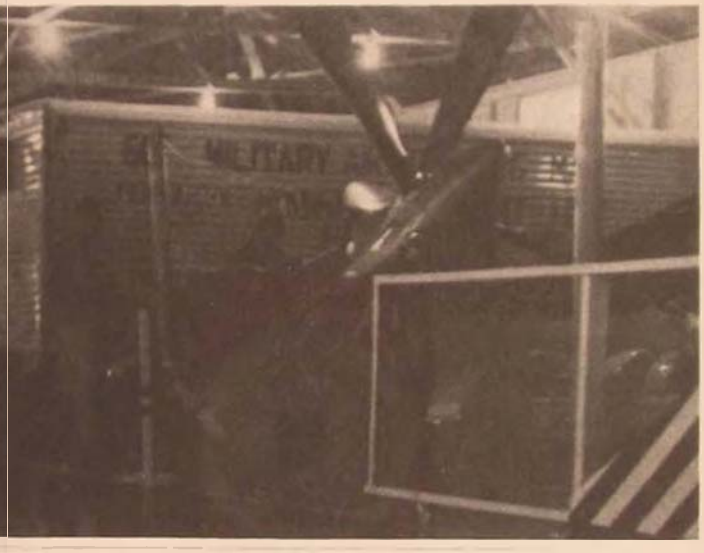
In May 1969 we directed an in-depth study of the WRSK concept. These kits have long been important to the mobility of Air Force units, allowing them to deploy and operate from new locations on short notice. We have approximately 500 WRSK's, representing an asset investment of more than $400 million. The cost of WRSK's has risen sharply with each new and progressively more sophisticated weapon system. With this in mind, we undertook to find the optimum method of supporting deploying units at minimum essential cost. When the study is completed in May 1970, we anticipate that improved WRSK management techniques and some changes in mobility support concepts will emerge.

airmunitions

We in Supply and Services manage both the nuclear and conventional nonnuclear airmunitions programs.

It is no longer news that the Southeast Asia conflict caught us virtually flatfooted with an arsenal of World War II conventional munitions, fuzes, and associated components and equipment. We spent the first two years of SEA escalation "catching up," modifying,



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improving, borrowing, and trading with other services. The use of out-of-date airmunitions relegated our sophisticated jet aircraft to unsophisticated roles.

Changing tactics of Communist aggression require continuous updating of nonnuclear countermeasures. Our experience in Korea and Vietnam has taught us that our conventional munitions as well as weapon delivery systems must be modernized and upgraded. We can no longer rely on a single "family" of firepower such as nuclear weaponry. I am sure that this theme will stand out when the Office of the Secretary of Defense (OSD) Joint Logistics Review Board and the Air Force Project Corona Harvest study group analyze the lessons learned from Southeast Asia.

Research and development of conventional munitions was suspended between World War II and Korea and again between Korea and the Vietnam conflict. The lapse cost us valuable lead time required to establish and expand production facilities, initiate research, and train engineers and support personnel. We should not be willing to gamble on having as much lead time again as we had during the Vietnam conflict.

Our current airmunitions inventory has been significantly enhanced by the expedited research and development prompted by the conflict in Vietnam. Because our new munitions were tested and evaluated in an actual rather than a simulated combat environment, we were able to choose the best new developments for countering potential near-term threats.

Standard Airmunitions Packages

The Coronet Bare exercise in October 1969 proved the effectiveness of many systems and concepts developed over the last few years. Among these were Standard Airmunitions Packages (STAMPS), which are selected packages of airmunitions that can be prepackaged for airlifting and prepositioning so that sorties can be launched within hours from any operating location in the world. The advent of the C-5 Galaxy will permit a larger variety of STAMPS. Although tested and validated, the concept is still in its infancy, and new ideas and variations of existing methods will be needed to ensure a viable program.

The reporting of airmunitions from base to depot evolved from a manual system in 1965 to an almost fully mechanized system. The computerized Standard Airmunitions Reporting and Management System was implemented in 1969 by every major command that had a significant volume of airmunition transactions. Continuing refinements and improvements are being directed toward the reporting of complete rounds and in-transit data. This system is interfaced with our mechanized munitions inventory system at the Ogden Air Materiel Area, Hill AFB, Utah. From these two data systems the Air Force can obtain almost any information required for munitions management and capability studies. Selected information is fed into the Air Force Command and Control System twice a month and provides the Air Staff with visibility of current munition assets. Ogden Air Materiel Area and Warner Robins Air Materiel Area, Georgia, also furnish selected data from these systems to JCS and OSD, and many of the airmunitions funding, production, and distribution decisions are based on these data.

Just as computers require extensive peripheral equipment to function at maximum efficiency, munitions rely on currency and flexibility of supplementary hardware and software for effective employment. At the beginning of the Vietnam involvement we were hard-pressed to supply fighter units with airmunitions and related support components. Munition storage facilities in Vietnam were inadequate or nonexistent. Vietnam ports were not capable of handling the thousands of troops and hundreds of thousands of tons of support supplies and equipment, and the in-country rail and road systems were inadequate and dangerous. We had to furnish most of the equipment and train hundreds of personnel to offload, handle, and transport cargo. The airmunition delays encountered at the Vietnam ports were overcome by the Air Force Special Express System, which had been proposed by a Thirteenth Air Force staff

study. It consisted of a fleet of ships chartered for exclusive use by the Air Force to transport airmunitions to Southeast Asia. These ships, loaded with selected airmunition items and their related support components, served as floating warehouses. Our bases ordered through the Airmunitions Control Point (ACP) at Headquarters Seventh Air Force. The ACP, equipped with copies of the ships' manifests, directed one of these Special Express vessels to a port for offload of the required munitions and supporting components. This system proved an excellent interim solution between March 1965, when the first ship sailed from CONUS, and January 1967, when the Special Express was phased out. At the peak of the operation we had 19 ships under charter.

supply services

Nine hundred thousand blue-suiters and their two million dependents require an extensive network of facilities to supply them with essential services. The Directorate of Supply and Services monitors the operation of 156 clothing stores, 202 commissaries, 1081 feeding facilities, 32 laundry and dry-cleaning plants. In addition, we establish policies and procedures for supplying Air Force housing and operating mortuary facilities. The availability and quality of these services vitally affect the welfare and morale of Air Force personnel and their dependents. This realization has resulted in placing increased emphasis upon improving these services and the facilities that house them.

commissaries

Crowded commissary stores and lack of commissary warehouse space have become almost a way of life. Commissary sales increase every year and the growing shortage of facilities threatens to become critical, but actions are being taken to alleviate these problems. Authority has been obtained to use excess commissary surcharge funds, not to exceed $200,000 per project, for alterations and minor construction of commissaries. This will help, but excess funds available for this purpose are limited and probably will continue to be. The Office of the Secretary of Defense has been requested to approve an increase in surcharge funds, which would slightly raise commissary prices, and to authorize use of these funds for major commissary construction. This procedure would be used only when funds could not be obtained through the Military Construction Program. Approval of the increased surcharge for building and enlarging commissaries would satisfy growing requirements for commissary facilities within five years.

The Air Force Data Systems Design Center is developing computer programs for commissary accounts which will integrate them into the Standard Base Supply System on the Univac 1050-II computer. This will eliminate time-consuming monthly inventories and concurrently update supply, accounting, and finance records. In addition, mechanization will automate price changes, requirement computations, semiannual inventories, and the commissary operating program.

clothing stores

Uniform clothing management has been attracting increasing attention, and a vigorous program of modernizing facilities is under way. Clothing stores in dilapidated out-of-the-way buildings do not attract customers; facilities comparable to those in civilian clothing outlets are the ultimate goal. Transformation of the WAF Clothing Issue Center, Lackland AFB, Texas, into a "House of Fashion" resembling a modern dress shop set an important precedent. Similar actions are under way or planned for several other clothing outlets. Equipment tables of allowances have been revised to authorize equipment suitable to the location and decor of attractively appointed stores.

Service tests at Air Training Command bases showed the desirability of automating Air Force clothing store operations using the basic Univac 1050-II Standard Base Supply System. Computerization is under way and will be completed by July 1970.

Following this trend toward computeriz-

A C-130 Hercules of the 315th Air Division lifts off after resupplying a remote Army outpost in Vietnam, 10,000 miles from the pipeline's start.

ing all base supply activities, priorities have been established to add munitions, aviation fuel, base housing supply, and redistribution and marketing accounts to the base 1050-II computers.

food services

Many improvements have been implemented in food services, and various other innovations have been tested and evaluated to make the dining halls more attractive to Air Force personnel. Convenience foods were tested, and it appears that they may be incorporated into menus as more specialized equipment and methods of reconstituting and serving them are developed. Central preparation of foods has proved to be practical and economical, so meats, vegetables, and bakery products are being processed at one location on a base and delivered to the individual dining halls.

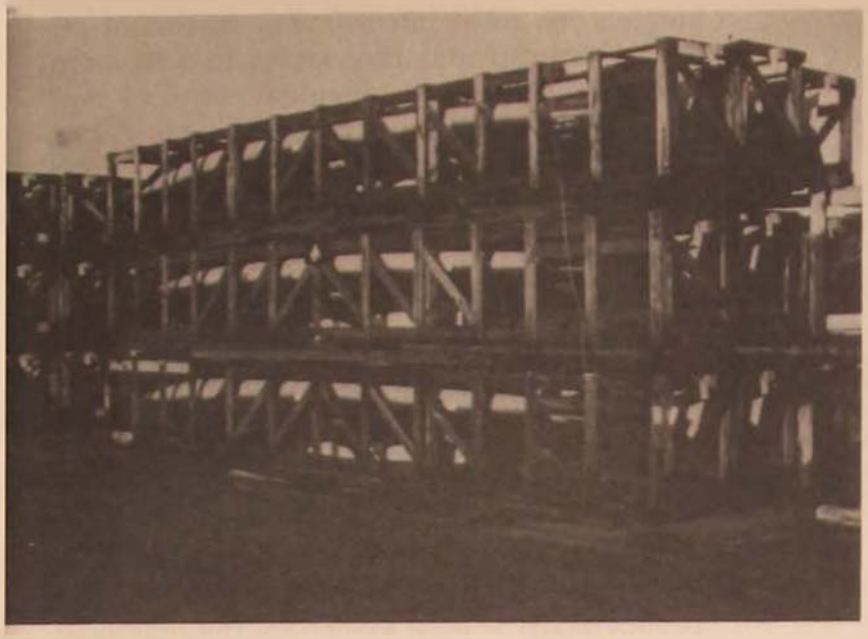
The military services completed six months of testing on an Armed Forces Standard 42-Day Cycle Menu. It was determined that locale had to be given greater consideration in planning menus: what is traditional in one section of the country often is not acceptable in another. Findings from the test are being incorporated into the master menu now being planned for calendar year 1971.

aviation fuels and oils

An allied responsibility of the Supply Services Division is management of aviation fuels and oils, which are subject to exceedingly rapid turnover. During the past year an average of 779 million gallons valued at $97 million was issued each month. The worldwide inventory, reported monthly, averaged 2.2 billion gallons valued at $266 million. These products are stored and issued at 243 bases supported by 94 storage terminals.

changes in supply philosophy

In the years following World War II the Air Force stored large stockpiles of materiel in numerous CONUS and overseas depots to support its activities. In recent years, improved technology in logistics processes paved the way for "direct support" of our operating units, which now requisition much of their



Droppable fuel tanks, a war consumable item stored at RAF Wethersfield, England

materiel, as required, from Air Materiel Areas. Overseas depots were eliminated and CONUS depots consolidated into the existing five AMA's. Requisitions instantaneously transmitted by AUTODIN, computer processing of supply actions at AMA's and bases, and increasingly rapid transportation make it possible to support a larger inventory of Air Force weapon systems and equipment with proportionately less support materiel. During the past ten years the total value of Air Force weapon systems and equipment increased by more than 40 percent, from $26.9 billion to $39.8 billion, while the supply support inventory increased less than 5 percent from $12.3 billion to $12.9 billion. During the same period supply effectiveness, as measured by operational readiness of Air Force operating units, increased.

How this was accomplished can be partially explained by an examination of our requirement computations, which are designed to represent mathematically what occurs in the supply system. Support requirements are directly related to supply experience, and they vary in direct proportion to changing supply conditions. For instance, on each recoverable line item, the procurement lead time requirement is computed from the item's procurement history, the replacement requirement from the item's failure and condemnation data, the order and shipping requirement from time of requisitioning to receipt of materiel, and the repair cycle requirement from time needed to repair the item. Management improvements over the years have decreased the time required to perform these functions and proportionately reduced stock levels required to support a given level of weapon system activity.

In FY 69 the Air Force brought all expense items under stock fund management. Stock funding brings control of supply resources down to the operational commander's level. He estimates annual budget requirements within his consumer funds availability and then operates within monies allocated for that purpose. Seven hundred thousand items centrally procured by Air Force AMA's, valued at $1.9 billion, are now managed under the Systems Support Division of the Air Force Stock Fund. An additional 858,000 items, procured from DSA, GSA, other service stock funds, and local purchase, valued at $705 million, have been placed under the control of the General Support Stock Fund.

Advanced Logistics System

The interrelationships of logistics functions will be brought into focus within the Advanced Logistics System (ALS) which AFLC is currently designing. Using third-generation computers, ALS will combine existing AFLC supply, maintenance, engineering, procurement, and transportation data systems into one unified system. It will be possible to appraise immediately the impact of a logistics action upon all aspects of item management. By providing complete visibility, ALS will isolate the source of logistics problems and direct our attention to the solutions.

Frequently, an apparent supply shortage is actually a symptom of a deficiency in one of the other logistics areas. Unreliability of item performance may be causing excessive failures, difficulties with engineering specifications may be lengthening procurement lead time, or unrealistic preservation and packaging instructions may be delaying shipment. And then again, the item may be available but unreported somewhere in the vast Air Force supply complex. Since AMA computers do not now function on real time and item managers do not have access to daily asset information at base level, on items other than AFRAMS, the item is lost to the system until reported. ALS will provide random access on a near real-time basis to worldwide asset information, thus contributing to optimum distribution of assets.

As THE WORLD'S largest user of computers, Air Force supply personnel are acknowledged leaders in implementing modern supply techniques. While we are proud of past achievements, in a climate of stringent military budgets we must intensify our review of all supply policies and procedures to find more cost-effective ways of providing optimum supply support. No supply technique, no matter how well established, will be exempt from this relentless search.

What does the future hold in store? Forecasting is always a precarious undertaking. However, the potential of third-generation computers strongly suggests the direction in which the Air Force supply system will evolve in the seventies.

Because item managers will have constantly updated worldwide visibility of spares, their management capability will increase. Knowledge of the worldwide supply status at bases will lend itself to a "push" system. Base requirements will be known by the item managers, who will be able to routinely ship materiel to where it is needed without requisitioning. Stock funded items, obviously, would be excluded from the "push" system. Supply discipline on stock funded items results from charging items against the limited funds of the requisitioners and then crediting them for return of items excess to their needs.

Mathematical modeling will play a larger role in creating supply stockage policy. In the past, experience was our only criterion, and experience often depicts the expedient rather than the optimum way of doing business. Computer simulation will test proposed supply policies before implementation to preclude costly trial-and-error testing within the supply system. Advanced analysis techniques will more effectively detect errors and suggest corrective actions.

Overall, the established trend of supporting a given inventory of weapon systems and equipment with a proportionately smaller investment in support materiel will continue.

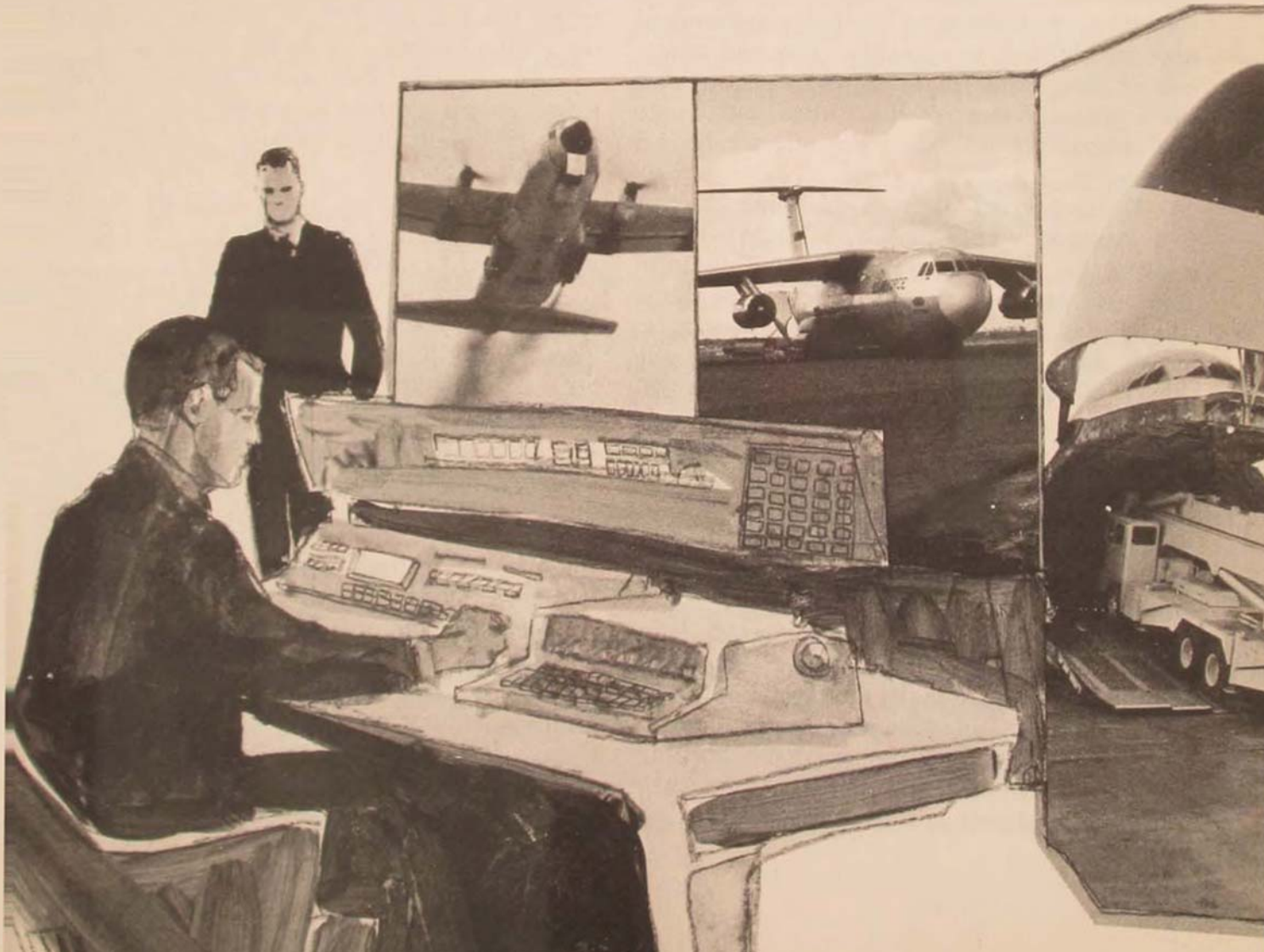
Hq United States Air Force

LOGISTICS PLANNING FOR THE 1980'S

BRIGADIER GENERAL PETER R. DELONGA

Strategy must have a logistics base. In the short run, logistics affects the deployment and employment of forces. In the long run, a logistics base must be developed to support strategy.[1]

Air Force Logistics Doctrine



THE GOAL in discussing planning for the 1980s is not to forecast developments in hardware or to outline the value of each of our printed plans, but to depict the challenges and decisions our logistics leadership must face during the 1970s.

Our Air Force is composed of highly trained and motivated personnel, who have numerous viewpoints and methodologies. It is our task on the Air Staff to draw from these individuals to continually redefine objectives, review the basic organization, and establish an operational framework.

Logistics planning responsibilities cut horizontally across the functional lines of procurement, supply, transportation, and maintenance in the development of logistics doctrine, concepts, objectives, and plans.

Long-range planning addresses organization, operation, and human problems and is directed toward the establishment of objectives, concepts, policies, and organizational relationships. These are "soft" problems in that they are influenced by their environment and are difficult to quantify. The end objective of long-range planning is to ensure that the logistics system of the future will create and sustain the military force effectively and efficiently.

If long-range logistics planning in this "soft" context is to contribute to the Air Force, it must be designed to present meaningful data, not only on future weapons, strategy, and tactics but also on economic, organizational, and human considerations. What we seek is a tie-in between our current way of doing business and the future requirements of the operational forces. In doing this, we must consider both our strengths and our weaknesses. It is from this analysis that courses of action are developed and decisions are made that determine the future role and structure of the logistics organization.

Our long-range planning is guided by three fundamental considerations. First, the reason we plan is to make the operational unit more effective and efficient. Second, people are the most vital resource we have, and our plans must be designed to encourage their attributes and not discourage them in our preoccupation with advanced automated systems. Third, there are no "sacred cows" that restrict challenging concepts and policies affecting logistics.

