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NEW YORK AIRPORTS DATA PACKAGE NUMBER 6, JOHN F. KENNEDY INTERN--ETC(U)
JUN 79 DOT-FA77WA-3961

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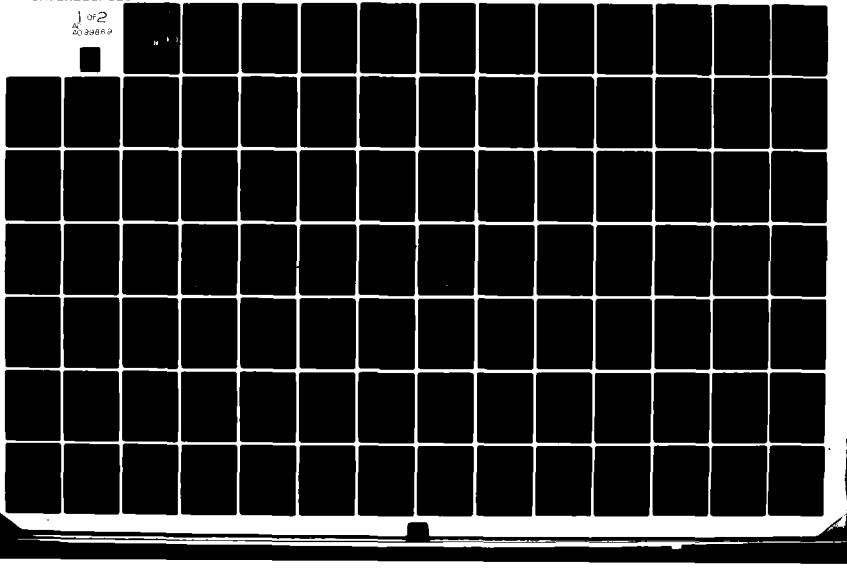


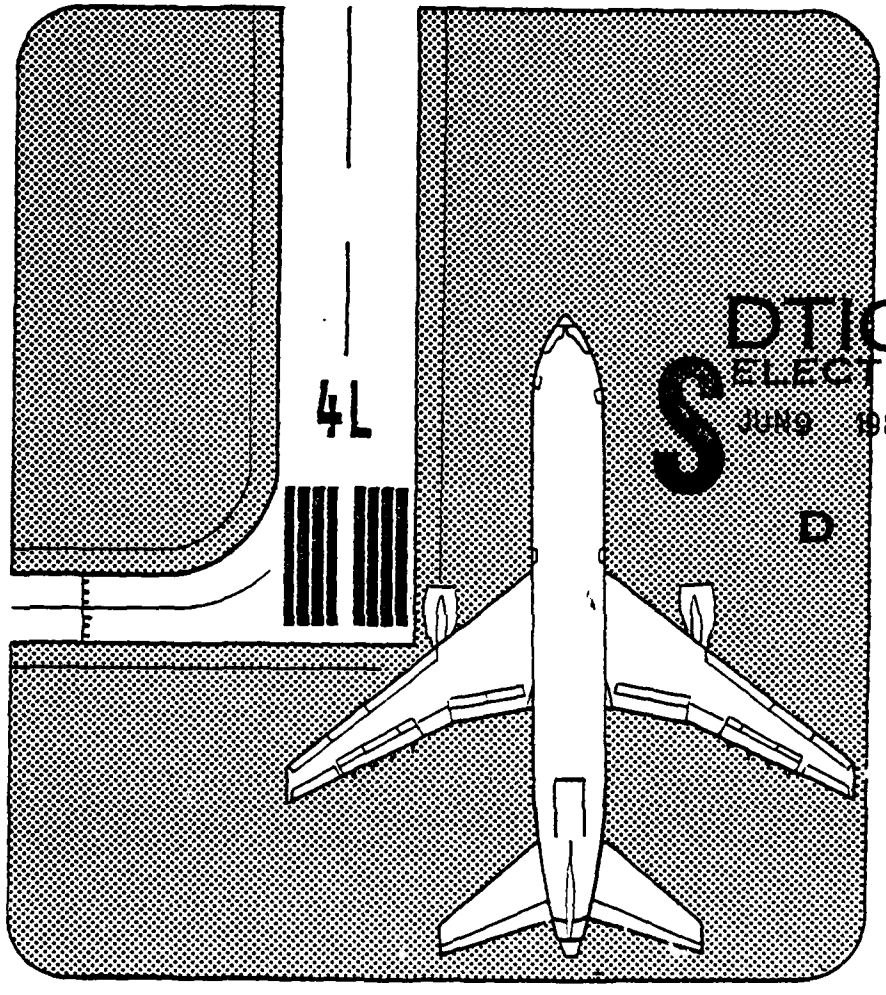
LEVEL II

NEW YORK AIRPORTS

DATA PACKAGE NO. 6

JOHN F. KENNEDY INTERNATIONAL AIRPORT, LA GUARDIA AIRPORT

AIRPORT IMPROVEMENT TASK FORCE DELAY STUDIES



prepared for
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
under contract
DOT-FA77WA-3961

PMM&Co. Peat, Marwick, Mitchell & Co.

JUNE 1979

PEAT, MARWICK, MITCHELL & Co.
P. O. BOX 8007
SAN FRANCISCO INTERNATIONAL AIRPORT
SAN FRANCISCO, CALIFORNIA 94128
Telephone: (415) 347-9521

June 15, 1979

Mr. Michael M. Scott, ATF-4
Federal Aviation Administration
800 Independence Avenue, S.W.
Washington, D.C. 20591

Re: New York Data Package No. 6, June 1979

Dear Mike:

Attached is New York Data Package No. 6. The material in this Data Package is organized to correspond with the agenda for the June 22, 1979, meeting of the New York Task Force:

- Attachment A contains the LGA simulation results and graphics, minus the west-taxiway experiments
- Attachment B has the LGA demand inputs and the short-form networks
- Attachment C presents the JFK simulation results and graphics
- Attachment D contains the JFK demand inputs and short-form networks
- Attachments E and F present the aircraft separations used in the simulations for LGA and JFK, respectively

A brief summary of the highlights and conclusions of the LGA and JFK simulations is presented at the beginning of the Data Package.

A supplement to this Data Package, which contains the results of the LGA west-taxiway experiments and annual delay results, will be presented at the June 22 meeting.

This information should be reviewed by members of the New York Task Force at their June 22, 1979, meeting.

Sincerely,

Stephen L. M. Hockaday
Manager

SLMH/sh
Enclosure

cc: Mr. J. R. Dupree (ALG-312)
Mr. C. Caiafa (AEA-4)

CONTENTS

TABLES

New York Task Force Delay Studies
Data Package No. 6

HIGHLIGHTS AND CONCLUSIONS

Purpose

This brief overview of the highlights and conclusions of the airfield simulation results is intended to guide the reader through the major findings of this report.

Scope

This data package contains the results of the simulation experiments except for the four west-taxiway experiments at LaGuardia Airport. Those west-taxiway results, along with the results of the annual delay model experiments, will be reported in a supplement to this data package at the next Task Force meeting.

