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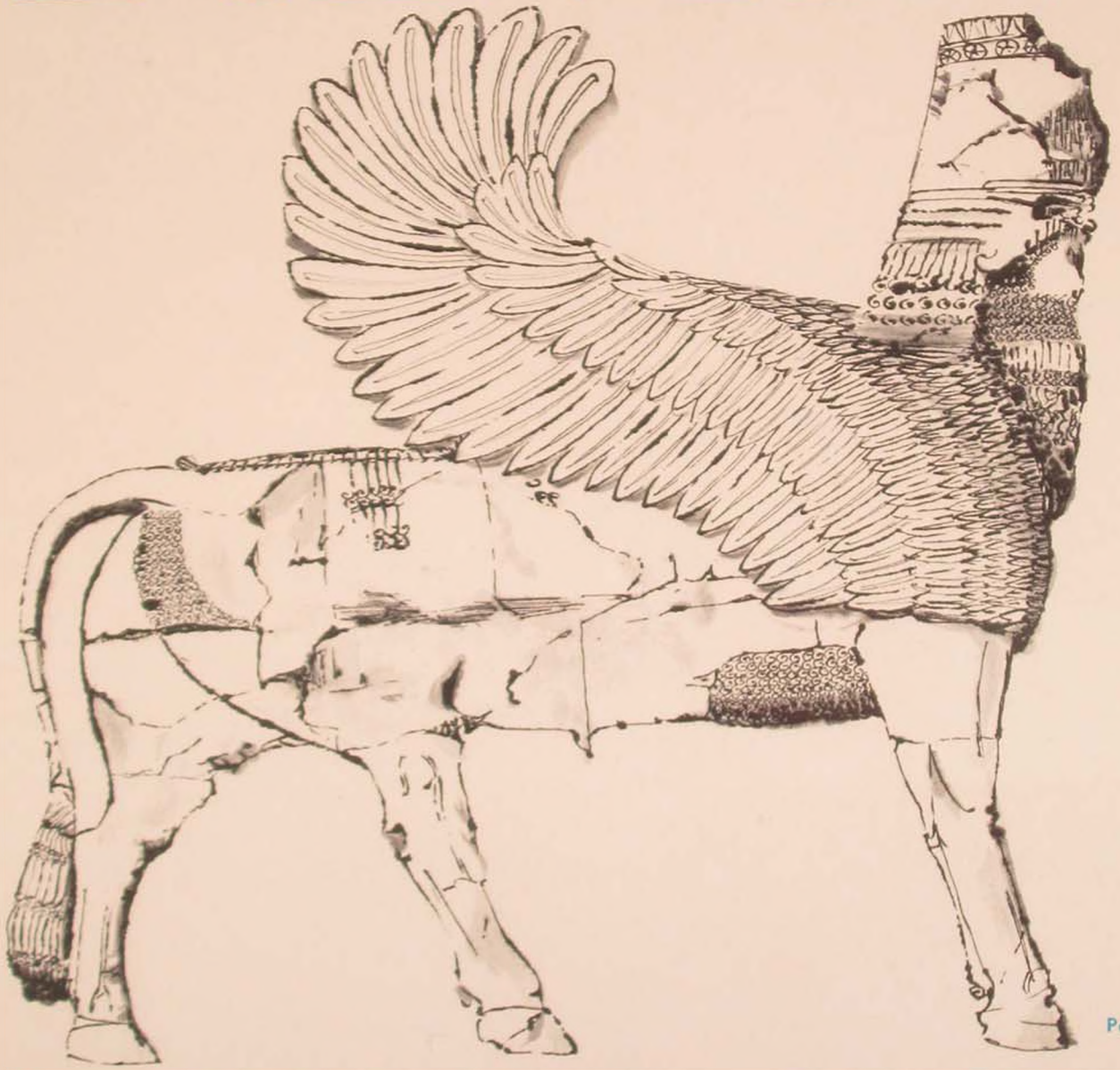

Persepolis

UNITED STATES STRIKE COMMAND—STATESIDE AND GLOBAL...EXERCISE DELAWAR, USSTRICOM AND MATS

SEPTEMBER-OCTOBER 1964

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the cover

Round the decay
Of that colossal wreck, boundless and bare
The lone and level sands stretch far away.

Recently the lone and level sands of old Persia teemed with life and activity as Iranian and U.S. troops cooperated in the combined ground/air/amphibious assaults of Exercise Delawar. Major General Joseph A. Cunningham and Lieutenant Colonel Clay T. Buckingham analyze this exercise.

UNITED STATES STRIKE COMMAND

Stateside and Global

Major General Clyde Box

CINCSTRIKE, the abbreviated title of the Commander in Chief, United States Strike Command, has become a familiar term to the military throughout the world. Army General Paul D. Adams, who bears the title, was given his original directive by Secretary of Defense McNamara on 19 September 1961: to organize a command to meet the national requirement for forces which could contribute to our ability to deal effectively and swiftly with any limited war in a manner and on a scale best calculated to bring it to a conclusion while minimizing the risk of hostilities' broadening into general war.

During the two years following the receipt of his directive, CINCSTRIKE built such a force. The proof of this statement lies in an enviable record of accomplishments which clearly demonstrate the validity of the need for unified direction of the major combat forces located in the United States. On 1 December 1963 General Adams was given additional area responsibilities which carried the concurrent title of United States Commander in Chief, Middle East/Southern Asia/Africa South of Sahara (USCINCMEAFSA). The title USCINCMEAFSA is used by CINCSTRIKE in connection with all activities conducted in the MEAFSA area.

United States Strike Command (USSTRICOM) was conceived against the recognition of a need for general-purpose forces to complement an established United States strategic retaliatory force. This need was brought into focus by experience gained in Lebanon, Korea, and Laos. General-purpose forces are used to meet contingencies short of general war and to provide a strategic central reserve in the event of general war. Included in general-purpose forces are the combat-ready units of the Army, Navy, Marines, and Air Force not committed to the strategic retaliatory role. The United States Strike Command as currently organized represents a substantial portion of the general-purpose forces of our nation.

The task of molding a force so vital to the national security was placed in the hands of General Adams, who had commanded United States Army and Marine forces in the Lebanon operation in 1958. General Adams is quick to admit that his tenure as Commander, American Land Forces in Lebanon, convinced him of the need for unified direction of joint forces during contingencies requiring rapid projection of military force into a remote troubled area. With this background, plus a wealth of staff and command combat experience, General Adams took the charter of his new command. He was aware of the difficulties in determining the specific requirements for general-purpose forces committed to United States Strike Command. Some of the difficulties he listed were diversity of unit capability; hazy or complex relationships with allied forces in collective security pacts; vast range of contingency roles to be met; role of reserve components; sheer number and diversity of weapons, equipment, and supplies involved; and the wide variety of possible areas of strategic employment. The role to be played by the forces, once selected, demanded that they be highly mobile, readily deployable, and versatile. These characteristics demand that adequate airlift and sealift be available to move forces promptly wherever they are needed. Transportation must be flexible enough to permit either strategic or tactical delivery of combat elements into the objective area if the situation dictates. The principle of "usable power" as advocated by Secretary McNamara served to guide in the selection of forces assigned to United States Strike Command.

A Joint Chiefs of Staff memorandum assigned the following mission to STRICOM:

1. To maintain a general reserve of combat-ready forces to reinforce other unified commands, and

2. To plan and execute contingency operations as directed by the Joint Chiefs of Staff.

Secretary McNamara elaborated on this mission when he stated before the Senate Armed Forces Committee on 19 January 1962:

> The recently created United States Strike Command—composed of units from the Strategic Army Corps and the Tactical Air Command—is intended to provide an integrated, mobile, highly combat-ready force which has trained as a unit and is instantly available for use as an augmentation to existing theater forces under

General Paul D. Adams, USA, CINCSTRIKE/USCINCMEAFSA, and his Strike Command deputy, Lieutenant General Bruce K. Holloway, USAF, at the critique of last year's Joint Exercise Swift Strike III

the unified commanders, or as the primary force for use in remote areas such as Central Africa or the Middle East.

The Joint Chiefs of Staff (JCS) have assigned to CINCSTRIKE the following specific functional responsibilities:

1. Provide a general reserve of combat-ready forces.
2. Provide augmentation forces to reinforce existing unified commands.
3. Conduct planning for and execute contingency operations as directed.
4. Develop recommended doctrine for employment of forces assigned.
5. Be responsible for the joint training of forces assigned.
6. Conduct joint training exercises to ensure maintenance of a high state of combat effectiveness and a rapid reaction capability.

Thus, assigned a mission and specific responsibilities, CINCSTRIKE set out in the closing months of 1961 to create his command. He assembled a staff, selected a headquarters location, and organized his command to the extent that on 28 December he reported to the Joint Chiefs of Staff that the command was operational. Since then CINCSTRIKE has made his command responsive to every challenge that has confronted it. Experience gained from such confrontations resulted in growth for all concerned. Two years after its inception, United States Strike Command's reputation was discussed in an *Armed Forces Management* magazine article which stated, "There is little doubt that United States Strike Command is ready and can react swiftly with powerful joint task forces, tailored to meet the enemy in jungles or arctic wastes. . . . Not since World War II has there been a joint command in the United States that could react quickly and globally."

One of USSTRICOM's missions was to give the United States a general reserve that could respond rapidly to a variety of contingencies abroad with the graduated force required by the situation. This mission is met today by USSTRICOM's two component commands—United States Army Forces, Strike Command (USARSTRIKE), and United States Air Force Forces, Strike Command (USAFSTRIKE). In these commands combat readiness through training has become the byword. For a proper understanding of United States Strike Command one must examine closely these major elements of the command.

United States Army Forces, Strike Command

USARSTRIKE is the powerful ground arm of United States Strike Command.

On 1 March 1964 General Hugh P. Harris assumed command of U.S. Continental Army Command (USCONARC). In addition to being Commanding General, USCONARC, General Harris is Commander in Chief, U.S. Army Forces, Strike Command (CINCARSTRIKE). CINCARSTRIKE commands one of the largest combat forces in the United States Army—a force that includes two strategic Army corps with a total of eight combat-ready divisions and additional combat and combat support units.

USARSTRIKE's XVIII Airborne Corps, commanded by Lieutenant General John W. Bowen, has its headquarters at Fort Bragg, North Carolina. Its major elements are the

82d Airborne Division, Fort Bragg, and the 101st Airborne Division, Fort Campbell, Kentucky. The corps is organized for rapid movement by assault airlift aircraft.

The other USARSTRIKE corps is the III Corps, commanded by Lieutenant General Harvey H. Fischer, with headquarters at Fort Hood, Texas. Major elements are the 1st Armored Division and 2d Armored Division, both at Fort Hood.

Other elements of USARSTRIKE are 1st Division, Fort Riley, Kansas; 2d Division, Fort Benning, Georgia; 4th Division, Fort Lewis, Washington; and 5th Division (Mechanized), Fort Carson, Colorado.

USARSTRIKE Headquarters is located at Fort Monroe, Virginia, which is also Headquarters USCONARC. Officers and men of the USCONARC staff there also serve in the same capacities on the USARSTRIKE staff.

CONARC has a number of important responsibilities beyond its mission in United States Strike Command. The Commanding General, USCONARC, commands the six ConUS Armies and, through the Army commanders, operates all Army posts, training centers, and service schools. He also commands and supervises the Army Ready Reserves. In fact, CONARC is the Army in the United States, holding its combat-ready forces in top condition for employment by United States Strike Command in joint operations or joint training.

United States Air Force Forces, Strike Command

USAFSTRIKE is the vital air arm of United States Strike Command. It is composed of three numbered Air Forces—the Ninth, Twelfth, and Nineteenth—and a powerful, versatile array of over 50 fighter, reconnaissance, and assault airlift squadrons of the Tactical Air Command (TAC). General Walter C. Sweeney, Jr., is the Commander in Chief of USAFSTRIKE as well as the Commander of TAC. His headquarters is at Langley AFB, Virginia.

The Ninth Air Force, commanded by Major General Marvin L. McNickle, with headquarters at Shaw AFB, South Carolina, includes roughly all regular and assigned reserve units east of the Mississippi and Ohio Rivers.

TAC operations and units in the area to the west of the Mississippi and Ohio Rivers are under the Twelfth Air Force, commanded by Major General John C. Meyer. Headquarters for the Twelfth is at Waco, Texas.

In total, the Ninth and Twelfth Air Forces comprise eleven tactical fighter wings, four assault airlift wings, an aerial reconnaissance center, and a special warfare center. These Air Forces provide packages of tactical fighters, reconnaissance aircraft, and globe-circling assault airlift aircraft for response to any contingency. Deployed forces are accompanied by sufficient supplies and equipment to sustain themselves for a considerable period.

The Nineteenth Air Force with headquarters at Seymour Johnson AFB, North Carolina, is the planning and control headquarters for USAFSTRIKE's rapid-reaction operations. Major General Gordon M. Graham is Acting Commander, Nineteenth Air Force.

USAFSTRIKE is a proud member of this unified command. It is alert, ready, and able to perform any mission USSTRICOM may require, ranging from "military presence" or "show of force" to general war.

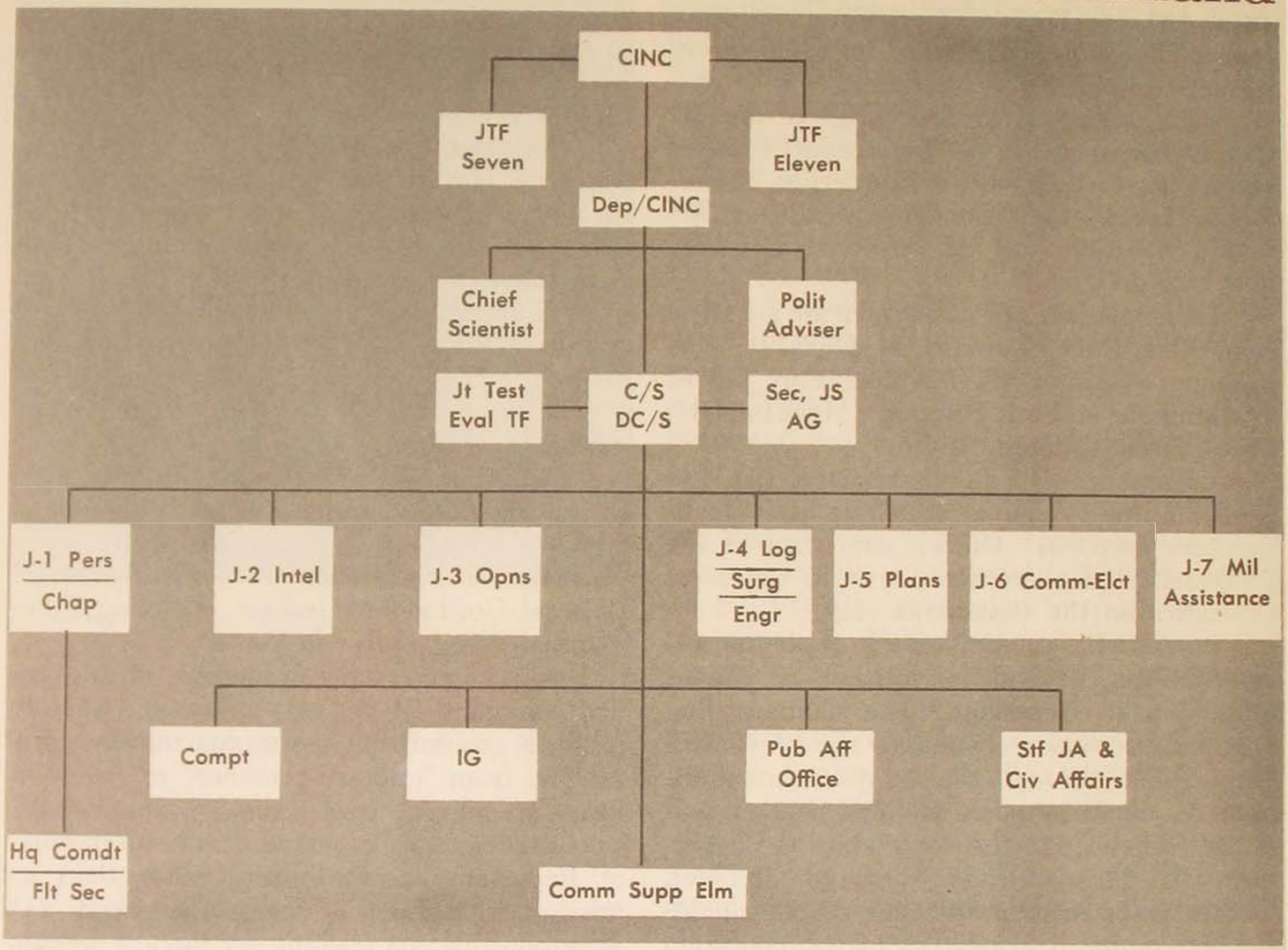
Tactical Air Command also has a number of important responsibilities other than its mission with the U.S. Strike Command. TAC is responsible for training jet tactical fighter, reconnaissance, and assault airlift crews, as well as personnel for overseas air forces employing tactical missiles. It operates 13 air bases in the United States.

When the combat power of these two mighty ground and air components is brought together in application at the highly integrated direction of CINCSTRIKE or by one of his joint task force headquarters, it is then that the astute military observer becomes aware of the tremendous striking power of the modern air/ground team. Jointly, the troops and aircraft of USSTRICOM represent a U.S.-based, general-purpose, strategic reserve unparalleled in United States history.

joint exercise program

The combat readiness of joint forces during peacetime is related directly to the train-

Headquarters United States Strike Command



ing they receive in joint training exercises. The joint exercise program developed and conducted by USSTRICOM has been an ambitious one characterized by imagination and realism. The results are noteworthy. From the very beginning the J-3, currently Army Brigadier General Charles V. Wilson, has devoted a great part of his efforts to the joint exercise program. The size of these exercises has ranged from small ones, involving one rifle company and a tactical fighter element of eight aircraft, to the "largest ever" Swift Strike III, which involved over 100,000 USARSTRIKE and USAFSTRIKE troops and some 450 aircraft.

Elaboration of this aspect of USSTRICOM activities is worthwhile in view of the impact it has on the mission and five of the six functional responsibilities assigned CINCSTRIKE. With the exception of the augmentation planning function, which will be discussed later, the execution of a vigorous joint exercise program proved to be a suitable vehicle for totally or partially fulfilling the command functions.

USSTRICOM's training requirements and objectives directly support its operational responsibilities. The command conducts four types of joint training exercises, all of which focus directly on developing increased skill and speed of reaction. These four types of exercises are (1) special exercises (test of joint doctrine); (2) tactical mobility exercises (ConUS exercises away from home base); (3)

strategic mobility exercises (deployment of forces to areas outside of ConUS); and (4) large-scale exercises (corps/air force level). They range in size from those involving a reinforced battalion ground combat team and a small composite air force to the large-scale exercises involving corps headquarters, numbered air force headquarters, multiple Army divisions, and large numbers of Air Force tactical fighter, reconnaissance, and troop-carrier squadrons.

The tactical mobility exercises are unannounced and are generally referred to as "no-notice" exercises. Others, like the Swift Strike series, require that detailed planning commence well in advance. A realistic appraisal of the quick-reaction capability of USSTRICOM forces is obtained by use of the unannounced exercise. CINCSTRIKE declares an alert condition which requires the rapid assembly of balanced joint combat forces on short notice at home stations and/or at specified distant points. All training exercises begin with orderly alerts and movements predicated on an established system of alerts but with the shortest time intervals possible.

Exercise One Shot 5-64. A typical "no-notice" exercise, One Shot 5-64, was conducted 23–25 February 1964 at Fort Bragg. Commander of the exercise joint task force was an Air Force colonel from Hq USSTRICOM. USARSTRIKE provided three reinforced rifle companies from the 82d Airborne Division.

The force was airlifted by USAFSTRIKE C-130 assault airlift aircraft to the staging base for ground forces at MacDill AFB, Florida, where they staged overnight before the assault was launched early the next morning. More than 50 C-130 Hercules assault airlift aircraft from TAC provided the aircraft for paradropping the 750 men and their equipment on the designated objective.

Twelve F-100 tactical fighters of the 481st Tactical Fighter Squadron, Cannon AFB, New Mexico, deployed to a staging base at England AFB, Louisiana, to provide tactical air support for the operation.

An aerial reconnaissance element of three RF-101 aircraft from the Tactical Air Reconnaissance Center at Shaw AFB was in place at England and accomplished preliminary aerial reconnaissance.

Big Lift. Exercise Big Lift in late 1963 tested USSTRICOM's ability to provide augmentation forces to an overseas unified commander. In this exercise the personnel of a complete armored division and three separate battalions were airlifted in 63 hours from ConUS to offload bases in Germany, where they married up with prepositioned heavy equipment. Concurrently a composite air strike force, composed of three fighter squadrons, a reconnaissance element, and necessary support teams, deployed to dispersed operating bases in northeastern France. This was the largest transoceanic Army–Air Force deployment ever made by air. USSTRICOM worked very closely with MATS and other Department of Defense agencies in planning and executing this deployment mission. Upon arrival in the objective area, operational command of USSTRICOM forces was passed by CINCSTRIKE to United States Commander in Chief, Europe (USCINCEUR).*

Swift Strike. The large-scale exercise is epitomized by the Swift Strike series, the latest of which, Swift Strike III, was held during the period 21 July–16 August 1963 in the southeastern United States. In size, scope, degree of innovation, and imagination, Swift Strike III was the largest joint exercise conducted by United States Strike Command until that time.

Swift Strike III was a semicontrolled joint exercise that stressed maximum freedom of action by commanders and freedom of maneuver consistent with exercise purposes and objectives.

Although the actual ground maneuver area encompassed almost 6,000,000 acres in North and South Carolina, most of which was privately owned land for which maneuver rights were obtained, air operations were conducted over a much larger area, and 15 air bases in North Carolina, South Carolina, Tennessee, and Georgia supported Air Force forces. The exercise included an airborne assault by a two-division airborne corps and

*An account of Big Lift is given by Maj. Gen. Glen R. Birchard in *Air University Review*, XV, 4 (May-June 1964), 17-34.

the maintenance of this force by an aerial line of communications throughout the maneuver. Resupply operations included use of assault landing strips by USAFSTRIKE C-130's and C-123's.

Swift Strike III consistently demonstrated the value of the flexible ROAD* infantry division organization, the basic fighting units of which are battalions. These are independent organizations which can be employed in tailored brigades at a moment's notice.**

Desert Strike. The United States Strike Command large-scale joint exercise for 1964 was Exercise Desert Strike. Similar in scale to Swift Strike III, the joint exercise involved slightly more than 100,000 USARSTRIKE and USAFSTRIKE soldiers and airmen and was the largest STRIKE exercise to date. Participating were 2 USSTRICOM joint task force headquarters, 2 Army corps headquarters, 2 Air Force headquarters, 2 armored divisions, an airborne division, a mechanized infantry division, an Army Reserve brigade, 2 National Guard brigades, 2 logistical commands, 15 tactical fighter squadrons, tactical reconnaissance and troop-carrier squadrons of 2 tactical air forces, and units of the Air National Guard and the Air Force Reserve.

Desert Strike inclusive dates were 17–30 May. The exercise was held on more than 13,000,000 acres of essentially desert land, in adjoining areas of California, Arizona, and Nevada, providing extensive field training for armored and mechanized forces. The Air Force units operated from some 25 Air Force, Navy, and Marine airfields from Texas to Oregon.

Desert Strike was a semicontrolled exercise in which opposing joint task forces were permitted a maximum of "free play" and initiative to develop and perfect combat techniques and tactics.

The maneuver area was selected primarily because the terrain is suitable for large-scale tank movements and because of the relatively sparse population of the desert area. The dispersal of Air Force units over distances similar to those expected in actual combat and the freedom of action given JTF commanders in their employment of ground and air units ensured a realistic and nonstereotyped course of combat maneuvers typical of USSTRICOM exercises.*

Delawar. Exercise Delawar was the first exercise in which a single unified commander conducted the deployment from ConUS to an overseas theater, employed the force in that area, and then redeployed it to the United States. In that exercise CINCSTRIKE, in his concurrent role as USCINCMEAFSA, directed the participation of a United States joint task force in a combined Iranian–United States military training exercise conducted in Iran between 12 and 15 April 1964.**

While an understanding of the USSTRICOM joint exercise training program does much to explain CINCSTRIKE's approach to mission attainment, it does not cover the vital area of augmentation planning nor does it cover adequately the development of joint doctrine. The United States Strike Command staff in general and the J-5 Plans Directorate in particular treated these functions on a priority basis during the formative months of the command.

planning

The planning task confronting USSTRICOM during its initial days was that of reviewing all the existing plans of unified commanders wherein ConUS augmentation forces were required. For each such plan it was necessary to write a supporting augmentation or deployment plan which would meet the JCS-approved requirements of the supported overseas unified commander. The number of such plans grew to nearly 200 before the estimate of the planning task was completed.

Techniques were developed whereby the magnitude of the planning task was pared down to workable proportions. One such technique was the package force concept. The basic principle underlying this concept is to establish standardized, prepackaged forces which are flexible enough to permit rapid

*Reorganization Objective Army Division.

**Fuller treatment of Swift Strike III is presented in *Air University Review*, XV, 2 (January-February 1964), 2-80.

*Articles about Exercise Desert Strike will appear in the November-December issue of *Air University Review*.

**See "Exercise Delawar—USSTRICOM" and "Exercise Delawar—MATS" in this issue.

tailoring to meet any contingency in a variety of environments. Once basic packages are established and made available, a supported unified commander can build the force required to meet the particular needs of the situation at hand merely by adding elements to or subtracting them from the basic structure. This "building block" technique was readily accepted by the Commander in Chief, Southern Command (CINCSOUTH), as a workable solution to his particular contingency planning problems. One of the unique aspects of the application of this technique is that the joint force packages are provided with tailored joint task force headquarters to provide vital command and control during employment. This option provides genuine flexibility to the unified commander who requests such augmentation and chooses not to establish his own ad hoc JTF headquarters, which at a minimum is a disruptive influence within his existing command structure.

The wisdom of maintaining ready-to-go JTF headquarters was reinforced recently when the Joint Chiefs of Staff directed CINCSTRIKE in his role as USCINCMEAFSA "to maintain readiness to deploy an appropriate headquarters overseas on short notice." Under this arrangement the JCS may exercise overall direction of operations "either through CINCSTRIKE or directly with the force commander." The directive went on, "CINCSTRIKE is to retain the capability to carry out normal operations from his headquarters in the ConUS." In pursuance of this directive, CINCSTRIKE ordered two JTF headquarters to be staffed on a continuing basis and to identify the positions within the authorized manning tables. Personnel holding JTF positions are made aware of their responsibilities by written directive and are tested by participation in frequent planning sessions as well as actual exercises. JTF standing operating procedures have been developed and are now refined to the point where the newly assigned member can quickly read himself into the *modus operandi* of the headquarters. It is the consensus of veteran staff officers within the command that this one measure has filled a void existing in past joint operations.

joint doctrine

The development of recommended joint doctrine for employment of forces assigned is a responsibility of CINCSTRIKE. As defined in a USSTRICOM policy letter, military doctrine is "an expression of principles and concepts developed from experience and theory and exposed to reasoning. It reflects current policy, and within these bounds, doctrine represents guidance. It should not bind the user with chains and thus prevent initiative and flexibility. Doctrine is dynamic and must adjust to changing conditions." In another policy letter CINCSTRIKE recognized the primacy of the services for responsibility to develop doctrine and defined United States Strike Command's role in the development of joint doctrine as follows:

> Develop joint doctrine for employment of forces assigned; develop and test new ideas and concepts in the interest of rapid reaction capabilities and development of maximum joint striking power. New doctrines and techniques proven in the field and approved by CINCSTRIKE will be made the basis of appropriate recommendations to the Joints Chiefs of Staff for revisions or additions to Joint Chiefs of Staff Pub 2, "Unified Action Armed Forces."

Some of the more important doctrinal studies now being conducted are close air support, control and coordination of airspace over battle area, tactical aerial reconnaissance and aerial battlefield surveillance, and joint unconventional warfare. Each of these subjects has been of special interest to the United States Strike Command, and exercises such as Swift Strike III and Desert Strike provided the opportunity for a thorough shakedown of procedures designed to improve the efficiency of joint operations. In some cases the validity of new procedures was proved. In others it was learned that additional testing of procedures will be required. The exposure of new techniques to open evaluation provides the opportunity for the detailed analysis required for a practical solution and confirmation of doctrinal theories.

Three guidelines are used when considering changes to existing doctrine or develop-

ment of new doctrine: integration of combat power, maximum freedom of action for joint and service commanders, and unity of effort through command and control.

Joint Test and Evaluation Task Force

Doctrine concerning the joint aspects of air mobility has received special attention within this command. In September 1963 a truly joint team was assigned the task of directing a newly created staff element of USSTRICOM, the Joint Test and Evaluation Task Force. Major General William B. Rosson, USA, is Director and Brigadier General Andrew S. Low, Jr., USAF, is Deputy Director. This task force is prepared, at Joint Chiefs of Staff direction, to test and evaluate doctrine, unilaterally conceived by the Army or Air Force, for its suitability in joint operations. Currently the JTETF is readying itself to determine the suitability in joint operations of Air Force units and procedures for using aviation to enhance the mobility of Army units. If the Joint Chiefs of Staff direct, the task force will test and evaluate the joint aspects of the Army's air mobility concept.

The JTETF, by means of field exercises and collateral studies, will arrive at conclusions and recommendations which are then presented to CINCSTRIKE for his review and comment prior to being forwarded to the Joint Chiefs of Staff.

Since its inception the JTETF has devoted considerable effort to the collection of maximum information and data which will have application during later tests and evaluations. The acquisition of a broad data base coupled with qualitative analysis from a staff characterized by a wealth of air/ground team experience should enable the JTETF to make a valuable contribution to this vital area of joint doctrine.

USCINCMEAFSA

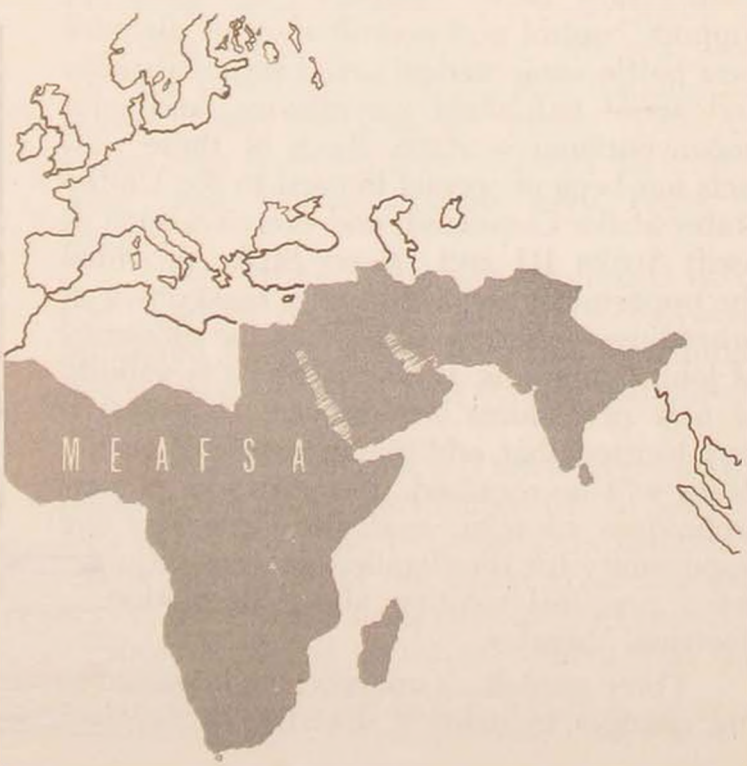
It is relevant at this time to contrast the United States Strike Command mission and specific functional responsibilities with the current missions and functional responsibilities of CINCSTRIKE in his new and additional role as USCINCMEAFSA. It is important to note that there is no MEAFSA command per se, and this is implied in the current statement of the mission:

> CINCSTRIKE is responsible for all United States defense activities in the Middle East/Southern Asia/Africa south of the Sahara area (MEAFSA). In this concurrent mission, CINCSTRIKE is designated USCINCMEAFSA.

Implicit in this mission statement is the requirement for CINCSTRIKE to assume the broad functions which the commander of a unified combat command undertakes when he is assigned responsibility for a given geographic area. CINCSTRIKE in his role as USCINCMEAFSA assumes and discharges the following functional responsibilities in accordance with national policy and as directed by the Joint Chiefs of Staff:

(1) Plans for and executes special activities and limited- and general-war operations, including counterinsurgency and unconventional warfare activities.

(2) Directs and supervises the Military Assistance Program and commands the Military Assistance Advisory Groups and missions in the area.



(3) Maintains liaison with national and foreign missions.

(4) Conducts joint training exercises and other training activities in MEAFSA.

It is important to note that while the added responsibilities caused major adjustments to the internal organization of Headquarters United States Strike Command and to the direction of staff effort, the basic character and functions of United States Strike Command were not altered or neglected. This is to say that the staff continued to devote appropriate effort to the tasks of maintaining a combat-ready reserve in ConUS, formulating recommended joint doctrine for employment of forces assigned, planning for the deployment of augmentation and contingency forces, and conducting joint training exercises. The phaseover of the MEAFSA area responsibilities from several commanders and agencies to the sole custody of USCINCMEAFSA was well planned and accomplished in an orderly fashion.

Press releases announcing the change of command arrangements in the MEAFSA area told the story in direct, matter-of-fact terms:

> Changes in command arrangements were designed to effect unity of responsibility for all United States military functions in the MEAFSA area, heretofore apportioned among several commanders. Changes were undertaken after several months of study by the Joint Chiefs of Staff.

The announcement to foreign governments was more elaborate:

> This is an administrative restructuring of command arrangements within our unified command system. It does not alter continued United States interest in the security of the Middle East Area, Pakistan, India and Iran, and existing arrangements for liaison and joint planning will be continued by USCINCMEAFSA in essentially their present form.
>
> General Adams' staff, located at MacDill Air Force Base, will be augmented to discharge his new responsibilities. Augmentation will include United States personnel who formerly handled such matters in Headquarters, Department of the Army, Washington; Headquarters USEUCOM, Paris, France; Headquarters, Naval Forces, Eastern Atlantic and Mediterranean; and Headquarters JTF Four, Norfolk, Virginia. These responsibilities include the command of United States Military Assistance Advisory Groups and Training Missions, as well as planning for military contingencies in the MEAFSA area.

The geographic area assigned to USCINCMEAFSA includes all of continental Africa (except Morocco, Algeria, Tunisia, and Libya, which are assigned to USCINCEUR) and the Malagasy Republic. In the Middle East and Southern Asia, the area includes Syria, Lebanon, Jordan, Israel, Iraq, the Arabian Peninsula, Kuwait, Iran, Afghanistan, Pakistan, India, Nepal, and Ceylon. Not all these countries host United States defense activities or military personnel. USCINCMEAFSA's water areas are the Persian Gulf and the Red Sea.

To carry out his responsibilities, USCINCMEAFSA has more than 1000 military personnel under his command overseas, primarily in Ethiopia, India, Pakistan, Saudi Arabia, Liberia, Mali, Republic of the Congo (Leopoldville), Iran, and Senegal. Most of these men are members of Military Assistance Advisory Groups (MAAG's) and Military Missions. Also under USCINCMEAFSA's operational command in the Red Sea–Persian Gulf area is the United States Middle East Force, a Naval force composed of two destroyers on rotation from the United States Sixth Fleet, a modified seaplane tender serving as the flagship, and a Navy C-54 administrative transport aircraft. Rear Admiral Arnold F. Schade commands the United States Middle East Force.

The total impact on Headquarters United States Strike Command is perhaps best revealed by a brief account of the period just prior to the assumption of the MEAFSA area by CINCSTRIKE. Having received direction from the Joint Chiefs of Staff to be prepared to assume responsibility if such a decision should ever be made, General Adams directed his staff during mid-1963 to initiate estimates on which phaseover plans could be based. All plans were geared to an E-day, a future date when he might receive JCS direction to assume command of the MEAFSA area. During the planning General Adams insisted that his staff keep uppermost in their minds two principles: the phaseover must be orderly and well

thought out, and responsibility for the area must be assumed as quickly as prudently possible.

With this framework, the staff plunged into the task of identifying the myriad actions to be accomplished and, once they were identified, assessed the time and effort necessary for their resolution and determined their relative priorities with respect to the overall phaseover task. Each staff directorate prepared a plan and tackled each task on a priority basis. Responsibility for monitoring the overall program was assigned to the Director of Plans, J-5. Close and continuing staff coordination was vital to the accomplishment of the task. Concurrency in planning and execution became the rule in order to meet self-imposed deadlines. CINCSTRIKE recommended to the Joint Chiefs of Staff that 30 November 1963 be designated as E-day, the day that the President's decision would be implemented. The CINC's decision bore out his resolution to assume responsibility as soon as practicable, since the decision to create MEAFSA was not made until late October.

Credit must be given to the commanders and staff of CINCNELM (U.S. Naval Forces, Eastern Atlantic and Mediterranean), JTF Four, CINCEUR, as well as representatives of Department of the Army and Department of the Air Force for their efforts in assisting the United States Strike Command staff in planning and executing the orderly phaseover of MEAFSA responsibilities. Shortly after receipt of the Department of Defense directives to implement the change in command organization, representatives of all commands and agencies concerned met at Hq USSTRICOM, MacDill AFB. The briefings, which were designed to pinpoint responsibilities to be assumed by USCINCMEAFSA, were presented to CINCSTRIKE and his staff. Area briefings highlighted the political, sociological, economic, and other aspects affecting military factors.

While assumption of the planning task for the MEAFSA area represented a formidable challenge in itself, the task of assuming responsibility for the discharge of the duties in connection with the Military Assistance Program (MAP) demanded a lion's share of attention.

Military Assistance Program. In the MEAFSA area the Military Assistance Program is administered through MAAG's, missions, or attachés in a number of countries. The United States Strike Command was not staffed initially to administer the program; therefore, it was necessary to establish a staff directorate for this purpose. This new staff addition is called the Military Assistance Directorate, J-7. The directorate was established on a provisional basis during September 1963 with personnel from other staff directorates assigned on a temporary basis. Today the directorate, under Major General Perry B. Griffith, USAF, is nearing maturity. Judicious personnel management techniques exercised by the services resulted in the assignment of individuals to the J-7 directorate who possess background experience in the MAP activities. The first impact on MAP of the directorate will occur when it is given an opportunity to inject its thinking into future MAP programs, which should occur to a limited degree with programs for FY 65.

Liaison. USCINCMEAFSA has assumed all liaison functions previously discharged by the Commander in Chief, U.S. Naval Forces, Eastern Atlantic and Mediterranean (CINCNELM) and Commander in Chief, Atlantic (CINCLANT) in the MEAFSA area. When the remnants of the CINCNELM headquarters phased out, a three-man CINCSTRIKE Liaison Group remained in the same quarters in London. Their primary mission is to serve as the United States element of the U.S./U.K. Planning Group in continuation of the coordinated planning with the British for the Middle East area. This element will conduct liaison with the United States Embassy and British agencies in London as well as with the Central Treaty Organization (CENTO) which was previously conducted by CINCNELM.

headquarters organization

With a fuller awareness of the tasks confronting the U.S. Strike Command, let us turn to an examination of its headquarters organization. The headquarters is comprised of the staff, Joint Test and Evaluation Task Force,

Communications Support Element, Flight Section, and Air Force Administrative Support Deployment Cell. The headquarters staff is made up of 500 officers and enlisted men plus 75 civilian personnel. Army and Air Force personnel make up about 80 per cent of the total military strength currently authorized; the rest are Navy and Marine Corps personnel. Prior to assumption of the MEAFSA area the Navy Department was represented by four Naval officers and one Marine. The addition of a truly representative cross section of the Navy Department to the headquarters has been a healthy infusion from all aspects. The wealth of experience which now accrues daily to CINCSTRIKE from these officers and enlisted men has been recognized throughout the staff.

The staff is organized along conventional joint staff lines, with complete integration of the services. The Commander in Chief is assisted by a deputy commander, Lieutenant General Bruce K. Holloway, USAF, and a Chief of Staff with seven directorates.

Worthy of special mention are the positions of Political Adviser and Chief Scientist. These senior civilian officers provide CINCSTRIKE and his staff with invaluable advice in their respective areas of interest. The Political Adviser maintains close and continuous liaison with the Department of State and stands ready to assist CINCSTRIKE in dealing with the political factors affecting the MEAFSA area. In another vital area the Chief Scientist keeps CINCSTRIKE apprised of the latest scientific thinking that has application to accomplishment of the United States Strike Command mission.

Command cannot be exercised without communications. The mission of U.S. Strike Command's joint Communications Support Element (CSE) resulted in the creation of a unique organization which is air mobile by C-130 aircraft. To maintain control of forces employed either in augmentation of other unified commands or in the conduct of contingency operations, the command must possess the capability to communicate with its Army and Air Force organizations at all subordinate levels of command down to battalion and squadron. In addition, the command must be able to enter one or more of the worldwide communications systems operated by the Army, Air Force, and Navy at various points in the world.

