What kind of air transport will we need in a space age that requires instant intercontinental deployment capability? Are we meeting the continuing, but underemphasized, manned bomber threat? What about survivability in tactical air warfare? Is the mixed-force concept getting the attention it deserves? What are the R&D prospects in the spectrum from VTOL and STOL all the way up into orbit? These and other questions were analyzed by Air Force top commanders at AFA's 1963 Convention.

MANNED AIRCRAFT REQUIREMENTS IN THE 1970s

A Symposium

The 1970s are around the corner. What will be the manned aircraft requirements in the coming, crucial decade? Five top Air Force commanders, whose areas of responsibility include air transport, air defense, tactical air warfare, strategic air warfare, and research and development, explored this controversial and vital question at a symposium September 12, 1963—one of the main features of the Air Force Association's Seventeenth Annual Convention and Aerospace Panorama.

Symposium moderator was Peter Hackes, National Broadcasting Company Pentagon correspondent. Mr. Hackes, a Washington-based newsman since 1955, regularly covers the Department of Defense "beat" for NBC and has covered the national manned spaceflight program since its inception.

Panelists were:

Gen. Joe W. Kelly, Commander, Military Air Transport Service, has been an airman since 1933 and was a veteran airmail pilot of the 1930s, a World War II bomb group commander in Europe, a postwar Strategic Air Command officer, and onetime USAF Director of Legislative Liaison. He commanded the Air Proving Ground before taking over MATS in 1960.

Lt. Gen. Herbert B. Thatcher, Commander, Air Defense Command, is a onetime infantryman who won his wings in 1936, and was an air combat commander during World War II in Europe. General Thatcher has served with SAC, with the Far East Air Force, with Continental Air Command, and as Director of Plans, Hq. USAF. Other posts have included Assistant DCS/Operations, US Strategic Air Forces, Pacific, during the atomic attack on Japan. He joined SAC as Vice Commander in 1948. From 1954 to 1957 he was commander of what was then the Air Research and Development (now AF Systems) Command. He became SAC commander in 1957.

Gen. Thomas S. Power, Commander in Chief, Strategic Air Command, has been an active military flyer since 1929. During World War II, General Power flew B-24s in North Africa and Italy and B-29s in the Pacific, and was DCS/Operations, US Strategic Air Forces, Pacific, during the atomic attack on Japan. He joined SAC as Vice Commander in 1948. From 1954 to 1957 he was commander of what was then the Air Research and Development (now AF Systems) Command. He became SAC commander in 1957.

Gen. Bernard A. Schriever, Commander, Air Force Systems Command, has been an airman since 1933 and is a onetime commercial airline pilot, a veteran military test pilot, holder of an M.S. in aeronautical engineering from Stanford University, and a veteran of the Pacific air war during World War II. Since World War II, he has specialized in research and development, and was instrumental in Air Force development of Atlas, Titan, Thor, and Minuteman missile systems.

A slightly abridged version of the symposium transcript follows:

It seems that this fact has led false prophets to predict the doom of the airplane and perhaps "the end of the flying Air Force." This panel can confidently be expected to challenge this thesis. I hope it can. The continued exploitation of technology, of course, is essential to the continued freedom not (Continued on following page)
Air Transport in the 1970s

GENERAL KELLY: These are my views on manned aircraft requirements for the 1970s, and their relationship to the role of the Military Air Transport Service as a combat-ready, flexible instrument of national policy.

First, we can be certain that we will need transport.

Secondly, it is essential that we continue to modernize and improve our transport capability so that it is ready instantly to provide efficient massive airlift to all points in the globe. Exactly what will be required is hard to say. Many people are hard at work to provide us with the best estimates of the future needs, and have indeed given us invaluable guidance in this area. It is at this point in the evaluation process that the planners and the engineers begin work to tailor transports to the needs of the Department of Defense and our national policy.

Most specifications developed in such studies must, of course, be classified. We can say generally that in addition to supporting brush-fire needs, MATS airlift force would be essential to the survival, recovery, and reconstitution of our whole national resources, particularly the deployment and employment of the United States military forces, including casualty evacuation and the nuclear attack environment. All this on a global scale.

This gives us the general ball park to which we must address our thinking for definitive assessments for future needs.

Other key factors to any aircraft program are the trend and the needs of the user; in this case the user is a military force. Its equipment size, quantity, and concepts for force deployment and use are all vitally important. For example, if we must think in terms of deploying a fighting unit such as an airborne division with its guns, tanks, and vehicles halfway around the world in a short time, and then keep such units resupplied by air, we introduce many design considerations to future cargo transport aircraft.

Today's cold-war needs are a different matter and are being met with a variety of aircraft which we now have in our airlift force. Most of these have already or are rapidly becoming obsolete through either advancing technology or by wear and tear. Our Douglas C-124 Globemasters provide a good example. This aircraft was truly an outstanding vehicle in its time and is still able to perform a very important job. Time and technology, however, have moved far beyond this grand old workhorse.

And so it is with most of our other transport aircraft, except perhaps for the relatively small numbers of the new C-130s and the C-135s in the MATS inventory.

Small items of cargo provide no real problem and can be lifted by most of the remainder of our force, including commercial carriers. But with changing concepts the need for a wider range of airlift capability continues to press upon us. The future massive needs of Army personnel and...
Manned Aircraft Requirements in the 1970s

Outsized military equipment against possible worldwide deployment under combat conditions will no longer be satisfied by our C-124s or the other aircraft in our present airlift force. Against this need we must also consider the C-133 Cargomaster, which is the largest cargo transport flying for MATS today. The Cargomaster flies higher and farther than the C-124, and can haul our big missiles—such as the Polaris, Atlas, Titan, and Minuteman—and much of the Army's mechanized equipment. Although larger and faster than the C-124, the C-133 is still not fast enough for this aerospace age.

And also the C-133 relies heavily on island refueling stops for intercontinental missions with heavy payloads. Incidentally, we have fewer than fifty of these aircraft in our force. The C-133 has one unique feature, however, which demands recognition and which we must build into our new force. That is its great cargo compartment size, its ability to accept outsized cargo. No other transport either now flying or in production can equal this capability; until such a time as this special ability is acquired by another aircraft, we must continue to keep the C-133 in the inventory.

