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FEDERAL REVIEW

REPORT OF AVIATION FACILITIES STUDY GROUP TO THE BUDGET BUREAU, DECEMBER 31, 1955

PART I—CONCLUSIONS AND RECOMMENDATIONS

FIFTY YEARS AGO the sky was virtually uninhabited by man and his inventions. In 50 years the air has become the principal medium for the conduct of offensive and defensive military operations. The growth of the air transportation industry, which has resulted in some of the largest airlines carrying more inter-city passengers than the largest railroads, is well-known. The growth of miscellaneous commercial and private flying—termed “General Aviation”—is not so well appreciated. It is surprising to many, for example, to find that there are more than fifty times as many aircraft engaged in General Aviation as are flown by the U. S. airlines, and that these airplanes fly two and one-half times as many aircraft miles as the airlines fly.

Aircraft are not the only users of the airspace. Other demands on it include artillery and missile ranges, restricted security areas, defense warning zones, TV and radio towers. In brief, the sky above us is being used for a variety of purposes and what goes on in it is destined to affect the lives of every living person.

In the course of our study we have asked many questions relating to the use of the airspace and the adequacy of facilities required for its efficient use. (We think of Aviation Facilities as comprising airports, navigation aids, traffic control devices, and the communications that link them together.) The answers that we have received have convinced us that much of our airspace is already overcrowded and that, in many important areas, the development of airports, navigation aids, and especially our air traffic control system, is lagging far behind both aeronautical development and the needs of our mobile population and of our industry.

Reports presented to us by responsible groups indicate that the risks of mid-air collisions have already reached critical proportions, and that the collision hazard is becoming greater as the increases in civil and military air traffic outpace the capabilities of outmoded traffic control facilities.

This condition is not, apparently, due to lack of scientific knowledge necessary for a solution. The Defense Department is even now proceeding with the installation of a \$3 billion air defense radar system which, we are advised, could be adapted to provide the main elements of safe and efficient aircraft separation and traffic control wherever required. The deficiency in our traffic control system is attributable in part, to the fact that aircraft capabilities and public demand for air transportation have proceeded much faster than anticipated. It is also due to the lack of general appreciation of the need for a “systems” approach to our aviation facilities development. Because of this lack of appreciation, the technical knowledge which is available has not been fully utilized and the programs needed to meet our traffic control requirements have not been formulated.

The multimillion dollar leviathans of the air which our aircraft manufacturing industry is creating in the jet age must become integral parts of a transportation system which includes the *airport* complex (with adequate approach areas), the *airway* (with its traffic control, navigation and instrument landing devices) and the associated *communications* on the ground and in the air. All of the Aviation Facilities mentioned have to be developed concurrently with the development of the aircraft which will use them.

This systems development concept has administrative and fiscal as well as technical aspects. It is necessary, for example, to determine who is to finance the building of the system, who is to pay for its operation, and how its operation is to be administered as well as who is responsible for designing it to serve national as well as local needs.

The evidence is abundant that, in attempting to meet our national Aviation Facilities requirements, we are following a piecemeal rather than a systems approach. The responsibility for meeting the requirements is diffused, the procedures for coordination among those who have the responsibility is highly complex and often ineffective.

Against this general background, which is more fully described in the following Sections of this report, we submit our answers to the questions you have asked us:

QUESTION NO. 1. *Should a study of long-range needs for aviation facilities and aids be undertaken?*

Our answer to this question is definitely affirmative. We have analyzed reports on almost every subject related to aviation. While a great deal of thought has been given to Aviation Facilities requirements, it is our considered opinion that there is still no top level *systems* study and master plan which would provide the executive branch and affected agencies of the government with a firm basis upon which to build a comprehensive legislative and fiscal program for Aviation Facilities development. We do not believe that the necessary facts have yet been put together in proper form. We, therefore, conclude that there is a need for a comprehensive study leading to a national plan for the Aviation Facilities of the United States for the next twenty years.

In recommending that a major study be undertaken, we would like to state that we do not regard the study which we recommend as an end in itself, but merely as a necessary prelude or accompaniment to an integrated Aviation Facilities development program which is urgently required in the interest of public safety, military security, and the national economy.