In his book *On Thermonuclear War*, Herman Kahn states that every five years or so there is enough of a change in technology to produce changes in the art of strategic war. Since World War II this five-year cycle has five times made an impact on corresponding doctrine equal to the strategic and tactical evolution between the Civil War and World War I, or between the two World Wars.

We have been slow to realize that in this era of technological explosion we have become slaves to the weapon systems designer. Traditionally, we have set the system design and operational concepts in concrete, then worried about logistics planning to support it. Consequently, we placed the logistics manager in a position of reaction rather than action and often had a costly, second-best situation. In today's environment we must be careful not to go too far, too fast, in fielding a weapon we cannot maintain or do not really need.

To reinforce this statement, let's review a few events as they appeared prior to 1960. The predominant aerospace doctrine was "massive retaliation," and our logistics concepts and objectives were designed on this foundation. Within five years we were thinking more of flexibility and mobility.

In 1960 the Air Force was in the process of adapting the F-4 to meet the needs of the Tactical Air Command. Designed primarily for carrier operations, the heavy and bulky support equipment for the Phantom was not the optimum for TAC's mobile mission. The C-130, destined to play such a vital role in our new strategy, was just coming into being in limited quantity. The game of logistics catch-up is further illustrated by the introduction of the C-141 in 1965, well after this country had committed itself to a strategy of flexible or gradual response.

As for our logistics base, in 1960 the Defense Supply Agency was in the planning stage. The maintenance capabilities of our Air Force operational units were designed on the concept of maximum self-sufficiency at

main operating bases. We were in the process of consolidating individual unit supplies into the base equipment management office, utilizing punch-card accounting machines. At this time computer system design was decentralized, and a few of our major operating commands were introducing computers as accounting tools in their base supply accounts. Air Force Logistics Command (AFLC) was implementing an improved management concept for airborne power plants. Information provided by the users, coupled with a computer data bank, saved millions of dollars because the engine manager knew engine location and condition and thus was able to reduce inventories worldwide. Use of computers as accounting devices was becoming commonplace; by 1967 AFLC had nearly 400 functionally oriented and individually designed computer systems. Many of these systems would interface while performing their routines. The full magnitude of this can be appreciated when one realizes that a change in any one of the input systems requires changes in the output systems, to ensure compatibility of data.

Now as we plan for the eighties, logistics is being challenged as never before, and in turn we must "rock the boat" more often, challenging today's methods of doing business.

Improvements in transportation have throughout military history changed the employment and deployment of forces. The latest of these improvements, the C-5A, will have a tremendous impact on military operations. This aircraft, with its great lift capacity, will enhance the flexibility and mobility of aerospace forces. It will also have spin-off effects on air cargo flow patterns, the transportation network, air terminals, inventory distribution policies, and maintenance concepts.

The current method of performing the maximum amount of maintenance ("self-sufficiency") at each base is being examined to determine its effect on force flexibility, mobility, and cost. We have tested a bare-base concept that emphasizes air-transportable equipment and structures that can be deployed, then redeployed and reused. The results of the initial bare-base demonstration indicate that the concept may have DOD-wide application.

Supply system design has been centralized and the Univac 1050-II base supply system has been introduced to 150 bases throughout the world. In the early 1970s AFLC will implement an Advanced Logistics System (ALS), which tackles the interface problems of the numerous functional systems. This system will revolutionize logistics management by providing the wholesale logistics manager with current information and improved support.

The Assistant Secretary of Defense has formed a DOD Logistics System Policy Council. The membership will include the service Assistant Secretaries for Installation and Logistics, the service Deputy Chiefs of Staff for Logistics, the J–4 of the Joint Staff, and the Director of the Defense Supply Agency. This council represents a precedent-setting action from which policies will emanate that will no doubt be far-reaching. These policies should provide the basis for increased compatibility and interface for logistics management by the services and within DOD.

ALTHOUGH past experience should be considered in planning for the future, it should not intuitively dictate solutions to future problems. The environment of the 1970s–80s will be different from any we have ever experienced. The quantity of mass media devoted to discussing national objectives, budgets, socioeconomic factors, foreign military intentions, human values, etc., is convincing evidence that nothing will be "sacred" in the new age we are entering.

Events of the past decade point to these basic factors which will influence the future:

(1) In all probability, fewer dollars will be available for defense;

(2) the clear demarcation line between pure operational and pure logistics considerations will become less evident;

(3) maintenance of an acceptable support responsiveness with decreasing funds will require new management techniques and accelerate the fading of traditional functional

logistics boundaries of procurement, transportation, supply, and maintenance (today the policies of any one function have a strong intrafunctional impact); and

(4) continuing advancements in information technology will contribute to a further collapse of the traditional organizational structure and have a profound impact on how managers manage and commanders command.

a conceivable future

The need for long-range planning has never been more critical than it is today. In the future, logistics planning must be progressive and dynamic.

In the last third of this century logistics planning will consider the use of reusable intercontinental rocket-propelled vehicles for resupply of a unit in any part of the world. Vertical and short takeoff and landing (VTOL and STOL) intertheater aircraft will interface with the strategic carrier, Military Airlift Command aircraft, then deliver the equipment and supplies directly to the user without rehandling. Increased capacities of airlift vehicles will permit increased air movement from an economical viewpoint, and shipment by air may well become routine for almost everything. Air transportation will be competitive with sea cargo when opportunity cost benefits gained by reduced inventories and pipeline time are considered.

In weapon system design it is feasible to include sufficient redundancy of components for the subsystems to operate maintenance-free for extensive periods of time. Aircraft and missiles will have total built-in testers and miniaturized components so reliable and maintainable that the organizational maintenance function will only be "remove and replace."

Continual improvements of communication networks and high-speed data processors will provide instant supply visibility. There will be a "single logistics information system," from which the manager will select only the data needed to develop conclusions and recommended actions.

Contingency planning will be accomplished by selecting force packages from a data bank and testing closure times over various routes, taking into consideration airfield capabilities and overfly limitations. The most advantageous operational plan would then be tailored to the circumstances and transmitted to each unit in a matter of minutes.

long-range logistics planning

In an article entitled "Are Technological Upheavals Inevitable?" Maxwell W. Hunter II states that "technological progress is a closely spaced series of revolutions. The best time to prepare for the next revolution is to begin immediately after the last, by projecting basic objectives far enough ahead so that they will serve as relatively fixed goals."[3]

It is our challenge in Logistics Planning to prepare for the next revolution by taking a hard look ahead at the means of today and plan for the "how, where, when, and why" of tomorrow. One method of doing this is to develop a framework for long-range logistics planning. This fundamental approach might be called "bread and butter" planning in that we must use a systematic and clearly defined method of developing objectives and concepts. (Figure 1)

In 1968 we took a major step in the development of this framework by compiling and publishing *Air Force Logistics Doctrine*. *Logistics Doctrine* is designed to complement and serve *Air Operational Doctrine*, and its principles comprise the fundamental philosophy of the logistics system. This was the first attempt by any service to publish such a set of guidelines. Although we do not consider this first attempt to publish doctrine the ultimate, it has already served a useful purpose. It has introduced a common logistics dialogue within the Air Force, and, more important, it establishes fundamental principles upon which to build the logistics system of the future. Future planning will be influenced by this document.

Air Force Logistics Doctrine states that the objective of the logistics system is to help create and sustain a military capability in support of national objectives in the full spec-

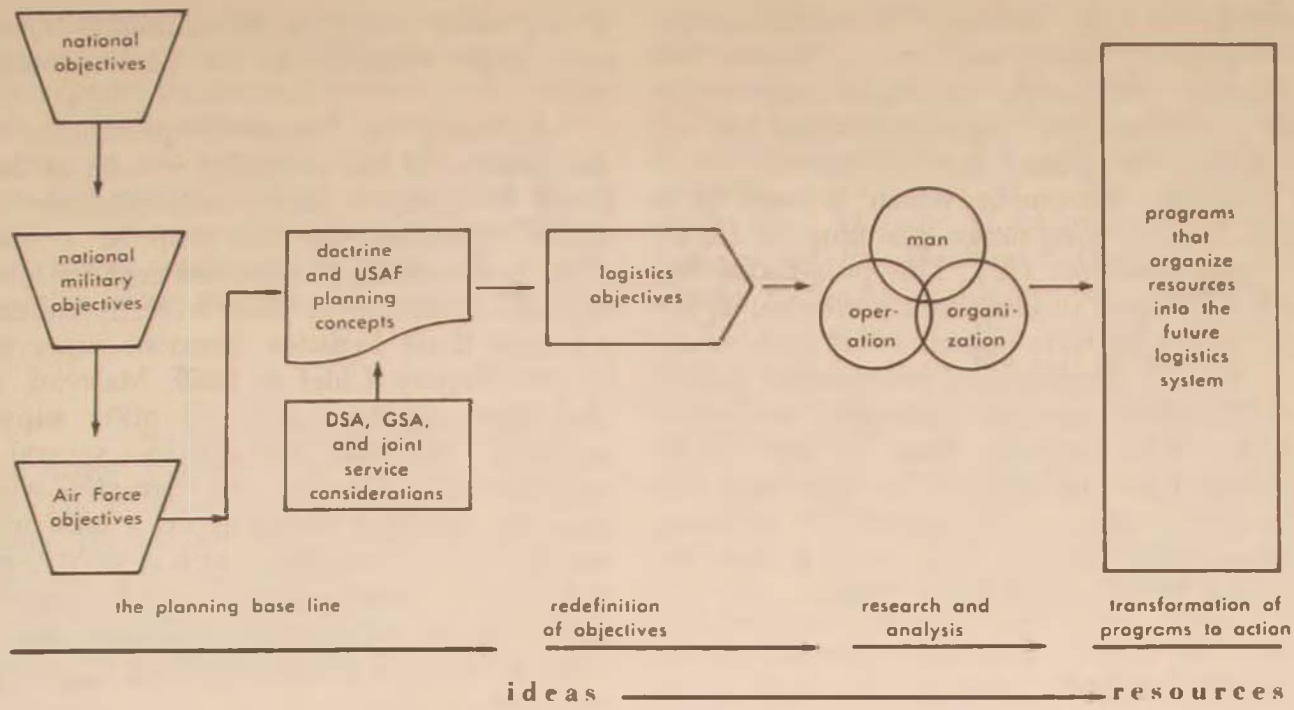


Figure 1. Framework for long-range logistics planning

trum from peace to total war. The logistics system is the link between the national industrial capacity and the combat forces. (Figure 2) The conventional breakout of supply, procurement, transportation, and maintenance is depicted by the four processes they perform. This view of logistics[4] illustrates the flow of resources from the nation's industrial base through the various logistics processes to final disposal. The diagram also shows the im-

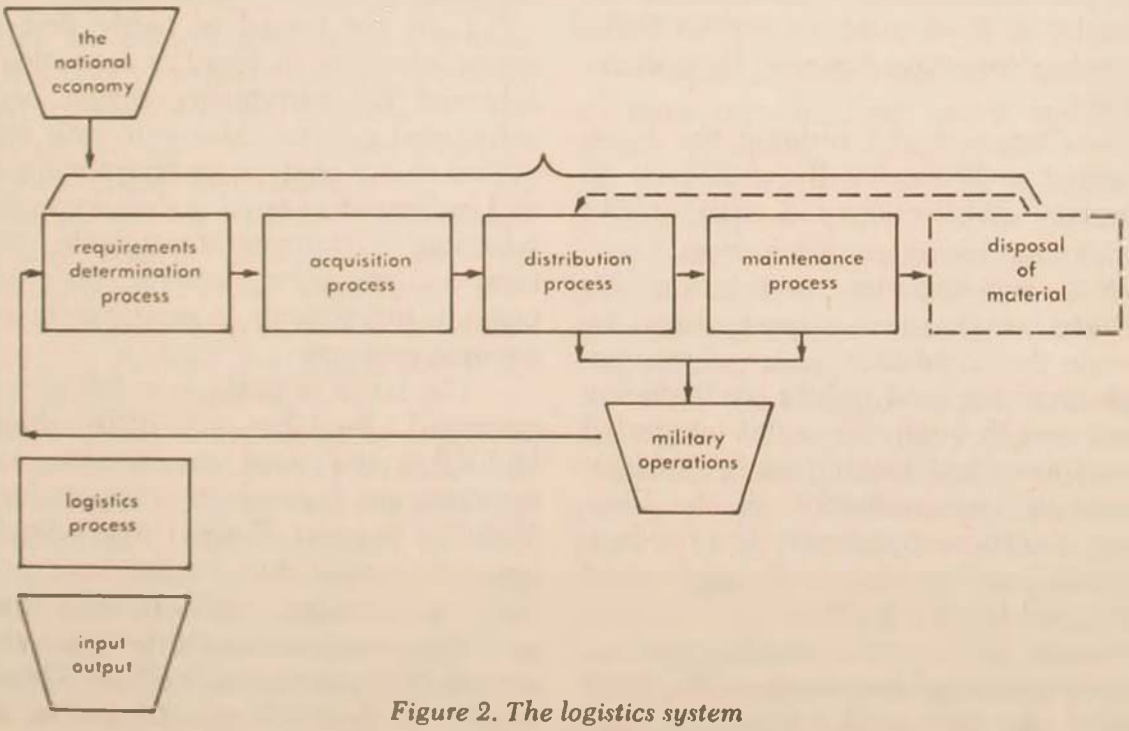


Figure 2. The logistics system

portance of the horizontal interrelationships of functions, which are critical because of monetary constraints, increased information and communication capabilities, and the requirement for greater responsiveness.

Another document which is used as a guide to our long-range planning is *USAF Planning Concepts* (U). This publication has been developed to provide a projection of the Air Force long-term objectives. It enables the Air Force to develop and recommend logical and consistent concepts, strategies, and capabilities. With *Logistics Doctrine* and *USAF Planning Concepts* forming the base line, it is possible to analyze our current way of doing business and develop logistics concepts responsive to the needs of the future.

operational analysis

Concurrent with the increased technical requirements of our weapon systems, there has been a quantum increase in the demands made on our logistics system. Consequently our logistics base has become the employer of approximately one-third of the military and civilian personnel and is responsible for managing nearly fifty percent of the annual operating budget. In periods of declining funds, operating and maintenance costs take on the characteristics of fixed costs. To the Air Force this means less investment money to modernize the force.

Our challenge in determining the logistics operating policies for the future is to further reduce distribution and maintenance costs without sacrificing responsiveness. Command action and logistics management literature have emphasized opportunities for economies in the acquisition phase of weapon system procurement, and rightly so. Reducing operational cost through the use of integrated logistics support (ILS) techniques is an essential element of cost reduction in the long-term sense. Another opportunity is to reduce cost in the 1.7 million items of supply used and maintained by the Air Force.

Innovation and creative thinking by our management personnel are needed. We must not consider the Advanced Logistics System or any other system as the ultimate, but we must begin planning for the next revolution now.

A Study of Future Requirements for Automation of the Logistics System at Base Level (STALOG) is being accomplished. This study represents the first step of a major effort to determine the best concept for future logistics operation at base level. It concerns not only those logistics functions supervised by the Deputy Chief of Staff, Materiel, but also their interface with all other support activities. The study will consider several alternatives. For example, one alternative would have the logistics functions on a base using one dedicated computer, with a utility computer for the other support activities. Another alternative would examine all logistics and the other support programs operating on a single computer system.

Planning is also under way to exploit the use of the computer as an adjunct to management in several areas. These efforts include Maintenance Management Information and Control System (MMICS); Transportation Integrated Management System (TRIMS); Customer Integrated Automated Procurement System (CIAPS); and other systems development projects in the areas of munitions, clothing sales, fuels, and commissary.

I do not intend to imply that the only major advances in logistics operation will be achieved by introducing bigger and better automated systems. Managers will still be required to use analysis techniques, imagination, and judgment in making decisions concerning selection of transportation mode, warehouse location, inventory control objectives and policies, investments in equipment, and maintenance concepts.

The large increase in airlift capacity programmed for the mid-1970s dramatically highlights the need to examine Air Force requirements for mobility support forces. The Mobility Support Forces (MSF) Studies Program was established by the Air Force in late 1968, to develop, demonstrate effectiveness, and implement new mobility support concepts for the full spectrum of logistics. This program consists of fourteen specific studies to deter-

mine manpower, equipment, facilities, and management systems needed to perform mobility support functions at air terminals, aerial ports of embarkation and debarkation, and contingency air terminals that are a part of the airlift system. Failure to consider these essential elements of the air transportation network will negate the capacity and greater utilization rates of these advanced carriers.

THE Air Force has been recognized as a major innovator in logistics management. The elimination of overseas depots and reliance on air resupply, maintenance data collection, and concurrency in the system acquisition process rank with computers and systems design as revolutionary logistics concepts. However, through the years we have essentially retained the traditional breakout of functional tasks under the headings of supply, transportation, procurement, and maintenance on both the wholesale and retail sides of the house. In the next decade revolutionary changes to the traditional logistics organizational structure must be made if we are to take advantage of automated and advanced communications systems.

On the wholesale side of logistics it is conceivable that all system support management could be consolidated at one central location and tied to various storage points by high-speed communications systems. At the other end of the spectrum, system management responsibilities can continue to be located at the various Air Materiel Areas. Other organizational options could vary between these two extremes. Further centralization of the total wholesale structure would introduce some extremely difficult personnel, sociological, and economic questions.

At base level, automating of logistics processes under a concept like STALOG will further erase the boundaries that separate traditional functions. If the alternative selected from the study effort is the use of a single automated system by all logistics, the organizational structure that emerges could be a combined line-staff organization under a single Deputy Commander for Logistics. This organization would include four functions: planning and analysis, acquisition, distribution, and maintenance tasks. At the other end of the alternative spectrum, the interface of all logistics functions with the other support activities could result in a base organized under two Deputy Commanders – Deputy Commander for Plans and Operations and Deputy Commander for Support. Regardless of the organization, the logistics structure must enable the flexibility and mobility of the force it supports and must be responsive to the requirements of a widely dispersed force such as fighters, bombers, and airlift aircraft.

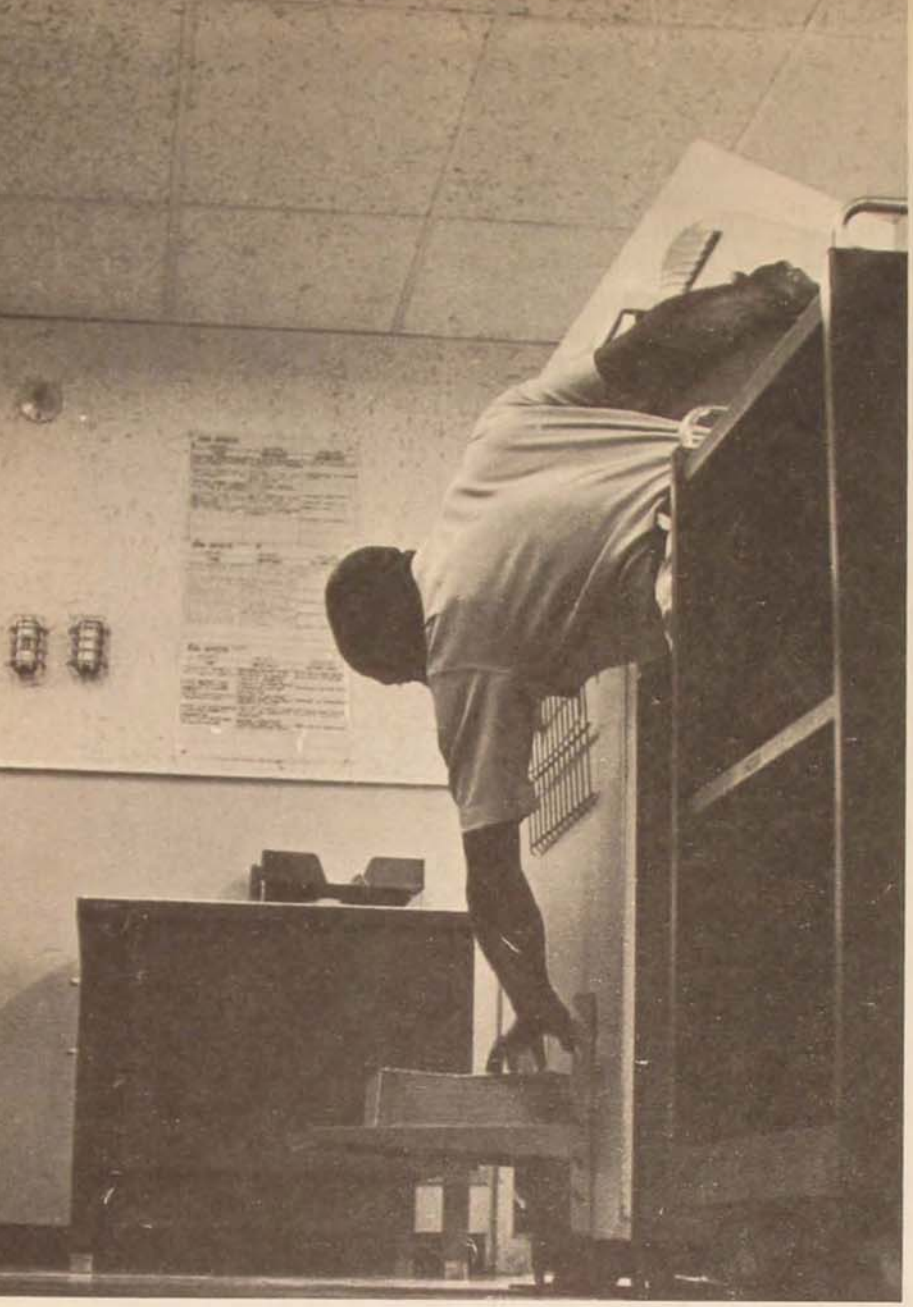
An essential element of a future Air Force logistics management structure must be the improved coordination of logistics planning between the Air Staff, AFSC, AFLC, and the operational commands. Under the integrated logistics support concept,[5] this coordination is especially critical. It is during the initial phases of weapon system development, not the acquisition phase, that critical conceptual decisions are being made which ultimately affect support capability and cost. The inclusion of logistics considerations in the design phases will represent logistics action rather than reaction. The result will reduce total life cycle cost.

human analysis

People are our most vital resource, and we must consider their needs and ambitions in our planning. Failure to do so increases the probability that we will be unsuccessful in attaining our objectives. In personnel development we must consider not only career progression but man-machine relationships, specialists-generalists concepts, and education and training as well.