Both of these heavy transports—the C-124 and the C-133—represent the backbone of our present MATS outsized-cargo airlift force. They have a big and important capability which will be retained, as by 1970 they should have become part of the reserve force.

A newcomer into the aircraft picture is the Lockheed C-130E, a high-performance turboprop aircraft. It has added much to our total capability, particularly in our training for combat airdrop of Army troops and their equipment. While this aircraft will remain productive for many years to come, unfortunately the C-130E does not satisfy all of our users' large-cargo requirements. We still need a larger, newer, and faster aircraft in great numbers if we are to fulfill our role as a combat-ready member of the defense team.

To help us do this, an important new aircraft will soon be added to our inventory. This is the Lockheed C-141 Star-Lifter. The first one rolled off the production line on August 22 and will be flying shortly. When available in adequate numbers, this all-jet transport will be able to deploy at record speeds most of the missiles that require overseas deployment. Any spot on the globe will be within one-stop range of the C-141. With a substantial payload, the C-141 is expected to provide the type of modern airlift capability the MATS airlift force must have. And as you can readily understand, we feel the C-141 will rapidly become the backbone of our force, much as the C-124 is today.

The ability to airlift men and material these distances at jet speed and in such quantity is unprecedented. Yet when we look ahead even further we must say that this is still not enough. Accordingly, Air Force estimators and planners have formulated requirements for a new aircraft. It is a true follow-on to the C-133 in every respect. It will be extremely large, with a great range, capable of more than 4,000 nautical-mile range and more than 100,000-pound payload. Air Force spec men have stressed the need for research and development in such an aircraft for some time.

Several of our larger aircraft companies have already voluntarily submitted preliminary studies on what an aircraft of this type would be like. Unofficially labeled the CC-4, this would be a 400- to 500-mile-an-hour airplane, one to six turbofan engines, larger than any known airplane today. It would have a cargo floor sixteen to nineteen wide, and about a hundred feet long. Cargo capability all the way from seventy-five tons to more than a hundred tons have been proposed.

An aircraft of this size could lift men and virtually all types of military equipment to nearly all potential trouble spots on the earth nonstop and land on modest airfields. A relatively small force of such airplanes would be able to satisfy nearly all outsized peacetime and emergency requirements that we can envision today.

We are on the fringes of still another idea which would undoubtedly have great impact on airplanes and air transportation. I speak of vertical-takeoff-and-landing capability. In a few short years VTOL technology has made great strides. And our R&D efforts in smaller aircraft have been encouraging. There is no reason to doubt that similar principles can be applied to transports. The successful development of such a transport would be a major contribution to our air assault capability and would deserve a prominent place in the airlift force, particularly in our Air Rescue Service.

In any case, the future remains bright and clear for manned transport aircraft in the 1970s, or for that matter, as far as the mind can see. The requirement for highly trained aircrews capable of handling big, fast aircraft under all types of conditions will remain in the Air Force as long as we handle special missions anytime, anywhere. Certainly complicated machinery, sophisticated command-and-control procedures, and the finest electronic systems in the world are wonderful to have. But the fact remains that highly trained and intelligent men are still the ultimate factor in the airlift equation.

Aerospace Defense Requirements

General Thatchr: When we talk about aerospace defense today, we tend to forget or at least to minimize our need for improved manned interception. Space ventures and ballistic missiles are successes, and they have captured the whole world's attention. And we are very mindful of the defense problems that they pose. In these areas, however, at least we think of the defense needs in terms of unmanned weapon systems. And let me assure you that the traditional threat of manned bombers is still with us. A manned bomber can carry many, many more megatons of destructive power than can any ballistic missile.

All the major powers have announced their intentions to proceed with the development of Mach 2 transports. Great Britain and France are cooperating on a Mach 2.5 aircraft. The United States has responded with a statement regarding Mach 2.5 transports. The Soviet Union announced a year ago its intentions to develop a similar aircraft. I quote the head of the Soviet Transport Bureau at a recent international air transport conference: "The Soviet Union will produce a supersonic transport before the West."

And many of the West European air-transport experts present when that statement was made agreed with the Soviet representative.

It is no great feat to develop a bomber version from such a supersonic transport, and traditionally the Soviets have already used this approach.

Picture for a moment the United States faced with this possible threat, and having in its possession only interceptor aircraft that were on the drawing board ten years ago. And it is a fact that no new interceptor aircraft has been built within the last two and a half years. NORAD—the North American Air Defense Command—is responsible for policing the skies of North America. We do this twenty-

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MANNED AIRCRAFT REQUIREMENTS IN THE 1970s

four hours a day, seven days a week. Any time we cannot positively identify an aircraft by any other means, we scramble our fighters to intercept and make positive prior for identification. We must continue to have this air-defense capability. Thus this requirement for an improved interceptor capability is certainly not a new subject. And picture it for a moment even in peacetime in connection with Mach 2.5 transports.

The Air Defense Command at NORAD has repeatedly stated its requirement for an improved manned interceptor. And in testifying before the Armed Services Committee last February, Air Force Chief of Staff, General LeMay, said, “The last interceptor designed specifically for air defense was delivered in March of 1961. A replacement interceptor is definitely required.”

I should also like to quote from Air Force Secretary Zuckert: “The present fighter systems are aging and would not be effective against Soviet supersonic or even subsonic attacks with advanced standoff missile systems.”

That was stated on May 3 of this year before the Senate Committee on Appropriations.

Further, Secretary Zuckert stated: “With missiles we continue to modernize our aerospace defense. Any failure to do so would result in serious deficiencies for which there is no price tag. Our present fighter-force systems are ancient. They would not be effective against Soviet supersonic or even subsonic bomber attacks with advanced missile systems. Accordingly, intensive study is being given to the need for development of improved manned interceptors.”

NORAD Commander in Chief, General Gerhart, in September of last year made this statement: “First we have a requirement for improved manned interceptors able to range far out and destroy heavy bombers and bomber-launched air-to-surface missiles long before they can reach their designated North American targets. Such an interceptor would have a greatly improved search radar and control system and would be armed with nuclear rockets. Its speed would be on the order of Mach 3, or 2,000 miles per hour, with a radius of action perhaps as great as 1,200 miles, plus or minus 300 miles. It is within the state of the art to build this interceptor now.”