QUESTION NO. 2. *What should be the coverage of such a study, if it should be made, including an indication of the specific areas and subjects which seem to require particular attention?*

We need to know a great deal more about:

1. How to make more efficient use of the national airspace by allocation and traffic control which is safe, efficient, and equitable for all users.
2. How to integrate civil and military expenditures, particularly expenditures for Aviation Facilities research and development.
3. How the cost of facilities should be financed from private and public sources.
4. What kind of government organization is required to control use of the airspace and be responsible for the appropriate Federal interest in the construction and use of government-financed military and civil Aviation Facilities.

QUESTION NO. 3. *How can such a study, if made, best be organized and conducted?*

We conclude that the study which we recommend should be made under the direction of an individual of national reputation, with a broad understanding of civil and military aviation. He should be given a temporary appointment to plan with all departments and

agencies of the executive branch at every level, without being restricted to narrow channels of communications.

The appointment should be made in such a way that it is clearly the appointee's responsibility, backed by Presidential authority, to work through and with existing organizations and avoid duplication of the services which they are able to provide. We are of the opinion that most of the areas requiring intensive study leading to an integrated Aviation Facilities program could under effective central leadership be undertaken in cooperation with the Departments of Commerce and Defense.

In general we feel that the personal qualifications of the individual selected may be more important than the position to which he is assigned in the government; but the two are obviously closely interrelated and we feel strongly that the position should be set up independently of any of the existing operating departments and interdepartmental committees in order to assure objectivity and freedom from deep involvement in day-to-day operating problems.

Unless some urgent action of this nature is taken to provide *full time* high-level leadership to the problem of bringing our Aviation Facilities in line with air traffic growth and the progress being made in aircraft development ever more dangerous conditions in the air can be anticipated.

Finally, it is our considered opinion that the studies which we recommend in our answers to Questions 1 and 2 would very likely be ineffective and wasteful of manhours and expense unless pursued under independent central direction at a high government level as recommended in our reply to Question 3.

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PART II — EXCERPTS

SECTION 1—FUTURE AIRCRAFT PERFORMANCE, PRODUCTIVITY, AND OPERATING COSTS

By T. F. Walkowicz

Any study of requirements for a period of twenty years ahead necessitates some arbitrary projections about the future. A list of the basic assumptions against which the projections in this report have been made are: No global war — continued tension — local incidents; USA vulnerable to enemy attack; U.S. population increasing to about 210-220 million; Gross national product to about \$715-740 billion (1955 dollars); Defense expenditures maintained at about \$30-40 billion.

Projections and predictions in the field of aeronautics have proved hazardous in the past, for technology is generally moving ahead faster than predicted by the "experts." As late as 1941, for example, jet propulsion was considered impractical by a group of leading American scientists and industrialists when called together to appraise its significance. Yet at that very moment — it was later found — the Germans were already flying a jet propelled airplane.

Four principal factors appear to characterize future aircraft design and performance.

First, aircraft speeds can be expected to increase greatly. Commercial transport operating speeds can be expected to rise from today's 300 miles

per hour to 1,000 miles per hour by the end of the twenty-year period. Military operations in the supersonic ranges will be commonplace.

Second, today's maximum civil operating altitude of about 25,000 feet will be increased to 40,000 or higher, putting jet airliners into the same airspace that is now the province of the military.

Third, civil aircraft will show greatly increased productivity. Productivity is the payload multiplied by the number of miles operable within a given period. For example, one of our latest type transports now in transatlantic service has the capability of carrying about 40,000 passengers both ways between New York and London annually. Each one of the jet transports being ordered for transatlantic use in 1959 and 1960 could produce about three times this volume of annual passenger transportation. By way of comparison, it has been pointed out that each of the new jet transports will have approximately the same annual transatlantic passenger carrying capacity as some of the larger luxury liners in the ocean trade.

Fourth, is the trend toward lower direct operating costs. The direct seat-mile cost of operating passenger aircraft is expected to go down about thirty percent in the twenty-year period. The direct operating ton-mile cost of cargo aircraft is expected to be reduced about 80 percent by 1975. Atomic freighters will probably not be introduced until the end of the twenty-year period and their probable operating cost are still very uncertain.

The progress projected in transport and military aircraft will undoubtedly be reflected in the design of private and business aircraft, thus making them increasingly useful and productive in business and industry.

Helicopters and other vertically rising or steep gradient aircraft are expected to come into greatly increased use during the next twenty years. The operating cost of today's helicopter is 10 to 15 times that of fixed wing aircraft. By the late 1960's, the direct operating cost of helicopters is expected to decline to about 3 times that of fixed-wing aircraft. At these cost levels, helicopters may begin coming into more general use, especially where ground transportation is slow and expensive. It is too early to predict, with any accuracy, when other vertical rising and steep gradient aircraft will be ready to provide safe transportation at reasonable cost.