Organization

A summary table of results is presented for each Airport (Table A-1, page 2, for LGA, and Table C-1, page 58, for JFK), along with summary sheets and graphics of individual experiment results. Also included are the following items:

- Tables of demand for each year and demand-sensitivity experiment (Attachments B and D)
- Short-form network diagrams for each experiment (Attachments B and D)
- Tables of the standard VFR and IFR separations used in the simulations (Attachments E and F)

Results for LaGuardia Airport

LaGuardia results are summarized in Table A-1. The experiments in Table A-1 are grouped by runway-use configuration and weather condition to facilitate comparisons of results over different years and sensitivity conditions.

The sensitivity runs tested the effects of: (1) the PNYNJ forecast, which contains a higher percentage of heavy aircraft and fewer total operations than the schedules used in the

other experiments; (2) levels of general aviation operations observed in August 1978 instead of the PNYNJ general aviation forecasts used in the other experiments; and (3) using today's ATC separations instead of the 1982 and 1987 ATC separations used in the other experiments. All of the sensitivity tests were done using the same runway-use configuration and weather condition, namely arrivals on 22 and departures on 13 in IFR1.

The following are the major conclusions of the LGA results:

1. The ATA forecast used in the standard experiments contained fewer OAG scheduled operations than in 1977 (see Tables B-1 through B-3); this, coupled with the relatively low PNYNJ general aviation forecasts, contributed to lower delays in both 1982 and 1987 than estimated for today for all runway uses.

2. Another factor in the foregoing delay reductions is the reduced aircraft separations assumed for 1982 and 1987 (see Tables E-1 and F-1).

3. The sensitivity tests indicated that the delays appear very sensitive to the general aviation forecasts (especially in 1982) and the assumed separations (especially in 1987), as shown below (see Figures 50b, 52b, 51b, and 53b):

	Baseline Delays		Delays with Today's GA		Delays with Today's ATC	
Year	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
1982	19.3	1.0	29.5	1.0	22.0	0.9
1987	3.0	1.5	4.4	1.6	24.3	1.0

4. Delays were not very sensitive to the 1982 PNYNJ forecast but were very sensitive to the 1987 PNYNJ forecast (see Figures 48b and 49b):

	Baseline Delays		Delays with PNYNJ Forecast	
Year	Arrivals	Departures	Arrivals	Departures
1982	19.3	1.0	18.8	0.9
1987	3.0	1.5	1.1	1.1

This is probably due to the large percentage of heavy aircraft in the 1987 PNYNJ forecast and the associated drop in total operations, coupled with the fact that the 1987 ATC Scenario of Report No. FAA-EM-78-8A has greatly reduced wake-turbulence effects.

Results for John F. Kennedy International Airport

The JFK results are summarized in Table C-1 and are organized the same way as the LaGuardia results. In this case, sensitivity runs were done only to test the effects of today's ATC separations in 1982 and 1987 (Experiments 44 and 45); there were no demand-sensitivity experiments for JFK. The forecasts for JFK provided by PNYNJ showed increases in both air carrier and general aviation traffic over today's traffic levels (see Tables D-1, D-2, and D-3).

The following are the major conclusions of the JFK results:

1. Delays are estimated to increase between today and 1982 and then they fall below today's levels by 1987 in all cases except the 2 n.m. stagger experiments (Experiments 18, 27, and 36).

2. The major factor contributing to the reduction in delays by 1987 is probably the assumed 1987 ATC Scenario, based on Report No. FAA-EM-78-8A, and its reduced separations and wake-turbulence effects.

3. Future delays are very sensitive to the assumed 1982 and 1987 ATC separations (especially in 1987), as shown below:

	Baseline Delays		Delays with Today's ATC Separations	
Year	Arrivals	Departures	Arrivals	Departures
1982	95.1	5.9	122.0	4.2
1987	32.5	4.4	131.9	5.2

The high separation sensitivity in 1987 is due to the very high percentage of heavy aircraft (71.6%) in the 1987 PNYNJ forecast and the fact that the 1987 separations have greatly reduced wake-turbulence effects conpared to today's separations.

Attachment A

LGA STAGE-2 SIMULATION EXPERIMENTS RESULTS AND GRAPHICS

LaGuardia Airport

New York

Airport Improvement Task Force Delay Studies

Peat, Marwick, Mitchell & Co.
San Francisco, California

June 1979

Table A-1

NEW YORK TASK FORCE DELAY STUDIES
LaGUARDIA AIRPORT
Summary Results of Stage-2 Experiments
Airfield Simulation Model Runs

Experiment No.	Description[a]	Runways Used		Time Frame	Weather Conditions	Highest Hourly Flow Rates					Average Runway Delays (minutes)	
								Combined Total				
		Arrivals	Departures			Arrivals[b]	Departures[b]	Arrivals	Departures	Total	Arrivals	Departures
1	1977 baseline	22	13	1978	VFR1	39	42	38	42	80	12.8	1.5
31	1982 baseline	22	13	1982	VFR1	41	34	41	33	74	2.2	1.4
37	1987 baseline	22	13	1987	VFR1	43	35	43	34	77	2.4	1.4
2	1978 baseline	22	13	1978	IFR1	30	34	30	33	63	42.6	0.7
32	1982 baseline	22	13	1982	IFR1	31	33	31	33	64	19.3	1.0
48[c]	1982 Heavy Sensitivity	22	12	1982	IFR1	32	33	30	30	60	18.8	0.9
50[d]	1982 GA Sensitivity	22	13	1982	IFR1	31	35	31	34	65	29.5	1.0
52[e]	1982 (today's ATC) Sensitivity	22	13	1982	IFR1	31	33	30	33	63	22.0	0.9
38	1987 baseline	22	13	1987	IFR1	41	36	41	34	75	3.0	1.5
49[f]	1987 Heavy Sensitivity	22	13	1987	IFR1	37	31	37	29	66	1.1	1.1
51[g]	1987 GA Sensitivity	22	13	1987	IFR1	42	39	42	39	81	4.4	1.6
53[h]	1987 (today's ATC) Sensitivity	22	13	1987	IFR1	30	33	29	33	62	24.3	1.0
33	1978 baseline	13	4	1978	VFR1	37	35	37	33	70	23.9	16.1
34	1982 baseline	13	4	1982	VFR1	41	37	41	33	74	2.4	9.7
39	1987 baseline	13	4	1987	VFR1	43	34	43	34	77	2.3	6.0
9	1978 baseline	13	4	1978	IFR1	27	29	27	29	56	33.8	9.8
35	1982 baseline	13	4	1982	IFR1	31	36	30	36	66	20.1	8.4
40	1987 baseline	13	4	1987	IFR1	42	34	42	34	76	2.9	4.5
3	1978 baseline	22	13	1978	IFR2	28	30	19	30	49	50.8	24.1
36	1982 baseline	22	13	1982	IFR2	31	29	31	28	59	9.4	8.0
41	1987 baseline	22	13	1987	IFR2	34	30	30	30	60	9.9	16.7
42	1978 baseline	31	4	1978	VFR1	37	31	37	29	66	28.3	23.6
44	1987 baseline	31	4	1987	VFR1	43	34	43	32	75	2.3	7.1
45	1978 baseline	31	31	1978	VFR1	33	33	33	32	65	31.8	14.7
47	1987 baseline	31	31	1987	VFR1	38	35	38	33	71	5.7	6.4

a. For the entire 6-hour simulation period.
b. Highest arrival flow rate is usually not in same hour as highest departure flow rate.
c. Sensitivity run with a higher percentage of heavy aircraft and fewer total operations in 1982 demand.
d. Sensitivity run with more general aviation operations in 1982 demand.
e. Sensitivity run with 1978 separations and 1982 demand.
f. Sensitivity run with a higher percentage of heavy aircraft and fewer total operations in 1987 demand.
g. Sensitivity run with more general aviation operations in 1987 demand.
h. Sensitivity run with 1978 separations and 1987 demand.