With the changing of the draft laws, the Air Force will encounter increased competition with industry in selecting and recruiting young people. This competition will take place after graduation, not after he has been in the military for a few years. To be competitive, we must offer a more rewarding and challenging career.

The young officer or airman who will enter the Air Force in 1980 was born in the



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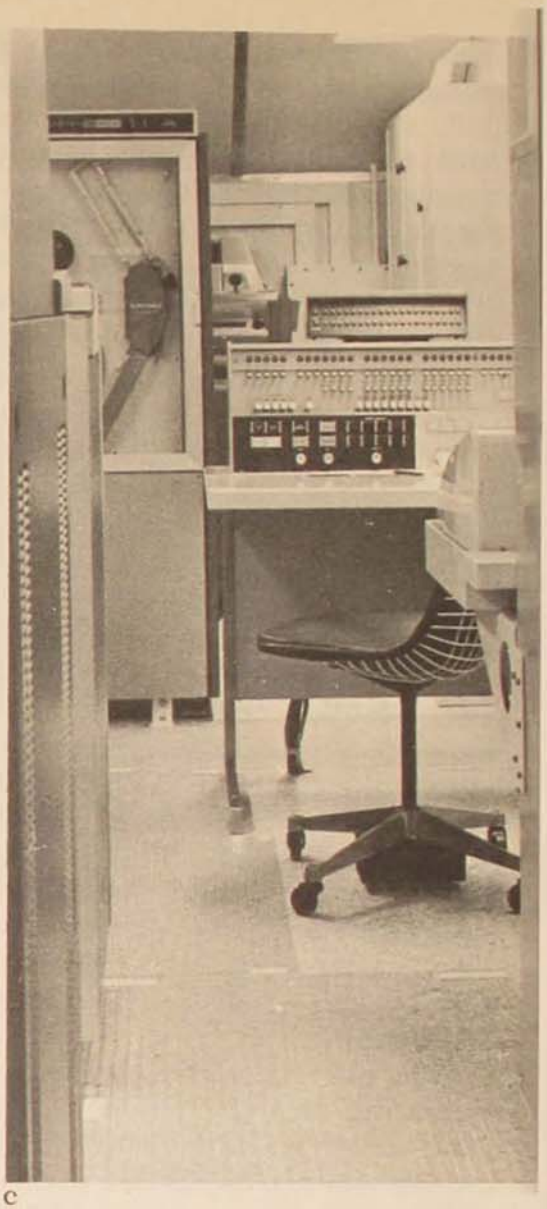

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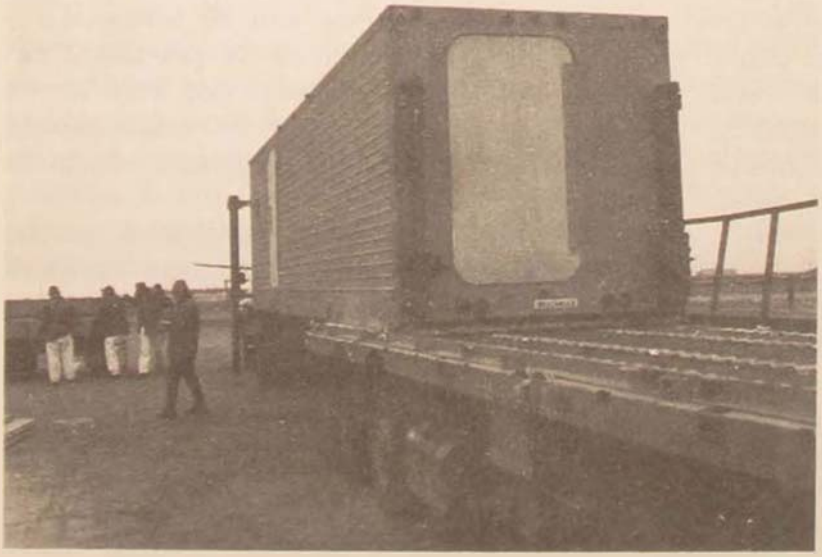


1050-II Computer

The Univac 1050-II supports the Standard Base Level Supply System now in effect at all major Air Force installations. It provides real-time processing, so its data are always current. In various configurations it accommodates to bases with 32,000 or 123,000 item records. (a) End-of-day reports roll off the main line printer. . . . (b) A mobile computer van goes onto a K-loader for rolling into a C-141. Completely self-sufficient, it can be operating within 6 hours after delivery. . . . (c) From this central location the operator directs activities of the 1050-II system.

early 1960s. To him Munich, World War II, Korea, Hungary, and Vietnam will only be history he has read about. We expect he will be well educated, motivated, and full of ambition. Further advances of technology and education of the 1970s will be a part of his growing up, and what to us appeared to be major innovations in science, space, management, etc., will to him be obvious evolutions. We must not lose this valuable resource because we failed to provide clear visibility of his Air Force career opportunities.

In a recent survey appearing in *Fortune*,[6] it was concluded that money and position have become less effective factors in attracting good men to industry. These traditional motivating forces have been replaced by job satisfaction, responsibility, and challenge. The new officer or airman of today grew up in a postwar industrial boom and never knew depression. To provide motivation, three of four industrial corporations interviewed by *Fortune* are revising their organization, with the objective of increasing job satisfaction and allowing more executives to run a small piece of the company show.[7] This is controlled decentralization of authority, with the design purpose of motivating people.

In the Air Force, motivation and retention have traditionally been a major topic at almost every meeting of logistics managers. To develop a meaningful program, we have initiated a permanent Logistics Career Development Working Group at the Air Staff level which includes representatives from each major air command. An adjunct to this was the establishment of a Logistics Retention and Career Development Research Project. Participants in this study are the Air Force Academy and the Human Resources Laboratory. Their objective is the assessment of logistics as a career. This task will be accomplished by the review of current programs, past and ongoing research, and determination of future study requirements. Our longer-term goal is to initiate a coordinated logistics manager/personnel program designed to improve career development and retention.

Any program designed to improve career development will deeply involve the newly assigned officer or airman's immediate supervisor. Studies have shown that a young man's first manager probably will be the most influential person in his career, his career pattern being largely determined by the attitude of his first supervisor.[8] This initial supervisor must have the ability and willingness to establish job standards, provide a satisfying challenge, and create a realistic opinion of his Air Force career opportunities.

One of the major issues raised by increased automation is the relationship between man and the computer. In designing systems we must not lose sight of two essential points: (1) the ultimate objective of every system is to help the operational unit support the mission effectively and efficiently; and (2) man's attributes, values, and aspirations are vital elements and must be primary considerations in the design of any new system.

Automation has traditionally been viewed primarily as a means of data storage, processing, reduction, and readout. An additional role the computer can perform is that of a decision-maker when the variables can be specified quantitatively along with clearly stated decision rules. Man's role will continue to be directed toward the selection of performance criteria, establishing goals of the organization, looking for opportunities, making nonprogrammable decisions, and maintaining the operation. Man must realize the potential these machines offer and direct his time and interests away from the routine administrative tasks and programmable problems. The manager's attention must be directed toward the selection of best solutions from alternatives. The machine is only one tool he will use to make the selection. Experience, judgment, and innovation are other necessary decision factors.

From a management viewpoint, automation will increase his requirement to be well versed in human skills and to intelligibly communicate the organizational objectives as related to the subordinate needs. The manager must not become inundated by tons of data but rather must develop information systems from which he will select only what he needs to know.

As a young person moves in his career from "doing" to "managing," his exposure will graduate from the narrower specialty to the broader viewpoint much earlier than before. The officer and airman entering the military in 1980 will continue initially to receive specialty training, but this first exposure to his specialty will also include the horizontal interaction of the various tasks with other components of the organization.

There will be a greater requirement for educational subjects to expand the individual's viewpoint at the middle management level. This trend will reduce the emphasis being placed on specialty training in favor of broader courses for field-grade and senior noncommissioned officers.

Top management must be equipped to participate in a variety of military-political-social problems. Training and education will come from institutions that are able to present this broad view. We will view educational institutions as a source of innovation in management techniques, relying upon them for ideas to ensure that our management force does not become intellectually obsolescent.

IN THE PAST, the image of long-range logistics planning involved the mechanics of logistics: what the fourth-generation computer would have in storage capacity, what our overhaul capabilities for aircraft and missiles would be, and how many tons of cargo require shipment. All of these are essential questions and must be studied, I agree. However, the crucial questions which must be addressed in the design of an effective logistics system for the future are: What are the human considerations? What will we have for an organization? How will it operate? What sort of people will we recruit and how will they be educated? And what will the top managers need to know five-ten-fifteen years from now?

Hq United States Air Force

Notes

1. In this article "logistics" acts as the bridge between the national industrial capacity and the combat forces, along which material and equipment flow. In this context logistics includes the function of procurement, supply, maintenance, and transportation as an integrated whole.

2. Herman Kahn, *On Thermonuclear War* (Princeton: Princeton University Press, 1960), Lecture III.

3. Maxwell W. Hunter II, "Are Technological Upheavals Inevitable?" *Harvard Business Review*, Vol. 47, No. 5 (September–October 1969), p. 82.

4. U.S. Department of Defense, *Joint Memorandum of Agreement on Basic Principles of Logistics*, Wright–Patterson Air Force Base, Ohio, 12 December 1967, p. 5-2. This document prescribes the basic principle for use as guidance by Army Materiel Command, Navy Material Command, Air Force Logistics Command, and Air Force Systems Command in the conduct of joint studies, negotiations, and internal operations. It also presents an excellent view of the logistics flow framework.

5. U.S. Department of Defense, Assistant Secretary of Defense (Installations and Logistics), *Development of Integrated Logistics Support for Systems and Equipments*, Department of Defense Directive 4100.35, 19 June 1964.

6. "What Business Thinks: The Fortune 500–Yankelovich Survey," *Fortune*, LXXX, 7 (December 1969), 115.

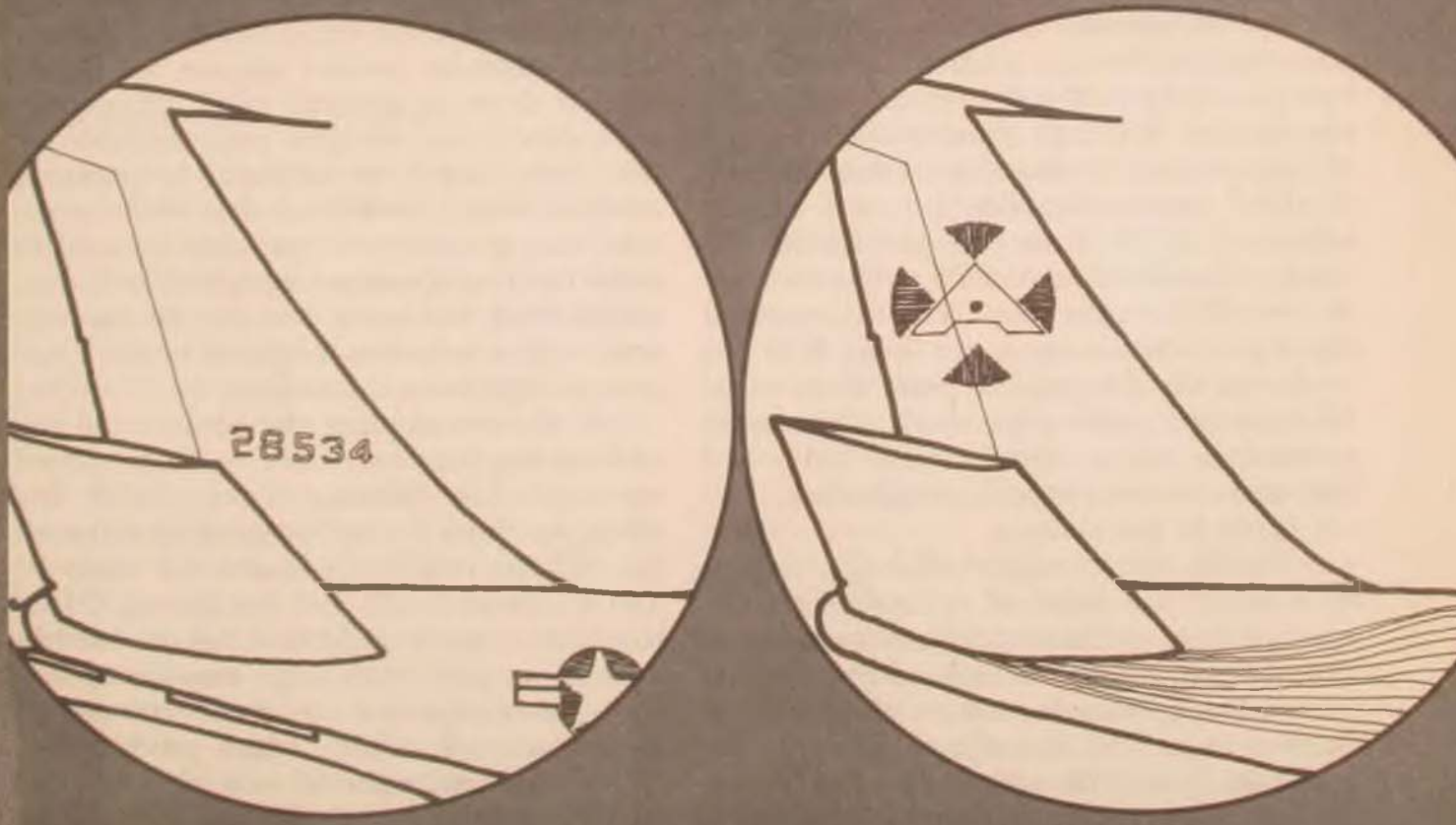
7. *Ibid.*

8. J. Sterling Livingston, "Pygmalion in Management," *Harvard Business Review*, Vol. 47, No. 4 (July–August 1969), p. 87.

DIRECT AIRCRAFT MAINTENANCE COSTS—MILITARY AND COMMERCIAL

LIEUTENANT COLONEL HERMAN L. GILSTER
MAJOR LLOYD WOODMAN, JR.

THERE are two basic inputs to any maintenance repair operation—labor and capital—and these inputs may be partially substituted for each other. The optimal or least-cost combination of labor and capital selected to perform a given maintenance service depends on both the productivities and costs of these two inputs. If the price of one rises, it should be partially replaced by the other, relatively cheaper input. Likewise, if



the productivity of one input decreases, it should be partially replaced by the more productive input.

The budgetary process, by allocating fixed amounts for personnel (labor) and capital, has constrained the substitution of one for the other. But regardless of these constraints, the relative labor/capital price ratio has increased over time. During the period 1960–68, the basic pay and allowances for military personnel increased by 50 percent, while the interest rate on long-term Treasury bonds, the cost of capital, increased by only 25 percent.

During the same period the retention rates in military units continually declined, and it became necessary to replace departing skilled mechanics with unskilled recruits. This means that at the same time the cost of labor was rising, its productivity was declining. Both of these changes move the military further away from the optimal or least-cost method of producing services if labor-intensive methods continue to be followed.

In an earlier article, a call was sounded for a re-evaluation of the Air Force's fundamental maintenance philosophy based on the discussion above and the results of previous studies.[1] As a bench mark for comparison, it was suggested that the maintenance cost structure prevailing in the commercial airlines be investigated. Although commercial fares, and to some degree revenues, are established by the Civil Aeronautics Board, profits can be influenced by the costs and productivities of the inputs selected to provide airline services. As we will show, the result is that commercial direct maintenance costs per flying hour are approximately 40 percent lower than those for equivalent military transports. The market mechanism, which stimulates the airlines to seek cost-effective methods of operation, does not apply to the military.

This is not to suggest that the airlines have found the point of optimal efficiency, but that they are closer to it than the military. Their operations may even be slightly biased toward the capital side, to show a lower return on investment and thus the need for an increase in fares. The actions of labor unions probably also provide an incentive to operate with less labor. The military, however, should have the same incentive, given the higher training costs and lower productivities that go with declining retention rates.

In addition to the reasons cited, an investigation into the comparative maintenance cost structures prevailing in the military and commercial sectors takes on added importance with the recent emphasis on a volunteer force. Within the Military Airlift Command, for example, 42 percent of the assigned manpower, or 44,000 persons, are engaged in the materiel function, 85 percent of them being employed in maintenance and 13 percent in supply. Under the volunteer force concept, the market cost of manning such a large maintenance force Air Force-wide could be beyond the budgetary constraint. This means that a more efficient method of providing maintenance services must be sought.

A comparison of maintenance cost structures in the military and commercial sectors is no easy task. In the first place, the accounting methods used by the two sectors differ significantly. The airlines carry direct line and depot maintenance costs in one account and general support costs (servicing, cleaning, etc.) in another. Air Force base or line maintenance includes general support man-hours but not depot or material costs. When sufficient data in any category were available for this study, they were subjected to statistical analysis; when insufficient data were available, only general averages could be used to make the cost structures comparable. A concerted effort was made, however, to use only conservative estimates tempered by the opinions of experienced personnel.

In the second place, the missions and aircraft of the commercial and military sectors are somewhat different. To minimize this effect, we chose the maintenance operation of the Military Airlift Command for analysis. The Lockheed C-141 and the Boeing C-135, backbone of MAC's airlift fleet, are comparable in many respects with large commercial aircraft. The comparison was made with one of the major trunk airlines, which provided detailed labor and material cost data for the analysis. Included in the sample were eight

years' data (1960–67) on the Boeing 720, six years' data (1962–67) on three Douglas DC-8 engine combinations, and four years' data (1964–67) on the Boeing 727. Because the data are not published, this airline will be designated "Airline X" in our discussion.

Finally, the capital costs available for this study included only the cost flow of spare parts and the material used in repairable spares. It was impossible to break out an amortized cost of maintenance support capital, such as test equipment, for both sectors. One reason for this is that part of the cost of such equipment is included in the purchase price of aircraft. This includes airborne diagnosis systems, which reportedly save numerous troubleshooting man-hours, and provision for more rapid accessibility to malfunctioning components. In this sense, the analysis admittedly is partial, being confined to comparison of only the direct maintenance costs prevailing in the two sectors.

Despite all these difficulties, we feel that an adequate comparison of military and commercial direct cost structures can be made and that this comparison provides considerable insight into the efficiency of the military operation.

direct maintenance cost structures

The average direct maintenance costs that prevailed through the 1965–67 period for three commercial and two military airlift aircraft are presented in the accompanying table. These cost estimates are based on data provided by the Military Airlift Command, the Air Force Logistics Command, and the Boeing Company and include both base and depot maintenance. Fiscal year 1968 cost estimates for the C-141 and C-135 are presented separately, since these costs are not compatible with previous years because of (1) exclusion of Class V modification costs and (2) a change in the method of distributing common cost items. A description of the calculations used to derive these estimates cannot be included in an article of this length, but the interested reader can find a detailed outline of the calculations in USAF Academy Technical Report 69-2.[2]

A Comparison of the Direct Maintenance Cost Structures in the Military and Commercial Sectors for the Period 1965–67

Cost Structure	720	DC-8	727	C-135	C-141[a]	FY 1968 (except Class V Modifications) C-135	FY 1968 (except Class V Modifications) C-141[a]
Man-hours/ flying hour	19.3	19.2	16.4	40.0	36.0	40.0	31.5
Labor cost/fh[b]	$72	$66	$62	$152	$137	$152	$120
Material cost/fh	$71	$73	$79	$100	$100	$58	$64
Total cost/fh	$143	$139	$141	$252	$237	$210	$184
Labor/ material ratio	1.0	.9	.8	1.5	1.4	2.6	1.9

[a]No major repairs were performed on the C-141 during this period; therefore, costs are expected to increase in the future.

[b]Military man-hours were multiplied by the direct airline wage rate prevailing during the time period to obtain equivalent cost structures.

Excluding the FY 1968 estimates, when Class V modification costs were not included, it would appear that the military used approximately twice as many man-hours per flying hour to maintain its fleet as the airline did. This in itself is indicative of a very labor-intensive approach to aircraft maintenance in the Air Force. Even if the FY 1968 estimates are used, the difference is significant.