Similar statements were made by General Larry Kuter at last year’s AFA Convention in Las Vegas.

Manned interceptors have as their greatest value the intelligence and reasoning power of a crew. This permits a flexibility of decision that cannot be duplicated by a missile or a robot vehicle. I cannot overemphasize this point. Intelligent judgment and precise decisions frequently have to be made bang on the spot, and I am very happy to state that there are several very detailed studies now under active consideration in the Department of Defense.

The Role of the Tactical Air Command

GENERAL SWEENEY: I think the best way of approaching the requirement for the weapon system is to take a look at the mission of the command. Ours is a complex mission. It is a fivefold mission. Suppose we take a look at each of those five missions, and we will talk very briefly about each one of them.

The first one is to gain air superiority—that is, control of the air in a vital area. There is no question but that ground-based missiles can help in this regard. But so far as we can see, looking into the future, I completely agree with General Thatcher that a manned vehicle is going to be required to seek out and kill the enemy in the air. By the same token, this vehicle will be tremendously useful in destroying the enemy ground-based missile. And if you bear in mind the fact that the enemy ground-based missile in the forward area will be a mobile system, you will see why we feel so strongly that we must have a manned vehicle to attack such a system.

Our second important mission is to intercept the battle area, and that means stopping the flow of supplies and personnel in the battle area—to put a dam on the stream. You can’t do that at the waterfall. This requires that we have a weapon system that is able to seek out, in good weather and in bad weather, day and night, where these supplies are coming from and destroy them. Again, it requires discrimination. And when we are talking about being restricted to the use of conventional weapons, it requires a precision of accuracy that is very, very difficult to obtain from missiles. When I use the word "missiles," I am talking about ground-based missiles versus the manned system. Certainly we have employed and are successfully employing air-launched missiles at the present time.

The third mission is close air support of our surface forces. I might add there is no priority intended here in my discussion of TAC missions. Close air support is an extremely important function.

We have just finished an exercise, Swift Strike III, and I have spent some time with the commanders in the field—the Army commanders and the air commanders. And while we were not at war, a very brief visit to the area would bear out the feeling that the thought of war is surely present when you are deployed in the field. We must have a system that can discriminate, that is accurate, that can respond to voice command in the battle area.

The fourth part of our mission is to provide assault airlift for the movement of personnel and supplies into and within the battle area. We have made great strides in this regard. I think you would have been quite interested to see us delivering with the C-130 aircraft—a big four-engine aircraft—onto a strip no more than a thousand feet long, supplies for a division. It is impossible for me to believe that we are going to be able to obviate this requirement in the foreseeable future. We must be able to get in with manned vehicles close to the enemy and deliver the supplies and the equipment required.

The last part of our mission is to provide tactical air reconnaissance. There was a time when we spent quite a bit of effort on achieving a broad capability. It is generally agreed that in this regard man is still in this field much better than anything we can apply through known technology. We must put in these vehicles the very latest of sensors. We can use the technology perhaps in the same aircraft that we are developing for our other missions in the tactical-reconnaissance field, adapted as we have the F-4C to the RF-4C, the F-111 to the RF-111.

The advances in technology—and they are great—dictate that the survival of our combat aircraft, survivability, be given the greatest possible consideration. Of course, a lot of things enter into survivability. Our studies indicate that operational flexibility, coupled with sound tactics, is the key to survivability. And in this regard two of the most important factors in obtaining operational flexibility are the following:

One, to increase our basing operations.

And two, to provide the widest possible range in speed for the aircraft in the combat zone.

I would like to emphasize that we are making some strides in both of these factors. For example, the F-4C will be able to operate out of strips only 5,000 feet long. This
is a considerable advance over our current Century series fighters. In this regard, the F-111 will be able to operate out of strips only 3,000 feet long.

The second factor is that of the widest possible range of speed. In the F-4C we have a wider range of speed by a great degree. We can operate very successfully below 200 knots with the F-4C, and can accelerate to speeds better than Mach 2. In the F-111, we can do the same thing, with the variable-geometry wing.

But the point is that certainly a step forward to give us a greater degree of survivability plus operational flexibility in our basing and in our range of speeds is the VTOL or the V/STOL airplane. In this, of course, your base operations become practically infinite and your speed range runs from zero up to whatever you pay for in high speed for your aircraft. So we certainly subscribe to the development of the VTOL fighter and reconnaissance aircraft.

The same thing is true in the case of the assault-airlift aircraft. We are convinced that the VTOL airplane in the transport role described by General Kelly is essential. We must get away from large-scale airborne operations. They are costly, expensive, and extremely hazardous as we look down the road. On the other hand, if we can develop a sound VTOL airplane with adequate range, we are convinced that this will materially improve our ability to support the Army. And we have to have it if we go VTOL in our fighter and reconnaissance aircraft, to provide the logistic support for those airplanes.

We also need tankers and we will need airborne early-warning and command-and-control aircraft in order to do the job.

We are very closely tied in with the Army. I mentioned last year at AFA’s symposium in Las Vegas that I felt that the Strike Command had made some great steps forward. I would like to reiterate that statement with even greater emphasis today. We are getting solutions to our problems. We have an authority who can make the decisions that are required. It is extremely encouraging, and a lot of our problems will disappear as this new command gets a little further along in its course.

SAC and the Mixed-Force Concept

GENERAL POWER: During the past few years the Strategic Air Command has evolved from a bomber force to a mixed force of bombers and missiles in which one is designed to supplement and complement the other. In my considered opinion, the mixed-force concept will be as good in the 1970s as it is today. In this mixed force the ballistic missile has assumed a role of increasing importance and scope ever since its integration into our strategic arsenal. Missiles are now coming into the operational inventory at a high rate, and they give us fast-action capabilities and rapid time-to-target never before possible. The mix of forces permits us a variety of weapon systems that cover the entire spectrum of conflict possible today. And it has so compounded the defense problem of a potential aggressor that he cannot now defend adequately against missiles or low-flying aircraft.

This is not to say, however, that this will always be true. In addition, there are the uncertainties concerning the effect of high-yield nuclear weapons on our missile sites which will have to ride out the initial attack. Therefore, it becomes apparent that we cannot depend on missiles alone to deter throughout the 1970s. And that is the primary reason why I see a continued need for manned aircraft in that time period.