Staffing must be flexible enough to meet the communications needs of two JTF headquarters. Assumption of the MEAFSA area has placed increased pressure on the J-6 and his staff to meet the command's ever increasing need for a flexible and reliable communications system. The J-6 has solved most of these communications problems by careful selection of the best Air Force, Army, and Marine Corps communications equipments to accomplish these tasks. He has assembled into the joint Communications Support Element appropriately trained Army and Air Force personnel to operate the selected equipment supplied by the services.

The exercise of command at unified command level is a subject of constant study, and command relationships are carefully prescribed to ensure compliance with law, policy, and doctrine. CINCSTRIKE/USCINCMEAFSA exercises operational command over forces assigned for the accomplishment of his mission. He exercises command of the bulk of his forces through his two component commanders, CINCARSTRIKE and CINCAFSTRIKE. CINCSTRIKE lacks a Naval component but exercises operational command over the Middle East Force. While this Naval element is small, it has done exceptionally well in projecting United States military strength into the potentially troubled waters of the MEAFSA area.

quick reaction and mobility

No discussion of United States Strike Command would be complete without treatment of the subject of quick reaction and mobility. At USSTRICOM they are synonymous terms. With its mission predicated on a quick-reaction capability, United States Strike Command is vitally interested in all aspects of global mobility. While airlift certainly heads the list, USSTRICOM planners are always aware of the necessity to live within existing capabilities, at the same time advancing new programs which will enhance the strategic mo-

bility of our nation's military power. At USSTRICOM headquarters the search never ceases for ways and means to improve our strategic reaction posture. Equipment lists of units assigned are scrutinized constantly to detect equipment changes that will enhance air mobility. As a means of improving response time and reducing immediate airlift requirements, prepositioning of heavy equipment and supplies to key locations is under daily consideration. USSTRICOM recognizes the vital need for sealift to move follow-on forces and supplies and promotes programs designed to achieve improvement in this area.

Axiomatic to CINCSTRIKE's concern for an increased airlift capability is the rapid-reaction principle. From a strictly military viewpoint, the principle implies the readiness of strategic forces based on an ability to place an element in action rapidly during the critical early phases of a contingency, rather than an ability to place a large force in the objective area. Speed is more critical than size. The Lebanon crisis in 1958 and early commitment of United States forces in Korea in 1950 are two examples of this concept.

A corollary to this proposition is the CINCSTRIKE view, shared by most unified commanders, that assault airlift must be instantaneously responsive to the commander responsible for employing the force in the objective area. As succinctly stated by General Adams, "You must have the bulk of troop carriers in the command that needs the aircraft." The 13 troop-carrier squadrons of C-130 aircraft currently within USAFSTRIKE's resources do not meet fully United States Strike Command's needs for rapid strategic reaction. Another principle to be observed to ensure against unnecessary delay in execution of contingency plans is the preparation of a complete family of plans for those emergencies that can be anticipated. In such plans, specific units are earmarked for specific tasks, and plans are prepared to the lowest level.

To cope with unforeseen contingencies, United States Strike Command uses a ready-force concept. This concept provides for joint package forces complete with airlift to move initial elements into objective areas with minimum delay from a no-notice situation. USARSTRIKE provides from its two airborne divisions initial ready units which are kept on a constant standby condition. This permits them to be ready for outloading at colocated airfields shortly after receipt of alert to move. USAFSTRIKE troop-carrier aircraft can be assembled rapidly to lift this force. The force can be increased substantially in a few hours. This is normal day-to-day readiness. By the use of MATS jet transports, these initial reaction forces can be in the Middle East ready for employment the same day. The larger ready force will close the following day. The entire airborne division can be ready for outloading by the time its initial unit arrives in the objective area.

United States Strike Command lives with the knowledge that the success of the application of military force when dealing with an international crisis is related directly to the rapidity with which the force is applied after the decision to use force is made. Vital to this concept is the further realization that decision-makers at the national or international level must arrive at such a decision in the minimum of time. Too many historical instances bear out the truism that a delay in the decision reduces drastically the chance of military success. The corollary, of course, is that the eventual force requirements will exceed that which would have been required if immediate action had been taken.

GENERAL ADAMS stated the philosophy of United States Strike Command when he said, "Our philosophy of operations for meeting the entire spectrum of warfare, ranging from military presence or show of force to general war, is to form quickly powerful combinations of Army and Air Force units into joint striking forces, and move them to any point where our services may be required. By skillful exploitation of air, sea, and land mobility we plan to move across both sea and land masses into critical objective areas and there achieve a rapid decision, rather than by fighting long drawn-out campaigns, costly in blood and treasure, in order to reach a military decision."

Hq USSTRICOM

EXERCISE DELAWAR

EXERCISE DELAWAR, USSTRICOM

LIEUTENANT COLONEL CLAY T. BUCKINGHAM

JUST AFTER dawn on 13 April 1964, 37 United States Air Force C-130 troop-carrier aircraft, supported by 15 USAF F-100 fighters, broke through the dust and haze over Drop Zone Hawk in the southwestern desert of Iran and dropped 1500 United States Army paratroopers and 100 tons of equipment.

A few hours later a United States Marine Corps rifle company stormed ashore on Kharg Island in the Persian Gulf, supported by two destroyers and one landing ship dock of the United States Navy.

Commanding these United States forces was Major General Clyde Box, USAF, Commander, United States Joint Task Force Delawar.

On hand to witness both the airborne and amphibious assaults were His Imperial Majesty Mohammed Riza Pahlavi, Shah of Iran, and a host of other dignitaries, including Ambassador Julius C. Holmes, General Paul D. Adams, Commander in Chief, United States Strike Command, and members of the Central Treaty Organization Permanent Military Deputies Group.

Thus began United States participation in the employment phases of Exercise Delawar, a joint/combined exercise with Iran, conducted under the aegis of the Central Treaty Organization (CENTO).

planning

Planning for Exercise Delawar dates back more than a year. The Commander in Chief, U.S. Naval Forces, Eastern Atlantic and Mediterranean (CINCNELM), represented the United States when U.S.–Iran discussions were initiated in March 1963. Major General George S. Eckhardt, USA, Chief, ARMISH MAAG,* was CINCNELM's on-the-ground agent in working with General Abdol Hossein Hedjazi, Chief of the Supreme Commander's Staff, Imperial Iranian Armed Forces.

To have a common basis for planning, a combined exercise directive was issued in November 1963 which stated the broad objectives and concept for the exercise. The name of the exercise, Delawar, was chosen by Iran and is the Farsi word for brave.

In early November 1963 CINCNELM held a conference in London to coordinate U.S. participation in Exercise Delawar. This conference was attended by representatives of the U.S. Element, CENTO; ARMISH MAAG; United States Strike Command (USSTRICOM); United States Army Forces, Strike Command (USARSTRIKE); United States Air Force Forces, Strike Command (USAFSTRIKE); the Middle East Force; United States Army, Europe (USAR-

*U.S. Military Mission with the Iranian Army–Military Assistance Advisory Group.

EUR); United States Air Forces, Europe (USAFE); Military Air Transport Service (MATS); and the Defense Communications Agency (DCA).

On 1 December the Unified Command Plan was revised, and CINCSTRIKE assumed responsibility for all U.S. military activities in the Middle East, Southern Asia, and Africa south of the Sahara, with the title U.S. Commander in Chief, Middle East, Southern Asia, and Africa South of the Sahara (USCINCMEAFSA). Responsibility for the planning and conduct of United States participation in Exercise Delawar passed from CINCNELM to CINCSTRIKE/USCINCMEAFSA.

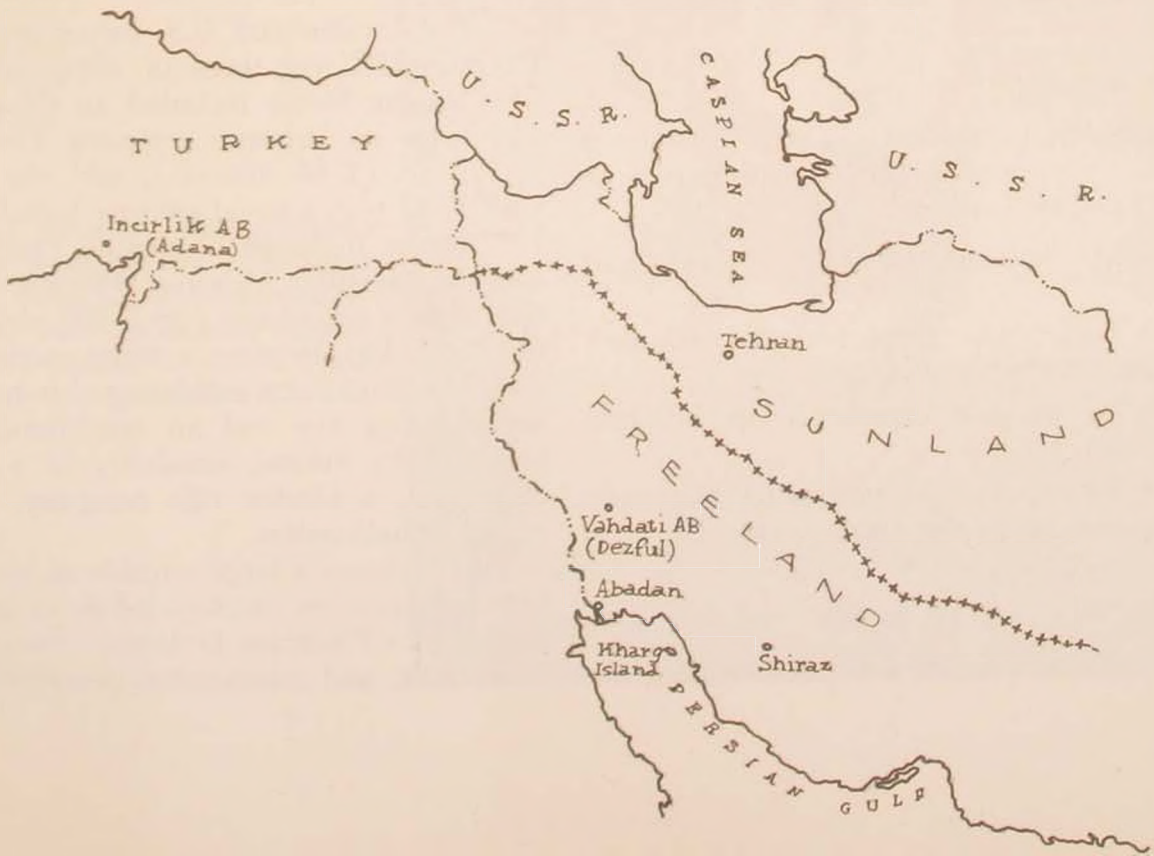
Under the provisions of Joint Chiefs of Staff Publication No. 2, Unified Action Armed Forces (UNAAF), a unified commander may, at his discretion, organize his forces into a joint task force for the conduct of military operations. Upon assuming responsibility for the MEAFSA area, General Adams organized two joint task force headquarters to conduct MEAFSA contingency operations and training exercises. These two JTF headquarters are made up of officers and men who concurrently are assigned full-time duties as staff officers in Headquarters USSTRICOM. One JTF concentrates on the Middle East and southern Asia—everything east of Suez. The second JTF concentrates on Africa south of the Sahara.

In numerous exercises in the continental United States since the activation of USSTRICOM in October 1961, the joint task force concept has been tested and refined. The assumption of responsibility for Exercise Delawar presented USSTRICOM with an excellent opportunity to improve procedures further for JTF operations in an overseas deployment.

As an appointed JTF commander, Major General Clyde Box, USAF, Director of Plans at USSTRICOM, was assigned responsibility for Exercise Delawar. General Box selected 39 Army, Navy, Air Force, and Marine Corps officers and men from his JTF to comprise Headquarters JTF Delawar.

Upon assuming responsibility for the MEAFSA area and Exercise Delawar, General Adams designated Major General Eckhardt, Chief, ARMISH MAAG, as USCINCMEAFSA agent for combined planning with the Iranians. In early December 1963 a combined conference, hosted by the Iranians and the ARMISH MAAG, was held at Tehran. As in the uninational London conference, all major participating and supporting U.S. headquarters and agencies were represented. The purpose of this conference was to identify and make a start towards solving problems of a combined nature and to conduct a reconnaissance of the exercise area.

In early February 1964 a logistics con-



ference was held at USAFE Headquarters, Wiesbaden, at which USARSTRIKE and USAFSTRIKE spelled out in detail their logistical requirements, and USAREUR and USAFE made final plans for meeting these requirements.

In late February 1964 an airlift conference, hosted by USSTRICOM, was held at MacDill Air Force Base, Florida. Other participants were MATS, USARSTRIKE, and USAFSTRIKE. The purpose was to finalize the specific airlift requirements for Exercise Delawar.

Although originally conceived as a bilateral exercise with Iran, Exercise Delawar was actually conducted under the aegis of CENTO. Both the U.S. and Iran agreed that placing the exercise within the CENTO context would emphasize American and Iranian support of the Central Treaty Organization. General Nadar Batmanglidj, the Iranian Permanent Military Deputy to CENTO, announced Exercise Delawar to the Permanent Military Deputies Group (PMDG) and invited the PMDG to send observers to the exercise. Subsequently the PMDG and the CENTO Military Planning Staff were thoroughly briefed on the exercise by USSTRICOM staff officers. During the conduct of the exercise the PMDG, the CENTO Military Planning Staff, and a large number of high-level CENTO military and civilian officials participated as observers. In addition, CENTO newsmen covered the exercise, and all news releases emphasized CENTO participation.

exercise purposes

United States Strike Command announced four basic purposes of United States participation in Exercise Delawar:

- To demonstrate ability to reinforce an ally.
- To increase preparedness to conduct operations in the MEAFSA area.
- To provide experience in bilateral operations.
- To improve procedures for joint task force operations in the MEAFSA area.

setting

In order to provide a fictitious setting for Exercise Delawar, Iran was divided into Sunland, an aggressor nation, and Freeland, a nation subscribing to the principles of the United Nations Charter. Sunland attacked Freeland, and Freeland requested military assistance. The United States responded by sending a USSTRICOM JTF consisting of Army, Navy, Air Force, and Marine forces. The committed force represented the initial increment of a simulated larger force on its way to reinforce the Freeland armed forces.

concept of operation

The broad concept consisted of:

a. The deployment of a USSTRICOM JTF by air and sea to Iran.

b. The participation in Iran of the JTF in a U.S.–Uninational airborne operation near Dezful, a U.S.–Uninational amphibious operation at Kharg Island, and U.S.–Uninational tactical air operations in support of the airborne and amphibious operations.

c. The participation of the U.S. Army, Navy, and Air Force forces with comparable Iranian forces in a combined exercise in Iran under a combined chain of command.

d. The redeployment of the USSTRICOM JTF to its original locations.

forces

The Iranian and U.S. forces involved in Exercise Delawar were of comparable size. The Iranian forces included an infantry brigade plus an airborne company, two fighter squadrons (F-86 aircraft), and the Persian Gulf Fleet plus a naval security battalion. The U.S. forces included a brigade (two battalions) of the 101st Airborne Division; two tactical fighter squadrons (36 F-100 aircraft) of the 832d Air Division; a troop-carrier force; a Middle East Force consisting of two destroyers and one AVP and an amphibious force, provided by EUCOM, consisting of a landing ship dock, a Marine rifle company, and six transport helicopters.

In addition a large number of headquarters and agencies participated in or provided support to Exercise Delawar. USARSTRIKE, USAFSTRIKE, and MIDEASTFOR provided forces.

USAREUR, USAFE, and USNAVEUR provided logistical support. MATS forces participated in the deployment, employment, and redeployment phases of the exercise. The Defense Communications Agency provided long-line communications circuits. The United States Coast Guard provided a sea rescue capability. The Strategic Air Command provided KC-135 tankers for air-to-air refueling during deployment and redeployment of the fighter aircraft. U.S. Element CENTO coordinated CENTO participation. ARMISH MAAG supervised combined planning and provided personnel to the combined staffs. Airspace reservations in the United States were obtained through the Federal Aviation Agency. Base and overflight rights were obtained through the State Department.

joint task force organization

General Box served as Commander, United States Joint Task Force Delawar (COMUSJTF Delawar), and reported directly to General Adams, CINCSTRIKE/USCINCMEAFSA. He had three subordinate commanders. The Commander, Army Force (COMARFOR), was Colonel Herbert E. Wolff, Commanding Officer, 1st Brigade, 101st Airborne Division. The Commander, Navy Force (COMNAVFOR), was Admiral Arnold F. Schade, Commander, Middle East Force (COMIDEASTFOR). The Commander, Air Force Force (COMAFFOR), was Brigadier General Gordon Graham, Vice Commander, Nineteenth Air Force.

The staff organization of the Delawar Joint Task Force Headquarters consisted of 26 officers and 13 enlisted men, not counting the weather center.

combined chain of command

The combined chain of command was both multinational and multiservice. The Supreme Allied Commander, Lieutenant General G. R. Azhari, was an Iranian. His deputy was General Eckhardt, Chief, ARMISH MAAG.

The Allied Army Commander, Major General Eugene Salet, Commanding General, Fort Gordon, Georgia, was an American. His deputy, Major General A. Fiuzi, was an Iranian.

The Allied Navy Commander, Vice Admiral A. A. Fatemi, was an Iranian; his deputy, Captain K. G. Nichols, Chief of the Navy Advisory Section, ARMISH MAAG, was an American.

In Exercise Delawar, Imperial Iranian Air Force aircraft were used along with U.S. Tactical Air Command F-100's for air cover and close air support. IIAF F-86's line up behind a USAF C-130 on the ramp, Vahdati AB, Iran.

The Allied Air Force Commander, Major General S. Ezazi, was an Iranian; his deputy, Colonel J. W. Hughes, Chief of the Air Advisory Section, ARMISH MAAG, was an American.

A combined Tactical Air Control Center (TACC) operated as an adjunct to the Allied Air Force Headquarters and controlled the air operations during the combined phase of the exercise. A combined Direct Air Support Center (DASC) operated as an adjunct to the Allied Army Headquarters and coordinated close air support of Army forces.

phase planning

The phasing of the activities planned for Exercise Delawar covered a period from 18 March through 12 May.

Phase One (18 March–4 April) Logistical and Administrative Buildup. USAREUR positions a provisional logistical command at Incirlik Air Base, Turkey, for support of the USARSTRIKE forces. USAFE provides an augmentation at Incirlik and prepositions navigational aids, personnel, and other equipment and supplies in Iran, as required for support of the USAFSTRIKE forces. CINCAFSTRIKE dispatches a combat support group at Vahdati AB, Dezful, Iran, for support of participating forces in Iran. CINCSTRIKE/USCINCMEAFSA dispatches advance elements of the USSTRICOM Communications Support Detachment to Incirlik, Vahdati, and other locations, as appropriate. USCINCEUR passes operational command of the amphibious force to CINCSTRIKE/USCINCMEAFSA when the amphibious force enters the Red Sea.

Phase Two (5–11 April) Deployment. CINCSTRIKE/USCINCMEAFSA deploys Headquarters JTF Delawar and the USSTRICOM Communications Support Detachment to Vahdati and Incirlik, closing on 6 April. CINCARSTRIKE deploys ARFOR (1st Brigade, 101st Airborne Division) from Fort Campbell, Kentucky, to Incirlik on MATS aircraft, closing on 10 April. CINCAFSTRIKE deploys two F-100 fighter squadrons from Cannon AFB, New Mexico, to Vahdati, closing on 9 April. COMIDEASTFOR assembles NAVFOR at Kharg Island in the Persian Gulf on 10 April.

Paratroopers of the 101st Airborne Brigade are given a final predawn readiness safety check on 12 April at Incirlik Air Base, Adana, Turkey. Tactical Air Command C-130's carried the troopers on the 3½-hour flight to Dezful, Iran, where the jump was made.

Phase Three (12 April) U.S.–Uninational. COMUSJTF Delawar directs airborne, amphibious, and air operations as follows:

a. ARFOR conducts a parachute assault operation at Drop Zone (DZ) Hawk in vicinity of Dezful at H-hour, D-day (0630 hours local time, 12 April) from the Intermediate Staging Base at Incirlik. USAFSTRIKE provides 40 C-130 aircraft for personnel drop. MATS provides 30 C-130 aircraft for heavy equipment drop and 18 C-133 aircraft for heavy equipment airlanding. The USAF Combat Control Team/USA Army Assault Team (CCT/AAT) drops on DZ Hawk at H minus 30 minutes. The heavy equipment drop comes in at 0630 hours followed by the personnel drop. Airlanding operations commence upon completion of the airborne assault. Aircraft recover at Incirlik, refueling at Hamadan, Iran, if required.

b. NAVFOR conducts an amphibious assault by helicopter and small boat at Kharg Island at 1000 hours local time.

c. AFFOR provides fighter cover to the airborne force en route from Incirlik to Dezful within range of F-100 aircraft operating from Vahdati without refueling; conducts visual reconnaissance and interdiction missions prior to the airborne and amphibious assaults, and

A member of the U.S. 101st Airborne Division untangles equipment and prepares for action as other paratroopers float down through the murky sky above Drop Zone Hawk.

subsequently conducts close air support to secure initial objectives of the airborne and amphibious assaults.

Phase Four (12–15 April) Employment-Combined. At 1010 local time, D-day, operational command of ARFOR, AFFOR, and NAVFOR passes to the Supreme Allied Commander, for exercise purposes, upon completion of the airborne assault, the amphibious assault, and attendant air operations. The Supreme Allied Commander conducts combined operations consisting of:

a. An attack by the Allied Army to include a two-company combined parachute assault operation on D+2

b. Naval patrol, minesweeping, and amphibious operations by the Allied Navy

c. Air operations in support of the combined Army and Navy operations by the Allied Air Forces.

During Phase Four, COMUSJTF Delawar and staff assist and advise the Supreme Allied Commander and the allied component commanders and assist the USSTRICOM Joint Evaluation Team. COMUSJTF Delawar resumes operational command of U.S. forces upon termination of Phase Four.

Phase Five (16–22 April) Redeployment. MATS and USAFSTRIKE aircraft arrive at Vahdati to effect redeployment. COMUSJTF Delawar exercises operational command of ARFOR, AFFOR, and NAVFOR for marshaling incident to redeployment. Operational command reverts to normal as each element of each force initiates redeployment from the exercise area. ARFOR redeploys from Vahdati directly to ConUS on MATS aircraft, beginning 16 April. AFFOR deploys from Vahdati to ConUS on USAFSTRIKE aircraft, beginning 17 April. MIDEASTFOR resumes normal operational missions, and the amphibious augmentation steams for the Mediterranean. CINCSTRIKE/USCINCMEAFSA redeploys Headquarters USJTF Delawar and the Communications Support Detachment from Vahdati to ConUS on MATS and USAFSTRIKE aircraft.

Phase Six (23 April–12 May) Logistical and Administrative Phase-out. Rear detachments from Headquarters USJTF Delawar, AFFOR, ARFOR, and NAVFOR clean up final work and return to home stations. Operational command of the amphibious force reverts to USCINCEUR when the amphibious force departs the Red Sea. USAFE and USAREUR redeploy logistical forces from Incirlik to home stations.

execution

With the concept of operation in mind, let us now turn to events as they actually took place.

Phase One. The buildup of forces at Incirlik proceeded essentially on schedule. The USAREUR Provisional Logistical Command set up a marshaling area at Incirlik which one combat-experienced paratroop officer indicated was "the closest thing to an actual wartime staging base that I have seen since World War II." TUSLOG (Turkish–U.S. Logistics Service) Detachment 10, reinforced by a personnel augmentation from USAFE, provided outstanding base support for the JTF forces at Incirlik.

The USAFSTRIKE Combat Support Group closed Vahdati on 27 March, and basic support activities, such as billeting and messing, were started. General Graham and advance elements of Headquarters AFFOR arrived at Vahdati on 31 March. Colonel Kenneth C. Dempster, USAF, Chief of Staff, USJTF Delawar, arrived at Vahdati on 4 April to establish the JTF advance command post.

The AFFOR Tactical Air Control Center (TACC) was established on 1 April. At the request of the Iranian Air Force Commander, General Graham provided assistance in establishing the Iranian Air Force TACC. Similar aid was given to Allied Air Forces in setting up the combined TACC.

Phase Two. The JTF Headquarters departed MacDill AFB on 5 April by MATS C-135 aircraft and proceeded directly to Incirlik, where a detachment was left to supervise the mounting of the airborne assault. This detachment consisted of ten officers and men, including the Deputy JTF Commander, Brigadier General Emil Eschenburg, 101st Airborne Division, and the JTF J-3, Colonel Luther O'Hern, USAF, Chief, Joint Exercise Branch, Hq Strike

Command. General Box and the remainder of JTF Headquarters proceeded to Vahdati to establish the main command post, arriving on the evening of 6 April.

The deployment of the 1st Brigade, 101st Airborne Division, from Fort Campbell to Incirlik proceeded according to schedule. Twenty-three MATS C-135 sorties transported the bulk of the 2346 Army personnel. Twelve C-135's were used, recycling as required for the second personnel echelon. Thirty MATS C-130's and 18 MATS C-133's transported 560 tons of heavy equipment to Incirlik. The C-130's, programed for further use in the parachute assault to drop equipment, were prerigged at Fort Campbell to obviate rigging at Incirlik. (Exercise Delawar was the first large-scale exercise in which MATS used jet and prop-jet aircraft only.) As these Army forces arrived at Incirlik, they passed to the operational command of General Box.

The deployment of the fighters of the Composite Air Strike Force (CASF) from the United States on 8 April was hampered by severe turbulence in air refueling areas, resulting in damage to refueling probes on several of the F-100's launched from Cannon AFB. On 9 April fighters were launched from Morón, Spain, for the flight to Vahdati. Blowing dust caused visibility at Vahdati to deteriorate to below minimum, forcing COMAFFOR to order all arriving aircraft to make an unprogramed recovery at Incirlik.

On 10 April 11 additional F-100 aircraft arrived at Morón from ConUS. On 11 April the F-100's at Incirlik were launched for Vahdati. Concurrently, 10 of the aircraft at Morón took off for Vahdati.

As the fighters started to land at Vahdati, the weather began to deteriorate, again due to blowing dust, and after 16 aircraft had landed, COMAFFOR ordered the remainder to recover at Incirlik. During the deployment of the fighters, air refueling was accomplished by SAC KC-135 tankers at seven en route air refueling areas.

The planned route for the airborne assault force was from Incirlik east into Iran and then south over the Zagros Mountains to DZ Hawk, located approximately 10 miles north of Dezful. This 1000-mile route, through the 150-mile-wide Iranian "corridor" between Iraq and the U.S.S.R., had a minimum of standard navigational aids. In addition, Exercise Delawar represented the first time MATS and USAFSTRIKE had worked together in the employment phase of an exercise in the MEAFSA area. Aircrews were, therefore, given a most meticulous briefing. It is a tribute to the professionalism of the officers and airmen of the airlift force that no errors were made.

In order to familiarize Iranian airborne troopers with the procedures to be used in the D + 2 combined parachute operation, General Graham and Colonel Wolff conducted practice jumps for Iranian personnel near Tehran on 8–10 April.

By 9 April NAVFOR had assembled near Kharg Island in the Persian Gulf, and at 0800 hours 10 April NAVFOR passed to the operational command of General Box. Admiral Schade conducted an in-port workup on 10 April and an amphibious and helicopter assault rehearsal on 11 April.

Back at Incirlik a briefing was conducted on 10 April by JTF staff officers for the CENTO PMDG, who stopped in Incirlik on their way to the objective area in Iran.

The joint Air Force–Army briefing for key personnel involved in the D-day airborne operation was conducted at Incirlik by General Box on 11 April. Late on the evening of 11 April General Box, General Graham, and Colonel Wolff met at Incirlik for the final weather decision. A forecast issued by the JTF Weather Center at Vahdati indicated visibility on the drop zone at H-hour would be 5 miles in dust with surface winds under 8 knots. Based on this favorable weather forecast, General Box issued a "Go" decision to conduct the airborne operation on 12 April as planned. However, parachute assault time was moved up one hour to 0730 hours local, and the fighter participation in the airborne assault was reduced. General Box flew to Vahdati following the final weather decision.

Phase Three. The C-130 assault airlift force took off from Incirlik using a modified stepped-up corridor procedure. Six aircraft,

Kharg Island Assault

During Phase Three of Exercise Delawar the U.S. Navy/Marine Corps executed an amphibious assault on desolate Kharg Island in the Persian Gulf. The Navy's Middle East Force, operating chiefly in the Red Sea and Persian Gulf, manned and supported the operation with a Marine company, two destroyers, landing craft, and transport helicopters.

U.S. Marines storm the beach at Kharg Island . . .

charge the enemy forces . . .

and establish gun emplacements.

taking off at 30-second intervals, climbed to 17,000, 18,000, 19,000, 20,000, 21,000, and 22,000 feet respectively. The second flight of six, taking off at 30-second intervals 2½ minutes after the last aircraft of the first flight had departed, climbed to 17,500, 18,500, 19,500, 20,500, 21,500, and 22,500 feet respectively. The third flight of six climbed to the same altitudes as the first flight, the fourth flight followed the second flight, and so on.

Following the departure of the C-130's, twenty F-100 aircraft took off from Incirlik, landing at Vahdati just prior to the scheduled airdrop.

General Graham controlled both the fighter deployment and the movement of airborne assault forces from the USAFSTRIKE C-135 Airborne Command Post.

The assault aircraft proceeded along the planned route to the objective area DZ Hawk. However, visibility on the drop zone, which had been between 5 and 7 miles all night, rapidly deteriorated just after dawn. Dust and haze, reflecting the rays of the sun, reduced slant range visibility to less than two miles.

The CCT/AAT aircraft scheduled to drop at 0700 hours, local time, aborted their airdrop after making one pass over the drop zone, when it was determined that visibility was too low to accomplish precise navigation to the DZ and execute a safe drop. General Graham then aborted the entire airdrop and directed the return of the airlift aircraft to Incirlik. General Box announced a 24-hour delay in both the airborne and amphibious assaults.

Experience of the preceding week had indicated that the best visibility usually occurred at night. Early morning visibility, although marginal for parachute operations, was usually above minimums for airlanding operations. However, as the day wore on, visibility frequently fell below minimum, requiring suspension of landings and take-offs at Vahdati until dusk, when visibility improved.

At the time the parachute assault aborted, the 18 heavy equipment C-133's were en route from Incirlik to Vahdati. General Box directed that the C-133's proceed with the airlanding at Vahdati according to the original schedule. Nine of these aircraft were able to airland at Vahdati before visibility went below minimums and the field was closed. The remaining C-133's returned to Incirlik.

Because a weather delay of no more than 24 hours was acceptable, a plan had to be developed that would do two things: first, include a parachute assault on 13 April, weather permitting; and second, allow the combined phase of the exercise to proceed on 13 April regardless of whether the parachute assault took place or not.

In order to accomplish this objective, General Box directed Colonel Wolff to split his brigade into two balanced forces. General Graham was directed to airland one force, plus the remaining C-133's, at Vahdati during the night of 12–13 April, when visibility was expected to be good, and to attempt a parachute assault with the other force on DZ Hawk at dawn on 13 April. If the visibility on the DZ was again too restricted for a safe jump, the parachute assault force would be airlanded at Vahdati immediately, getting in before visibility went below minimum for airlanding. COMNAVFOR was directed to conduct the amphibious assault at 1000 hours on 13 April.

On order from General Box, the revised plan was implemented.

In addition to the remaining C-133's, an ARFOR balanced force of approximately 720 troopers and 170 tons of equipment, transported on 13 MATS and 17 USAFSTRIKE C-130 aircraft, was airlanded at Vahdati on the night of 12–13 April.

Out on DZ Hawk, the Shah, Ambassador Holmes, General Adams, and approximately 700 other observers took their places in the reviewing stands specially constructed for the occasion. Approximately 70 newsmen from the U.S. and the CENTO countries were present. One officer from JTF Headquarters, one officer from ARMISH MAAG, and one Iranian officer were set to narrate the events in both English and Farsi.

Visibility was about 3 miles. A thin layer of dust was suspended in the air. Winds were light and variable.

At 0602 hours four C-130's passed precisely over the impact point and dropped the

Air Force Combat Control Team and the Army Assault Team. The CCT quickly assembled and marked the DZ for the main assault. The AAT provided protection for the CCT and staked out the assembly areas for the airborne force.

At 0632 hours 12 MATS C-130 aircraft air-dropped heavy equipment on the north end of the DZ. At 0639 21 USAFSTRIKE C-130's dropped ARFOR troopers on the south end of the DZ. Fifteen USAF F-100 aircraft provided cover for the airborne assault force. Approximately 1500 personnel and 100 tons of equipment were dropped in the parachute assault.

Upon completion of the parachute assault, the Shah mounted a ¼-ton truck and spent more than an hour inspecting the DZ and talking to the troopers.

The amphibious assault at Kharg Island was executed successfully, with the Shah, CINCSTRIKE/USCINCMEAFSA, and other dignitaries witnessing the action. Landing-force operations ashore continued until the island was "secured" and control restored to the Iranian authorities.

Phase Four, the Combined Employment Phase, was conducted essentially according to the published plans. ARFOR linked up with the Iranian Army Force and began the attack phase. Troopers of the 101st Airborne Division rappelled down a 100-foot cliff carrying full combat equipment, including mortar tubes, base plates, and other necessary battle gear. At the base of the cliff, attached engineers erected a light infantry assault bridge and three rope bridges across the Balarud River.

On 15 April the Allied Army conducted a combined parachute assault by one U.S. airborne rifle company and one Iranian rifle company. Seven USAFSTRIKE C-130's were used. The airdrop was well-coordinated between the combined forces. Iranian F-86 aircraft provided air cover for the airdrop.

The combined naval operations consisted of screen tactics, antiaircraft gunnery, surface gunnery, underway replenishment, minesweeping, and an amphibious assault near Ganaveh on the coast of the Iranian mainland.

Air operations were hindered by low visibility during the first two days of the combined exercise. However, on the last two days, air operations in support of the Allied Army did take place as planned.

Phase Five. Redeployment, already delayed 24 hours, was further delayed an additional 12 hours due to low visibility at Vahdati. ARFOR redeployed directly to Fort Campbell on MATS C-135's, C-133's, and C-130's using staged crews to obviate the requirement for overnight (RON) stops en route. The 36 F-100's made one RON stop at Lajes and arrived in ConUS without a single abort. SAC KC-135's again accomplished air refueling at eight air refueling areas. The *USS Spiegel Grove*, the landing ship dock used for the amphibious assault, with the Marine company aboard, steamed for the Mediterranean. The Middle East Force resumed its normal activities. Lastly, the JTF Headquarters redeployed on one MATS C-135 aircraft, arriving at MacDill AFB, Florida, on 21 April.

Phase Six. The administrative and logistical phase-out took place according to plan.

special features

A number of special features deserve mention before discussing problems and recommendations.

News Coverage. News coverage was extensive and effective. Six Iranian newsmen were flown to the United States and joined ARFOR and AFFOR prior to 5 April. Fifteen U.S. newsmen, invited by CINCSTRIKE to participate in the exercise, also joined ARFOR and AFFOR prior to 5 April. Both the Iranian and U.S. newsmen then accompanied the deploying forces through the staging bases into the exercise area. Fifteen CENTO newsmen and about 50 additional Iranian newsmen also covered the exercise. Stories printed both in the U.S. and overseas were highly favorable.

Civil Affairs. Because the exercise was conducted in a friendly country, civil affairs activities were directed primarily toward effecting liaison with the government of Iran and civilian officials in order to facilitate military actions and prevent incidents which would impair attainment of the exercise purposes.

The government of Iran provided military government, police, and gendarmerie liaison officers to JTF Headquarters. Additionally, a member of the Supreme Court of Iran was positioned at JTF Headquarters with authority to make on-the-spot decisions for the government of Iran concerning all matters pertaining to jurisdiction, customs, and immigration. At the conclusion of the exercise, this Justice expressed his admiration for the cooperation and mutual understanding developed between the Iranian officials and the American forces.

There were no major incidents, and claims, which were few, were for small amounts.

Concurrent with Exercise Delawar, the Tactical Air Command Band made a 12-day concert tour of principal Iranian cities. Response was genuine and enthusiastic.

Accidents. A significant aspect of the exercise was that there were no fatal accidents or serious illnesses. The United States Air Force flew approximately 1000 sorties, many over vast ocean distances and rugged mountain ranges, without a single accident of any type. Although approximately 1800 troopers jumped during Exercise Delawar, only nine minor injuries were sustained. Preventive action, taken prior to deployment to make sure that immunizations applicable to the area were completed and that suppressive medication was available, paid rich dividends. There were no serious illnesses among the approximately 6800 Exercise Delawar participants.

EXERCISE DELAWAR demonstrated the ability of the United States to come quickly to the assistance of a country with which we have a mutual security treaty. Although the forces were not large, they should be considered as an example of the initial forces that we might deploy. Once the flow of forces has been started, it is really only a matter of time, effort, and expense to continue the buildup to a greater force level. The important factors are that the reaction time was short, the forces were dispatched quickly, and they arrived in time to keep the assumed operational situation from getting out of hand.

It should be noted, however, that the Exercise Delawar forces were large enough to analyze joint and combined operational procedures in such fields as communications, weather forecasting, air traffic control, logistical support, air support, command and control, and a host of other things that go to make up the fabric of military operations. Clearly worked-out and understood operating procedures promote teamwork and enhance the joint/combined combat power of the forces. The important factor is that a representative joint force—Army, Navy, and Air Force—worked with comparable forces of another country. The lessons learned are directly applicable to larger forces.

At the conclusion of Exercise Delawar, General Adams stated that the most important single lesson to emerge from the exercise was the outstanding effectiveness of the Joint Task Force Headquarters in commanding and controlling the elements of all services comprising the Joint Task Force. Exercise Delawar completely validated the principles regarding joint task forces as laid down in Unified Action Armed Forces and habitually followed by the United States Strike Command for the centralized direction and control of joint forces.

Hq USSTRICOM

EXERCISE DELAWAR, MATS

MAJOR GENERAL JOSEPH A. CUNNINGHAM

IN APRIL 1964 the United States and Iran planned and executed a joint military and naval exercise called Delawar. It involved some 200 sorties by USAF jet fighter and propjet airlift aircraft—over unfamiliar terrain, with limited navigational aids, and in almost totally unpredictable weather.

The fact that Exercise Delawar was completed without incident or accident is a tribute to the dedication, professionalism, and determination of the USAF aircrews involved. Any look at this exercise and the operational demands it involved, no matter how superficial, will bear out that statement beyond argument.

Delawar, appropriately enough, is the Persian word for courageous. The name was applied to an exercise conducted under the auspices of the Central Treaty Organization and designed generally to demonstrate United States willingness and ability to provide help immediately and in force to counter aggression against Iran. In addition to its other unusual features, Delawar involved a number of exercise "firsts" that will be providing material for study and development for some time to come:

- Delawar was the first STRICOM exercise in the MEAFSA° area.
- It was the first joint overseas employment exercise of Military Air Transport Service and Tactical Air Command assault airlift units.
- It involved the longest and largest night assault formation ever executed over allied territories.
- It was the first large-scale exercise for MATS in which jet and propjet aircraft were used exclusively.
- It was the first large overseas exercise in which MATS heavy-equipment-drop aircraft assault-loaded in the U.S.
- It was the first combined/joint exercise in which Iranian air forces participated.
- It involved employment-corridor operational procedures designed specifically for Exercise Delawar.

°Middle East/Southern Asia/Africa south of Sahara.

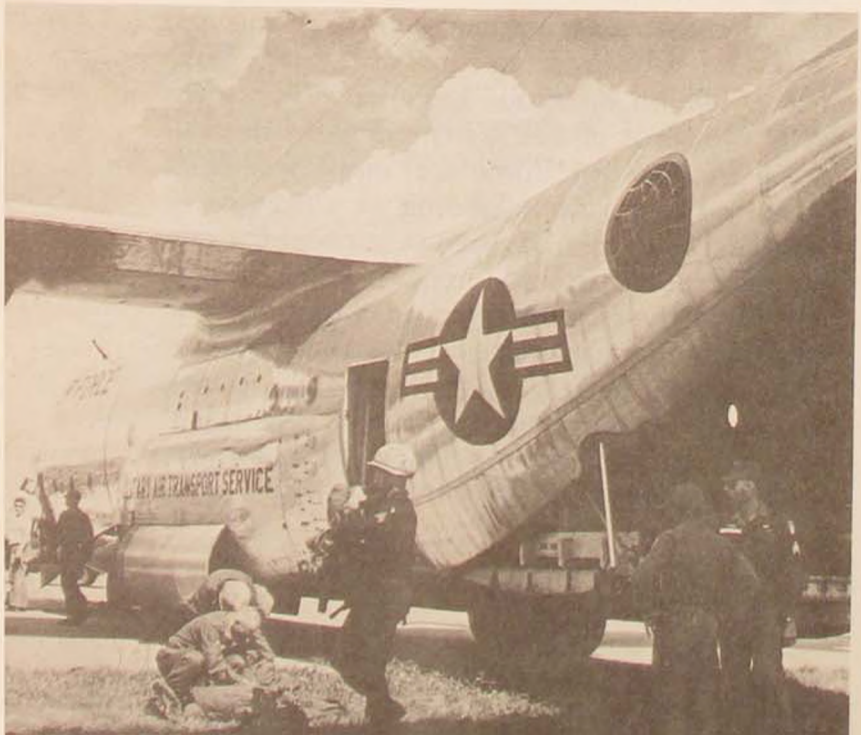
planning

The overall scenario of Exercise Delawar called for U.S. air, ground, and naval forces to augment Iranian forces under simulated attack from an unnamed aggressor. The naval phase included maneuvering in the Persian Gulf and an assault landing from ships of the U.S. Sixth Fleet. The air operation included deployment of a TAC force of F-100's to augment the Imperial Iranian Air Force and employment by paradrop and assault landing of a brigade of the 101st Airborne Division to support the embattled Iranian ground forces.