To put labor costs on an equivalent basis, military man-hours were multiplied by the direct labor wage rates of Airline X during the period. Material costs for both sectors were already in dollar figures. The table shows that, even in the area of material, military expenditures were approximately 30 percent higher than those of Airline X, giving a total direct-cost difference per flying hour of about $100—a significant cost differential considering that the C-141 has a flying program of 600,000 hours a year.

The labor/material ratios also show a significant difference between the two sectors. As expected, military operations are very labor-intensive when compared to the airlines. But, in addition, the commercial ratios show a very interesting pattern: although the total maintenance costs for all three commercial aircraft are approximately equal, the labor/

material ratio declines with newer models. This implies a sensitivity to the rising cost of labor which results in labor-saving maintenance provisions being incorporated in the newer aircraft, a factor that could not be costed in this study. There is also some evidence of this trend in the military sector.

In summary, the estimates in the table indicate that the direct cost of military aircraft maintenance is significantly higher than that of the airlines. The main reason for this is the extensive use of labor in the military. Even if one argues that Class V modification costs should be excluded and the FY 1968 figures used, the cost difference runs between $40 and $50 per flying hour. The 1968 figures, however, imply a much higher labor/material ratio, indicating an even more intensive labor operation when compared to that of the airlines.

Of course, objections can be raised on the basis that the estimates presented in this article were derived from limited data. We can only state that a consistent effort was made to err, if at all, on the conservative side in deriving these estimates. Another argument may be that a valid comparison of military and commercial maintenance operations cannot be made on the basis of differences in operating techniques, missions, and aircraft. Here we tried to minimize these differences by selecting the maintenance operation of the Military Airlift Command to analyze. MAC's mission is airlift, the same as the airlines; and its aircraft, the C-141 and C-135, are large four-engine jet transports, most closely resembling those of the airlines. In fact, the C-135 is the military equivalent of the Boeing 707.

Still other objections may be sounded, based on the comparative utilization, size, and age of the two fleets. During the period analyzed, MAC averaged from 6 to 7 flying hours per day on its C-135 and C-141 aircraft, whereas Airline X averaged from 9 to 10 hours on its equipment. This could certainly be a factor in explaining some of the difference; but given the fact that Air Force maintenance units are manned primarily on the basis of total programmed flying hours, we feel that it is not as important a factor as some might believe.

In any case, this argument can be somewhat offset by results obtained by a number of researchers showing that maintenance requirements are more correlated with the number of flights than with total flying time, primarily because of starting and stopping stresses.[3] Airline X's flight lengths averaged from one to three hours, depending on aircraft type, while the C-141 averaged 7.64 hours per flight.[4] This means that for a given total flying time—the deflating variable in this study—Airline X's fleet was subjected to a greater number of flights than the military fleet. This would lead one to believe that commercial maintenance requirements per flying hour would be comparatively higher.

There is also a common belief that economies of scale accrue to the management of larger fleets. Over the period analyzed, Airline X owned approximately 28 720s and 40 DC-8s, and its inventory of 727s was growing from an average of 65 in 1966 to 96 in 1967. During this same time period MAC had approximately 20 C-135s, and its inventory of C-141s grew from 68 at the first of 1966 to 271 at the end of 1967. Economies of scale could therefore account for the higher cost on the smaller C-135 fleet but not on the larger C-141 fleet, which averaged two to three times that of Airline X's 727 fleet. It cannot even be said that Airline X obtained its economies by cross-maintenance with other airlines during this period because only 2.5 percent of the direct maintenance costs were contracted outside the firm. Airline X essentially acted as an entity with a total fleet size less than that of the Military Airlift Command. Given this fact, any economies of scale should have accrued to MAC. The reason for the significant difference in costs must be sought elsewhere.

It might also be argued that the C-141 aircraft was still within its stage of "infant mortality" during the period of comparison, and its maintenance requirements should therefore be higher. Certainly there is some justification for this argument. The 727 maintenance costs decreased from $127 to $120 per flying hour during the period 1965 to 1967. This change, however, is not great, and Boeing studies show that this stage is passed within

one year for military transport aircraft; in the case of a majority of the C-141s, it would be by 1968.[5] It should also be noted that no major depot repair was performed on the C-141s during the period analyzed and that these costs are expected to increase in the future. These costs could offset the lower maintenance costs expected after the "infant mortality" stage, which in the past has been verified only with line maintenance data.

The C-135 was certainly past its "break-in" stage and was subjected to major repair. Although this fleet was small, its costs may provide a feel for the costs experienced in the "steady state" or random failure stage in the life of military transport aircraft.

In summary, we do recognize certain validities in the opposing arguments we have outlined. These differences make any comparison of this type quite difficult. We do feel, however, that the cost structures are so radically different that any adjustments in the estimates will not significantly alter the major finding of this study: maintenance operations in the military are extensively more labor-intensive and more expensive than in the commercial sector. Although the comparisons made in this study were based on the maintenance operation of the Military Airlift Command only, the results should not be utilized to single out inefficient use of labor in a single Air Force component. The Military Airlift Command operates under a basic labor philosophy that is prevalent throughout the armed services.

There appears to be considerable slack in some portions of the system, which will permit the military to economize on labor. How can this desired end be brought about? A number of ways have been suggested, both by us and by members of research organizations presently engaged in Air Force maintenance analyses. The four recommendations which we will outline are intended not as an exhaustive listing but as a framework for a start in the right direction.

Adopt a more capital-intensive approach.

Two aspects stand out in a more capital-intensive approach. One centers around the more extensive use of maintenance support equipment, the other around the use of spares and material to effect repairs. Maintenance support equipment includes flight line, shop, depot, and airborne equipment, which provide for a more expeditious and reliable diagnosis and repair of aircraft failures. The high cost of depot maintenance (approximately 40 percent of the total) may well be the result of antiquated labor-intensive maintenance techniques that have prevailed for a number of years. Modernization of depot maintenance facilities along more capital-intensive lines may provide considerable savings in labor.

Provisions for increased accessibility to failed components and airborne diagnosis systems can conserve on line maintenance man-hours. The Air Force is already moving in this direction with newer aircraft, such as the C-5, which will incorporate the Malfunction Detection, Analysis and Recording (MADAR) diagnosis system. This movement should be encouraged and expedited whenever technically reliable diagnosis equipment can be developed. It should not be confined, however, to large transport aircraft. The newest fighter aircraft, for example, employ expensive and sophisticated computers for target acquisition, tracking, and firing. Majors Albert E. Preyss and Richard E. Willes of the USAF Academy believe that, as a result of their study of fighter aircraft technology, it may also be possible to program these computers to diagnose maintenance systems, thus making them productive on the ground as well as in the air.

The other side of the capital philosophy is a more intensive use of spare parts relative to labor man-hours. The Air Force tends to expend a large number of unskilled man-hours at the aircraft in attempting to determine which component of a system has failed, whereas airline policy is to remove a whole bank of components for diagnosis and repair in the shop, where more skilled technicians and better test equipment can be concentrated. This policy obviously saves a number of trouble-shooting man-hours and does not add appreciably to material costs, as evidenced by the

material estimates in the preceding section. One possible reason for this is outlined in the next recommendation.

Finally, with a more capital-intensive approach the expected number of ineffective maintenance actions, and thus the total man-hour workload, should decrease. Studies by the Boeing Company, the Strategic Air Command, and others show that anywhere from 20 to 40 percent of the total maintenance actions performed on a number of B-52 aircraft systems are necessitated by improper diagnosis and repair of previous failures.[6] As productivity decreases with lower retention rates, this phenomenon could increase. The substitution of capital for labor should result in a lower margin of error.

Stop "overmaintaining" the aircraft.

Scheduled maintenance comprises over 50 percent of the total maintenance workload on military aircraft. The need for such a large number of man-hours to be devoted in this area is now being questioned. The experience in Southeast Asia has shown not only that the sortie rates can be increased with little additional expenditure of man-hours but also that aircraft can fly long beyond their scheduled overhaul periods with no adverse effects.

Along with this, the whole concept of planned replacement for many aircraft components has been challenged by Chauncey F. Bell and Milton Kamins of the RAND Corporation.[7] As an example they cite a test program conducted by United Air Lines covering engine accessories, electronics, hydraulics, and air-conditioning components. Although the scheduled overhaul program called for the removal of 1200 components, the tests proved that planned replacement on only 33 components was necessary. United Air Lines therefore feels that scheduled component overhauls are rarely necessary.

The elimination of a planned replacement policy can save material as well as labor. This may be the reason material costs in the commercial sector are not higher than those in the military sector. If the "burnout" stage for many aircraft components does not exist, or is far beyond the programmed overhaul time, premature removal requires larger inventories than are necessary.

Additional support for this argument can be drawn from the studies of Major Frank Dyke of the Materiel Analysis Section, Strategic Air Command. An analysis of a large number of aircraft systems revealed that system reliability was some 20 percent lower after a maintenance action than it was after a number of successful flights when a steady failure rate was reached. Major Dyke feels that aircraft systems are inherently reliable and that a large percentage of failures are maintenance-induced. A less protective policy could help eliminate this phenomenon.

Establish major maintenance bases.

Most Air Force line maintenance organizations operate at a 50 percent self-sufficiency level. Economically, this calls for an extravagant use of resources, both labor and capital, when compared to the airlines' major maintenance base philosophy. The possibility of establishing strategically located major maintenance bases and rotating aircraft through these bases should be investigated. Whether this could be accomplished by a renovated depot system or would require a separate major base concept should also be analyzed. Not only would such a system conserve on a portion of the capital and labor that is now duplicated at each line base but it would also permit consolidation and fuller utilization of the limited number of highly skilled technicians now available to the military.

Weigh generalist mechanics vs. specialists.

Airline mechanics are required to perform general maintenance on the entire aircraft whereas the Air Force has resorted to a large number of specialists to perform its maintenance. Given the short length of service for most enlisted personnel and the fact that specialists are more quickly trained, this policy appears to be economically feasible, but it does result in a low utilization of military manpower. It has essentially been necessary

to overman Air Force maintenance units for peak loads because it is considered cheaper to queue mechanics than aircraft. This policy results in a large amount of unproductive time being expended by various system specialists. Tradeoffs between the costs of aircraft delay and additional personnel have been perfected by Murray A. Geisler and Chauncey F. Bell of the RAND Corporation and should be investigated as a basis for a more efficient manning policy.[8]

Beyond this, serious consideration should also be given to effecting a more generalist type of mechanic concept. Research in this area has already been initiated by John W. Merck, also of RAND. This concept has intuitive appeal because it would permit a reduction in manpower and a more productive utilization of the remaining force.

IMPLICIT in these recommendations is the belief that their adoption would enable the same output to be produced with a smaller labor force, thereby conserving on the high and rising cost of personnel in the defense budget. If in the past military labor was indeed less expensive than civilian labor and the budgetary process did put effective constraints on the use of capital, Air Force policy was not as irrational as it would at first appear. But times are changing. Military labor is now expensive, and it will grow more expensive in the future. A change in philosophy toward its use is needed.

United States Air Force Academy

Notes

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A NEW AMERICAN POLICY IN THAILAND

DR. FRANK C. DARLING

SINCE the end of World War II the United States and Thailand have cooperated actively in a joint effort to promote the territorial security and economic development of Southeast Asia. During this time the American government has expended approximately $1 billion in the Thai kingdom to strengthen its military forces and elevate its economic and social standards.[1] American business corporations have invested $125 million in commercial and industrial enterprises. American missionaries continue to maintain modern educational and medical facilities as they have

done for almost 150 years. Some 45,000 American military personnel are presently stationed on Thai soil to assist in the defense of South Vietnam. Seven hundred American Peace Corps volunteers are currently working in Thailand on a variety of educational and developmental projects.

With few exceptions, the Thai people have reciprocated with friendly relations with the United States. More than 6000 Thai students are attending American colleges and universities, and many more are preparing to come. Thailand has promoted its economic development primarily by means of private enterprise, and Thai businessmen have consistently appealed for more American capital investment. Expanding trade opportunities with the United States and other countries have achieved notable results. For almost twenty years the Thai economy has increased at a rate of 7.5 percent, which is the best growth record in South and Southeast Asia. The national treasury holds a foreign exchange balance of approximately $1 billion, giving it the largest monetary reserve of any non-industrial nation.[2] The gross national product (GNP) is $5 billion, and it is expected to reach $6.5 billion by 1971. Removal of serious security threats and reduction of a costly military burden could enable Thailand to match the gains made by Iran and Formosa, so that it could dispense with foreign economic aid and promote economic progress on its own initiative. This achievement should enable the kingdom to move beyond what Professor Walt Rostow has called the "takeoff" stage in self-sustained development.

Throughout this period the Thai government has been a cooperative ally of the United States. It has promoted regional cooperation and contributed to the work of the United Nations. It has taken some of these actions with American assistance; it has undertaken numerous measures on its own initiative. Some disagreements have intermittently arisen between the two countries, which is inevitable in any relationship between a major power with global interests and a small country with regional responsibilities. Both nations are leading rice exporters and compete actively on the world market. They disagreed sharply at the 1962 Geneva conference over the admission of Communists to the government of Laos.[3] Americans have criticized corruption in the Thai government and the sluggish progress toward some form of constitutional rule. The Thai have been displeased with American journalists who travel briefly in their country and write sweeping criticisms of their society. Yet these irritants have never disrupted the friendly relations between the two countries; they have been resolved by negotiation, compromise, and restraint.

In spite of widespread cooperation during the past two decades, American-Thai relations face numerous uncertainties in the 1970s. Many Americans are questioning the role of the United States in Southeast Asia. Others want a more vigorous policy in deterring Communist aggression. Major pressures are being exerted on the United States Congress to curtail military expenditures. Opposing influences seek a military victory. Critics of American foreign involvement abound on university campuses and in the mass media. Proponents of a "get tough" posture speak out in the armed forces and in large segments of American public opinion.

Thailand is deeply concerned with the path American policy will follow after the settlement in Vietnam. For almost twenty years the Thai kingdom has served as the core of American effort to assist the small nations of the region in preserving their independence and elevating their economic standards. By a series of concentric patterns of geopolitical power, American policy in Thailand has been a function of American policy in Southeast Asia. Today many people in the region are uncertain of the future course of this policy. The Thai Foreign Minister, Thanat Khoman, has stated: "The United States has tried to raise doubts in our minds and it has succeeded. It has succeeded in raising doubts in its own mind."[4] Thus the important questions arise: What actions by the United States lie ahead? What course will American policy follow in Southeast Asia? What commitments will the United States maintain in Thailand?

Four major alternatives have been recommended for future American policy in Thailand.

• One proposal upholds the need for the United States to reduce its commitments to Thailand. It urges that the American government withdraw its troops and curtail its military program. It suggests that the United States should urge the Thai government to depend largely on its own resources for its defense and security. The proponents of this first alternative foresee a reduced external threat to the small nations in the region. They claim that Ho Chi Minh was not Hitler, that the Communist bloc is not monolithic, and that America must avoid the "glue pot" of Asia. Their specific proposal advocates a retrenchment in United States policy and the removal of the American presence from the mainland of Southeast Asia, once the Vietnam conflict is ended. They wish to rely on an island defense among American allies stretching from Japan to Australia and supported by American military bases from Okinawa to Hawaii.

Most likely, this policy alternative would result in numerous adverse consequences for the United States, and it would cause a major reversal of American policy in Thailand and elsewhere in Asia. Although it represents a sincere effort to improve American foreign policy at a time of impatience and frustration with both domestic and foreign affairs, it reveals a misunderstanding of the nature of totalitarian Communism and contemporary international politics. It is a revision of the isolationist policy for which the United States paid heavily in lives and treasure in World War I and World War II. Just as Americans have been warned since their early history to avoid "entangling alliances" on the mainland of Europe, this new form of isolationism has advocated the avoidance of American involvement on the continent of Asia. This policy would commit the United States to the defense of precisely those nations in Asia which are the least exposed to Communist expansion, and it would relegate the nations most vulnerable to Communist penetration to an uncertain fate. It appears to many Americans as a simple and logical solution after two frustrating limited wars on the Asian mainland, yet contrary to the claims of its proponents it is the policy alternative most likely to involve the United States in "more Vietnams."

A retrenchment policy has already been tried in Asia, and it has failed. It was applied in the official pronouncement of the United States in 1949, when for economic reasons South Korea was declared outside the American defense perimeter. Within a year this policy encouraged Communist aggression and led to a costly war. The current claim that the Communist threat is receding because the Communist bloc is no longer monolithic overlooks the important fact that in spite of deep splits between the Soviet Union and Communist China, these Communist powers in their own national and ideological interests are providing large quantities of military assistance to North Vietnam. These military weapons are used to support Communist insurgents in Laos and Thailand. Those who downgrade the expansive designs of Ho Chi Minh tend to overlook the fact that North Vietnam or any small Communist state, if supported diplomatically and militarily by the Soviet Union or Communist China, is capable of launching subversive operations into adjoining nations and, if unchecked, of seizing control over large numbers of unwilling people.

• A second alternative would be for the United States to urge Thailand to protect its national security by adopting a policy of nonalignment, supplemented perhaps by more reliance on the United Nations. Detached from a close alignment with American policy in Southeast Asia, the kingdom might conceivably remove itself from the criticism and aggressive efforts of nearby Communist regimes. The Thai government on its own initiative might adopt certain aspects of the foreign policies of India, Indonesia, and Egypt, seeking maximum benefits by accepting aid and favors from both the Western and Communist blocs.

Many aspects of this alternative are beyond American control, but it would entail

many disadvantages for the United States. American policy has little to gain and much to lose by attempting to alter Thai foreign policy from a pro-Western alignment to a neutral status. The Communists do not effectively occupy a portion of Thai territory, and no reduction in Communist forces in the region is envisaged as a *quid pro quo* for the removal of the American presence from the kingdom. At the present time the United Nations is not prepared politically or militarily to protect the independence of small nations threatened by a major power. The Thai leaders themselves have occasionally voiced some sentiments for a nonaligned foreign policy, but since 1950 they have opposed any major move to reduce their close ties with the United States. They have adopted this policy not because they are ideologically pro-American or pro-Western but because they believe this is the most effective policy in protecting the security of the kingdom. They are also opposed to a nonaligned foreign policy because it has not discouraged Communist aggression and subversion in India, Burma, Cambodia, and Indonesia. Thailand has long cooperated with the United Nations and has received many technological and social advances from its specialized agencies. Bangkok has been the regional headquarters for the United Nations Economic Cooperation Administration in the Far East (ECAFE) since it was removed from the Chinese mainland in 1949. Yet the Thai do not believe that the United Nations can guarantee their national security.

• A third alternative is for the United States to pursue an active role in promoting regional cooperation among non-Communist nations in Asia. American policy might consider providing more support to recently organized regional organizations such as the Association of Southeast Asia (ASA), the Association of Southeast Asian Nations (ASEAN), and the Asia and Pacific Council (ASPAC). The United States might endeavor to broaden the economic, social, and cultural programs of these organizations and possibly urge one of them to become a regional military alliance. This move might appeal to proponents of the first alternative seeking a retrenchment in American policy, since the non-Communist nations in Asia could presumably rely more on each other for their security and less on the United States.

This alternative appears attractive on the surface, but portions of it would result in serious shortcomings for American policy in Asia. The United States has long supported moves toward regional cooperation in nonmilitary fields and indirectly assisted this trend. The effort toward greater coordination in economic, social, and cultural affairs has been taken by Asian nations on their own initiative, but these constructive steps have been possible only because their security and developmental programs have been bolstered by the United States. American policy-makers have voiced their support for more advancements in this direction in the future. They have promoted this cooperative process by assisting additional regional developments, including the Mekong River Project and the Asian Development Bank. Yet genuine regional associations of this kind should continue to grow primarily among the Asian members themselves. An active and direct American role in these nonmilitary affairs would cause them to lose much of their regional orientation and character.

On the other hand, any effort by the United States or its Asian allies to form a regional military alliance without American participation would be unrealistic and deceptive. American policy has wisely rejected such a move in Western Europe; it should also oppose a similar effort in Asia. American allies in Asia, as in Western Europe, are presently unable to deter Communist expansion. In Asia, more than in Western Europe, the United States is the dominant military power. Non-Communist armed forces are relatively weak and are scattered over a wide and diverse area. Not until the Communist threat recedes and the power of non-Communist nations in Asia can balance the power of the Communist states can any Asian military alliance emerge without an active role by the United States. The Secretary-General of the Southeast Asia Treaty Organization (SEATO),

General Jesus M. Vargas, has declared:

> As long as peace and security of the countries of South-East Asia are threatened by Communist aggression, a regional defense alliance is very essential. . . . It would not be effective without the support of a world power or powers.[5]

For some years to come the only world power capable of providing this regional military capability will be the United States.