Among the many other unique advantages of the manned weapon system is the fact that it has greater reliability. It permits far more realistic and extensive operational testing, and therefore it enhances the discovery and correction of deficiencies which, otherwise, may not be uncovered until it is too late—that is, in actual employment.

Similarly, operators of manned weapon systems can be trained under closely simulated combat conditions and thus not only achieve a high degree of combat readiness but also provide a realistic measure of a weapon system's over-all capability.

The factual data on reliability and performance of our strategic weapon systems are of particular importance to me in my capacity as Director of the Joint Strategic Target Planning Staff. In discharging the responsibility of preparing the Single Integrated Operational Plan for the nation’s nuclear strike forces, I need proven facts rather than estimates and assumptions in order to determine which and how many weapon systems to plan against each specific target.

It is not generally realized that at the moment about eighty percent of the free world’s nuclear firepower is still carried in SAC bombers. However, this percentage will keep decreasing in the years ahead.

In addition to the buildup of the Navy’s Polaris, SAC’s inventory of ICBMs is growing rapidly. In fact, we are presently receiving Minuteman missiles, complete with silo and support equipment, at the rate of better than one a day. At the same time we are gradually phasing out our B-47 medium bombers, and no additional B-52s or B-58s are now programmed.

As gratifying as the buildup of our missile capability is, we cannot afford to neglect our manned weapon systems. If we are to preserve a dependable and convincing deterrent through the next decade, we must make certain that we will maintain a well-balanced mixed force which gives us not only the necessary flexibility in strategic operations, but also the vital assurance that we can cope with any foreseeable developments and conditions.

This means that we must initiate action now to provide our mixed force with the numbers and types of manned weapon systems considered necessary for the years ahead. We have been able to prevent nuclear wars to this date because of the actions that we have taken in the past, actions which have given us such overwhelming military superiority as to make nuclear aggression against this country or its allies unthinkable. The actions which we take today will determine whether we can continue to deter aggressors in the 1970s by maintaining a credible and convincing military superiority across the entire spectrum of manned and unmanned strategic capability—underwater, in the air, and, eventually, in space.

Systems Command in the 1970s

GENERAL SCHRIEVER: From a technological standpoint, as I look into the 1970s, I haven’t heard a single requirement here that we can’t fulfill.

It is particularly gratifying for me to be invited to participate in a panel on manned aircraft. I am sure that there are a lot of you in the audience here today who have never associated me with anything but missiles and space. I might remind you that I started in the airplane business and that it is still my first love. Today the glamor of missile and space technology seems to have captured the imagination of the public. As a result there is a widespread tendency to feel that manned aircraft are old hat and out of date in the nuclear/rocket age. I want to state emphatically... (Continued on following page)
MANNED AIRCRAFT REQUIREMENTS IN THE 1970s

ically that I do not share this pessimistic point of view. The military airplane is far from dead. I believe that manned aircraft will continue to play an important military role in the 1970s.

There are two compelling reasons for making this prediction. The first reason involves technology. We are far from the end of the road in aircraft development. There are as many potential advances ahead of us in the aircraft technology as there are in other technical areas. During the next ten or fifteen years aircraft technology promises to make major advances which will provide significant improvements in range, speed, and versatility and therefore in over-all capability.

For example, the application of shock cancellation techniques may enable aircraft of fundamentally subsonic design to approach and possibly exceed Mach 1 cruise speeds.

The use of laminar-flow control promises to make possible a significant increase in the subsonic range and endurance of large aircraft.

Advances in engine-inlet design and combustion technology, together with the use of hydrogen as a fuel, could lead to the technical feasibility of manned aircraft with much higher speeds than our present supersonic aircraft. I am talking about speeds on the order of Mach 6 to 8.

Technical progress in such areas as aircraft configuration, high-temperature structural materials, and propulsion systems will make feasible the development of a great variety of advanced type of aircraft, ranging from the conventional design to the VTOL, the vertical-takeoff-and-landing aircraft. These could afford the military planner many new mission capabilities not previously available.

For example, the vertical-takeoff-and-landing aircraft promises to afford us new capabilities for logistics, rescue, and close-support missions. They will provide flexibility and survivability.

By the latter part of the 1970s we may be using manned systems that combine many of the characteristics of aircraft and space vehicles. We are currently studying a concept known as the Aerospace Plane that can take off like an aircraft from a standard runway, perform a mission in space, and then return for a routine airfield landing. There are several technical approaches which might give us this capability. Such a system may have many advantages for military space operations.

These are only a few examples of the future developments that now appear to be feasible. They make it clear that in terms of technology there is much room for progress in the manned aircraft area.

Now, the second reason for a positive attitude toward the future of manned aircraft is the fact that they will continue to be needed to meet vital military requirements that have already been pointed out here. Our nation will need a mixed deterrent force for many years to come. Since manned and unmanned systems each possess their own unique advantages, it is pointless to talk of one replacing the other. We will continue to need both. In addition to our growing force of ballistic missiles, we will still need the flexibility, the maneuverability, the versatility, and the high degree of control which are best provided by manned aircraft.

It is not a matter of being a champion of one kind of system versus another kind. Rather our objective must always be the best combination of systems to do the job we have to do. If we are going to do our job properly, we must recognize that weapons are always evolving. It is a mistake to become overly attached to any one type of weapon system, no matter how advanced it may appear to be. At the rate technology is advancing, something better is likely to come along—and very soon. And we must take advantage of the potential advances that may be found in any technical area.

The Air Force is seriously studying its own and the Army's needs for new manned aircraft in every major mission area. Among the proposals being studied are several strategic systems, including a high-altitude, extremely high-speed reconnaissance/strike type aircraft; an aircraft designed specifically for low-altitude penetration to targets; and a multipurpose, long-endurance aircraft capable of several types of missions. As a minimum, we should be introducing a new manned strategic system by the early 1970s.

There are also other requirements for advanced aircraft. Future aircraft needs for the air-defense and Special Air Warfare missions are under study. There is a definite need for new aircraft to conduct tactical operations. Airpower will continue to play a critical role incountersurprise and limited-war situations and in support of the Air Force's requirements for strategic airlift and close-support firepower.