LGA STAGE - 2 EXPERIMENTS

Experiment No. 31

Objective:

To provide baseline delay estimates with 1982 demand, in VFR1 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
22	13

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours, and average values over the 6-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment	
			Average[a]	Peak[b]
Arrival	Flow Rate	a/c per hr.	30.8	41
Arrival	Air Delay	min.	2.2	5.3
Arrival	Taxi-In Delay	min.		0.0
Departure	Flow Rate	a/c per hr.	28.3	33
Departure	Runway Delay	min.	1.4	1.1
Departure	Taxi-Out Delay	min.		0.5

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 31A AVERAGE RUNWAY FLOW RATES

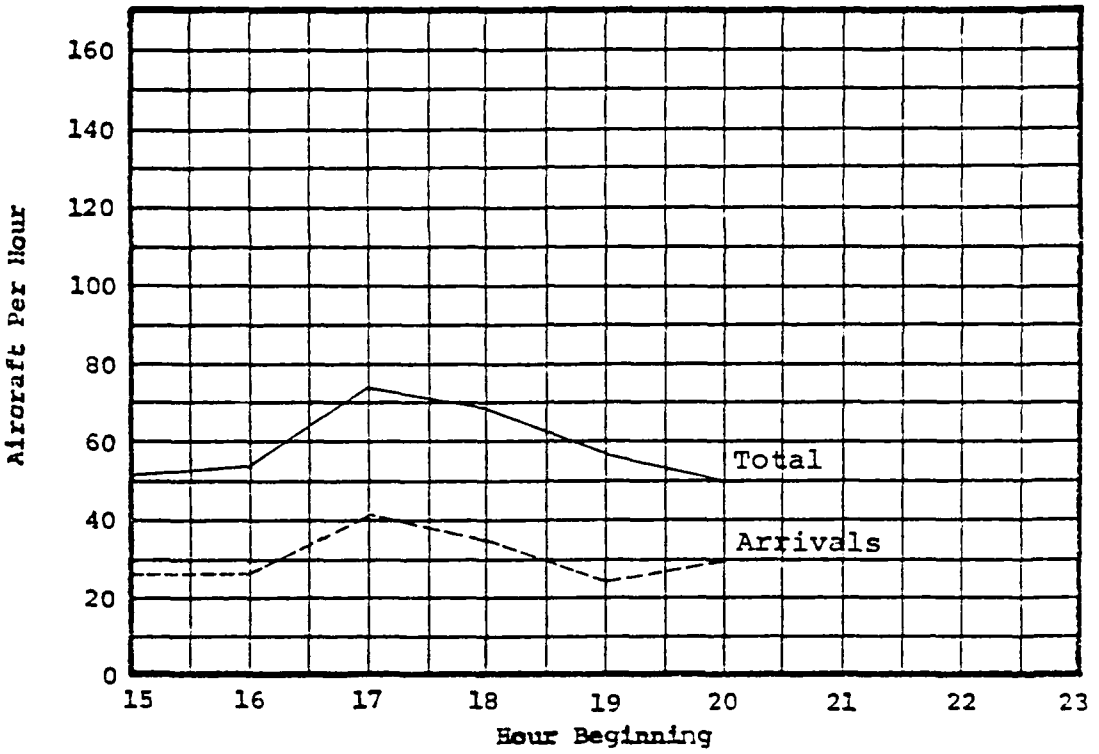
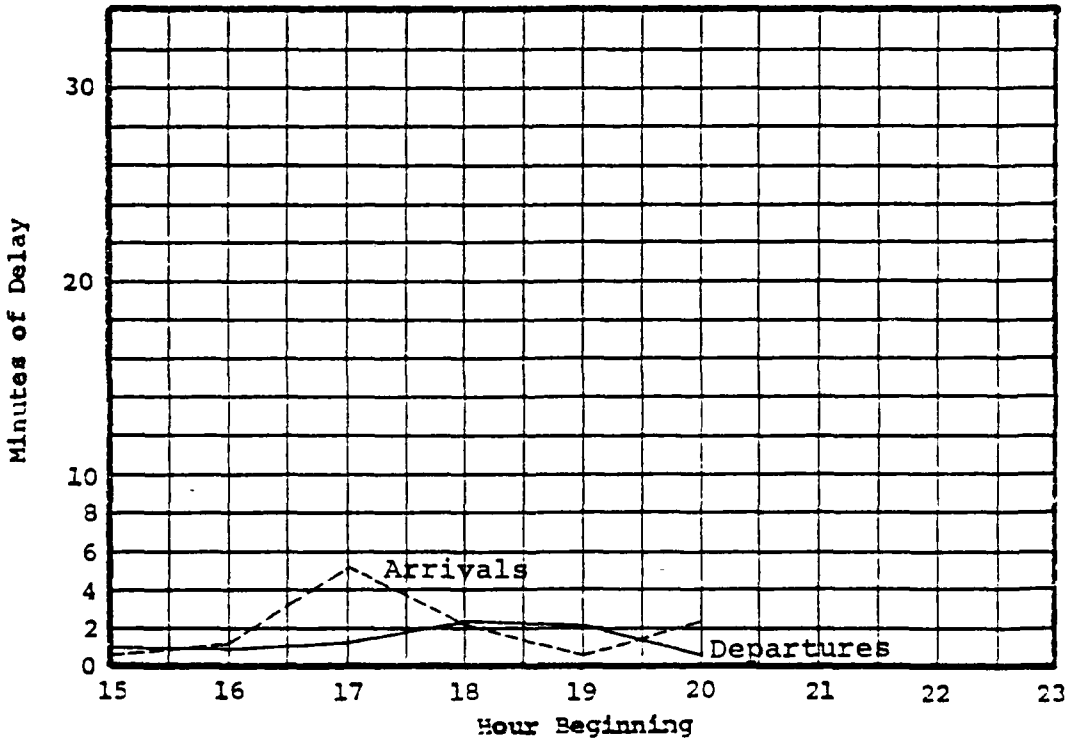


FIGURE 31B AVERAGE RUNWAY DELAYS



LGA STAGE - 2 EXPERIMENTS

Experiment No. 32

Objective:

To provide baseline delay estimates with 1982 demand, in IFR1 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
22	13

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours, and average values over the 6-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	29.0	31
Arrival	Air Delay	min.	19.3	16.4
Arrival	Taxi-In Delay	min.		0.0
Departure	Flow Rate	a/c per hr.	27.7	32
Departure	Runway Delay	min.	1.0	1.1
Departure	Taxi-Out Delay	min.		0.3

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 32a AVERAGE RUNWAY FLOW RATES