• A fourth alternative is for American policy in Thailand (and in all of Southeast Asia) to continue the broad goals of the past in deterring Communist expansion and assisting the evolution of independent and progressive societies, but to adjust certain bilateral and multilateral programs to achieve more effective long-range results. This policy of containment and construction is the one which I support. It is based on the assumption that an honorable settlement in Vietnam will entail the withdrawal of North Vietnamese troops from South Vietnam, but it suggests that the Hanoi regime may continue to pose a threat to the stability of nearby non-Communist states. Future advances in economic and social development by South Vietnam may arouse envy and resentment in North Vietnam, and the Hanoi regime, like the government of North Korea, may be tempted to foment subversion in its southern opponent to obstruct the evolution of a more productive non-Communist society. North Vietnam, assisted by Communist China, also continues as a security threat to Laos, Cambodia, northeastern Thailand, and possibly Burma.

This recommendation agrees with the motive of those critics who declare that there must be new changes in American foreign policy. Yet it urges that these changes be based on reason and hope, not on frustration and fear. It opposes a retreat to the strategy and tactics of the past, although these provide a foundation on which to build a more effective policy for the future. It recognizes that American military forces in South Vietnam and Thailand should be significantly reduced after a suitable settlement of the Vietnam conflict but holds that effective American commitments to the mainland of Southeast Asia should be maintained. It suggests a clarification and elucidation of American obligations, to make vividly clear to Communists and non-Communists alike that the United States will not abandon this strategic region to unwanted totalitarian rule. In spite of recent moves in Congress and elsewhere indicating displeasure with American involvement in Southeast Asia, the fourth alternative assumes that much greater losses will be incurred in the absence or inadequacy of suitable U.S. actions. This policy recommendation does not propose a reckless expansion of American commitments or an overreaction to Communist provocations. It upholds communication and suitable cooperation with Communist states as they genuinely mellow and relinquish their desire to impose their system on unwilling people. It is not a "go it alone" policy or a new version of "massive retaliation." It is an alternative combining alertness and strength with restraint and clarity. It is a policy of flexible response with firmness. It is a policy to prevent "more Vietnams."

In the military field, this new policy would operate at three levels. Thailand has an important role in each. The United States could promote a division of labor in the military defense of the Thai kingdom and other non-Communist nations in the region. It could tailor its military aid program to the training and equipping of local elite units capable of rapid deployment to areas threatened by guerrilla warfare and externally infiltrated insurgents. Better military equipment and tactics, combined with more effective economic and social programs, could serve as a front line in discouraging new threats of Communist insurrection and aggression.

At the second level, sufficient American military power would be available to support Thai and other indigenous non-Communist forces if they were unable to cope with expanding thrusts of Communist terror and violence. American ground troops would be highly mobile and adequately trained to work effectively with the people of the region. American air and naval power would be sufficient to assist American and local ground

forces at the threatened areas. The application of American military power would be as swift and sizable as the situation requires. Sufficient American ground forces could be stationed at Pacific islands away from the populous centers of Southeast Asia. New arrangements could be made to maintain skeleton American forces at key military bases in Thailand. Adequate equipment at these bases would be kept ready in the event of new threats to the region. After the total withdrawal of British forces from Southeast Asia in the early seventies, these bases might conceivably serve long-range security needs in the Indian Ocean region. This proposal is based on the conviction that only a premeditated, articulated, and convincing display of military capability by both local and American armed forces at required levels will deter Communist expansion in Southeast Asia. It seeks to end the ambiguity of American military commitments in the past and the vague status of American military personnel serving in the region as "training missions" or "advisers."

At the third level, the United States would adjust its treaty obligations to a more effective long-range defense of the region. It is unfortunate that the SEATO alliance, the first American commitment to the mainland of Southeast Asia, has many notable deficiencies. Yet at the present time the United States has more to lose than to gain in abolishing this treaty organization. An initial constructive step might be to reaffirm the Thanat-Rusk agreement of 1962 upholding individual as well as collective action by the member nations. This move could enhance the flexibility of the alliance and provide greater freedom to the United States and Thailand in dealing with future threats. France and Pakistan might be encouraged to resign from the treaty organization, and Indonesia, Malaysia, and Singapore could be invited to join.

Yet new defense arrangements for Southeast Asia are required. Such commitments should not focus on the past, as did the SEATO alliance in 1954 when it included Great Britain and France at the twilight of their influence in the region. Instead new defense obligations should be based on the long-range interests of the nations vitally concerned with their own security and progress. Various defense structures are possible. Perhaps most effective would be a bilateral pact between the United States and Thailand similar to the American alliances already in effect with South Korea, Japan, Formosa, the Philippines, Australia, and New Zealand. This move would give the Americans and the Thai considerable freedom in maintaining an effective defense of the kingdom and in supporting other nations in the region. A trilateral pact including the United States, Thailand, and Australia could serve the same essential purpose. Another possibility is a defense system sustained by the United States and Thailand in the northern tier of Southeast Asia, supplemented by a similar military organization composed of Malaysia, Singapore, Australia, and New Zealand in the southern tier. Other security arrangements are feasible.

These defense measures would be supported by adequate nonmilitary programs. The United States would continue to assist the Thai government in its efforts to elevate economic and social standards in the vulnerable northeastern provinces adjoining Laos and integrate these people as rapidly as possible into the mainstream of Thai society. Little need exists for additional large-scale American economic aid. The United States could continue to provide loans to Thailand for development projects through the World Bank and the Asian Development Bank. It could encourage more private American investment in the kingdom through the investment guarantee program.

The United States might expand its cultural exchange programs in Thailand and bring greater benefits to both countries. It could provide larger resources for Thai students and professional people to study and train at American universities. Some of the most competent leaders in the kingdom have been educated in the United States, and virtually all Thai who have received advanced training abroad return to their own country. Unlike some developing nations, Thailand has virtually no "brain drain."

American policy could indirectly assist the recent political reforms consisting of a new permanent constitution and the holding of free national and local elections. Improved security measures could promote a more stable and conducive atmosphere for the development of democratic institutions. Adequate defense commitments by the United States should mitigate the intense fear of external aggression among Thai political leaders which has encouraged authoritarian rule in the past. Within limits, the United States could assist the elected House of Representatives formed under the 1968 constitution. Public praise by American officials for this emerging legislative body and appropriate personal contacts with Thai legislators could strengthen the evolution of representative government. Suitable assistance might also be given by Americans to Thai business associations, labor unions, agricultural groups, and other private economic and social organizations.

Realistic and farsighted policy decisions by the United States should enable the continuation of friendly and constructive relations with Thailand in the future. Both nations have common interests in preserving the security and independence of the nations of Southeast Asia. Both share the important objective of promoting economic and social development in the region. Both have much to learn from each other. Expanding relations with Thailand have exposed Americans in considerable degree to the Asia of the future. In a unique setting with a unique people, the United States has begun a learning process which will benefit its own people and others in the years ahead. In Thailand the Americans have discovered what can be accomplished among a people free from the suspicion and distrust of a colonial background. In turn the Thai have profited greatly from increased contacts with the United States. They have been able to elevate living standards for a growing portion of their population. They have learned that control over their domestic affairs has not been weakened in this modernization process but has actually been enhanced by adapting useful ideas and practices from abroad to their own traditions and culture.

At present these same conditions do not exist elsewhere in South or Southeast Asia where colonialism once ruled. Yet within another decade or two more Asian nations will be like Thailand—they will be almost two generations removed from the colonial experience. They will also be strongly oriented toward the vision of an independent future. Most likely they will be dealing more extensively with the United States and other foreign nations, hopefully with less fear of military threats and more concern with the expansion of economic, social, and cultural benefits for their people.

A vital facet of this endeavor is to maintain an open and frank dialogue between moderate and informed leaders in Thailand and the United States. If this condition prevails, the good relations of the past should continue in the future. Both nations can continue to move along the paths of economic, social, and political development they have charted for themselves. Both can render even greater services to their own people and to the international community.

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Notes

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4. Press Release No. 52, Permanent Mission of Thailand to the United Nations, July 8, 1968.

5. *SEATO Record*, Public Information Office, SEATO Headquarters, Bangkok, Thailand, April 1968, p. 21.

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Military Opinion Abroad

AN INSIGHT INTO THE CHINESE COMMUNISTS' "PEOPLE'S WAR" AND THE MEANS OF DEFEATING IT

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IN recent years, the Chinese Communists have been publicizing and clamoring for "people's war." In addition to emphasizing that "people's war" will be waged on the China mainland to defend the Communist regime, Lin Piao has threatened to use "people's war" as a means to achieve victory in worldwide revolution. The term "people's war" has won the attention and interest of politicians and militarists all over the world. Many articles have been published on "people's war." Some list it and nuclear war as the two types of modern warfare, while others regard it as a new form of warfare.

In this study I will attempt to answer the questions, "What is people's warfare?" and "Are the Chinese Communists capable of conducting it?" The current anti-Mao and anti-Communist turmoil on the mainland (resulting from the power struggle between the supporters of Mao Tse-tung and Lin Piao and those of Liu Shao-chi, the Red Guard rampages, and the "Great Proletarian Cultural Revolution") has not only proved the inability of the Chinese Communists to wage "people's war" but has also exposed to the world their fatal weaknesses, lack of popular support, and failure to exercise effective control over the China mainland.

The experiences and lessons learned in the Chinese anti-Communist operations of the past and the Vietnam war of today have indicated that, in order to ensure victory in the counteroffensive and national recovery war and defeat the Chinese Communists, we must first seek an insight into the so-called "people's war" of the Chinese Communists. Nearly all strategy, tactics, intrigues, and ruses have evolved from the concept of "people's war." Actually, the basic premise of "Mao Tse-tung's Thoughts" is "to align one's self with the masses and to seize political power through armed struggle" for, according to Mao, "political power grows from the barrel of a gun."

Mao's thoughts of "people's war," in his book *On Guerrilla Warfare*, stemmed from the "mass rebellion" advocated by Karl Marx and Friedrich Engels, who said: "A nation fighting for freedom must not stick to the traditional laws of operations, but must carry out a mass rebellion by arming all the people. Thus, as a lion may be subdued by ants, the Regime may be destroyed by the masses. Therefore, guerrilla warfare is the only pattern of war by which a weak nation can fight against an enemy superior in number and equipment." Mao said of his "people's war": "You fight yours. I fight mine." His is the tactic of ants versus lion. Holding that the oppressed proletariat is the absolute majority, Lenin, following Marx and Engels, deceived and intoxicated the people with the fallacious concepts of communism, advocated class struggle, and intimidated the people with massacres and terrorism. This is what Mao means by "align one's self with the masses."

The Chinese Communists' current principles of military buildup and their strategic courses are to establish the "people's army," wage "people's war," and "combine position warfare with war of movement so as to conduct protracted warfare and positive defense." We should not overlook the Chinese Communists' "people's war," nor should we be frightened by it. We should not overlook it because unorganized and unarmed people will be driven by the Communists like lambs under the threat of massacre and terrorism. We should not be frightened by it because the "people's army" is organized with people under Communist threat of massacre and terrorism. Thus, there exists an inherent fatal weakness in the "people's war" philosophy. As a consequence, we should dare to fight against the Chinese Communists and be confident of victory.

What Is "People's War"?

The basic tricks of Mao Tse-tung's political activity are fabrication and bewitchment. This is a well-known fact. One of Mao's fabrication and bewitchment methods is to coin terms and change their real meanings. This is especially true of bewitchment, as people are easily taken in by it. For instance, the campaign Mao launched on the mainland to suppress the anti-Mao and anti-Communist activities was apparently aimed at cleaning out the antagonists, striking the intellectuals.

and undermining the culture, yet Mao's coined term for it was "Great Cultural Revolution." The anti-Communist peoples of the world cannot explain this term. Even the Communists seem not to comprehend its meaning. In like manner, the terms "people's war" and "people's army" do not indicate their true meaning. They were coined to achieve deception and bewitchment. We know that the Chinese Communists added the term "people's" to all their titles, e.g., "people's republic," "people's government," "people's police," "people's commune." If one accepts the term "people's" when used by the Chinese Communists as he normally thinks it to be, he is bound to be deceived.

Now let's see Mao's explanation of "people" given in his "On People's Democratic Dictatorship": "What are the people? In China, at the present stage, they represent the working class, the peasant class, the urban petite bourgeoisie and the national bourgeoisie." And as seen from Article I of the Chinese Communists' "Constitution," which states: "The People's Republic of China is a people's democratic state led by the working class and based on the alliance of workers and peasants," the so-called working class actually refers to the proletariats. Thus it is very clear and definite that the word "people" in the Chinese Communists' titles refers to their "proletarian brothers" only, while people other than those so referred to are only slaves and tools subject to their autocracy, dictatorship, oppression, and destruction. The armed forces of the Chinese Communists are nothing but the primary means for enforcing dictatorship, by no means siding with the people or bearing in mind the interests of the people. Accordingly, the "people's war" is not a war waged in the people's interest. Consequently, the people will not support the Communists in waging such a war.

For years, Mao Tse-tung has purged his dissidents under various pretexts aimed at safeguarding his "proletarian brothers' iron-bound rivers and mountains." Particularly in the last few years, the Chinese Communists have exercised military control over the vast masses with the "people's army" and have "supported the leftists of the proletariats to purge the rightists." However, in their propaganda, the Chinese Communists also call this "people's war." Therefore, the term "people" used by the Chinese Communists refers neither to the general public nor to the proletariats as a whole but only to the leftists of the proletariats. So far as the anti-Mao and anti-Communist situation on the mainland is concerned, the "people" of Communist China are becoming fewer and fewer. In such a situation, how can the "people" possibly wage a "people's war"? Therefore, the "people's war" and "people's army" of the Chinese Communists are nothing but verbal tricks for carrying out revolution by violence under the pretense of the misunderstood, high-sounding term "people." Once it is understood that every word uttered by the Chinese Communists is deceptive and bewitching and that the term "people" as they use it has no relation to the true meaning of the word, no one will fall into their trap no matter how they propagandize "people's war."

The Essential Contents and Schemes of "People's War"

What are the contents of "people's war" advocated by the Chinese Communists? In an article entitled "On Battlefields of the Liberated Area" Chu Teh, who has now been purged by Mao Tse-tung, said: "The essence of people's war is war of the masses. It is waged with the cooperation of the people, not only politically and economically, but also militarily. This type of war is not waged by the armed forces alone, but through the flexible coordination of the war efforts of the masses, the co-ordinated operation of main forces and local forces, regular forces and guerrilla forces, and militia and 'people's self-defense forces.'" In this regard, Lin Piao added: "There is indeed little secret in people's war. It is simply the process of mobilizing, organizing and arming the people." However, in his article entitled "Long Live the Victory of the People's War," published on 2 September 1965, Lin Piao further stressed the global strategy of "people's war" and its

international significance. This indicated that the strategy originally developed for domestic struggle alone was also to be used for external aggression and that "people's war" had been developed into a general line for expansion into South Asia, Africa, and Latin America and into strategic guidance for infiltrating and subverting the free world.

The political objective of the Chinese Communists' efforts to initiate "people's war" is generally to achieve their purposes in the name of "national revolution" or "democratic revolution." They use the slogan "national revolution" in resisting invading alien troops, and they subvert the government under pretense of "democratic revolution." For example, during the Sino-Japanese War (1937–45) the Chinese Communists "raised high the banner of nationalism," but as soon as Japan was defeated they started open rebellion against the government. And again, in their attempts to stir up "world revolution," the Chinese Communists adopted different situations in various areas and various countries. For instance, they launch the "struggle for peace" in capitalistic states; they stir up so-called "anti-Revisionist struggles" in socialistic states; they initiate the so-called "struggle for national liberation" in underdeveloped areas or colonized countries and the so-called "struggle for democracy" in neutral states. These are the strategies and techniques of the Chinese Communists' "people's war."

Methods of Defeating the Chinese Communists' "People's War"

In China, all wars during the period between the Hsia dynasty (2205–1766 B.C.) and the national revolution led by Dr. Sun Yat-sen were those of the feudal ages, although the uprisings by Chen Sheng and Wu Kuang, the popular revolution by Liu Pang, and the national revolution by Chu Yuan-chang bore certain similarities to national wars. Not until the national revolution led by Dr. Sun, however, was the era of national war really begun. After Dr. Sun's death, President Chiang Kai-shek succeeded him to lead the National

Revolutionary Army in the Northern Expedition. With the support of the whole nation for the revolution, the Army successfully routed the warlords, and the nation was thus unified. At the onset of the Sino-Japanese War (1937–45) President Chiang advocated that resistance to the Japanese militarists be carried out by everyone regardless of sex, age, or position. Through a war that lasted eight years the Japanese militarists, then the most powerful in the Orient, were eventually crushed by our military forces, which had the people of the whole nation as their basis.

In Europe, the French Revolution of 1793 began to change from the warfare of the feudal ages to a common effort of the thirty million French people. Every citizen made himself responsible for national affairs. This was particularly true and definite in the time of Napoleon Bonaparte. With Revolution-seasoned military strength that had the support of all French citizens as its basis, Napoleon achieved unprecedented military successes. At that time none of the old-type

feudal armies of Europe could match his invincible forces.

As to the characteristics of national war, Sun Tzu said nearly 3500 years ago: "Victors always owe their success to the people." In Book VIII of *On War*, Karl von Clausewitz said: "By participation of the people in war, instead of a cabinet and an army, a whole nation with its natural weight entered the scale."

Jomini, in his *Art of War*, said:

> In national war, each armed inhabitant knows the smallest paths and their connections; he finds everywhere a relative or a friend to aid him. The commanders also know the country and, learning immediately the slightest movement on the part of the invader, can adopt the best measures to defeat his efforts. The enemy, without information of their movements and not in a condition to reconnoiter, having no resource but his bayonets and certain of safety only in the concentration of his columns, is like a blind man. His efforts are failures. When after the most carefully concerted movements and the most rapid and fatiguing marches, he thinks he is about to accomplish his aim and deal a terrible blow, he finds no signs of the enemy but his campfires. So while, like Don Quixote, he is attacking windmills, his adversary is on his line of communications, destroying detachments left to guard it, surprising his convoys and depots, and carrying on a war so disastrous for the invader that he must inevitably yield.

This paragraph of Jomini's indeed relates to a situation which is precisely similar to that of Nationalist China's Communist-suppression operations and the Vietnam war of today.

Marshal Foch of France said in his *Principles of War:*

> The aggressor nation has organized and armed all of its people to fight an all-people war against us, while France, in coping with the enemy, can only conscript a handful of men from the poverty-stricken areas and fight by obsolete combat methods of the eighteenth century. Unless the enemy should adopt methods of combat the same as ours, we would not have the slightest chance to win the war.

In the Israeli-Arab war in June 1967, Israel won a victory which stunned the whole world. General S. Charish, Israeli commander of the southern battlefield (Sinai Peninsula), concluded in his postoperational report: "At all times, in this national war—a war waged by all Israeli citizens, they dedicated their bodies and their spirit to this successful war. Success actually belongs to them." As Clausewitz said it, "a whole nation with its natural weight entered the scale." Here lies the real basis of the Israeli victory.

The primary difference between a national war and "people's war" is that not only does a national war take place on account of great interests closely affecting all nationals but also it should be an ideological war fought for freedom. Clausewitz said: ". . . National war takes place only on account of great interests closely affecting all the nationals. . . ." These words must not be neglected. Since a national war must be fought by the nationals themselves, a war which fails to directly represent the interests of the nationals of the whole country and in which the nationals do not know "for what and for whom they fight" can hardly be classified a national war. In short, without ideology, there will be no national war at all. For instance, as all the French people were aroused by the slogan "Liberty! Equality! Fraternity!" to fight in the French Revolution for liberty, so all the Israelis were aroused to fight in the Israeli-Arab war for the independence of their native land and the survival of their nation.

In leading the national revolution of China, Dr. Sun aroused the populace with the Three Principles of the People that saved the country and the people. Even in his last moments, he put these words in his will: "My experience, accumulated in these forty years, has firmly convinced me that to attain this objective we must awaken the masses of our own people." In other words, unless the whole nation is aroused to join the war in unison, it will be difficult to attain the goal of national revolution. President Chiang has said: "Our war of counter-offensive and national recovery today is a struggle of the Three Principles of the People based on benevolence and love against communism based on revenge and hate."

The Chinese Communists' so-called "people's war" is nothing more than the use of Communist ideology to cheat and intoxicate the common people and to stir up class hatred. They promise allotment of farmlands and pledge to make the poor "masters" in order to induce and coerce the masses into waging so-called "people's war." As regards the difference between "national war" and "people's war," "national war" embraces people of the whole nation regardless of sex or age, even including members of the Communist Party and its armed forces already awakened by our declaration: "All who are not our enemies are our comrades." As President Chiang has said, "We welcome all patriots, intellectuals and the masses of workers and farmers—including all such awakened members of the Communist Party as Peng, Huang, Liu and Teng—to join our united front for suppression of Mao Tse-tung." The "people" referred to by the Communists in "people's war," however, are the workers and farmers of the "proletariat" in addition to the bandits, traitors, and rebels. Theoretically or practically, workers and farmers are merely a part rather than the whole of the nation.

A national war is, as Dr. Sun put it, "one which is initiated by the people and won by the people." The Communists' "people's war" is nothing but coercion by means of massacre and terror, a war "which is not initiated by the people but will definitely be put off by the people." In short, a "national war" is fought for the cause that moral laws will prevail. It is a fight for good and is destined to succeed, while the "people's war" resorts to violence, is evil, and is doomed to perish. And so will tyranny perish.