Future transport aircraft may include both vertical-takeoff-and-lifting and new, large, cargo aircraft. In the first category, we already have two aircraft under development—the X-19 experimental vehicle, which had its rollout in July, and the XC-142 transport, which is scheduled for its first flight next year. These are the Air Force part of the triservice VTOL aircraft program. The program also includes the X-22A, a ducted-fan research vehicle which is under Navy management. And the development of a new large transport, the CX-4, may be required as a replacement for the C-133, which is the only operational aircraft capable of airlifting Atlas, Titan, and Minuteman ICBMs and other outsized cargo.

These are some of the possibilities for the future that we can identify today. But the fact that they are possible does not guarantee their actual development. The crucial factor in acquiring a new system is often not technology. Rather it is the problem of translating technology into operational systems in a timely fashion. No matter how extensive our research may be, it has not served its purpose until a decision has been made to actually build something.

In the final analysis, the future of manned aircraft depends heavily on the close cooperation of the Air Force and the aerospace industry. We will continue to depend on the help of industry. Better definition of the state of the art, validated predictions of advances in the state of the art, and more accurate cost estimates are all essential to intelligent decision making. Further improvements in management, together with advances in technology, will prove crucial to the timely development of new manned aircraft.

I would like to summarize. As I see it, there are some very substantial technological advances that are right before us in the area of materials and the area of propulsion. And I am talking about old-fashioned jet propulsion. We can achieve much higher thrust-to-weight ratios. We can achieve much better specific fuel consumption. We should get away from a single point design. These are all possible, and they are possible today. So instead of being dead I feel we are really on a new threshold as far as the aircraft developments are concerned.

Manned Aircraft R&D Neglected?

MR. HACKES: I would like to go back to one of the original observations I made about technology. General Schriever, what about the present manned aircraft R&D
programs? There have been some charges that they are being neglected by both the military and NASA. Is it possible that we are dragging our feet to the point where some aeronautical Sputnik from Moscow may come along and scare us half to death?

GENERAL SCHRIEVER: There has been a great deal of emphasis on ballistic missiles in the past six or eight years. I feel that there has been some slack in developments that are essential to moving aircraft forward. I mentioned one area of propulsion that has not moved forward nearly as fast as the state of the art permitted it to. Under our present national policy of controlled response, and as General LeMay has pointed out, where we have a deterrent capability or counterforce capability over a large spectrum of warfare, the airplane just simply falls in place, with an extremely important role.

We have to accelerate developments in a number of areas. I am talking about advancing the state of the art from a technological standpoint. And this will provide us with greatly improved capabilities aircrafwise in the 1970s. Lead times being what they are, if we make decisions in the next several years for new aircraft, they are not going to be with us until the 1970s.

MR. HACKES: What do you suppose is in store for the 1970s for such Air Force bases—and there are many—as Tinker Field in Oklahoma, whose main business today is the repair and renovation of aging bombers?

GENERAL SCHRIEVER: I am sure that as long as we have airplanes we will have a requirement to change them, modify them, beef up their wings, and put the tails back on.

GENERAL POWER: Oklahoma City, I might add, is real busy, too, with the SAC missiles.

MR. HACKES: General Kelly has told us about the requirements for bigger and faster transports. This is the natural follow-on question to that. In the discussion about the commercial utility of the supersonic transport there is some debate about whether it is economically feasible. General Kelly, you must be as pressed as anyone to justify your requirements on materials and costs. Is there a possible requirement for a military SST in the 1970s, and will you be able to figure the costs, and do you support them?

GENERAL KELLY: I have submitted a requirement for a supersonic transport. However, the Administration has given the responsibility for this development to FAA, and we have discussed our requirements with FAA. So I think we will have to refer this one back to Mr. Halaby.

MR. HACKES: Here is one that calls for a comment from General Sweeney and General Power. Will both of you discuss the reconnaissance/strike plane? We all know about the Air Force's B-70. There is no B-70 any more. As a straggler from one budget situation to another, it wound up as the RS-70. What about the concept—what part does it play in the mixture of the force?

GENERAL POWER: Reconnaissance is a vital element of my military posture. It is more important today than it ever was. Whether you are in the missile business or the aircraft business, you are going to have to plan to hit targets. And if you are going to plan to hit targets, you are going to have to have intelligence. How to get it is a difficult problem. There are requirements for manned reconnaissance airplanes, and there always will be such a requirement. When you put the missions together, it looks like you are getting something cheap—two missions for one—but they don't go together. In one you are going out and getting intelligence, and in the other you are destroying targets.

And there are many different weapon systems that can destroy targets. I covered this in my opening remarks.

MR. HACKES: General Sweeney, do you have anything to add to that about the mission of a plane of that nature for attack or anything similar?

GENERAL SWEENEY: No, I completely agree that you have got to have manned reconnaissance systems. And we certainly need them in the strategic field as well as in the tactical field.

MR. HACKES: Do you have a suggestion for an addition or different attack modification of the RS-70 that you would like to have, something slightly different that also has a reconnaissance/strike capability?

GENERAL POWER: I might bail him out on that. The RS-70 today is not a weapon system. They are developing the test vehicle. So it is not a fair question.

MR. HACKES: Here is a question that goes to General Schriever and General Sweeney.

We hear and read much about the F-111—the TFX. We have been told that the F-111 is doing fine. General Sweeney has said that it will improve attack effectiveness.

Can you, Generals Sweeney and Schriever, expand on that, with particular relation to limited war and support of ground forces?

GENERAL SWEENEY: There isn't any question in my mind that the airplane we are getting will do a job that is badly needed. It will do an extremely fine job. We are working very closely with General Schriever on following the program, and the program is going along well. My big hope now is to get it.

GENERAL SCHRIEVER: I don't have much to add. The airplane has much greater performance capabilities than anything we have in the inventory today or anything that is going into the inventory. This is performance in the way of runway requirement or performance in the way of low-altitude and high-altitude speed, range, and bomb-carrying capacity.

MR. HACKES: How will the technological advances in the F-111 apply to future aircraft programs? Will movable wings and thrust reversers be applicable to other systems? And what about the fabrication techniques?

GENERAL SCHRIEVER: The variable-geometry wing does have applications to larger aircraft of the high-performance type. I mentioned the possibility of a low-altitude penetration aircraft for the strategic role—General Power's responsibility. The same technology from an aircraft-structure standpoint or an aerodynamic-condition standpoint certainly would be effective. It wouldn't be applicable to a transport. But when you get into performance, if you want low- and high-altitude capability, if you want a high state of the art, technology does have application.