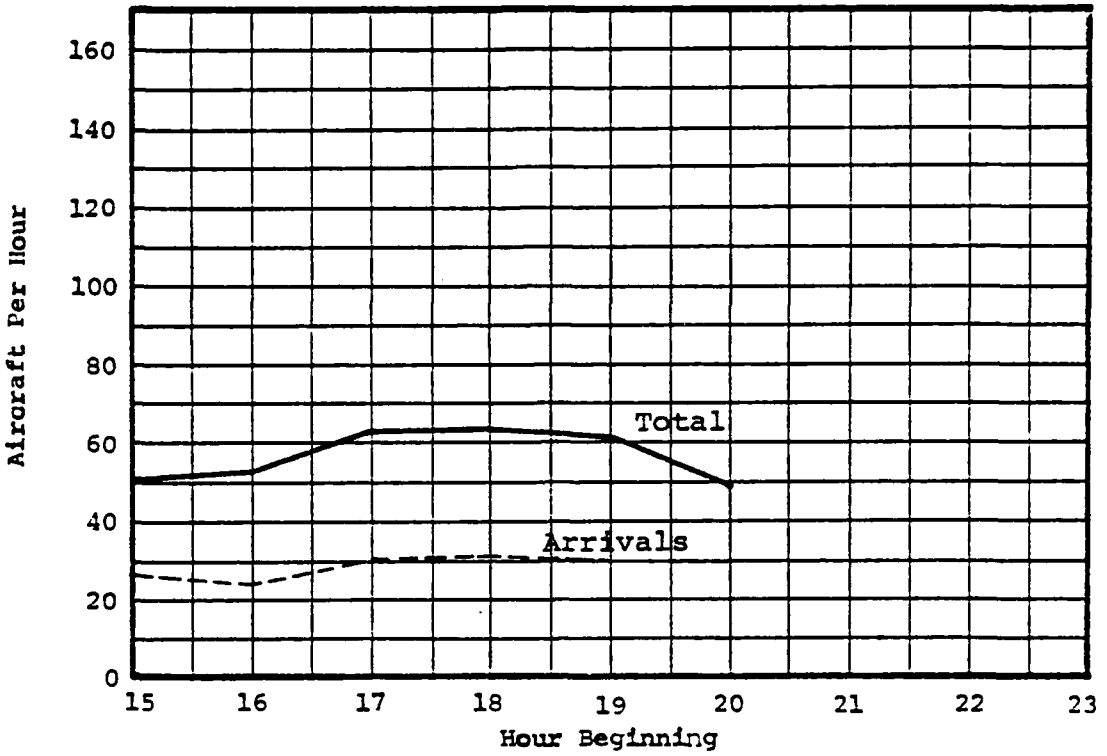
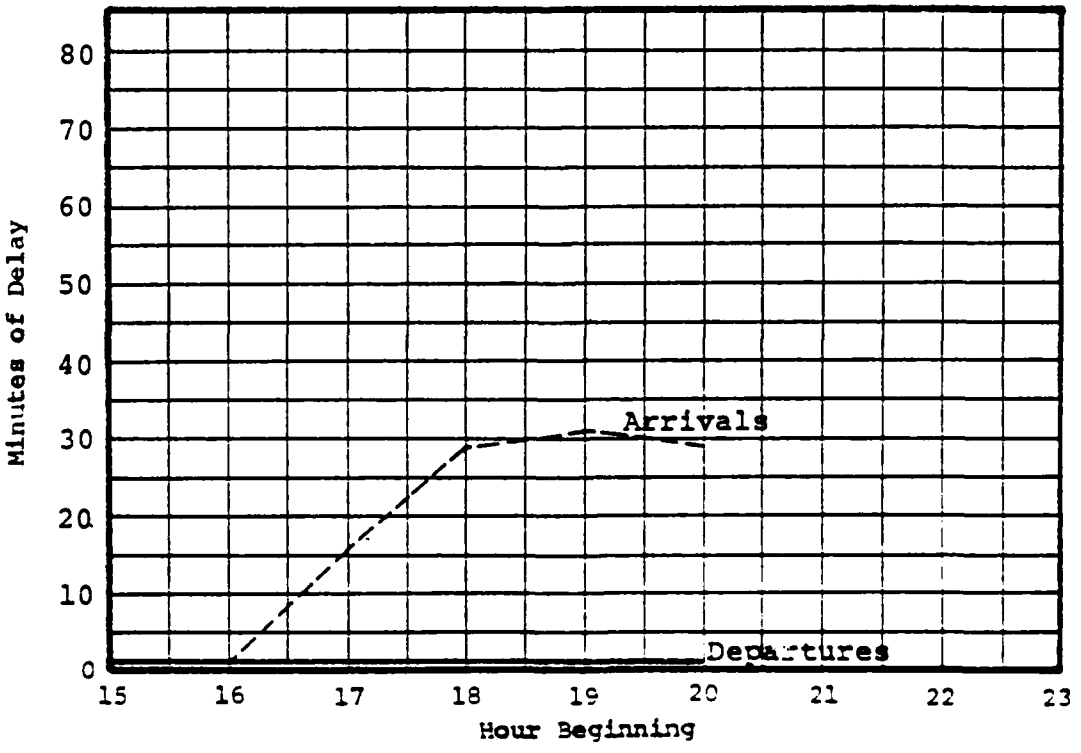


FIGURE 32b AVERAGE RUNWAY DELAYS



LGA STAGE - 2 EXPERIMENTS

Experiment No. 33

Objective:

To provide baseline delay estimates with 1978 demand, in VFR1 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
13	4

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours, and average values over the 6-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment	
			Average[a]	Peak[b]
Arrival	Flow Rate	a/c per hr.	32.0	37
Arrival	Air Delay	min.	23.9	16.1
Arrival	Taxi-In Delay	min.		0.1
Departure	Flow Rate	a/c per hr.	30.5	25
Departure	Runway Delay	min.	16.1	7.7
Departure	Taxi-Out Delay	min.		0.2

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 33A AVERAGE RUNWAY FLOW RATES