Objectives of Delawar, as outlined in the Allied Air Force exercise report, were twofold:

> (a) A U.S. unilateral phase to test USCINCMEAFSA procedures for deployment and employment of a Joint Task Force into this area, under the control of a U.S. Joint

A USAF airman adjusts communications equipment atop a tower at Incirlik, Turkey, in preparation for the flying activity in Exercise Delawar. . . . The C-130's that will fly the airdrop missions during the employment phase of the exercise get the same careful maintenance at Incirlik that they would at home base. . . . Troops of the 101st Airborne Division check over their equipment to be used in the air assault phase of the exercise, which will take them from Incirlik more than 1000 miles to the southwest of Iran.



Task Force Commander; and, to demonstrate U.S. capability to respond to requests for military assistance from Allied Nations.

(b) A bi-national phase to conduct a combined U.S.-Iranian training exercise for the purpose of testing command relationships, communications, and to provide training to the Iranian armed forces staffs and tactical units in the planning procedures and doctrine for joint and combined operations.

As for reporting on the overall exercise, let it suffice here to quote further from the Allied Air Force report: "It is considered that the foregoing objectives were substantially achieved." The purpose here is to deal with the deployment and employment phases in which MATS was involved and to discuss some of the unusual problems faced by the airlift elements and some of the solutions worked out or indicated as a result of the exercise.

Delawar was a typical exercise for MATS only in its across-the-board representation of command activities. Air Rescue Service provided rescue orbits for the Composite Air Strike Force move to and from the area and rescue coverage in the exercise area. Air Photographic and Charting Service provided documentary coverage of exercise activity. Air Weather Service, in addition to providing en route weather reconnaissance for the fighter movement, had the most hazardous of all the technical activities: weather forecasting in the exercise area. The largest MATS activity, of course, was provided by elements of the global airlift force.

The deployment phase was pretty much routine for MATS. It involved flying 2346 troops and nearly 1.4 million pounds of equipment and cargo from the U.S. more than 5000 miles to Incirlik Air Base, Turkey. The experience of previous training with elements of the U.S. Strike Command paid off in planning that led to a smooth movement within projected deployment requirements. Twelve C-135 jet Stratolifters made two trips each to Incirlik, and the 37 C-130 Hercules and 18 C-133 Cargomasters made one trip each for a total of 79 sorties. The MATS deployment flow was planned to close at 1110 Zulu 10 April. Ninety-seven per cent of the aircraft closed on time, and the two that overshot the deadline made it in plenty of time for the employment phase.

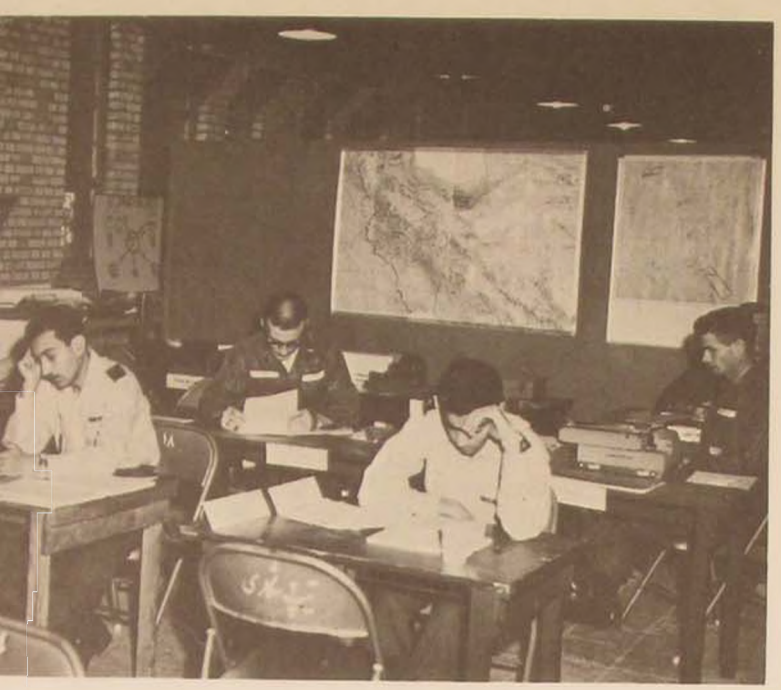
It was the employment phase that presented problems that never could have been overcome without the outstanding cooperation between MATS and TAC and the professional competence of the aircrews. Some of the geographic, equipment, political, and procedural obstacles are evident from the roughest outline of the employment mission. The mission force would take off from Incirlik at night. As planned, it would involve 40 TAC C-130's for troop airdrop, 30 MATS C-130's for heavy equipment drop, and 18 MATS C-133's for airlanding combat equipment. This huge force would travel more than 1000 miles through a corridor less than 100 miles wide, over unfamiliar terrain, avoiding the Soviet border on the north and the Syrian and Iraqi borders on the south, and join up for a mass assault, at first light of day, near Dezful, Iran —over a narrow plain restricted by mountains on one side and the inviolable Iraqi border on the other.

Adding to the complexity of the mission was the necessity for visual identification of the drop zone in uncertain weather expected to be minimal at best. To cap this, throw in Noah's Mount Ararat in eastern Turkey, towering at the edge of the corridor and restricting altitude minimums to 17,000 feet.

The terrain restrictions in the corridor, compressed from the sides by political limitations, presented a problem. The real problem, and one that required special procedures, however, was the probability of weather en route. If we could have been assured of VFR weather, we could have employed standard formation procedures.

The possibility of aborts also had to be considered, and procedures were worked out to allow aborting aircraft to break clear of the formations, turn within the corridor and within the compressed altitude limitations, and make for Incirlik or an alternate.

On 8 and 9 April lead crews flew practice missions that helped refine the new corridor procedures and familiarized aircrews with the route. On 11 April based on weather conditions and a forecast for the drop zone, a "Go"



Iranian and U.S. members of the Intelligence Section of the Delawar staff prepare for the air action by studying data compiled at Vahdati AB, Iran.

was given for 0400 Zulu 12 April. The mission was on.

employment phase

The employment phase was launched from Incirlik as scheduled, with 30 MATS and 40 TAC C-130's in the stepped-up in-trail formation. The entire formation was in solid weather for the majority of the corridor route, going to the DZ and returning to Incirlik. Join-up was effected, and the low-level portion of the mission was started. The Shah of Iran was ready to witness the drop. Then, just before the Combat Control Team aircraft was to drop, in-flight visibility fell below two miles. Far from the mud and rain of Incirlik, the mission encountered the blowing dust and sand of the Persian plain. The employment force was right on the nose, but for the safety of the paratroopers the mission was recalled to Incirlik. Nine of the C-133's already had landed their cargo at Vahdati Air Base, near Dezful, and the other nine were recalled. The mission was rescheduled after a 24-hour weather delay.

Since the point had been made in the initial employment run—the air assault force delivered on the spot on time—and since little improvement was expected in the weather, the size of the employment drop force for the delayed assault was reduced to 12 MATS and 21 TAC C-130's. Again the corridor flight was accomplished, and join-up was effected at dawn under restricted visibility conditions, using a new location for join-up. Because of existing weather in the preplanned join-up area, the new location was selected after the aircraft were airborne. This was a significant accomplishment, considering the conditions. Again the dust and sand were blowing and visibility was poor over the drop zone, but most of the drop was accomplished with a high degree of accuracy.

lessons from Delawar

In effect, considering the peacetime safety standards adhered to, the mission was accomplished and it was accomplished safely. The lessons it taught are important: our ability to accomplish the airlift missions of the future will be affected greatly by how well we learned them.

One major lesson concerned corridor procedures, which must be expanded to allow more flexibility. With the proper procedures, we have learned that we can stretch the employment phase of such an operation to almost any distance within the range of our aircraft. Before Delawar it was almost unheard of for an employment phase to cover more than 300 miles. We proved that it can reach more than 1000 miles, so it stands to reason that with the right equipment we can make it reach 5000 miles, if necessary.

One procedure we need to develop is a corridor operation that can continue directly over the drop zone without the necessity for the preassault rendezvous, which delays the lead aircraft in the combat zone. Before this procedure can be made effective for a sizable force, there is a specific requirement for two types of equipment, one for accurate airborne station-keeping and another for positive identification of the drop zone despite weather conditions.

An Iranian airman and his American counterpart stand guard at Vahdati Air Base. The base buildings in the background are obscured by the blowing dust and sand of the Persian plains, which presented the most severe weather problem during the exercise.

Shah Mohammed Riza Pahlavi of Iran greets General Joe W. Kelly, MATS commander, and General Paul Adams, CINCSTRIKE and CINCMEAFSA, in the field during Exercise Delawar.

Paratroopers of the 101st Airborne Division boarded MATS C-135 jet transports at Fort Campbell, Kentucky, and flew more than 5000 miles to the Delawar staging area, Incirlik Air Base, Turkey. There they switched to TAC C-130's for another 1000 miles and a jump into the exercise area in southwest Iran. Despite limited visibility imposed by dust and sand blown up from the plains, the airdrop was successfully completed. The 101st Airborne Brigade landed in Drop Zone Hawk near Vahdati Air Base at Dezful.

In Delawar we learned that the APN-59 radar now available is much more effective for station-keeping than we expected. The windshear problem at varying altitudes in Delawar promoted an overfly at the upper levels of the employment corridor sections. With positive drop zone identification despite low visibility, we could deliver the troops and cargo on target with a minimum of danger to the troops in any kind of weather. We have two types of procedures to consider for development: those that will make our present equipment more effective and those that will make the entire operation more effective when the improved equipment becomes available.

Delawar also served to re-emphasize the importance of adequate weather operations, both forecasting and transmitting. In the exercise the weathermen—and hence the airlift force—faced two major problems. One was the shortage of historical weather data on the geographic area, and another was inadequate communications facilities.

Even though the forecasting was highly accurate, a peculiar local condition caused most of the exercise weather difficulty. It was the problem of a thick, unpredictable haze of dust and sand, apparently generated by sunlight in combination with other local conditions that in most areas would have little if any bearing on aircraft operations. The rapidity of the development of this condition, combined with the inadequacy of available communications, was the biggest weather problem connected with the exercise.

Despite the extension of employment activity over an extra day because of weather and despite the extended distances involved in the entire exercise, Delawar presented no insurmountable logistical problems for MATS. Theater and ZI onload base resources were used where available, supplemented with MATS mobility equipment. Spares support was provided from air-transportable kits prepositioned at offload bases, with War Readiness Materiel airborne kits as a secondary source of supply. Resupply was provided through the MATS Forward Supply System. The result was a logistics reliability rate of better than 90 per cent overall and almost 95 per cent in the employment sorties.

Another lesson reiterated by Delawar is the crippling impact that political restrictions can have on airlift flexibility. It is axiomatic that multiple onload bases, multiple routings, and multiple offload bases provide this flexibility and that when all or part of these are missing the chances for the success of the mission diminish accordingly. While the effects of these limitations on Delawar may be unique, the situation may be projected to cover many areas of the world. With the existing equipment that is available to airlift forces, the problems are likely to persist and may become worse. The addition of the new C-141 StarLifter to the MATS inventory will alleviate this problem somewhat.

MEANWHILE, we must continue to adapt our procedures to meet exercise—or contingency—requirements with the equipment at hand and to seek the additional aids necessary to make that equipment more effective. And it will help to remember one lesson that is by no means peculiar to Delawar alone: in the end, regardless of the quality of the planning, equipment, and support, it is the aircrews who will get the job done.

Hq Military Air Transport Service

FOUNDING OF THE AIR FORCE INSTITUTE OF TECHNOLOGY

LIEUTENANT COLONEL JOHN J. POWERS

ON 10 NOVEMBER 1919 the Air School of Application, a new special service school within the Army, began its first course of instruction at McCook Field, Dayton, Ohio. This school, which came into being with a student body of six officers, is known today as the Air Force Institute of Technology, an institution which conducts and administers educational programs for over 8000 Air Force students.

What was the setting that provided the basis for that modest beginning of today's institute with its extensive education and training programs in the scientific, technological, and managerial fields? McCook Field, the original home of the present-day institute, came into use in 1917 as a result of a general reorganization within the Signal Corps brought about by the need for more centralized control over the many activities connected with the expanding wartime aviation program. (Today's Air Force originated as part of the Army Signal Corps, and the Army's aviation activities are still part of the Signal Corps.)

As a part of this general reorganization an Equipment Division was formed in August of 1917. This division, charged with responsibility for the production and procurement of aircraft, engines, and accessories, had several functions concerned with aircraft production. Among them were research, experimentation, and testing. To handle these particular responsibilities the Equipment Division established a Department of Engineering in October of 1917.

Dayton, Ohio, was selected as the locale for this department because of its centralized position with respect to the aeronautical manufacturing agencies and, further, because a field already graded for aviation purposes was available. The field had been named for General Anson McCook, who with his seven sons fought in the Civil War and became known as the "Fighting McCooks."

By the end of World War I various technical, engineering, and production branches had been set up, and the Engineering Department had achieved division status under the new Air Service, United States Army. In late November of 1918 Colonel Thurman H. Bane, who sparked the idea for the Air School of Application, was appointed chief of the new division and Commanding Officer of McCook Field.

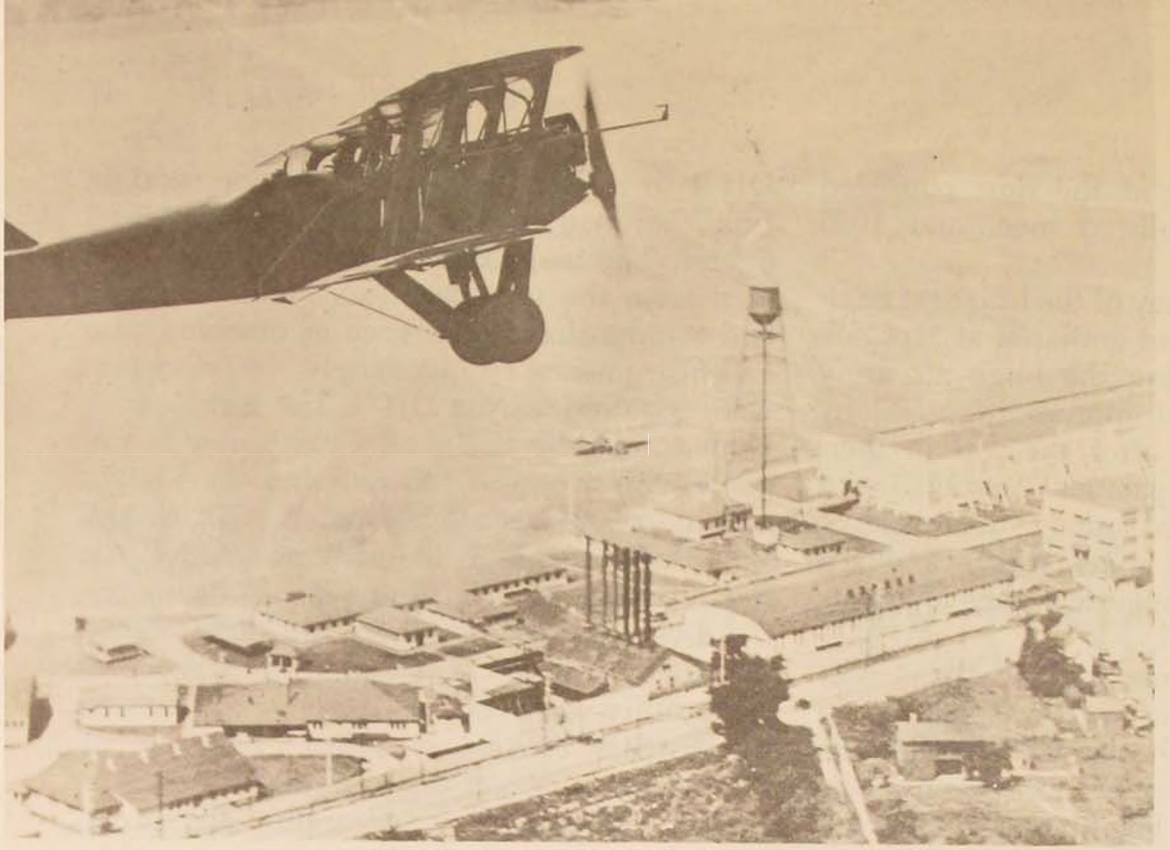
Documents indicate that as of 1 January 1919 the McCook facilities consisted of a flying field with an area of 254 acres and 69 buildings, including hangars, shops, laboratories, offices, a hospital, and a wind tunnel. These buildings were erected on ground leased to the Government for $34,000 a year. The

personnel complement at the time consisted of 56 officers, 322 enlisted men, and 1096 civilians.

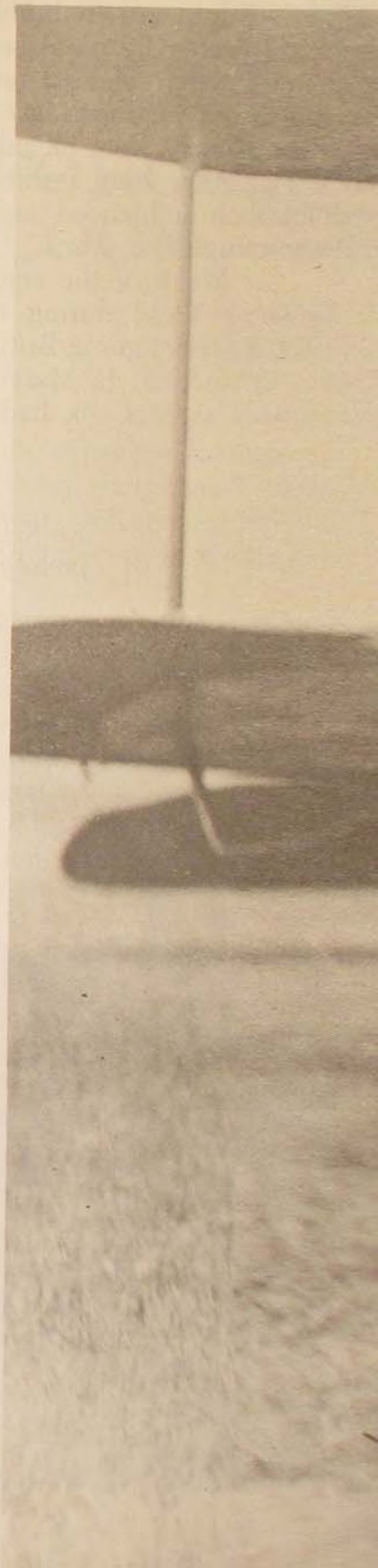
During the war many of the foremost engineers in the country had gathered at McCook Field to aid in building the huge air army projected by plans and appropriations. Many of them remained on after the war in their various engineering capacities. Commissioned personnel were included among these experts. Together they formed a technical vanguard which influenced aeronautical developments through the years.

Much of the engineering activity at McCook Field during the war was concerned with redesigning British planes for production in America. In March 1918, for example, the men at McCook had begun redesigning the DH-9 to accept the Liberty engine, and in June they had started to redesign the Bristol fighter. The magnitude of such tasks may be seen from the fact that, exclusive of engines and standardized items such as machine guns and instruments, approximately 3000 drawings were required for the DH-9. The Engineering Department also designed a two-seater fighter plane with five guns and redesigned a Vought training plane for production. It built several experimental planes in its shops at McCook. For testing the strength of aircraft structures, the division developed a sand-loading method in which sandbags were piled on a wing, or some other member, until the weight caused the structure to collapse. Using a wind tunnel, the engineers tested airplane models and conducted experiments to determine the forces

Air Service Engineering Division, McCook Field, where the Air School of Application, prototype of today's Air Force Institute of Technology, first convened in November 1919.



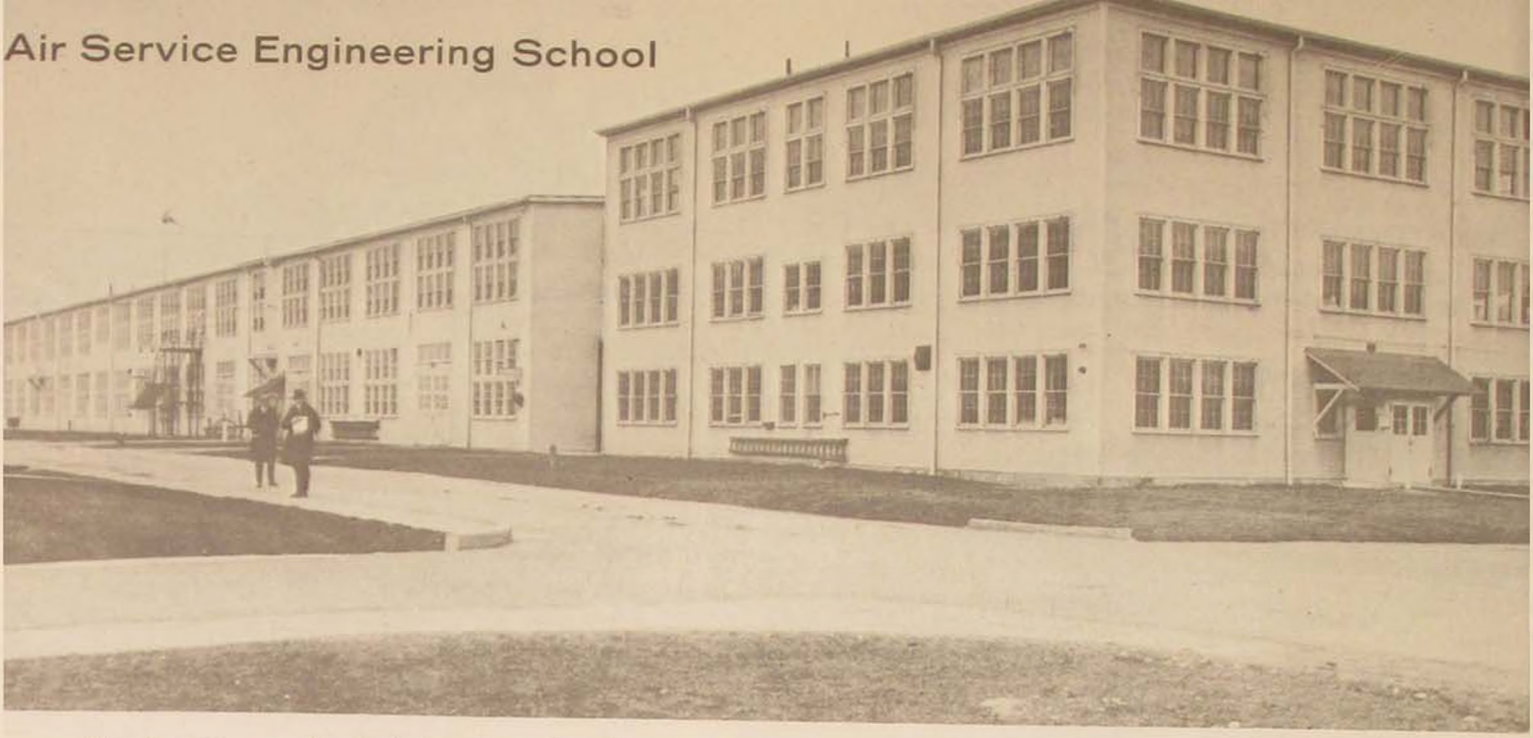
Over McCook Field on 6 September 1919 a new "two man" unofficial world altitude record of 28,250 feet was set by Major Rudolph W. Schroeder and Lt. G. A. Elfrey flying a Le Pere Liberty 400 biplane (LUSAC-11). Built by Packard and named for its French designer, the Le Pere was the only American-made fighter aircraft to reach France before the end of World War I.



acting on a tail surface or the advantages that would result from different combinations of wing structures on biplanes. There was laboratory research to find the best material, or combination of materials, for propellers. The flight-test section of the department tested the performance of planes, engines, propellers, carburetors, ignition systems, instruments, and other equipment in flight.

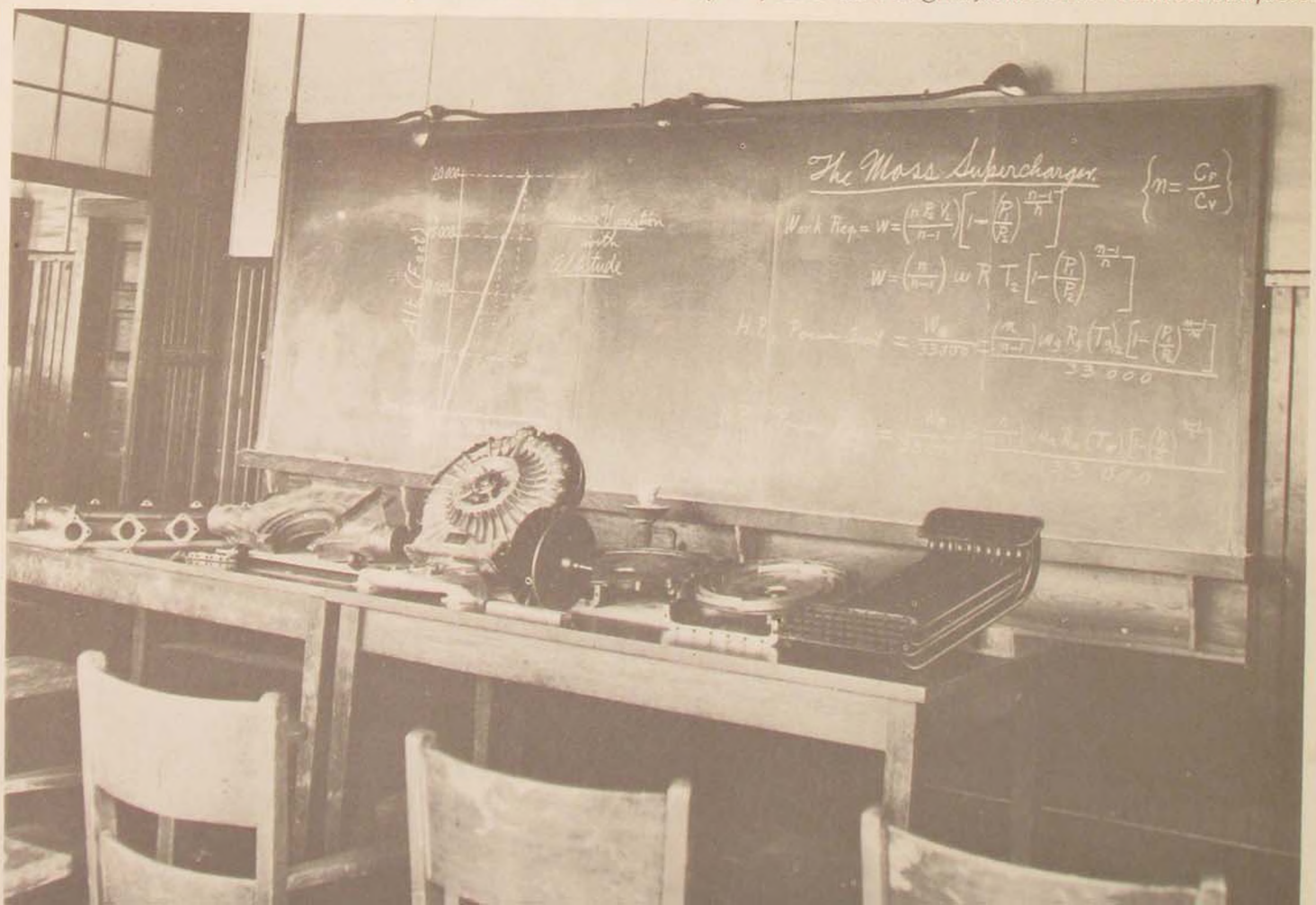
To appreciate the situation of military education at the time of the establishment of the Air School of Application, one might well glance briefly at the Army's school system as it existed in 1919. For officers there was first the United States Military Academy and then a specialized school in each arm or service—the Infantry, Cavalry, and Artillery schools representing the arms, and the Quartermaster, Ordnance, and Corps of Engineers schools representing the technical services. At higher levels were the Command and General Staff School, the Industrial College, and the War

Major General Charles T. Menoher, who was Chief of the Air Service from 1919 to 1921, and Colonel Thurman H. Bane, Commanding Officer of McCook Field and father of the Air Service Engineering School, predecessor of Air Force Institute of Technology



Engineering and administration buildings. The two-story engineering structure, 60 feet by 600 feet, housed on its first floor the wood shop, machine shop, unit assembly and inspection and on its second floor the engineering offices and main drafting room.

A typical classroom in the Air Service Engineering School. The school was conducted by a commissioned officer and a staff of assistants. The Chief of the Air Service named the officers to be enrolled in each succeeding course from September to June. The subjects taught included trigonometry, airplane design, engine design and overhaul, practical maintenance of airplane and engine, and other related subjects.



College. None of these general or special service staff schools met the Air Service's need for its own technical institution. There was a definite requirement for a school that would place a much greater emphasis upon the teaching of basic and fundamental aeronautical knowledge than was to be found in the special schools of any of the arms and services. As Army General Order 112 provided for the establishment of such additional schools as were necessary to fill the demands of the various services, authority was granted to establish the Air School of Application. By this action the military authorities of the time gave concrete recognition to the technical nature of air power and the need for a special type of technical military education to ensure its adequate development and administration.

For a school or organization to come into being, there must be a need for it and the resources to bring it about. There must also be people with imagination and initiative to see future needs and possibilities. The key person in this particular instance was Colonel Thurman Bane. He was the prime mover in the establishment of the Air School of Application and the school's first commandant. He had been Chief of the Technical Section, Office of the Director of Military Aeronautics, during the First World War. He had also had a hand in the administration of the wartime course in military aeronautics given at Massachusetts Institute of Technology. After the Armistice he became commanding officer of the experimental engineering base at McCook Field. His experience and position gave him an opportunity to see how essential technically trained officers were to a rapidly changing Air Service.

The correspondence between Colonel Bane and his superiors in Washington during the latter part of 1918 and early 1919 offers vivid evidence of his efforts to establish the school and reveals some of the thinking behind its establishment. In his initial request for the establishment of an Air School of Application, dated 30 November 1918, Colonel Bane pointed out the school's objectives.

> The object of this school would be to give the proper technical training to the permanent officers of the Air Service, so that Commanding Officers of flying fields will understand thoroughly technical maintenance of airplanes and motors, machine shop installation, shop management and cost accounting, and the operation of machine tools, power plant installation and operation, gasoline, raw materials, etc., elementary aerodynamics not including applied design except in a general way (there would be no intention of making aeronautical engineers of the students).

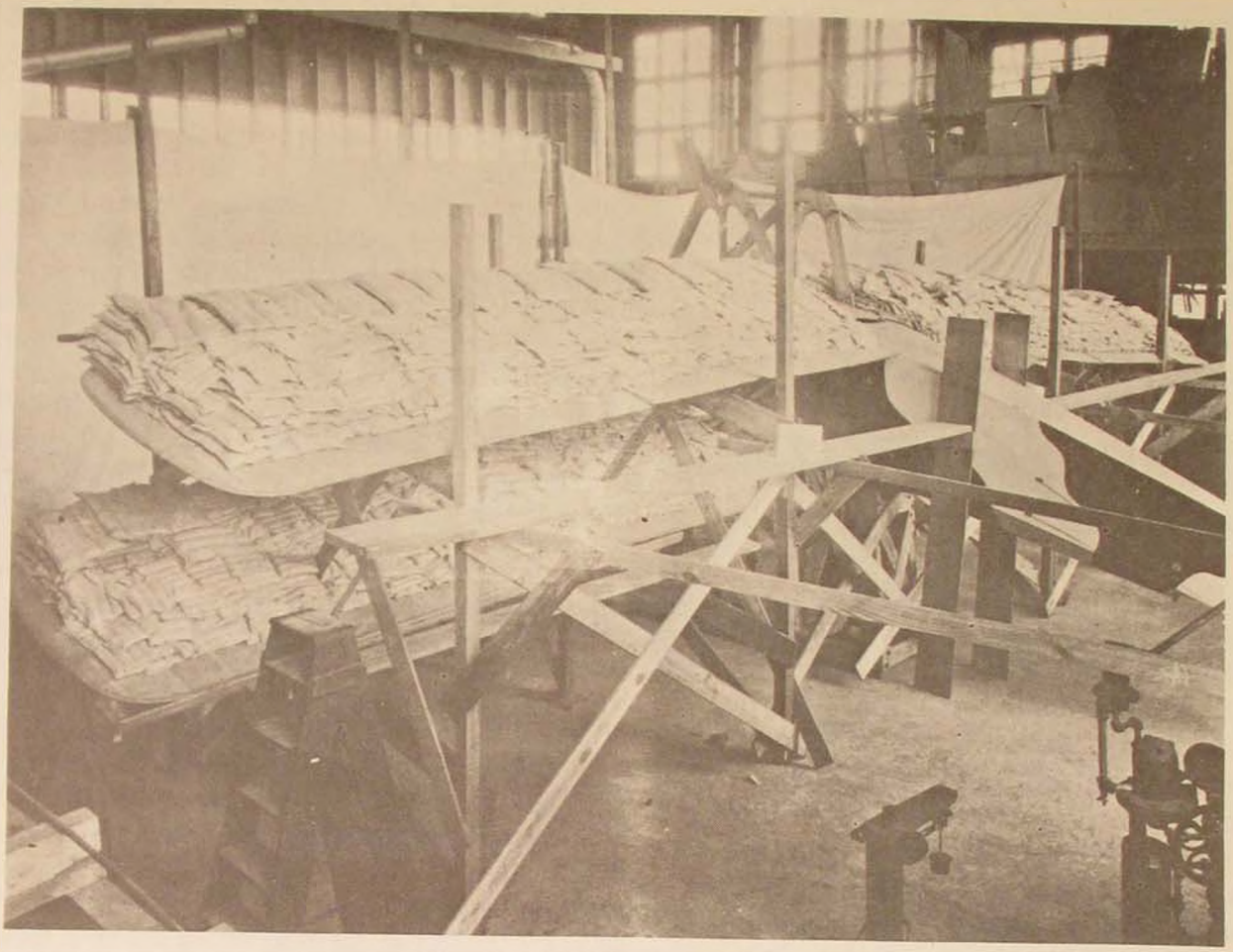
He felt that the setting up of such a school would result in better operational procedures throughout the Air Service.

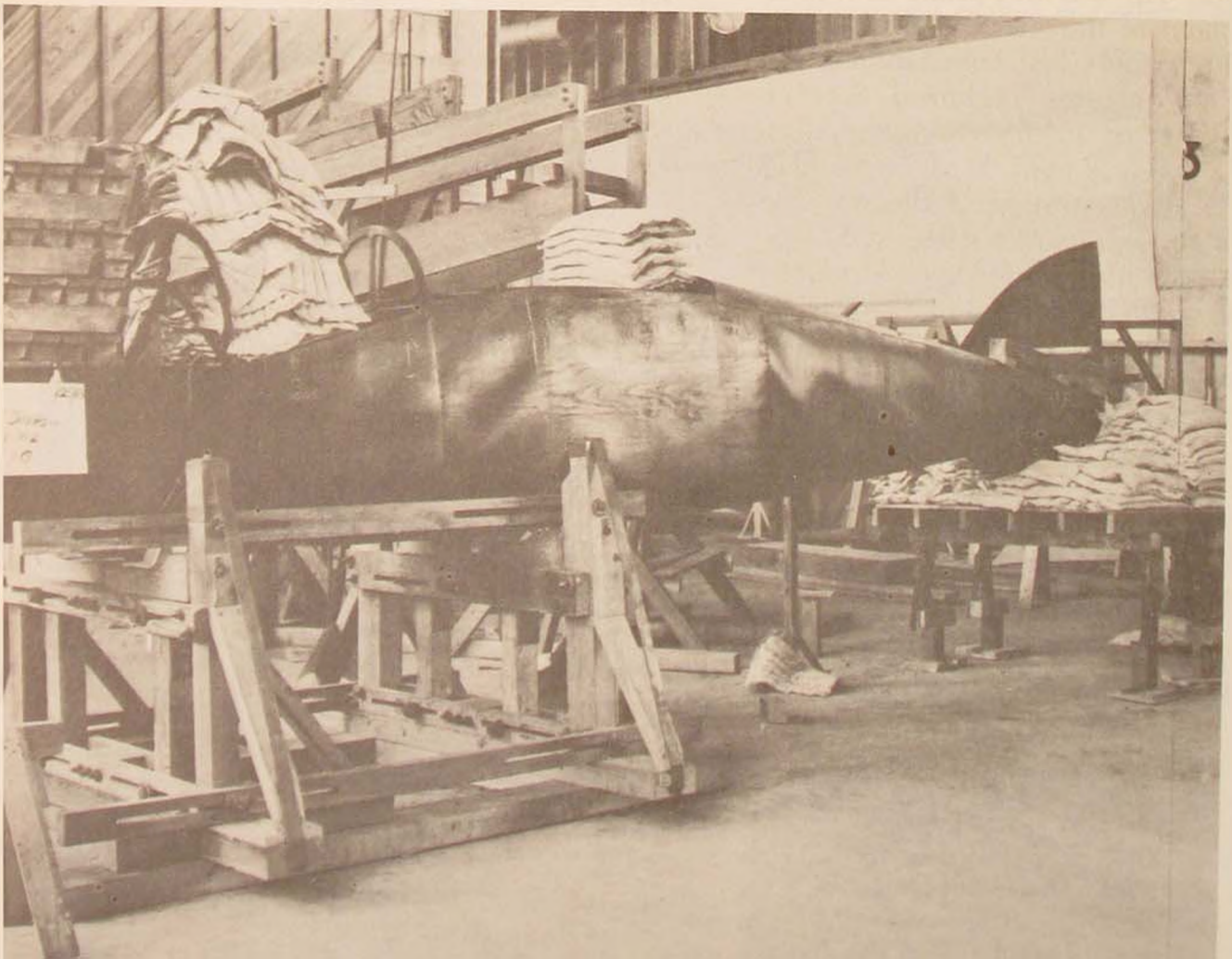
> The course would also result in standardization of operation methods and maintenance at fields. It would give the Air Service a Corps of mentally alert and efficient young officers and would improve materially the operation of our flying stations. The calibre and mental efficiency of our Air Service officers would be such as to establish the Air Service on a sound basis in the eyes of the commercial world and the rest of the Army. Our officers would be of the same class as the young Ordnance officers who are in charge of shops at manufacturing arsenals. We may some day have a government aircraft factory. With the training proposed our officers could operate it efficiently.

It is interesting to note that the Air Service never reached the point of having a Government aircraft factory comparable to the Army arsenals. However, the experimental work carried out today in Air Force laboratories at Wright-Patterson AFB is on a scale comparable to that of any of our large companies.

To keep up with current knowledge and advances being made in the field of aeronautics, Colonel Bane suggested that, as an integral part of the course, leading men from colleges and the commercial world be secured to lecture. He also recommended more intensive use of outside resources as part of the program.

> The best officers from this course will be picked out for specialization on technical matters. Some will be sent to Mass. Inst. of Tech. to become thorough aeronautical engineers, others





Sand-load and Weight Testing

In 1918 at McCook Field extensive tests were conducted to determine the weight tolerances of various aircraft structural elements. Prior to the wing truss tests, sandbags were laid out on the floor around the machine in a well-defined order to facilitate application of various increments of the load. The wings were marked off in sections to ensure proper load distribution. Jacks sustained the wing while the load was applied. Afterward they were released slowly, and wing deflection was measured. The process was repeated until the wing structure failed to support the load. In a sand-load test of the wing truss of a Le Pere 2-seat fighter (upper left), failure occurred at a safety factor of 8.5. Testing the strength of a veneer finish (below). In a test a DH-4 chassis (right) sustained a load of 14,500 pounds.

> to Forest Products Laboratories to study woods, some to aircraft factories, others to some college or university to study metallurgy and commercial chemistry.