The Deterrent Force of Tomorrow

MR. HACKES: What can you tell us, General Power, first of all, about how we are doing offensively? Are there new concepts and developments still needed to help your SAC planes get to the target in the 1970s?

GENERAL POWER: We owe it to the people who have to fly our equipment to give them the best equipment and the best chance of survival. Today there is no question in my mind that with the plans we have written today, we will destroy the targets that we have weapon systems assigned against. We try a realistic war game, a sortie through a defense environment, and then we take that sortie down—give it a downgrade through malfunctions of the equipment, through weather, through crew error, and through enemy attrition. You have to take each sortie through a normal defense environment.

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MANNED AIRCRAFT REQUIREMENTS IN THE 1970s

Now, we arrive at a confidence factor of whether that particular sortie will deliver its weapons. And with the weapons we deal with in SAC, it takes only one weapon to destroy anything that is in its target area, if it is delivered accurately. So, therefore, we just have to add on weapons until we reach the desired structure.

For example, in one weapon system, say a B-52 out of New Mexico going against the Soviet Union, if after your realistic war games are through, let's say you have a fifty percent confidence factor for destroying that target with a given weapon. If you are satisfied with a fifty percent confidence factor that that target would be destroyed, you would send that one weapon against it. If you want a higher confidence factor you send two. You don't get a better percent confidence; you get seventy-five percent confidence with a given weapon system. If you want more confidence, you send three. Now, if you are in the high eighties, if you want to be still more confident, you send four or five, and eventually get up to six or seven. Each added weapon system only buys you a very small fraction of percentage of increase so there is a level you can't go beyond.

But let's say you have a ninety percent confidence factor. That means there is a ten percent chance you don't destroy your target at all. You might send four or five weapons against it, but you don't necessarily send four or five of the same weapon. This is where a diversified inventory helps you in a war plan. You send one type, and then another type, maybe from a different location—mixing airplanes and missiles together to make sure that you get that target.

Now, the difference between regular war plans and most of the things most people get involved in—you are down to stark reality here—and now you are dealing with facts. You can't be wrong. And all I will tell you is that we have a better than ninety percent confidence factor that what we call the hard targets, important targets, will be destroyed.

Mr. Hackes: General Thatcher, would you like to add anything to that?

General Thatcher: I just support everything that General Power says very much. I might say the principle of air defense calls—and always has and always will—for four basic ingredients: surveillance, identification, interception, and destruction. It calls for four specific actions. I will say that the Air Defense Command affords me a great confidence factor in being able to deter a subsonic air defense calls—and always has and always will—for four basic ingredients: surveillance, identification, interception, and destruction. It calls for four specific actions. I will say that the Air Defense Command affords me a great confidence factor in being able to deter a subsonic attack upon this nation and make this deterrence so effective that a so-called expert cannot speak from experience. They are speaking from theory.

I will give you a few facts. In the last war we flew 1,550,000 heavy-bomber sorties at a loss rate within 18 percent. We lost 9,500 bombers. Those are the facts. I have been in the bombing business since the spring of '29 and yet every other expert in the bombers said we would be shot down. The British said we could not do daylight bombing. Everyone predicted utter failure for the bombing mission. And yet an American bombing mission has never been turned back from its target.

The defenses have improved. In the last war we did not target them. In the last war we lost 1.8 percent, but they are targeted today and they are way up on our target list and we would like everybody in the world to know that.

We will take the best penetration device ever invented by man, the hydrogen bomb, and we will destroy them and will deliver those bombs—no question about it. We know what the defenses can do. We do not exploit their strength, but their weaknesses.

You have a choice of tactics and timing. There is no question about it. There is absolutely no question about our ability to destroy any target on that target list today.

Mr. Hackes: I assume the same will hold true in the 1970s.

General Power: We have this position because of action we took in the past. If you do not do anything now, you will not maintain that position. This is not a static position. Some people say this is an arms race. If it is an arms race, let us win it. And we are winning it.

Mr. Hackes: General Power, is the fact that there are no manned bombers in production causing such a significant concern among your aircrews in SAC as to endanger your organization?

General Power: This is the first time in the history of the United States Air Force, formerly the Army Air Corps, that we have not had some type of bomber in production. The B-52 and the B-58—well, we only have a handful of the B-58s so we cannot consider them as providing a substantial part. There is a rule of thumb in that a new weapon system becomes obsolete in seven years and obsolete in ten years.

So when you introduce a new weapon system, putting it in the hands of combat troops, you should then start planning the replacement for it. When I had the Air Research and Development Command in 1955 we laid down the B-70 to replace the B-52. We have been talking about it for eight years. I suggest you will never have one if you do not start talking and build one.

What do we want? I will take anything because it is better than nothing. There is a whole family of weapon systems that are acceptable to me. I have made my requirements known to the Chiefs of Staff and made them known in the order of their priority, but it covers the whole spectrum. I will put it in the reverse: I could live with more B-57s. It is a very effective weapon system, and, due to the tactics we employ, it could penetrate any place in the world today. The B-52 is a very fine weapon system, and we hope it will be in the inventory for years.

The B-58 We finally have the bugs out of it, and I consider it one of the finest systems in the world today. It has a very fine low-altitude capability, and of course it has a Mach 2 capability at high altitudes. It has an extraordinary piece of bombing equipment in it.

Now, if you want to go to new aircraft, General Schriever mentioned some of the ones he had under consideration—the so-called long-endurance aircraft, low-altitude manned penetrator, and high-performance, high-altitude aircraft.
General Schriever has these under consideration. What we would like at the Strategic Air Command is to have them stop considering them and light on one and let's build it.

**Need for a Mach 3 Interceptor**

MR. HACKES: General Thatcher, you stated you must intercept unidentified enemy aircraft. Do Mach 2 bomber speeds imply you must have a Mach 3 interceptor to accomplish that?

GENERAL THATCHER: It is historically correct that the fighter has to have a one-third speed advantage over the bomber—he has to get altitude and into position. You have the logistics of aircraft control and you have to contend with the atmosphere before you can intercept. This one-third speed advantage is required for an interceptor under normal conditions.