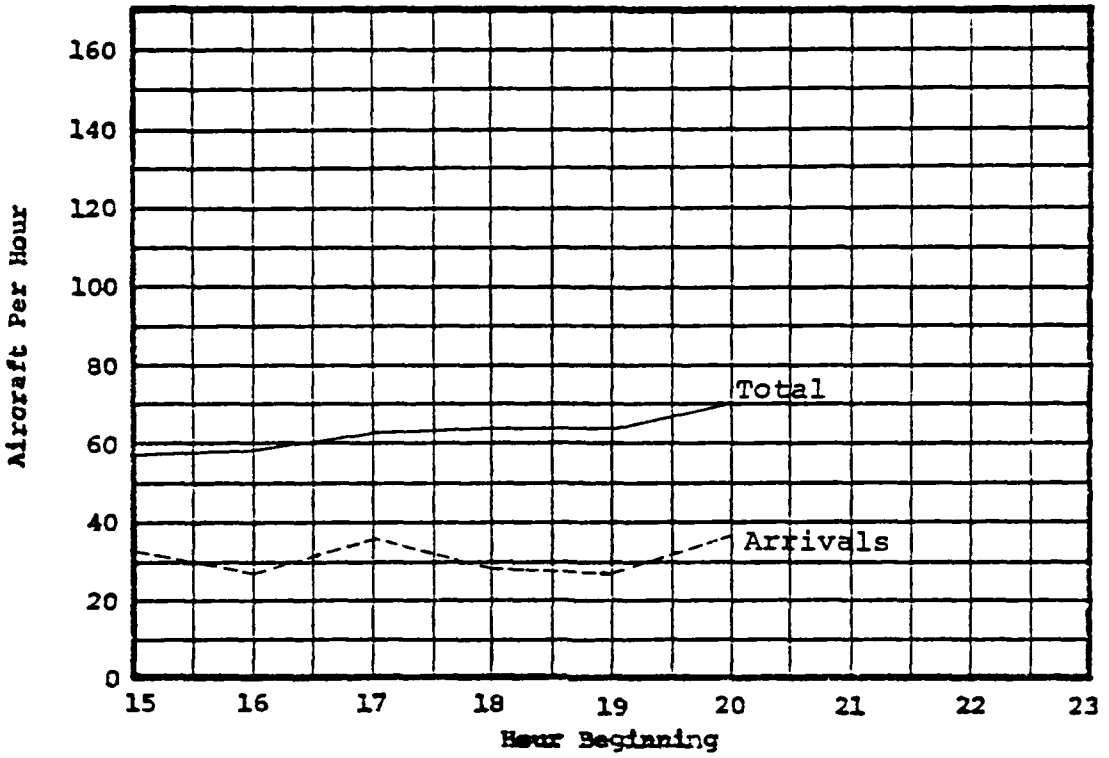
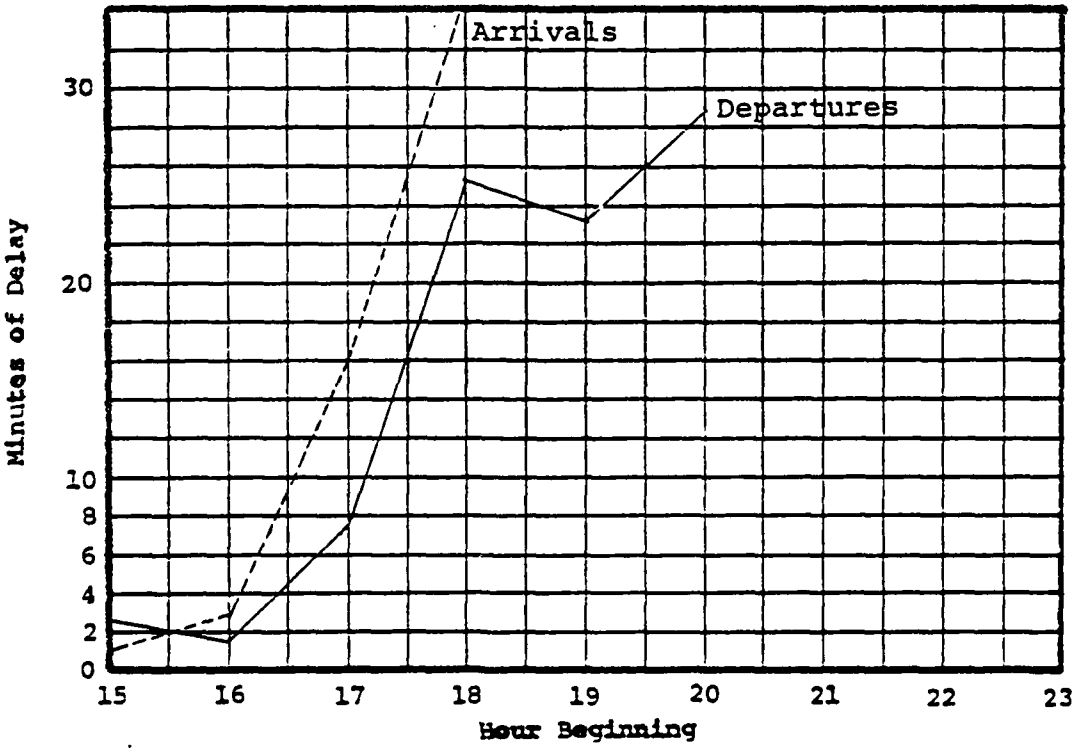


FIGURE 33B AVERAGE RUNWAY DELAYS



LGA STAGE - 2 EXPERIMENTS

Experiment No. 34

Objective:

To provide baseline delay estimates with 1982 demand, in VFR1 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
13	4

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours, and average values over the 6-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	30.8	41
Arrival	Air Delay	min.	2.4	5.3
Arrival	Taxi-In Delay	min.		0.1
Departure	Flow Rate	a/c per hr.	27.5	33
Departure	Runway Delay	min.	9.7	3.1
Departure	Taxi-Out Delay	min.		0.2

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 34A AVERAGE RUNWAY FLOW RATES