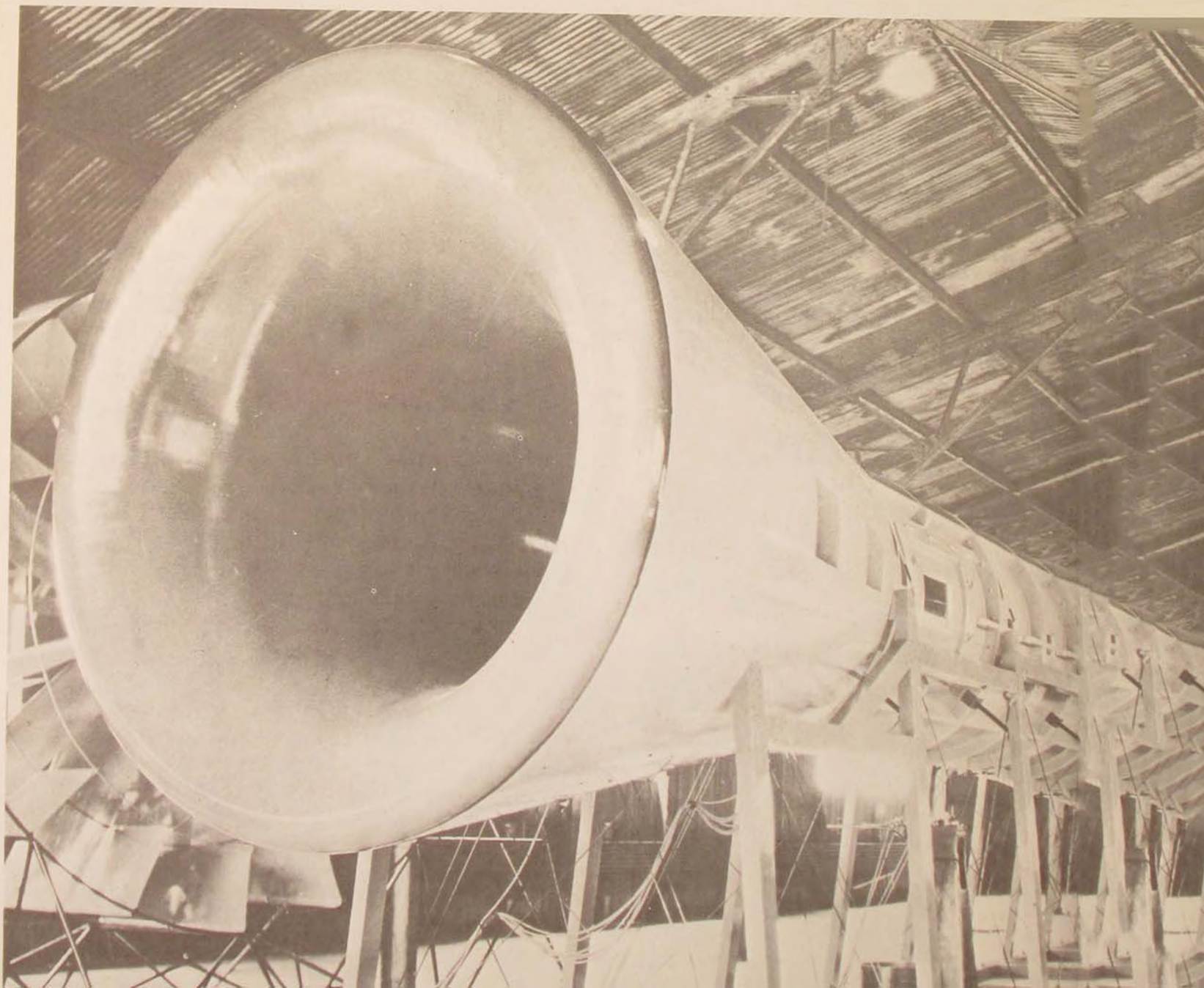
This recommendation has become standard practice today through the Civilian Institutions Division, a major component of today's Institute of Technology. This division is charged with the selection of programs and the administration of Air Force officers studying in civilian educational institutions and training in factories throughout the country.

Colonel Bane also noted that military aviation would be closely linked with industry and that the military man would have to be able to work effectively with industrialists. Thus he wrote:

> Establishment of the school will do more than anything to give us a status in the engineering and commercial world.

Bane's initial letter sheds some light on the limited technical training conducted before World War I. It also presents his thoughts concerning the professional officer qualifications necessary for the future success of the Air Service.

Our old flyers are familiar with conditions at



San Diego before the war—such conditions do not spell progress. We worked until noon only. If the entire afternoons had been devoted to good sound technical training, we would have been in much better shape to have handled the war expansion. The conditions at San Diego were due to almost total ignorance of technical aviation and in some cases of aviation itself on the part of those in charge.

The Air Service will never be a complete success until all officers in command of Air Stations and in staff positions understand the game from its very foundation. The Engineer Corps of the Army and the Ordnance Department have no untrained men. No branch of the service wants nor should have men who are merely executives. No man can efficiently direct work about which he knows nothing.

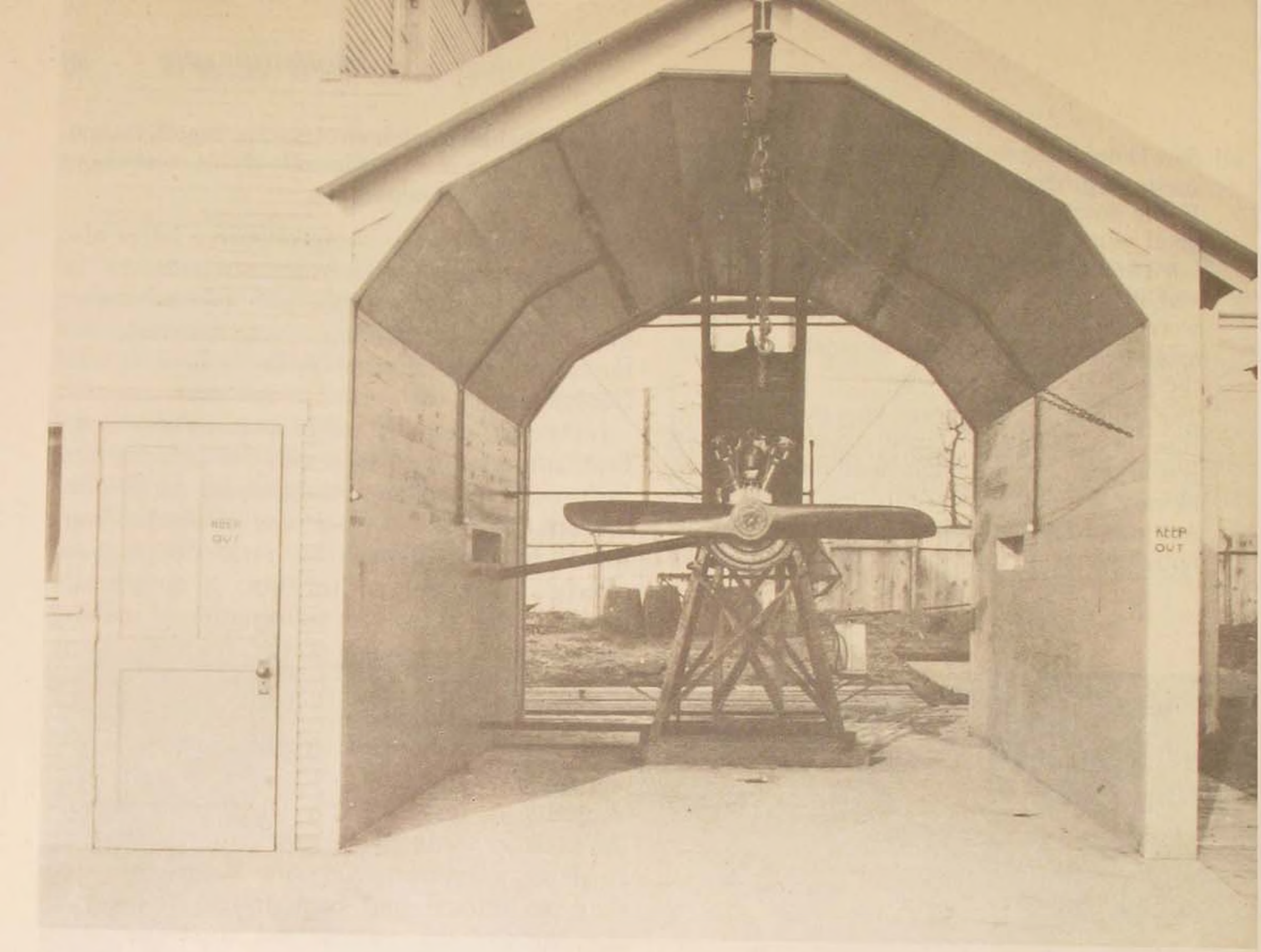
Colonel Bane's very comprehensive letter also made proposals concerning subjects to be given, the course length, and the admission qualifications for students and discussed the facilities available to start the school at McCook Field.

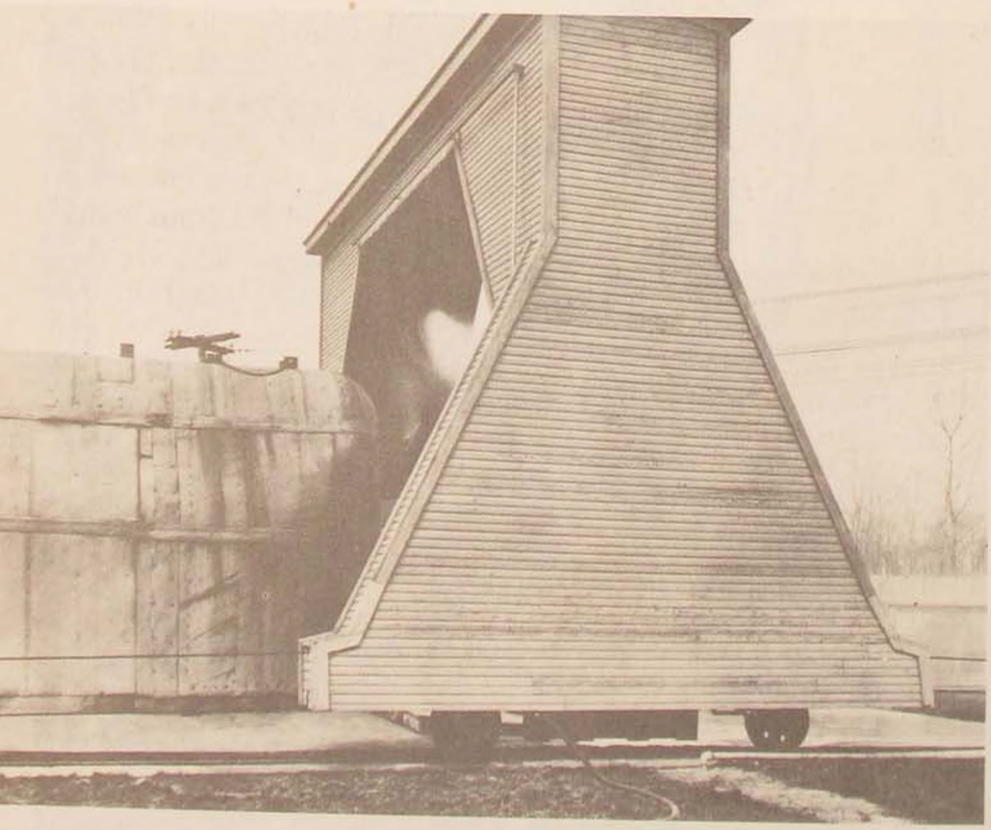
At this point it seems reasonable to say that Colonel Bane had a well-thought-out idea for providing technical training for Air Service officers. The initial plan was somewhat narrower in scope than the resident program offered today at the institute: it specifically declared that there was no intention of making aeronautical engineers of the students. Bane did not preclude the possibility of making Air Service officers into aeronautical engineers. Rather he recognized the limitations of the school as well as the limitations of officers as students. A year of study was hardly enough to make an aeronautical engineer of a student. In later discussion Colonel Bane indicated that the educational background of most of the Air Service officers was such that they could not undertake a course in aeronautical engineering without the preliminary course at the Air School of Application.

Bane further showed realistic thinking in the stress he laid on the importance to the Air Service of making a favorable impression on industry and the engineering profession. Probably not many Army officers of his time would have considered this effort important. He did, and it has been an important factor in Air Force growth over the years.

Colonel Bane's request to establish an Air School of Application was received with mixed

Wind tunnel at McCook Field, 1922. Five feet in diameter and 96 feet long, the tunnel required the exclusive use of a 140-foot hangar. Scale models of airplanes, dirigibles, wings, etc., were mounted in the tunnel, and effects of the airstream on the model were measured. A 1/70 scale model of the triplane Barling bomber was among early aircraft that underwent tests in this tunnel.



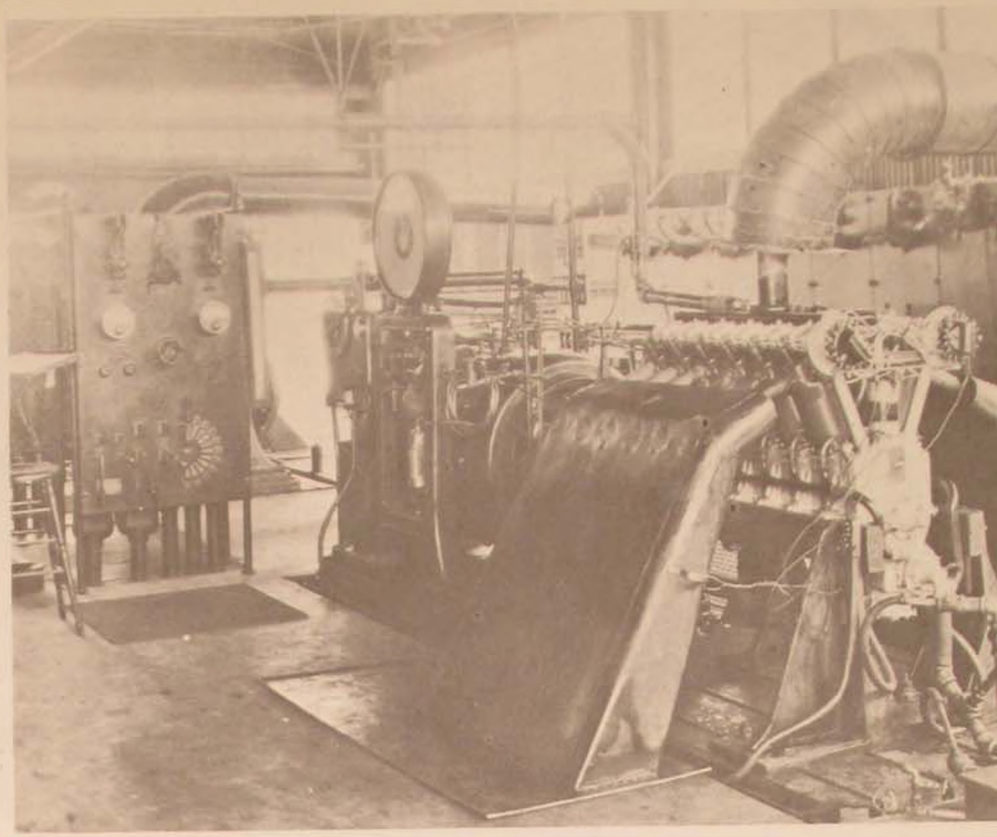


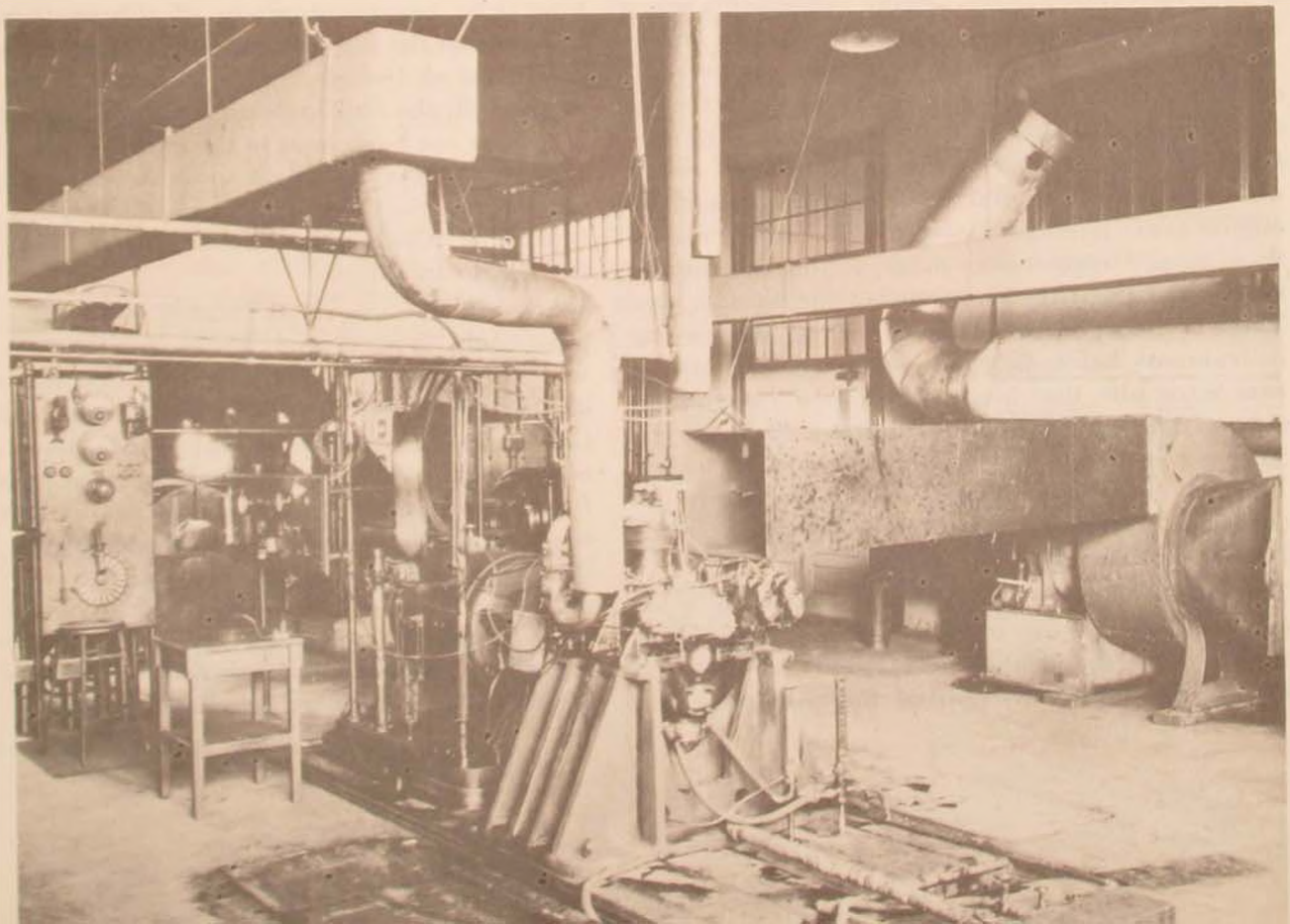
Propeller Testing Laboratory

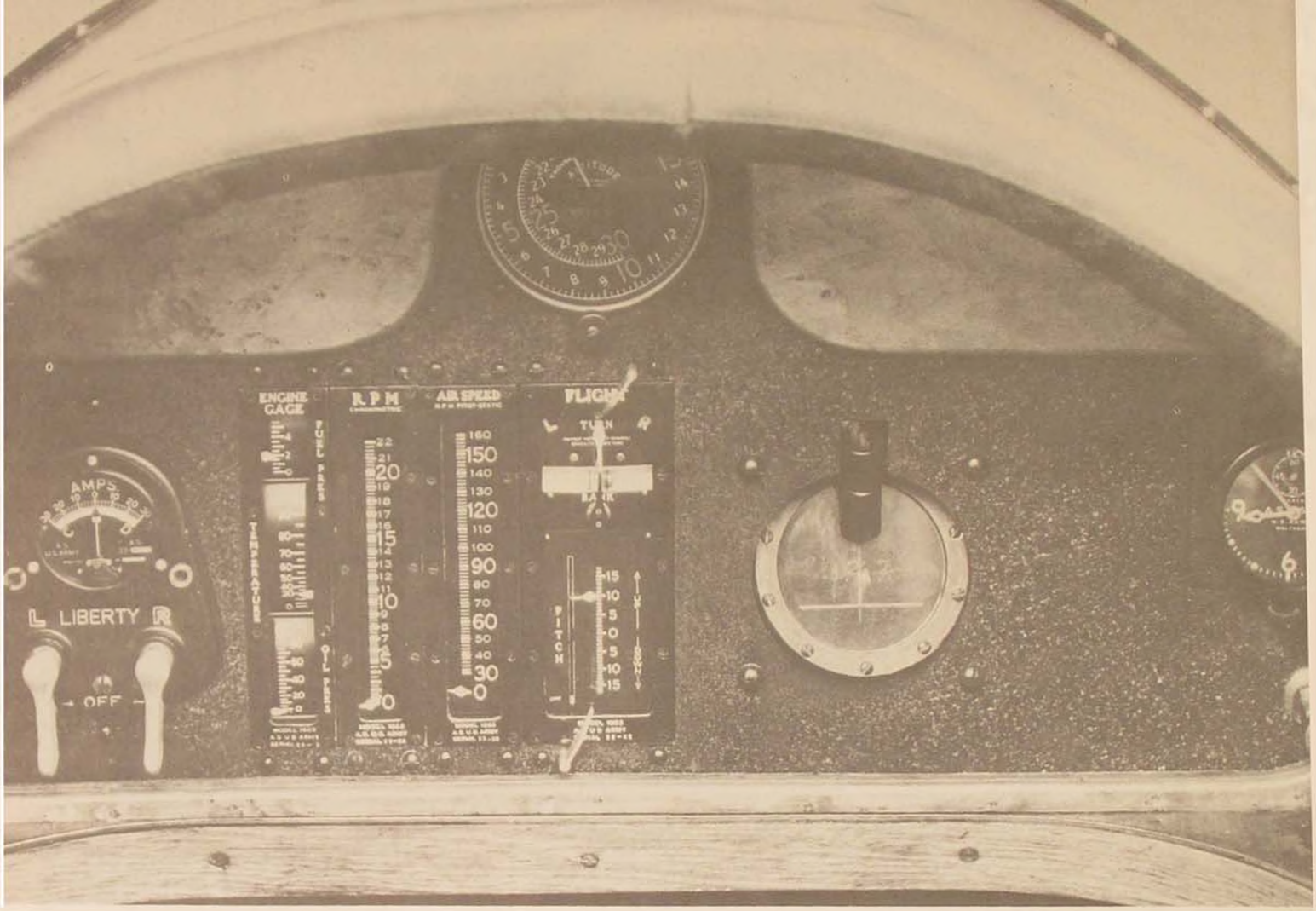
Propellers were subjected to whirling tests for endurance and destruction characteristics and for measurement of thrust, torque, and blade distortion at various speeds. Different woods were tested in a number of combinations and splices. The apparatus above could test propellers absorbing up to 1000 hp, 18 feet in diameter, and with speeds up to 3000 rpm. The rig at left used water spray to test the effects of rain and moisture on the spinning propeller.

Engine Test

Before an engine could be installed in an airplane it had to pass the Power Plant Laboratory's tests for fuel and oil consumption, friction, cooling, etc. A Liberty engine (right) is tested on the 400-hp Sprague electric cradle dynamometer that has auxiliary water brakes and a capacity of about 1000 hp at 1700 rpm. A single air-cooled cylinder is being tested in the laboratory (below), and in another section an engine is run on the torque stand to determine its horsepower, endurance, and torque or twist.







The Vertical Instrument Board

The first airplane instruments were scattered over a large instrument board, engine instruments being scattered indiscriminately among navigation instruments. The pilot's eye had to travel from one end of the board to the other in search of the information desired. By designing instruments with rectangular faces instead of the old fashioned round dials and putting several small instruments such as engine gages in single cases, it is possible to mount them snugly against each other, so that instrument boards are less than one-fourth their former size. They are also grouped properly, all the engine instruments being together, so that if the pilot's ears warn him that his engine is not functioning properly, he may learn his trouble at a single glance. They are set as far as possible flush with the board. This was not true of the old type boards, where the compass, especially, was responsible for much injury to the faces of pilots in crashes.

The flight indicator shown on the board is a bit of wizardry in the way of recent equipment development. When flying above the clouds, at night or in fog, cut off from sight of his only reference point, —the earth, this single instrument will give him three important pieces of information. The indicator at the top will tell him if he is turning off his course and whether his swerving is to the right or the left, the ball indicator will tell him whether his wings are horizontal to the earth or whether he is slipping dangerously into a bank, while the pitch indicator at the bottom tells him whether his plane is level or whether he is nosing up or down, and the degree of pitch.

When aviation was in its infancy it was thought a pilot could depend upon his sense of balance for such information. Now it is known that the senses of sight and balance work in conjunction and that the nerve centers along the Eustachian tubes respond to a false vertical when acted upon by forces other than gravity. In a loop or spin the sense of equilibrium is deceived and gives a false illusion of balance. Therefore without the flight indicator, the pilot going unconsciously into a loop or spin, might crash before finding the direction to pull out, should the clouds be low and show him the direction of the earth too late.

(Original caption, McCook Field, *circa* 1924)

feeling by members of the Director of Aeronautics' staff. Their comments indicate an immediate interest in who would be assigned to operate the school and the technical section rather than in the merits of the proposal itself. Bane received no definite answer to his request, but he was asked to send further plans and more detail as to just what the course would cover.

This he did. He submitted a proposed outline of instruction, prepared by civilian educators who were working as engineers at McCook Field. After various members of the headquarters staff had studied his proposals, Colonel Bane was informed that the school was being considered but that it could not be started until the future of the Air Service was determined. Since there was considerable uncertainty as to how many officers would remain with the Air Service after demobilization, realistic needs and training plans of the Air Service were difficult to formulate.

One might well wonder what the Headquarters attitude was toward immediate postwar training of Air Service officers and whether that attitude was in any way compatible with Colonel Bane's desires for an Air School of Application. Some light is shed on this matter by a memorandum from Colonel M. F. Davis, Chief of Training for the Air Service, to Major General Charles T. Menoher, Chief of the Air Service, dated 9 January 1919. In this memorandum, apparently prepared without knowledge of Bane's slightly earlier proposal, Davis pointed out that the emergency need for wartime intensive training was over. He also stated that time was now available to complete the training of the field officers in the Air Service in order to make them better qualified to assume their respective administrative and executive duties.

News of Colonel Davis' recommendation must have reached Colonel Bane at McCook Field, for on 3 February 1919 he had the correspondence relating to his request for the establishment of the school given to Colonel Davis for his consideration.

Colonel Davis found Bane's plan generally acceptable. He promptly recommended to General Menoher that a small class be started under Bane's supervision at the Engineering Division, McCook Field. General Menoher agreed with Davis' recommendation and directed that Colonel Bane be commended for what he had already done toward developing an Air School of Application and that he be informed that such a school was being looked on with favor and would be authorized in the near future.

At this point the remaining correspondence runs out. National Archives records pertaining to McCook Field contain no reference to the school from February until September 1919. At this latter date General Menoher wrote to the Chief of the Engineering Division, McCook Field, for a copy of the course to be given at the Air School of Application starting in November 1919.

There is, however, reason to suspect that a decision on the establishment of the school was made on or about 26 March 1919. Several of the principal pieces of correspondence are labeled "For filing purposes" on that date. One of these, a letter from Colonel Bane to General Menoher dated 15 January 1919, has written across it, "Air Service Engineering School of Application Approved. File for Reference. M.F.D." The file stamp is dated 26 March 1919.

Even though we are not able to pin down the historical date of approval for the school's establishment, we do know that the first class started on 10 November 1919. With this starting class of six officers—four colonels and two majors—one of our most important Air Force schools came into being. It came into being largely because one man recognized the need for such a school and had the imagination and initiative to do something about it.

The Air Force owes Colonel Thurman Bane a debt of gratitude for his pioneering spirit and actions in the field of Air Force technical education. The Air School of Application that he founded became the Air Service Engineering School in 1920. It was redesignated the Air Corps Engineering School in 1926, when the Air Service was raised to the status of a corps, and operated under this name

until after Pearl Harbor. In 1927 the school moved with the Engineering Division to the recently established Wright Field, where more extensive engineering facilities were being developed. The school was closed for a while during World War II, but a continuing need for such a school was soon recognized and it reopened in 1944 as the Army Air Forces Engineering School. In 1947, when the Air Force became an autonomous unit, the school was renamed the Air Force Institute of Technology, the name by which it is recognized today.

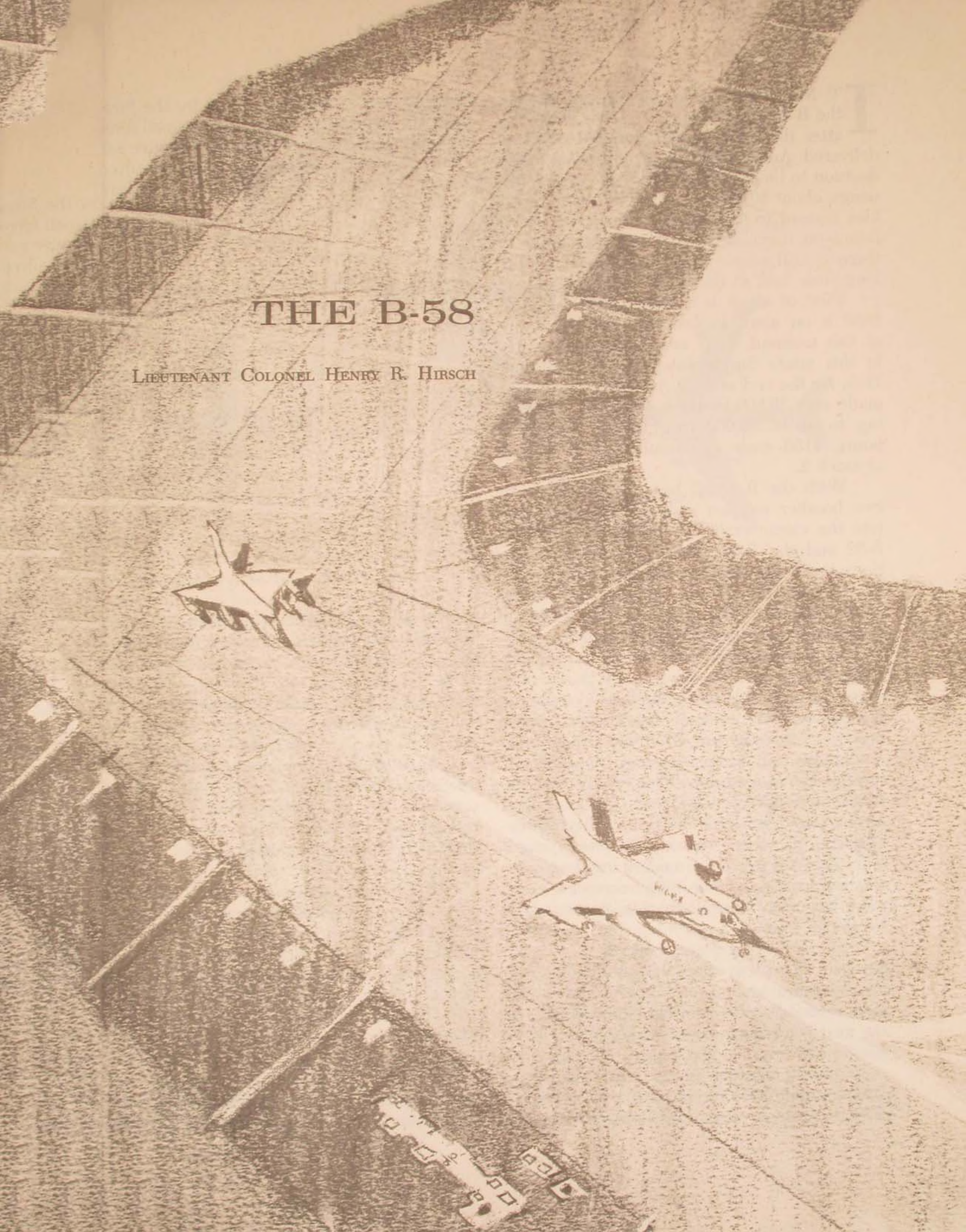
Hq Air University

Acknowledgment:

The author's sources for the historical facts included documents and histories held by the Air University Archives and the files of the Office of the Director of Air Service held by the National Archives. The illustrations are from albums in the Air Force Museum at Wright-Patterson Air Force Base and Air University Archives.

THE B-58

Lieutenant Colonel Henry R. Hirsch



IT MAY seem inappropriate to discuss the B-58 Hustler in detail some five years after the first combat-equipped one was delivered. And in the face of a firm Air Force decision to limit B-58 procurement to just two wings, about 80 aircraft, it might seem a good idea instead to look ahead to a more modern follow-on manned aircraft. All this granted, there is still ample justification for taking a long close look at the B-58.

First of all, it is a system in-being. The B-58 is on alert, loaded, and combat ready at this moment. It is employed significantly in this year's Single Integrated Operational Plan. By the end of 1963 Air Force crews had made over 10,500 flights in the B-58, amounting to about 53,000 flying hours. Of these hours, 1150 were supersonic and 375 were at mach 2.

With the B-47 all but phased out, only two bomber weapon systems are programed into the vague early Seventies. They are the B-52 and the B-58. These two bombers are the systems that will furnish the all-important "mix" of aircraft and missiles which Air Force leaders unanimously agree is a critical factor in maintaining a credible deterrent.

It must be faced that at this writing the Department of Defense has not made any selection of a follow-on manned system for development. Experience has shown that it takes between eight and ten years to bring a modern aircraft weapon system from concept to operational readiness. That means that the B-58 and B-52 are going to be the backbone of our mixed strategic forces into the foreseeable future. As the newer of the two systems and the better suited for modern low-level penetration techniques, the B-58 becomes a much more important aircraft than its few numbers would indicate.

In the second place, because it was designed primarily as a penetrator—in configuration, defense systems, and performance—the B-58 resembles, to some degree, what may be the next generation of manned bomber. If the Air Force buys an Advanced Manned Precision Strike System (AMPSS), it will fly an attack profile very similar to that of today's B-58 Emergency War Order (EWO) mission. Certainly the experience gained by the Strategic Air Command in operating its small force of highly sophisticated Hustlers will give SAC a valuable head start on the problems involved in keeping tomorrow's AMPSS force on at least 50 per cent alert.

concept of operations

The B-58 had its beginning in "GEBO II" (generalized bomber) studies which were conducted as early as March 1949. These studies had indicated that a supersonic bomber was feasible. On 8 December 1951, after consideration of further feasibility studies made by ARDC, General Dynamics (then Convair), and Boeing, the Air Force issued a general operational requirement (COR) for an aircraft with maximum penetration capability. This capability was to be ensured by a concept of small size (for low radar reflectivity), supersonic speed at high altitude, high speed at very low altitude, and both electronic countermeasures (ECM) and active defenses. Air refueling was to be required to attain intercontinental capability. Size, performance, and support were to be adaptable to operation from advance bases. Navigation and bombing were to be as automatic and accurate as possible. Reliability was a general requirement.

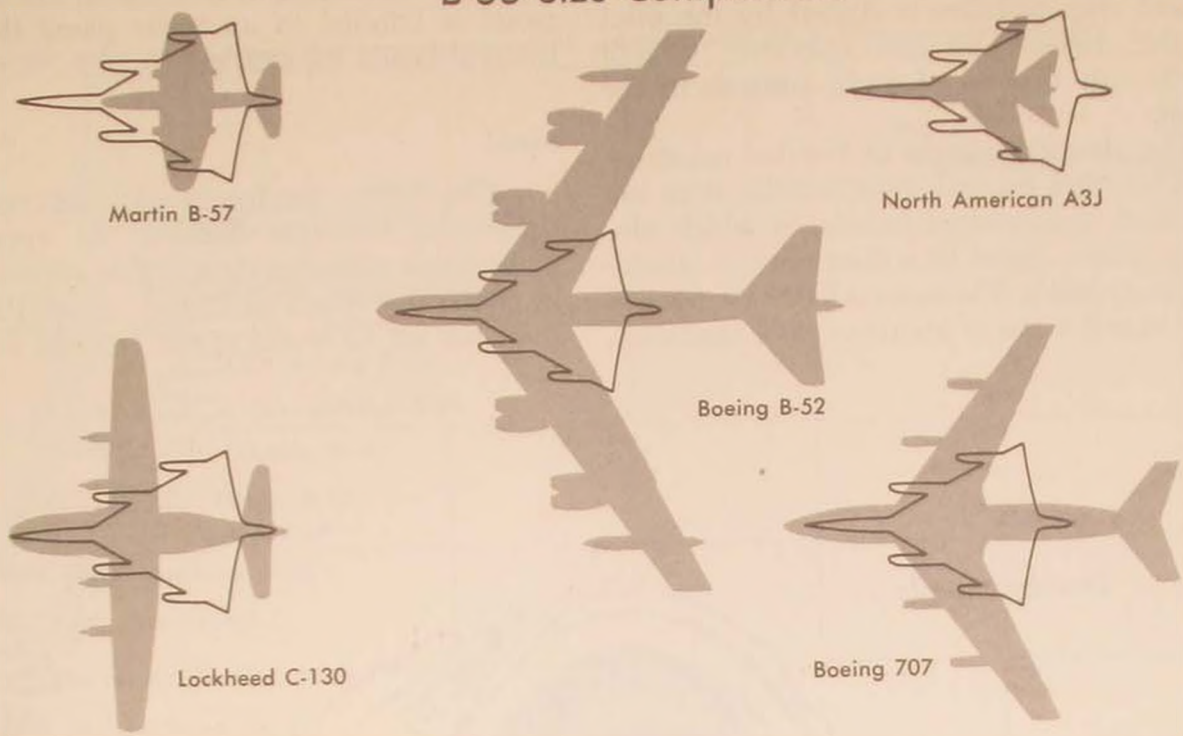
The B-58 configuration was carefully oriented to comply with these elements of the COR. In size, for instance, the B-58's span is one third that of the B-52; its length is about one half. This small size resulted in a radar reflectivity that is one tenth to one thirtieth that of a B-52 (depending on the angle of view).

The B-58's high aspect ratio, delta design, wing loading, control system, and arrangement result in a superior ride at low-level penetration altitudes. These factors, plus a responsiveness of the engines, make the B-58 one of the Air Force's easiest airplanes to fly and to refuel in flight.

general description

The small size of the B-58 is further shown in the chart. The Hustler's span is just 56 feet

B-58 Size Comparison



10 inches, its length 96 feet 9 inches, and its height to the fin tip 29 feet 11 inches. Its wing area is 1542 square feet, about the same as that of a B-47. Its designed take-off gross weight is 163,000 pounds, about three times its landing weight. This is a high mass ratio for a high-speed airplane.

It normally carries about 100,000 pounds of fuel. It can be refueled in flight to a gross weight of 176,890 pounds.

The aircraft is powered by four General Electric J-79 engines with afterburners. These engines were originally developed for the B-58, but they are also used by the A3D and F-104. They give the B-58 a take-off thrust of 62,800 pounds.

Basically, the B-58 is a two-component system. The upper component is a delta-wing aircraft, and the lower component is a center-line mounted pod containing fuel and part of the payload. The arrangement makes possible a very high density airplane. In fact, part of the fuel tank and all of the bomb bay are dropped before starting home, thereby reducing drag and weight.

The aircraft carries a three-man crew: pilot, navigator, and defense systems operator. Each of these crewmen occupies an encapsulated seat. This escape capsule constitutes a completely automatic survival system requiring no action on the part of the crew member from initiation of escape until safe landing. The capsule gives the crew member a pressurized "shirt-sleeve environment." It is capable of safe ejection from zero altitude at speeds of 100 to 300 knots and safe ejection at mach 2 from very high altitudes. Further, it has its own pressure system for safe descent and contains survival equipment and flotation gear for survival on land or water. In tests a man lived in a capsule for three days without assistance.

All prospective crew members must be "man sized" to the capsule before beginning crew training. Failure to fit the seat is cause to reject a would-be crewman.

Fuel comprises most of the B-58's internal volume and is carried in integral fuel tanks. In flight the pumping of fuel automatically changes the aircraft's center of gravity to trim

the aircraft for various airspeeds. Fuel management responsibility is shared by the pilot and the defense systems operator, though there is only one set of flight controls in the aircraft.

