AVIATION DEMAND AND AIRPORT FACILITY REQUIREMENT FORECASTS FOR LARGE AIR TRANSPORTATION HUBS THROUGH 1980

AUGUST 1967

[redacted]

DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION

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August 1967

Department of Transportation
Federal Aviation Administration
Airports Service

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DISTRIBUTION: ZPO-382; PAT-1 (5 cys ea); PAT-2 (3 cys ea); PAT-3,4,5,6,7,8 (1 cy ea)

1. INTRODUCTION. This report presents forecasts of long-range airport aviation demand and selected airport facility requirements at the Nation's large air transportation hubs as developed by the FAA's Airports Service. The forecasts are designed for use in advance planning of the physical, as well as financial, airport facility development required to meet the air transportation needs of 1980. They are also intended to assist in promoting the development of comprehensive, long-range metropolitan airport master plans by airport and local government planning officials.

The scope of the aeronautical demand forecasts herein has been limited to air transportation activity within twenty-two (22) metropolitan areas classified as Large Hubs -- communities which generate one percent (1%) or more of the Nation's scheduled air carrier domestic enplaned passengers. However, because of their proximity, the New York and Newark Large Hubs have been combined and presented as a single New York hub for purposes of this report.

Since a community's percentage share of the U. S. airline passenger market has proven relatively stable from year to year, and because passenger data are highly correlated with other measures of aeronautical activity such as aircraft operations, the hub structure serves as a valuable stratification method in forecasting local activity trends based on national data. Large Hubs in FY 1965, collectively, accounted for 68% of all domestic enplaned passengers and 79% of all domestic air cargo carried by U. S. scheduled airlines. The forecast data indicates that only a slight increase in the percent of the respective U. S. totals will prevail for the Large Hubs in 1980. Thus, it can be assumed that a major portion of the Nation's future public air transportation system's airport facility requirements are encompassed by the Large Hub forecasts.

In the course of this forecast effort, aviation activities at 123 airports which are within the Large Hubs and open to the public were reviewed, analyzed, and projected through 1980. It is pointed out, however, that the hubs' forecast data were developed for fixed wing aircraft only, since it was assumed that helicopter and other nonfixed wing aircraft activities would probably remain relatively small until after the 1980 forecast period.

The individual Large Hub airport demand and requirement forecasts are presented in two sections:

Part I. Forecasts of Airport Aviation Activity, 1970-1980, were developed as a joint project by FAA's Airports Service, Air Traffic Service, and Office of Policy Development. The activity forecasts are broken down by type of user (scheduled air carrier, general aviation, and military), type of activity (itinerant and local

aircraft operations, busy-hour operations, enplaned passengers and air cargo tons), general aviation based aircraft, and aircraft mix (type of aircraft). Appendix 1, Methods Developed for Forecasting Aviation Demand at the Nation's Air Transportation Hubs, 1965-1980, describes in detail the forecasting techniques, source documents and other material used in the development of each of the line items presented in this section.

Part II. Forecasts of Selected Airport Facility Requirements, 1980, were developed by FAA's Airports Service from the airport aviation activity forecasts shown in Part I. The future needs of the Large Hubs, classified according to type of civil user (air carrier and general aviation), are quantified in units or area requirements for terminal aprons, terminal buildings, Federal inspection passenger facilities, cargo facilities and public vehicle parking areas.

Individual airport airfield requirements are not included in these facility forecasts since quantification of such for a hub airport system can be accomplished only by relating forecast demand to capacity for each airport within the hub. This should be accomplished as a follow-on action in the development of local comprehensive airport master plans for the metropolitan areas.

The forecast techniques, source documents, and other material used in the development of each line item in this section are described in detail in Appendix 2, Methods Developed for Forecasting Selected Airport Facility Requirements at the Nation's Air Transportation Hubs, 1980.

The cover page for each of the individual Large Hub forecasts contains a list of the airports identified within the hub's geographical area that were studied and used in the development of its future demand. Additional comments pertinent only to the particular hub are also included. Each airport listed has been coded as to type by its current and projected primary usage, as follows:

Type Codes	Definitions
AC	Air Carrier
GA	General Aviation
R	General Aviation airport which relieves traffic congestion at an air carrier airport
P	Airport identified as potential candidate for air traffic control services or navigational aids
(T)	Airport with ATC tower

The types of follow-on actions considered vital to obtain maximum use of these forecast data in assessing a Large Hub's ability to meet future demand are:

(1) an assessment of the currently available airport facilities within each hub.

(2) a determination of the additional facilities needed at each location in order to adequately meet the anticipated demand.

(3) the development of a comprehensive, long-range airport master plan for each hub, or metropolitan area, to insure the timely construction of the required airport facilities.

2. LARGE HUB FORECAST SUMMARY. The magnitude of airport aviation activity and related facilities needed within the Large Hubs by 1980 is summarized in the table below. The table provides an indication of the most urgently needed facilities required to meet the demand likely to be imposed on the system by 1980.

SUMMARY OF LARGE HUB AIRPORT AVIATION ACTIVITY AND SELECTED AIRPORT FACILITY REQUIREMENT FORECASTS THROUGH 1980

A. Airport Aviation Activities	1965	%	1980	%	% Incr. 1965-80
Aircraft Operations (Mil.)	20.3	100	74.6	100	269
Scheduled Air Carrier	3.8	19	9.1	12	143
General Aviation	15.9	78	65.0	87	309
Military	.6	3	.5	1	(-21)
Enplaned Passengers (Mil.)	69.5	100	370.6	100	433
Air Carrier	62.8	90	339.2	91	440
Domestic	57.8	83	311.9	84	440
International	5.0	7	27.3	7	445
General Aviation	6.7	10	31.4	9	367
Sched. Air Carr. Cargo Tons(Mil.)	1.3	100	19.7	100	1,377
Gen. Aviation Based Aircraft(000)	20.3	100	50.0	100	146
Less than 12,500 lbs.	16.0	79	35.3	71	121
More than 12,500 lbs.	4.3	21	14.7	29	242

B. Selected Airport Facilities	1980 Requirements
Air Carrier	
Passenger Gate Positions	2,253
Cargo Gate Positions	521
Public Vehicle Parking Area (Sq. Yds.)	11.5 Mil.
Terminal Building Area (Sq. Ft.)	52.3 Mil.
Cargo Building Area (Sq. Ft.)	7.9 Mil.
Terminal Apron Area (Sq. Yds.)	19.4 Mil.
Cargo Apron Area (Sq. Yds.)	4.4 Mil.
General Aviation	
Public Vehicle Parking Area (Sq. Yds.)	3.3 Mil.
Terminal Building Area (Sq. Ft.)	3.5 Mil.
Aircraft Apron Parking Area:	
Hangars (Sq. Yds.)	22.1 Mil.
Open (Sq. Yds.)	45.3 Mil.

One of the potential major problem areas within the Large Hubs centers around air passenger accommodations. By 1980 air carrier passenger enplanements, alone, are expected to increase more than five times the number experienced in 1965. The related smaller, yet significant, increase in air carrier aircraft operations reflects the introduction of large capacity aircraft during this time period. The forecasts of general aviation passenger enplanements also indicate a substantial increase, but at a lesser growth rate. Here too, a trend toward larger aircraft is reflected in the general aviation field as noted in the Based Aircraft breakdown of the above table. General aviation aircraft operations are expected to increase at more than twice the rate of the scheduled air carriers. This anticipated growth in general aviation operations will require almost three times the parking/servicing areas of that required by the air carriers.

In order to accommodate the large passenger growth predicted by 1980, airport terminal facilities must be expanded considerably, as well as the apron areas in order to accommodate the size and number of larger capacity aircraft. Air cargo traffic is expected to require about 15% as much terminal space as passenger traffic within the Large Hubs, but will require approximately 20% as much apron area for the cargo aircraft.

3. LARGE HUB FORECASTS. The following pages of this report present for each Large Hub the airport aviation activity and airport facility requirement forecasts described above.

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

NEW YORK (L) HUB*

Historical and projected activities at the following airports within the New York air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
Deer Park, New York	Deer Park	R
Farmingdale/Amityville, New York	Republic/Zahns	R
Hempstead/Huntington, New York	New/Grumman-Bethpage	R
Islip, New York	McArthur Field	AC (T) R
New York, New York	Flushing	R
New York, New York	LaGuardia	AC (T)
New York, New York	J.F.K. International	AC (T)
White Plains, New York	Westchester County	AC (T) R
Caldwell, New Jersey	Wright	R
Linden, New Jersey	Municipal	P R
Morristown, New Jersey	Municipal	GA (T) R
Newark, New Jersey	Newark	AC (T)
South Plainfield, New Jersey	Hadley	R
Teterboro, New Jersey	Teterboro	GA (T) R

* Although Newark, New Jersey, is classified as a separate large hub, it was combined with the New York Hub because of its geographical location.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

NEW YORK (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	2389.1	3753.2	5463.8	8025.5
a. Itinerant Operations	1360.1	2091.7	2899.6	4057.5
(1) Sched. Air Carrier	588.9	828.5	1050.7	1395.5
(2) General Aviation	748.2	1242.6	1829.3	2642.4
(3) Military	23.0	20.6	19.6	19.6
b. Local Operations	1029.0	1661.5	2564.2	3968.0
(1) General Aviation	1023.6	1657.2	2559.9	3963.7
(2) Military	5.4	4.3	4.3	4.3
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	176	213	277	372
2. General Aviation 1/	1130	1962	2923	4365
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	12325	22464	38337	64469
2. Sched. Air Carrier	11600	21149	36179	61048
a. Domestic	9290	16951	29000	48940
b. International	2310	4198	7179	12108
3. General Aviation	725	1315	2158	3421
D. AIR CARGO - TONS (000)				
1. Domestic	315	813	2004	5148
2. International	-	-	-	-
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	1755	2593	3411	4360
2. Less than 12,500 lbs.	1330	1862	2346	2933
3. More than 12,500 lbs.	425	731	1065	1427

1/ Not same hour as Air Carrier.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

NEW YORK (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	38.0	39.2	38.6	35.8
b. Group B	62.0	60.8	61.4	64.2
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	4.0	22.6	40.5
b. Group L (120 - 199 seats)	38.0	43.1	35.3	25.2
c. Group M (75 - 119 seats)	25.2	44.9	39.2	34.3
d. Group S (55 - 74 seats)	24.1	-	-	-
e. Group T (54 seats and under)	12.7	8.0	2.9	-
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	0.6	4.0	6.8	8.3
b. Group D & E	99.4	96.0	93.2	91.7
4. Military - Operations	100.0	100.0	100.0	100.0
a. Group B	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

NEW YORK (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	419
b. Apron Area (Sq. Yds.)	3,762,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	3,150,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	4,359,000
c. Concession Space (Sq. Ft.)	1,355,000
d. Total Area, Terminal Building (Sq. Ft.)	8,864,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	545,000
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	55,000
b. Area (Sq. Yds.)	1,951,000
5. Cargo Facilities	
a. Gate Positions (No.)	100
b. Apron Area (Sq. Yds.)	865,000
c. Cargo Building (Sq. Ft.)	1,986,000
d. Vehicular loading and unloading area	
(1) Spaces (No.)	163
(2) Area (Sq. Yds.)	22,000
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	4,282,000
(2) Aircraft Parking/Tie Down Positions (No.)	4,584

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

NEW YORK (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	2,070,000
(2) Aircraft Parking Positions (No.)	1,308
c. Total Apron Space	
(1) Area (Sq. Yds.)	6,352,000
(2) Aircraft Parking Positions (No.)	5,892
2. Terminal Building, Area (Sq. Ft.)	385,000
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	10,214
b. Area (Sq. Yds.)	363,000

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

CHICAGO (L) HUB

Historical and projected activities at the following airports within the Chicago air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
Aurora	Municipal	R
Chicago	Merrill C. Meigs	GA (T) R
Chicago	Midway	AC (T)
Chicago	O'Hare International	AC (T)
Chicago	New/Pal-Waukee	R
Chicago	New/Hinsdale	R
Chicago	New/York Township	R
Chicago	New/Mitchell	R
Elgin	Elgin	R
Joliet	Joliet Municipal	P R
Lockport	Lewis-Lockport	R
West Chicago	DuPage County	R
Waukegan	Waukegan Memorial	P R
Gary (Indiana)	Municipal	P R

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

CHICAGO (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	1425.7	2248.4	3258.4	4756.6
a. Itinerant Operations	986.6	1458.6	2004.1	2777.2
(1) Sched. Air Carrier	441.5	575.3	753.1	960.8
(2) General Aviation	527.3	868.9	1237.6	1805.0
(3) Military	17.8	14.4	13.4	11.4
b. Local Operations	439.1	793.8	1254.3	1979.4
(1) General Aviation	423.8	782.5	1243.0	1968.1
(2) Military	15.3	11.3	11.3	11.3
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	99	122	162	198
2. General Aviation 1/	799	1150	1621	2268
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	9194	16857	28766	48479
2. Sched. Air Carrier	8710	15993	27367	46189
a. Domestic	8375	15388	26328	44438
b. International	335	605	1039	1751
3. General Aviation	484	864	1399	2290
D. AIR CARGO - TONS (000)				
1. Domestic	207	578	1396	3394
2. International	-	-	-	-
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	1281	1856	2408	3027
2. Less than 12,500 lbs.	1083	1516	1910	2387
3. More than 12,500 lbs.	198	340	498	640

1/ Not same hour as Air Carrier.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

CHICAGO (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	40.7	45.9	42.7	41.7
b. Group B	59.3	54.1	57.3	58.3
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	5.8	21.9	45.2
b. Group L (120 - 199 seats)	40.7	48.4	39.0	23.8
c. Group M (75 - 119 seats)	25.9	34.7	33.4	27.3
d. Group S (55 - 74 seats)	16.4	-	-	-
e. Group T (54 seats and under)	17.0	11.1	5.7	3.7
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	0.4	2.9	4.9	6.1
b. Group D & E	99.6	97.1	65.1	93.9
4. Military - Operations	100.0	100.0	100.0	100.0
a. Group B	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

CHICAGO (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	252
b. Apron Area (Sq. Yds.)	2,374,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	2,414,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	3,340,000
c. Concession Space (Sq. Ft.)	1,038,000
d. Total Area, Terminal Building (Sq. Ft.)	6,792,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	105,000
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	42,095
b. Area (Sq. Yds.)	1,495,000
5. Cargo Facilities	
a. Gate Positions (No.)	76
b. Apron Area (Sq. Yds.)	686,000
c. Cargo Building (Sq. Ft.)	1,255,000
d. Vehicular loading and unloading area	
(1) Spaces (No.)	107
(2) Area (Sq. Yds.)	14,200
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	2,329,000
(2) Aircraft Parking/Tie Down Positions (No.)	3,201

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

CHICAGO (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	1,074,000
(2) Aircraft Parking Positions (No.)	908
c. Total Apron Space	
(1) Area (Sq. Yds.)	3,403,000
(2) Aircraft Parking Positions (No.)	4,109
2. Terminal Building, Area (Sq. Ft.)	200,000
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	5,304
b. Area (Sq. Yds.)	186,000

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

LOS ANGELES (L) HUB

Historical and projected activities at the following airports within the Los Angeles air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
Burbank	Lockheed Air Terminal	AC (T)
Compton	Compton	R
El Monte	Los Angeles - El Monte	R
Hawthorne	Municipal	GA (T) R
Lancaster	General Wm. J. Fox Airfield	AC P
La Verne	Brackett Field	GA (T) R
Long Beach	Long Beach (Daugherty Field)	AC (T)
Los Angeles	International	AC (T)
Los Angeles	Van Nuys	GA (T) R
San Fernando	Whiteman Airpark	R
Santa Monica	Municipal	GA (T) R
Huntington Beach (Sunset Beach)	Meadowlark	R
Torrance	Municipal	GA (T) R
Santa Ana	Orange County	AC (T)
Fullerton	Municipal	GA (T) R