The national revolution led by Dr. Sun is a national war in essence. While in Kweilin, Dr. Sun said in reply to G. Maring, a Communist sent to China by Russia: "In China, there is a cultural heritage handed down from the Emperors Yao, Shun, Yu, Tang, Wen, Wu, the Duke of Chou and Confucius. My ideology is based on this very heritage." This heritage was well expressed by Mencius thus: "It was by benevolence that the three dynasties gained the empire, and by not being benevolent that they lost it. It is by the same means that the decaying and flourishing, the preservation and perishing of states are determined." Hence, what is embodied in our orthodox philosophy is just benevolence. Having this heritage from Dr. Sun, President Chiang has said: "The essence of war is benevolence and love." He has also said: "The goal of our Communist-suppression operations is to realize the Three Principles of the People so as to save the country and the people. Therefore, to suppress the Communists is to put benevolence into practice." By contrast, the Communists' so-called "people's war," in essence of war, is to put malevolence into practice.

Lenin said: "For the sake of revolution, the end always justifies the means, any means even if to slaughter half of mankind throughout the world." In following Lenin's words, Mao Tse-tung addressed the Communist Congress at Moscow on 18 November 1957: "Even if half of the Chinese population were sacrificed, there will still be three hundred million Chinese remaining, quite enough to rebuild a socialist culture." To enforce Marx-Leninism —a doctrine and practice with hate as its basis, which is against spiritual culture, against life, against moral principles, and against human nature—Mao's regime of so-called "people's democratic autocracy" is in fact nothing but his despotic tyranny of the "I am the people" type. Under Communist instigation, wives rebel against their husbands, sons rebel against their fathers, and man becomes devoid of human qualities, becomes a beast and a tool of war. Thus the whole China mainland is made the darkest hell. Therefore, a "national war" will overcome the Communists' so-called "people's war" exactly as Mencius said: "Benevolence subdues its opposite just as water subdues fire."

As A RESULT of Mao's perversities, most people on the China mainland today have turned against him. Furthermore, Mao is completely isolated internationally. Although the Chinese Communists proclaim their "people's war" all over the world, they themselves cannot lead the way to wage a "people's war."

The loss of effective control over the masses not only has made the Communists incapable of waging a people's war today but also precludes forever all possibility of doing so, as the Chinese Communists' tyranny has failed the people. No people in the world will fight against their own interests.

Chinese Communists could well exploit "nationalism" for double-dealing purposes. Should the mainland today be invaded by Russian or other alien forces, Chinese Communists might, by following in the wake of the Sino-Japanese War or Stalin's example against Germany in World War II, mobilize a portion of the people in the name of nationalism for waging a national war against the aliens. However, should the forces invading the mainland be those of the Republic of China, the National Revolutionary Army led by President Chiang, which our seven hundred million fellow countrymen on the mainland long for day and night as liberators, all our countrymen will fear only that they might respond too late. Can there possibly be any people to fight the so-called "people's war" for Mao? This is why the Chinese Communists merely talk about conducting "people's war" to cope with our counteroffensive operations.

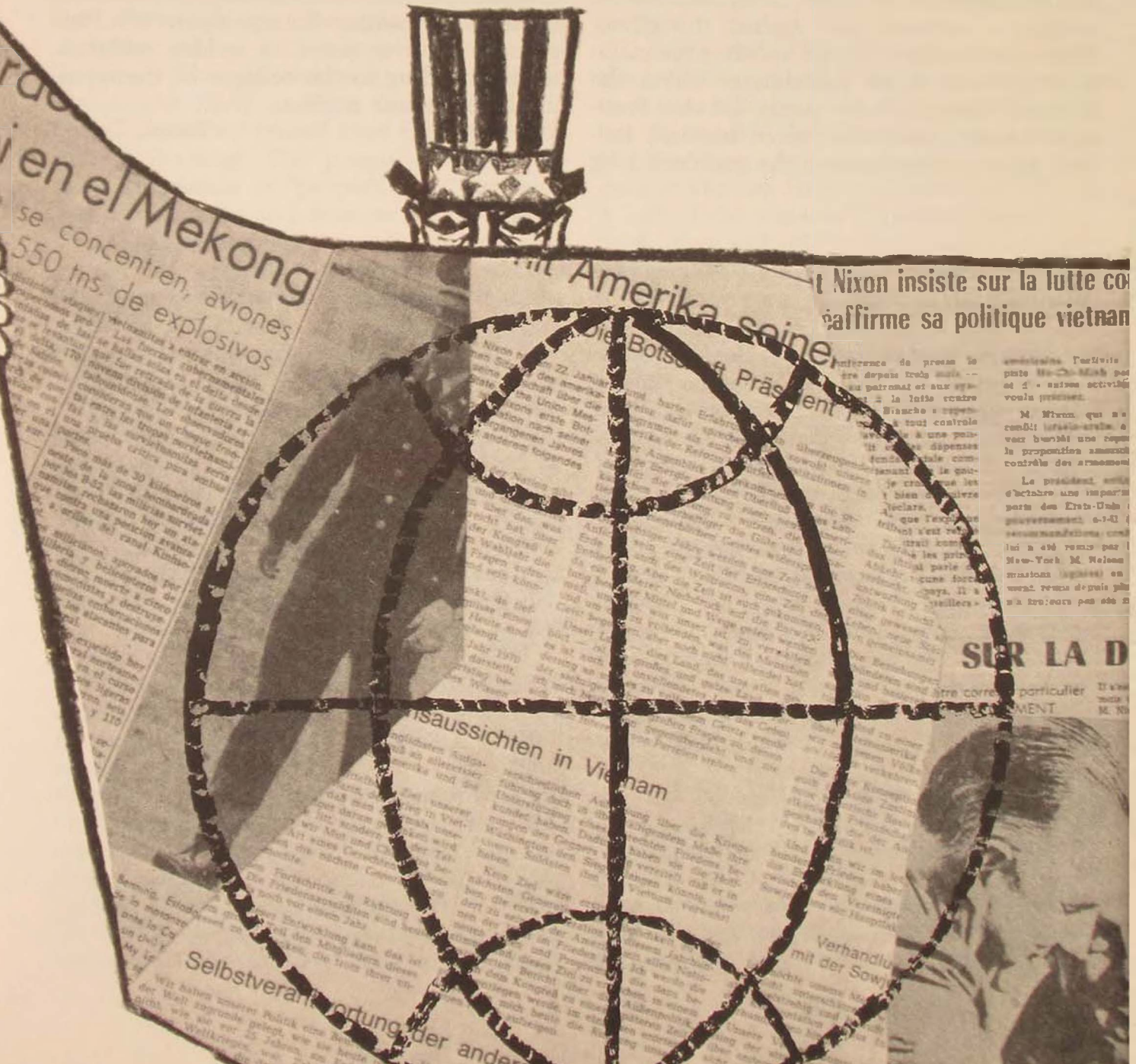
Today, the growing anti-Mao and anti-Communist emotions within the Communist Party and among all mainland people fully manifest the people's inclination toward the Government of the Republic of China, which increases in strength day by day. And such a change constitutes a fatal threat to the Chinese Communists. As soon as the Republic of China launches its counteroffensive operations, this change will give rise to a sudden outbreak, thereby leading to the collapse of the tyrannical Communist regime.

Taipeh, Taiwan

In My Opinion

PUBLIC INFORMATION, WORLD OPINION, AND COUNTERINSURGENCY

Raymond J. Barrett



In my opinion, Vietnam suggests that if we are to deal successfully with future insurgencies we must carefully refine our international public information program. As much can be lost in public opinion as can be won on the battlefield. The characteristics of an insurgency and of the public media are highly likely to create a picture of the counterinsurgency that is prejudicial to our efforts. To maintain a balanced impression, a carefully constructed public information effort on our part is essential.

Public opinion around the world may seem a nebulous thing, but it can be crucial in dealing effectively with an insurgency. Through the Joint U.S. Public Affairs Office in Saigon and other means, we carried out an intensive and impressive public information effort regarding Vietnam. The effort was imaginatively and industriously conducted and obviously had many beneficial results. Great talent and resources were devoted to this activity, and information about Vietnam was imparted through all the media and in many forums.

Despite this effort, a large body of opinion against the United States' role in Vietnam built up around the world. The growing pressures of antagonistic world opinion made our steadfast efforts to deter aggression in Vietnam vastly more difficult. At best, these pressures have badly obscured the seemingly simple truth that indirect aggression must be shown to be fruitless if peoples around the world are to have reasonable opportunity to work out their own destiny. At worst, these pressures may yet lead to a settlement in Southeast Asia that fatally compromises this basic principle. It is often fashionable to deride world public opinion. But once it starts to flow, it is a powerful force, shaping attitudes and policies in a way that is very hard to alter or deter.

These comments stem from my service in Europe as the Vietnamese problem came to a peak in 1965–67. I was the Embassy officer assigned responsibility for Vietnam matters and was actively engaged in trying to explain Vietnam and our policies there to Europeans. This commentary is impressionistic and, of course, is far from a complete picture of all that was done in the public information field. Nor are these suggestions comprehensive in the sense that they present all the things that need to continue to be done in any effective public information program. Nor, it should be emphasized, are these comments meant to disparage the fine efforts of USIA, JUSPAO, and the others who participate in our information program. These suggestions are offered in the hope of sharpening our efforts toward the attainment of the vitally important goal of demonstrating that indirect aggression cannot succeed.

A basic consideration must be the concerns of our audience. This may not always be easy. One might have thought that Europeans would be responsive to the threat of indirect aggression, having themselves but recently experienced both Nazi and Communist aggression. But few Europeans put Vietnam in this context. For most of them, Vietnam was a faraway place; they knew little, if anything, about it, and few were prepared to make the conscious effort to become more knowledgeable about the country and its problems. Europeans were far more absorbed in their own economic boom and in their aspirations for material and social betterment. Having shed their colonial responsibilities, they were distinctly disinclined to concern themselves actively about problems in the underdeveloped parts of the world. In short, Vietnam was a very peripheral subject for the overwhelming majority of Europeans.

With this in mind, let's consider the type

of information that Europeans received as the Vietnamese crisis came to a peak. The principal news was the United States' decision to intervene. The news services and other media covered this story and its developments in thorough fashion. The coverage, by and large, was factual. But what it presented was a steady succession of photos and stories about American military forces being deployed in Vietnam. These are the things the European audience got from radio, television, and newspaper. But such photos and reports can easily, and quite unconsciously, produce an awesome, calculating, and thoroughly military image of the United States' role.

Most of the European audience had little if any knowledge of what had gone before. A new generation had grown up in the decade since France left Vietnam. American leaders made many lucid expositions of U.S. goals and restraints, and USIA and JUSPAO put out impressive material explaining American policies and activities. While this information had an impact on many areas of European leadership, its effect on much of the general public was very limited. The average European neither knew nor cared to learn much about such key historical factors as the Geneva Agreements, the failure of the International Control Commission, the post-1954 developments in the two parts of Vietnam, and the evidence of Hanoi's calculated efforts to subvert and conquer the South. Put in the context of his absorption in his own concerns, it is not surprising that factual reports of the American buildup gave the average European an unfavorable initial impression of the United States' role in Vietnam.

As the crisis developed, the picture presented by the public media tended to become more unfavorable. As American activity stepped up, the news services and other media reported this activity in detail. Again, what the Europeans saw on TV or read in their newspapers were photos and reports of American military sweeps, American bombings, American bases, American naval vessels, ad infinitum. The cumulative impact, without any malicious intent, was highly prejudicial to the United States. It presented an image of massive and highly destructive military force being repeatedly and callously loosed in a small and long-suffering country.

On the other hand, little about the widespread and vicious Viet Cong terrorism got the attention of the European audience. The acts of terrorism were not conducive to sustained newsworthiness. Even less newsworthy were such things as textbook distribution, improved rice crops, monetary reform, trained teachers and doctors, and similar constructive achievements of the U.S. aid program.

Thus, the nature of the media news soon gave the European audience a distinctly unfavorable image of the United States' role in Vietnam. There was nothing sinister about this; the things we were doing were open, reportable, and conducive to news items likely to be printed. In particular, they could be photographed, and people who see photographs without reading the complete written story often get inaccurate impressions.

Yet neither the terrorism nor constructive activities were likely to be reported or photographed. A nighttime killing or a cold-blooded ambush could not, by its nature, be photographed, nor was a photographer or reporter likely to be handy when terrorists deliberately burned a school or medical center. As candidates for newsworthiness, these things were not as dramatic or attention-getting as large military activities, bombings, or bomb damage. A report on "15 More Teachers and Doctors Assassinated Last Night" might or might not make the newspapers or TV, but one on "Massive New American Military Sweep" or "U.S. Bombs New Targets in North Vietnam" was virtually certain to appear. Similarly, it was hard to photograph or report in attention-getting fashion the new textbooks, the better rice, the sounder currency, or the additional teachers and doctors.

With his central concerns focused on his own welfare, the average European did not reason, inquire methodically, or balance information carefully. He got his impressions intuitively from the information which the public media *did* present to him and which he absorbed in casual fashion. With the information heavily weighted in one direction, it was not

surprising that he developed an unfavorable impression of the United States' role in Vietnam. And once he did, the process became cumulative; he tended to interpret additional information in even more unfavorable manner.

Since his own direct interests were not involved, the European tended to react to the Vietnamese crises in "human" terms. As an unfavorable image of the United States' activities developed, he became increasingly disinclined to consider the questions of deterrence, world order, geopolitics, or other pertinent considerations. The view that all would be well if the United States would just "stop" gained acceptance. Strong pressures thus developed for the United States to end the bombing of the North, to go to the negotiating table, to overlook "details" like the shape of the table, and to give ground in the negotiations.

Symptomatic of the prejudiced image of the United States that developed was the belief that the United States had intervened in Vietnam to maintain its domestic prosperity. This theory contended that the American economy depended on defense production and that a war had been necessary to maintain this production and thus the prosperity of the rest of the economy. This view gained remarkable currency and strength. It yielded grudgingly, if at all, to the clear evidences of inflation and other economic and social distress caused in the United States by the war in Vietnam.

Similar opinions prejudicial to the United States undoubtedly developed in other areas of the world. In underdeveloped areas, where there was little knowledge of or interest in Vietnam and where the flow of information was largely verbal and transmitted second-, third-, or fourth-hand, the likelihood of misunderstanding the nature of American military strength was probably greatest.

The clear lesson for us is that in any future counterinsurgency situations—and there will inevitably be more—we must seek ways to preclude this development of antagonistic world public opinion. I suggest that we must adjust our efforts more precisely to the nature of our audiences and to the characteristics of the public media. A well-rounded effort of the type that USIA does so well will again be necessary. But vigorous priority should go to portraying quickly and forcefully the *human* dimension of the problem.

We must concentrate our efforts frankly and strongly on making clear the brutal nature of the aggression. Our audience, we must remember, has only a peripheral interest. It will not be attracted to, much less respond to, historical reviews of who did what to whom in the past, legal analyses of international law, exhortations on world order, philosophizing on the sanctity of agreements, or other "reasoned" rationale. The basic feeling will be a "gut" reaction in human terms. We must make clear the vicious, cold-blooded, inhuman terrorism of the aggressor. We must make it *abundantly* clear that it is *we* who are coming to the defense of an oppressed and innocent people.

We must also move promptly. Before, or at least while, the news reports of our intervention are appearing, we must make crystal clear the full and vicious nature of the aggression we are responding to. In many respects, prompt and effective public information requires one of our highest priorities in the initial stages of a counterinsurgency operation. Unless we explain the situation immediately, unfavorable impressions of our actions are liable to start developing. Once that happens, we stand to lose as much through unfavorable world opinion as we gain through military action.

Our efforts must be hard-hitting and explicit. Frankly, we must overcome our natural tendency toward decency. We must set out to shock. We need plenty of photos showing atrocities in grim and horrifying detail—the dead, the mutilated, the tortured, the women and children. Vivid photos are also needed of schools, medical centers, churches, and other humanitarian facilities deliberately burned, bombed, or attacked by terrorists. Along with these photos, we need plenty of dramatic and poignant stories. These should point up the innocence of those attacked and the brutal and deliberate nature of the assault. I invariably got a stunned and sympathetic reaction when I related instances such as one in which the Viet Cong not only blew up a

school bus but then deliberately machine-gunned the school girls as they lay among the wreckage. We must make clear the viciously calculated pattern of assassination—of teachers, priests, medical workers, doctors—in an effort to destroy the social fabric.

Put bluntly, we must make it convincing that, as John Steinbeck once put it, "Charley is a son of a bitch."

Our theme should be: "Who is truly helping the people?" Is it those who are deliberately murdering innocent people? Is it those who are deliberately and systematically murdering those, such as doctors and teachers, who are working to improve the life of the people? Is it those who deliberately and systematically attack and destroy those facilities, such as schools and medical centers, designed to improve the life of the people? Is it those, no matter what their political or other claims, who aid and abet this cold-blooded terrorism by sending in arms and troops?

Rather, isn't it those who have come to the defense of these oppressed people? Isn't it those who have sent sons thousands of miles to die to protect these innocents and who have poured forth treasure and might to try to end the cold-blooded slaughter of a peaceful people? Isn't it those who officially and voluntarily perform untold acts of human kindness for the people among whom they are serving? Isn't it those who are working mightily to train—not slaughter—teachers and doctors, to build and equip—not destroy—schools and medical centers, to improve the health, food, and conditions of life of the common people?

Use of these themes enables us to put a difficult situation in human terms that elicit audience response. I frequently had audiences turn from hostile to friendly when I pictured Vietnam in these terms. This approach catches the imagination. It enables us to make clear the enormity and brutality of the aggression and the humanity of our response. It sets the news reports about our military activities in context and gives us manifold opportunities to make newsworthy both the terrorism and our friendly economic and social development efforts. The issue of who really is helping the people makes the basic issue absolutely clear.

One question that arises is the impact on such an approach of reports alleging American atrocities like those regarding the incident at My Lai. Wouldn't we make our credibility vulnerable? Obviously, reports of this type, if they seemed to be true, would not help us. But the approach suggested in this article would make us less vulnerable than we are at present. For one thing, we would have established the vicious nature of the aggression and provocation, against which such an aberration is more humanly understandable even though deeply deplorable. The strong and widespread repugnance toward even alleged atrocity and the prompt and thorough effort to investigate and assess blame demonstrate again the humanitarian nature of our response. And they offer abundant opportunities to underline publicly the contrast with the aggressors, to whom such inhumane behavior, far from being an aberration to be condemned, is deliberately chosen and executed policy.

The approach suggested in this article is more easily described than fulfilled. We must include provisions for this public information operation in our contingency planning for counterinsurgency. Qualified personnel should be earmarked for prompt deployment, since speed is of the essence. The plans should include procedures and personnel not only for obtaining the necessary in-country photos and stories but also for rapid transmission of this material around the world. There should also be flexibility to respond rapidly, in pinpoint fashion, to requests for material particularly useful in a given area of the world.

Especially important would be the rapid deployment of teams to each of the major geographic areas of the world. These should consist of experienced and imaginative United States Information Service officers and, ideally, a Foreign Service or military officer with a sound political-military background in the area of the insurgency. Each team would have to have good secretarial and other support. Some such officers were deployed to deal with Vietnam, but not until after the Vietnamese situation became critical. And, for whatever

reasons, the program did not seem to produce the vigorous and carefully adapted flow of information needed. These teams must have strong priorities. Their principal purpose would be to provide an on-the-scene source of quick-response information geared to the particular characteristics of the audience in that area. It would also offer guidance and assistance to the American embassies, military commands, and other agencies involved in getting out our information in the area.

The group would also help to obtain information geared to particular audiences in its area. For instance, photos and human-interest stories of terrorist attacks on Catholic priests, teachers, students, and schools in Vietnam would be powerful material in Spain, Portugal, Italy, and other Catholic areas of Europe. Regular material on the Spanish Military Medical Team in Vietnam would have been useful in Spain and among the medical and military professions generally; it also would have been an excellent peg for stories on several aspects of our humanitarian and aid efforts. (While JUSPAO offered this service for Vietnam, there were many competing demands on its time and resources. It is essential that this activity have a priority claim on resources to ensure that the desired information is fully and rapidly provided.)

These teams would be familiar with both their audiences and their material. This is essential to a convincing presentation. They would be highly valuable centers for guiding an effective on-the-scene public information operation.

Counterinsurgency is a battle for men's minds internationally as well as internally. To be effective internally, we must be effective in dealing with world opinion. To do this, in turn, requires attention to the nature of public media and the impact on distant audiences. From this must flow equally careful plans for a public information program likely to meet the particular and very real problems involved.

Arlington, Virginia

ON MILITARY FORCE PLANNING

U. A. Coty, E. J. Daniels, and R. A. Shane

FOR the past five years a diverse team of research and development engineers, economists, and ex-military war/force planners in industry has been examining some of the factors which seem to interfere most with obtaining maximum effectiveness in the process of military force planning. This article will present some of their findings, in the form of considered observations based on individual experience. Since we feel that each of the different portions of the planning community has its own specialized ways of looking at the various aspects of this subject, we will divide the article into three parts. The first will be an approach to force planning as seen by research and development. The second part will reflect the viewpoint of the economist and operations researcher. The third will point out some war-planner thoughts and present a set of key caveats that may be helpful to those involved with force planning.

the R&D look

The objective of research and development in military force planning is threefold:

(1) Identify the technologies that could contribute the most to overall effectiveness of the future military force structure.