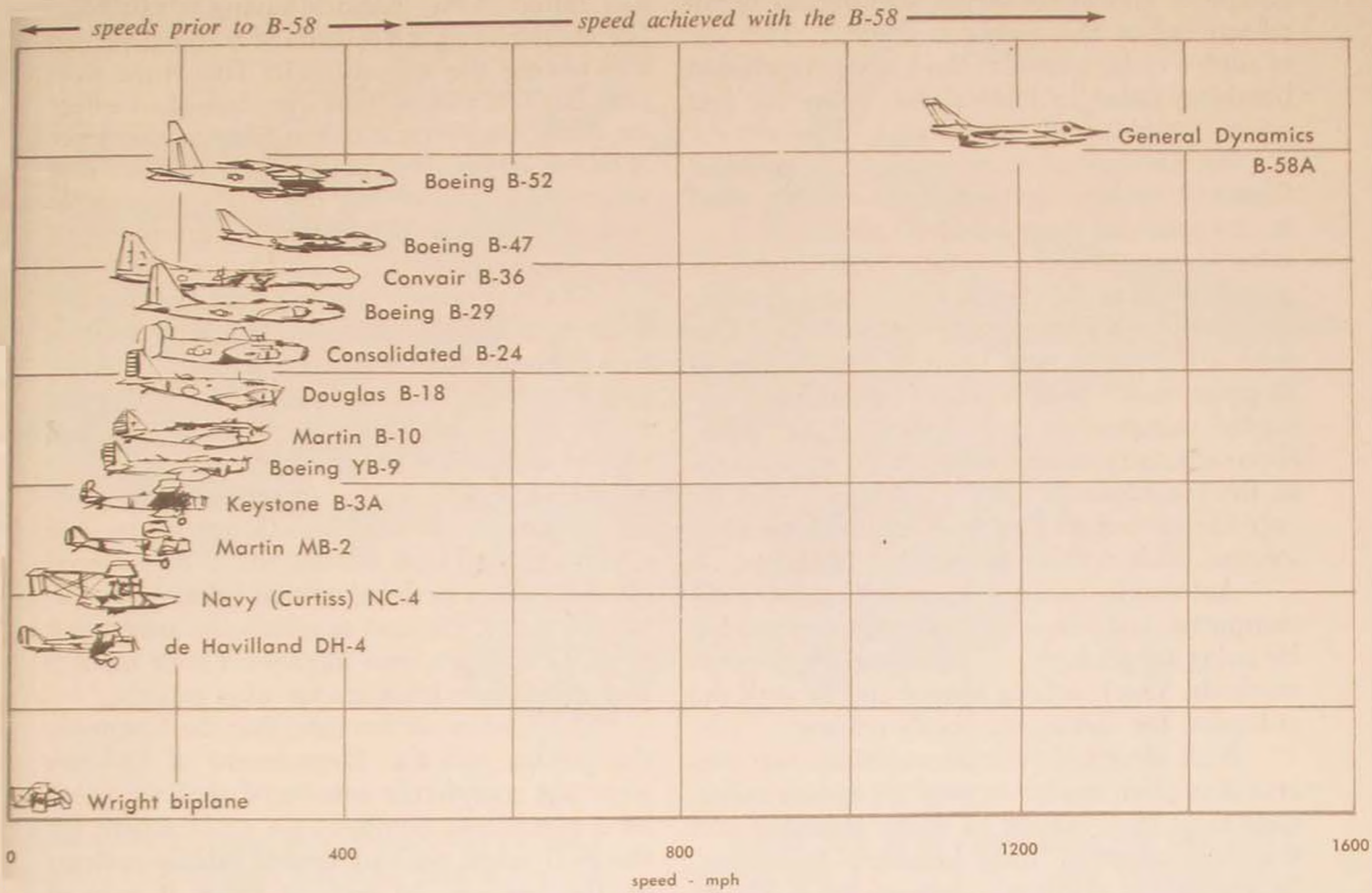
The aircraft's skin is of bonded construction. The wing fin and some nacelle skins are of bonded, sandwiched panels, in which aluminum skin is glued to a fiber glass or aluminum honeycomb. Elevons and the aft portion of the nacelles are of stainless steel sandwich. Fuselage skin is also of two layers. The smooth panel is bonded to an inner panel that has integral beads for stiffness.

speed

The B-58 is the free world's first and only supersonic strategic bomber. At very high penetration altitudes its speed is approximately twice the speed of sound. Since 1961 the B-58 has set 13 world speed records, flown in

Ejection capsule

Bomber Speeds



combat configuration by SAC combat crews. Five of these records were formerly held by the U.S.S.R. The B-58 has also won all major international awards. Most recently, on 16 October 1963, "Greased Lightning," a B-58 of the 305th Bombardment Wing at Bunker Hill Air Force Base, Indiana, flew an average of almost 1000 miles per hour from Tokyo to London, including five subsonic refuelings. The flight took 8 hours 35 minutes to cover 8028 miles. Besides setting world speed records the flight demonstrated that the Air Force, through the Strategic Air Command, could place a payload on any spot on the earth in just a few hours.

bombing-navigation and defense systems

The B-58 bombing-navigation equipment is called a Doppler-inertial-stellar system. It is a continuously computing analog dead-reckoning system with means for en route corrections using known fix points. Basic sensors for the computer are a stable platform of inertial elements to sense attitude and acceleration, a Doppler radar to sense speed and drift, and an astro or star tracker to provide heading. These have been developed and combined in such a mannner as to take advantage of the best features of each, resulting in an inherent overall accuracy on the order of ten times greater than that of previous navigation systems. A considerable advancement and simplification was made in Doppler radar techniques by going to Ku band continuous wave (rather than pulse), using fixed (rather than space stabilized) antennas.

The high-resolution Ku-band (16–17 kilomegacycles) search radar serves the double purpose of sighting on known fix points for

updating the present position given by the computer and direct target sighting for bomb release when this mode is desired. The use of such a radar provides the highest-resolution bombing radar in tactical use today for less space, weight, and frontal area.

An Integrated Computing, Display, and Control Unit ties together all the sensing units. It also provides many alternate modes of operation in case of loss or erratic performance of one. For example, should cloud cover render the star tracker unusable, magnetic heading from a flux-valve may be switched in; should Doppler radar indications of speed be interrupted, airspeed may be switched in. While these alternate modes may not be as accurate as the fundamental method, they are entirely capable of supporting the continuance of a mission, thus adding to mission reliability.

Automatic bomb release with accurately computed and corrected ballistics is provided by using target sighting, offset, or check-point methods. The bombing system ties in with the autopilot for automatic bomb release.

B-58 electronic countermeasures use several deceptive modes to confuse enemy radar. Generally they consist of noise jamming and the more selective "track breaking" technique. In addition to electronic devices, the B-58 also carries chaff. For active defense the defense systems operator controls a radar-directed 20-mm "Gatling" cannon mounted on the bomber's tail.

B-58 progress

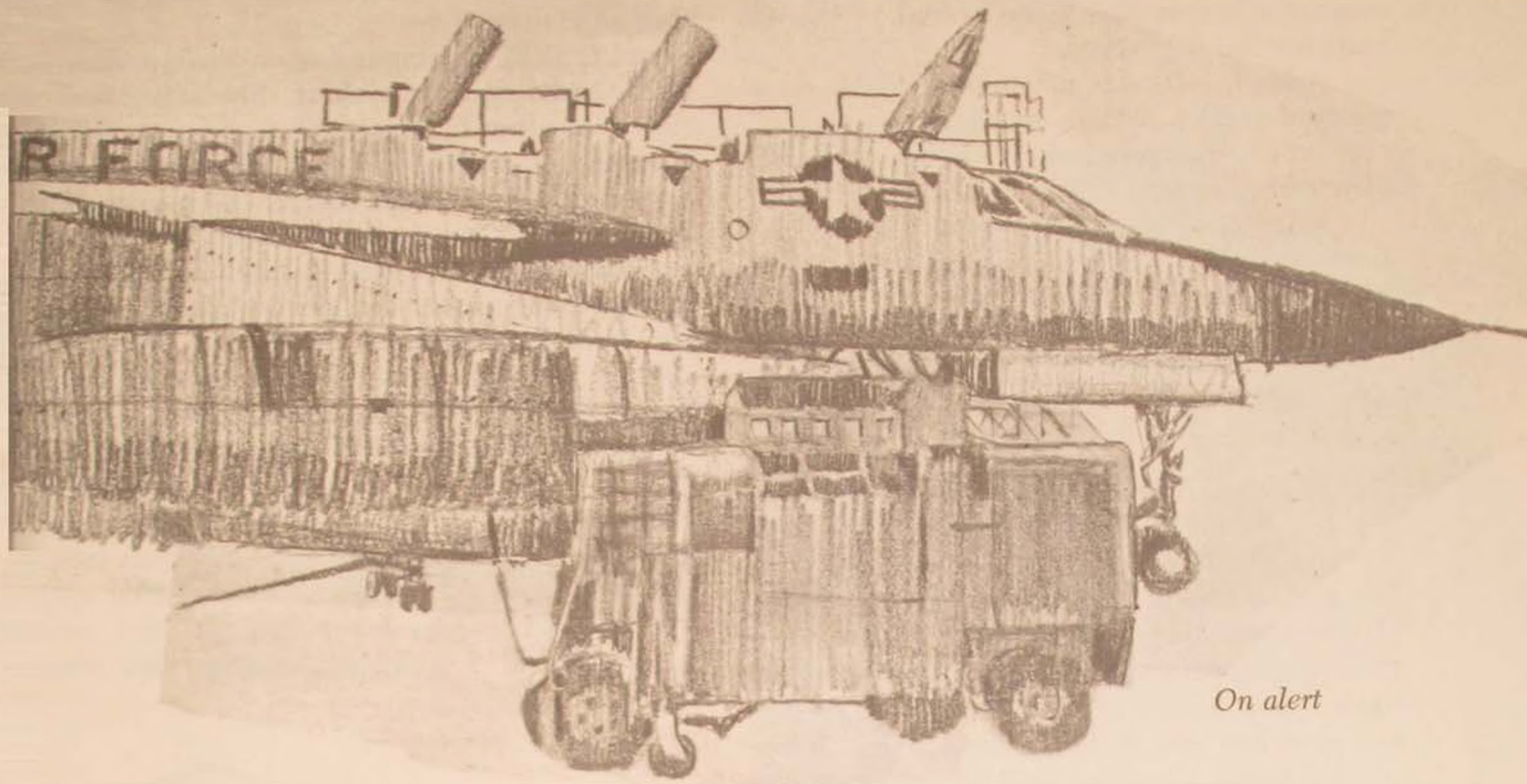
The development experience of the B-58 was typical of today's weapon systems. Its progress was controversial, erratically funded, and endlessly debated. However, the B-58 was the first strategic bomber developed under the integrated weapon system concept. This enabled the combat force to build rapidly after the first aircraft were delivered. For example, the 305th Bomb Wing received its first B-58 in May 1961. The wing was declared combat ready in August 1962 and went on alert in September 1962. Also the B-58 was the first aircraft system for which the Strategic Air Command played a major role in testing. When first given B-58's in August 1960, the 43d Bomb Wing, besides having a SAC combat mission, had the mission of training people and testing the new aircraft. This triple mission had an unfortunate psychological effect on some Air Force and SAC officers who were accustomed to receiving weapon systems that were thoroughly wrung out. SAC's early experience with the B-58 was full of frustration and disappointment.

Many people mistakenly expected the aircraft in its operational testing to be as trouble-free as the B-47 or B-52. It was not.

The B-58, because of its being developed at the same time as the early ICBM program, had to compete strongly in Congress for development funds. And, despite strong supporting testimony before the Congress by the Chiefs of Staff and others, the B-58 suffered several pauses in development because of dollar shortages. On one occasion the contractor continued on his own money for four months and in another instance for nine months.

It appeared at the time that the Congress, the public, and the Department of Defense were not completely convinced that we needed a supersonic bomber as a replacement for the B-47 when we had several missile systems on the horizon. In fact, at times it seemed that the Air Force was not so sure either. Our uncertainty about the weapon system is evidenced by the fact that we had not decided which command would fly the aircraft until December 1957, six years after the COR. A SAC configuration was not firm until March 1958, nor was an operational concept approved until later that year. The end result has been that in recent months B-58 procurement has finally been limited to two combat wings plus test aircraft.

It is generally believed that the B-58 was an expensive aircraft to buy. While it is true that the aircraft that were delivered cost more than the B-52, for example, the higher price was due largely to the small number of airplanes bought. B-58 production stopped at slightly more than 100 aircraft. Contractor estimates show the B-58 and B-52 cost per aircraft evening out at about 150 aircraft. At airplane number 200, the contractors believe the



On alert

flyaway cost of the B-58 would have been 1.1 million 1959 dollars less than that of the B-52.

achievements

Despite cost and controversy, however, SAC does have two wings of this remarkable bomber on alert today, and in their brief history as part of the Strategic Air Command they have acquitted themselves rather well. We have already discussed the B-58's fifteen world speed and altitude records and six aviation trophies, including the latest records established on Operation Greased Lightning in October 1963. It is interesting to recall also that the single B-58 entered in the 1960 SAC Combat Competition almost swept the board. This aircraft completed all missions 100 per cent, including night refueling and bombing from low and high altitude, and won the radar bombing trophy. The B-58 had the quickest reaction from ground alert—2 minutes 5 seconds—of any SAC aircraft in the competition.

It has also been established by test and exercise that the B-58 is a very difficult aircraft to detect, track, and intercept. Its facility at penetration more than satisfies the hopes for a high-speed penetrator voiced in its original COR.

In the course of its ten years of development, the B-58 lost some subsystems that would have broadened its capability. But in the same period it picked up a few, too.

On the plus side is the entirely new bombing-navigation system, pound for pound the finest system of its kind in the world. Its navigation accuracy is about ten times better than that of previous systems.

Ku band radar with its very high resolution was also pioneered in the B-58.

The B-58 ECM system was the first production use of track-breaking where the range gate of the tracking radar is captured and led away from the attacker.

The use of punch-tape programing for aerospace ground test equipment was initiated

for the B-58 program, and a punch-tape recorder for recording in-flight performance on combat missions was incorporated in the aircraft for the first time.

Added, too, was a voice-readback emergency detection system in which a soft feminine voice—prerecorded, of course—tells the pilot of impending equipment malfunction.

Since becoming operational the B-58 has also acquired a multiweapon capability. Periodic B-58 deployment to European and Far Eastern bases has become routine. So far the original 1951 COR has been satisfied and more.

deployment

The SAC B-58 force is divided between the 43d Bomb Wing at Carswell AFB, Texas, and the 305th Bomb Wing at Bunker Hill AFB, Indiana. Each wing flies about 40 aircraft. Under normal operations, half of them and their crews are held on ground alert at all times. The remaining crews and aircraft fly SAC exercises and training missions.

In recent months the B-58 has been performing with distinction. An extensive modification program and a growing backlog of maintenance experience have produced an aircraft as reliable as any in the Air Force. Stock B-58's are flying every 24 hours on 6- to 8-hour training missions. The three TB-58's assigned to each wing for pilot instrument training fly shorter missions daily.

Thousands of simulated bomb drops against fixed and mobile radar bomb scoring units have verified the very small circular probable error (CEP) of this aircraft at both low and high altitudes.

Crews like the B-58. It handles very smoothly in flight because of its delta wing and excellent flight control system.

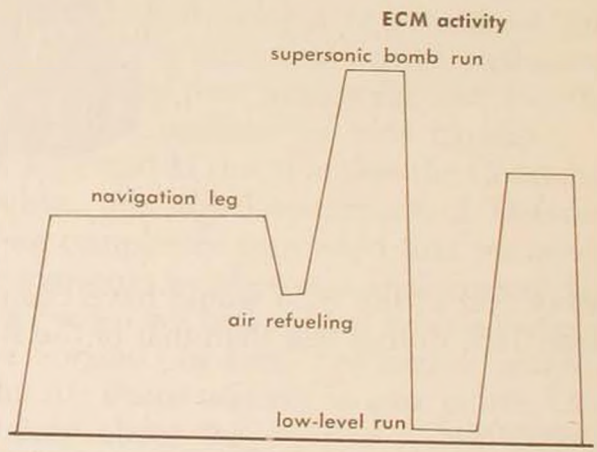
SAC flight training missions approximate as closely as possible the actual profile of an EWO mission, while satisfying the command combat crew and wing training requirements.

Each training mission usually contains navigation legs, a refueling, and one or more radar-scored simulated bomb drops from either high or low altitude. A training mission may also include a supersonic leg down one of many FAA-cleared supersonic corridors. Such missions are flown in all weather, day and night.

A typical training mission profile is shown in the accompanying chart. Operating from either Bunker Hill or Carswell, SAC B-58's have the capability of flying this kind of profile effectively against U.S.S.R., satellite, and China targets. EWO missions differ from training missions in that they may use buddy refueling and an overseas recovery base.

It is expected that the B-58 would be among the first ground-alert aircraft over hostile targets. The basic penetrative talents of the aircraft could be augmented by using its multiweapon load for defense suppression or by teaming with other aircraft in a "roll-back" attack.

Typical B-58 Training Mission Profile



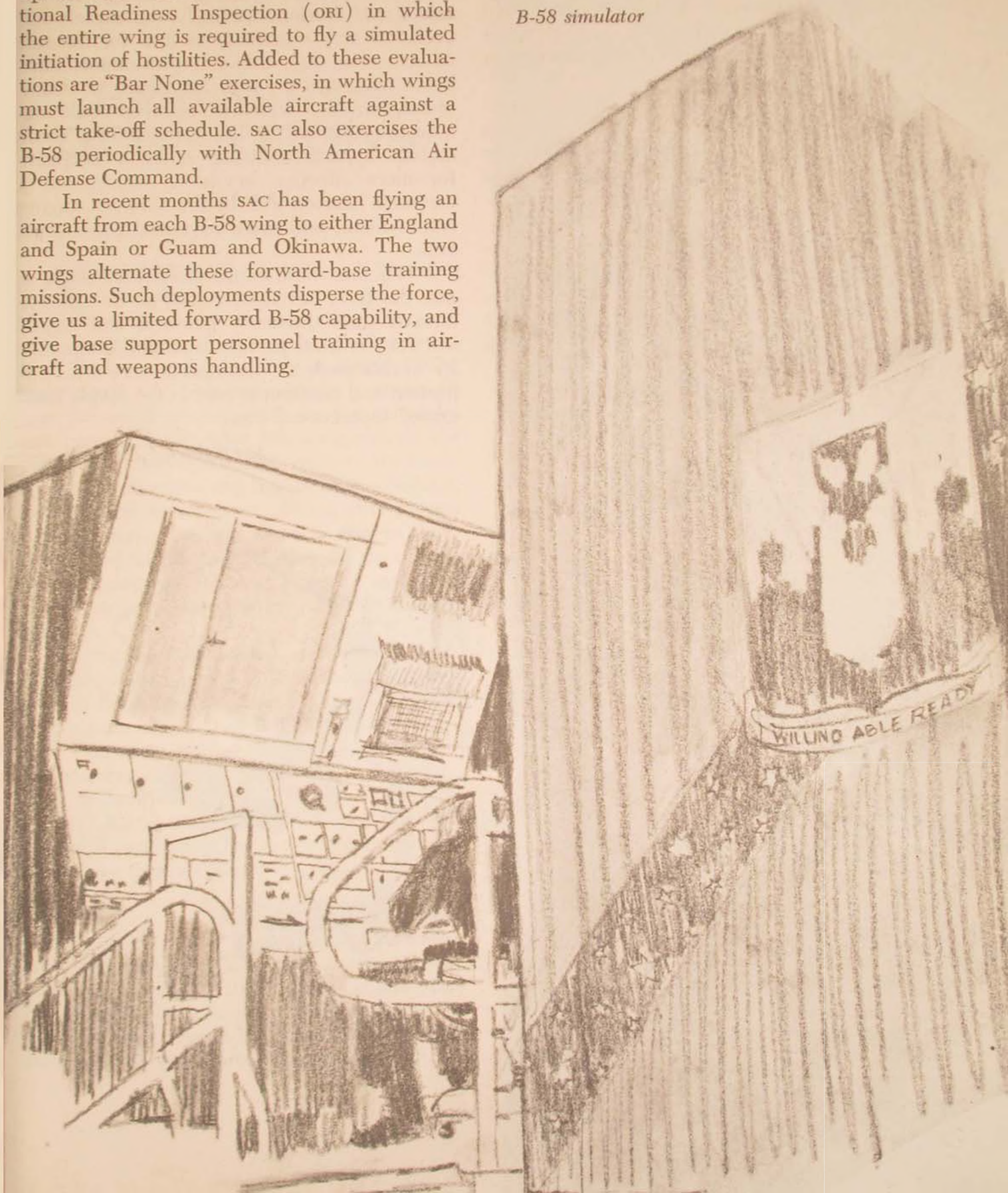
B-58 ground survivability is improved in SAC operations by use of the quick-reaction capability of the aircraft in the ground alert plus use of a minimum-interval take-off technique in which aircraft follows aircraft down the runway only seconds apart. Regular evaluation has demonstrated that the B-58 force can be airborne well within the warning period expected from the Ballistic Missile Early Warning System.

Wing combat readiness is monitored constantly. All combat-ready crews are subject to regular standardization and evaluation checks

by the SAC Combat Evaluation Group. The well-known SAC management control system applies to B-58 units as well as to all other SAC units, both missile and aircraft. SAC backs up the MCS with an annual no-notice Operational Readiness Inspection (ORI) in which the entire wing is required to fly a simulated initiation of hostilities. Added to these evaluations are "Bar None" exercises, in which wings must launch all available aircraft against a strict take-off schedule. SAC also exercises the B-58 periodically with North American Air Defense Command.

In recent months SAC has been flying an aircraft from each B-58 wing to either England and Spain or Guam and Okinawa. The two wings alternate these forward-base training missions. Such deployments disperse the force, give us a limited forward B-58 capability, and give base support personnel training in aircraft and weapons handling.

B-58 simulator



Crew training is limited by the requirement for a 50 per cent ground alert and complicated by the aircraft crew arrangement. There is no room in the aircraft for a flight instructor or evaluator, so most combat crew training is conducted in three-station flight simulators. This simulator can train men for individual crew positions or be tied together as a crew procedures trainer.

The pilot's simulator station is unusual in that the simulator cockpit actually pitches and rolls in relation to aircraft attitude. The navigator's simulator permits feeding the student actual electronic-scope returns that simulate any desired track.

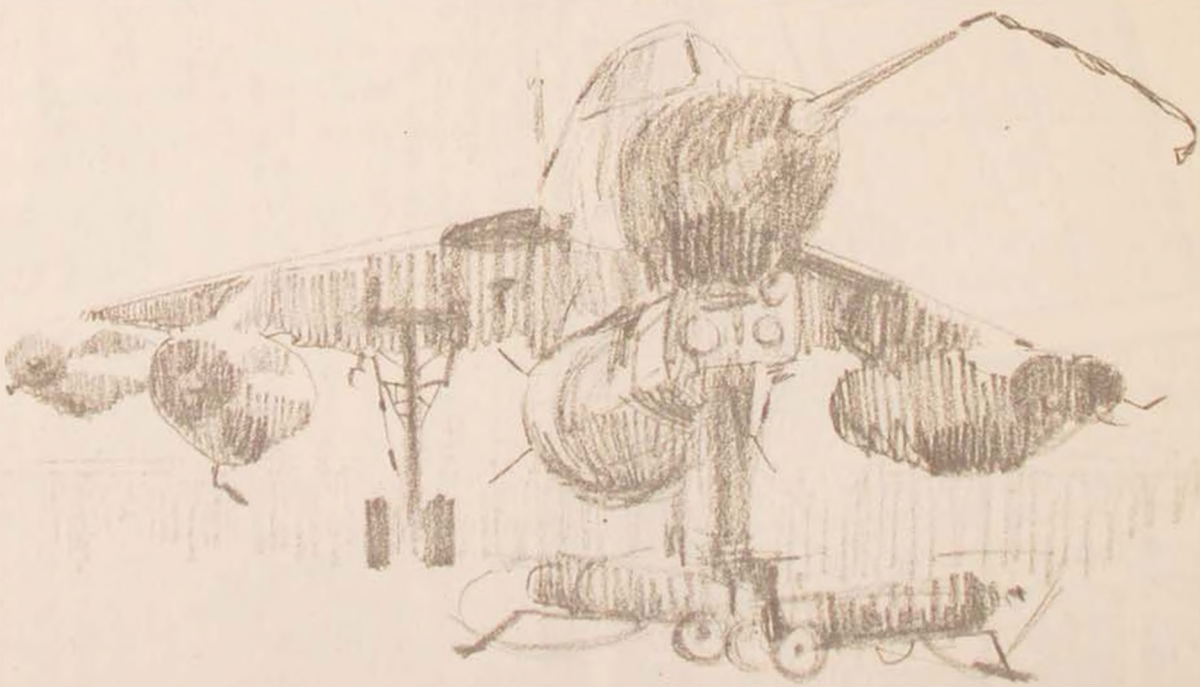
Additional pilot instrument training beyond the simulator is accomplished in the TB-58 aircraft, which has a tandem crew station, behind the pilot, for an instructor pilot. The navigator station is eliminated. Each wing owns three of these training aircraft.

future employment

The future of the B-58 is fairly well fixed. The existing two wings will continue as part of SAC's mixed force into the Seventies. No more of these aircraft are scheduled to be purchased. The last production B-58 was delivered in November 1962. Although further minor modifications are likely, the aircraft will probably stay essentially as it is for the rest of its useful life. Some improvements have been requested by the Strategic Air Command, however, which if approved could significantly add to the B-58's capability. These include terrain-following radar—a necessity for more effective low-level penetration; a cartridge starter, for better forward-staging employment; and more advanced penetration aids.

Whether these improvements are made or not, the B-58 has shown itself to be a better aircraft than the early planners had hoped for. Its low-level performance and adaptability to this mode of penetration give it an important and continuing role in the Single Integrated Operational Plan.

Hq Strategic Air Command



B-58 WING OPERATIONS

DON SMITH

AT APPROXIMATELY 1600 each Thursday afternoon an important event occurs within every Strategic Air Command wing. At that time, as required by SAC Regulation 60-9, "Planning and Scheduling of Aircraft/AGM Utilization," SAC base reproduction sections all over the world print a small sheaf of schedules that predict exactly what the wing will do the next week. These thin stapled volumes, the weekly aircraft utilization and maintenance schedules, represent the management concept that governs the operation of all SAC weapon systems, both aircraft and missile. In brief, they are the instructions for mounting the most powerful and ready alert force in military history. And this includes the B-58.

Flying the B-58 presents a unique problem. It is unique because the B-58 is the free world's only mach-2 strategic bomber. At this moment the trophy cases of SAC's two B-58 wings at Carswell AFB, Texas, and Bunker Hill AFB, Indiana, hold almost every major aviation award in the world. They include the Bendix Trophy, Thompson Trophy, Blériot Cup, Mackay Trophy, and the Air Force Association President's Trophy. In winning these trophies the B-58 has set 13 world speed records.

Operating a combat wing of B-58's seemed a task almost beyond accomplishment when SAC crews first began formal training in them in May 1960. Today, after minor modification and years of mastering the subsystems, each B-58 can be flown regularly every other day. It is not unusual for one TB-58 to fly three missions in twenty-four

hours. Some SAC maintenance people believe it will soon be the most reliable aircraft in the command.

The way SAC operates all its combat operational wings is unique in the Air Force. The SAC operations concept is built on the need to keep 50 per cent of all combat-ready aircraft on ground alert or airborne alert training 24 hours a day. While on alert, SAC's aircraft cannot receive scheduled maintenance, nor can they fly training sorties. While on alert, combat crews cannot fly proficiency or training missions. In effect, a SAC wing's alert force is detached from its parent wing and assigned to SAC headquarters.

How, then, can a combat wing operate with a large portion of its key resources unavailable? Also, how at the same time can the combat wing conduct special training projects and overseas reflex, which are rotated among all SAC units? The answers to these questions and the procedures that produce the required satisfactory performance make SAC wing operations unique in the Air Force.

First of all, a SAC combat wing is organized for ready combat capability. The SAC wing commander is a combat commander. He is directly responsible for the operation and maintenance of his crews and aircraft. The commander of a separate combat support group is responsible for all base support activities. The B-58 wing commander, for instance, is primarily concerned with bombing, not transportation or personnel services. These services are part of the concern of his combat support group commander, the nominal base commander.

Each SAC wing commander has a closely coordinated pair of deputies who oversee the two key elements in his wing's combat capability. They are the deputy commander for operations (DCO) and the deputy commander for materiel (DCM). The staffs of these men marry the wing's resources to the Emergency War Order (EWO) tasks laid on by the Defense Department through Hq SAC. The symbol of their successful union is the weekly schedule.

wing scheduling

The system works this way. To accomplish its EWO mission, the wing requires a given number of certified combat-ready crews. Before a crew can be certified, it must demonstrate unquestioned ability to perform the multitude of complex tasks associated with safely and reliably putting a nuclear weapon on a target. Add to this requirement that of launching half a wing of multiengine jet bombers in less than 15 minutes. Bringing crews to this state of readiness requires considerable training in the classroom, in pilot, navigator, and defense-systems-operator simulators, and in the air. Once certified, a crew must continue its combat-ready status indefinitely through continuous ground and flight training.

How much training? What kind? The answer for each weapon system is contained in one of the volumes of SAC Manual 50-8 on training. This manual describes in detail the exact skills required and the level of proficiency required for the entire wing and each individual crew member. It specifies what type of training sorties will be flown and what they will accomplish.

The primary task of the wing deputy commander for operations is to ensure that combat crews maintain EWO readiness through SACM 50-8 training. He has two limitations: first, almost one third of his crews are always on alert, and they as well as the remainder are men with normal physical and mental limits. The average combat crew member works approximately 72 hours per week. With his 50-8 requirements in mind, the DCO and DCM must then turn to SAC Regulation 60-9, their scheduling guide. It tells the DCO to plan his training and other wing operations at least six months in advance. His plans must become more detailed at three months and even more detailed one month in advance. Finally, by the afternoon of the Thursday before the scheduled week, the schedule is printed and includes specific crews, aircraft tail numbers, take-off times, call signs, and every other detail of the week's flying.

How does the wing deputy for operations plan his crew training in such detail so far in advance? SAC Reg 60-9 tells him exactly how many and what types of sorties he must fly in a year. Based on this anticipated need, the wing asks its parent numbered air force to authorize enough flying hours to accomplish its required tasks. The flying hours allocated to the wing are also the reference point for fuel, oil, and lubri-

cant procurement, supply levels, and other hard-core support.

His flying hours authorized, the DCO now asks the DCM for enough sorties to fly the wing training requirement. Thus over the six-month planning period the DCM can plan maintenance activities so that sufficient aircraft will be ready to meet training requirements.

As the planning period gets shorter, crew availability is coordinated with aircraft availability and wing commitments. By 1600 every Thursday the scheduling people from DCO and DCM have made the trade-offs and compromises necessary to print a hard schedule for the next week.

While this same operations concept is generally followed by other Air Force commands, the pressure of such a system is more severe in SAC than in other commands. Maintaining continuous alert, the complexity of the hardware, the intricate combat crew coordination, the rigorous top-level command and control that shapes the Strategic Air Command—all place extra stress on SAC wings. The SAC wing commander is, for instance, more closely evaluated than other wing commanders. He is given less flexibility in his operation than is given in some other commands. A familiar saying in SAC is that there is no difference between an unlucky commander and an ineffective commander: their product is the same.

operations and training

The 43d Bombardment Wing at Carswell was the first B-58 wing in SAC and today flies approximately 40 of the supersonic Hustlers. The 305th Bombardment Wing at Bunker Hill AFB flies the same number. To fly these aircraft, each wing keeps over 70 crews certified as combat ready. A normal duty assignment for a crew is between three and five years. Accordingly the wing training program is designed to add three combat-ready crews to the wing each six-month period. It normally takes about six months of training to bring a crew to combat-ready status. New crews, built from other SAC units, are comprised of experienced top men, personally endorsed by their old wing commander.

SAC continually evaluates the wing's reliability by a stringent crew standardization/evaluation program and four no-notice exercises a year. One of these programs, the Operational Readiness Inspection, simulates an EWO strike and is conducted by the SAC Inspector General. In "Bar None" exercises all the wing's aircraft and crews fly against an unfamiliar target according to a strict preset time schedule. The combat evaluation group also makes both scheduled evaluations of crew proficiency and no-notice spot checks several times each year.

These sorties, like all SAC training sorties, simulate as closely as possible an actual EWO mission profile. They include both high- and low-altitude navigation problems, aerial refueling, and simulated bomb drops. The accuracy of the bombing is plotted by a SAC radar bomb scoring unit mounted on a railroad train. The location of SAC's several "RBS Express" trains is changed at random every six months. If a B-58 sortie includes a supersonic leg, this must be flown over a specified corridor cleared for such flight by Hq USAF and the Federal Aviation Agency.

Because of the high percentage of aircraft on alert and the tight proficiency flying schedule, considerable use is made of a B-58 flight simulator. The simulator contains all three crew stations —aircraft commander, navigator, and defense systems operator. Simulator crew stations can be used separately or integrated. As there is no room in the B-58 aircraft for an instructor pilot, crew standardization evaluation is usually performed in the simulator. Although each wing owns three TB-58's with the second station outfitted as an instructor pilot seat, the upgrading training load allows combat-ready crews only a minimum of flying in these aircraft.

Most ground training, including positive control procedures evaluation and EWO mission study, is performed while crews are on alert.

The normal alert schedule places each crew on a seven-day alert tour every three weeks. During this tour, Carswell crews live together in a converted barracks close to the flight line. Approximately once each tour a no-notice scramble sends the crews to their aircraft in a check of their reaction time.

maintenance and supply

About 1500 men are assigned to maintenance activities in the 43d Bomb Wing to keep its two-

score aircraft available for scheduled sorties. Because of the honeycomb-type aircraft structure, field maintenance requires a high percentage of fully qualified personnel. Three maintenance men are assigned to each aircraft. The special problems emerging from the aircraft's unique fuel and weapons pod are assigned to a separate Munitions Maintenance Squadron. The complex subsystems and unusual configuration of the B-58 call for a variety of special ground support equipment.

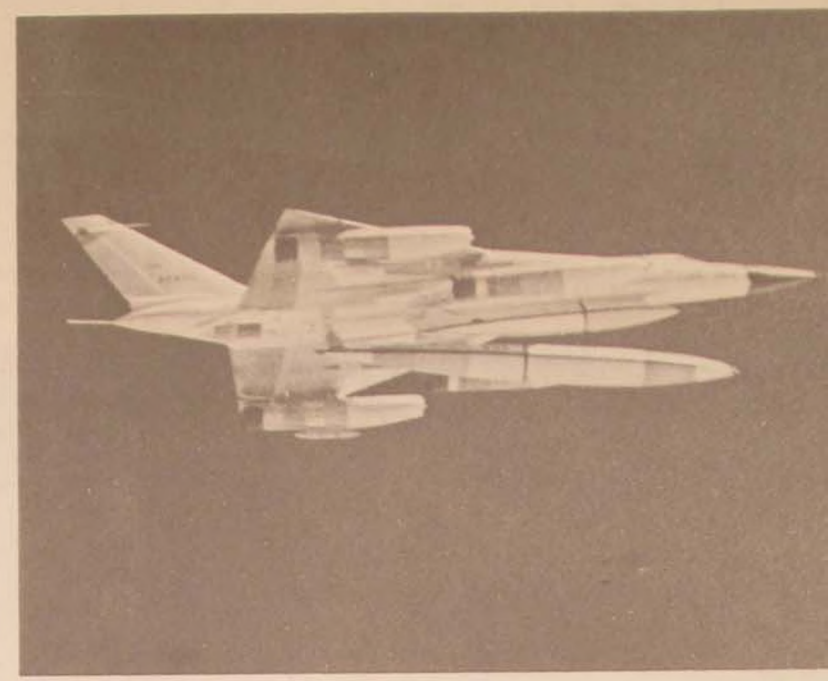
Maintenance of the B-58's armament and electronics is especially critical because of the fine tolerances required for proper operation of its Doppler-inertial navigation and guidance system and advanced bombing and navigation system.

THE B-58 is well integrated with the SAC mixed force. Its great bombing accuracy, stable high- and low-level flight characteristics, mach-2 dash capability, and proved reliability make it a valuable deterrent asset. This high-speed bomber is particularly flexible and foreshadows manned weapon systems of the future.

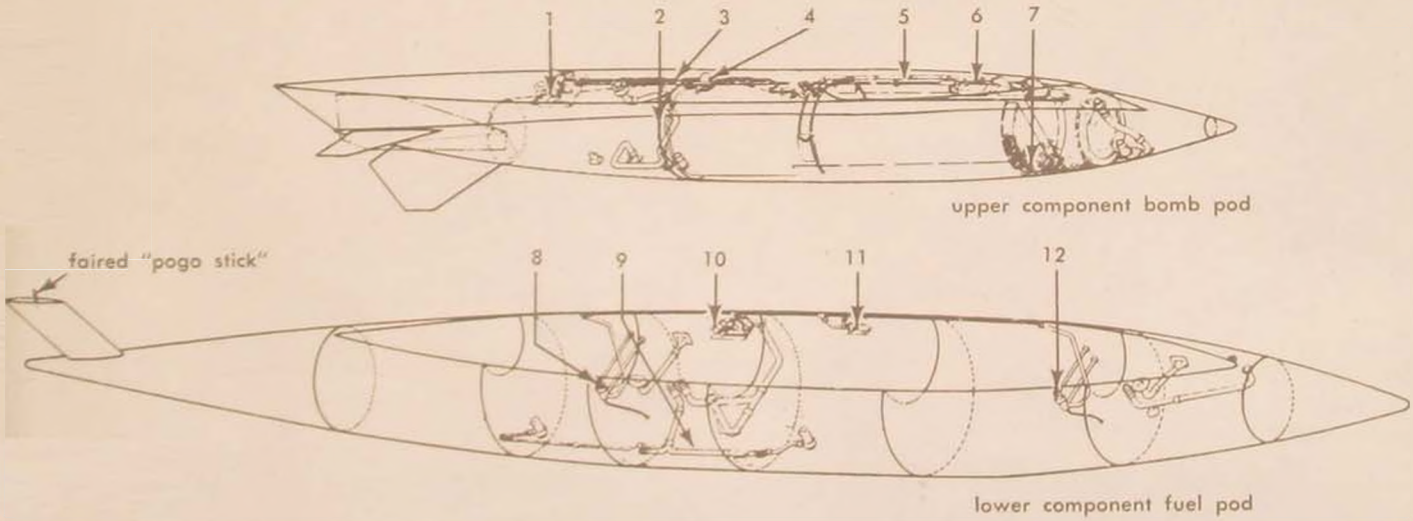
Keeping the B-58 combat ready has proved to be well within the capability of the Strategic Air Command. More advanced future weapons should similarly pose no problems more difficult than those already solved in SAC's 18 years of mixed-force employment.

Hq Strategic Air Command

In the daily "stand up" briefing, the B-58 bomb wing commander is informed by his deputy for materiel and deputy for operations as to the status of the wing and the next day's scheduled operations. Operations and Materiel must schedule combat crews and aircraft up to six months in advance to ensure efficient use of wing resources.



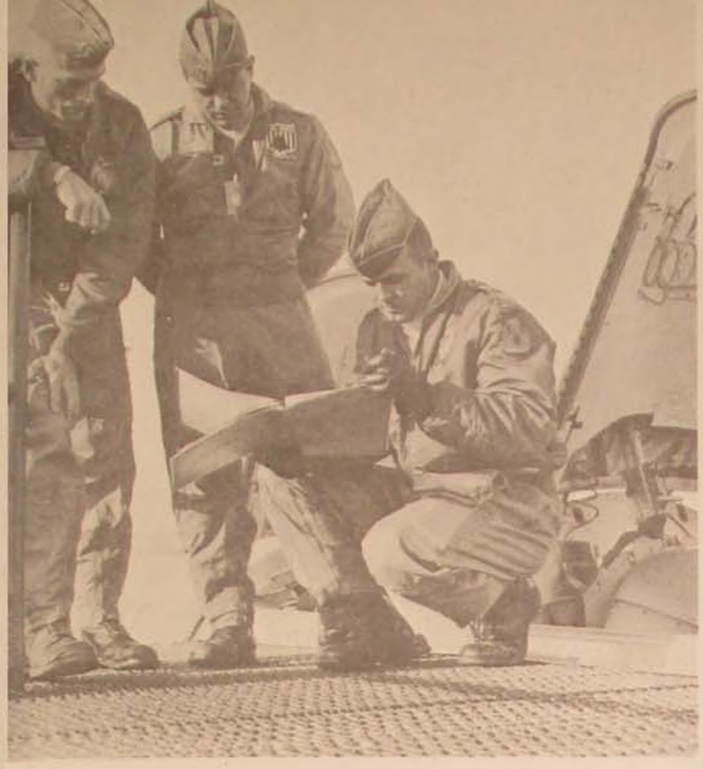
A Strategic Air Command B-58 Hustler jettisons its fuel pod component during supersonic flight. The streamlined aft end of the pod remains attached to the aircraft by a faired "pogo stick" until the pod has assumed a nose-down attitude, to stabilize it in that attitude. With only the smaller armament pod remaining, the B-58 dashes to its target at speeds well over 1300 mph and altitudes over 60,000 feet. Pods can also be dropped from low level when the Hustler hugs the deck to avoid enemy radar. Pod drop tests are conducted at Kirtland Air Force Base, New Mexico. When the two-component pod is joined, the upper armament pod nestles halfway into the fuel pod.