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

LOS ANGELES (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	3137.0	5532.6	8764.6	13798.8
a. Itinerant Operations	1646.0	2707.7	4025.5	5892.1
(1) Sched. Air Carrier	325.7	419.6	556.3	676.1
(2) General Aviation	1292.6	2268.6	3452.7	5199.5
(3) Military	27.7	19.5	16.5	16.5
b. Local Operations	1491.5	2824.9	4739.1	7906.7
(1) General Aviation	1482.5	2802.3	4716.5	7884.1
(2) Military	8.5	22.6	22.6	22.6
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	120	121	157	186
2. General Aviation 1/	1720	3505	5544	8840
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	7171	13222	22781	37876
2. Sched. Air Carrier	6109	11028	18838	31767
a. Domestic	5561	10060	17209	29046
b. International	548	968	1629	2721
3. General Aviation	1062	2194	3943	6109
D. AIR CARGO - TONS (000)				
1. Domestic	131	322	760	1900
2. International	-	-	-	-
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	4448	6599	8704	11148
2. Less than 12,500 lbs.	3376	4726	5953	7443
3. More than 12,500 lbs.	1072	1873	2751	3705

1/ Not same hour as Air Carrier.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

LOS ANGELES (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	54.3	57.0	51.3	57.0
b. Group B	45.7	43.0	48.7	43.0
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	6.0	21.1	49.5
b. Group L (120 - 199 seats)	54.3	59.7	46.7	31.2
c. Group M (75 - 119 seats)	20.8	24.0	27.2	19.3
d. Group S (55 - 74 seats)	11.1	-	-	-
e. Group T (54 seats and under)	13.8	10.3	5.0	-
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	0.7	4.4	7.5	9.1
b. Group D & E	99.3	95.6	92.5	90.9
4. Military - Operations	100.0	100.0	100.0	100.0
a. Group B	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

LOS ANGELES (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	161
b. Apron Area (Sq. Yds.)	1,621,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	1,686,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	2,333,000
c. Concession Space (Sq. Ft.)	726,000
d. Total Area, Terminal Building (Sq. Ft.)	4,745,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	163,000
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	29,406
b. Area (Sq. Yds.)	1,044,000
5. Cargo Facilities	
a. Gate Positions (No.)	39
b. Apron Area (Sq. Yds.)	369,000
c. Cargo Building (Sq. Ft.)	738,000
d. Vehicular loading and unloading area	
(1) Spaces (No.)	60
(2) Area (Sq. Yds.)	7,980
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	10,903,000
(2) Aircraft Parking/Tie Down Positions (No.)	11,313

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

LOS ANGELES (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	5,351,000
(2) Aircraft Parking Positions (No.)	3,345
c. Total Apron Space	
(1) Area (Sq. Yds.)	16,254,000
(2) Aircraft Parking Positions (No.)	14,658
2. Terminal Building, Area (Sq. Ft.)	779,000
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	20,670
b. Area (Sq. Yds.)	734,000

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

ATLANTA (L) HUB

Historical and projected activities at the following airports within the Atlanta air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
Atlanta	Atlanta	AC (T)
Atlanta	DeKalb-Peachtree	GA (T) R
Atlanta	Fulton County	GA (T) R
Douglasville	New/Flying S Ranch	R
Lithonia	New/Gunn	R
Marietta	McCollum	P

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

ATLANTA (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	702.6	1215.9	1844.2	2743.3
a. Itinerant Operations	423.6	695.8	1001.3	1376.4
(1) Sched. Air Carrier	198.2	318.1	454.5	574.0
(2) General Aviation	211.5	368.4	537.5	793.1
(3) Military	13.9	9.3	9.3	9.3
b. Local Operations	279.0	520.1	842.9	1366.9
(1) General Aviation	264.3	512.8	835.6	1359.6
(2) Military	14.7	7.3	7.3	7.3
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	60	89	131	169
2. General Aviation 1/	402	577	906	1427
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	3554	7331	12502	21061
2. Sched. Air Carrier	3350	6939	11871	20037
a. Domestic	3350	6939	11871	20037
b. International	-	-	-	-
3. General Aviation	204	392	631	1024
D. AIR CARGO - TONS (000)				
1. Domestic	57	158	392	946
2. International	-	-	-	-
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	482	701	911	1160
2. Less than 12,500 lbs.	396	554	697	872
3. More than 12,500 lbs.	86	147	214	288

1/ Not same hour as Air Carrier.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

ATLANTA (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	25.5	28.8	27.9	29.4
b. Group B	74.5	71.2	72.1	70.6
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	3.0	8.3	27.4
b. Group L (120 - 199 seats)	25.6	29.2	25.3	16.7
c. Group M (75 - 119 seats)	22.9	42.2	54.2	55.9
d. Group S (55 - 74 seats)	19.1	-	-	-
e. Group T (54 seats and under)	32.4	25.6	12.2	-
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	0.4	3.1	5.3	6.5
b. Group D & E	99.6	96.9	94.7	93.5
4. Military - Operations	100.0	100.0	100.0	100.0
a. Group B	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

ATLANTA (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	136
b. Apron Area (Sq. Yds.)	999,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	1,035,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	1,430,000
c. Concession Space (Sq. Ft.)	445.000
d. Total Area, Terminal Building (Sq. Ft.)	2,910,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	0
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	18,030
b. Area (Sq. Yds.)	640,000
5. Cargo Facilities	
a. Gate Positions (No.)	31
b. Apron Area (Sq. Yds.)	232,000
c. Cargo Building (Sq. Ft.)	397,000
d. Vehicular loading and unloading area	
(1) Spaces (No.)	30
(2) Area (Sq. Yds.)	3,990
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	1,013,000
(2) Aircraft Parking/Tie Down Positions (No.)	1,337

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

ATLANTA (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	456,000
(2) Aircraft Parking Positions (No.)	348
c. Total Apron Space	
(1) Area (Sq. Yds.)	1,469,000
(2) Aircraft Parking Positions (No.)	1,685
2. Terminal Building, Area (Sq. Ft.)	126,000
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	3,340
b. Area (Sq. Yds.)	119,000

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

WASHINGTON, D. C. (L) HUB*

Historical and projected activities at the following airports within the Washington, D. C. air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
Alexandria, Virginia	Washington - Virginia	R
Clinton, Maryland	Hyde Field	R
College Park, Maryland	New/College Park	R
Gaithersburg, Maryland	Montgomery County	P
Fairfax, Virginia	New Fairfax County/Woodbridge	R
Leesburg, Virginia	Municipal (Godfrey)	R
Manassas, Virginia	Municipal	P R
Mitchellville, Maryland	New/Freeway	R
Washington, D. C.	Dulles International	AC (T)
Washington, D. C.	National	AC (T)
Baltimore, Maryland	Friendship International	AC (T)

*Although Baltimore Friendship International is classified as a separate medium hub, it was combined with the Washington Hub because of its geographical location.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

WASHINGTON, D. C. (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	1012.9	1466.4	1964.9	2575.4
a. Itinerant Operations	595.2	870.5	1204.9	1606.7
(1) Sched. Air Carrier	303.0	429.0	594.0	789.0
(2) General Aviation	263.0	412.3	573.7	770.5
(3) Military	29.2	29.2	37.2	47.2
b. Local Operations	417.7	595.9	760.0	968.7
(1) General Aviation	348.7	521.4	701.5	925.2
(2) Military	69.0	74.5	58.5	43.5
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	72	114	154	192
2. General Aviation 1/	389	550	704	893
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	4614	8420	14480	24467
2. Sched. Air Carrier	4356	7981	13818	23512
a. Domestic	4290	7811	13964	22559
b. International	66	170	454	953
3. General Aviation	258	439	662	955
D. AIR CARGO - TONS (000)				
1. Domestic	44	93	212	528
2. International	-	-	-	-
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	812	1165	1505	1906
2. Less than 12,500 lbs.	710	994	1253	1566
3. More than 12,500 lbs.	102	171	252	340

1/ Not same hour as Air Carrier.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

WASHINGTON, D. C. (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	8.2	21.8	35.6	35.4
b. Group B	91.8	78.2	64.4	64.6
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	2.2	18.5	42.5
b. Group L (120 - 199 seats)	14.8	30.9	32.1	23.2
c. Group M (75 - 119 seats)	39.4	46.6	38.0	30.2
d. Group S (55 - 74 seats)	27.8	2.1	-	-
e. Group T (54 seats and under)	18.0	18.2	11.4	4.1
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	0.2	2.3	4.0	4.9
b. Group D & E	99.8	97.7	96.0	95.1
4. Military - Operations	100.0	100.0	100.0	100.0
a. Group B	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

WASHINGTON, D. C. (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	198
b. Apron Area (Sq. Yds.)	1,800,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	1,229,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	1,701,000
c. Concession Space (Sq. Ft.)	529,000
d. Total Area, Terminal Building (Sq. Ft.)	3,459,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	57,100
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	21,450
b. Area (Sq. Yds.)	762,000
5. Cargo Facilities	
a. Gate Positions (No.)	22
b. Apron Area (Sq. Yds.)	200,000
c. Cargo Buildings (Sq. Ft.)	232,000
d. Vehicular loading and unloading area	
(1) Spaces (No.)	17
(2) Area (Sq. Yds.)	2,261
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	1,248,000
(2) Aircraft Parking/Tie Down Positions (No.)	1,740

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

WASHINGTON, D. C. (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	612,000
(2) Aircraft Parking Positions (No.)	572
c. Total Apron Space	
(1) Area (Sq. Yds.)	1,860,000
(2) Aircraft Parking Positions (No.)	2,312
2. Terminal Building, Area (Sq. Ft.)	78,000
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	2,089
b. Area (Sq. Yds.)	74,160

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

SAN FRANCISCO (L) HUB

Historical and projected activities at the following airports within the San Francisco air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
Antioch	Antioch	R
Concord	Buchanan Field	GA (T) R
Fremont	New/King Skylanes	R
Half Moon Bay	Half Moon Bay	P R
Hayward	Hayward	GA (T) R
Livermore	Municipal	P R
Novato	Marin County	R
Oakland	Metropolitan Oakland	AC (T)
Palo Alto	Palo Alto	R
San Jose	Reid-Hillview	R
San Carlos	San Carlos	P R
San Francisco	International	AC (T)

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

SAN FRANCISCO (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	1701.9	2805.7	4019.5	5714.5
a. Itinerant Operations	724.9	1167.0	1627.3	2226.0
(1) Sched. Air Carrier	195.0	309.0	410.0	525.0
(2) General Aviation	520.2	848.6	1208.9	1692.6
(3) Military	9.7	9.4	8.4	8.4
b. Local Operations	977.0	1638.7	2392.2	3488.5
(1) General Aviation	958.7	1626.3	2382.8	3480.1
(2) Military	18.3	12.4	9.4	8.4
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	41	65	88	111
2. General Aviation 1/	1025	1529	2185	3152
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	4593	8633	14649	24519
2. Sched. Air Carrier	4074	7731	13229	22330
a. Domestic	3785	7211	12339	20828
b. International	289	520	890	1502
3. General Aviation	519	902	1420	2189
D. AIR CARGO - TONS (000)				
1. Domestic	103	313	730	1709
2. International	-	-	-	-
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	2004	2900	3756	4764
2. Less than 12,500 lbs.	1738	2433	3064	3830
3. More than 12,500 lbs.	266	467	692	934

1/ Not same hour as Air Carrier.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

SAN FRANCISCO (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	46.5	46.4	44.3	41.3
b. Group B	53.5	53.6	55.7	58.7
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	4.4	16.0	36.4
b. Group L (120 - 199 seats)	46.6	50.6	44.7	30.2
c. Group M (75 - 119 seats)	24.4	26.3	30.3	29.5
d. Group S (55 - 74 seats)	7.7	-	-	-
e. Group T (54 seats and under)	21.3	18.7	9.0	3.9
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	0.3	2.4	4.2	5.1
b. Group D & E	99.7	97.6	95.8	94.9
4. Military - Operations	100.0	100.0	100.0	100.0
a. Group B	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

SAN FRANCISCO (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	187
b. Apron Area (Sq. Yds.)	1,694,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	1,178,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	1,630,000
c. Concession Space (Sq. Ft.)	507,000
d. Total Area, Terminal Building (Sq. Ft.)	3,315,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	90,000
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	20,544
b. Area (Sq. Yds.)	729,000
5. Cargo Facilities	
a. Gate Positions (No.)	51
b. Apron Area (Sq. Yds.)	445,000
c. Cargo Building (Sq. Ft.)	703,000
d. Vehicular loading and unloading area	
(1) Spaces (No.)	54
(2) Area (Sq. Yds.)	7,182
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	3,282,000
(2) Aircraft Parking/Tie Down Positions (No.)	4,366

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

SAN FRANCISCO (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	1,616,000
(2) Aircraft Parking Positions (No.)	1,429
c. Total Apron Space	
(1) Area (Sq. Yds.)	4,898,000
(2) Aircraft Parking Positions (No.)	5,795
2. Terminal Building, Area (Sq. Ft.)	278,000
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	7,376
b. Area (Sq. Yds.)	262,000

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

DALLAS (L) HUB*

Historical and projected activities at the following airports within the Dallas air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
Dallas	Love Field	AC (T)
Dallas	Addison	GA (T) R
Dallas	Redbird	GA (T) R
Garland/Dallas	New/Dallas-Garland	R
Grand Prairie	Municipal	R
Mesquite/Dallas	New/White Rock	R
Fort Worth	Greater Southwest International	AC (T)
Fort Worth	Meacham Field	GA (T)

The forecast years include the new Dallas - Fort Worth Regional Airport. The general aviation activity for Greater Southwest International was included in the hub forecasts as activity at a general aviation tower airport.