MR. HACKES: Do we have a manned interceptor with the capability to identify, intercept, and destroy an aircraft with similar flight characteristics to the U-2?

GENERAL THATCHER: There is some difference between an identification and destruction. I believe we have in the F-106A and the F-101B and the F-104, which is now in the Air Defense Command, an ability to identity. We do not believe we have under all conditions an ability to destroy that aircraft because the time/space factor becomes very critical.

However, there is, if such an aircraft exists in enemy hands, a conclusive requirement for our need for an interceptor which can intercept.

MR. HACKES: General Schriever, we moved away to General Thatcher before you perhaps had a chance to respond to General Power.

GENERAL SCHRIEVER: General Power left the impression that I am doing all the considering and I ought to light on something, He knows where the lighting is done.

MR. HACKES: General Sweeney, is it not true that our General Purpose Forces are too small to fight a stepped-up limited war and too large for the needs of wars most likely to be waged short of a nuclear war?

GENERAL SWEENEY: The forces have are certainly not too large for anything. But, (I can answer) that in my opinion they certainly are not too large for the job we have at hand in today's world. We have recommended increases in the force structure and they are continually doing so (and) with their staff assistants.

MR. HACKES: General Power, you mentioned that you'd just as soon have anything rather than nothing?

GENERAL POWER: I did not say that. I said something is better than nothing.

MR. HACKES: Do you feel we are approaching the point where continued modification and updating of the B-52 force is being militarily and economically impractical?

GENERAL POWER: We do not update aircraft merely to get increased performance, but to get better reliability. There have been some modifications which increased performance. But the real requirement is reliability and flying safety.

To get into this war-planning business—the most useless thing in this world is a weapon system that cannot fight—and I mean twenty-four hours a day. We have a lot of systems that are of questionable value. The only ones I can put into action are the ones that have known reliability factors. And this is why I stress the word reliability.

Take the B-58. We went through a long hard period in trying to get that airplane so it flies. It will fly in the development criteria and make speed records, but when you put a combat requirement on it in order to fly twenty-four hours a day, either you can do it or you cannot do it. It took three years to bring that one up to the state where today it is an acceptably reliable weapon system.

There is no question at all about the B-47. That has been reliable for years. The B-52 was a big jump forward in this airplane. But until the B-58 we had never flown a bomber at supersonic speed. We packed it into a very small package. But the point is, you fly realistically, discover the bugs, and then you modify it and fix it.

But you basically fix it for reliability and flying safety. That is the point—not to get increased performance.

MR. HACKES: What I was thinking of was getting back to the '47s and '52s. You will arrive at a point where those planes for one reason or another cannot be used effectively?

GENERAL POWER: I do not think that is a true statement. I think the B-47 fleet in the hands of professionals could deliver weapons in the year 2000. I am not saying that you will not get kicked around. There is no easy way to fight a war. We will deliver the weapons, however much it costs us to deliver them. But why do it the hard way if you can do it the easy way?

We owe it to the crews to have equipment and technology so that they do not have to lay down their lives to fight a war unnecessarily.

MR. HACKES: General Schriever, would you please specify which materials are at the stage of breakthrough?

GENERAL SCHRIEVER: I will not specify the material because I would be getting into classified areas. But there are several materials breakthroughs. Some can be applied today to technology and some are not quite so advanced, but they appear to have a tremendous payoff in the structural area. Just take my word for it—we have got them.

MR. HACKES: Do you feel that the Soviet attitude in future manned aircraft and spacecraft systems is similar to the views you have expressed?

GENERAL SCHRIEVER: I wish I knew. That is one of the things we do not seem to know much about—what they are thinking. We know a little about what they are doing, but very little about what they are thinking.

MR. HACKES: Does someone else want to jump in on that? General Kelly, is it possible that the Russians might develop a need for a mass airlift system and get into big systems of the mass airlift type?

GENERAL KELLY: I do not know. About the biggest thing they are doing now is their nonstop flight from Murmansk to Cuba.

MR. HACKES: General Thatcher, why cannot ground-to-air missiles replace fighter-interceptors against Mach 2 attacking aircraft?

GENERAL THATCHER: If you put a missile on every street corner and had a proper control system for it and you can afford it, it might be possible in the future. But the important thing I think, in air defense, is the power of decision and flexibility and power of decision in the cockpit whereby you can shift from target to target, where you can move out and destroy miles from your base and still do a job.

MR. HACKES: Here is one for General Power.

(Continued on following page)
Would you care to comment on the military value of a Mach 3 strategic bomber versus a subsonic aircraft with lots of endurance—one that can loiter around for two or three days with a load of airborne missiles?

GENERAL POWER: We first made a rather general statement. We talked about the future. We have been trying to develop the weapon systems for the future. There is one thing about the future: it is very difficult to predict. Most of the people who are so sure they can predict the future have one common failing, and that is they are almost always wrong.

We must be prepared to cover the entire spectrum of tactics that are necessary to fight a war. You want me to say that one is better than the other. I say we need them both. A long-endurance plane, with standoff missiles, is good for one reason. As we place more and more reliance on ballistic missiles, I am happy to receive them. If the Soviet perfects an anti-ICBM, you could lose your deterrent if your entire deterrent depends on ballistic missiles.

You have to have some weapon systems that are not bombers, some systems that fly high and some that fly low. I choose the tactics when I am delivering the bomb. As I said before, they cannot last for 100 years. So we have to plan to replace them.

Now in replacing them, somebody might theoretically achieve a superman system, to be all things to all men. We have never achieved that possibility or capability. And I suggest a real practical way of making sure is to have both of those systems you mentioned.

In other words, have one of the buy systems that penetrate at low altitudes. This is the standoff airplane that General Schriever is referring to, and the other is supersonic. We know we can make that. If we have a very high-speed, high-altitude plane—now, you are talking about something very exotic—but all three of those airplanes give you flexibility across all spectrums of tactics and in turn force the enemy to defend against it. You cannot lose your flexibility to plan it. You cannot paint yourself in the corner. As W. C. Fields used to say, "It is hard to hit a moving target."

MR. HACKES: One of our audience has come up with an interesting question. If General Power is so confident about penetration, how can General Thatcher be so confident about defense?

GENERAL POWER: If General Thatcher had the Strategic Air Command sitting over in the Soviet Union, he would not be very confident.