In summary — future civil and military aircraft will fly much *faster*, at much *higher altitudes*, carrying *greater loads*, and they will do this at significantly *lower* direct operating costs. Furthermore, *vertical rising* and *steep gradient* aircraft will begin in an important way to take their place in the national transportation picture.

SECTION 4 — AIRPORTS

By Fred M. Glass

As the expanding requirements of commerce and defense have caused unprecedented congestion of the airspace and overload airways facilities, demands on airports and terminals have in a great many instances, stretched them to the limits of their capacity.

The airport should be regarded as an integral part of a national Aviation Facilities system, but it is too often evident that airport planning is primarily based on local considerations which, in many instances, are not properly related to national objectives; and that airport design, particularly for future construction is not coordinated with anticipated operating requirements of future aircraft nor with the capacity of the air traffic control system.

There are about 700 *major* civil and military airports. There are over 6,000 additional civil airports (of lesser significance).

The Federal Government's responsibilities for airport development fall

into two broad categories: first, is the field of planning; and second, is the field of financial participation. The orderly development of military and civil airports requires long-range planning—planning of an overall or master plan nature—so that those primarily responsible for the development, financing and management of airports at the local level can have the essential information required.

Cities and local communities should be advised of traffic requirements which their airports should be prepared to meet in 1960, in 1965, and in 1975 so that airports will not become bottlenecks of an improved Aviation Facilities system. They should be provided with continuously revised estimates of plane movements in order that ample terminal facilities and handling space can be provided; the operating characteristics and tire footprint pressures of future aircraft, etc., in order that land acquisition, runway lengths and weight bearing characteristics will be adequate. Plans for nearby military and civil airports should be coordinated in order that runways may be properly located and traffic control procedures properly integrated.

Additional factors, such as the future role of the seaplane in military and commercial operations; characteristics and anticipated volume in urban areas of vertical lift and steep gradient aircraft must be estimated and the forecasts made known to the local airport planner.

The high noise level of jet powered aircraft has created extremely difficult problems in community relations for the military services and will create additional problems of a very serious nature for civilian operators as jet powered aircraft are introduced, unless the designers can find a solution.

The Federal Government, in setting military aircraft procurement specifications, and in the allocation of research and development funds, could, in our opinion, do much more than is being done toward the solution of the noise problem.

The mention of Federal financial participation in a national system of civil airports raises, first, considerations as to the size of the program, and, secondly, how its cost should be allocated between Federal, local government and private interests.

The overall cost of modernizing the nation's airports has been and will continue to be very large. We have been advised that over \$3 billion has been spent on military airports in the United States since 1951. During the same period, only \$116 million of Federal funds (exclusive of special appropriations such as those for the National Airport in Washington, D. C.) have been invested in civil airports. This amount was spent under the 1946 Federal Airport Act, which authorized a total of \$500 million, of which only \$212 million has been spent since the Act was passed. The total investment in civil airports, including Federal, local government and private is not known, but construction costs are, in general, borne predominantly by local governments and private interests. Some figures regarding the investment made at the four major airports in the New York metropolitan area are cited to illustrate, in a general way, the magnitude of the expenditures required.

Ninety-two million dollars (exclusive of the purchase price of Teterboro and prior governmental investments in the other three fields) has been invested by the Port of New York Authority in Idlewild, LaGuardia, Newark and Teterboro during the past eight years. The Federal contribution under the 1946 Airport Act was \$9 million in addition to this amount. Current plans for the next ten years indicate an additional local expenditure of about \$175 million with the requirements beyond 1956 unpredictable on the basis of available data, but in all likelihood involving substantial additional sums. This local expenditure of about \$268 million on four airports over

a 15 to 20 year span may be compared with the program Congress recently passed calling for Federal assistance of \$251 million over the next four years for all of the nation's civil airports.

The question of how much of the cost of construction of the nation's civil airports should be borne by the Federal Government has been hotly debated for many years. Some objections have been raised to any Federal participation on the grounds that this would constitute unwarranted government assistance to the commercial air carriers.