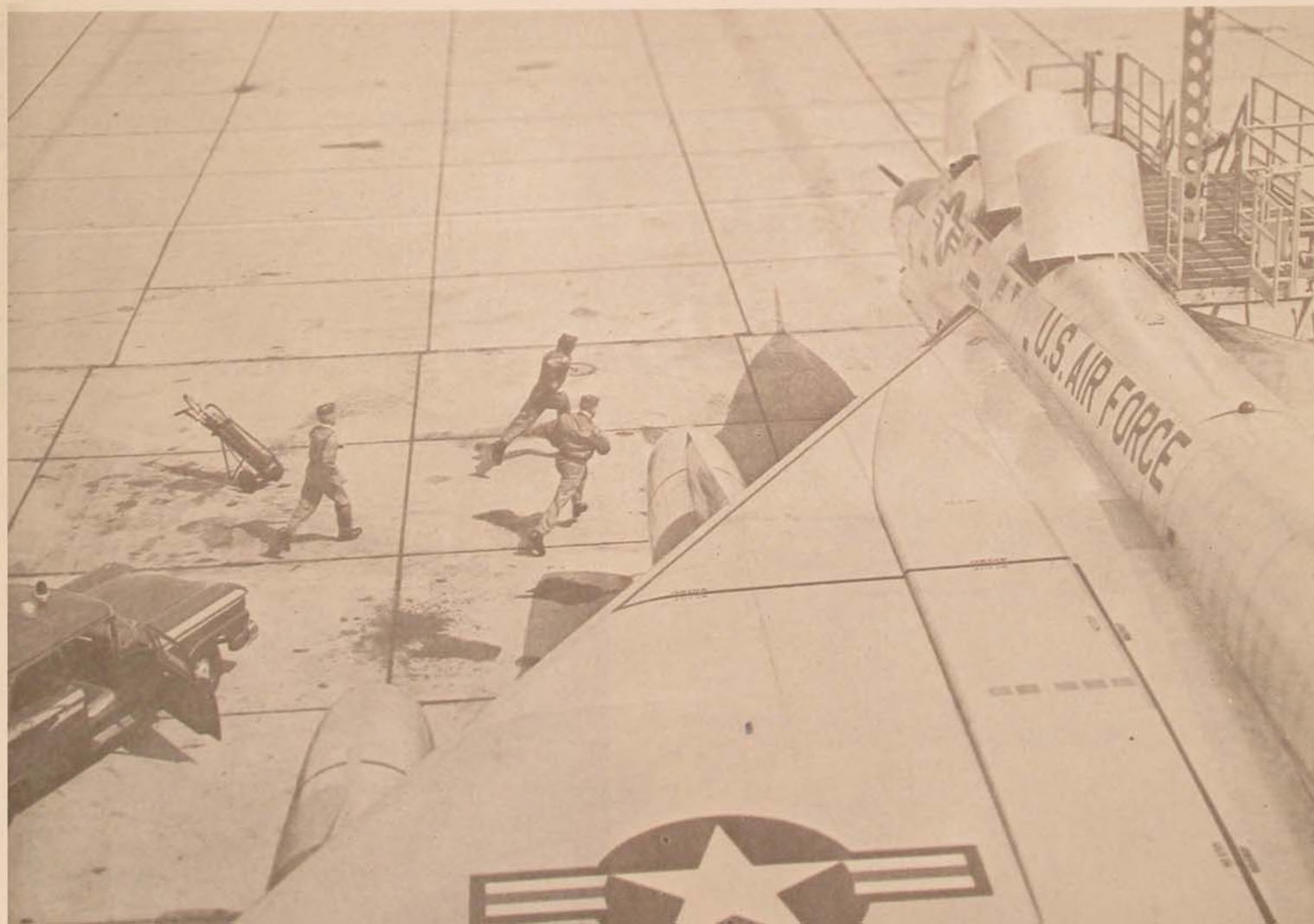
1 gas generator for hood release actuator
2 shaped charge ring
3 explosive disconnect
4 cartridge-actuated cutter
5 forward hook actuation rod
6 electrical disconnect
7 filler
8 aft releaser
9 fuel line
10 electrical disconnect
11 gas generator
12 forward releaser

Training Flight

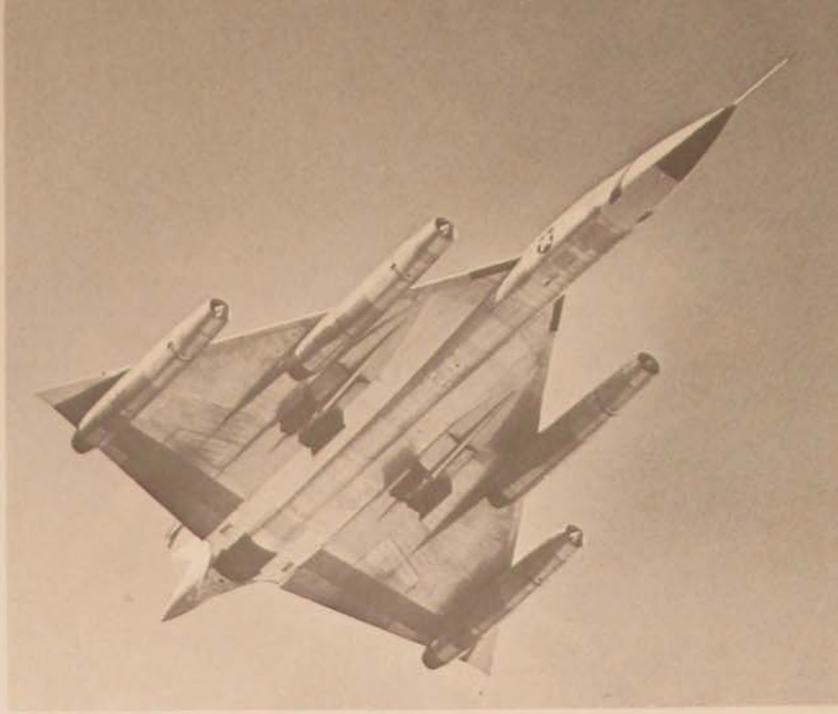
B-58 crews in training spend as much as a day planning a single mission. The mission itself may last six or seven hours.



A combat crew of the 43d Bomb Wing, Carswell AFB, Texas, checks the mission profile preliminary to a training flight (above). An alert crew races to its ready aircraft. Half of SAC's aircraft and crews are on alert 24 hours a day. They can be airborne within the 15-minute warning given by the Ballistic Missile Early Warning System.



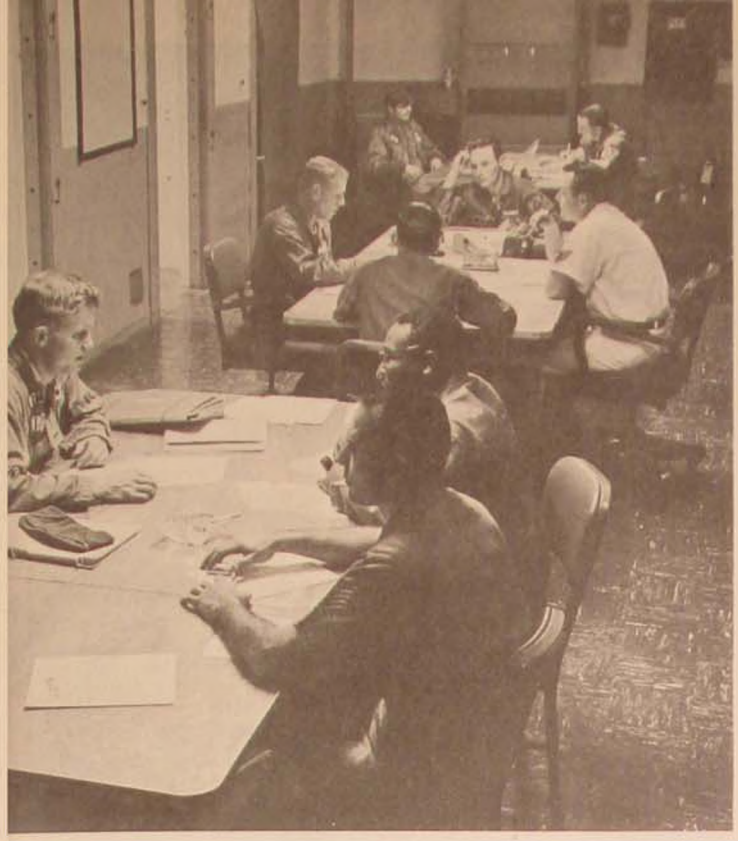
B-58's, like all SAC combat aircraft, continually practice minimum-interval take-off (MITO). This technique, with take-offs as close as 15 seconds apart, gets bombers into the air in double-quick order and speeding away from surprise missile attack.



The trainer version of the B-58. Almost identical in appearance, the two are different in that only the TB-58 can be flown either by the pilot trainee in the first station or by the instructor in the second station.

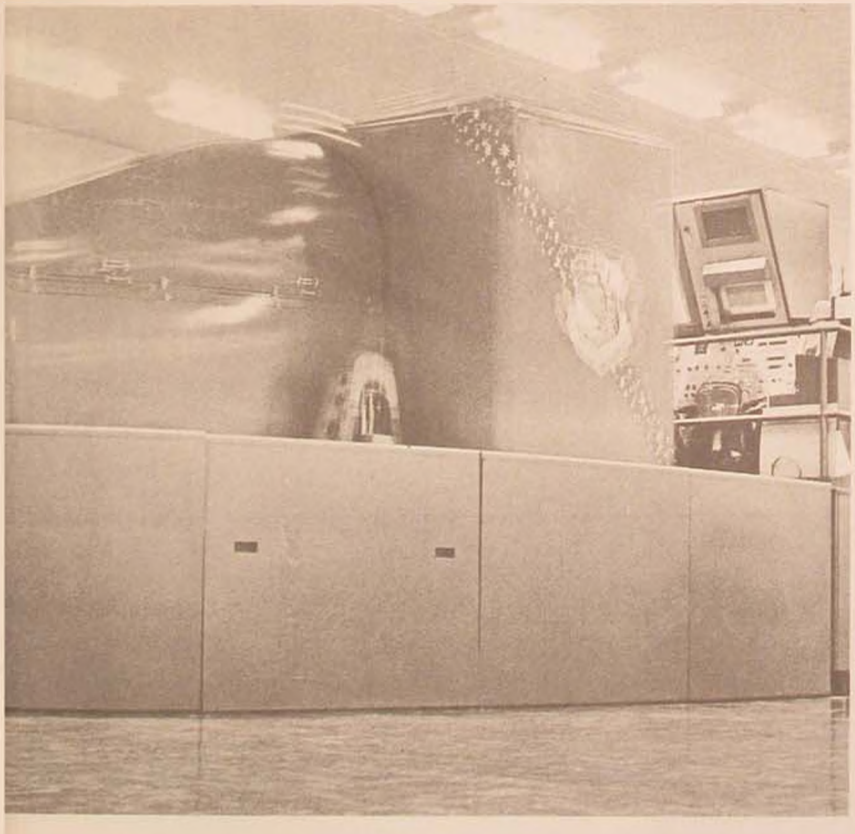
Most B-58 training missions have at least one leg of low-level flying. The delta wing gives the B-58 an unusually smooth low-altitude ride at speeds just under the speed of sound. All supersonic flight is at altitudes above 30,000 feet. A B-58 (below) touches down after a training mission. Drag-chute deceleration saves brakes and tires.

Returning from a 7-hour training flight, a B-58 crew is met by instructors and an organizational maintenance debriefing team. The crew proceeds to a special debriefing room for an hour's interrogation and discussion of aircraft performance.



By interrogating the crew, SAC maintenance technicians identify any equipment malfunction that occurred on the flight. They pass the information to Maintenance Job Control, which then schedules any maintenance necessary to place the aircraft on flying status again.

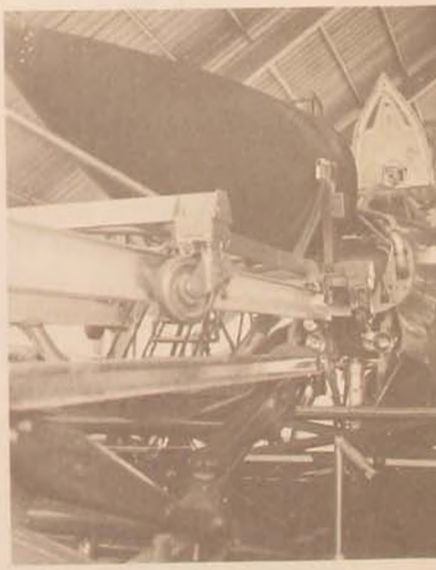
There is an individual simulator for each of the three crew stations in the B-58. Only the pilot's simulator (left) actually pitches and rolls as the aircraft does in flight. Crew training can be conducted for each station separately or by integrating them. Three combat crew members (right) are evaluated by tape-recorded examination on their ability to interpret communications they may receive in flight. SAC B-58 crews complete most of their ground training while standing a 7-day ground alert tour.



Maintenance

Maintenance Job Control monitors all regularly scheduled and emergency maintenance. Experienced NCO's tell at a glance the maintenance status of each B-58 in the wing.

Alert aircraft of the 43d Bomb Wing at Carswell wait under floodlighted flight-line shelters while high-priority spare parts are unloaded from an Air Force Logistics Command contract aircraft. Maintenance technicians (below) are part of three work shifts that keep the B-58's operational. Their tasks are numerous: one uses heat lamps to cure a specially fabricated fiber gasket that seals the fuel-carrying wing to the fuselage . . . one checks line pressure . . . another removes the forward radome.



SKY SOLDIER–TIEN BING IV

LIEUTENANT COLONEL THEODORE MADDEN

THE FOURTH in a series of joint combined airborne defensive training exercises involving ground and air forces from the Government of the Republic of China (G.R.C.) and the United States was conducted in the vicinity of Tainan, Taiwan, during the period 20–26 October 1963.

Planning for the exercise, named Sky Soldier–Tien Bing IV, began on 5 August 1963 at the U.S.–Taiwan Defense Command, Taipeh, Taiwan. Objectives of the exercises were defined as follows:

(1) To improve U.S./G.R.C. airborne techniques, operations, and staff coordination.

(2) To exercise airlift/airborne capabilities, including close air support for such operations.

(3) To practice squad, platoon, company, and battalion tactics.

The coordinated exercise staff, with representatives from all participating ground and air agencies, met at Headquarters G.R.C. Airborne Regiment, Ping-Tung, Taiwan, 15–21 September 1963, and prepared the Joint Exercise Plan and Operations Order. Participating ground forces were to be the 1st G.R.C. Airborne Regiment and the Okinawa-based U.S. 173d Airborne Brigade (Separate), each of which would provide two battalion task forces. The Chinese Air Force would provide troop-carrier and tactical fighter support to the 1st G.R.C. Airborne Regiment. The U.S. Air Force in the Pacific (PACAF) would provide airlift and aerial resupply to the 173d Airborne Brigade (Separate) with C-124 and C-130 troop-carrier and transport aircraft from the 315th Air Division, while Fifth and Thirteenth Air Forces would provide fighter units. The 405th Fighter Wing, Clark Air Base, Republic of the Philippines, would provide a detachment of F-100 aircraft for friendly close air support operations. The 18th Tactical Fighter Wing, Kadena Air Base, Okinawa, would provide a detachment of F-105's to act as "aggressor" aircraft and operate in conjunction with ground aggressor forces opposing the 173d Airborne Brigade (Separate).

This was to be the first in the series of Sky Soldier–Tien Bing exercises to include U.S. aggressor close air support operations with F-105 aircraft and Chinese Air Force aggressor operations with F-84 aircraft.

Communications/navigation aids support would be provided by USAF's Air Force Communications Service from elements of the Southeast Asia Communications Region. A detachment from Hq 1st Medical Wing at Clark Air Base would also be deployed.

D-day was established as 20 October 1963. One U.S. battalion task force and one G.R.C. battalion task force would execute a coordinated parachute assault on adjacent drop zones, link up, and conduct coordinated attacks to seize parallel objectives by D plus 2

(22 October). A second cycle, utilizing the other two battalion task forces, would involve similar operations on the same terrain during the period D plus 4 to D plus 6 (24–26 October). Large-scale aerial supply operations would be carried out during both cycles.

Director Headquarters was established at A-Lien, Taiwan, on 16 October 1963, to control the exercise and serve as Headquarters 1st Allied Airborne Brigade. Brigadier General Ellis W. Williamson, USA, Commanding General, 173d Airborne Brigade (Separate), was the Exercise Director, and Major General Yu Po Yin, Commanding General, 1st G.R.C. Airborne Regiment, was the Deputy Exercise Director. Brigadier General Gladwyn E. Pinkston, USAF, Commander of Air Task Force 13 (Provisional), Taipeh, Taiwan, was the Tactical Air Commander for U.S. forces and exercised overall control of air operations through the Joint Operations Center in Taipeh. The headquarters was staffed with G.R.C. and U.S. Army and Air Force personnel. It was planned that maneuver control would be exercised by this staff through U.S./G.R.C. umpires and controllers assigned at all echelons. Evaluators were assigned at various echelons to assess results and serve as umpires when directed. All participating units, including aggressor units, would be responsive to Exercise Director control provided in the form of a scenario and mission orders.

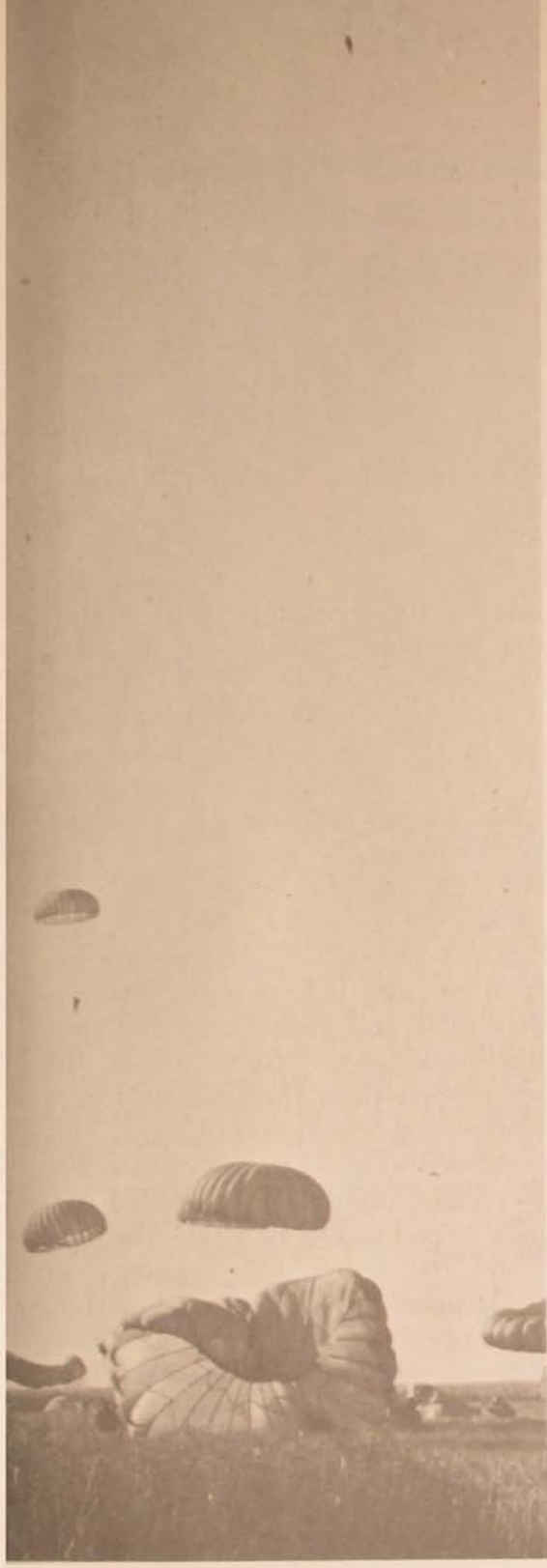
Exercise Sky Soldier–Tien Bing IV began as planned on 20 October with a parachute assault by the G.R.C. battalion task force on Drop Zone King at 0730. The U.S. battalion task force began its attack on Drop Zone Linn at 0930 when a 12-man USAF Combat Control Team together with a 50-man Army Assault Team parachuted from a single C-130 Hercules troop-carrier aircraft. The USAF Combat Control Team proceeded to set up electronic and visual aids to assist the main troop-carrier formations in identifying the drop zone and established radio contact with the incoming serials. Overhead an F-100F had an Air Force/Army Airborne Air Coordinator Team aboard to control close air support strikes in the vicinity of the drop zone and provide last-minute reconnaissance. This team called in other F-100 Super Sabres as required to assist in protection of the USAF Combat Control Team and to attack enemy forces moving into the area.

At 1000 the main parachute assault took place with 800 troopers jumping from a serial of 12 C-124 Globemaster aircraft. The troops, members of the 173d Airborne Brigade (Separate), had marshaled near their home base on Okinawa early in the morning to be airlifted to the drop zone. The flight to the objective area was uneventful, and the drop was made exactly as scheduled.

As the troopers disengaged their parachutes and moved out on the double to their assembly points to secure the airhead, a USAF forward air controller, who had parachuted in with them, rendezvoused with the other members of the Air Control Team and prepared to control close air support strikes as requested by the ground force commander.

Taiwan Airdrop

In October 1963, during the fourth Sino-American airborne defense training exercise, Sky Soldier—Tien Bing IV, troops and equipment were flown in from Kadena Air Base, Okinawa, and Clark Air Base, Philippines. Regular participation in joint exercises is part of the combat-readiness training of U.S. Air Force and Army personnel as well as of our allies in the southwest Pacific.



U.S. Army paratroopers from Okinawa land in a south Taiwan rice field.

Personnel of the 173d Airborne Brigade free an airdropped Army "mule" as "aggressor" F-105's harass the operation.

"Over the drop zone—Go!"

Super Sabres of the 405th Fighter Wing, Clark AB, begin a simulated strafing run.

As planned, the F-100's from the 405th Fighter Wing stayed in the area on airborne alert and were called in for close air support as the tactical situation required. Early missions continued to be controlled by the Air Force/Army Airborne Air Coordinator Team in the F-100F.

At 1030 the heavy drop serial, consisting of 24 C-130 Hercules aircraft, arrived over the drop zone and delivered a total of 127 individual loads. These consisted of 38 jeeps, 4 ambulances, 58 "mules," 6 ¾-ton trucks, 14 ¼-ton trailers, 2 ¾-ton trailers, 4 105-mm howitzers, and 1 self-propelled antitank gun. The self-propelled antitank gun was the heaviest single unit delivered, weighing 19,900 pounds with its shock-resistant honeycomb packing.

The period of reorganization immediately following the initial phase of any airborne assault is a critical one. Time is required to collect equipment and assemble as tactical units, and the lack of organic air defense weapons makes the airborne unit particularly vulnerable to air attack. For the purposes of this exercise, it had been assumed that neither side would have complete air superiority, and the battalion task force was forced to regroup and move out against its final objective hampered by stiff resistance from the aggressor F-105 aircraft of the 18th Tactical Fighter Wing. The aggressor ground forces employed every means to slow down the advance, including ambushes, mock mine fields, simulated blown bridges, and psychological warfare propaganda.

Requests for close air support for both the G.R.C. and U.S. battalions were forwarded to the jointly manned Director Headquarters at A-Lien, where they were evaluated and coordinated. The aggressor force requests for air support were also coordinated at this level. In the interest of air safety, friendly and aggressor aircraft were not allowed in the same general area simultaneously. Final control of all airspace and scrambling of fighter aircraft was exercised by the Joint Air Operations Center at Taipeh. All close air support missions were controlled by either a G.R.C. or U.S. forward air controller.

Objectives for the day were secured by late afternoon, and a link-up between G.R.C. and U.S. forces was accomplished at 1730 local time.

At 1825 the first 24 C-130 aircraft began an airland operation at Tainan Air Station in support of the exercise combat forces. These were the same C-130 aircraft that had participated in the heavy drop operation earlier in the day and had since made the round trip to Okinawa for reloading. The aircraft landed at five-minute intervals, dropping loading ramps and offloading cargo under banks of floodlights. Engines were not shut down, and in approximately three minutes each aircraft was again on the move, taxiing out for takeoff. In a two-hour period, the 24 C-130's had landed and offloaded 600,000 pounds of equipment for use by the U.S. battalion task force. The operation was conducted without interruption of the normal Chinese Air Force jet fighter operation from the base.

D plus 1 (21 October) began with a coordinated attack by the G.R.C. and U.S. battalion task forces at 0525. Close air support, from both Chinese and U.S. sources, was provided at first light and throughout the day. Considerable intelligence information in the form of spot reports from the friendly forces fighter aircraft was received and utilized. This information proved to be of exceptional value.

At 2030 on 21 October, the 1st Allied Airborne Brigade issued orders to attack the final objectives, and the attack was launched at 0540 on 22 October. Weather was favorable, and close air support missions which had been preplanned the day before were carried out at first light. Additional immediate close air support strikes were carried out on request as the tactical situation developed. The final objectives were secured at 1330, and link-up was accomplished at 1400 hours. The first phase of the exercise terminated at 1430.

The second phase of Sky Soldier IV began on D plus 4 and was identical to the first phase. Fresh G.R.C. and U.S. troops were employed while the original two battalion task forces were returned to their home bases. Economy of airlift was achieved by the use of the same PACAF troop-carrier aircraft to move the second U.S. battalion task force from Oki-

nawa to Taiwan and return the first battalion task force to Okinawa.

No major problems were encountered during the exercise, and all exercise objectives were attained in a superior manner. A total of 245 close air support sorties were flown, 124 from G.R.C. resources and 121 from U.S. resources. The fourth Sino-American field training exercise marked the first time that PACAF's F-105 Thunderchiefs had participated in a training maneuver of this type. Their use as an aggressor force provided valuable training for the ground units in passive air defense techniques as well as training for the aircrews in close air support tactics.

Both Chinese Air Force and USAF forward air controllers parachuted in with assault elements in both phases of the exercise and controlled friendly air strikes. Additional forward air controllers were positioned with the aggressor forces to control their air strikes. Targets attacked included troop concentrations, vehicles, artillery positions, bridges, and command posts. The G-3 air element at Director Headquarters was composed of G.R.C. and U.S. Army personnel and liaison officers from each national air force. The Joint Air Operations Center of Air Task Force 13 in Taipeh exercised control over all air operations. Interpreters were available, and no problems arose because of language differences. Staff coordination between G.R.C. and U.S. personnel was excellent. The demonstrated ability of staff officers of both countries to work together in harmony was undoubtedly one of the highlights of the exercise.

Spot intelligence reports from fighter aircraft of the friendly forces were relayed through the forward air controllers to the ground forces. These reports, concerning location of small enemy units, single vehicles, and gun emplacements, were treated cautiously in the early stages of the operation. The Exercise Director, General Williamson, was skeptical as to the validity of such sightings from a high-performance jet aircraft until he was given the opportunity to observe for himself from a two-place F-100F. The experience convinced him that pilot reports, incidental to normal close air support operations, can be accurate and useful tools.

Sky Soldier–Tien Bing IV terminated on 26 October 1963 with a flag-lowering ceremony at A-Lien, Taiwan. Personnel of Director Headquarters came to attention and presented arms as the national anthems of both countries were played and the colors lowered. The operation was a reassuring demonstration of the readiness and ability of the Government of the Republic of China and the United States of America ground and air units to respond and conduct combined operations in the event of an invasion of Taiwan. This combined capability could also be used in other areas, should such a contingency develop. Thus the larger value of this annual joint Sino–U.S. exercise emerges.

Hq Thirteenth Air Force

In My Opinion

LET'S GET HARDHEADED ABOUT MANAGEMENT

COLONEL CHARLES L. BROOKS

AT THE risk of arousing violent reactions from the "Sweetness and Light" school, I would like to suggest some tenets of a concept of management not geared to getting along with people but rather to getting results through people. Basic to this philosophy is the precept that management should be measured in terms of results.

In 1958 Dr. Malcolm P. McNair, a professor at Harvard Business School, took a rare cut at the human relations cult through an article in *Look* magazine entitled, "Too Much 'Human Relations'?" Dr. McNair, in his short but thoughtful paper, took the affirmative to the question, "Are we so tied down by worrying about other people's feelings that we can no longer make tough decisions or get a job done?" Although Dr. McNair's article was oriented to the industrial environment, we in the military could well stand some soul-searching on how we stack up against his platform for more "toughness," less exploring for behavioral causes, and more concern for training people to think and develop their abilities against mission objectives.

Today's military organization is big business, and the success of big business is directly related to how it is managed. We can ill afford to key our management philosophy to establishing a permissive atmosphere which may dilute the decision-making responsibilities inherent to all levels. The identification and development of managerial skills to establish and maintain a "going concern" are mandatory. A common weakness in the managerial development methods used today is the failure to realize that most people learn best by experience. Managers can only be developed by being given the opportunity to manage at the lower levels. "Learning by doing," through all levels of an organization, is generally accepted as the best method of developing managerial talent. We cannot afford to permit our "comers" in the lower and middle management areas to depend on creating a "democratic image" at their levels while passing unpopular decisions upward.

Good old-fashioned hardheaded decisions which are mission-oriented must be made at all levels. Managers who are in the process of learning

should be measured in terms of the results they obtain. Course and direction, in any organization, should be set at the top and expressed by establishing mission objectives, goals, and expected results. Each management level down the line should establish requirements for results which support top management's goals. The demand must be for results, not activity.

To get results we must encourage decision-making at the lowest possible levels and give the growing manager the authority to act and the right to use it. This means the "right to make errors." Until people are allowed to take chances and make decisions within their sphere of authority, they cannot be expected to develop into managers.

We should demand accountability for the actions of the young manager. Along with the authority to act to accomplish the responsibilities which he has been assigned, he should be required to account for his actions in terms of cost versus effort. Return on investment is a basic statistical and objective measurement of business effectiveness. We must be comparably objective in evaluating our supervisors. The payoff should be tangible and measurable. "Busy work" cannot be accepted as a substitute for product.

The requirement for cost consciousness in management at all levels in the Air Force is vital. Every decision management makes, every action it takes, has immediate impact on cost because it invariably deals with manpower, materiel, and time, each of which has its price. The degree of success in controlling costs is a measure of the fulfillment of management's economic obligations. Military managers should be critically evaluated on their ability to maintain costs at an acceptable level and account for those costs against return on investment.

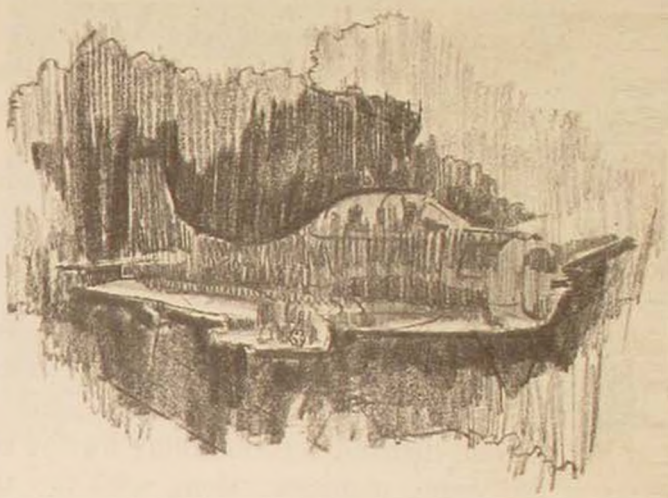
I realize our current so-called human relations courses emphasize greater consideration for people, greater awareness of interpersonal relations, and more democracy in management. In my opinion, however, the human relations approach—consciously or unconsciously applied—does our people an injustice. This overconcern about people's feelings can undermine self-confidence and tends to be manipulative in nature.

In actuality today's overemphasis on dealing with people, their feelings and problems, can often hinder getting the job done. You can't legislate human relations. As Dr. McNair pointed out, "consciously trying to practice human relations . . . is phoney." Effective workers are not deceived by the unearned pat on the back, the personality kid, or the junior psychologist. They are happiest and most satisfied when doing a good job and producing results that are recognized as contributing to the total mission. Productivity and results are the true measure of how well an individual, a unit, or a command is doing the job.

The individual should, of course, be recognized as one part of the whole, an entity possessing worth and human dignity. We should provide him with the opportunity to think, work, and develop in an environment which reflects the objectives of that environment and recognizes his value as a contributing part of it. Human relations have existed and always will exist where there are interactions among people. Good human relations reflect the general tenor of a good working environment—they don't make it. They are an effect, not a cause.

Hq Thirteenth Air Force

Air Operations in Viet Nam



NIGHT FLARE STRIKE

LIEUTENANT COLONEL JAMES F. SUNDERMAN

Air Operational Summary, 2d Air Division, 4 May 1964:

Shortly after midnight, a heavily armed Viet Cong force attacked the government outpost 21 miles northwest of Ca Mau, which was subjected to three fierce attacks yesterday. A VNAF C-47 illuminated the battle area with 100 parachute flares while two A-1H's raked the attacking force with bombs and automatic cannon fire. The assault group withdrew, but renewed the attack at 0330 hours. A USAF C-123 responded to the second alarm, supported by another pair of A-1H's. After 83 flares and another heavy bombing and strafing attack, the Viet Cong evacuated the area.

Meanwhile, another C-123 flareship dropped nine flares which assisted the defenders of a fortified new rural life village (NRLV) two miles northwest of Rach Gia in repulsing a Viet Cong probing attack.

IN MANY daily air operational summaries from the official files of 2d Air Division you will read about night flare strikes. . . .

Sinister shadows come alive and begin to move when nighttime covers the delta, the jungles, and the mountains of Viet Nam. Darkness is a massive shield for the Viet Cong. Under its all-encompassing shroud, A-frame bearers safely shuffle war supplies along footpaths and through open rice paddies. Barefoot boatmen pole supply-laden shallow-draft sampans along canals, streams, and river banks, distributing a rifle here, a box of ammo there. Elephants, strapped with bulging grass baskets from the north, move down mountain trails to

keep the war stream trickling. So-called farmers by day drive straw-covered carabao carts by starlight along isolated roadways.

Indeed, nighttime is a time for the Viet Cong military to maneuver with cunning and quiet, a time to stalk a victim from the shadows, a time to attack with surprise in small but determined bands and then fade back into the shadows, a time when the military advantage of surprise shifts to the side of the black-garbed Communist insurgents.

Prime targets for enemy night attack are the relatively isolated government military outpost and the NRLV. These installations are scattered throughout the country, each defended by small numbers of Civil Defense guards or Self Defense Corps troops. Some are defended by artillery units. The Viet Cong know that each is a potential source of weapons, ammunition, food, and war material, as well as a possible chink in the government's political armor if captured or destroyed. The purpose of many attacks is to defy Republic of Viet Nam (RVN) authority and demonstrate to the people that their government cannot protect them. Then too, the assaulting of government outposts or NRLV's offers the Viet Cong a realistic training ground for their new recruits.

The attack is usually quick and vicious, and the retreat is back into the bush, where pursuit becomes an amorphous maneuver for the government troops. The pattern is not unlike the Indian warfare of another century on the American frontier, and at first the tactics used against it were those of the frontier days.

In the beginning the Viet Cong found outpost raiding a most successful venture. But it was one they would not long pursue with ease after 2d Air Division officials and their Viet Nam Air Force (VNAF) counterparts took the matter to the planning table.

If the basic problems of enemy night attack confronting the defenders were darkness and lack of defensive firepower, then the solution was simply to eliminate the darkness and increase substantially the firepower of each fortress. In traditional parlance, this would mean new outlays in manpower and ground weapons for defense of each installation—commitments that U.S./V.N. military officials could ill afford for protecting pinpoints of real estate, many of which (especially some outposts) were military liabilities to begin with.

A more feasible solution was advanced by the tactical airmen. Assist in the defense of outposts by air, they reasoned. Combine the magnesium paraflare with highly mobile, quick-reaction aerial firepower. By this method two aircrews and two aircraft might well serve in assisting in the defense of several outposts or NRLV's in a single night and be capable of providing firepower not otherwise available. The tactical aircraft could carry a variety of ordnance to deal with a wide range of situations from small to large-scale attacks. The theory represented sound economy of force and excellent utilization of the characteristics of the tactical air weapon.

And thus a countertactic to the Viet Cong night raid emerged. Called the "night flare strike," this technique was implemented by the planners with measured success from the very outset.

First step was to issue PRC-10 radios to outpost and NRLV defenders and teach these people how to operate the equipment. Purpose of the PRC-10 was direct communication with aircraft overhead.

Next, night air flare strike teams were organized and placed on a combination airborne/strip alert in various parts of the country, ready for quick deployment to aid any beleaguered garrison that called for close air support.

The team combined C-47 and/or C-123 aircraft, specially equipped for paraflare drop, with strike elements consisting of one or two twin-engine light bombers or fighter-bombers armed with general-purpose demolition and antipersonnel fragmentation bombs and an array of .50-caliber and/or 20-mm forward firepower for low-level work.

The general procedures, as they evolved, in the night flare strike can best be outlined by a thumbnail sketch of a typical operation.

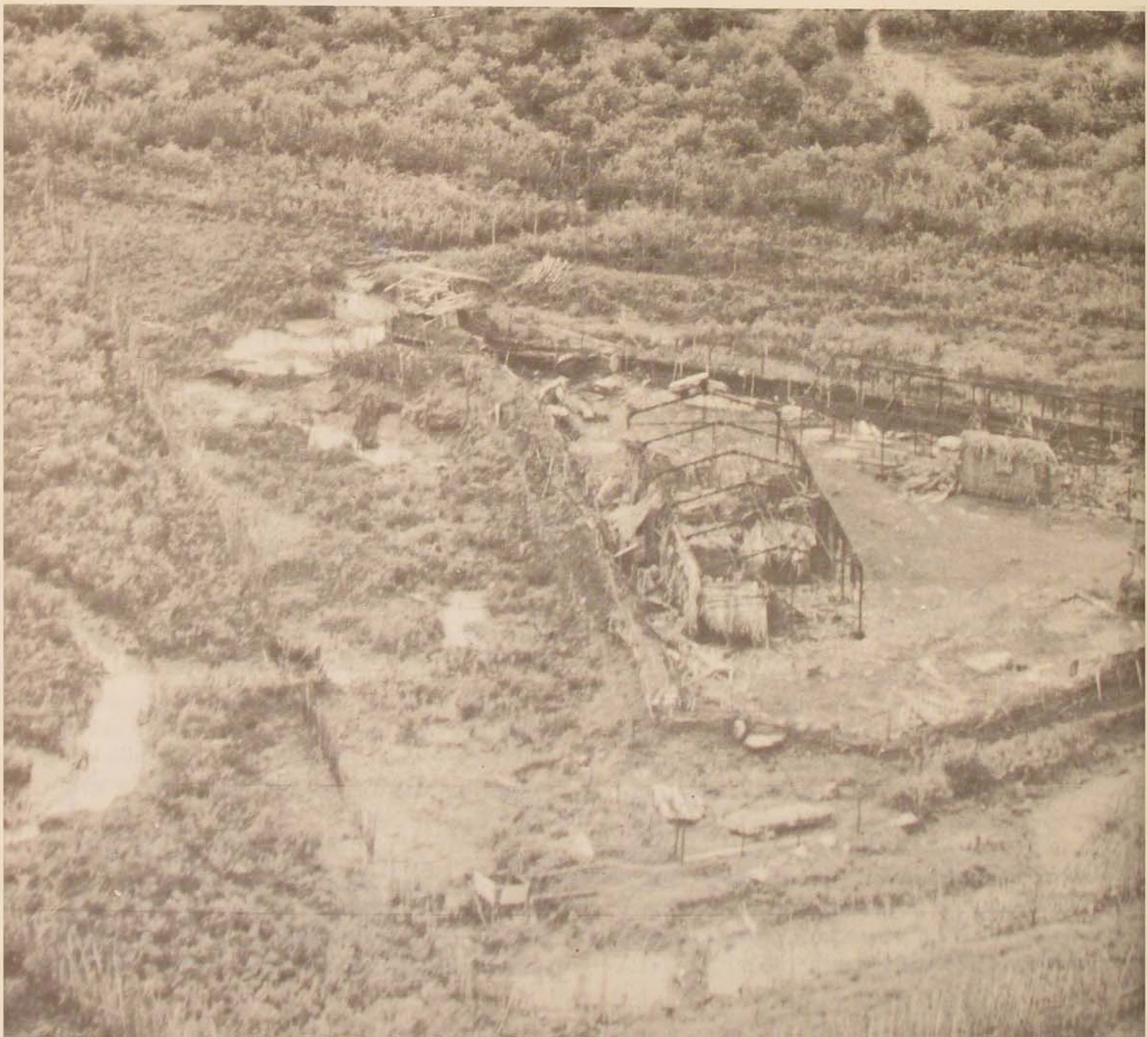
> It is 0130 hours in the morning. A strong band of Viet Cong raiders slips quietly out of the brush to the perimeter areas of a delta outpost that defends a nearby NRLV. The assault begins.
>
> Inside, the defenders size up the enemy force and decide that help is needed if the fortress is to be saved. They place a call through the Army of Viet Nam (ARVN) land-line communication network to their division headquarters, requesting assistance in countering the

Viet Cong attack.* At division headquarters the call for air support is transmitted again by ARVN land line to the Corps Area Tactical Operations Center (CTOC). At ARVN corps level the request gets into VNAF channels via relay to the Air Support Operations Center (ASOC), which is colocated with the CTOC.

In direct reaction to the call the ASOC contacts an airborne/strip alert flare aircraft in the

An isolated Republic of Viet Nam government outpost, guarding one of the many river entrances in the Mekong River delta, was overrun and destroyed by Viet Cong guerrillas under cover of darkness before tactical air support could arrive. Note the three rings of bamboo fortification and on the right the lookout tower which was not damaged.

*In some cases, depending upon geographic location, other prearranged air request communication is used besides land lines, such as PRC-10 radio, rocket flares, sirens, etc. Originally it was planned to utilize chaff-dispensing rockets in the outposts as notification of Viet Cong attack. The theory was that chaff would be seen on radar and flare-strike aircraft would then be scrambled. More detailed study of this notification technique revealed many loopholes, and it was not adopted.



area and informs the radar control center of the geographic coordinates of the outpost or NRLV. Radar control immediately contacts the flareship and vectors it to the scene of attack.