*Although Greater Southwest International and Meacham Field are identified with medium hubs, they were combined with the Dallas Hub because of their geographical location.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

DALLAS (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	949.5	1712.4	2465 7	3644.5
a. Itinerant Operations	569.5	968.4	1295.9	1804.2
(1) Sched. Air Carrier	174.0	230.1	333.5	424.0
(2) General Aviation	382.8	723.9	950.0	1368.8
(3) Military	12.7	14.4	12.4	11.4
b. Local Operations	380.0	744.0	1169.8	1840.3
(1) General Aviation	363.6	732.4	1158.2	1829.7
(2) Military	16.4	11.6	11.6	10.6
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	43	53	79	100
2. General Aviation 1/	606	906	1275	1949
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	2971	5777	9684	16513
2. Sched. Air Carrier	2593	5033	8612	14780
a. Domestic	2548	4945	8463	14528
b. International	45	88	149	252
3. General Aviation	378	744	1072	1733
D. AIR CARGO - TONS (000)				
1. Domestic	52	135	273	547
2. International	-	-	-	-
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	1112	1664	2211	2842
2. Less than 12,500 lbs.	799	1118	1409	1762
3. More than 12,500 lbs.	313	546	802	1080

1/ Not same hour as Air Carrier.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

DALLAS (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	29.4	39.3	35.8	35.7
b. Group B	70.6	60.7	64.2	64.3
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	2.5	6.6	26.1
b. Group L (120 - 199 seats)	29.4	45.2	42.3	33.1
c. Group M (75 - 119 seats)	22.3	31.9	39.3	37.7
d. Group S (55 - 74 seats)	11.4	-	-	-
e. Group T (54 seats and under)	36.9	20.4	11.8	3.1
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	0.8	5.1	8.5	10.3
b. Group D & E	99.2	94.9	91.5	89.7
4. Military - Operations	100.0	100.0	100.0	100.0
a. Group B	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

DALLAS (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	84
b. Apron Area (Sq. Yds.)	631,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	771,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	1,067,000
c. Concession Space (Sq. Ft.)	332,000
d. Total Area, Terminal Building (Sq. Ft.)	2,170,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	19,000
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	13,454
b. Area (Sq. Yds.)	478,000
5. Cargo Facilities	
a. Gate Positions (No.)	17
b. Apron Area (Sq. Yds.)	125,000
c. Cargo Building (Sq. Ft.)	227,000
d. Vehicular loading and unloading area	
(1) Spaces (No.)	18
(2) Area (Sq. Yds.)	2,000
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	3,004,000
(2) Aircraft Parking/Tie Down Positions (No.)	2,813

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

DALLAS (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	1,504,000
(2) Aircraft Parking Positions (No.)	853
c. Total Apron Space	
(1) Area (Sq. Yds.)	4,508,000
(2) Aircraft Parking Positions (No.)	3,666
2. Terminal Building, Area (Sq. Ft.)	172,000
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	4,560
b. Area (Sq. Yds.)	162,000

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

BOSTON (L) HUB

Historical and projected activities at the following airports within the Boston air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
Bedford	L. G. Hanscom	GA (T) R
Beverly	Municipal	P R
Boston	Logan International	AC (T)
Marshfield	Marshfield	R
Norwood	Memorial	P R
Quincy	New/Braintree Municipal	R

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

BOSTON (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	708.9	1144.7	1730.8	2513.3
a. Itinerant Operations	394.6	610.9	899.1	1231.8
(1) Sched. Air Carrier	150.1	205.1	307.5	386.0
(2) General Aviation	217.0	384.9	570.7	824.9
(3) Military	27.5	20.9	20.9	20.9
b. Local Operations	314.3	533.8	831.7	1281.5
(1) General Aviation	280.8	523.6	821.5	1271.3
(2) Military	33.5	10.2	10.2	10.2
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	40	52	80	103
2. General Aviation 1/	471	592	886	1289
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	2805	5175	8823	14832
2. Sched. Air Carrier	2587	4768	8158	13771
a. Domestic	2455	4524	7740	13065
b. International	132	244	418	706
3. General Aviation	218	407	665	1061
D. AIR CARGO - TONS (000)				
1. Domestic	39	123	266	580
2. International	-	-	-	-
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	433	633	830	1062
2. Less than 12,500 lbs.	340	490	617	772
3. More than 12,500 lbs.	83	143	213	290

1/ Not same hour as Air Carrier.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

BOSTON (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	20.4	26.7	24.0	25.7
b. Group B	79.6	73.3	76.0	74.3
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	1.9	7.2	28.6
b. Group L (120 - 199 seats)	20.4	34.7	35.5	27.0
c. Group M (75 - 119 seats)	13.4	53.1	51.5	44.4
d. Group S (55 - 74 seats)	49.5	-	-	-
e. Group T (54 seats and under)	16.7	10.3	5.8	-
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	0.4	4.1	6.9	8.4
b. Group D & E	99.6	95.9	93.1	91.6
4. Military - Operations	100.0	100.0	100.0	100.0
a. Group B	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

BOSTON (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	113
b. Apron Area (Sq. Yds.)	866,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	723,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	1,000,000
c. Concession Space (Sq. Ft.)	311,000
d. Total Area, Terminal Building (Sq. Ft.)	2,034,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	42,000
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	12,607
b. Area (Sq. Yds.)	448,000
5. Cargo Facilities	
a. Gate Positions (No.)	22
b. Apron Area (Sq. Yds.)	164,000
c. Cargo Building (Sq. Ft.)	250,000
d. Vehicular loading and unloading area	
(1) Spaces (No.)	18
(2) Area (Sq. Yds.)	2,400
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	989,000
(2) Aircraft Parking/Tie Down Positions (No.)	1,259

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

BOSTON (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	448,000
(2) Aircraft Parking Positions (No.)	319
c. Total Apron Space	
(1) Area (Sq. Yds.)	1,437,000
(2) Aircraft Parking Positions (No.)	1,578
2. Terminal Building, Area (Sq. Ft.)	114,000
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	3,016
b. Area (Sq. Yds.)	107,000

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

MIAMI (L) HUB

Historical and projected activities at the following airports within the Miami air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
Miami	International	AC (T)
Miami	Opa Locka	GA (T) R
Miami	New Tamiami	GA (T) R
Homestead	Homestead	R
Fort Lauderdale	Fort Lauderdale-Hollywood	AC (T)
Fort Lauderdale	Executice	R
Hollywood	North Perry	P

Air carrier training operations have not been included because of the possible relocation of this type of activity to a less congested area.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

MIAMI (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	1563.7	2960.5	4553.5	6920.0
a. Itinerant Operations	669.4	1338.1	1969.5	2829.9
(1) Sched. Air Carrier	177.6	274.7	376.9	463.0
(2) General Aviation	483.9	1051.3	1581.5	2355.8
(3) Military	7.9	12.1	11.1	11.1
b. Local Operations	894.3	1622.4	2584.0	4090.1
(1) General Aviation	882.8	1611.5	2573.1	4080.2
(2) Military	11.5	10.9	10.9	9.9
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	56	91	120	149
2. General Aviation 1/	758	1686	2606	4063
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	3319	6508	11154	18824
2. Sched. Air Carrier	2906	5505	9413	15883
a. Domestic	2130	3932	6726	11357
b. International	776	1573	2687	4526
3. General Aviation	413	1003	1741	2941
D. AIR CARGO - TONS (000)				
1. Domestic	32	82	152	479
2. International	49	86	191	266
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	998	1498	1994	2566
2. Less than 12,500 lbs.	691	968	1219	1524
3. More than 12,500 lbs.	307	530	775	1042

1/ Not same hour as Air Carrier.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

MIAMI (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	42.0	46.7	43.3	36.5
b. Group B	58.0	53.3	56.7	63.5
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	4.7	20.2	53.0
b. Group L (120 - 199 seats)	41.9	53.7	44.8	22.8
c. Group M (75 - 119 seats)	33.9	37.4	34.7	24.2
d. Group S (55 - 74 seats)	19.2	4.0	0.3	-
e. Group T (54 seats and under)	5.0	0.2	-	-
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	0.8	5.2	8.7	10.6
b. Group D & E	99.2	94.8	91.3	89.4
4. Military - Operations	100.0	100.0	100.0	100.0
a. Group B	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

MIAMI (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	128
b. Apron Area (Sq. Yds.)	1,318,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	897,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	1,242,000
c. Concession Space (Sq. Ft.)	386,000
d. Total Area, Terminal Building (Sq. Ft.)	2,525,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	272,000
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	15,650
b. Area (Sq. Yds.)	556,000
5. Cargo Facilities	
a. Gate Positions (No.)	21
b. Apron Area (Sq Yds.)	205,000
c. Cargo Building (Sq. Ft.)	303,000
d. Vehicular loading and unloading area	
(1) Spaces (No.)	24
(2) Area (Sq. Yds.)	3,200
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	3,112,000
(2) Aircraft Parking/Tie Down Positions (No.)	3,283

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

MIAMI (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	1,428,000
(2) Aircraft Parking Positions (No.)	770
c. Total Apron Space	
(1) Area (Sq. Yds.)	4,540,000
(2) Aircraft Parking Positions (No.)	4,053
2. Terminal Building, Area (Sq. Ft.)	358,000
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	9,508
b. Area (Sq. Yds.)	329,000

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

DETROIT (L) HUB

Historical and projected activities at the following airports within the Detroit air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
Detroit	City	GA (T) R
Detroit	Metropolitan Wayne County	AC (T)
Detroit	Willow Run	AC (T) R
Grosse Ile/Flat Rock	Grosse Ile (NAS)/Nan-Bar	R
Plymouth	Mattetal	R
Pontiac	Allen's	P
Pontiac	Municipal	GA (T) R

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

DETROIT (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	733.9	1109.6	1694.6	2544.4
a. Itinerant Operations	485.5	609.4	869.8	1185.5
(1) Sched. Air Carrier	167.0	214.3	292.5	354.6
(2) General Aviation	307.3	389.5	573.7	828.3
(3) Military	11.2	5.6	3.6	2.6
b. Local Operations	248.4	500.2	824.8	1358.9
(1) General Aviation	243.6	497.1	822.7	1356.8
(2) Military	4.8	3.1	2.1	2.1
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	40	41	57	69
2. General Aviation 1/	408	681	1035	1607
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	2154.1	3716.8	6265.7	10455.7
2. Sched. Air Carrier	1857.9	3392.5	5800.9	9790.3
a. Domestic	1857.9	3392.5	5800.9	9790.3
b. International	-	-	-	-
3. General Aviation	296.2	324.3	464.8	665.4
D. AIR CARGO - TONS (000)				
1. Domestic	71.7	178.9	418.7	997.5
2. International	-	-	-	-
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	898	1330	1758	2249
2. Less than 12,500 lbs.	675	945	1193	1488
3. More than 12,500 lbs.	223	385	565	761

1/ Not same hour as Air Carrier.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

DETROIT (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	24.8	31.8	27.3	26.3
b. Group B	75.2	68.2	72.7	73.7
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	1.2	9.4	37.3
b. Group L (120 - 199 seats)	24.8	39.6	31.8	18.7
c. Group M (75 - 119 seats)	34.2	45.1	51.5	40.6
d. Group S (55 - 74 seats)	18.7	-	-	-
e. Group T (54 seats and under)	22.3	14.1	7.3	3.4
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	0.6	4.4	7.4	9.0
b. Group D & E	99.4	95.6	92.6	91.0
4. Military - Operations	100.0	100.0	100.0	100.0
a. Group B	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

DETROIT (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	54
b. Apron Area (Sq. Yds.)	454,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	589,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	816,000
c. Concession Space (Sq. Ft.)	254,000
d. Total Area, Terminal Building (Sq. Ft.)	1,659,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	0
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	10,280
b. Area (Sq. Yds.)	365,000
5. Cargo Facilities	
a. Gate Positions (No.)	38
b. Apron Area (Sq. Yds.)	316,000
c. Cargo Building (Sq. Ft.)	430,000
d. Vehicular loading and unloading area	
(1) Spaces (No.)	32
(2) Area (Sq. Yds.)	4,256
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	2,188,000
(2) Aircraft Parking/Tie Down Positions (No.)	2,183

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

DETROIT (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	1,093,000
(2) Aircraft Parking Positions (No.)	675
c. Total Apron Space	
(1) Area (Sq. Yds.)	3,281,000
(2) Aircraft Parking Positions (No.)	2,858
2. Terminal Building, Area (Sq. Ft.)	142,000
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	3,761
b. Area (Sq. Yds.)	134,000

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

PITTSBURGH (L) HUB

Historical and projected activities at the following airports within the Pittsburgh air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
Beaver Falls	Beaver County	P R
Canonsburg/Bridgeville	New/Campbell	R
Conway	New/Aliquippa-Hopewell	R
Finleyville	Finleyville	R
Jeannette/Irwin	New/Sky Ranch/Inter. Co. Non Commercial	R
Latrobe	Westmoreland-Latrobe	R
Monongahela	James Scott Thompson Mem.	R
Monroeville	New/Pittsburgh-Monroeville	R
Pittsburgh	Allegheny County	GA (T) R
Pittsburgh	Greater Pittsburgh	AC (T)
Tarentum	Remich	R
Washington	Washington County	R

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

PITTSBURGH (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	556.3	854.8	1216.1	1744.9
a. Itinerant Operations	310.7	463.1	636.2	885.7
(1) Sched. Air Carrier	114.1	151.0	210.0	278.0
(2) General Aviation	177.6	295.7	409.8	591.3
(3) Military	19.0	16.4	16.4	16.4
b. Local Operations	245.6	391.3	579.9	859.2
(1) General Aviation	226.3	374.9	563.5	842.8
(2) Military	19.3	16.4	16.4	16.4
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	27	35	49	66
2. General Aviation 1/	305	422	615	904
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	1821	3382	5727	9612
2. Sched. Air Carrier	1653	3061	5237	8840
a. Domestic	1653	3061	5237	8840
b. International	-	-	-	-
3. General Aviation	168	321	490	772
D. AIR CARGO - TONS (000)				
1. Domestic	18	46	105	240
2. International	-	-	-	-
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	503	750	998	1282
2. Less than 12,500 lbs.	379	531	669	836
3. More than 12,500 lbs.	124	219	329	446

1/ Not same hour as Air Carrier.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

PITTSBURGH (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	14.3	19.2	17.6	18.0
b. Group B	85.7	80.8	82.4	82.0
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	0.9	5.9	23.4
b. Group L (120 - 199 seats)	14.3	25.2	29.2	23.5
c. Group M (75 - 119 seats)	32.1	52.7	54.1	47.6
d. Group S (55 - 74 seats)	26.7	-	-	-
e. Group T (54 seats and under)	26.9	21.2	10.8	5.5
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	0.8	5.5	9.1	11.1
b. Group D & E	99.2	94.5	90.9	88.9
4. Military Operations	100.0	100.0	100.0	100.0
a. Group B	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

PITTSBURGH (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	57
b. Apron Area (Sq. Yds.)	401,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	532,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	736,000
c. Concession Space (Sq. Ft.)	229,000
d. Total Area, Terminal Building (Sq. Ft.)	1,497,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	0
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	6,188
b. Area (Sq. Yds.)	330,000
5. Cargo Facilities	
a. Gate Positions (No.)	8
b. Apron Area (Sq. Yds.)	58,000
c. Cargo Building (Sq. Ft.)	101,000
d. Vehicular loading and unloading area	
(1) Spaces (No.)	8
(2) Area (Sq. Yds.)	1,064
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	1,277,000
(2) Aircraft Parking/Tie Down Positions (No.)	1,264

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

PITTSBURGH (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	636,000
(2) Aircraft Parking Positions (No.)	385
c. Total Apron Space	
(1) Area (Sq. Yds.)	1,913,000
(2) Aircraft Parking Positions (No.)	1,649
2. Terminal Building, Area (Sq. Ft.)	79,700
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	2,115
b. Area (Sq. Yds.)	75,000

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

PHILADELPHIA (L) HUB

Historical and projected activities at the following airports within the Philadelphia air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
Camden, New Jersey/Moorestown	New/Moorestown	R
Langhorne	Lower Bucks County/Old Star	R
Media/West Chester	New/West Chester	R
Philadelphia	Wings Field	R
Philadelphia	International	AC (T)
Philadelphia	North Philadelphia	GA (T) R
Prospectville	Turner	R

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

PHILADELPHIA (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	559.4	849.8	1250.8	1784.1
a. Itinerant Operations	314.3	473.6	685.1	901.3
(1) Sched. Air Carrier	130.6	171.0	238.0	312.0
(2) General Aviation	177.8	297.1	442.6	584.8
(3) Military	5.9	5.5	4.5	4.5
b. Local Operations	245.1	376.2	565.7	882.8
(1) General Aviation	241.6	375.2	564.7	881.8
(2) Military	3.5	1.0	1.0	1.0
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	31	37	54	70
2. General Aviation 1/	287	378	554	813
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	1831	3376	5725	9569
2. Sched. Air Carrier	1642	3068	5247	8857
a. Domestic	1574	2941	5031	8492
b. International	68	127	216	365
3. General Aviation	189	308	478	712
D. AIR CARGO - TONS (000)				
1. Domestic	32	68	189	518
2. International	-	-	-	-
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	415	594	770	978
2. Less than 12,500 lbs.	364	509	641	802
3. More than 12,500 lbs.	51	85	129	176

1/ Not same hour as Air Carrier.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

PHILADELPHIA (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	24.4	32.1	30.8	27.9
b. Group B	75.6	67.9	69.3	72.1
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	0.9	9.3	27.3
b. Group L (120 - 199 seats)	24.4	39.3	37.9	30.8
c. Group M (75 - 119 seats)	30.2	44.5	43.5	38.9
d. Group S (55 - 74 seats)	18.7	-	-	-
e. Group T (54 seats and under)	26.7	15.3	9.3	3.0
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	0.2	2.8	4.9	6.0
b. Group D & E	99.8	97.2	95.1	94.0
4. Military - Operations	100.0	100.0	100.0	100.0
a. Group B	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

PHILADELPHIA (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	59
b. Apron Area (Sq. Yds.)	447,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	543,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	751,000
c. Concession Space (Sq. Ft.)	233,000
d. Total Area, Terminal Building (Sq. Ft.)	1,527,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	27,000
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	9,460
b. Area (Sq. Yds.)	336,000
5. Cargo Facilities	
a. Gate Positions (No.)	12
b. Apron Area (Sq. Yds.)	90,000
c. Cargo Building (Sq. Ft.)	204,600
d. Vehicular loading and unloading area	
(1) Spaces (No.)	17
(2) Area (Sq. Yds.)	2,260
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	686,000
(2) Aircraft Parking/Tie Down Positions (No.)	1,000

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

PHILADELPHIA (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	315,000
(2) Aircraft Parking Positions (No.)	290
c. Total Apron Space	
(1) Area (Sq. Yds.)	1,001,000
(2) Aircraft Parking Positions (No.)	1,303
2. Terminal Building, Area (Sq. Ft.)	71,700
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	1,900
b. Area (Sq. Yds.)	67,400

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

DENVER (L) HUB

Historical and projected activities at the following airports within the Denver air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
Boulder	Municipal	P
Broomfield	Jefferson County	P R
Denver	Stapleton International	AC (T)
Longmont	Municipal	P
Parker/Denver	New/Sky Ranch	R

General aviation activity at Stapleton International includes air carrier training.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

DENVER (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	529.7	824.2	1111.9	1554.2
a. Itinerant Operations	299.2	466.9	660.2	886.5
(1) Sched. Air Carrier	94.0	134.0	188.0	244.0
(2) General Aviation	203.7	331.4	471.7	642.0
(3) Military	1.5	1.5	0.5	0.5
b. Local Operations	230.5	357.3	451.5	667.7
(1) General Aviation	227.3	356.1	451.5	667.5
(2) Military	3.2	1.2	0.2	0.2
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	30	41	60	77
2. General Aviation 1/	173	249	321	412
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	1755	3325	5603	9331
2. Sched. Air Carrier	1505	2940	5031	8492
a. Domestic	1505	2940	5031	8492
b. International	-	-	-	-
3. General Aviation	250	385	572	839
D. AIR CARGO - TONS (000)				
1. Domestic	20	53	126	300
2. International	-	-	-	-
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	596	894	1191	1533
2. Less than 12,500 lbs.	423	591	744	930
3. More than 12,500 lbs.	173	303	447	603

1/ Not same hour as Air Carrier.