(2) Allocate the resources required to achieve the desired level of knowledge prior to the start of engineering development on new programs.

(3) Provide a balanced effort with sufficient alternate courses of action to achieve an acceptable level of risk.

Effective R&D planning requires several key elements: timing, technology forecasts, estimated measure of resources required, assessment of risk that level of knowledge will not be achieved, and measures of effectiveness.

Many books, articles, and technical papers are available on these five key elements. Nevertheless, we still do not have a generally accepted method of allocating resources to the advancement of the relevant technologies. The Air Force is developing a method called Torque, which has been tested on advanced development phase tasks and shows great promise, but the advancements of basic technologies that occur more in preceding exploratory development and basic research phases will require a more sophisticated analysis. The problem is this: One of the six basic requirements for starting contract definition is that the technology be essentially in hand. We have too many sad examples of programs that started into development when the technology was not in hand. Too often we find that the level of technology we need to do a really effective job of performing a mission has not been achieved because the need was not recognized and the resources were not allocated early enough to permit the exploratory development which had to precede the required in-hand advanced development technology. At this point, the tendency might be to stretch the meaning of "essentially in hand," with all the sad consequences.

The important principle here is that the level of technology *could* have been achieved if the need and the priority had been recognized early enough. A method of doing this is being explored which evaluates the sensitivity of mission and cost effectiveness to the level of specific technologies. Technology forecasts give an indication of whether such levels are possible in the desired time frame of a particular future program. The technologist, with the need defined, can say how the level of knowledge can be achieved and what resources are required and can estimate the risks involved. Allocation of R&D resources can

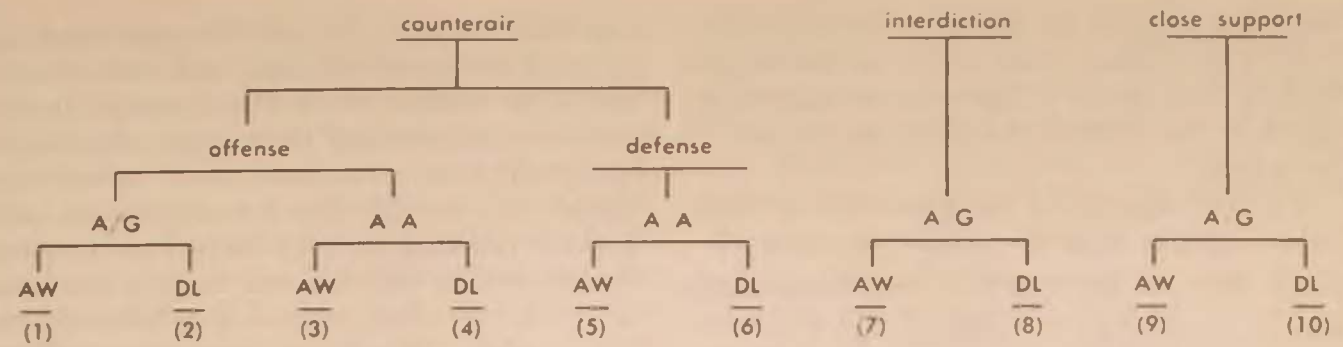


Figure 1. Tactical air missions

Legend:
A G - air to ground; A A - air to air;
AW - all weather; DL - daylight.

then be made on the basis of resources invested and risk versus the payoff in mission and cost effectiveness.

Allocation of R&D resources by technology tradeoffs requires that certain relationships and definitions be established with the real world uppermost in mind. The timing of a future program must take into account the priority of the mission, the operational deficiency, *and* the *limited* Department of Defense (DOD) budget that will be available at that future time. Measures of effectiveness must be defined in a manner that permits the true worth of a technology level to be assessed. For example, the average number of bridge-busting sorties flown per day per aircraft is a meaningless measure if no bridges were *actually busted*. Clearly, the successful accomplishment of a mission must be one of the measures of effectiveness of the weapon system that performs that mission. In addition, the calculation must show what level of this kind of effectiveness can be realized if the technology is *not* developed to the desired level.

Assessing the measures of effectiveness is further complicated by the fact that the Air Force must maximize the capability of its total *force mix* for a given budget. This raises the critical question of just how the force mix will perform the missions.

Operational people tend to push for a single-purpose aircraft which performs its basic mission in the most effective manner that technology will allow. At the opposite end of the spectrum is the belief that the multipurpose aircraft is the only way to fly. These opposing views will not be reconciled until it is recognized that the answer lies somewhere between the two. The search for the optimum point is being pressed today, using the following methodology.

The objective is to determine the optimum force mix of fighter and attack aircraft to perform the tactical air missions. Although there are over 25 tactical missions identified with fighter and attack aircraft, the three which govern the size and mix almost exclusively are counterair, interdiction, and close air support.

Figure 1 shows that the three basic tactical air missions divide into ten sub-missions. The approach is to start with a base design aircraft which performs one sub-mission as effectively as the technology of the time period will allow. This, in effect, is starting with ten single-purpose aircraft in the force mix. A representative scenario can give the target types, quantities, and rates which determine the size of the mix. This first step forms the base from which effectiveness can be measured on the basis of the total force mix life-cycle costs. The next step is to add an increment of multimission capability to some of the base designs that had some degree of multimission capability inherent in their design to start with.

Two ground rules govern the adding of

these increments of multimission capability:

(1) The mission effectiveness of the original base design cannot be reduced, perhaps meaning that the cost of the new design will be increased.

(2) The capacity of the force mix as established by the scenario cannot be reduced.

Each time an increment of multimission capability is added, new force levels and mixes are determined on the basis of constant capability and the total costs calculated. Iterations of this process should converge to a force mix which has a minimum cost but still has the mission effectiveness desired by operational people.

the economists' view

Money rules! The textbooks do not teach planning in such terms. Secretary McNamara tried vigorously to measure the cost of military effectiveness, but the triumph of the dollar is inevitable.

Why inevitable? Because effectiveness is calculated by military planners, but dollars are allocated by the Congress. Congressmen understand dollars, but they must take the military planners' word for environments, threats, and measures of effectiveness. When they have done so—as they generally have in the past—they have put their money where their faith was; when they do not—and a great number of them clearly are of a mind not to now—they trust the dollars they understand, and effectiveness becomes an interesting derived quantity for the DOD to evaluate.

What this means to the force planner is that he may start his analysis with long-range strategic objectives and with technological and system requirements, but he must soon recognize that he is suboptimizing. He is working with an inner loop of the planning servo; "requirements" are only a wish list. The size of the dollar sign is the driving input to his outer loop and thus to his entire system. Whatever his opinions may be of this process, his time will be spent most efficiently if he comes up with the optimum solutions within the dollar constraints imposed.

An understanding of the real world is essential for any planner. The real world is peopled by human beings, and thus it is a world of emotion as well as reason. In the past, the citizens and their representatives in Congress took a realistic view of military threats and treated their social problems with wishful thinking. If they have now reversed themselves on both counts, then a condition of wishful thinking regarding military threats and realistic treatment of social problems becomes the present planning environment.

What, then, should the planner do in such an environment? He still has a rational task to perform, even within emotional constraints. He simply appends the words "under the circumstances" to his deliberations. He will find, however, that these circumstances will impose some rather severe restrictions on the new systems he can include in his forces. Fewer systems with more derivatives and with longer life required for each "tail number" will, in all likelihood, reduce overall effectiveness. The more severe question may come not in the reduced effectiveness of the next system but in the compounding effect on the generation beyond that one. That is, the fact that we have not funded an advanced system may have its most damaging effect in our having a lower level of technology available on which to base succeeding systems. Thus past projections of the growth of effectiveness may need to be scrutinized carefully. A trend is generally valid only when one can make the "all other things being equal" assumption. More stringent economic constraints on R&D are the kind of other-things-not-equal condition which can invalidate extrapolations from past growth experience.

the military force planner's view

For a third viewpoint, we turn to some of the interactions found in the overall planning community and a number of resulting caveats which we believe should be carefully considered, especially by those specializing in any one segment of the three-part planning community: R&D planning, economics/resource planning, and war/force planning.

The highly specialized areas of finance

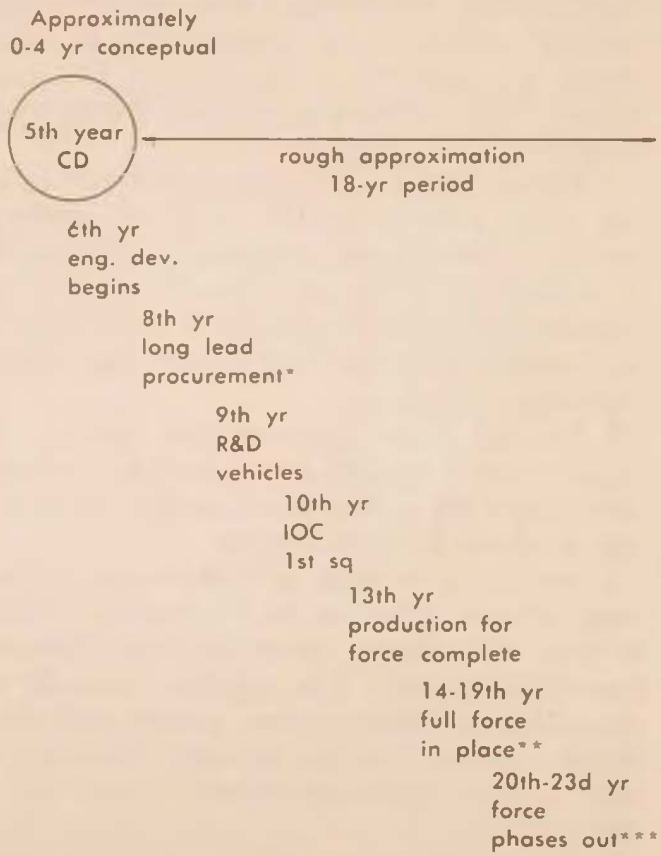
and R&D since World War II have, in general, forced an officer and civilian manning situation that tends to create specialized communities in the Air Force military force planning structure. While war plans, force structuring, and operations staff activities can be manned with generalists who have a broad background tied to forces in the field, the same cannot be said of R&D and finance. In many cases (excluding some assignments in Vietnam) these two career areas have become so individually complex that officers and civilians have had consecutive assignments for a great number of years in a single community, even though they may have been working at different-level assignments in different headquarters—AFSC, ASD, Flight Dynamics Laboratory. It is not uncommon for an R&D plans officer to go long periods before being assigned to the field forces, if ever.

Financially oriented staff officers often rotate between budget, cost, accounting/finance, programs, management analysis, data automation, and comptroller functions. Relatively short interruptions to attend Air University or other military schools do not seem to shake this identification with the specialty. Concurrently each community, including the generalist war and force plans category, has developed a specialized language not easily understood by other communities. Thus the operationally oriented group works with unit equipment (UE) numbers of aircraft while the group oriented to "P" series resource programs tends to think of authorized active inventory (AAI)—two different ways of keeping books on aircraft numbers. The economics /cost/budgetary group deals in such specialized terms as cost estimating relationships, intricate learning curves, above the line, below the line, flyaway, gross program costs, total costs of forces. Recent cross-training assignments should be helpful; for example, an essentially R&D planner has been given a major supervisory position in the budgetary cost division, including force costing responsibility. When the three-part community has been completely coordinated in a timely way and communications have been smooth, some very interesting patterns have developed, reflecting the integrated thinking of the R&D, cost, and operational groups which is possible in force planning. Such developments seem most effective when generated and implemented by the full three-part planning community. One typical life cycle model is shown in Figure 2.

basic caveats

The interaction of R&D, economic, and force quantification items can best be shown in a series of "caveats." Among the caveats that not only reflect mistakes or lessons learned but include potential future danger areas as well, the following are particularly important.

Figure 2. Typical life cycle model of aircraft program (not of any certain one). New contract definition (CD) and initial operational capability (IOC) dates for replacement systems must be logically phased in, based on operational deficiency, economics, technical feasibility, and age and condition of force being replaced.



*Can slip 1 yr on difficult programs.
**Full force can remain in-being longer—up to 10 years.
***Mods can slow down phase-out period as with B–52G and H.

1. Exploit the building blocks of exploratory development/applied research, including mission analysis, technical tradeoffs, and technical intelligence, at a sufficiently early date in R&D to contribute to the direction that future forces take. Do not wait for advanced development to exploit R&D. This is too late.

2. Continuously modify operational doctrine to challenge R&D technology for implementing solutions and vice versa. Stale doctrine does not effectively drive technological innovators; more often than not it tends to push solutions for the last war.

3. Generally, allocate only limited R&D funds to long-term end objectives of mission accomplishment and attainment of operational capability objectives; technology for technology's sake is valid only for research.

4. Step up frequency and effectivity of communications between R&D and other parts of the planning community.

5. On an overall budget basis, clearly recognize that operational requirements may call for dollars in an amount two or more times that expected in the budget, thus presenting major allocation problems which planners should help to solve.

6. Do not insert new replacement into force too early relative to life cycle of replaced system. Procurement/maintenance objective is at least 11 or 12 years generally for a tail number and up to 20 years for a large bomber or transport if an efficient system was picked to start.

7. Do not insert augmentation system (to supplement a system now existing) without due regard for procurement budget overloading involved for government.

8. Spread knowledge of procurement *planning* internal practices in government. (This is over and above Armed Services Procurement Regulations.) This applies especially to operations and requirements people, with particular reference to the intricate financing of new systems with government funds on a phased basis.

9. Expand the mere handful who understand force structuring *and* force costing, including more cross-training assignments between segments of the planning community.

10. Provide sufficient effort to research force planning methodology/techniques, including ways of better integrating the activities of the three-part community.

11. Look *beyond production* at the life cycle *annual operating cost* of the force and its parts, especially in the phase-out time period.

12. Establish greater *uniformity* in interpreting military missions and which systems can specifically perform which missions, and the degree of effectiveness in performance, quantified beyond emotion.

13. Avoid overly frequent assumption that new technology *automatically* insures new procurement.

14. A key general planning factor is to keep a system in at full force after final production (not including peacetime attrition) for 5 to 7 years before beginning system phase-down. Well-modified systems, such as the rejuvenated B-52, can, of course, extend this 5–7 year period in isolated cases. The point is to *objectively* review the system being replaced in the force structure. There is no set factor, but the 5–7 year full-force period is suggested as a reference value, which must be modified (less or more) for each new system.

15. Watch for specific characteristics that influence system life. Strong systems, such as the RF-4 for reconnaissance, can defer RFXs at least to the phase-down period. AXs replacing A-7s too early, if at all, must have some *special advantage*; without this advantage, such a replacement would be tantamount to declaring that the original A-7 *purchase was in error*. Or, as is the case, A-7s may have doubled in *cost* and it is possible to put a hold on a portion of production and *substitute a quick-fix airplane*. This could happen with any aircraft where *prices are too high, performance is poor*, and there is still time for a hold, *prior to delivery* of the whole force, for substitution. In every case, the situation should be tested against a pattern like the "5–7-year" full-force schedule and/or new patterns still under study.

for the future

We have discussed several ideas capable

of implementation today. Beyond these are other ideas whose need we perceive but whose development requires effort from both sides of the maligned "military-industrial complex." We suggest these ideas in particular:

1. *Encourage a service-industry pooling of data on technological forecasting,* which is an important element of R&D planning.

2. *Place more effort on tactical doctrine that the services wish to employ in the future.* This would tend to create the technology base that will permit employment of the desired doctrine, rather than continue patching the doctrine to fit what existing technology will allow.

3. *Develop a new concept to replace "requirements."* The term is meaningless—required in order to do what? Since many so-called requirements are not met, they could not have been required. But the need for replacement is more than one of semantics.

4. *Develop a method for assigning a risk index for each force structure in each projected environment.* This index would relate the weakness of the nation's defense posture to the principal threatened hostile action in that environment. Such an index, suitably defined in lay terms, might be a means of communicating with the Congress on the consequences of a proposed cut in forces or budget.

5. *Modify the definition of cost effectiveness to include future effects.* Project the cost effectiveness of the system beyond the one under consideration, then apply discount factors to account for uncertainties in technologies and environments. But recognize in the calculation that there will be a next system and that it may be significantly affected by a development which is not undertaken today because the cost-effectiveness case cannot be made for it in the immediate program.

6. *Increase utilization of the computer* for quick response changes in force structure planning patterns and alternative options. With development of more precise and detailed planning factors, this will be possible to a much greater degree than in today's process.

7. *At the middle management level, provide extensive periods of broadening-type training for those over and beyond flag rank.* This would even go so far as to give selected fighter staff people, including wing commanders, tours as comptrollers, R&D people tours in procurement production, and vice versa. This will take a determined effort, with top-level backing, to really have a more-than-nominal impact. "Tokenism" here will be insufficient.

OUR main purpose in writing this article is a heuristic one rather than the dispensing of any cut-and-dried gospel. We would hope that it generates some thinking in the mind of each reader, whether he is a "force planning" specialist or not. After all, planning is everyone's business, no matter how small a part he may play in the actual decision process.

Burbank, California

Books and Ideas

MEGAMANAGEMENT FOR THE SPACE AGE

LIEUTENANT COLONEL ROBERT H. DRUMM

IN A recent issue of *Astronautics and Aeronautics,* Dr. Robert C. Seamans, Jr., Secretary of the Air Force, stated: "Whether as simple as buying the Sunday paper or as complex as the Apollo program, action requires first deciding to allocate resources for given goals, and then applying those resources effectively."[1] At first this statement seems trite, but with a second reading comes the realization that simple and complex problems have a great deal in common, especially in the basis for solution.

In James Webb's new book, *Space Age Management: The Large-Scale Approach,*† we have a rich compendium of space age management history. The text presents his own involvement in this history and voices a number of observations. Many of these observations, like Dr. Seamans' statement, reflect a plan for down-to-earth management of large-scale endeavors. As administrator—until recently—of the National Aeronautics and Space Administration (NASA), Mr. Webb is no stranger to the management of massive dynamic organizations.

Mr. Webb has extensive experience in guiding large corporate structures in the private as well as public sector of our economy. He has held such diverse positions as Director of the Bureau of the Budget, Under Secretary of State, Director of Oak Ridge Institute of Nuclear Studies, Vice-President of Sperry Gyroscope Company, and Director of McDonnell Aircraft Corporation.

This book is the product of the thirteenth series of Columbia-McKinsey Lectures. In the Introduction to the book, Dr. Courtney C. Brown, Dean of the Columbia University Graduate School of Business, states:

> The tasks of mankind are rapidly becoming more complex. Increasingly they impinge on those qualities of life that extend beyond the production task of providing abundance. New structures, new methods, and new attitudes will be required for the fulfillment of man's requirements in the years to come. The patterns of social and economic organizations of the past are now less adequate. The ideologies of yesterday are fading fast. The magnitude, the urgency, and the complexity of the space program of this nation have demonstrated this to be so. The program has required fresh imagination and venturesome thinking.

A plea seems to be reaching out from the book for more and better research in the area of management—for better and more dependable ways to organize and administer the great enterprises in which our nation must increasingly engage. This research, according to Mr. Webb, must provide greater knowledge and deeper understanding of what successful leaders in unprecedented endeavors really do, why they do it in a prescribed manner, and what the effects of these actions are.

The author does not hold solidly to traditional management values. On the other hand he does not advocate change in tradition for change's sake. He does encourage increased research in organization theory. In this light Mr. Webb explains how efficient administration of current large-scale ventures departs radically from traditional management doctrine. He shows how the management requirements of the space age, as practiced by NASA, often went beyond the proven capabilities of present managerial forms and methods.

He addresses a number of specific areas of large-scale management in this rather distinctive approach to administration:

• Change is increasingly becoming the norm rather than the exception in the managerial arena. He quotes one student of organization theory who puts it as "adaptive, problem-solving, temporary systems of diverse specialists, linked together by coordinating executives in organic flux."[2]

• Large-scale endeavors may differ widely but all have a common thread of being generated by change: interaction is often turbulent; they can be made effective by use of current managerial processes in existing forms; they have complex managerial requirements; they have a "critical mass" of support; they

†James E. Webb, *Space Age Management: The Large-Scale Approach* (New York: McGraw-Hill, 1969, $6.95), xiv and 173 pages.

are concerned with the adoption of new knowledge; they have important side effects associated with the prime objectives, some of which are intangibles; and they all loom large in the public eye.

• Environmental factors affect large-scale endeavors—an environment which knows success will retain confidence in the prudent use of leadership power. Leadership that abuses power will eventually lose the trust of the populace that makes up the environment.

• The key to successful accomplishment of large-scale endeavors is real-time feedback between the endeavor and its environment.

As a behavioral scientist, I was intrigued by the use of feedback in controlling an organization the size of NASA, which at its peak had a payroll of more than 400,000 people. Mr. Webb implies that this feedback was used in the contemporary sense of a "learning situation" and not strictly as a control device.