The attack warning is simultaneously flashed by ASOC to the joint Air Operations Center (AOC) at Tan Son Nhut Air Base, Saigon, with request for night fighter support for the flareship. The AOC, heart of the Tactical Air Control System (TACS) in Viet Nam, maintains hot lines to all fighter locations and directs the immediate scramble of strip-alert fighter-bombers from the base nearest the Viet Cong attack. Once airborne, the fighter-bombers are taken over by the radar network and vectored to a rendezvous with the flareship.

Meanwhile the paraflare aircraft arrives at the outpost, and the VNAF forward air controller (FAC) aboard communicates directly with the defenders via the PRC-10 equipment. The pilot thus secures details of the attack needed to determine the illumination requirement, the appropriate altitudes and direction for his flare-drop runs, and the general procedures for aerial defense assistance.

Utilizing these facts, the pilot makes his drop runs, dispensing paraflares in sequence and as required from altitudes normally ranging between 2500 and 3000 feet. These one-million-candle-power magnesium flares descend slowly, floodlighting a wide area surrounding the besieged fortress and providing the defend-

ers "near daylight" conditions to meet the enemy assault. In some cases the dropping of the flares alone has been sufficient to cause the Viet Cong to break off, retreat, and disappear, since their expected advantage of surprise and concealment is lost.

If the attackers persist and close air support is required, an observer in the flareship, who is in radio communication with the outpost defenders and the strike aircraft pilots, serves as the airborne strike controller from his vantage point above the scene. Under the canopy of artificial daylight he calls in the fighter-bombers for the dive-bombing and strafing runs.*

Inside the fortress defending forces have ignited a large gasoline-soaked arrow, a device each installation is required to maintain. Positioned in the center of the fort, the arrowhead points in the direction of the main attack. This burning signal aids the strike aircraft pilot in locating the enemy force.

After several dive-bombing and strafing runs, assisting the ground defense, the enemy breaks off the attack, carries his dead and wounded into the bush, and disappears. The threatened outpost is safe for the night.

On various occasions the flare strike teams have conducted a running battle with the Viet Cong following break-off of the outpost attack. One instance of note occurred on the night of 20 June 1963 when a large force of regular Viet Cong was driven back by A-1H night air strikes from their attack on an outpost 25 miles east of Soc Trang in the delta area. The Viet Cong retreated in two groups, one by land and the other by sampan. With paraflares lighting the retreat routes, elements of tactical fighters pressed the fleeing enemy throughout the night.

With daylight, the running attack continued till late afternoon, when the enemy force completely dispersed. While evidence of heavy casualties was found later by ARVN ground forces along part of the enemy's retreat route, confirmation of the number killed in action could not be made. The Viet Cong, as usual, carried away or quickly and secretly disposed of their dead to hide losses. The dense, swampy terrain into which they fled made further ground follow-up impossible. A number of sampans used by groups in the getaway were sunk by the fighter-bombers. At one spot along the retreat route, fighter-bombers blew up a group of grass huts into which an L-19 forward air control pilot reported a Viet Cong contingent had taken refuge.

In a similar battle, beginning on 29 June 1963 with an outpost attack 60 miles north of Rach Gia, the pursuit lasted for the next 24 hours. About 300 Viet Cong regulars were involved, and in their hasty retreat they left behind more than 35 dead, victims of air strike.

Occasionally night flare strike defense of outposts or NRLV's meets stubborn, determined enemy resistance.

One of the fiercest night strikes of early 1964 occurred on the night of 7–8 April and involved three flare aircraft and five VNAF fighter-bombers against a strong enemy force attacking an outpost 11 miles southeast of My Tho in the lower Mekong delta. The battle began shortly before 2200 hours on 7 April, when the Viet Cong struck the outpost in force. A USAF C-123 flare aircraft responded to the outpost call for help and dropped 87 paraflares to illuminate the battle area brilliantly for about two hours. Two VNAF A-1H fighter-bombers made numerous dive-bombing and strafing runs on the areas surrounding the outpost from which the main attack was coming.

Shortly after midnight a second USAF C-123 flare aircraft relieved the first and continued flare-lighting the battle area, enabling the outpost defenders to hold off the Viet Cong assault. At 0135 a new flare strike team, comprising a VNAF C-47 and three T-28 fighter-bombers, rendezvoused over the outpost and took up the fight. By the light of 53 more flares the trio of fighters made repeated bombing and strafing passes and succeeded in wiping out a Viet Cong heavy mortar position hidden in the dense foliage. With the loss of the mortar, the enemy broke off the attack shortly before 0300 and fled, nearly five hours after the fighting started.

These examples are but a few of scores of night air strike missions described in the daily tactical air operational summaries compiled by 2d Air Division.

*Caution is the watchword for the FAC aboard the flare aircraft and for the strike pilots on this phase of the operations, since the Viet Cong have attempted in the past to direct air strikes by their own portable radio sets. All these ruses have been detected by the flare strike pilots, and in no instance has the Viet Cong been successful in this sort of deception.

The illumination of a parachute flare produced this rare night reconnaissance photograph taken during a Viet Cong attack on an RVN government outpost in the Mekong delta area on 9 October 1963. The burning arrow inside the rectangular outpost guided the strike pilots toward the enemy concealed in the brush between village and outpost.

Of course the night flare strike is not a wholly new development in counterinsurgency. Like most tactics employed in the jungle war in Viet Nam, it is a partial adaptation of a technique previously used by USAF/USMC tactical air in the Korean War. During that war "firefly missions" became a most successful operation of night intruder aircraft against the North Korean and Chicom night-moving troop and supply convoys and trains. While the Korean "firefly missions" were purely paraflare-lit night interdiction strikes, the adaptation in Viet Nam applies the tactic in a close air support role.

In Viet Nam the twin-engine B-26 Invaders at first comprised the strike elements of the flare strike team. Single-engine T-28 and A-1H fighter-bombers were also employed as trained crews became available, and eventually they took over the night work entirely.

The tactic itself may sound simple, but actually it is quite complex, requiring skill and experienced marksmanship. Outposts and NRLV's are small dots in the blanket of darkness that enshrouds Viet Nam after sunset.

Surrounding vegetation, usually thick and tall, can prove hazardous to low-level dive bombing and strafing approaches. Accurate aerial gunnery is required to work over enemy forces lodged in dense foliage that frequently edges close to the friendly outpost. Then too, weather in the tropics is no small factor in either day or night air operations. The Viet Cong prefer nights that are moonless, overcast, or dripping wet for their insurgent activities, and there are plenty of nights like this in Viet Nam. Thunderstorms, steady rains so typical of the tropics, and night fog provide ideal settings for enemy surprise moves. The monsoon season, which blankets the northern and southern sections of Viet Nam at different times of the year, brings extended heavy downpours from low, scuddy clouds. Air operations in this environment call for skill and professionalism in the cockpit.

On the night of 22 July 1963, for example, the Viet Cong struck an outpost situated on the bank of a river about 15 miles northwest of Bien Hoa. Rain showers were drenching the countryside from a 200- to 500-foot broken ceiling when a pair of VNAF T-28's was scrambled at Bien Hoa Air Base to aid the outpost.

Operating under a low ceiling in the rain, they spotted the Viet Cong in a wooded area near the fort. With minimum paraflare visibility, the T-28's made four bomb runs on the insurgent force. During these strikes they noted another enemy force attempting to overrun the fortress from the river side and diverted the attack, making repeated rocket and strafing runs on this group of Viet Cong.

Advised by the USAF C-47 flareship that the enemy had broken off the attack, the T-28's returned to their base. The pilots reported an estimated 40 Viet Cong killed. Several days later the official ground-confirmed reports indicated 68 dead Viet Cong.

One week later, at 2100 hours on 29 July 1963, a strong Viet Cong contingent struck another outpost 17 miles north of Bien Hoa. Responding to the outpost call for help, a B-26 light bomber took off in a heavy rain. Breaking out of the overcast at 3000 feet altitude, the pilot called for and got a radar vector to the general outpost area. Descending through the overcast, he broke out at 600 feet above the heavily wooded, hilly area. Darkness and rain enveloped the countryside, effectively hiding the outpost. The crew undertook a widening circular search for the fort and within ten minutes spotted it about six nautical miles north of the radar plot. The pilot immediately called radar control for a flareship vector through the overcast to the site, and within minutes the C-47 appeared. By the light of paraflares and directed by a flaming arrow signal from inside the fortress, the bomber crew worked over the insurgent force with seven low-angle strafing and rocket passes. Heavy enemy small-arms fire was encountered on each pass. Since the low ceiling and extremely poor visibility made conventional bombing attack procedures impossible, the crew improvised a strike plan. Lining up the target area on the fort lights, they made a treetop approach on each bomb run, pulling up into the overcast and pickling off their bombs at 1000 feet—lobbing them into the enemy ranks.

In two such passes they tossed six 100-pound general-purpose bombs and six 120-pound frag clusters. The ingenious toss-bomb maneuver was followed by additional strafing passes, and the Viet

Cong broke off the attack and fled. The outpost was saved, and the paraflare/attack team returned to its base. Total mission time was 1½ hours.

SINCE INITIATION of the flare strike operations, the incidence of successful Viet Cong night attacks on NRLV's and outposts has declined in areas where flare/strike aircraft have been capable of rendering prompt support. Also significant is the effect that night flare strike operations have had on the outpost defenders. Whereas previously the defenders would frequently evacuate their outpost at the approach of the Viet Cong, they now stand up and fight with air support overhead.

During the first six months of 1964, flare aircraft flew 363 airborne alert sorties; 309 outposts and NRLV's under Viet Cong attack requested and received para-air strike support. In these attacks, 469 flare sorties were flown by paraflare aircraft, dropping 20,306 paraflares. Under the canopy of the magnesium-lighted sky, 326 night fighter strike sorties were conducted against the Viet Cong.

During April-May-June 1964, requests for night strike support from Vietnamese outpost NRLV's increased 22 per cent over requests during the January-February-March 1964 period. Using the same comparative time-frame, flare sorties by flarecraft increased 29 per cent while total flares dropped increased 20 per cent. The requirements for night strike fighter aircraft in outpost/NRLV attacks decreased 16 per cent in the second quarter of 1964; however, nearly one third of all Viet Cong attacks during this quarter were broken off with the dropping of the paraflares alone. This type of enemy reaction precluded requirement to call in night fighters and indicates a healthy respect the insurgents have developed for night strike fighter aircraft.

It is a fact that night tactical air has achieved an enviable record in helping to save NRLV's and outposts in all cases where it was requested in time and participated in the installation's defense.

That deficiencies do exist in the system is also a fact. No military tactic is foolproof, nor is any used in combat with 100 per cent success. A major weakness in the present system lies in the initial notification. In some cases NRLV or outpost defenders themselves could institute a more rapid request for flare strike support, once the enemy attack is assayed. Then too, adoption of a less cumbersome, more efficient ground communication network would permit the request for air to reach the Air Support Operations Center in minimum time. At times outpost or NRLV calls, retransmitted through the present network, have arrived too late in the ASOC, and the installation has been overrun before paraflare and strike aircraft could arrive. On many occasions requests for air support have been based on premature evidence of enemy intentions, such as mere presence of Viet Cong in the area. In some instances the enemy feints attack, then withdraws a considerable distance into the bush to sit out the arrival, orbit, and departure of the night flare strike force. Once the aircraft have left the area, the Viet Cong attack before recall of flare and strike aircraft can be accomplished. Here again, a speed-up in communications from outpost to ASOC would cut down the incidence of this kind of Viet Cong success.

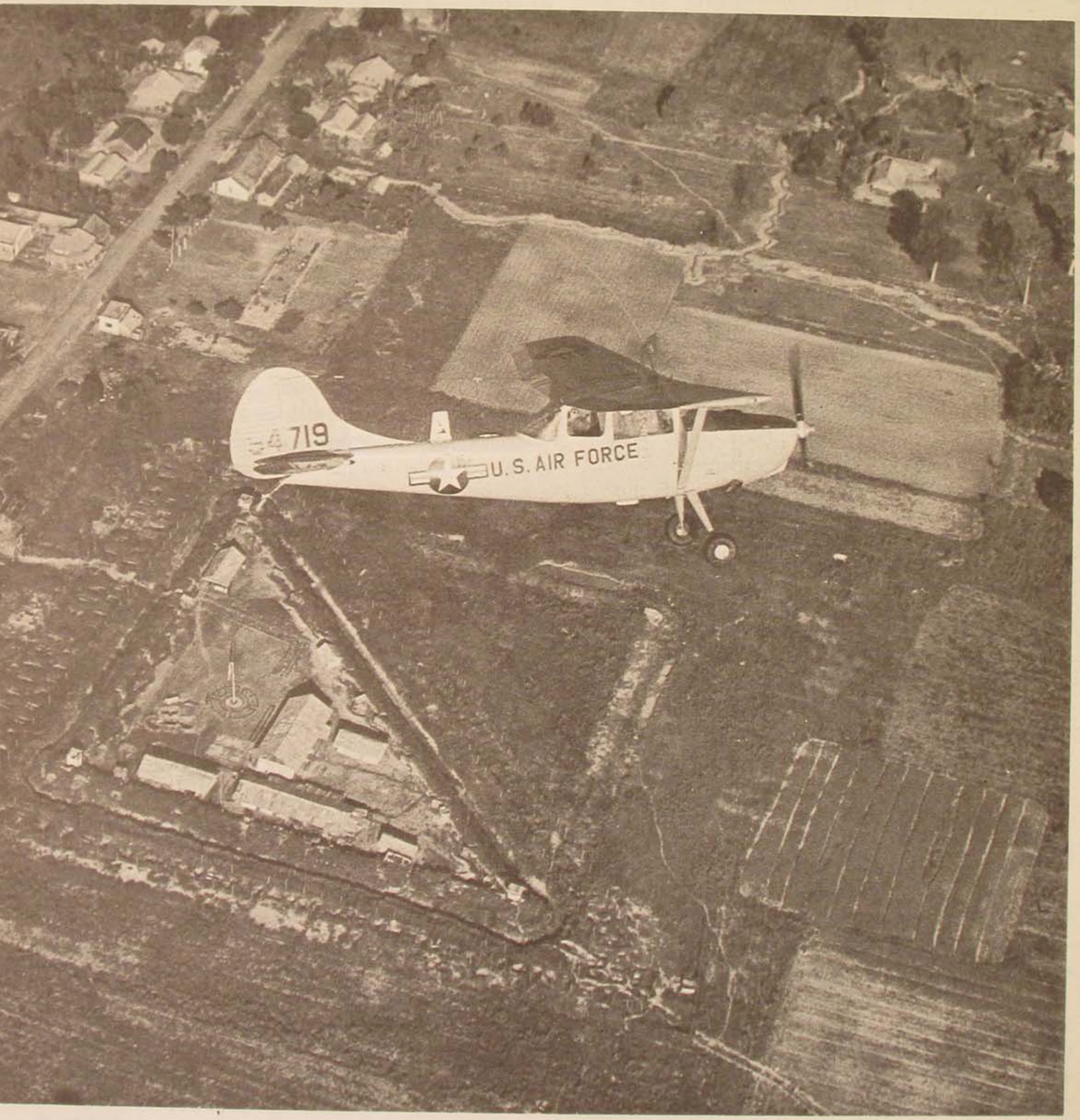
Refinement of the technique and the system to meet any possible contingencies or Viet Cong deception and trickery is a continuing effort of the planners in Viet Nam. Among the considerations of the planners are the Viet Cong's false radio signals, false flaming arrows, "lure" attacks staged to ambush air support aircraft in ground-to-air crossfire, and others.

Overall, the night flare air strike has effectively reduced the potential danger from organized Viet Cong military units during the hours of darkness by reducing the military advantage of surprise and cover.

The flare strike tactic provides Viet Nam forces round-the-clock capability in offensive/defensive military actions, serving a wider application than just outpost or NRLV defense. Flare strike aircraft also provide close air support for ARVN regular and special forces engaged with the Viet Cong in open night battle. Sometimes large-scale joint air/ground "search and clear" operations spill into the night hours, requiring paraflare close night air support strikes in pursuit of enemy forces. Then too, aircraft and helicopter crews downed in known Viet Cong-infested country can depend on the vigil of paraflare and orbiting strike aircraft all night, if needed, until rescue is accomplished.

Although airmen can rightfully be proud of their accomplishments to date in turning darkness

A USAF T-01D forward air control aircraft searches for signs of possible Viet Cong activity in the vicinity of a government outpost. Like many others, this outpost is triangular in shape and is surrounded by a moat and an earthen wall, outside of which is a double barbed-wire fence with deep protective ditches and ground slits.



into daylight and helping to drive the insidious enemy back into his jungle lairs, the night flare strike may well play a greater role in the future than it has in the past.

Many airmen feel that the new "Chien Thang" military plan*—the spreading oil-spot concept—will drive the Viet Cong into more frequent night operations by depriving them of geographic areas of operation they now hold. As the Viet Cong become more and more restricted by government capture and by the clearing and holding of large land areas, they may well resort to increased night attacks on outposts and NRLV's for terrorizing the populace and seizing the basic essentials of existence. If this event materializes, night flare strike may make an even more important contribution in the counterinsurgency.

It was this way in the beginning and is still this way in Viet Nam today: when nighttime covers the delta, the jungles, and the mountains, sinister shadows come alive and begin to move.

Nighttime is still the best time for the Viet Cong to attack, and only a miracle can alter the situation completely. It is no secret to the Viet Cong, however, that the growing capability of night tactical air strike negates much of the military advantage of surprise upon which they have leaned heavily for their successes in the past.

Neither can they question that night tactical air provides a tactic to which they now have no counter.

Hq Pacific Air Forces

*Chien Thang (The Victorious) is the name of the new National Pacification Plan of Prime Minister Lt. General Nguyen Khanh. It is aimed at freeing the Republic of Viet Nam of Communist insurgency through a series of "clear and hold" operations employing air and ground forces. Step by step operations will expand government-controlled areas as a drop of oil spreads on striking the water.

Air Force Review

INCREASING PRODUCTIVITY AT OCAMA

COLONEL I. R. PERKIN

THE MAGIC WORDS in the Air Force Logistics Command these days are "cost reduction." Virtually every phase of this multibillion-dollar operation is now receiving a searching, down-to-earth analysis to ensure that we buy only what we need, buy at the lowest sound price, and reduce operating costs. These are indeed the specific objectives of the Air Force's official cost reduction program; to attain them without degrading operational effectiveness poses, in the eyes of many, the greatest single continuing challenge ever faced by AFLC management. Many forces—economic, legislative, political, and military—are at work today which make the terms "do more—at less cost" or "increase efficiency—decrease costs" almost mutually exclusive. Concomitantly, however, there are also many forces pressuring to make these terms synonymous—forces which stem in large part from better education, better communications, better methods and management, better tools and equipment, along with a vast spillover from by-products of research and development programs. In short, forces which facilitate increased productivity.

An important key, then, to meeting the challenge of cost reduction is to increase productivity. How is this done? Generally, three ways are recognized: (a) Induce people to exert more effort. (b) Provide better tools and equipment. (c) Develop better procedures and techniques. How is increased productivity measured? Usually in terms of *dollars*, i.e., decreased cost per unit of output; *time*, i.e., increased output per man-day or decreased flow times; and *quality*, i.e., increased reliability or decreased reject rates. This last is particularly important if we are to avoid degradations in combat or operational effectiveness.

Currently, an all-out effort is under way at the Oklahoma City Air Materiel Area to improve in-house productivity. Its depot shops process many of the Air Force key weapon systems, and with a labor force of over 9000 workers the opportunities for increased performance are great. For example, a recent spot check in the engine overhaul shop revealed an "in-process" inventory of engines and engine parts amounting to $44,742,720. If we could improve handling procedures and decrease flow times by just one day, we could expedite

$2,433,966 worth of engines and parts through the pipeline and get them into the hands of the combat forces that much sooner. Similar examples can be cited affecting the KC-135, B-52, AGM-28, etc., plus the numerous critical components and subsystems that flow through OCAMA production lines. The impact of speeding up depot flow time upon total inventory requirements and improved combat effectiveness is obvious.

To achieve improved depot shop productivity and cut costs, a three-pronged attack is actively under way. Since it is generally recognized that the most effective way to achieve significant gains in productivity is through the use of more efficient tools and equipment, major emphasis is placed here. In the process, however, the other elements contributing toward increased productivity, i.e., inducing workers to greater effort and developing and applying new procedures and techniques, are not being slighted. As it turns out, a constant interplay is taking place, with the net effect producing a healthy increase in productivity. The results are demonstrable and measurable. Let's look at some examples.

work smarter—not harder

Continued improvements and modifications have turned the B-52 into a flying electronic bombing platform. During processing through OCAMA shops, some 60,000 circuits on each aircraft must be thoroughly checked for continuity, insulation breakdown, voltage, and electrical shorts. Manual checking requires over six man-years, prohibitive down time, and questionable reliability.

To overcome this problem, a task group was established to solve the circuit-checking bottleneck. It was determined that off-the-shelf automatic circuit analyzers had great potential, thanks to a heavy spin-off from DOD research and development programs. However, "you just couldn't get there from here" because the analyzers had been designed for different purposes.

An intensive design and development effort was then undertaken which produced a portable adapter that could carry current from the aircraft to the automatic analyzer. Each of the many circuits could thus be isolated, identified, evaluated, and corrected, if necessary. Adapters were fabricated, automatic circuit analyzer equipment was procured, and the results have marked a truly giant forward stride in increased shop productivity. Flow time was shortened by five days, 96 per cent of damage to electronic gear resulting from faulty wiring was eliminated, and the average number of test flights per aircraft dropped from five to two.

All told, repetitive annual savings of over $800,000 can be attributed to the use of this equipment, which cost some $600,000—an "expense to profit" ratio that can withstand the most searching analysis. Further, a better quality product is produced, assuring SAC of a higher-reliability weapon.

Another example of applied ingenuity involves KC-135's. Here cracks were occurring in the aircraft wing skin which weakened the structure and permitted fuel leaks. The approved engineering fix consisted of drilling a series of holes on the periphery of the skin to be removed, filing off the edges, and then fitting the new skin into place. This technique is tedious and time consuming.

Searching for a better method, shop personnel devised a portable pneumatic router guided by a track and mounted on a pantograph. Automatic feed speed and both lateral and longitudinal motion were provided for. As a result of this technique both the skin removed and the hole left in the wing have supersmooth edges. Consequently the removed piece can be used as a templet for cutting the replacement to the proper contour, and the newly designed router can be used to cut the new skin.

The net result in terms of productivity increase from using this simple but ingenious technique is impressive. Over 400 KC-135's have been processed to date at a savings of some $1700 per aircraft. Furthermore, airplane down time for the operation was halved and flow time shaved by three days. The cost of this particular innovation was insignificant compared to the savings involved.

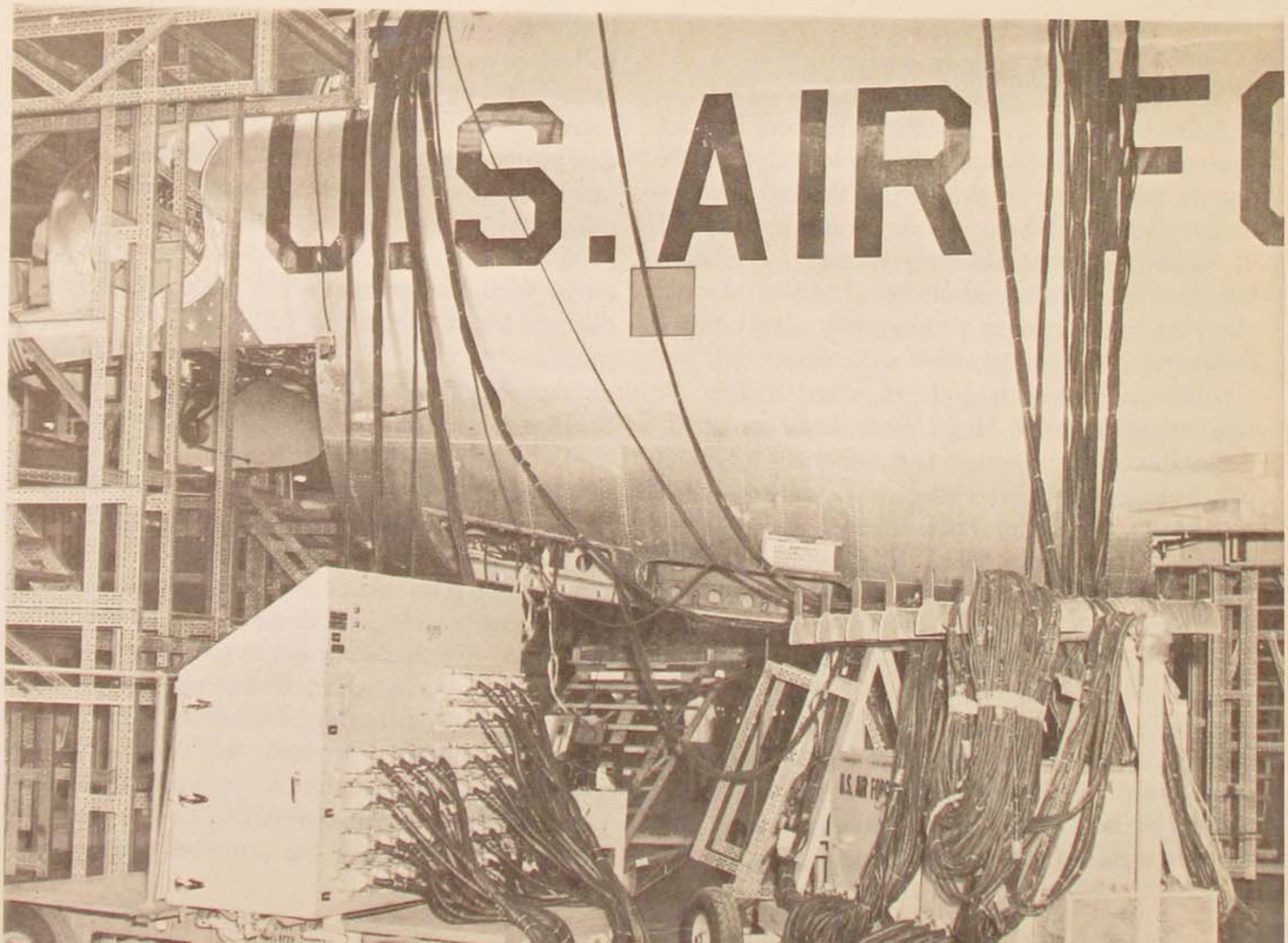
In another case the cost was high, but so were the savings. Processing aircraft, missiles, and engines through a depot requires constant use of specialized stands, racks, dollies, superstructures, etc. Normally these are made to order for a particular job and then discarded or salvaged, though generally little salvaging is feasible. To overcome this costly operation, we spent $187,500 for slotted angle metal erector material. These precut, all-purpose metal beams are assembled in any desirable configuration in much the same fashion as a toy

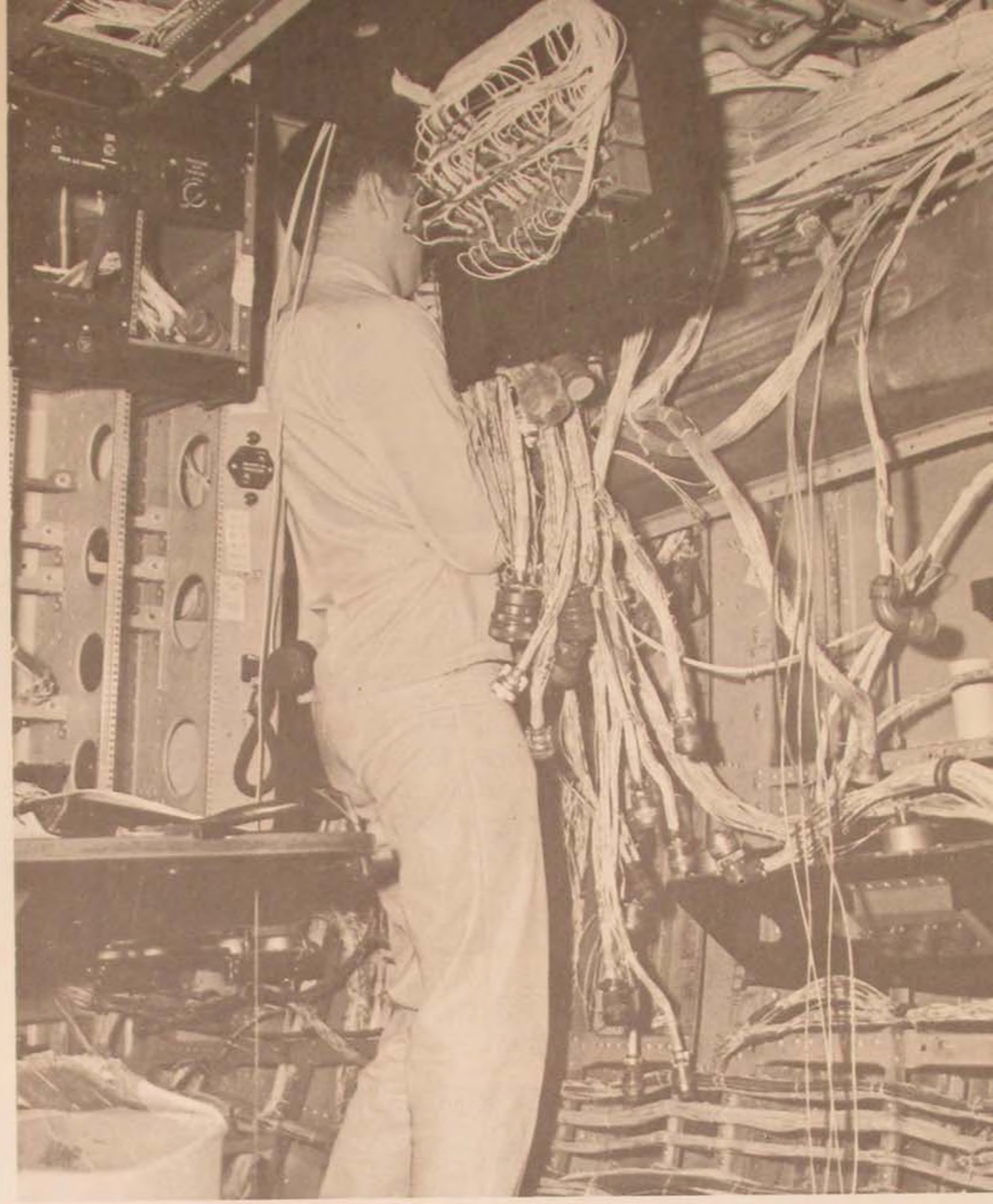
erector set, and like a toy set they can be disassembled and used over and over again. In the past two years these versatile beams have been employed to make static docks for aircraft, work benches, carts and dollies, parts storage shelves, access steps, and temporary enclosures. The resultant savings in labor, material, and equipment have averaged $165,000 per year. Labor costs were cut in half, while durability, flexibility in design, and reduction in weight to facilitate movement all contributed to increased productivity.

Another example involves fuel left in aircraft tanks. This fuel creates a fire hazard, and, as a consequence, aircraft processed through depot shops are required to have their fuel systems purged of explosive vapor and volatile fuels. Initially only two purging methods were recognized as satisfactory to make the aircraft "hangar safe." The first and more desirable method involved aeration, in which the tanks were opened, mopped dry of jet fuel, and then aerated by air forced through the system to remove explosive gas mixtures. This procedure took approximately two days. The alternate procedure involved "nitrogen inerting." In this procedure nitrogen is forced through the system to expel all explosive gaseous mixtures. All vents are then sealed, leaving lines and tanks filled with inert nitrogen to preclude further generation of explosive mixtures. This method is less desirable from a safety standpoint because a leak can develop, allowing nitrogen to escape and the aircraft to become contaminated. When this occurs, all work must stop in and around the aircraft until it is again purged. When either of these methods is used, there is an additional requirement to coat all rubber cells with a preserving oil to inhibit deterioration.

A search was launched for a better purging

New method of checking B-52 circuitry. The adapter was designed to enable use of off-the-shelf automatic circuit analyzing equipment, resulting in significant savings.





The old method. Not only is it awkward and time consuming but of questionable reliability.

agent. Investigation revealed that the addition of 10 per cent motor oil to a low-grade jet fuel, JP-5, resulted in a satisfactory purging material. The JP-5, which has a much higher flash point than the residual fuel in the tanks, absorbed this residue and raised the flash point of any material remaining in the tank to a safe level. Further, the oil additive left a preserving coat on the tanks.

To date some 1200 aircraft have been processed by use of this locally developed purging method at one tenth of what the cost would have been with the old methods. In addition a better quality product is ensured.

These specific cases illustrate but a few of the many payoff projects OCAMA has achieved through applied ingenuity. Other examples can be cited involving welding and heat-treating procedures, reworking of jet engine blades formerly condemned, application of value engineering techniques to manufacturing, improved plant layouts, unique chemical milling processes, selective management of high-value items, the use of PERT techniques in plant operations, and the use of laser beams for welding and spectroscopy. In general, top-level management strives to create an atmosphere conducive to constant challenge—no job is considered sacrosanct and no technique inviolate. If it can be done better, cheaper, faster—

Curing metal fatigue in the KC-135. Old method (above) required 8 days and 1600 man-hours. A locally designed pneumatic router mounted on a pantograph (right) reduced installation costs, cut flow time, and also ensured a job of higher quality.

if the quality can be bettered or the performance enhanced—any improvement-seeker can find a sympathetic ear.

Excess Property Utilization Program

Today's AFLC depots are really composites of many manufacturing industries. Rapid reaction to Air Force requirements, particularly on the provisioning of out-of-production parts, requires an across-the-board capability. The order of the day thus comprises activities such as machining, plating, grinding, forging, welding, stamping, heat treating—the entire spectrum of functions necessary for fabrication. With any enterprise of this nature, replacement of aging or worn-out production equipment is mandatory if productivity is to be maintained, let alone increased. But replacement or modernization is costly, and new equipment funds are tight.

Vigorous exploitation of DOD's Excess Property Utilization Program has helped OCAMA overcome this problem to a degree. Replacement of old and obsolete equipment with newer and more efficient is being accomplished at very little or no additional cost to the Air Force. As a matter of record, some $3,000,000 worth of property that had been declared excess elsewhere was (and is being) carefully screened, verified for use, and shipped for installation in OCAMA's shops. In addition to shop modernization at minimum cost, a further productivity dividend is achieved: timeliness in the availability of urgently needed equipment to eliminate bottlenecks and line stoppages. Normal procurement lead times for some of the machinery obtained can be measured in years, yet

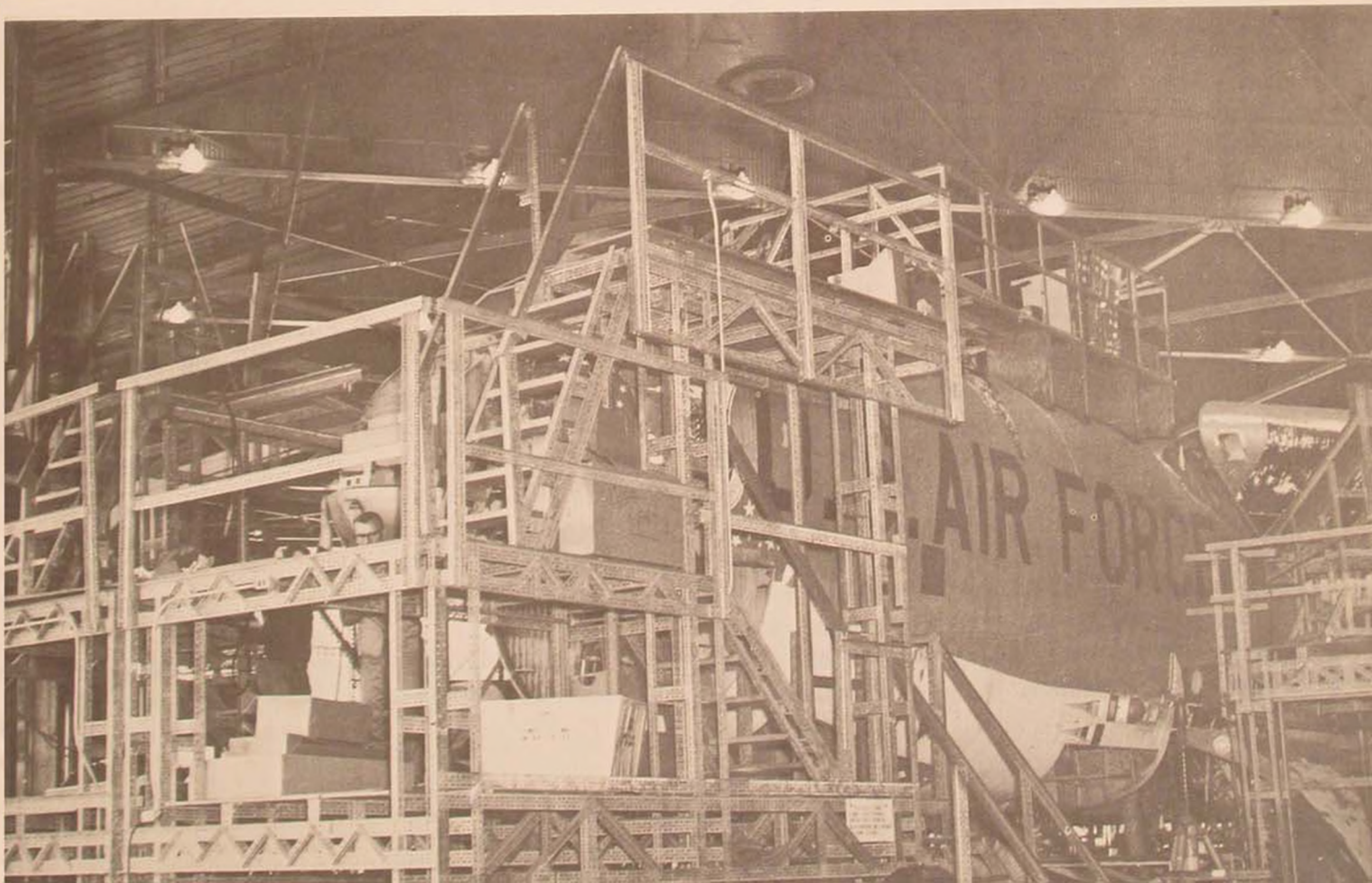
we have cases on file of such equipment being located, installed, and operational within a matter of weeks. Here are some examples of how this is paying off.

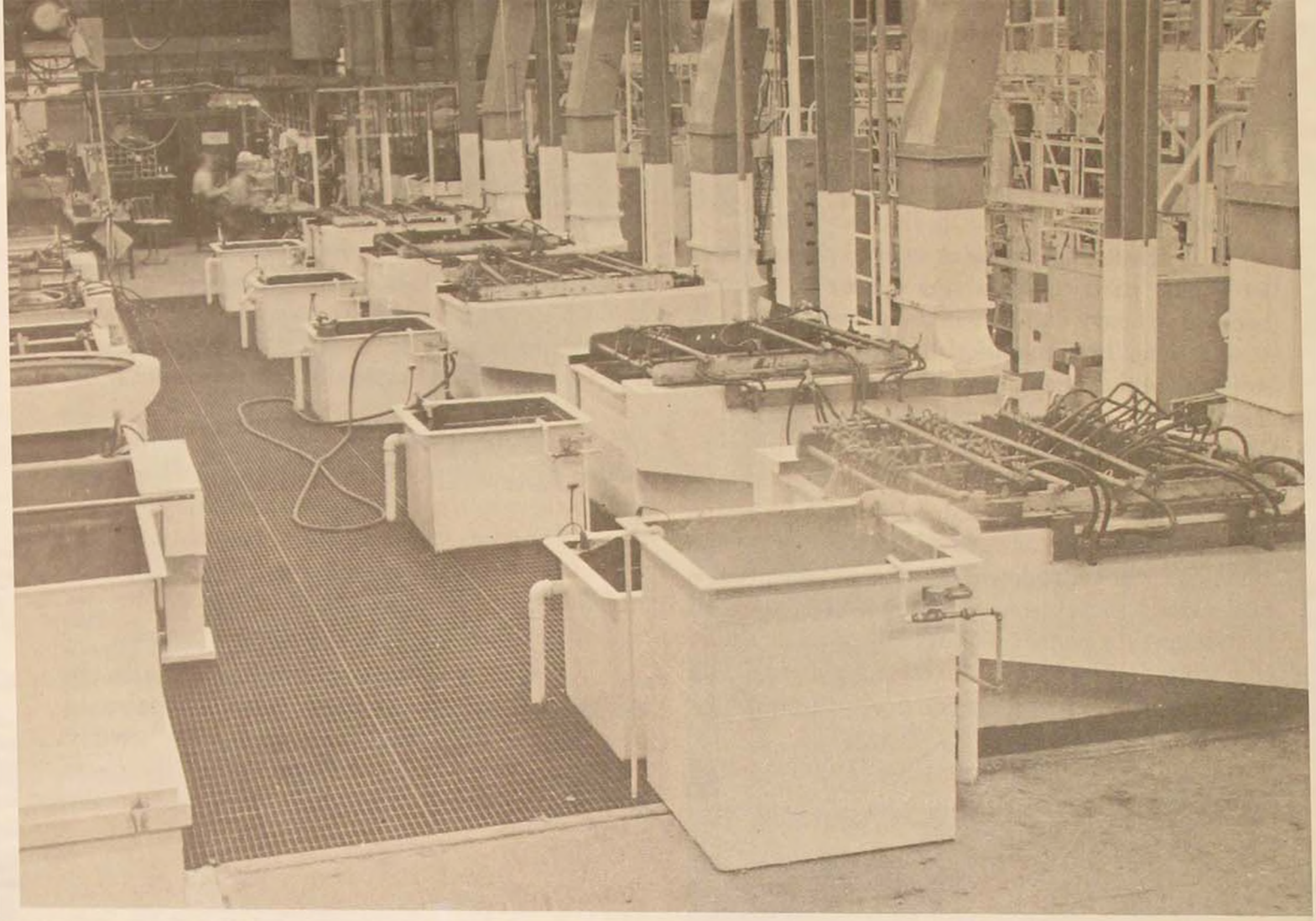
• Heat-treat furnaces used to stress-relieve jet engine parts in the shops were obsolete and because of heavy use were in danger of breakdown at any time. In recognition that this could cause stoppage of the jet engine production line, procurement action had been initiated to obtain new furnaces, but lead time was 18 months. Funds were in short supply, and consequently new furnaces had been on back-order status for some 2½ years. Intensive screening of excess lists was resorted to when furnace breakdown became imminent. Replacement furnaces, some almost new, were located and shipped to OCAMA within 30 days after action was started. Besides eliminating a potential line stoppage, this excess property procurement saved the Air Force approximately $185,000.