It must be recognized, we believe, that it has been a traditional government policy to render Federal financial assistance, in one form or another, to almost every type of transportation at some time during its development. This assistance has often been and logically should be withdrawn when without it an industry can produce the required public services and when national security considerations permit. The airlines of the United States have matured as an industry, and with few exceptions, the air carriers should be expected to pay reasonable amounts for services received and facilities utilized. It is impractical, however, except under very special circumstances, for them to build their own airports, install their own navigation aids, or set up their own traffic control facilities. They must, for the most part, share publicly provided facilities with military and many other civil users. The determination of who should pay how much for the use of these facilities can and should proceed simultaneously with the provision of the facilities themselves.

Among the airport improvements which are required are longer and stronger runways, clear approach zones, high-speed taxi turnoffs, high intensity lighting, larger passenger and cargo handling areas, enlarged utility systems — to name but a few. Certain airport deficiencies have been acceptable to date with low performance aircraft, but those now being operated and those shortly to take to the air are far more demanding on the landing facilities provided for them.

A consideration of no small concern from a national defense standpoint which seems to require special note, is the fact that although civil airports should and must provide a reserve for military use in time of emergency to our knowledge, no single civil airport in the country is capable, at the present time, of handling the Air Forces' principal long range bombers at full operational loads on a sustained basis. What this means to the military's ability to disperse its forces in time of emergency is obvious.

In conclusion, then, the responsibility for the financing of individual civil airports and the responsibility for their management and individual planning should remain at the local level. But the Federal Government must accept responsibility for overall planning of a national airport system as part of the national Aviation Facilities concept and for the programming of such additional funds, both direct and supplemental, as may need to be invested in airports in the national interest. Any other course of action could only lead to confusion and wasteful inadequacy.

SECTION 5 — GOVERNMENT ORGANIZATION

By J. Gordon Bennett, Jr.

Prior to 1926 — the infant days of aviation — matters pertaining to navigation aids, communications, and air traffic control were the responsibility of the Bureau of Lighthouses. The Air Commerce Act of 1926 created an Assistant Secretary to help the Secretary of Commerce foster air commerce and designate air routes.

The Air Mail Act of 1934 established a commission to recommend a U. S. aviation policy. The recommendations of this commission contributed

to the Civil Aeronautics Act of 1938 which created an independent agency called the Civil Aeronautics Authority. The Civil Aeronautics Authority was responsible not only for developing, installing, and operating airways and air traffic control facilities, but also for economic and safety regulation and accident investigation.

Under Reorganization Plans III and IV of 1940, President Roosevelt divided the Civil Aeronautics Authority—keeping the adjudicating, economic, and accident investigation functions, and the promulgation of broad safety regulations under what we now know as the Civil Aeronautics Board. He placed airports, safety enforcement, airways, communications, and air traffic control under the Civil Aeronautics Administration. He then put the Civil Aeronautics Administration within the Department of Commerce, where it remains today.

From 1938 to 1946 there was a massive expansion and technical growth of aviation, domestic and international, civil and military. Aviation thus spread out into many new areas of our governmental structure. In order to have a coordinated government policy on both domestic and international aviation, the President in 1946 established the Air Coordinating Committee. The mission of the Air Coordinating Committee was to examine aviation problems and developments affecting more than one participating agency and to develop and recommend integrated policies.

As post-war civil and military air traffic increased, delays caused by inadequate air navigation and traffic control facilities increased. To meet their individual needs, civil and military agencies were developing separate devices for air navigation and traffic control. In 1947 the need for development of a single or "common system" was recognized and an industry-government advisory organization, founded in 1935, and known as the Radio Technical Commission for Aeronautics, drew up the basic requirements of such a system.

In order to keep the civil and military agencies coordinated in the implementation of this long-range effort, the Air Navigation Development Board was created in 1948. The Air Navigation Development Board was charged with preparing a single budget for all *research and development* required in connection with the common system, and neither the civil nor the military agencies were to begin or maintain any research and development without the express authorization of the Board.

In summary then, the present responsibility for Aviation Facilities development, within the Government, is distributed somewhat as follows:

The Civil Aeronautics Administration has the responsibility for operating the airways.

The military services fly under Civil Aeronautics Administration's control but must, of necessity, provide certain traffic control and air navigation services to meet their own requirements, if the Civil Aeronautics Administration is unable to meet them.

The Air Coordinating Committee has the responsibility for coordinating board aviation policies.

The Air Navigation Development Board is responsible for coordinating Aviation Facilities development programs.