GENERAL THATCHER: I am happy to state that at one time I was in the Strategic Air Command and I share General Power's view.

However, that is the combination of the Air Defense Command and Strategic Air Command. It is the combination, the fact that we can perhaps deter with some degree of confidence, to allow the SAC force to get off the ground.

I know his force can do it. I am the last to say he cannot be deterred. I am the first to say that the mission of a defense command is to maintain a posture that allows his force to operate and not have that force destroyed on the ground without warning and let his force be deteriorated. So it is a combination of the two forces.

GENERAL POWER: We are fighting on the same side. We are partners in a common goal.

He provides an important element of that deterrent, and it is meaningless to say who is making the greater contribution. We need both, for we are depending on the Air Defense Command. They protect our bases.

It is a mistake to try to put us in competition with one another. We are both working on a common mission.
tically test aircraft under combat conditions and you could do the same with missiles if you wanted to.

But the trend today is not to test them realistically from their actual operating locations. And this kind of testing means you take a weapon out of the inventory, put it in the hands of a combat unit, and take it out and detonate it just to see if it goes off.

We know from hard experience that until you do that, you are never sure, and we have many dramatic examples where things were mathematically sure, but when you actually went to test, somebody forgot to twist a wire the right way and it just did not go off.

We've had some interesting things in the field of firing bombs that were lying in storage. We went to drop them and they just would not go off. In the present environment, it is difficult to test ballistic missiles.

If that changes, you can achieve as high a degree of reliability with missiles as with manned systems. But the key to it is the practicality of realistic testing.

**MR. HACKES:** Ideally and realistically, test-ban treaty aside, what would be your proposal or suggestions for a continued program which would face up to this problem?

**GENERAL POWER:** You are getting into a classified area. It would be sufficient to say that over the years I have been asking for this time after time after time. It is not difficult to do. We have the weapons. All somebody has to say is, “Go out and drop one,” and we are perfectly capable of doing it.

But somebody has to say that.

**MR. HACKES:** General Sweeney, do you see a role for a larger aircraft than the F-111 in a limited-war strike role?

**GENERAL SWEENEY:** I hope we do not have to get bigger airplanes than the F-111. What we want, of course, is the smallest airplane that will do the job. The airplane that we are talking about today you recall is in the VTOL area. Again, the more size you have, the more difficult your problem is.

Do you agree, General Schriever?

**GENERAL SCHRIEVER:** Yes, I think they might become smaller.

**MR. HACKES:** General Thatcher, this has been touched on, too. Do you see a lessening of the bomber threat in the years immediately ahead?

**GENERAL THATCHER:** I see the announced trend in transports, the Mach 2 and Mach 2.5. But virtually every leading power has now stated its requirements and the fact they are in the design phase. It is no trick at all to turn one into a bomber version, and therefore I see a very continuing threat for the reasons General Power stated that no one power is going to put all its eggs in one weapon system.

You have to have diversification. Therefore, I see a continuing threat in the manned bomber.

**MR. HACKES:** How do you feel about the feasibility of the development of the Aerospace Plane?

**GENERAL SCHRIEVER:** The X-20 Dyna-Soar is an experimental program. It is following the X-15. Very definitely the Aerospace Plane concept would be delayed if we do not go ahead with the Dyna-Soar program. We have to explore reentry from speeds of about five times the speed of sound to twenty-five times the speed of sound in a winged vehicle, which is the main objective of the Dyna-Soar program.

This would be the same reentry problem that an Aerospace Plane would have when and if it is ever perfected.

**MR. HACKES:** General Sweeney, should TAC request greater numbers of tactical fighter wings to handle conventional war threats, and if so, how much?

**GENERAL SWEENEY:** We have asked for more wings. The matter is still being discussed as to whether the program will be increased.

**MR. HACKES:** Would you please discuss the relationship of the 1970 efficiency of remote systems such as drones versus manned aircraft-reconnaissance systems?

**GENERAL SWEENEY:** You must break it down into two parts. One, we are going in the direction of what you might call remote systems. That is, you get ground readout from the systems.

However, as I indicated, for the foreseeable future we do not think much of the drone airplane doing the job. You have manned aircraft doing the Strategic Air Command reconnaissance job. There is a tremendous advantage and they are working on getting direct radar from the aircraft to the ground so that you can cut down your intelligence time.

**MR. HACKES:** General Power, there has been a good deal of talk these weeks on the ups and downs of the development and production of additional missiles for a family of missiles.

Would you tell us how critical you feel that situation is at the moment and what you expect?

**GENERAL POWER:** It depends upon semantics. We like to think we have improved Minuteman. Whether there is a family of missiles is a choice of words. We have taken steps in improvement in the range and accuracy and improvement of the warhead yield and greater target flexibility. This is already in the mill.

**MR. HACKES:** Does the present TFX specification fulfill the air-defense interceptor requirement?

**GENERAL THATCHER:** The present TFX is billed to do a different job. And I do not recall any airplane ever in our inventory which was an all-purpose airplane. The requirements for an improved manned interceptor are so strict that I doubt whether any airplane designed for another mission can perform the mission that we have in store for it.

Therefore, I reiterate, we need an improved manned interceptor. I do not consider the TFX the version responsive to our requirements.

**MR. HACKES:** General Sweeney, what effect per se has the following had on TAC: first, placing of most of TAC's aircraft under the Strike Command; and second, increasing and persistent efforts of Army aviation to get into troop transport in battle areas?

**GENERAL SWEENEY:** The effect on TAC is very simple. We have been doing the best we can to demonstrate day in and day out to the Army and Strike Command that we can do the job properly and will be there when needed and will do the job as required.

We are making some headway.

**MR. HACKES:** I would like to ask General Power one final question. What about mobile enemy missiles, submarine-based enemy missiles, and extremely hard enemy sites, 1,000 psi, in view of your confidence of destroying targets on the target list?

**GENERAL POWER:** The same rule holds. You cannot destroy the target unless you know where it is. You cannot fly a warplane to a target when you do not know where it is. When you talk about targets, you know where they are and you have programmed a weapon against it. Depending on the hardness—if it is hard, it requires more weapons. There is not anything that man can build today that will stand a direct hit from a hydrogen bomb. If he builds it, we can destroy it.

**MR. HACKES:** Thank you all on behalf of AFA.—End