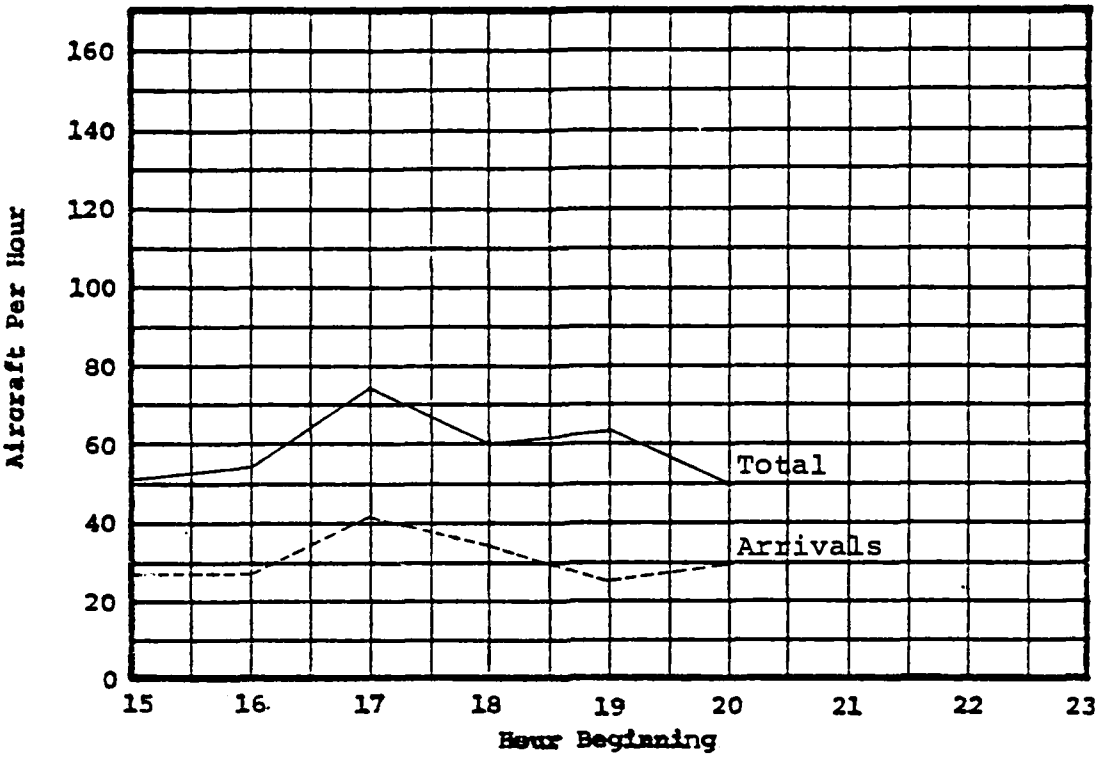
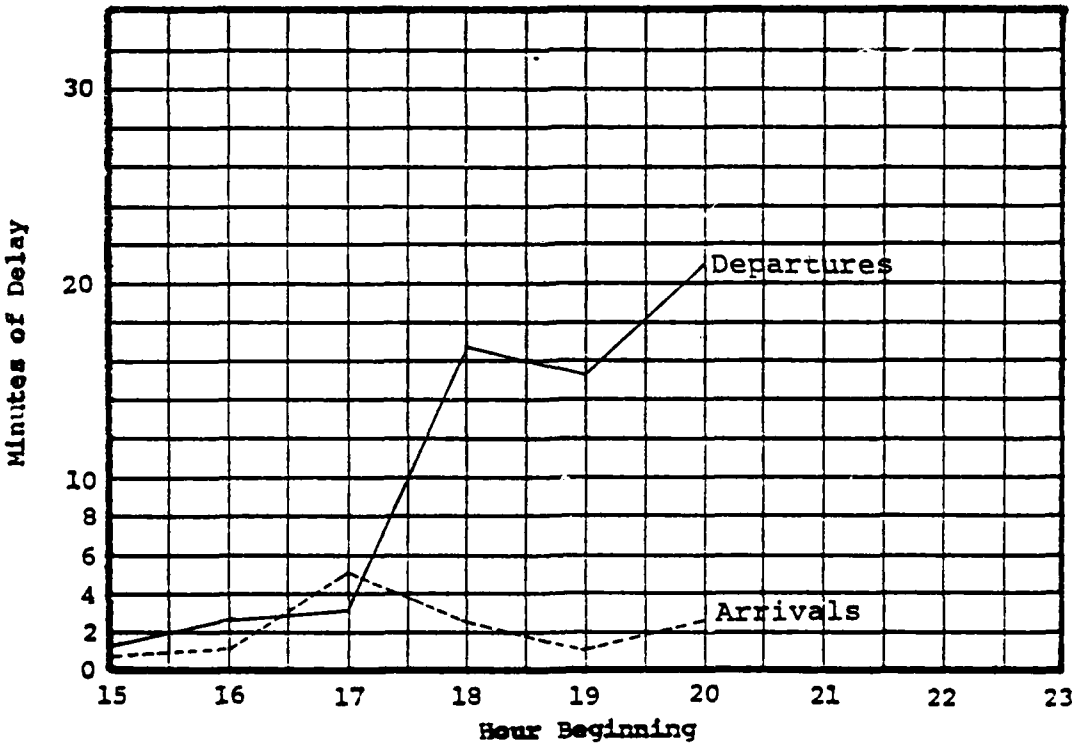


FIGURE 34B AVERAGE RUNWAY DELAYS



LGA STAGE - 2 EXPERIMENTS

Experiment No. 35

Objective:

To provide baseline delay estimates with 1982 demand, in IFR1 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
13	4

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours, and average values over the 6-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	28.8	31
Arrival	Air Delay	min.	20.1	16.1
Arrival	Taxi-In Delay	min.		0.1
Departure	Flow Rate	a/c per hr.	26.5	32
Departure	Runway Delay	min.	8.4	3.0
Departure	Taxi-Out Delay	min.		0.1

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 35A AVERAGE RUNWAY FLOW RATES

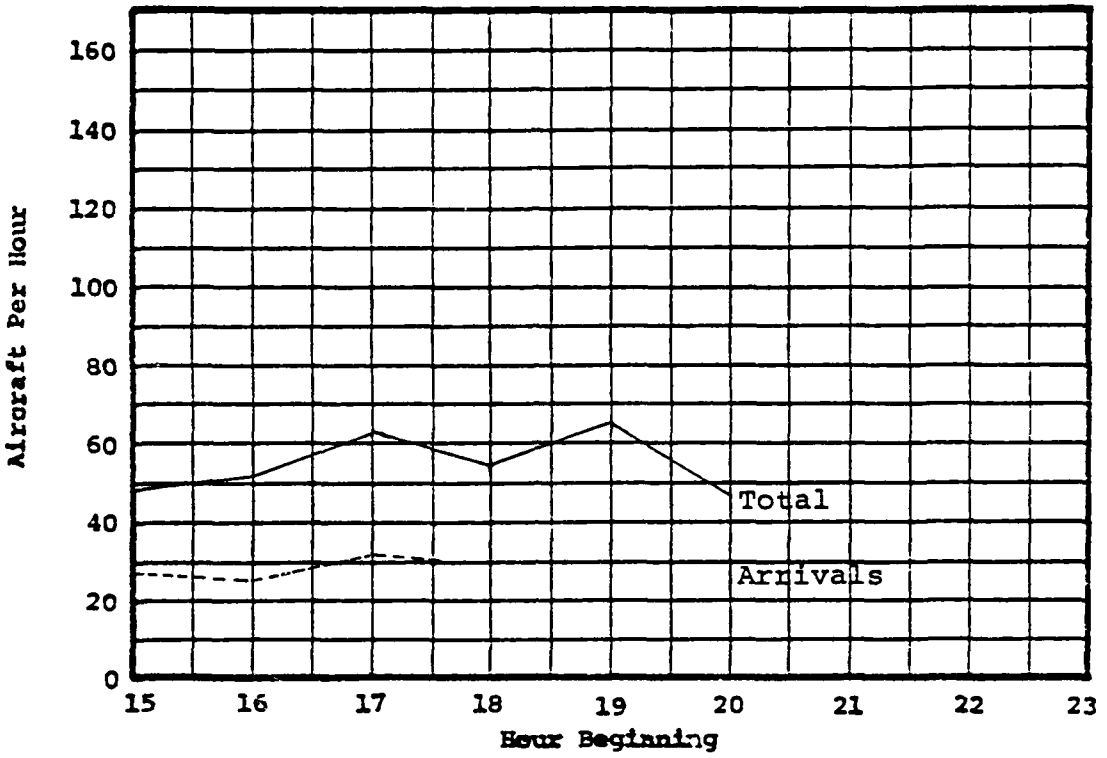
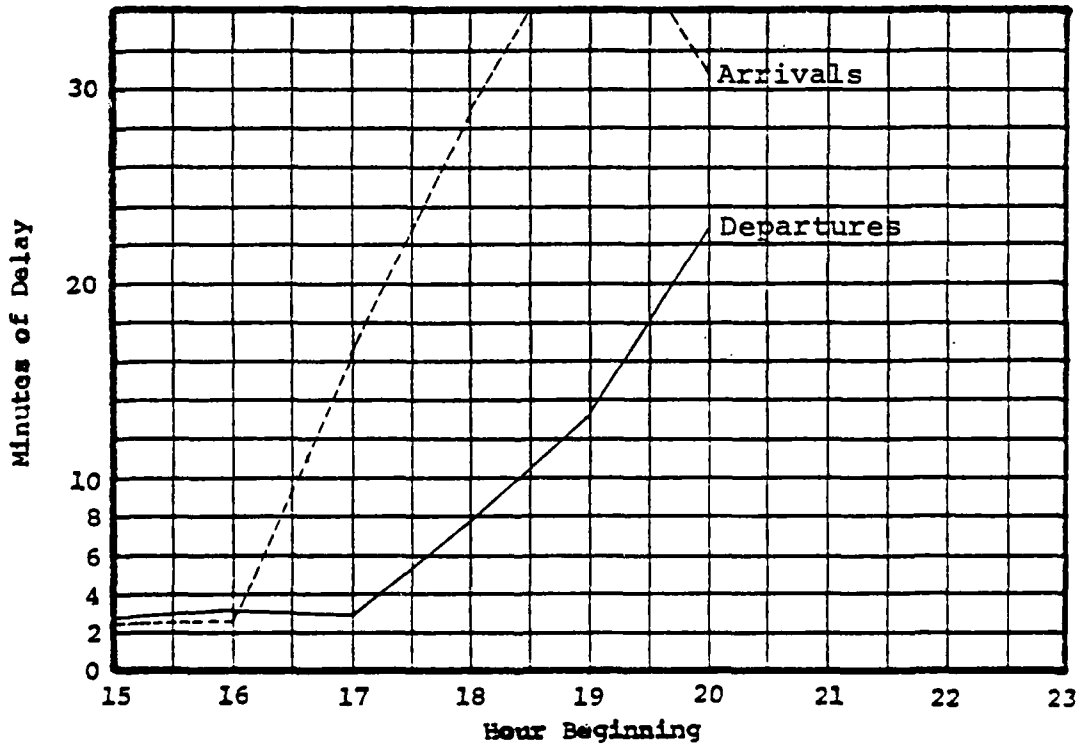