PART 1. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

DENVER (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	32.5	39.2	32.0	28.2
b. Group B	67.5	60.8	68.0	71.8
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	1.0	11.2	33.8
b. Group L (120 - 199 seats)	32.5	45.8	33.9	22.8
c. Group M (75 - 119 seats)	27.5	41.2	45.4	40.3
d. Group S (55 - 74 seats)	11.0	-	-	-
e. Group T (54 seats and under)	29.0	12.0	9.5	3.1
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	0.7	5.6	9.2	11.2
b. Group D & E	99.3	94.4	90.8	88.8
4. Military - Operations	100.0	100.0	100.0	100.0
a. Group B	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

DENVER (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	53
b. Apron Area (Sq. Yds.)	431,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	511,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	707,000
c. Concession Space (Sq. Ft.)	220,000
d. Total Area, Terminal Building (Sq. Ft.)	1,438,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	0
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	8,920
b. Area (Sq. Yds.)	317,000
5. Cargo Facilities	
a. Gate Positions (No.)	9
b. Apron Area (Sq. Yds.)	73,000
c. Cargo Building (Sq. Ft.)	123,000
d. Vehicular loading and unloading area	
(1) Spaces (No.)	10
(2) Area (Sq. Yds.)	1,330
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	1,569,000
(2) Aircraft Parking/Tie Down Positions (No.)	1,275

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980
DENVER (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	832,000
(2) Aircraft Parking Positions (No.)	460
c. Total Apron Space	
(1) Area (Sq. Yds.)	2,401,000
(2) Aircraft Parking Positions (No.)	1,735
2. Terminal Building, Area (Sq. Ft.)	36,000
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	960
b. Area (Sq. Yds.)	34,300

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

CLEVELAND (L) HUB

Historical and projected activities at the following airports within the Cleveland air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
Cleveland	Cleveland-Hopkins	AC (T)
Cleveland	Burke Lakefront	GA (T) R
Cleveland	Cuyahoga County	P R
Lorain	New/Lorain	R
Painesville	Concord Airpark	R
Strongsville	Strongsville	R
Willoughby	Lost Nation	R

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

CLEVELAND (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	496.4	737.8	1059.0	1474.7
a. Itinerant Operations	328.6	458.0	651.3	884.8
(1) Sched. Air Carrier	128.0	143.0	206.0	268.0
(2) General Aviation	197.7	313.2	444.5	616.0
(3) Military	2.9	1.8	0.8	0.8
b. Local Operations	167.8	279.8	407.7	589.9
(1) General Aviation	166.5	279.4	407.3	589.5
(2) Military	1.3	0.4	0.4	0.4
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	30	33	47	62
2. General Aviation 1/	220	281	407	594
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	1754.5	3169	5352	8922
2. Sched. Air Carrier	1544.8	2805	4799	8100
a. Domestic	1544.8	2805	4799	8100
b. International	-	-	-	-
3. General Aviation	209.7	364	553	822
D. AIR CARGO - TONS (000)				
1. Domestic	34	85	212	525
2. International	-	-	-	-
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	546	800	1045	1332
2. Less than 12,500 lbs.	435	609	767	959
3. More than 12,500 lbs.	111	191	278	373

1/ Not same hour as Air Carrier.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

CLEVELAND (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	14.5	22.7	20.3	22.1
b. Group B	85.5	77.3	79.7	77.9
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	2.4	9.1	27.9
b. Group L (120 - 199 seats)	14.5	31.6	30.1	26.3
c. Group M (75 - 119 seats)	39.4	59.9	56.1	44.3
d. Group S (55 - 74 seats)	30.7	-	-	-
e. Group T (54 seats and under)	15.4	6.1	4.7	1.5
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	0.5	3.4	6.0	7.4
b. Group D & E	99.5	96.6	94.0	92.6
4. Military - Operations	100.0	100.0	100.0	100.0
a. Group E	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

CLEVELAND (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	51
b. Apron Area (Sq. Yds.)	383,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	487,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	675,000
c. Concession Space (Sq. Ft.)	210,000
d. Total Area, Terminal Building (Sq. Ft.)	1,372,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	0
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	8,505
b. Area (Sq. Yds.)	302,000
5. Cargo Facilities	
a. Gate Positions (No.)	16
b. Apron Area (Sq. Yds.)	121,000
c. Cargo Building (Sq. Ft.)	217,000
d. Vehicular loading and unloading area	
(1) Spaces (No.)	17
(2) Area (Sq. Yds.)	2,261
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	1,130,000
(2) Aircraft Parking/Tie Down Positions (No.)	1,235

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

CLEVELAND (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	567,000
(2) Aircraft Parking Positions (No.)	400
c. Total Apron Space	
(1) Area (Sq. Yds.)	1,697,000
(2) Aircraft Parking Positions (No.)	1,635
2. Terminal Building, Area (Sq. Ft.)	52,000
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	1,390
b. Area (Sq. Yds.)	49,000

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

ST. LOUIS (L) HUB

Historical and projected activities at the following airports within the St. Louis air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
St. Charles	Smartt Field	R
St. Louis	Lambert-St. Louis Municipal	AC (T)
St. Louis	Spirit of St. Louis	R
St. Louis	Weiss	R
St. Louis	New/Creve Coeur-Arrowhead	R
Festus	Festus Memorial	R
Alton, Illinois	Civic Memorial	GA (T) R
East St. Louis, Illinois	Bi State Parks	R
East St. Louis, Illinois	New/Lakeside	R

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

ST. LOUIS (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	645.4	966.2	1326.9	1893.9
a. Itinerant Operations	390.5	571.1	757.3	1075.5
(1) Sched. Air Carrier	99.0	132.0	142.0	231.0
(2) General Aviation	271.4	418.2	594.4	823.6
(3) Military	20.1	20.9	20.9	20.9
b. Local Operations	254.9	395.1	569.6	818.4
(1) General Aviation	248.3	389.3	563.8	812.6
(2) Military	6.6	5.8	5.8	5.8
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	23	31	43	57
2. General Aviation 1/	257	389	556	791
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	1757	3234	5422	9005
2. Sched. Air Carrier	1454	2744	4696	7926
a. Domestic	1454	2744	4696	7926
b. International	-	-	-	-
3. General Aviation	303	490	726	1079
D. AIR CARGO - TONS (000)				
1. Domestic	19	43	91	195
2. International	-	-	-	-
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	658	970	1273	1625
2. Less than 12,500 lbs.	514	720	908	1186
3. More than 12,500 lbs.	144	250	365	439

1/ Not same hour as Air Carrier.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

ST. LOUIS (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	24.0	31.0	28.9	25.9
b. Group B	76.0	69.0	71.1	74.1
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	0.9	9.8	29.6
b. Group L (120 - 199 seats)	24.0	37.2	35.2	24.9
c. Group M (75 - 119 seats)	16.3	45.0	47.1	42.1
d. Group S (55 - 74 seats)	32.2	-	-	-
e. Group T (54 seats and under)	27.5	16.9	7.9	3.4
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	0.8	3.8	6.[illegible]	7.9
b. Group D & E	99.2	96.2	93.6	92.1
4. Military - Operations	100.0	100.0	100.0	100.0
a. Group B	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

ST. LOUIS (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	50
b. Apron Area (Sq. Yds.)	386,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	477,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	660,000
c. Concession Space (Sq. Ft.)	216,000
d. Total Area, Terminal Building (Sq. Ft.)	1,353,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	0
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	8,320
b. Area (Sq. Yds.)	295,000
5. Cargo Facilities	
a. Gate Positions (No.)	8
b. Apron Area (Sq. Yds.)	61,000
c. Cargo Building (Sq. Ft.)	86,000
d. Vehicular loading and unloading area	
(1) Spaces (No.)	6
(2) Area (Sq. Yds.)	800
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	1,453,000
(2) Aircraft Parking/Tie Down Positions (No.)	1,537

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

ST. LOUIS (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	727,000
(2) Aircraft Parking Positions (No.)	487
c. Total Apron Space	
(1) Area (Sq. Yds.)	2,180,000
(2) Aircraft Parking Positions (No.)	2,024
2. Terminal Building, Area (Sq. Ft.)	70,000
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	1,851
b. Area (Sq. Yds.)	65,700

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

MINNEAPOLIS/ST. PAUL (L) HUB

Historical and projected activities at the following airports within the Minneapolis/St. Paul air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
Minneapolis	Anoka County, Janes Field	P R
Minneapolis	Crystal	GA (T) R
Minneapolis	Flying Cloud	GA (T) R
Minneapolis	Minneapolis/St. Paul Int'l (Wold Chamberlain)	AC (T)
Rosemount	Southport	R
St. Paul	Downtown (Holman Field)	GA (T) R
St. Paul	Lake Elmo	P R
South St. Paul	Municipal	P R

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

MINNEAPOLIS/ST. PAUL (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	861.0	1601.4	2450.3	3728.2
a. Itinerant Operations	413.6	684.7	988.4	1402.7
(1) Sched. Air Carrier	85.1	123.0	162.0	206.0
(2) General Aviation	299.2	533.1	797.8	1168.1
(3) Military	29.3	28.6	28.6	28.6
b. Local Operations	447.4	916.7	1461.9	2325.5
(1) General Aviation	415.1	885.4	1430.6	2294.2
(2) Military	32.3	31.3	31.3	31.3
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	23	29	39	51
2. General Aviation 1/	746	912	1424	2227
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	1606	2991	5092	8539
2. Sched. Air Carrier	1320	2443	4180	7055
a. Domestic	1320	2443	4180	7055
b. International	-	-	-	-
3. General Aviation	286	548	912	1484
D. AIR CARGO - TONS (000)				
1. Domestic	19	64	135	282
2. International	-	-	-	-
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	1039	1504	1952	2476
2. Less than 12,500 lbs.	893	1250	1576	1970
3. More than 12,500 lbs.	146	254	376	506

1/ Not same hour as Air Carrier.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

MINNEAPOLIS/ST. PAUL (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	25.0	28.2	26.6	29.2
b. Group B	75.0	71.8	73.4	70.8
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	-	7.4	26.1
b. Group L (120 - 199 seats)	25.0	28.2	29.1	24.4
c. Group M (75 - 119 seats)	29.8	43.6	47.8	42.2
d. Group S (55 - 74 seats)	16.1	0.8	-	-
e. Group T (54 seats and under)	29.1	27.4	15.7	7.3
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	0.3	2.7	4.7	5.8
b. Group D & E	99.7	97.3	95.3	94.2
4. Military - Operations	100.0	100.0	100.0	100.0
a. Group B	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

MINNEAPOLIS/ST. PAUL (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	39
b. Apron Area (Sq. Yds.)	285,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	424,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	587,000
c. Concession Space (Sq. Ft.)	183,000
d. Total Area, Terminal Building (Sq. Ft.)	1,194,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	0
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	7,407
b. Area (Sq. Yds.)	263,000
5. Cargo Facilities	
a. Gate Positions (No.)	9
b. Apron Area (Sq. Yds.)	66,000
c. Cargo Building (Sq. Ft.)	117,000
d. Vehicular loading and unloading area	
(1) Spaces (No.)	9
(2) Area (Sq. Yds.)	1,200
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	1,823,000
(2) Aircraft Parking/Tie Down Positions (No.)	2,483

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

MINNEAPOLIS/ST. PAUL (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	861,000
(2) Aircraft Parking Positions (No.)	743
c. Total Apron Space	
(1) Area (Sq. Yds.)	2,684,000
(2) Aircraft Parking Positions (No.)	3,226
2. Terminal Building, Area (Sq. Ft.)	196,000
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	5,210
b. Area (Sq. Yds.)	185,000

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

KANSAS CITY (L) HUB

Historical and projected activities at the following airports within the Kansas City air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
Independence	Memorial	R
Kansas City	Mid-Continental International	GA (T) - future AC (T)
Kansas City	Municipal	AC (T) - future GA (T)
Kansas City	New/Excelsior Springs Memorial	R
Lee's Summit/Grain Valley	New/East Kansas City	R
Lake Winnebago/Harrisonville	Municipal/Sevy	R
Kansas City, Kansas	Fairfax Municipal	GA (T) R
Kansas City, Kansas/ Bonner Springs	New/K. C. Suburban	R
Olathe, Kansas	Olathe City	P R

The forecast years include the new Mid-Continental Airport. The general aviation activity for Kansas City Municipal was included in the hub forecasts as activity at a general aviation tower airport.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

KANSAS CITY (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	732.3	1457.9	2154.3	3186.6
a. Itinerant Operations	333.6	545.4	770.2	1086.4
(1) Sched. Air Carrier	80.4	108.0	151.0	214.0
(2) General Aviation	248.0	433.4	615.2	868.4
(3) Military	5.2	4.0	4.0	4.0
b. Local Operations	398.7	912.5	1384.1	2100.2
(1) General Aviation	393.8	907.7	1379.3	2095.4
(2) Military	4.9	4.8	4.8	4.8
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	20	26	36	51
2. General Aviation 1/	421	723	1054	1535
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	1367	2487	4226	7099
2. Sched. Air Carrier	1206	2217	3793	6402
a. Domestic	1206	2217	3793	6402
b. International	-	-	-	-
3. General Aviation	161	270	433	697
D. AIR CARGO - TONS (000)				
1. Domestic	17	40	105	158
2. International	-	-	-	-
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	745	1072	1381	1747
2. Less than 12,500 lbs.	642	900	1134	1418
3. More than 12,500 lbs.	103	172	247	329

1/ Not same hour as Air Carrier.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

KANSAS CITY (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	20.6	28.2	26.6	24.8
b. Group B	79.4	71.8	73.4	75.2
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	-	5.4	12.8
b. Group L (120 - 199 seats)	20.6	31.5	26.5	19.9
c. Group M (75 - 119 seats)	20.7	42.8	57.7	64.8
d. Group S (55 - 74 seats)	20.4	-	-	-
e. Group T (54 seats and under)	38.3	25.7	10.4	2.5
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	0.3	2.1	3.5	4.2
b. Group D & E	99.7	97.9	96.5	95.8
4. Military - Operations	100.0	100.0	100.0	100.0
a. Group B	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