• In July 1963 the Air Force concentrated the entire J-57 engine overhaul program at OCAMA. This made sense in terms of economy, but it threw an extra heavy workload on chromium-plating facilities. Engine overhaul in a depot follows this sequence: disassembly, cleaning, inspection, rework, assembly, and test. Rework is the key to producing a serviceable engine, and most rework consists of grinding to below tolerances, plating to above, and regrinding to specifications. Thus replacement of worn material by plating on new is a key procedure. A check of the excess list plus a trip to Detroit produced a complete chromium-plating system, including tanks, rectifiers, pumps, and ductwork, that was excess at the Ford plant because of contract termination. Installation of the system at OCAMA saved well over $75,000, plus the added and timely capability needed to ensure success of the J-57 single point repair program.

• Quality improvements can also be achieved, thereby aiding productivity. For example, contaminants that creep into water used in plating processes can cause defective end products. The process can be materially improved by first

Slotted-angle metal erector scaffolding is used in modification of the B-52. Like tinker toys, it can be taken apart and reconstructed in many different configurations, thus conserving on labor and material costs while providing maximum shop flexibility.





The chromium-plating facility was obtained from the Ford Motor Company on termination of a Government contract. Over $75,000 was saved and single-pointing of the J-57 engine workload was expedited through acquisition and reuse of this excess equipment.

deionizing the water. The price tag for such equipment is $15,000, if funds are available and procurement approval is secured—a big "if" in these days of cost avoidance. A search of the files revealed a complete Government-owned water-deionizer system excess to the needs of the Martin Company at its Denver missile plant. Installation of the system at OCAMA will ensure that all water used in the plating shops is first deionized.

Many other examples can be cited of how vigorous exploitation of this program has helped to modernize OCAMA's shop facilities. Of course what we are really talking about is a first-class "scrounging" effort, and as in all such efforts a degree of expertise helps. This degree of expertise has been developed by centering responsibility within certain specific industrial engineering functions. The results have paid off in terms of shortened procurement lead time, cost avoidance, and improved productivity.

Because of its considerable involvement in this effort, OCAMA has been able to assist other DOD agencies. For example, the National Cash Register Company recently declared constant-speed drive test equipment surplus as a result of contract termination. After OCAMA had utilized as much of this equipment as it needed, a sizable portion still remained that was slated for salvage. A check with the appropriate office in the Department of the Navy revealed a real need for equipment of this nature in new test cells being installed at North Island and Pensacola. The Navy paid transportation costs and received well over a quarter of a million dollars worth of equipment, which it has since put to good use.

numerical control (N/C)

In 1949 the Air Force became concerned over production lead times for the tooling associated

with new aircraft and missile designs. Experience during World War II had clearly indicated that conventional manual and tracer-controlled machine tools could not readily cope with frequent design changes and that they were not speedy enough to produce adequately in an emergency. An intensive research and development program was undertaken, and by 1953 the Servomechanisms Laboratory of Massachusetts Institute of Technology had successfully harnessed electronics to machine tooling and produced a numerically controlled (N/C) milling machine. Subsequent developments from this marriage of modern data processing to machine tools have revolutionized industrial processing in the United States. This revolution promises small-lot cost reduction paralleling the lowered costs of mass production brought on by automation.

Recognizing the pertinence of this new technique to depot operations, AFLC directed that a numerical control service test center be established at OCAMA. Specific objectives included the establishment of management and operational techniques and procedures for applying N/C equipment to depot maintenance production and emergency manufacturing requirements. The test is currently well under way, and the findings to date appear significant.

For example, one of the machines in use is a Morey Profile Milling Machine controlled by a programed magnetic tape. On Project Fast Fix, involving 59 B-52's, 6 fuel booster pumps per aircraft required stress relief milling. To accomplish the job on conventional machines using contractor-furnished fixtures would have required 64 hours. Using the Morey, the job was done in 8 hours with an estimated savings of $11,151. Further productivity increase was obtained by a shortening of aircraft down time.

Again, in January 1964 we were faced with the need to modify the hinges on certain Atlas silo doors. Machining was required along with fabrication of fixtures and holding devices. Estimates of conventional repair amounted to 30 hours of machine time plus the time needed to manufacture appropriate fixtures and holding devices. By use of the Morey, the job was done in 10 hours with no need for jigs or fixtures.

A Burgmaster tape-controlled drill press has been in use for over a year and to date has fabricated some 6000 parts in support of 88 different jobs. Records indicate a savings in the order of 100 per cent over conventional methods. In one specific case involving a Plexiglas part of a KC-135, the standard called for 2 hours 4 minutes by conventional means; the Burgmaster did it in 11 minutes. In another instance this same drill produced 1750 engine brackets required to unground the B-50 force in one half the time required by an all-out effort on 6 conventional machines. Savings in lead time, vital in returning grounded aircraft to service, can be as important as dollar savings.

Currently five N/C machines are in operation at OCAMA with two more slated for installation by early 1965. The machines are costly, ranging in price from $27,000 for the least sophisticated to $240,000 for a highly versatile Milwaukee-Matic, capable of handling 31 different tools at one time. Experience to date justifies their cost, however, in terms of time saved, higher quality (the machines can hold to much tighter tolerances than a man), and the elimination of jig and fixture requirements. In general, the savings result from reduction of nonproductive actions inherent in human labor along with continuous operation at optimum speeds. This lets man do what he does best—THINK—and lets machines do what they do best—WORK. The result is lower-cost end items produced more rapidly and at a higher quality level—the very essence of improved productivity.

The technological advancement in N/C today is so rapid that new developments are outrunning our ability to include them in hardware as well as our ability to manage them. As an example of our planning, a system promising a quantum jump in AFLC productivity might function something like this: a required part would be rough-sketched by a light-beam pencil on a fluorescent screen; converted to a mathematical description; analyzed for design parameters and optimum stress qualities; converted to machine instructions; scheduled to individual machines; produced on any of a group of machines strategically located within the AFLC depot complex under automatic control; continuously inspected during machining, with all detected errors corrected; all dollar costs during the operation recorded; and finally the entire operation analyzed, with a report on any required actions to improve the product or lower the cost. This is not science fiction, since each of these steps is under

development today. The complete sequence can be uninterrupted from start to finish when appropriate computers become available. The removal of the tedious manual labor promised by these developments indicates still more reduction in the cost of producing a part in the near future.

nontraditional machinery

Used parts made of cobalt, tungsten, and titanium present difficult machining problems and as a result suffer high condemnation rates and early scrappage. To reduce costs here, OCAMA experimented with the use of electrical discharge machines as a means of metalworking. These experiments indicated a high potential for the technique, and two Elox machines were acquired several years ago at a cost of some $66,000. As a direct result, many parts previously condemned are now reworked and returned to service. In addition to this productivity increase, machining time by ordinary methods was also reduced sharply. For example, some 450 TF-33 jet engine fuel distributors required tech-order modification. Because of the metal's hardness and the need for an offset operation, grinding on an ordinary machine required 11 hours. The Elox did the same job in 45 minutes and did it to supertight tolerances.

These machines have repaid their initial cost many times over. Since their acquisition, parts made of sintered tungsten carbide and new exotic alloys are beginning to appear in ever increasing numbers. Without this unique capability to work intricate shapes regardless of hardness, these workloads could not be accomplished and depot responsiveness and flexibility would have been curtailed accordingly.

total quality control

From management's viewpoint, the primary mission of OCAMA shops is to produce a quality product on time and at an acceptable cost. SAC's plans are predicated on input and output dates, by tail number, of B-52's and KC-135's undergoing depot overhaul and modification. Schedules, once established, tend to become inviolate. TAC and ADC flying-hour programs hinge upon the availability of jet engines flowing from depot repair lines. In addition, many hundreds of thousands of line items —pumps, valves, navigational instruments, fuel controls, air accessories, constant speed drives, refueling booms—must be processed on time to meet requirements of the operating commands.

To increase productivity while confronted with the pressures of demanding schedules frequently poses a dilemma for the production manager. An increase in productivity *can* be achieved, in terms of decreased flow time or reduced operating costs, but all too often at the expense of a trade-off in quality. It takes time to rework a piece of equipment properly, test it, and ensure that it performs up to standard. Indiscriminate speedups or cutting corners can lead to disastrous consequences if quality is compromised. Increasing productivity in the face of this ever present dichotomy, production versus quality, presents a tough challenge. It can be met by (a) increasing production with no attendant increase in acceptable reject rates, or (b) keeping production constant while significantly reducing the reject rates.

a significant case history

Today OCAMA shops have a comprehensive program under way embodying both these concepts. To a degree, this program has been fundamentally influenced by the experience of one of our major American automobile manufacturers. Since a basic philosophy of operation is involved, it might be well to examine in detail the derivation and subsequent highly successful application of this philosophy to the production/quality dilemma faced by this particular company.* The problems are not unlike our own.

Not long ago one of the "big three" made a radical change in its merchandising policy. Intensive market research had pointed up the critical importance of quality guarantees upon sales. In effect the surveys said, "You will sell more cars—if you can guarantee performance." The question thus became one of how to produce effectively, yet competitively, a vehicle that could credibly carry a suitable customer-enticing warranty.

After careful assessment by top management it was decided that the car's power-train components—the engine block, transmission, rear axle, differential, etc., that provided the power to the

*"Golden Key to Production Profits," *Dun's Review and Modern Industry*, April 1963, p. 50.

vehicle—were what caused the customer the greatest concern and expense. Next came the all-important decision on the warranty itself.

An intensive quality-analysis program was undertaken which uncovered significant data. As a result, leaky piston seals were redesigned to a greater degree of rigidity, which in turn ensured better assembly techniques. It was found that a sealing ring in a motor-cooling pump could be inspected more reliably by "finger-feel" than by optical or mechanical testing equipment. Expensive 100 per cent inspection of porous oil pump castings led to redesign of casting processes. These and many similar steps helped to increase performance reliability.

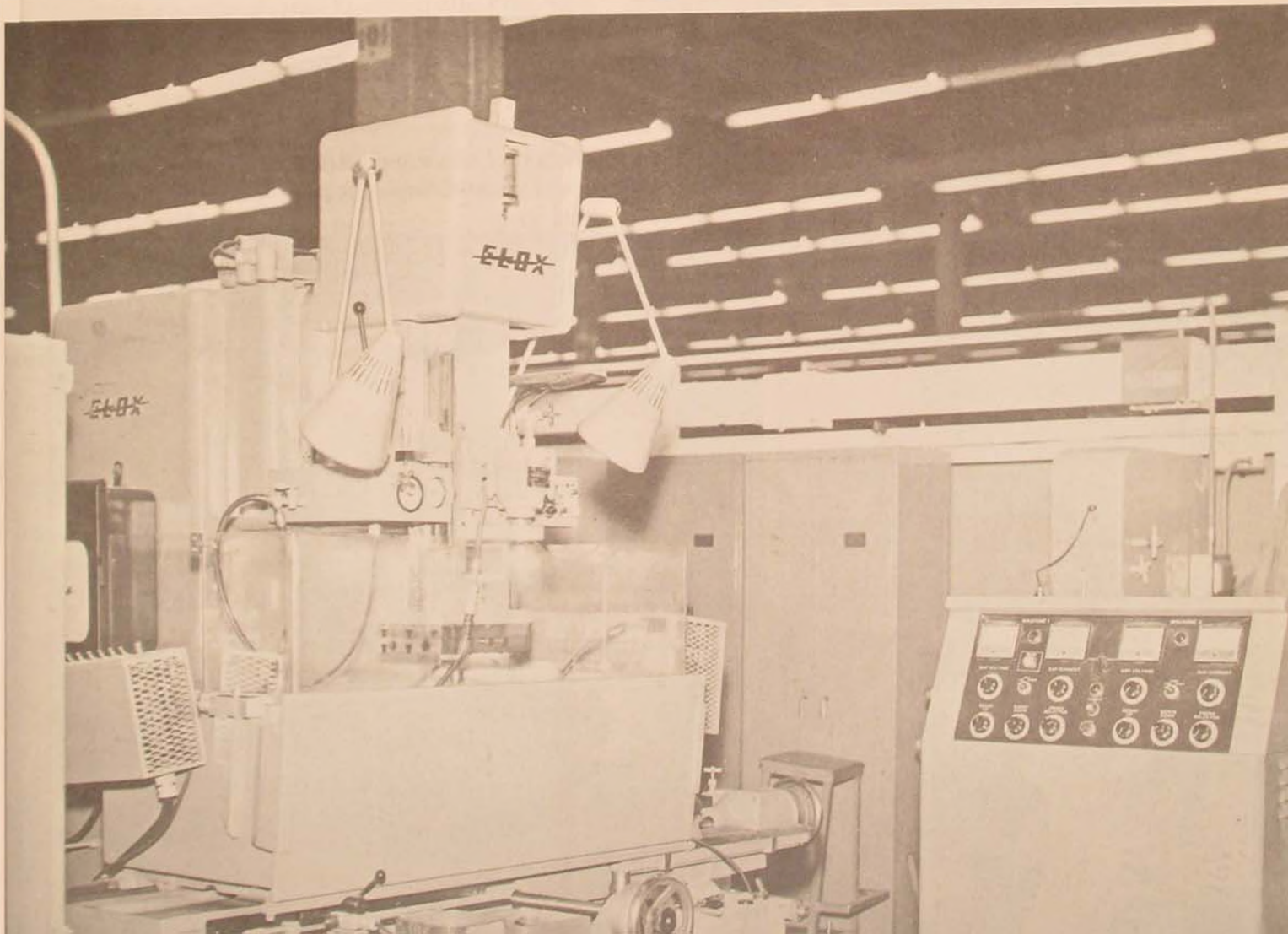
Most important of all was the need for valid and reliable data on the critical transmission parts. To gather pertinent statistical information, some 12,000 transmissions were built and road-tested. Many of these were installed in New York City taxicabs. The results were then carefully analyzed. The findings indicated that the *main reason* for failure before 50,000 miles was minute quantities of dirt that had gotten into the transmission cases during assembly. To overcome this problem, the company built a large "clean room" to control dust levels during assembly operations and took further steps to ensure stringent cleaning controls during assembly and installation of critical components.

Based upon these experiences, the corporation then decided to pursue a precedent-shattering marketing policy which guaranteed the customer 50,000 miles or 5 years, whichever came first, of trouble-free power-train operation. The results of this policy made (and are making) automotive history.

True, this approach initially increased production costs, but the increase in quality coupled with the attendant increase in sales more than offset these costs. Thus a significant increase in productivity was achieved.

A statement by the company's Vice President

Elox electrical discharge machine for removing metal. The metal is removed by local application of intense heat, the cutting tool being a high-energy electrical discharge.

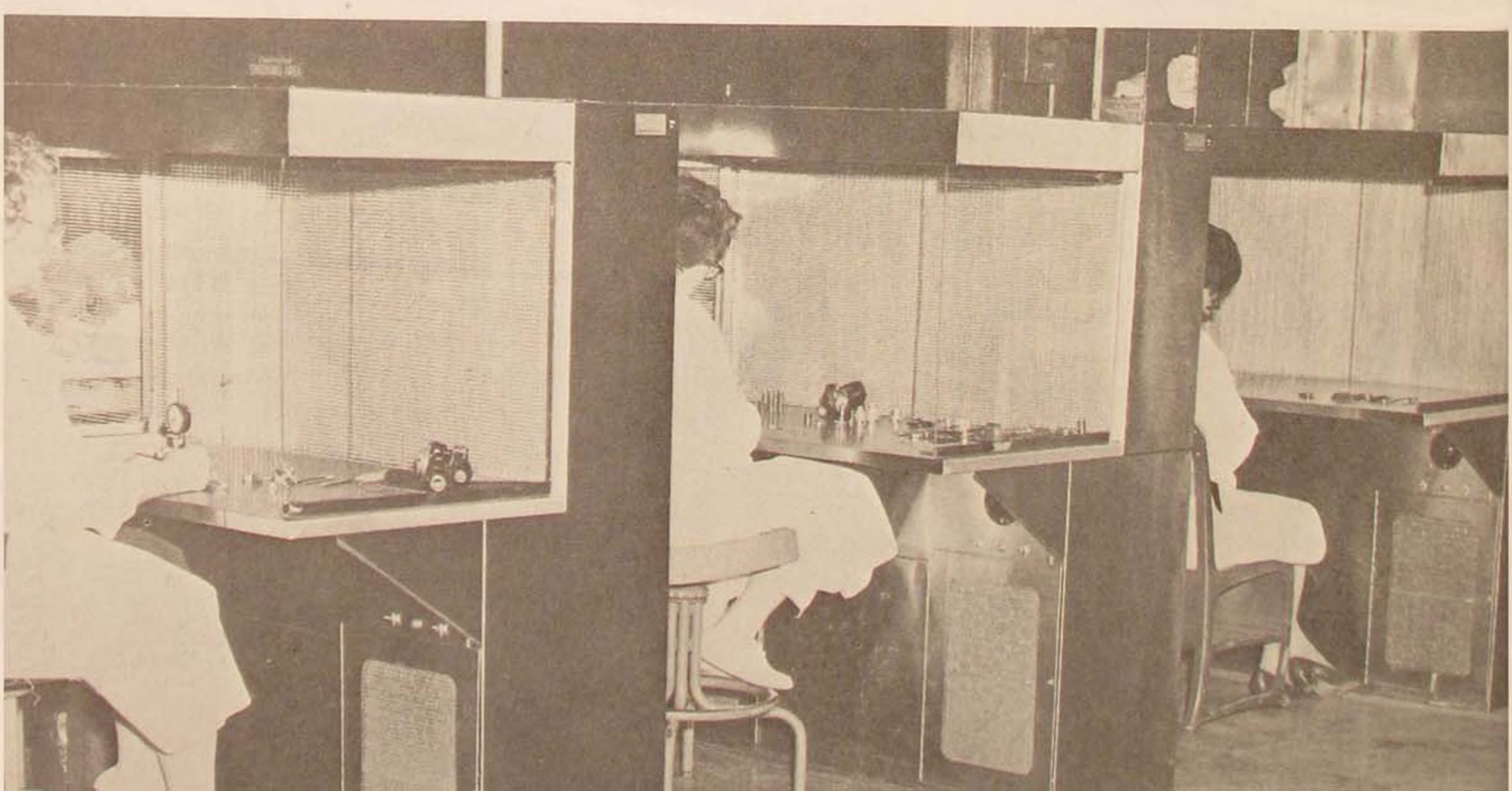


of Quality Control and Reliability brings home the importance of this "clean room" approach. "By cleaning up the dirt problem," he stated, "we went from a 20,000-mile transmission to 50,000 miles. If we eased up on controls, we would be back to 20,000 miles in a week." The lesson inherent in this case history is clear. It now provides one of the cornerstones for OCAMA's approach to the production/quality dilemma. If the dirt problem assumes such significance in the manufacture and assembly of automobiles, does it not stand to reason that it applies as well—if not more so—to the overhaul, repair, and assembly of aircraft, engines, missile systems, and their components? Cleaning up the dirt problem is thus on the top of OCAMA's priority list in increasing productivity by improving quality. To date, the results of this approach have been gratifying.

For example, one of the key Pratt and Whitney engine accessories worked at OCAMA is the bleed valve and governor assembly. The valve bleeds off excessive pressures built up in the compressor section of the engine during acceleration and deceleration upon command of the governor. Should these components fail to operate properly, compressor stall can occur. Wear limit tolerances range from .0001 inch to 3 light bands, so precise workmanship and rigid environmental control are necessary. For some six years these components had been worked in an open shop exposed to normal factory air-conditioned atmosphere. Because of the complexity of the operation, a reject rate of some 20 per cent had come to be accepted as normal, and man-hour work standards were adjusted accordingly.

The new approach to increased productivity now dictated a searching look at the so-called "normal factory atmosphere." Air samplings were taken which indicated a dust count ranging up to 200,000 particles per cubic foot with sizes of one micron in diameter or larger. Comparison with particulate quantity-versus-distribution charts compiled by the Middletown Air Materiel Area revealed an unacceptable condition. Middletown, which had recently done a significant amount of research in the field of clean room technology, determined that instruments, gyros, engine pumps, actuators, and, in general, components operating with tolerances in the order of .0001 inch or smaller should be handled in an atmosphere which contained no more than 20,000 particles per cubic foot with diameters of one micron or more. (A micron is one-thousandth of a millimeter, and any particle smaller than 25 microns cannot be seen

Laminar flow work benches are an innovation in the overhaul of jet engine bleed valve governors, ensuring a contamination-free atmosphere around the work piece.



with the naked eye.) We thus had a clear indication that if we were to improve product quality we should work valves and governors in a clean room.

instant clean rooms

Clean rooms are expensive. They take time to construct, they lack flexibility, and the military procedure for new construction is long, time consuming, and not always successful. Fortunately, the Advanced Manufacturing Development Division of the Sandia Corporation had recently discovered a new and relatively inexpensive technique for achieving clean room conditions by use of air flowing in laminar fashion. Incorporated into a work bench, this technique provides an ideal way to achieve clean room conditions without the expense of creating a conventional clean room. Further, such work benches can be procured "off the shelf."

Twelve of these laminar flow benches were obtained along with an "air bubble" room which had been declared excess by the Air Proving Ground Center. Industrial engineers then reviewed the entire overhaul operation and incorporated both the new benches and the air bubble room into a revised production and testing assembly line. Prior to layout realignment, all supervisors and workers involved were given a special training course on the techniques—the whys and wherefores, the do's and don't's—of clean room operations. Graphic examples were given of how dirt—dirt so small it could not be seen with the naked eye—could score pistons, lock valves, clog lines, and cause short circuits. The correlation between cleanliness and good work practices and their impact upon product quality and reliability were hammered home.

Experience with "before and after" quality clearly and strongly vindicates the wisdom of the new approach. The reject rate dropped from 20 per cent to 5 per cent. Layout improvement plus decreased rework dropped the number of man-hours required for complete overhaul by 10 per cent. Finally (and this should come as no surprise to students of management) we earned another dividend—the morale of shop workers improved greatly. To a degree, we had repeated and validated Elton Mayo's classic experiment of the mid-1920's at the Hawthorne Works of the Western Electric Company. The attention showered on procedures, layout, and personal performance had its definite and measurable effect on individual (and team) productivity.

visual aids

In October of 1963, AFLC Manual 66-11 was published. This manual stands as a landmark in its comprehensive treatment of quality control within depot shops. It prescribes the latest scientific techniques utilizing sampling, process and procedural verification, product acceptance, and production certification verification. Above all, it stresses AFLC's goal of ensuring optimum quality of every end item or service produced.

To the uninitiated or untrained, however, statistical sampling techniques plus their attendant indices can be confusing. Both quality and production personnel at OCAMA were thus faced with a problem of communication and comprehension in implementing the new AFLC manual. To meet the challenge, a special console was designed which graphically portrays the complete quality control system for the commodity involved. Appropriate averages and control limits are prominently displayed and numbered. Large green, amber, and red neon lights are mounted atop the console. Operation is simple. If all processes are "in control," the green light comes on; when "warning limits" are reached, the amber light flashes; and when an "out of control" situation exists, the bright red light stands out like a sore thumb. Specific numbered areas light up on amber or red to further isolate and pinpoint deficiencies.

One such console, appropriately configured, was placed in operation in November 1963 on the KC-135 modification/maintenance line. The trend in defects has dropped sharply, to date decreasing over 50 per cent.

Currently fifteen of these consoles are in use throughout OCAMA shops, and their impact upon productivity is felt daily. The red light is anathema to the production foreman—he bends all effort to turn it amber or green. Control of the switch, literally speaking, provides the quality inspector with the authority he needs to ensure adherence to the desired standard. Further, top management gets an immediate "eyeball" on overall shop quality by the color of the lights, while the worker has be-

fore him, at all times, graphic evidence of his and his unit's quality performance.

personnel output

People can be induced to work harder in order to increase productivity, though such efforts generally tend to be short-lived and of an emergency nature. Sooner or later the worker will return to his "normal" pace, and to budge him from this level of activity, without change in his tools or work environment, is difficult. For this reason standards for work accomplishment are established by industrial engineers based upon the average length of time it takes the average worker to perform a job.

To achieve above-average performance at OCAMA, an intensive awards program is pursued. Outstanding workers are suitably recognized by certificates, plaques, and newspaper, radio, and television publicity along with special dinners and lunches attended by top management. A picture "honor roll" is maintained in the shop area of all such workers, and considerable effort is expended to provide these personnel increased stature in the eyes of their coworkers. Currently, specific awards are given for Producer of the Week, Manager of the Month, Safety Keyman of the Month, Manager of the Year, Director's Monthly Award for Outstanding Achievement, and Maintenance Prospector of the Month. This program is supplemented by encouraging personnel to compete for national Federal and non-Federal awards and trophies.

In addition, work center teams of management personnel compete monthly for an award based upon key management indicators. This competition is especially keen, and in the process a healthy improvement has been noted in lowered cost per direct product earned hour and increased output per man-day. Specific elements rated include total labor effectiveness, material planning, labor standards coverage, housekeeping, quality, methods improvement, and production. The real payoff from this particular program comes from identification of the low-rated work centers and their subsequent efforts to upgrade their position relative to the group. The net result is an unremitting pressure in the direction of improved performance.

Not all efforts to increase productivity at OCAMA have proved successful. In some cases ideas backfired, proved costly, and had to be abandoned. In other cases productivity increased while effectivity actually fell. This anomalous situation arose in the case of the jet engine bleed valve governors: the increase in production was so great that we exhausted the stock of reparables and were unable readily to reposition the work force to other areas. The consequent idle time militated against the rating system employed in this work center, and the net result reflected a decrease in effectivity. We just hadn't planned on the increased performance and were insufficiently flexible to cope with it rapidly when it came.

By and large, however, our experience to date clearly indicates that increases in productivity and attendant cost reductions can be planned for and achieved. To do so requires vigorous exploitation of all existing means. Prudent and timely capital investments in better tools and equipment offer the most immediate means. Not to be overlooked are the increases afforded by improved procedures and techniques, coupled with ever present inducements to the worker to increase his output. By constant interplay among these productivity elements, OCAMA has managed an average 4.2 per cent per year increase in its output per man-day for the past four years. Overriding this increase has been the checkrein of *quality* performance. Every action taken is carefully weighed for its impact upon quality production.

In no case is compromise possible where quality is involved. Quantity production takes a back seat in the race to achieve OCAMA's quality goal of a zero defect record.

Hq Oklahoma City Air Materiel Area

"MORE FIT TO CARRY THE HOD THAN THE EPAULET"

MAJOR RAY W. ALVORD AND
CAPTAIN LYLE D. KAAPKE

THE TERSE, succinct, and blunt judgment here used as a title was written by a commanding officer about the performance of one of his subordinates. It is familiar to many officers and represents one of the earliest military attempts at performance evaluation. While the statement may seem humorous in a modern-day context, it was a revealing and probably honest evaluation of the officer in question.

Officer evaluation techniques and philosophy have changed greatly from that simple approach. The method utilized by the Air Force today under AFM 36-10, *Air Force Officer Effectiveness and Training Reports*, is the result of many years of experience and scientific studies designed to produce as realistic, unbiased, and valid performance ratings as possible. The system in-being is for all practical purposes now in its adolescent state, having been basically conceived in 1951. Changes in format, rating factors, and administrative instructions have occurred, but the overall philosophy has not shifted to any great degree since inception. More important is the continued dependence of the system upon reporting officials' and indorsing officials' respect for the intent and spirit of the OER, the acceptance by officers being rated, and the validity of performance ratings in supporting personnel decisions.

Although extensive data are developed on rating tendencies by command, by duty specialty, etc., very little information exists regarding the degree to which officers as a group correctly utilize or are satisfied with performance evaluation. From conversations with individuals, group discussions, and service school staff studies, one would receive the impression that an overwhelming series of problems exists. In the light of detailed examination, many of these problems are found to be inconsistent with what is known regarding both the evaluation and personnel systems. In order to answer the question of officer satisfaction with personnel evaluation more specifically, a Hq USAF-approved research study was initiated to examine potential problem areas and test new concepts of rating scales. If there is dissatisfaction in the ranks regarding evaluation techniques, can it be related to the extent to which officers are familiar with the system or experienced in rendering performance ratings? Are there varying degrees of satisfaction that can be related to grade, duties, major air command, etc.?

To answer these questions, the authors visited selected bases in six major commands and surveyed more than 3000 officers serving in the grades of lieutenant through colonel. The survey, consisting largely of written materials, permitted participating officers to react to the current evaluation system and to make recommendations in a number of areas. These officers, while initially reluctant to participate in "another survey," were almost universally satisfied with the opportunity to comment on the program. The results of this detailed study are now being analyzed.

Possibly one of the most revealing portions of the entire study was the spontaneous discussion of aspects of the evaluation system by survey participants. No attempt was made to require or forcefully solicit opinions from officers in the sample beyond the written questionnaire items, but many individual contacts and discussions occurred.

Almost without exception those involved in discussions criticized some aspect of the evaluation system—generally failure of officers or organizations to respect the system. These points were rather general; that is to say, the same type of opinion and problem appeared repeatedly, with variations, as each base was visited.

For illustrative purposes we are including a sample of the types of problems reported. They apparently exist for a small percentage of the officer force, and obviously the instances are unverified in that the reported factors or conditions were not investigated. An investigation is irrelevant, however, because we have no reason to question the motives or attitudes of the individual officer who felt sufficiently interested to discuss a problem. To him these problems were real, whether or not he had actually experienced them personally. Since the problems were real, equally real solutions must be considered.

—An officer is assigned to a reporting official as he reports on base. The officer then departs for school. After completion of the school, he returns to the job for two weeks. With no immediate contact or supervision, the supervisor is required to write an OER. Is this evaluation realistic?

—An officer is assigned to a flying unit. His immediate supervisor is overseas on rotational TDY. As his supervisor returns after three months, the officer departs for a tour. The officer asks, "How can he know what I'm doing?"

—Individual officers are rotated into new assignments with orders delayed for various reasons. They are still rated by their old supervisor, who is no longer immediately aware of their job performance.

—Indorsing officials two or more steps removed from direct contact or observation of the individual's work are required to comment on the rating.

—Some squadron commanders may write twenty to thirty OER's in one month. The question posed is related to good management and whether the rating task can be adequately performed in this situation. How does this rating load affect repetitiveness in ratings? Word pictures?

—Reports are physically prepared by secretaries, "professional" OER writers, or someone other than the official reporting officer.

—An indorsing official returns an OER for "revision" until it no longer contains any differences of opinion. Rater and indorser then "agree."

—An organization would not permit "referral" OER's to be sent forward because this kind of thing would reflect on the quality of the organization.

—OER's are sent back for "administrative" changes by higher-level organizations, perhaps with such instructions as "Fill the word picture completely" or "Do not leave any rating factors as unobserved."

—Exhaustive administrative processing. Nine separate committees or individuals review each OER prior to its departure from the *base*.

—A reporting official must write a certain level of report based on a crew's "status" rather than on an individual crew member's contribution or ability. A low personal OER for the reporting official is threatened if he does not comply.

—Assignments and raters are manipulated to secure a series of "outstanding" ratings for a favored officer.

—Additional indorsers are required on a routine basis to add more "weight" to officer ratings from the unit.

—OER's are utilized for motivational purposes in the improper sense, i.e., units that get individuals who cannot perform the mission well but if rated correctly would become demotivated and quit working altogether solve the problem by giving high ratings to everyone in the hope that some board members will read between the lines.

—By deliberately avoiding "referral" reports through adroit placement of rating checks and use of words, a rater leaves the individual with no hope of rebuttal, voiding, or possible promotion.

—An officer with a series of typically "effective and competent" ratings is placed on the control roster and identified for release from service because the unit keeps only "outstanding" officers.

—The true level of performance is adjusted upward to compensate for what the reporting official feels may be a degree of rating inflation.

—Nonperformance situations such as participation in seat belt contests, fund drives, etc. are given excessive weight in rating performance.

—Rating officers show a lack of concern for the importance of the OER in the individual's career.

—Arbitrary rating ceilings or floors are established because the reporting official or commander announces that no officer is ever better or worse than some specified level.

These are only a sampling of the variations. The feeling and intensity related to these problems are not evident in the written word. Many officers simply expressed a feeling of helplessness in explaining or understanding why the Air Force was not aware of these problems and was not controlling such actions. Actually, very few new types of situations were reported, and provisions existed in AFM 36-10 to resolve many conditions had the policies been properly applied.

A most interesting aspect was that after two or three base visits rarely did a completely new type of situation appear—repetition was the rule. As the visits progressed, it became evident that the entire area of concern with officer evaluation could be resolved into several general types of situations. Though many of the comments fit equally well into several of the categories, the main problem areas can be categorized as follows:

Problem Type 1: administrative limitations, burdens, or variations. Policy variations, special restrictions, or applications by units or commanders place unintended restrictions and rating policies into the evaluation program.

Problem Type 2: lack of direct observation. Operational conditions or physical locations frequently place reporting or indorsing officials in a position which makes it impossible or difficult to render a performance judgment based on direct observation. Both reporting officials and officers being rated resent this lack of contact. Most often the problem is suggested by the man being rated—he feels his true qualities may not have been recognized. Under these conditions "neutral" type ratings are awarded.

Problem Type 3: "beating the system." Officers performing ratings speculate on what methods can be utilized to secure a higher ratio of promotions for officers in the unit, to compensate for supposed inflation, differences in command rating levels, or similar conditions where rating adjustments are attempted.

Problem Type 4: rating standards. Variations exist in performance concepts among different rating officials as well as the emphasis placed on specific rating factors or policies by the immediate supervisor of each rating official.

Problem Type 5: confusion or disregard of the purpose and intent of evaluation. This confusion most commonly appears as an influence on ratings due to application of unrealistic weights to nonperformance factors or lack of knowledge about various aspects of the OER program.

Aside from the examples of specific problems and our attempt to categorize them by types, there were additional impressions that were positive and reassuring.

Throughout all visits and discussions we detected no repetitive derogatory comments with regard to the form or intent of the evaluation system. Officers who did report problems were concentrating primarily on aspects of application rather than design. We also noted that officers universally have a definite interest in the status of the program. They want to know what is taking place and where they stand as individuals. Because many personal career decisions are involved with OER relationships, the level of officer speculation regarding OER-related events tends to be high. Questions were continually posed as to the effect of not having a college degree on evaluation or promotion, the effect of a single low OER rating, rating levels for officers of their grade, etc. Mere speculation as to the correct answers to these questions creates many of the problem areas reported. Events or conditions not directly related to the evaluation system then tend to be attributed to past ratings or relationships with reporting officials. For example, officers not selected for promotion tend to blame the OER system whereas more often than not they are simply the victims of a quota system that forces the boards to pass over a given number of officers. They can rationalize failure to be selected only by blaming a past rating official, personality differences, lack of a college degree, etc. Some of these conditions may in fact be true, but more often the cause and effect are only remotely related to any basic administrative or psychological foundation of the OER system.

It is interesting to note that a degree of inflation in ratings is more or less universally accepted.

All feel that rating patterns do not follow the recommended distribution shown on OER forms. Possibly because of this acceptance or personal self-confidence, no officer really expects that he will receive a "referral" type OER. Those who have been recipients feel the referral was unjustified and resulted from excessive weight being given to non-performance-type relationships.

One of the most profound impressions derived during these visits was related to the wide variation in OER interest as expressed in comments by officers from different organizations. In some units it was apparent that tacit policies existed to encourage inflation of OER rating levels. In others administrative policies or procedures unnecessarily complicated the task. At the lower end of the spectrum the unit attitude was one of near indifference to officer evaluation documents and concepts—a tedious task with lowest priority. In almost every instance, however, the level of unit interest could be traced through the discussion to emphasis placed on the OER program by the organizational commander. We must therefore conclude that the intensity of concern for officer evaluation within a unit is merely an extension of the commander's interest.

THE ULTIMATE question remains: How can all this information be incorporated into policy and management systems? It is still to be seen. The attitudes and opinions expressed verbally represent nothing particularly new regarding performance evaluation. The problems are old and familiar. They are of this type because the basic ingredients of any personnel evaluation system remain unchanged—reporting official judgments and individual officer satisfaction. We have at least received from these personal contacts a stimulus and feeling for the types of problems that are real to officers in the Air Force. On this basis we have made some tentative conclusions which may be well worth the consideration of all officers who are involved in evaluation.

• Problem areas related to evaluation of performance do exist to the degree that the individual considers the situation as "real" and reflecting on his status or career in the Air Force. These problem areas cannot be ignored.

• The problems are "real" to the individual officer whether or not he personally experienced the conditions—he knows of a guy who . . .

• Many of the problems can be traced directly to lack of information or understanding of the OER and related personnel systems.

• Individuals attempt to make complex judgments as to why certain career-related events occur. Because of concern with OER and rating relationships in general, they speculate. In speculating they arrive at decisions which may or may not be accurate.

• All officers are interested in the OER program and by far the majority feel that the program is satisfactory. Most officers participating either as reporting officials or as administrators feel they are conscientiously accomplishing their tasks and would deny that anything other than performance variables influences their judgments. At the same time, very little effort is made to prepare the individual officer for eventual rating responsibilities.

A realistic solution to the specific problems or general types of problems may never be achieved. It is theoretically and practically impossible at this stage of human understanding to define the factors of personality, duty responsibilities, and interactions of these with Air Force requirements in such a way that every officer and his reporting official are in a state of perfect accord. The officer passed over or removed for cause may never be able to recognize his contribution to the event, nor will every rater fully understand his own biases.

The most important consideration in the area of personnel evaluation is that it remains a challenge. The challenge can be met only if we recognize that problem areas, whatever their magnitude, do remain. A most refreshing aspect of these many visits and discussions was that there were so few different kinds of problems. Reduced to the least common denominator, the two most challenging and perhaps most frustrating areas, we feel, are these:

1) The reporting official's interpretation of the rating task and the standards he applies in the evaluation process. Some have suggested that we in fact have 130,000 sets of rules for rating.

2) The rating task and resulting reliability of

ratings are further compromised by actual or tacit policies emphasized by organizations at every level.

We tend to receive the impression that somewhere in all our concern for administration, rating levels, etc., the ultimate rating system objective is dissipated. Very simply and idealistically, this objective is ultimately to identify and select the leadership necessary to accomplish the Air Force mission whether under hot- or cold-war conditions. We will undoubtedly have numerous changes in techniques and forms utilized for evaluation, but in fact we may be on the moon before these two basic, challenging problem areas are even partially solved. Evaluation systems may change, but the unpredictable nature of individuals remains.

What is most reassuring is the fact that, when presented logical arguments, most officers recognize the true nature of evaluation problems and approach the OER with a new objectivity. With emotionalism removed, most officers will pursue their career objectives with reasonable assurance—assurance that the USAF evaluation system is based on a sound philosophy and that one of the most reliable predictors of eventual leadership capability is a series of evaluations of performance as observed by a commander. But basic to these observations must be a realistic honesty which in fact separates the "hod" carriers from the wearers of the "epaulet," the potential leaders of the USAF.

6570th Personnel Research Laboratory

NOTICES

(Notices of general professional interest are accepted for our "Air Force Review" department.)

SUBJECT: Chaplain technique

TO: The Editor, *Air University Review*

For the past two years, during our squadron's annual 15-day tour of duty, I have—with the consent and encouragement of the commander—delivered daily a 5-minute inspirational message to the entire squadron, immediately after roll call.

In 1962, I chose each day a great passage from American literary or historic documents—some well known, e.g., the Declaration of Independence and the Constitution; some not so well known, e.g., Washington and Jefferson's addresses. After quoting the text, I briefly described its background and then applied it to current military and civilian life.

In 1963, I chose all texts from Lincoln's writings. Carl Sandburg's magnificent biography of Lincoln was particularly useful. For the 1964 annual encampment, I selected readings from and about George Washington.

The reactions of the listeners have been most favorable. Instead of a morning prayer, the legality and efficacy of which are questionable, the chaplain has an opportunity to stress a moral theme, link it with our American heritage, and apply it to squadron life.

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ATTENTION

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