The Radio Technical Commission for Aeronautics is a government-industry advisory organization with no continuing official government status; which serves upon request.

There are now over 75 committees, subcommittees, and special working groups addressing themselves to Aviation Facilities matters. The existence of so many groups is not, in itself, an evil, but it is increasingly apparent that the process of coordination is becoming more and more time consuming, and that preoccupation with current issues tends to obscure forward vision.

SECTION 6 — THE ORGANIZATION OF A STUDY LEADING TO A PLAN
FOR A NATIONAL AVIATION FACILITIES SYSTEM

By N. E. Halaby

It is clear that a great deal of effort has been made to coordinate the activities of various government departments and agencies in the development and operation of Aviation Facilities. But it is also clear that the development of the required facilities is lagging far behind the needs of aviation. It seems appropriate to re-examine the organizational structure of the government for handling the planning, programming, and development of a national Aviation Facilities system.

We find that none of the interdepartmental committees dealing with coordination has any independent executive authority. Their members serve only on a part-time basis and the membership changes frequently. While it was originally intended that, in addition to exercising their coordinating functions, they would be instrumentalities for the development of forward looking policies, they have, in practice, become primarily mechanisms wherein the representatives of various Federal agencies meet to debate and, whenever possible, coordinate action on pressing current problems. Furthermore, the coordination *among* the committees themselves has become a problem, and the delineation of their respective functions is not always clear.

It is not our desire to belittle the useful functions which these organizations perform, but we do wish to note their practical limitations. We think it is abundantly clear that, because of their basic structure, they cannot be expected to provide the dynamic leadership required for *origination* and development of a comprehensive national Aviation Facilities system. Certain essential elements of effective government action seem to be missing — full time direction, full disclosure of departmental information and plans, closely coordinated budgetary planning and funding, and a unified approach to the Congress in matters of appropriations.

Most of the reports which come out of these committees appear to be statements of requirements, which may be excellent in themselves; but these requirements require budgetary support and authoritative decision and assignment of necessary resources before they can become programs ready to be put into action.

A recent report of Special Working Group No. 13 of the Air Coordinating Committee, entitled "Aids to Air Navigation and Landing," contains two statements which illustrate the problem:

"It has been concluded that 'research and development programs have been severely handicapped for lack of continued participation of operational planning groups.' Such groups 'after writing reports and recommendations, disbanded and their sponsoring agencies did not continue to review progress and keep operational requirements up to date.'

"There has been insufficient recognition of air traffic control requirements from a budgetary standpoint. Not only is strong budgetary support needed for the immediate needs of the air traffic control system, but strong support is needed for a proper research and development program for air traffic control. This is essential because it is impossible to imagine that any air traffic control system will in itself become *the* ultimate. Keeping pace with the rapid advancements in aircraft design will actually result in a series of so-called 'ultimate' systems which through evolution will in themselves become interim transitions to a better system."

It seems evident that there is a need for forceful, high level direction of the studies leading to a national Aviation Facilities program. Inasmuch as the regular departments of the government are fully occupied with heavy operating responsibilities which are diverse and sometimes conflicting, and as the interdepartmental committees are fully occupied in resolving day-to-day conflicts, it seems logical to conclude, as we have done, that the direction of the study necessary for intelligent future planning should be established elsewhere in the government.

It is our conclusion that the study should be undertaken within the framework of the executive branch and should be headed by an individual serving under a temporary appointment in the Executive Office of the President.

The personal qualifications of the individual selected for this assignment are of paramount importance, in our opinion. He will have to exercise a high degree of leadership in dealing with the disputes which will inevitably arise as a result of the varying objectives of the users of our airspace. The Armed Forces, for example, aggressively strive for optimum combat performance other considerations being secondary. The airlines put safety and economy ahead of maximum performance. The owners and operators of small private and miscellaneous commercial aircraft are often unable to afford some of the very expensive and heavy equipment that the military, the airlines and large business aircraft operators may be willing to buy, and therefore sometimes find themselves at odds with both the military and the scheduled airlines.

We believe that placing responsibility on an individual is more likely to produce successful results than would be the case if the assignment were made to a board, committee or commission, although we recognize that the individual selected might desire an advisory commission or committee to help him, and may need to enlist the aid of talents available outside of the government.

We believe the urgency of the problem is such that no effort should be spared to find an individual of superior talents and proper background who has the President's confidence and who can work on a basis of mutual trust and respect with those members of the Cabinet most directly concerned.