KANSAS CITY (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	42
b. Apron Area (Sq. Yds.)	242,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	385,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	533,000
c. Concession Space (Sq. Ft.)	166,000
d. Total Area, Terminal Building (Sq. Ft.)	1,084,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	0
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	6,720
b. Area (Sq. Yds.)	239,000
5. Cargo Facilities	
a. Gate Positions (No.)	6
b. Apron Area (Sq. Yds.)	39,000
c. Cargo Building (Sq. Ft.)	68,000
d. Vehicular loading and unloading area	
(1) Spaces (No.)	5
(2) Area (Sq. Yds.)	665
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	1,205,000
(2) Aircraft Parking/Tie Down Positions (No.)	1,673

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

KANSAS CITY (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	578,000
(2) Aircraft Parking Positions (No.)	524
c. Total Apron Space	
(1) Area (Sq. Yds.)	1,783,000
(2) Aircraft Parking Positions (No.)	2,197
2. Terminal Building, Area (Sq. Ft.)	111,000
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	2,994
b. Area (Sq. Yds.)	106,000

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

HOUSTON (L) HUB

Historical and projected activities at the following airports within the Houston air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
Baytown	New/Baytown/Humphrey	R
Houston	Intercontinental	P - future AC (T)
Houston	Wm. P. Hobby International	AC (T) - future GA (T) R
Houston	Andrau Airpark	R
Houston	New/Clover	R
LaPorte	Municipal	P R

The forecast years include the new Houston Intercontinental Airport. The general aviation activity for William P. Hobby International was included in the hub forecasts as activity at a general aviation tower airport.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

HOUSTON (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	405.1	1057.2	1473.2	1957.5
a. Itinerant Operations	259.7	515.2	709.3	925.9
(1) Sched. Air Carrier	80.0	114.0	159.0	197.0
(2) General Aviation	177.3	399.8	548.9	727.5
(3) Military	2.4	1.4	1.4	1.4
b. Local Operations	145.4	542.0	763.9	1031.6
(1) General Aviation	145.4	542.0	763.9	1031.6
(2) Military	-	-	-	-
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	21	29	41	51
2. General Aviation 1/	173	360	462	614
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	1441	2652	4471	7412
2. Sched. Air Carrier	1215	2244	3840	6481
a. Domestic	1159	2141	3664	6184
b. International	56	103	176	297
3. General Aviation	226	408	631	931
D. AIR CARGO - TONS (000)				
1. Domestic	15	31	74	178
2. International	-	-	-	-
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	671	1013	1354	1745
2. Less than 12,500 lbs.	454	636	801	1001
3. More than 12,500 lbs.	217	377	553	744

1/ Not same hour as Air Carrier.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

HOUSTON (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	39.1	44.7	48.7	43.9
b. Group B	60.9	55.3	51.3	56.1
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	6.1	13.3	38.4
b. Group L (120 - 199 seats)	39.1	42.1	42.9	29.2
c. Group M (75 - 119 seats)	13.6	27.5	31.3	27.3
d. Group S (55 - 74 seats)	7.9	2.9	-	-
e. Group T (54 seats and under)	39.4	21.4	12.5	5.1
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	.8	5.7	9.4	11.4
b. Group D & E	99.2	94.3	90.6	88.6
4. Military - Operations	100.0	100.0	100.0	100.0
a. Group B	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

HOUSTON (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	47
b. Apron Area (Sq. Yds.)	411,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	398,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	550,000
c. Concession Space (Sq. Ft.)	171,000
d. Total Area, Terminal Building (Sq. Ft.)	1,119,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	22,000
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	6,940
b. Area (Sq. Yds.)	246,000
5. Cargo Facilities	
a. Gate Positions (No.)	10
b. Apron Area (Sq. Yds.)	84,000
c. Cargo Building (Sq. Ft.)	84,700
d. Vehicular loading and unloading area	
(1) Spaces (No.)	6
(2) Area (Sq. Yds.)	800
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	1,900,000
(2) Aircraft Parking/Tie Down Positions (No.)	1,476

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

HOUSTON (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	1,006,000
(2) Aircraft Parking Positions (No.)	524
c. Total Apron Space	
(1) Area (Sq. Yds.)	2,906,000
(2) Aircraft Parking Positions (No.)	2,000
2. Terminal Building, Area (Sq. Ft.)	54,000
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	1,437
b. Area (Sq. Yds.)	51,000

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

NEW ORLEANS (L) HUB

Historical and projected activities at the following airports within the New Orleans air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
New Orleans	International	AC (T)
New Orleans	Lakefront	GA (T)

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

NEW ORLEANS (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	314.3	516.5	787.0	1186.0
a. Itinerant Operations	201.8	295.4	423.8	575.2
(1) Sched. Air Carrier	76.0	116.0	162.0	205.0
(2) General Aviation	120.4	175.2	257.6	366.0
(3) Military	5.4	4.2	4.2	4.2
b. Local Operations	112.5	221.1	363.2	610.8
(1) General Aviation	105.0	216.4	359.5	607.1
(2) Military	7.5	4.7	3.7	3.7
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	21	31	44	56
2. General Aviation 1/	180	246	399	635
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	1234	2278	3886	6515
2. Sched. Air Carrier	1118	2090	3576	6036
a. Domestic	1016	1900	3251	5487
b. International	102	190	325	549
3. General Aviation	116	188	310	479
D. AIR CARGO - TONS (000)				
1. Domestic	12	27	60	132
2. International	-	-	-	-
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	186	283	380	492
2. Less than 12,500 lbs.	133	186	234	293
3. More than 12,500 lbs.	53	97	146	199

1/ Not same hour as Air Carrier.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

NEW ORLEANS (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	42.8	42.8	45.8	40.0
b. Group B	57.2	57.2	54.2	60.0
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	5.8	10.8	32.5
b. Group L (120 - 199 seats)	42.8	40.9	44.2	31.1
c. Group M (75 - 119 seats)	23.3	32.7	40.0	36.4
d. Group S (55 - 74 seats)	10.0	2.7	-	-
e. Group T (54 seats and under)	23.9	17.9	5.0	-
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	1.1	6.7	11.1	13.4
b. Group D & E	98.9	93.3	88.9	86.6
4. Military - Operations	100.0	100.0	100.0	100.0
a. Group B	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

NEW ORLEANS (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	47
b. Apron Area (Sq. Yds.)	366,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	368,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	509,000
c. Concession Space (Sq. Ft.)	158,000
d. Total Area, Terminal Building (Sq. Ft.)	1,035,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	33,000
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	6,419
b. Area (Sq. Yds.)	228,000
5. Cargo Facilities	
a. Gate Positions (No.)	6
b. Apron Area (Sq. Yds.)	48,000
c. Cargo Building (Sq. Ft.)	59,000
d. Vehicular loading and unloading area	
(1) Spaces (No.)	4
(2) Area (Sq. Yds.)	532
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	578,000
(2) Aircraft Parking/Tie Down Positions (No.)	584

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

NEW ORLEANS (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	272,000
(2) Aircraft Parking Positions (No.)	148
c. Total Apron Space	
(1) Area (Sq. Yds.)	850,000
(2) Aircraft Parking Positions (No.)	732
2. Terminal Building, Area (Sq. Ft.)	56,000
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	1,485
b. Area (Sq. Yds.)	53,000

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

SEATTLE (L) HUB

Historical and projected activities at the following airports within the Seattle air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
Arlington	Arlington	P
Everett	Paine Field	P
Seattle	Seattle-Tacoma International	AC (T)
Seattle	King County (Boeing Field)	AC (T)
Tacoma	Tacoma Industrial	AC P

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

SEATTLE (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	481.7	748.6	1140.7	1725.3
a. Itinerant Operations	273.3	409.0	590.1	837.3
(1) Sched. Air Carrier	78.5	114.2	174.7	248.0
(2) General Aviation	168.6	268.9	389.5	564.4
(3) Military	26.2	25.9	25.9	24.9
b. Local Operations	208.4	339.6	550.6	888.0
(1) General Aviation	196.9	330.1	541.1	878.5
(2) Military	11.5	9.5	9.5	9.5
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	29	42	56	76
2. General Aviation 1/	261	425	649	1004
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	1360	2615	4647	7801
2. Sched. Air Carrier	1204	2338	4195	7074
a. Domestic	925	1824	3273	5522
b. International	279	514	922	1552
3. General Aviation	156	277	452	727
D. AIR CARGO - TONS (000)				
1. Domestic	35	122	267	579
2. International	-	-	-	-
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	457	654	843	1067
2. Less than 12,500 lbs.	398	557	702	877
3. More than 12,500 lbs.	59	97	141	190

1/ Not same hour as Air Carrier.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

SEATTLE (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	66.7	70.1	55.0	40.3
b. Group B	33.3	29.9	45.0	59.7
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	5.0	11.6	23.5
b. Group L (120 - 199 seats)	66.7	69.4	56.8	39.0
c. Group M (75 - 119 seats)	15.1	25.6	31.6	37.5
d. Group S (55 - 74 seats)	14.8	-	-	-
e. Group T (54 seats and under)	3.4	-	-	-
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	0.2	2.1	3.8	4.7
b. Group D & E	99.8	97.9	96.2	95.3
4. Military - Operations	100.0	100.0	100.0	100.0
a. Group B	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

SEATTLE (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	51
b. Apron Area (Sq. Yds.)	373,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	439,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	608,000
c. Concession Space (Sq. Ft.)	189,000
d. Total Area, Terminal Building (Sq. Ft.)	1,236,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	93,000
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	7,660
b. Area (Sq. Yds.)	272,000
5. Cargo Facilities	
a. Gate Positions (No.)	16
b. Apron Area (Sq. Yds.)	116,000
c. Cargo Building (Sq. Ft.)	235,000
d. Vehicular loading and unloading area	
(1) Spaces (No.)	18
(2) Area (Sq. Yds.)	2,400
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	759,000
(2) Aircraft Parking/Tie Down Positions (No.)	1,140

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

SEATTLE (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	342,000
(2) Aircraft Parking Positions (No.)	320
c. Total Apron Space	
(1) Area (Sq. Yds.)	1,101,000
(2) Aircraft Parking Positions (No.)	1,460
2. Terminal Building, Area (Sq. Ft.)	89,000
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	2,349
b. Area (Sq. Yds.)	83,000

FORECASTS OF AVIATION ACTIVITY AND AIRPORT FACILITY REQUIREMENTS, 1970 - 1980

CINCINNATI (L) HUB

Historical and projected activities at the following airports within the Cincinnati air transportation hub were used in the development of future aviation demand and selected airport facility requirements:

LOCATION	NAME	TYPE
Covington, Kentucky	Greater Cincinnati	AC (T)
Cincinnati	Municipal Airport - Lunken Field	GA (T) R
Cincinnati	New/Cincinnati Airport Inc.	P R

275-438 O - 67 - 9

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

CINCINNATI (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
A. AIRCRAFT OPERATIONS (000)				
1. Total Operations	332.6	510.8	766.1	1157.2
a. Itinerant Operations	197.2	300.3	424.3	601.0
(1) Sched. Air Carrier	75.4	106.1	140.5	185.0
(2) General Aviation	118.8	192.6	282.2	414.4
(3) Military	3.0	1.6	1.6	1.6
b. Local Operations	135.4	210.5	341.8	556.2
(1) General Aviation	130.8	209.3	340.5	555.0
(2) Military	4.6	1.2	1.2	1.2
B. BUSY HOUR OPERATIONS (NO.)				
1. Sched. Air Carrier	20	27	37	50
2. General Aviation 1/	194	249	389	611
C. ENPLANED PASSENGERS (000)				
1. Total Passengers	910	1866	3175	5334
2. Sched. Air Carrier	795	1661	2841	4794
a. Domestic	795	1661	2841	4794
b. International	-	-	-	-
3. General Aviation	115	205	334	540
D. AIR CARGO - TONS (000)				
1. Domestic	13	33	62	117
2. International	-	-	-	-
E. BASED AIRCRAFT - GEN. AVTN. (NO.)				
1. Total Based Aircraft	289	419	542	688
2. Less than 12,500 lbs.	232	325	409	511
3. More than 12,500 lbs.	57	94	133	177

1/ Not same hour as Air Carrier.

PART I. FORECAST OF AIRPORT AVIATION ACTIVITY, 1970-1980

CINCINNATI (L) HUB

AIRPORT AVIATION ACTIVITY	BASE YEAR 1965	ACTIVITY FORECASTS 1970	1975	1980
F. AIRCRAFT MIX (TYPES) - (% Distr.)				
1. Air Carrier - Operations	100.0	100.0	100.0	100.0
a. Group A	19.7	25.0	27.4	22.3
b. Group B	80.3	75.0	72.6	77.7
c. Group C	-	-	-	-
2. Air Carrier - Passenger/Cargo	100.0	100.0	100.0	100.0
a. Group X (Over 200 seats)	-	0.8	8.4	26.3
b. Group L (120 - 199 seats)	19.7	30.7	33.1	22.8
c. Group M (75 - 119 seats)	6.1	41.9	42.8	42.5
d. Group S (55 - 74 seats)	40.3	-	-	-
e. Group T (54 seats and under)	33.9	26.6	15.7	8.4
3. General Aviation - Operations*	100.0	100.0	100.0	100.0
a. Group C	0.3	2.3	4.2	5.2
b. Group D & E	99.7	97.7	95.8	94.8
4. Military - Operations	100.0	100.0	100.0	100.0
a. Group B	40.0	40.0	40.0	40.0
b. Group C	60.0	60.0	60.0	60.0

* General Aviation - Passenger/Cargo - all Group T aircraft.

Re Appendix 1 for aircraft group classification code definitions.

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

CINCINNATI (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
A. Air Carrier	
1. Terminal Apron	
a. Gate Positions (No.)	26
b. Apron Area (Sq. Yds.)	191,000
2. Terminal Building	
a. Passenger Handling (Includes ticketing, baggage claim, operations space and passenger hold areas; excludes freight and cargo space) (Sq. Ft.)	330,000
b. Circulation, utilities and public conveniences (Sq. Ft.)	456,000
c. Concession Space (Sq. Ft.)	142,000
d. Total Area, Terminal Building (Sq. Ft.)	928,000
3. Federal Inspection Facilities, Passenger (Sq. Ft.)	0
4. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	5,752
b. Area (Sq. Yds.)	204,000
5. Cargo Facilities	
a. Gate Positions (No.)	4
b. Apron Area (Sq. Yds.)	29,000
c. Cargo Building (Sq. Ft.)	49,000
d. Vehicular loading and unloading area	
(1) Spaces (No.)	5
(2) Area (Sq. Yds.)	665
B. General Aviation	
1. Aircraft Parking	
a. Apron Space (Unhangared)	
(1) Area (Sq. Yds.)	592,000
(2) Aircraft Parking/Tie Down Positions (No.)	739

PART II. FORECAST OF SELECTED AIRPORT FACILITY REQUIREMENTS, 1980

CINCINNATI (L) HUB

SELECTED AIRPORT FACILITIES	1980 REQUIREMENT FORECASTS
b. Apron Space (Hangared)	
(1) Area (Sq. Yds.)	277,000
(2) Aircraft Parking Positions (No.)	206
c. Total Apron Space	
(1) Area (Sq. Yds.)	869,000
(2) Aircraft Parking Positions (No.)	945
2. Terminal Building, Area (Sq. Ft.)	54,000
3. Public Vehicular Parking Areas	
a. Vehicular Parking Spaces (No.)	1,430
b. Area (Sq. Yds.)	51,000

APPENDIX 1

METHODS DEVELOPED FOR FORECASTING AVIATION DEMAND AT THE NATION'S LARGE AIR TRANSPORTATION HUBS

1965 - 1980

April 14, 1967

Department of Transportation
Federal Aviation Administration

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INTRODUCTION

The airport activity forecast methods contained herein were developed by the Federal Aviation Administration for use in forecasting aeronautical demand at the Nation's large air transportation hubs through 1980. Methods used in forecasting activity at the 26 major air carrier airports within the 22 large hubs were developed by the Office of Policy Development. Forecast methods used for the other 147 selected tower and nontower airports within these large hubs were developed jointly by the Airports and Air Traffic Services. The demand forecasts resulting from the application of these methods will, in turn, be used to predict selected airport terminal facility requirements of the hubs.