The subject covered by the author is potentially a highly esoteric one. In spite of this hazard, Mr. Webb brought forth many basic points which show that humanism is still retained in a large-scale operation. Among these are:

(1) The real key to large-scale success is the careful selection of highly motivated men of great ability. One factor in retaining their motivation is to expand their responsibilities continually (a method of job enrichment).[3]

(2) Detailed follow-up by the top echelon is imperative to organizational success.

(3) Sophisticated information sciences (computers) cannot replace the *Homo sapiens* manager. This Mr. Webb concludes even when faced with the 300,000 tons of data generated during the Apollo program.

The author's emphasis on the method of conducting programs of huge magnitude without destroying the basic framework of our society is one of the book's strong points. He does a superb job of documenting the methods required to organize programs involving rapid growth, large sums of money, and management of thousands of administrative, technical, and professional people. The success of the Apollo program attests to the basic feasibility of Mr. Webb's tenets. To the serious student of management theory, these same large-scale applications may have a like application to social problems facing man on earth. Mr. Webb supports this thesis by quoting Dr. H. W. Johnson, President of the Massachusetts Institute of Technology: "The world is changing with such a speed that only the adaptive innovator can keep the pace. We are in the process of a social, economic and political evolution in which, clearly, only the fittest of enterprises will survive."

I recommend the book to all serious students of the managerial arts—especially those with responsibility for large-scale organizations such as the Department of Defense. Much of the text has direct application to managing change as it is currently experienced by military leaders.

Maxwell AFB, Alabama

Notes

1. Robert C. Seamans, "Action and Reaction—Part Two: Lessons Learned," *Astronautics and Aeronautics*, September 1969, Vol. 7, No. 9, pp. 44-52.
2. Warren S. Bennis, "New Patterns of Leadership for Tomorrow's Organizations," *Technology Review*, April 1968, p. 37.
3. Frederick Herzberg, "One More Time: How Do You Motivate Employees?" *Harvard Business Review*, January-February 1968, pp. 53–62.

WINNING IN VIETNAM

COLONEL RICHARD F. ROSSER

WHEN *Can We Win in Vietnam?* appeared in the summer of 1968, the political climate was not ripe for its suggestions of alternative strategies. Today, a new administration has begun to reduce our military commitment in Vietnam. A different strategy necessarily will follow—the current watchword is "Vietnamization" of the war. Those formulating new programs should carefully examine the work of Herman Kahn and his Hudson Institute colleagues.[1] They offer a number of suggestions which may help stabilize the situation in South Vietnam. Without stability, the future could be difficult. General Giap warned recently that America's Dien Bien Phu was yet to come.[2]

Every officer who considers himself a professional should examine *Can We Win in Vietnam?*† In the context of a debate over whether we *can* win, Kahn, Frank Armbruster, and Raymond Gastil for the affirmative and William Pfaff and Edmund Stillman for the negative argue almost every serious issue of strategy and tactics and almost every scheme that has been proposed over the years for winning the war. Until the definitive history of the Vietnam conflict is written—and this will be a long time coming—there is no better textbook for the professional concerned with strategy and tactics.

The book is disjointed and repetitive, obviously drawing heavily on studies done earlier by the Hudson Institute. Kahn's sections read like transcripts from his notorious marathon lectures, replete with cascading charts, lists, and scenarios. Nevertheless, this collective product is superior to other collections of articles on Vietnam because all the authors at least address the same question—Can we win? Furthermore, the debate is not slanted. I found myself in agreement with points made by both teams.

I suggest that the book is particularly necessary for those who are positive that we can win (or could have won) providing we do this or that, and for those who are positive that we cannot win no matter what we do. The authors question almost every generalization that has been made about Vietnam—and there have been more generalizations based on less empirical evidence about this conflict than about any other war in the twentieth century. They raise legitimate doubts, for example, in regard to assertions that successful guerrilla actions indicate widespread discontent with the legitimate government; that South Vietnam can never attain a viable government; that American aid always strengthens the "legitimate" government in a developing country; that the United States became involved in Vietnam by accident; that Vietnam is a major juncture in world history, or a crucial testing ground for Communist strategy in the developing countries.

I especially commend this Hudson Institute book to those members of the military who officially or unofficially are now analyzing the success or failure of various strategies used in Vietnam. It is vital that our historical analyses be placed in the broadest possible perspective and that they indicate a decent respect for scholarship.

We in the military need to demonstrate that we have a sophisticated appreciation of the political, psychological, and military complexities and uncertainties of counterinsurgency warfare. We must indicate understanding that foreign policy—including defense policy—cannot be separated from domestic policy and domestic politics.[3] The success of

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†Frank E. Armbruster, Raymond D. Gastil, Herman Kahn, William Pfaff, and Edmund Stillman, *Can We Win in Vietnam?* (New York: Frederick A. Praeger, 1968, $7.95), xiv and 427 pp.

our escalation strategy in Vietnam (in Kahnian terminology, the "attrition-pressure-ouch" strategy) depended, for instance, on Hanoi's view of the total will of American society to persevere. Kahn notes:

> . . . escalation pressure is likely to be less effective if it is a gradual and tightly controlled response by an opponent who cannot look like a "force of nature" but instead shows signs of internal disunities, anxiety, uncertainty, and other human and exploitable characteristics. Thus, when one examines our escalation in Vietnam, one finds a list of characteristics virtually designed to increase the opponent's resistance. I should add to this that it was and currently is inconceivable that the United States could bomb the kind of resource and demographic targets it attacked in World War II, given the political and moral situation in America. (pp. 194–95)

If our analyses show political savvy, they may be accepted by persons in authority. Our strategy may be more in line with the broad guidelines set by a democratic society. If we do not indicate an appreciation of the total problem, we will be ignored by the very persons whom we hope to influence.

Regardless of the current attitude toward the military, we need to be more aware of the subtleties of combating "national liberation wars." (The Marxist-Leninists have scored in getting us to accept this euphemism for what is often a Communist-directed takeover.) As professionals, we have not done our duty in developing a counterinsurgency strategy that is both politically and militarily acceptable. Lacking clearly defined goals and tactics, we have tended to emphasize the traditional American solution for the use of force in the twentieth century: superior technology, backed up by the world's paramount industrial base, and, until the spring of 1968, more and more men.

Kahn pleads for "a generally accepted and reasonably valid theory of insurgency war or even 'theory of victory.'" He adds:

> It is not necessary that such a theory be entirely accurate. Much can be accomplished if a theory merely is widely shared and understood and not wildly misleading. For at least one has a framework in which information, arguments, and issues can be placed, and communication difficulties are minimized. . . . Most important, it would focus attention on priorities and direct efforts toward obtaining, evaluating, and transmitting certain kinds of information—thus substituting an orderly effort for fitful starts and stops and an almost indiscriminate spreading of energies. (p. 181)

In respect to technology, Kahn charges:

> . . . probably the largest single U.S. military problem in Vietnam, at least in the beginning, was an almost complete inability to use modern equipment to supplement, complement, and decisively improve the efficiency of counterinsurgency operations. . . . Americans have developed an almost compulsive addiction to the technologically advanced and often find it nearly inconceivable to use sober, older, and less fashionable equipment (or tactics)—particularly equipment that seems obsolete, even though it may also be inexpensive, easy to acquire and maintain, and suited for its intended use and operational environment. (p. 309)

I like Kahn's homely example of the "civil servant" who turned down lightweight polyurethane-coated ponchos for Vietnam because they wouldn't launder. A Hudson staff member later asked if any soldier ever sent his poncho to the laundry. The answer: "No, but it may happen."

As might be expected, the three Hudson optimists are not deterred from giving advice by the lack of an acceptable general strategy. Armbruster develops the argument that the long-range factor which dominates the entire situation in South Vietnam is the continued existence of the Communists' guerrilla and cadre small-war tactics, in spite of our outstanding conventional battle successes, which undoubtedly have hurt Viet Cong (and certainly North Vietnamese) morale. The main requirement is to provide security for the countryside, and only a government that provides security is likely to be acceptable to the people. Kahn, Armbruster, and Gastil suggest that we develop an overall plan to clear and hold "gradually increasing areas within which

organized police and constabulary action, perhaps with some military support, can provide general security." (p. 341)

Kahn says that this concept may be "superficially" similar to standard military tactics now being used in Vietnam, but claims that it embodies "some profoundly different basic concepts and emphases that up to now have not been thoroughly studied, understood, or evaluated." (p. 342) Specifically, the pacification plan involves the establishment of frontiers behind which intensive police operations can be carried on. The basic concept is that successful police operations should be the chief short-range object of our military effort —in addition, of course, to preventing direct invasion of the country or the seizure of territory. (Sir Robert Thompson notes in his review of *Can We Win in Vietnam? [Survival*, November 1968] that he would have to agree with this proposal because it so closely conforms to much of the advice tendered earlier by the British Advisory Mission.)

Stillman and Pfaff, the resident pessimists, believe that Vietnam is in a stage of "cultural chaos" and the Vietnamese people are intractable, making it enormously difficult, if not impossible, for a white, technologically advanced, and implacably pragmatic people (meaning us) to deal with the issues. They believe that the National Liberation Front is dedicated, disciplined, competent, and to some degree a genuinely indigenous and "modern" movement with a nationwide base and appeal. They find few of these qualities in the government of South Vietnam. In contrast to the optimists, Stillman and Pfaff see no changes to our present strategy which might make a decisive impact on the outcome of the conflict.

The pessimists make a good case. Their analysis is far more sophisticated and relevant than most of the criticism now appearing in influential journals. Stillman's section, "The Political Issues: Facts and Fantasies," should be read by all administration speech writers. He raises serious difficulties inherent in various reasons which have been advanced for our involvement: namely, that American intervention is necessary to contain Communist China; to contain Communism; to contain the tactic of wars of national liberation; and to contain the very practice of aggression.

Stillman's critical analysis of the third given reason for our presence in Vietnam is particularly well taken. He does not believe that there is any clearly defined or coordinated Communist program for the instigation of successive wars of national liberation around the globe. I agree. The Soviets and Chinese often have published broad analyses of the world situation and suggested general tactics for local revolutionary parties. But there appears never to have been a "master plan," a concept which would be inoperable today in any case because of the Sino-Soviet dispute.

Where they have attempted to stimulate or direct specific revolutions from afar, Soviet and Chinese leaders usually have failed miserably. With the notable exception of East Europe, Communist parties have succeeded where capable *local* leaders have exploited a revolutionary climate. The Soviets, if not the Chinese, seem to have learned this lesson: there are increasingly fewer examples of Soviet dabbling in revolutionary planning abroad. Even Soviet aid to promising insurgents appears now to be generated primarily by the Sino-Soviet competition for leadership of the socialist camp.

The critical question is what impact the outcome of the Vietnam conflict will have on individual would-be revolutionary leaders around the globe. I suspect that the outcome, whatever it may be, will have little impact. Such leaders appear to evaluate their chances of success primarily in terms of the internal political situation in their own country, not in terms of what the major powers may do.

Stillman also strikes home when he criticizes our lack of ability as a people to comprehend the inner life of alien societies or the "nonreasonable" elements in such societies. Our tendency has been to convert "strange" issues into ones which we can understand. He claims that this has happened in spite of the "vast professional literature" devoted to area studies since World War II. I suggest that there has never been enough of this literature.

How many experts on Vietnam did we have in the United States in 1960? Furthermore, the knowledge of the area specialists who do exist has not been fully utilized in the decision-making process.[4]

In spite of the trenchant criticisms of the pessimists, I suspect that most of us in the military will line up with Kahn, Armbruster, and Gastil. American participation in the Vietnam war obviously has had an impact, and we would like to think that the impact has been in line with what we intended. Other strategies might have been more appropriate, but the military situation certainly is not as desperate as it was in 1965. The North Vietnamese and the Viet Cong are at the conference table in Paris precisely because they finally despaired of achieving their goals by force.

The political situation in South Vietnam is far from hopeless. Even Saigon's severest critics, notes Armbruster, "would have to concede that much less sophisticated countries without the talent or economic potential of South Vietnam have succeeded in developing home rule." (p. 123) These critics also cannot point to a single Communist-ruled country that has held elections with the degree of freedom which was given to the South Vietnamese in 1967.

The gains may be less than we or the government of South Vietnam would have desired. But should we have expected this poor, beleaguered nation to become a full-blown democracy with a thriving economic system in the midst of a disastrous war? It took the newborn United States, with all its many advantages, decades to attain that goal —and it had been left in relative peace.

Gerrards Cross, England

Notes

1. The *New York Times* reported on 27 June 1969 that the Hudson Institute's proposal for a modified strategy in Vietnam was circulating at high levels in the Nixon administration.

2. From the interview of General Giap by Oriana Fallaci for *L'Europeo*, reprinted in the *Washington Post*, 6 April 1969.

3. A good case could be made that the Soviet leaders, in spite of their stranglehold on the decision-making process, are even more concerned about the interrelationship between foreign and domestic policy and domestic politics.

4. I argued in the November-December 1968 issue of this journal the special need for *military* area specialists to give us a better appreciation of the problems mentioned by Stillman.

SUCCESSOR TO HO CHI MINH?

Major Philip D. Caine

Certainly there could be no more appropriate book to appear at this time than Major Robert J. O'Neill's *General Giap—Politician and Strategist*.† Although published four months prior to Ho Chi Minh's death, it dealt with a man who was and will continue to be a key figure in any government that may rule North Vietnam. There can be little doubt that General Vo Nguyen Giap has tremendous power and prestige in the North, yet he lacks something that assures men of his stripe a solid hold on power: the ability to promulgate independent action and win acceptance of it by his rivals.

†Robert J. O'Neill, *General Giap—Politician and Strategist* (New York: Frederick A. Praeger, 1969, $6.95), 219 pp.

O'Neill alludes to this quality and makes it clear that Giap became what he is largely because of Ho Chi Minh and circumstances. However, the point is not sufficiently expanded by the author, for time and again he attributes action to Giap when actually the shots were called by Ho and the Politburo, including some of Giap's rivals.

Giap has made many enemies in his quest for power, and several are key personnel in the government that will succeed Ho Chi Minh, the most powerful being Truong Chinh. O'Neill effectively documents the conflict between Giap and Chinh, pointing out that it is not only one of power and position but also one of basic Communist orientation. While Giap, because of his background and training, leans strongly toward the Russian sphere, Truong Chinh is very pro-Chinese in his thinking. This basic difference is sufficient to cause rumbling from Hanoi in the months ahead.

O'Neill's book is the second one to appear recently dealing with the heretofore little-known leadership of North Vietnam. In 1968 Jean Lacouture published his masterful *Ho Chi Minh, A Political Biography,* in which he saw Ho as the great Vietnamese nationalist who strove to unite a divided Vietnam after freeing it from the French. The O'Neill book is not of the same caliber as Lacouture's, but then his subject is not of the same caliber.

In any evaluation of *General Giap—Politician and Strategist,* one must appreciate the difficulty involving both the man and research about him. On such subjects as battlefield leadership, it is almost impossible to separate fact from myth in any relatively closed country. Research on Giap is especially difficult because little has been written about him, and the North Vietnamese sources are so much influenced by propaganda and Communist platitudes that the real Giap fails to appear. Despite this handicap, O'Neill has written a fairly well-balanced and judicious account. He gives the reader a relatively clear grasp of Giap's character and adequately portrays highlights of his later life. He also brings into his narrative the key men in the General's life and identifies those important in his rise to power. Finally, he presents an astute analysis of Giap's war against the French, although actual coverage of the war is far from complete.

The aspect of the book that seems to have given the author most difficulty is the same that makes the Lacouture book on Ho so excellent: the effort to probe the man in terms of deep drives, motives, and desires. Of course this kind of information is always hardest to come by.

O'Neill also fails to deal in any depth with Giap prior to World War II, devoting all but 35 of his 204 pages to the post-World War II period. For this reason, it is difficult for the reader to grasp the early development of Giap's character and the foundations that eventually made him the man he has become.

The most glaring weakness of O'Neill's work is the lack of documentation. He leaves undocumented far too many points that are not commonly accepted and that can be realistically disputed, and he makes assumptions that cannot be proven and that are not necessarily valid. This fault is compounded by the secondary nature of his research. It must be realized that primary sources dealing with Giap are probably unavailable, but the lack of references to even accepted secondary sources furthers the weakness. On this point O'Neill is somewhat ahead of Lacouture, since the latter failed to include *any* footnotes or bibliography—a frustrating situation to say the least.

Despite the implications in the book's title, the picture that O'Neill paints of Giap is neither of a great politician nor of a great strategist. Rather he portrays an opportunist who found the military sphere of the Vietminh regime vacant and who, because of an early interest in military history, decided that this was the place for him to cut his niche. He thus became a self-taught general, in the tradition of the guerrilla leader. It is little wonder that Giap adopted the tactics of Mao and possibly those of Sun Tzu, for the tactics of the guerrilla are basically those of common sense and of the untrained military leader. This point is further demonstrated by the continual trouble he had when facing his first sophisticated enemy, the French. His trial-and-error methods were not those of the great strategist but rather those of the amateur, unsure of

how to deal with the situation. This holds true for the siege of Dien Bien Phu, where Giap demonstrated neither great strategy nor any great degree of resourcefulness. He had an ideal situation in almost all respects: he faced a hopelessly outnumbered enemy that lacked equipment, logistics, leadership, and the backing of its government. Yet what he won was a war of attrition. One may suggest that Giap is considered great not because of Dien Bien Phu—he *should* have won and any competent general would have—but rather because Dien Bien Phu was part of a political victory and was therefore great. His victory can be compared to Jackson's at New Orleans: the war of 1812 ended in victory there, the Americans thought, even though the battle was fought a month after peace had been arranged, and thus Jackson became a hero. Dien Bien Phu ended the French adventure in Indochina with defeat, and thus it was a great victory, even though it was probably not a major element in the French decision to withdraw or in the peace treaty that was eventually drawn up at Geneva. Yet because of this battle, Giap is classed as a great military leader.

Neither does Giap emerge as a great politician. He may well be above average as one, but he did not rise to his position in the North Vietnamese government through his own prowess. Rather he was fortunate enough to tie himself to Ho Chi Minh's coattails, at a time when the latter needed faithful lieutenants, and to move forward with him. Lacouture also seems to hold this view of Giap. There is no natural charisma in his being, no magnetic quality that draws men to him, but rather the characteristics of an opportunist who was able to do the appropriate thing at the appropriate time. This, I think, makes it highly improbable that Giap will emerge as the head of the new government in North Vietnam, unless he gains it through control of the military. If he should succeed Ho Chi Minh, it seems quite possible he would be easy prey for the men who have tended to emerge ahead of him on several occasions.

It is also important to consider Giap in light of the present conflict in Vietnam. O'Neill characterizes the war as basically Giap's. The validity of this assumption is doubtful, since the entire course of North Vietnamese history since World War II has been basically Ho Chi Minh's, including the military aspects short of actual battlefield tactics. If, however, O'Neill is correct, this could have a significant impact on the present situation. In a bid for leadership in the North, might not Giap try to stage another Dien Bien Phu? With the United States already committed to a course of withdrawal, might he not try making it appear that the withdrawal was one of great military defeat? This could serve his position well, but what about his rivals, Pham Van Dong and Truong Chinh? Might they not try to discredit Giap's war, to remove him from the potential power structure? A negotiated peace that was not accompanied by a crushing military victory might result in the opposite of Dien Bien Phu. The future will tell.

Another issue, and one which O'Neill discusses very well, is the problem of North Vietnamese individuals and the influence of the Russian-Chinese orbit. North Vietnam is fighting a war that aids both China and Russia, although the former gains more than the latter. To China, it is another war of national liberation from colonialists, a method of bleeding the United States, and, of great importance, a way of securing her border from a Western power, a situation which she cannot tolerate. To Russia, on the other hand, the war is an economic and manpower drain on the United States. It is also a drain on the Soviet Union, but not to nearly as great a degree. In addition it is a great unsettling force in the world.

It seems reasonable to assume that the new government of North Vietnam may be more susceptible to outside pressure than that of Communist/Nationalist Ho Chi Minh was, and also that any pressure to end the war will be creditable more to the Soviet Union than China. This puts another variable into the North Vietnamese governmental situation, since Giap is more likely to be influenced by the Russians, Truong Chinh by the Chinese. Because they both sit on the council

that now rules North Vietnam, conflict over conduct of the war seemingly could erupt in Hanoi, with Ho's strong hand now removed from the wheel.

General Giap—Politician and Strategist brings these several points to the reader's mind and poses many more. In this way it is a provocative book. The author admits that he has not written the definitive biography of Giap, which of course would be impossible under present conditions, and he has not added anything to our knowledge of the man. He has also not made a sufficiently strong case to prove that Giap is, in fact, the one who will emerge as the head of state in North Vietnam, but he has presented his facts in such a way as to demonstrate that Giap will be an influential force. The book is at best a compilation of previously published material on Giap. Yet it is well worthwhile for anyone who would be as fully informed as possible on North Vietnam and the courses it may follow in the months ahead.

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AWARD

The Air University Review Awards Committee has selected "Computers and Communications in the Information Age" by Major General Gordon T. Gould, Jr., USAF, as the outstanding article in the May-June 1970 issue of *Air University Review*.

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