FIGURE 35B AVERAGE RUNWAY DELAYS



LGA STAGE - 2 EXPERIMENTS

Experiment No. 36

Objective:

To provide baseline delay estimates with 1982 demand, in IFR2 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
22	13

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours, and average values over the 6-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	27.8	31
Arrival	Air Delay	min.	9.4	12.4
Arrival	Taxi-In Delay	min.		0.0
Departure	Flow Rate	a/c per hr.	25.3	28
Departure	Runway Delay	min.	8.0	5.2
Departure	Taxi-Out Delay	min.		0.3

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 36A AVERAGE RUNWAY FLOW RATES

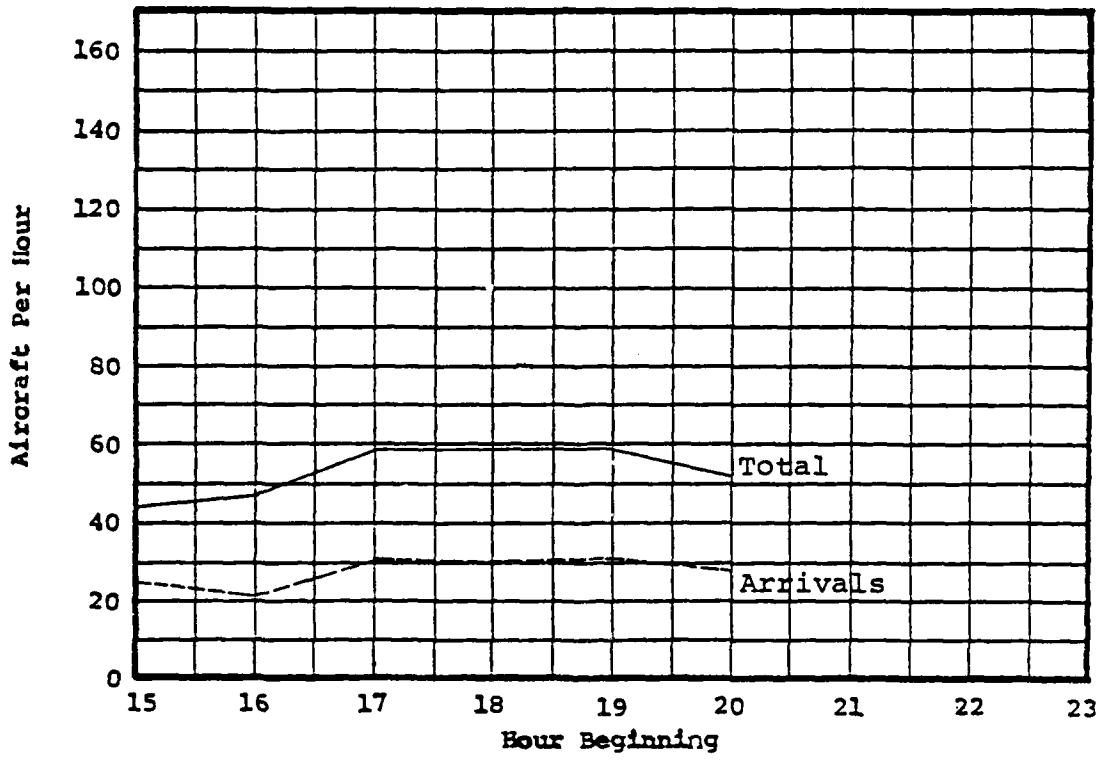
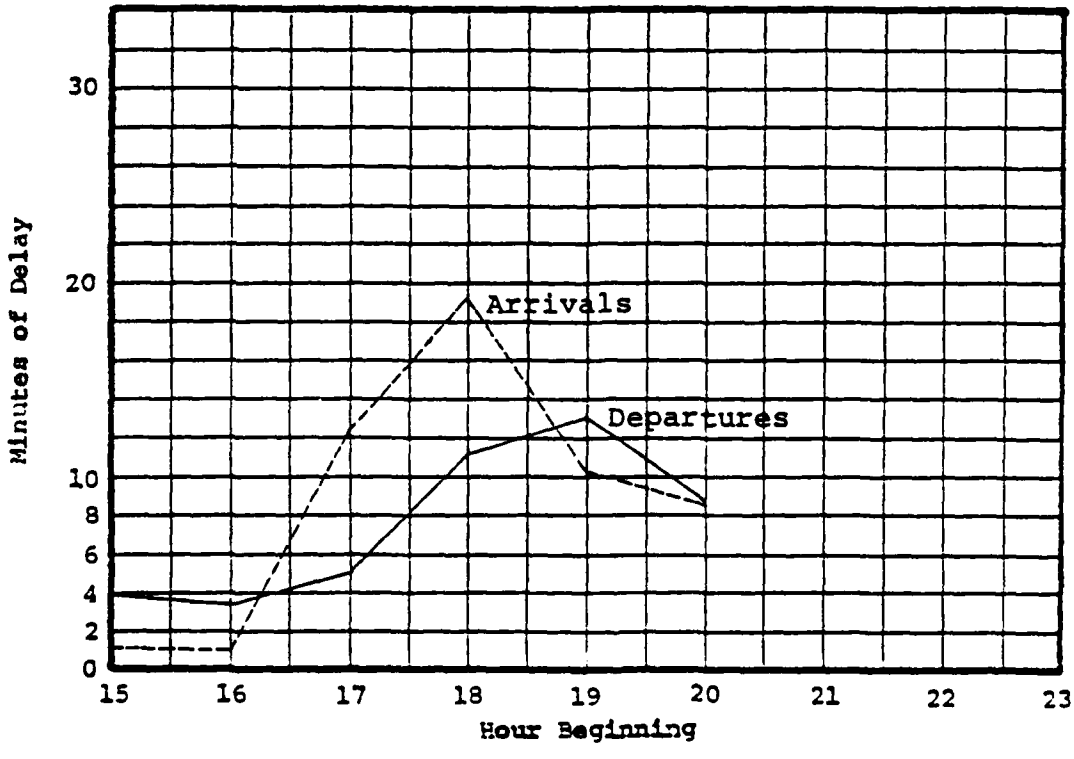