National planning assumptions and forecasts relevant to the future of the economy, and to the aviation industry as a whole, are those contained within the FAA publication, Aviation Forecasts, Fiscal Years 1967 - 1977, dated January 1967, and as extended by the Office of Policy Development through 1980. In the development of the specific airport activity forecast methods, it was necessary to make additional basic assumptions applicable to each type of activity. These assumptions are described briefly with the method.

The forecast methods have been tested, and the products checked against other forecast data as to their validity. The results have been reasonable. However, it is recognized that these methods must be refined and updated as additional information becomes available.

METHODS DEVELOPED FOR FORECASTING AVIATION DEMAND AT THE NATION'S LARGE AIR TRANSPORTATION HUBS, 1965-1980

I. PASSENGER METHODOLOGY

A. Air Carrier

Basic Assumptions/Source Data

(1) The twenty-one[1/] large air transportation hubs regularly account for at least two thirds of the national total of airline passengers. All of these hubs have some common characteristics and through time each tends to maintain a generally consistent relationship to the national total. Nevertheless, there are sufficient differences to necessitate forecasting each on an individual basis.

(2) The total traffic of the nation is composed of almost a dozen series of domestic and international services such as Domestic Scheduled Services, International Nonscheduled Services, etc. The services for each community were identified and their source data assembled for separate forecasting of each series. These data were then reviewed and adjusted to correct for fluctuations resulting from temporary influences, such as Management/Labor difficulties, World Fairs, etc.

Method: The projection methods used were as follows. Most community forecasts required more than one of the methodologies.

(1) Percentage Method. There are cases where the range through time of a community's percentage of national passengers is so tight that a permanent relationship may be assumed. The national forecast for a future year may be multiplied by the typical percentage to obtain a reasonable estimate of the domestic passenger volume of the community for that year.

(2) Statistical Method. Numbers of passengers at a community may display a rate of growth that is regular but not satisfactorily correlated with the national trend. A statistical technique such as the method of least squares can be employed. Such a statistical technique can also be applied to other than just the domestic series of passengers.

(3) Data Series Comparison Method. Two series will sometimes be correlated to a degree where one may be capable of measuring the other.

1/ The New York Standard Consolidated Area was considered one community as was the Washington/Baltimore complex.

For example, some communities' numbers of U. S. international passengers are sufficiently correlated with the domestic for it to be assumed that the relationship will continue.

(4) The final forecast for each community is the sum of the projections for all the types of service it receives.

B. General Aviation

Basic Assumptions/Source Data

(1) Number of enplaned general aviation passengers can be estimated for hub by use of a passenger load factor and one-half the total number of general aviation itinerant operations.

(2) It is assumed that the passenger load factor will increase in the future years as larger general aviation aircraft are introduced into the fleet. It is also assumed that for most large hubs the following factors can be applied across the board for 1965, 70, 75 and 80:

Passenger Load Factor	1965	1970	1975	1980
Air Carrier Airports	2.77	3.02	3.26	3.36
Other Airports	1.70	1.90	2.20	2.50

Method: Multiply passenger load factor by one-half the total number of general aviation itinerant operations.

II. AIRCRAFT OPERATIONS METHODOLOGY

A. Air Carrier (Itinerant)

Basic Assumption/Source Data

(1) The basic premise underlying the methodology for forecasting air carrier operations by airport is that a relationship exists between the number of enplaned passengers and the level of service provided. It is assumed that the number of aircraft seats for transiting and enplaning passengers and the number of flights by type of aircraft have been a function of the traffic demand and traffic characteristics of the community as well as the route structure and operating policies and practices of the individual carriers. And it is assumed that these same factors will continue to determine the level of operations in the future.

(2) The base year, FY 1965, operations by individual air carrier by aircraft type were developed from the "aircraft departures performed" data published in the CAB/FAA report, Airport Activity Statistics of Certificated Route Air Carriers. Where appropriate, additions were made for foreign and large intrastate air carrier operations based on an examination of published schedules. A further adjustment was made for each airport forecast to balance the sum of the above operations with the total air carrier operations reported in the FAA publication, FAA Air Traffic Activity, FY 1965. This adjustment was necessary to account for supplemental air carrier and other unidentified operations.

(3) The total seats provided by each aircraft type were determined by multiplying the operations by an average number of seats installed. The total seats generated during the base year for all transiting and enplaning passengers were the sum of the seats provided by the various aircraft types. A percentage distribution of seats by each aircraft type was also computed.

Forecast Methodology

(1) The total base year seats at each airport were forecast to increase at the same rate as the forecast of enplaned passengers.

(2) The forecast of aircraft operations was determined by reversing the steps followed in developing the base year data. The total forecast seats were distributed among the types of aircraft the carriers are expected to operate at each airport in the forecast year. The seat totals, by aircraft type, were divided by average seating capacities to get the number of aircraft operations required. Total air carrier operations were determined by summing the operations by aircraft type.

B. General Aviation (Local and Itinerant)

Basic Assumptions/Source Data

(1) Air Carrier Airports

a. Base year data for numbers of general aviation operations at air carrier airports were obtained from the FAA publication, FAA Air Traffic Activity, FY 1965.

b. General aviation itinerant growth rates have varied considerably among the leading air carrier airports, and it was assumed that individual differences would continue throughout the forecast period.

c. It was assumed that general aviation itinerant operations at these airports were primarily for connections with air carriers.

d. Local operations are usually minimal at leading airports and were not considered in this forecast.

(2) General Aviation Airports

a. Base year data for numbers of general aviation local and itinerant operations at FAA tower airports within hub is obtained from the FAA publication, FAA Air Traffic Activity, FY 1965.

General aviation local and itinerant operations at non-towered airports are estimated for base year (use mid-year, no interpolation if within six months 6/30/65), from data reported on FAA Airport Facilities Records (Form 29A); or, if available, from the FAA publication, Terminal Locations for Planning Purposes, FY 1965. It is assumed that the same relationship existing between current number of based aircraft and numbers of local and itinerant operations can be used in forecasting future operations activity.

The foregoing tower and nontower airport figures are added together to obtain hub's total general aviation local and itinerant operations for base year.

b. Forecasts of future general aviation operations at FAA tower airports are derived from the FAA publication, Aviation Forecasts, FY 1967-77. Forecast data were extended to 1980 by the Office of Policy Development. The following table can be used for annual % increase for future periods.

	1970	1975	1980
General Aviation Aircft. Operations at FAA Tower Airports (Millions)			
Total Operations	69.3	113.4	184.6
Total Itinerant Operations	40.4	61.7	93.6

c. The forecast of local and itinerant operations at nontower airports will be derived as a product of the number of projected based aircraft for each time period, times the adjusted number of operations per based aircraft as determined from the base year (1965). The growth factor adjustments for the number of base year operations per based aircraft are:

1965 Operations Per Based Aircraft Col. 1 (X=Actual)		1970	1975	1980
Local	X	Col. 1 x 1.05	Col. 1 x1.10	Col. 1 x 1.15
Itinerant	X	Col. 1 x 1.05	Col. 1 x1.10	Col. 1 x 1.15

Forecast data for tower and nontower airports' general aviation local and itinerant operations can be added together to obtain hub totals for each future year.

Forecast Methodology

(1) Air Carrier Airports

a. Each airport was forecast separately.

b. Each forecast was prepared on a judgment basis considering such factors as:

1. The past trend of general aviation operations at each airport.

2. The air carrier activity forecast for the airport.

3. The number of general aviation airports for the community that were coded "Reliever" in the FAA's National Airport Plan.

4. The number of towers planned or programmed for general aviation in the area.

5. The numbers of operations at general aviation airports serving the community.

6. Discussions with airport management and FAA Regional personnel.

(2) General Aviation Airports

a. Tower Airports

1. Determine airport's percent of U. S. total operations and total itinerant operations, using prior year publications of FAA Air Traffic Activity, FY 1965 and knowledge of individual airport expectations.

2. Apply the derived percentage factors to the national forecasts years to obtain the airport's forecast for total operations and total itinerant operations.

3. Forecast military itinerant and local operations as shown for tower airports in Section C., Military (Local and Itinerant).

4. Subtract forecast of military itinerant operations from forecast of total itinerant operations to get forecast of general aviation itinerant operations.

5. Subtract forecast of total itinerant operations from forecast of total operations to get forecast of total local operations.

6. Subtract forecast of military local operations from forecast of total local operations to get forecast of general aviation itinerant operations.

b. Nontower Airports

1. Base year data obtained from Form 29A for airport. Divide total number of based aircraft into total numbers of local and itinerant operations and adjust with growth factors to obtain average per aircraft. Forecast general aviation based aircraft as described in Part IV, Based Aircraft Methodology. Average numbers are then multiplied by number of based aircraft forecast for future periods to obtain local and itinerant operations for 1970, 1975 and 1980.

c. Hub Total

1. Sum products of (a) and (b), above, for each five-year period.

C. Military (Local and Itinerant)

Basic Assumptions/Source Data

(1) Base year data for number of military local and itinerant operations at FAA tower airports within hub is obtained from the FAA publication, FAA Air Traffic Activity, FY 1965.

(2) Military local and itinerant operations at nontowered airports can be estimated for base year from data reported on FAA Airport Facilities Records (Form 29A), where military activity is indicated.

(3) The foregoing tower and nontower airport data of (1) and (2), above, are added together to obtain hub's total military local and itinerant operations for base year.

(4) It is assumed that the same ratio of local to itinerant military operations at airports in the hub can be used in the forecast of future operations activity.

(5) At nonair carrier airports, it is also assumed that military operations will remain constant over the future time period at base year (1965) level.

(6) Military operations at the large air carrier ariports have been declining. It was assumed that this downtrend will continue.

Forecast Methodology

(1) Air Carrier Airports - Base year data were projected based on past trends and information provided by military sources.

(2) General Aviation Tower Airports - Base year data obtained from noted source document. Forecast periods will remain constant to base year.

(3) Nontower Airports - Base year data estimated from Form 29A for airport, if indicated. Forecast periods will remain constant to base year.

(4) Hub Totals - Sum products of (1), (2) and (3), above, for base year and future periods.

III. AIR CARGO (TONS) METHODOLOGY

A. Air Carrier

Basic Assumptions/Source Data

(1) For the forecast period it was assumed that the air cargo growth rates will continue in the area of 19-20% annually for total domestic cargo, and approximately 25% annually for international cargo.

(2) Data on domestic, international (foreign and U. S. flag), nonscheduled, intra-line transfers, and other segments of the cargo industry were derived from CAB/FAA publications, individual airports, air carriers, and other sources.

Forecast Methodology

(1) Each airport was examined and forecast separately.

(2) The forecasts were developed considering the airport's past relationship to national and international trends as well as the historical growth pattern of the individual airport.

(3) Domestic, international, nonscheduled, and intra-line transfers were considered and treated separately where circumstances dictated.

IV. BASED AIRCRAFT METHODOLOGY

A. General Aviation

Basic Assumptions/Source Data

(1) Base year data (1965) for number and types of general aviation based aircraft within hub were obtained from FAA Airport Facilities Records (Form 29A) for each airport. These were added together to obtain total number within hub. (Single engine aircraft were assumed to be less than 12,500 pounds and the multi-engine were assumed to be greater than 12,500 pounds.)

(2) Forecasts of general aviation aircraft within hub are based upon growth rates reflected for national totals

in the FAA publication, Aviation Forecasts, FY 1967-77. Forecast data were extended to 1980 by the Office of Policy Development. The following table can be used for annual % increase for future periods.

Annual % increase (X=Actual, base year)	1965	1970	1975	1980
Single Engine	X	8.0	5.2	5.0
Multi-engine	X	10.4	6.[illegible]	5.6
Turbine	X	169.6	24.[illegible]	11.2

Forecast Methodology

(1) Multiply the annual % increase given for the first period to be forecast by the number of years (5) to be forecast in the first period, add 100 to the result and apply this total % to the number of based aircraft obtained for the base year. Follow the same procedure for the successive periods; with the 1970 product as the base for the 1975 forecast, and the 1975 product as the base for 1980.

(2) Turbine aircraft are estimated by multiplying the total number of multi-engine aircraft on the Form 29A by .029 (Turbine share of total multi-engine 1965 aircraft mix), and the % annual increase for that aircraft type applied. The multi-engine % annual increase is applied to the total multi-engine based aircraft (less the derived turbine based aircraft).

(3) If the number of based multi-engine aircraft in 1965 is insufficient to yield a turbine aircraft figure, forecast the multi-engine and apply the factors below until a turbine figure is derived with which to forecast ME and T separately.

	1965	1970	1975	1980
Turbine Share of Total Multi-engine Aircraft	0.029	0.156	0.234	0.273

(4) If there were no multi-engine based aircraft at the airport in 1965, make no attempt to forecast multi-engine piston and turbine aircraft separately. Assume one (1) based aircraft for total multi-engine in 1970, two (2) in 1975, and three (3) in 1980.

(5) Add aircraft types together to obtain hub toal; separate into two major subcategories: (a) number less than 12,500 pounds, and, (b) number 12,500 pounds or more.

V. BUSY HOUR OPERATIONS

A. Air Carrier Airports

Basic Assumptions/Source Data

(1) Air Carrier

a. A special tabulation from the FAA Form 886, Monthly Airport Traffic Record, was made for each airport ranking the daily air carrier operations for FY 1966. The thirty-seventh day was selected as the busy day. The percent this day was of the annual operations was computed, and it was assumed the forecast busy day operations would remain at the same percent of the forecast annual operations.

b. Another special tabulation of published Official Airline Guide schedules for November 1965 was made for all air carrier operations by hour of the day by individual airport. The peak air carrier hour was selected from the list. It was assumed this hour and the percent of daily passengers carried during this hour would remain the same through the forecast period.

(2) General Aviation

a. The number of general aviation operations on the air carrier busy day were determined from the above-mentioned ranking of FAA Forms 886.

b. These operations were spread between the hours of 7 a.m. and 10 p.m. in the same proportion that air carrier operations were during these same hours. The general aviation operations during the air carrier peak hour were then identified. The resulting percentage of the busy day operations was held constant throughout the forecast period.

c. These operations have been predominantly itinerant and local operations were generally not a factor in the forecast.

Forecast Methodology

(1) Air Carrier

a. The number of seats required during the peak hour for each forecast year was determined by first multiplying the annual seats required by the base year busy day percentage. The busy day seats required were then multiplied by the base year peak hour percentage of the busy day.

b. The peak hour seats required were allocated among the various types of aircraft the carriers are expected to operate during the forecast years based on the distribution of total seats offered by aircraft type during the base year.

c. The seats required by aircraft type were then divided by an average capacity to determine the aircraft operations required. The total number of peak hour aircraft operations was the sum of the operations by aircraft type.

(2) General Aviation

In general, the methodology for forecasting general aviation peak hour operations follows the steps in forecasting air carrier peak hour operations.

a. The annual operations were multiplied by the base year busy day percentage.

b. The busy day operations were then multiplied by the vase year peak hour percentage to yield peak hour operations.

B. General Aviation Airports

Basic Assumptions/Source Data

(1) Depending on the aircraft mix, busy hour of the week is a percent of peak daily traffic. Peak hour general aviation total operations can be determined by using the FAA Advisory Circular AC 150/5060-1, Airport Capacity Criteria Used in Preparing the National Airport Plan, August 1966. This circular provides an annual demand-weighted hourly demand relationship.

Forecast Methodology

(1) Tower - Base year busy hour is obtained from the FAA publication, Terminal Area Air Traffic Relationships, FY 1965. The forecast years are obtained by using Figure 9, "Hourly versus Annual Capacity" in Appendix 2 of AC 150/5060-1.

Enter the total annual aircraft operations on the graph and, depending on the general aviation aircraft mix, read the peak hour demand (weighted hourly capacity operations per hour) that is obtained from the intersection of annual operations and the aircraft mix population curves.

(2) Nontower - With the exception that the base year busy hour must be obtained from Appendix 2 of AC 150/5060-1, the procedure for Nontower General Aviation Airports is identical with that for Tower General Aviation Airports.

C. Military

Military operations were not considered in the busy hour since the military services avoid congested time periods at civil airports.

VI. AIRCRAFT MIX METHODOLOGY

A. Air Carrier

Basic Assumptions/Source Data

(1) The underlying assumption for the methodology of forecasting the air carrier aircraft mix is that the assignment of an aircraft type for service at an airport has been, and will continue to be, in response to the traffic demand of the community and the route structure, the fleet, and operating practices of the carriers. It is also assumed that the traffic characteristics of each community as they would influence the assignment of aircraft types will remain relatively unchanged. For example, a community which generates primarily long haul trips will continue to do so in the forecast period.

(2) The analysis and forecast of the aircraft mix is an internal part of the methodology to determine the number of air carrier operations, described in Part II.

(3) The aircraft types in the base year were ranked according to size from four-engine turbojets to two-engine piston aircraft and a percentage distribution was computed for the corresponding total seats generated.

Forecast Methodology

(1) The total forecast seats were allocated to the categories of aircraft types in about the same proportion as the seat distribution in the base year. This step considered the individual carriers serving each community, the respective fleets, and the aircraft on order.

(2) The phasing out process of aircraft such as the two-engine piston models was accomplished by substituting, for example, two-engine turboprops. As the jumbo jets and SST's are introduced into service, it was assumed the percentages of seats provided by current four-engine turbojets would decline.

(3) The forecasts of aircraft types were summarized into the seating capacity groups X through T and operational groups A and B as described on Page 18.

B. General Aviation

Basic Assumptions/Source Data

(1) It is assumed that general aviation aircraft mix is by type according to the classification of the based aircraft. This is predicated on a similarity of transient general aviation and based aircraft by type and equipment. Thus, general aviation operations by aircraft type follow operational levels according to the percentage distribution of based aircraft and the national forecast for aircraft by make and model in the FAA publication, Aviation Forecasts, FY 1967-77.

(2) For operational performance, two factors are significant, type and number of engines (multi-engine) and weight (greater than 12,500 pounds). It has been assumed that turbine-powered airplanes will have the operational performance characteristics of Type C airplanes. Type D and E have been combined throughout the tabulations.

(3) For passenger capacity, general aviation aircraft are considered as all Group T aircraft.

(4) It is assumed that helicopter and other nonfixed wing aircraft activities would probably remain relatively small until after the 1980 forecast period and can be disregarded.

(5) Based aircraft for each airport within the hub for the current year is available on the FAA Airport Facilities Records (Form 29A) by type airplane; i.e., multi-engine and all others. Forecast based aircraft is discussed in Part IV, Based Aircraft Methodology.

Forecast Methodology

Determine the forecast of general aviation based aircraft as shown in Part IV, Based Aircraft Methodology, and calculate Groups C and combined D and E as percent of total:

(1) Total turbine based aircraft divided by total based aircraft times 100 equals percent Group C operations and Group T passenger capacity based aircraft mix.

(2) One hundred minus the percent Group C and T based aircraft mix equals percent Group D and E operation and Group T passenger capacity based aircraft mix.

CIVIL AIRCRAFT TYPES BY USER CATEGORY CLASSED BY CAPACITY AND OPERATIONAL GROUPS

Aircraft Type by User	Capacity Group[1] by Operational Group[2] A	B	C	D/E
Air Carrier				
Turbojet - 4 engine - standard	L			
- stretched	X			
- jumbo	X			
- Concorde	L			
U. S. SST	X			
- 3 engine - standard		M		
- stretched		L		
- 2 engine - standard		M		
- jumbo		X		
Turboprop - 4 engine		M		
- 2 engine		T		
Piston - 4 engine		S		
- 2 engine		T		
General Aviation				
Turbine powered			T	
Piston powered				T

1/ Capacity Group
- X - +200 seats
- L - 120 - 199 seats
- M - 75 - 119 seats
- S - 55 - 74 seats
- T - 54 and under

2/ Operational Group
- A - Air carrier - 4 engine turbojet
- B - Air carrier - all other aircraft
- C - General aviation turbine powered
- D/E- General aviation-all other acft.

C. Military

Basic Assumptions/Source Data

(1) It is assumed that military aircraft mix % by type according to the aforementioned classifications is the same as that of the military aircraft operating nationally.

(2) It is assumed that military operations by aircraft type follow national data for busy day, 1960, which was approximately 40% jet, (Group B) and 32% multi-engine and 28% single engine (together 60% Group C).

(3) Forecasts for 1970, 1975 and 1980 military itinerant and local operations are based on a constant level of activity with little change in aircraft characteristics.

Forecast Methodology

Use estimated % based on national military activity:

	1965	1970	1975	1980
Percent Military Operations				
Group B	40	40	40	40
Group C	60	60	60	60

APPENDIX 2

METHODS DEVELOPED FOR FORECASTING SELECTED AIRPORT FACILITY REQUIREMENTS AT THE NATION'S AIR TRANSPORTATION HUBS, 1980

May 15, 1967

Environmental Planning Branch
System Planning Division
Airports Service

Table of Contents

Introduction

The methods contained herein were developed by the Airports Service to forecast selected facility requirements at the Nation's air transportation hubs for the 1980 time period. The estimates arrived at from the application of these methods are based on the demand forecasts shown in Part 1 of the report.

Methods for forecasting individual airfield facility requirements (runways, taxiways and their supporting items) are not included in this document. Quantification of such requirements for a hub airport system can be accomplished only by relating forecast demand to capacity for all airports within the hub.

The forecast methods have been tested, and the results checked against other available forecast data as to their validity. The results appear to be reasonable. The rationale, pertinent backup data and assumptions used in developing these methods are contained in this section. As additional data become available, these methods will be refined and updated.

HUB AIRPORT REQUIREMENTS - 1980

Name of Hub:

Item A. 1. Apron Space, Terminal, Air Carrier

References: a. Airport Terminal Plan Study, Contract FAA/RDS 136, 2/62
b. Airport Aprons, AC 150/5335-2, 1/65

Procedure:

Item	Entry	Input From
1. 1980 Annual Enpl. Psgrs., Forecast, P_2		Part I.
2. Annual Enpl. Passengers, Current, P_1		Part I.
3. Current Scheduled Gate Positions, G_1		Backup Sheets, P. 2 of 2
4. Forecast Total Gates, Uncorrected G_2		$G_2 = \frac{P_2}{P_1} (G_1 - 2) + 2$ (Ref. a.)
5. Current Peak Hour Operations		Part I.
6. 1980 Peak Hour Operations		Part I.
7. Proj. Peak Hr. Opns. (Current Aircraft)		Item 5 x $\frac{P_2}{P_1}$
8. Forecast Total Gate Positions		$\frac{\text{Item 6}}{\text{Item 7}}$ x Item 4
9. % Aircraft Mix, 1980:		
a. % Type X		Part I.
b. % Type L		Part I.
c. % Type M		Part I.
d. % Type S & T		Part I.
10. Area Calculations:	sq. yd. (000)	
a. Type X		9 a. x Item 8 x 15
b. Type L		9 b. x Item 8 x 6
c. Type M		9 c. x Item 8 x 4
d. Type S & T		9 d. x Item 8 x 3
11. Total Apron Area Required		10 a. + 10 b. + 10 c. + 10 d.

Item A. 1. Apron Space, Terminal, Air Carrier (cont.)

Rationale:

The Airborne Instruments Laboratory study, reference a. above, recommends that gate positions be increased in proportion to the increase in enplaned passengers. However, this would not be accurate for the 1980 time period due to the introduction of large payload aircraft prior to 1980. Item 6 reflects the use of these large aircraft. Item 7 represents the peak hour traffic if the current fleet is used in 1980. Thus, Item 4 is adjusted downward by the ratio of Item 6 to Item 7 to obtain the forecast total gates corrected for future aircraft (Item 8). National Airport Plan instructions and the AIL study essentially agree.

The AIL study and this analysis assume mutual use of gate positions by the airlines. Also, two gates are assumed as always being needed for minimal traffic, maneuvering, and advance scheduling (see Item 4).

Area calculations for aircraft type are on a backup sheet to this paper.

Backup Sheet for Apron Space, Terminal, Air Carrier

Passenger Capacities:

X	+ 200
L	120 - 199
M	75 - 119
S	55 - 74
T	54 or less

Calculations of Average Wing Span or Length by Aircraft Group

X		L		M		S		T	
B-747	231'	B-707	153'	CV-880	129'	BAC-111	93'	F-27A	95'
DC-8-61 & 63	187'	B-720	131'	B-727	134'	New F-27J	95'	340 & 440	106'
SST	306'	CV-990	139'	B-737	94'	DC-6,7	117'	580	106'
L-500	246'	DC-8	151'	DC-9-10	104'	3)	305'	N-262	107'
4)	970'	B-727-200	153'	DC-9-30	119'	=101', Use	105	4)	414'
= 242', Use	240	5)	727'	Caravelle	108'			= 103', Use	105
		= 145', Use	150	6)	688'				
				= 113', Use	125				

Calculations of Average Square Yard (Sq. Yd.) Apron Figures Per Aircraft

Aircraft Type	Average Wing Span or Length (A)	Applied Formula * of $\frac{(1.5 \times A)^2}{9}$ to	Apron Space/Aircraft in Sq. Yd.	
			Actual	Rounded
X	240'	obtain sq. yd.	14,400	15,000
L	150'		5,680	6,000
M	125'		3,910	4,000
S	105'		2,750	3,000
T	105'		2,750	3,000

* Used approx. figure of 1.5 for estimating purposes in accordance with suggested holding apron clearances in AC 150/5335-2, par. 5, f.(2).

Backup Sheet for Apron Space, Terminal, Air Carrier

Method Used for Estimating Base Year Scheduled Gate Positions:

A sample of six large hub locations was checked manually by comparing Dec. 1966 activity statistics on passenger enplanements with the gates required by schedules derived from a comparable edition datewise of the Official Airline Guide. For these six locations the following relationships were computed:

Location (Name of Hub)	Gates Req. by Sched. (OAG 12/66)	Annual Enpl. CY 1966 (Mil.)	Annual Enpl. Per Gate (000)	Terminal or En Route Loc.	Average Annual Enplanements Per Gate (000)
Miami	57	3.1	54	T	
Philadelphia	36	2.0	56	T	58 - Terminals
Houston	24	1.5	63	T	
Kansas City	22	1.5	68	ER	
Atlanta	74	4.7	69	ER	68 - En Route
Denver	28	2.0	71	ER	

A judgment determination was made as to whether a hub should be considered a terminal or en route location based on geographic location and the relation of originations to enplanements. Large hubs averaged 91.5% originations to enplanements. Percentages above this average indicated a terminal location. Percentages below this average indicated an en route location. For examples, New York originations = 98% of enplanements; Chicago originations = 85% of enplanements.

Backup Sheet for Apron Space, Terminal, Air Carrier
(cont.)

Estimate of Scheduled Gates, Large Hubs, Base Year 1965

Terminal Locations (Factor - 58)			En Route Locations (Factor - 68)		
Hub	Enpl. Pass. (Mil.)	Est. Sched. Gates	Hub	Enpl. Sched. (Mil.)	Est. Sched. Gates
Boston	2.6	45	Atlanta	3.4	30
Cleveland	1.5	26	Chicago	8.7	128
Detroit	1.9	33	Cincinnati	.8	12
Houston	1.2	21	Dallas	2.6	38
Los Angeles	6.1	105	Denver	1.5	22
Miami	2.9	50	Kansas City	1.2	18
New Orleans	1.1	19	Minneapolis	1.3	19
New York	11.6	200	Pittsburgh	1.7	25
Philadelphia	1.6	28	St. Louis	1.5	22
San Francisco	4.1	71			
Seattle	1.2	21			
D. C.	4.4	76			

HUB AIRPORT REQUIREMENTS - 1980

Name of Hub:

Item A. 2. Terminal Building, Air Carrier, Passenger

References: a. FAA Airport Terminal Buildings, 1960
b. Airport Engineering Data Sheet No. 19, 1959

Procedure:

Item	Entry	Input From
1. 1980 Annual Psgrs. Enpl., Domestic (000)		Part I.
2. Total Annual Passengers, Domestic (000)		(Item 1) x 2
3. Typical Peak Hr. Psgrs., Domestic (TPHP)		Backup Sheets, par. 3
4. 1980 Annual Psgrs. Enpl., Int'l. (000)		Part I.
5. Total Annual Passengers, Int'l. (000)		(Item 4) x 2
6. Typical Peak Hr. Psgrs., Int'l. (TPHP)		Backup Sheets, par. 3
7. Total Typical Peak Hr. Passengers (TPHP)		(Item 3) + (Item 6)
8. Area Calculations	sq. ft.(000)	Backup, par. 1
a. Passenger Handling		(Item 7) x 86/1000
b. Circulation, Utilities & Public Conv.		(Item 7) x 119/1000
c. Concession Space		(Item 7) x 37/1000
9. Gross Area		Sum a. + b. + c., above

Rationale - Included in backup sheets. TPHP gives reasonable results as checked with existing terminal plans.

Notes: Item 8 b. includes circulation space, mechanical, electrical & other utility space, maintenance space, allowance for walls & partitions & rest rooms. Item 8 a. includes ticket lobby, airline operations, baggage claim, waiting rooms. Item 8 c. includes eating facilities, kitchen & its storage & other concessions.
Area calculations above do not include Federal inspection facilities at int'l. locations or air freight/cargo facilities. Consult applicable requirements calculation sheets for these items.

Backup Sheet for Terminal Building, Air Carrier, Passenger

1. Derivation, Unit Area Per TPHP, Domestic

Using the data in "Airport Terminal Buildings" as bases for determining unit square foot areas per typical peak hour passengers (TPHP), and assuming the values in the curves for 1,000 TPHP to be the norms for our present purpose, the following values are given:

Ticket Lobby	10 sq. feet	
Airline Oper.	48 sq. feet	
Baggage Claim	10 sq. feet	
Waiting Rooms	18 sq. feet	
Eating Fac.	16 sq. feet	
Kitchen & Stor.	16 sq. feet	
Other Concessions	5 sq. feet	
Rest Rooms	3 sq. feet	
Total	126 sq. feet	= 52*
Circulation, Mech. & Maint., Walls, Partitions	116 sq. feet	= 48*
Gross Area	242 sq. feet/TPHP	= 100%

* Factors used by Philadelphia Consultants, 1966

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2. Derivation, Unit Area Per TPHP, Int'l.

Using the data in "Federal Inspection Facilities at International Airports," AC 150/5360-3, as bases for determining unit square foot areas per typical deplaning passenger, the areas are as follows:

Public Health	15 sq. feet
Immigration	10 sq. feet
Customs	33 sq. feet
Agriculture	2 sq. feet
Visitor Waiting Rooms	15 sq. feet
Total	75 sq. feet
Circulation Baggage Assembly, Utilities, Walls, Part.	75 sq. feet
Gross Area	150 sq. feet per TPHP

Backup Sheet for Terminal Building, Air Carrier, Passenger
(cont.)

3. Derivation of TPHP

Using available data to determine typical peak hour passengers related to total annual passengers at various levels of passenger activity, the following values are applicable:

Total Annual Passengers	TPHP As a Percent of Annual
20,000,000 and over	.030
10,000,000 to 19,999,999	.035
1,000,000 to 9,999,999	.040
500,000 to 999,999	.050
100,000 to 499,999	.065
Under 100,000	.120

The above values apply separately to domestic and international passengers at any given location.

HUB AIRPORT REQUIREMENTS - 1980

Name of Hub:

Item A. 3. Federal Inspection Facilities, Passenger

References: Federal Inspection Service Facilities at International Airports, AC 150/5360-3, 1966

Procedure:

Item	Entry	Input From
1. 1980 Annual Psgrs. Enpl, Int'l. (000)		Part I.
2. Total Annual Passengers, Int'l. (000)		(Item 1) x 2
3. Typical Peak Hr. Passengers, Int'l.		Backup, par. 3*
4. Typical Peak Hr. Deplaning Passengers, Int'l. ($TPHP_d$)		(Item 3)/2 Based on assumption deplaned = enplaned passengers
5. Area Calculations a. Public Health	sq. ft.(000)	Backup, par. 2 ($TPHP_d$) x 15/1000
b. Immigration		($TPHP_d$) x 10/1000
c. Customs		($TPHP_d$) x 33/1000
d. Agriculture		($TPHP_d$) x 2/1000
e. Visitor Waiting Rooms		($TPHP_d$) x 15/1000
f. Circulation, Baggage Assy., Util. Walls, Part.		($TPHP_d$) x 75/1000
6. Gross Area		Sum a. + b. + c. + d + e. + f., above

Notes: *TPHP Calculation from backup sheets for "Terminal Building, Air Carrier, Passenger"

HUB AIRPORT REQUIREMENTS - 1980

Name of Hub:

Item A, 4, Public Vehicular Parking Areas, Air Carrier, Passenger

References: a. FAA Airport Terminal Buildings, 1960
b. A.S.C.E. Journal, January 1966

Procedure:

Item	Entry	Input From
1. 1980 Annual Psgrs. Enpl., Domestic (000)		Part I.
2. Total Annual Passengers, Domestic (000)		(Item 1) x 2
3. Typical Peak Hr. Psgrs., Domestic (TPHP)		Backup Sheets, par. 3*
4. 1980 Annual Psgrs. Enpl., Int'l. (000)		Part I.
5. Total Annual Passengers, Int'l. (000)		(Item 4) x 2
6. Typical Peak Hr. Psgrs., Int'l. (TPHP)		Backup Sheets, par. 3*
7. Total Typical Peak Hr. Passengers (TPHP)		(Item 3) + (Item 6)
8. Calculations a. Vehicular Parking Spaces		(Item 7) x 1.5
b. Area (Square Yards)		(Item 8 a.) x 35.5

Notes: Determine TPHP's separately for domestic and international passengers.

* See backup sheets for "Terminal Building, Air Carrier, Passenger" for TPHP's.

HUB AIRPORT REQUIREMENTS - 1980

Name of Hub:

Item A, 5, a & b, Cargo Gate Positions and Apron Area

References: Official Airline Guide, Quick Reference, North American and International Editions; Part I Forecasts

Procedure:

Item	Entry	Input From
1. Base Year Annual Freight (Tons)		Part I.
2. a. Base Yr. Sched. Peak Gate Pos., Dom.		O.A.G.,Q.R., No. Amer. Ed.
b. " " " " " " , Int'l.		" " , Int'l. Ed.
c. " " " " " " , Total		2 a. + 2 b.
3. Total Base Yr. Daily All Cargo Schedules		O.A.G. as above
4. 1975 Annual Freight (Tons)		Part I.
5. 1975 " " by Comb. Flights (Tons)		Item 4 x 50%
6. 1980 " " (Tons)		Part I.
7. 1980 " " by All Cargo Acft. (Tons)		Item 6 - Item 5
8. 1980 All Cargo Daily Schedules		Item 7 x $\frac{2000}{264}$ x $\frac{1}{A + B}$ A = (Item 10.a.)(176,000) B = (Item 10.b.)(60,000)
9. 1980 All Cargo Gates		Item 8 x Item 2 c./Item 3
10. Aircraft Mix, 1980	Percent	
a. Percent Class X		Part I.
b. Percent Class L, M, S, T		"
11. Area Calculations	sq. yd.(000)	
a. Class X		Item 10 a. x Item 9 x 14
b. Other Aircraft		Item 10 b. x Item 9 x 5
12. Total Apron Area Required		Item 11 a. + Item 11 b.

Backup Sheet for Cargo Gate Positions and Apron Area

Average Weights

Aircraft (Current)	Capacity (A)	Adjustment for Nos. in Fleet * (B)	(A) x (B)
B-707	72,000	4	288,000
B-727	36,000	3.5	126,000
DC-8F	70,000	2.5	175,000
		10	589,000

589,000 ÷ 10 = 58,900 average

(Future X Type)	Capacity (A)	(No Adjustments)
B-747	218,000	
L-500	222,000	
	440,000 ÷ 2 =	220,000 x 80% load factor = 176,000 average

(Future LMST Type)	Capacity (A)	(No Adjustments)
Current	59,000	(from above)
DC-8-63	92,000	
	151,000 ÷ 2 =	75,000 x 80% load factor = 60,000 average

* Obtained from current "FAA Statistical Handbook of Aviation."

Backup Sheet for Cargo Gate Position and Apron Area
(Cont.)

Average Areas

Aircraft	Wing Span or Length (A)	Apply Formula $\frac{(1.5 \times A)^2}{9}$	Average Area
(X Type)			
B-747	231'	$\frac{(1.5 \times 238)^2}{9}$ =	14,000 sq. yd.
L-500	245'		
	476' ÷ 2 = 238		
(LMST Type)			
B-707	153'		
B-727	153'	$\frac{(1.5 \times 135)^2}{9}$ =	5,000 sq.yd.
DC-8	151'		
DC-9-10	104'		
DC-9-30	119'		
L-100(C-130)	133'		
	813' ÷ 6 = 135		

Backup Sheet for Cargo Gate Positions and Apron Area
(cont.)

Rationale and Assumptions:

1. Average number of work days/month for all cargo - 22

2. The % of cargo to be handled by combination flights remains about 50% through 1975 (1975 is optimum).

3. From 1975-1980 the peak daily gates required for cargo are not adjusted beyond the 50%-of-1975 level for combination flights.

4. Current daily schedules' relation to peak daily gates for cargo flights is proportional to 1980 schedules and gates (after adjustment for 1975 combination cargo).

5. Although large cargo jets will probably outnumber the smaller cargo jets, no accurate % mix for the cargo fleet exists for the 1980 time period. Therefore, the method used is to assume the % mix of large (X) to small (L, M, S, T) passenger jets will be the same at each hub for cargo jets. Thus, Step 8 converts annual tons to daily pounds and determines daily schedules by dividing by the average cargo weights of the aircraft using the hub.

HUB AIRPORT REQUIREMENTS - 1980

Name of Hub:

Item A. 5. c. & d. Cargo Building and Vehicular Loading Area

References: a. "Terminals for Air Cargo," Vol. 1, Hackney Airlift Assoc.
b. Airport Cargo Facilities, AC 150/5360-2 and related data
c. Airport Activity Statistics
d. Part I. Forecasts
e. Various data from airlines

Procedure:

Item	Entry	Input From
1. 1980 Total All-Cargo Gates Peak Period		Part II., A. 5. a.
2. Total Wt. of Cargo during Peak Period		Item 1 x 76.5 tons
3. Space Req. for Handl. Peak Cargo, sq. ft.		Item 2 x 30 sq. ft./ton
4. Daily Tons, 1980		$\frac{\text{Annual tons (Part I.)}}{264 \text{ working days}}$
5. Space Req. for Norm. & Def. Frt.,Circ.,etc.		Item 4 x 83.4 sq. ft./ton
6. Total Processing Space, sq. ft.		Item 3 + Item 5
7. Administrative Space, sq. ft.		Item 6 x 7%
8. Total Cargo Terminal Building Space, sq. ft.		Item 6 + Item 7
9. Total No. of Truck Docks, 1980		$\left(\frac{\text{Item 4 x 2000}}{24}\right)\left(\frac{1}{10,000}\right)$
10. Space for Truck Docks, sq. yd.		Item 9 x 133 sq. yd.

Rationale: Read backup information for this data item.

Backup Sheet for Cargo Building and Vehicular Loading Area

1. Using four hypothetical cargo loads, ranging from cut flowers at 5 lbs./cu. ft. to electrical parts at 50 lbs./cu. ft. typical packaged densities, each weighing 10 tons, the following analysis was derived:

Dimensions	Density	Floor Space
5' x 8' x 10'	50 #/c.f.	80 sq. ft.
6.3' x 10' x 12.6'	25 #/c.f.	120 sq. ft.
9' x 14.6' x 18.2'	8.3 #/c.f.	260 sq. ft.
10.75' x 17.2' x 21.5'	5 #/c.f.	370 sq. ft.

4) 830 = 207 sq.ft. average

207 sq. ft. @ 10 tons = 20 sq. ft./ton

2. Average pallet (or container) areas for B-747, L-500, DC-8-60 series and 1967 aircraft = about 70 sq. ft. Average weight per pallet is = about 5,000#. Using 1. would reduce area for average pallet weight to 52 sq. ft. To be conservative, and more practical, the 70 sq. ft. per pallet will be used. This results in area calculation of about 30 sq. ft./ton. This figure is used in peak load calculation.

3. The area required for normal processing space, according to backup data for the "Air Cargo Facilities", Advisory Circular, is 200 sq. ft./ton in a 24-hour period; or 66.7 sq. ft./ton in 8-hour day. This includes area for circulation, separate space for various destinations, and equipment space. The space for deferred freight adds another 25% for total of 83.4 sq. ft./ton for normal + deferred freight.

Backup Sheet for Cargo Building and Vehicular Loading Area (cont.)

4. Administrative Area = 5 to 15% of total terminal space. Use 7%.

5. In 1980 time period the efficiency of truck dock operations will be twice as good as the present nominal 5,000 #/hour. Use 10,000 #/hour based upon computerization, automation, etc., and area should be 12' x 50' long plus additional 50' length for maneuvering. (12' x 50') 2 = 1,200 sq. ft./space = 133 sq. yd.

6. For approximating peak period cargo, the peak period gates must be multiplied by an average load aircraft. As previously stated, composition of the 1980 cargo fleet is unknown, but for forecasting cargo building space, the following assumptions appear reasonable:

Aircraft	Cargo Weight (A)	Adjustment for Nos. in Fleet (B)	(A) x (B)
1967 Aircraft	59,000	1	59,000
B-747	218,000	4	870,000
L-500	222,000	4	890,000
DC-8-63	92,000	1	92,000
			1,911,000 ÷ 10 =
			191,100

$$191{,}100 \times \frac{80\% \text{ load factor}}{2{,}000} = 76.5 \text{ tons}$$

HUB AIRPORT REQUIREMENTS - 1980

Name of Hub:

Item B. 1. a. Apron Space, General Aviation Aircraft (Unhangared)

References: a. AC 150/5060-1
b. AC 150/5335-2
c. Working Draft "Storage and Protection of Small Aircraft"

Procedure:

Item	Entry	Input From
1. Annual GA Operations, 1980 (A)		Part I.
2. Annual Itinerant GA Operations, 1980 (B)		"
3. Peak Hour GA Operations, 1980 C		"
4. (C) x (B)/(A) = Peak Hr. GA Itinerant		
5. Based Aircraft over 12,500#,1980		Part I.
6. " " under " ,1980		"
7. Item 5 x 70% (x 3,000 sq. yd.)		
8. Item 6 x 70% (x 350 sq. yd.)		
9. Item 4 (x 370 sq.yd.)		
10. Total Sq. Yd. of Apron GA (Not in Hangar)		Add Items 7, 8 and 9
11. Aircraft Parking Positions, GA(Unhangrd.)		(Item 5 + Item 6) x .70 + Item 4

Rationale for using total peak hour itinerant general aviation operations (as established in AC 150/5060-1) in calculating general aviation apron space is that using total operations - in lieu of arrivals only - includes an approximated increase for average layover of various aircraft types through the peak hour. However, based aircraft which are stored on the apron must also be accounted for. Based upon a recent inhouse study an estimated climate condition results in application of 30% hangar-stored based general aviation aircraft. Thus, a factor of 70% was multiplied by based general aviation aircraft to obtain apron requirements (items 7 and 8, above).

Backup Sheet for Apron Space, General Aviation Aircraft (Unhangared)

Over 12,500#

For General Aviation aircraft over 12,500# use area for "T" size aircraft as shown on Air Carrier Backup Apron Data. Reasoning for this is DC-3 is considered as General Aviation over 12,500# critical and it has wing span similar to "T". This area is = 3,000 sq. yd.

Under 12,500#

Average wing span estimated to be approximately 45' for twins and 33' for singles.

Type	Average Span (A)	Square Yards $\frac{((A) \times 1.5)^2}{9}$	Rounded + Taxiing Space
Twin	45	506	500
Single	33	272	300

Use 350 sq. yd. as average for both, considering fleet

Note: These figures include some space for maneuvering aircraft. Information in AC 150/5335-2 and working draft of "Storage and Protection of Small Aircraft"

On Peak Hour Itinerant information only Total General Aviation Operations are known; therefore, square yard figures for Itinerants are adjusted as follows:
GA Fleet is about 9 singles to 1 multi-engine, of the multi's about 20% are estimated as over 12,500# $\therefore \frac{(9 \times 300) + (.2 \times 3{,}000) + (.8 \times 500)}{10}$ = 370 sq. yd.

HUB AIRPORT REQUIREMENTS - 1980

Name of Hub:

Item B. 1. b. Apron Space General Aviation (Hangared)

References: None

Procedure:		Input From
Item	Entry	
1. Based Aircraft over 12,500#, 1980		Part I.
2. Based Aircraft under 12,500#, 1980		Part I.
3. (Item 1 x .30 x 3,000 sq. yd.) x 1.3		
4. (Item 2 x .30 x 350 sq. yd.) x 1.3		
5. Total Sq. Yd. of GA Apron(in hangars)		Add Items 3 and 4
6. Aircraft Parking Positions		((1.) + (2.)) x .3
Item B. 1. c. Total Apron Space		
1. Area		Total from Sheets B.1.a. & B.1.b.
2. Aircraft Parking Positions		Total from Sheets B.1.a. & B.1.b.

Rationale:

The best storage setup is tie-down which averages 13/acre for small aircraft. Factor developed for T-hangars and shop hangars on clearances for buildings is increase in area of 25%. Also assumed one of every ten spaces in shop hangar is needed for maintenance (10%). Ratio of T-hangars to shop hangars, from space available standpoint, is 2:1. Therefore, an adjustment of 5% is needed for shop hangars or a total of 30% for aircraft in hangars. This is how the 1.3 factor was derived in 3 and 4, above. The .30 merely represents the balance of based aircraft considered to be hangared.

Name of Hub:

Item B. 2. Terminal Building, General Aviation

References: FAA Administration Buildings for General Aviation Airports, 1960

Procedure:

Item	Entry	Input From
1. Aircraft Opns., GA, Peak Hr., 1980, No.		Part I.
2. Pilots & Psgrs., GA, Peak Hr., 1980, No.		Item 1 x 1.8
3. Area Calculations	sq. ft.	
a. Waiting Area/Pilots Lounge		Item 2 x 15 (200 sq. ft. min.)
b. Management/Operations		Item 2 x 3 (180 sq. ft. min.)
c. Public Conveniences		Item 2 x 1.5
d. Concessions, Dining, etc.		Item 2 x 5
e. Circ., Mech., Maint., Walls & Part.		Equal to a. + b. + c. + d.
4. Total Area		Sum of above

Rationale: General aviation terminal building occupancy is largely by private pilots, and the occasional passenger per operation. Concessions are usually minimal especially where facilities are located in hangars or hangar lean-to's. The calculations reflect ideal facilities as suggested by fixed base operators at representative general aviation airports.

Item B. 3. Public Vehicular Parking Areas, General Aviation

References: Same as above.

Procedure:

1. Vehicular Parking Spaces, No.		Item 2 x 1.3
2. Area (Sq. Yd.)		(1.) x 35.5