FIGURE 36B AVERAGE RUNWAY DELAYS



LGA STAGE - 2 EXPERIMENTS

Experiment No. 37

Objective:

To provide baseline delay estimates with 1987 demand, in VFR1 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
22	13

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours, and average values over the 6-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment	
			Average[a]	Peak[b]
Arrival	Flow Rate	a/c per hr.	31.5	43
Arrival	Air Delay	min.	2.4	4.1
Arrival	Taxi-In Delay	min.		0.0
Departure	Flow Rate	a/c per hr.	29.2	34
Departure	Runway Delay	min.	1.4	1.2
Departure	Taxi-Out Delay	min.		0.4

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 37A AVERAGE RUNWAY FLOW RATES

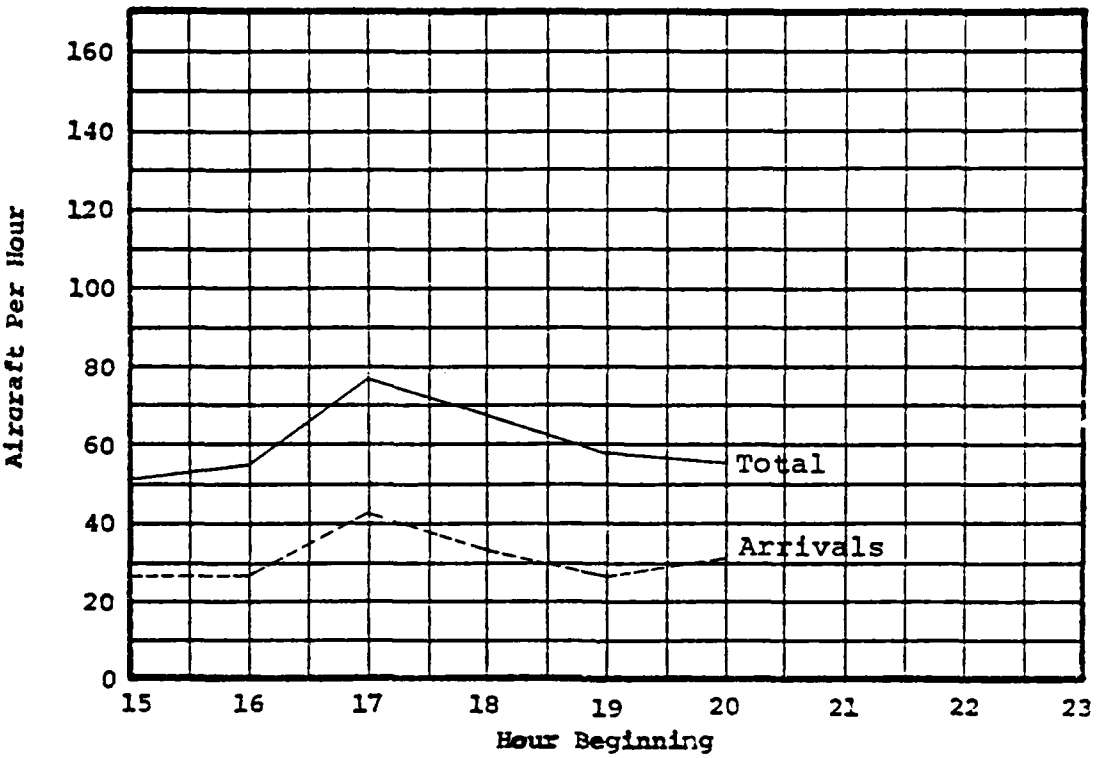
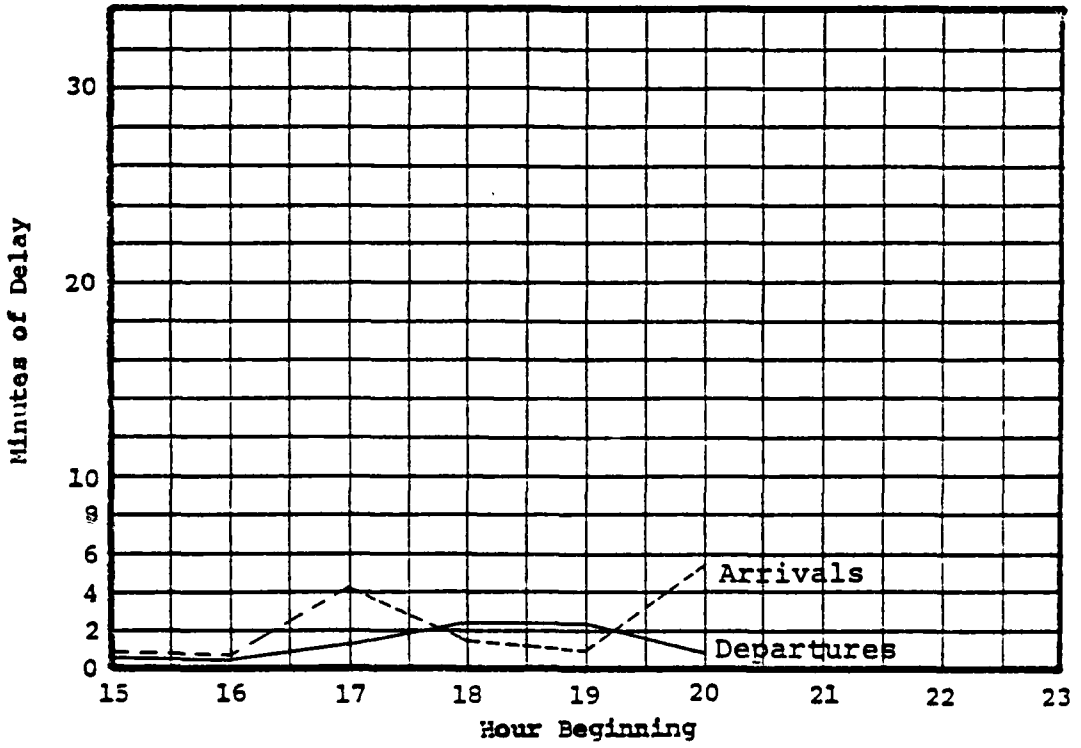


FIGURE 37B AVERAGE RUNWAY DELAYS



LGA STAGE - 2 EXPERIMENTS

Experiment No. 38

Objective:

To provide baseline delay estimates with 1987 demand, in IFR1 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
22	13

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours, and average values over the 6-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	31.5	41
Arrival	Air Delay	min.	3.0	5.2
Arrival	Taxi-In Delay	min.		0.0
Departure	Flow Rate	a/c per hr.	29.3	34
Departure	Runway Delay	min.	1.5	1.2
Departure	Taxi-Out Delay	min.		0.4

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 38A AVERAGE RUNWAY FLOW RATES

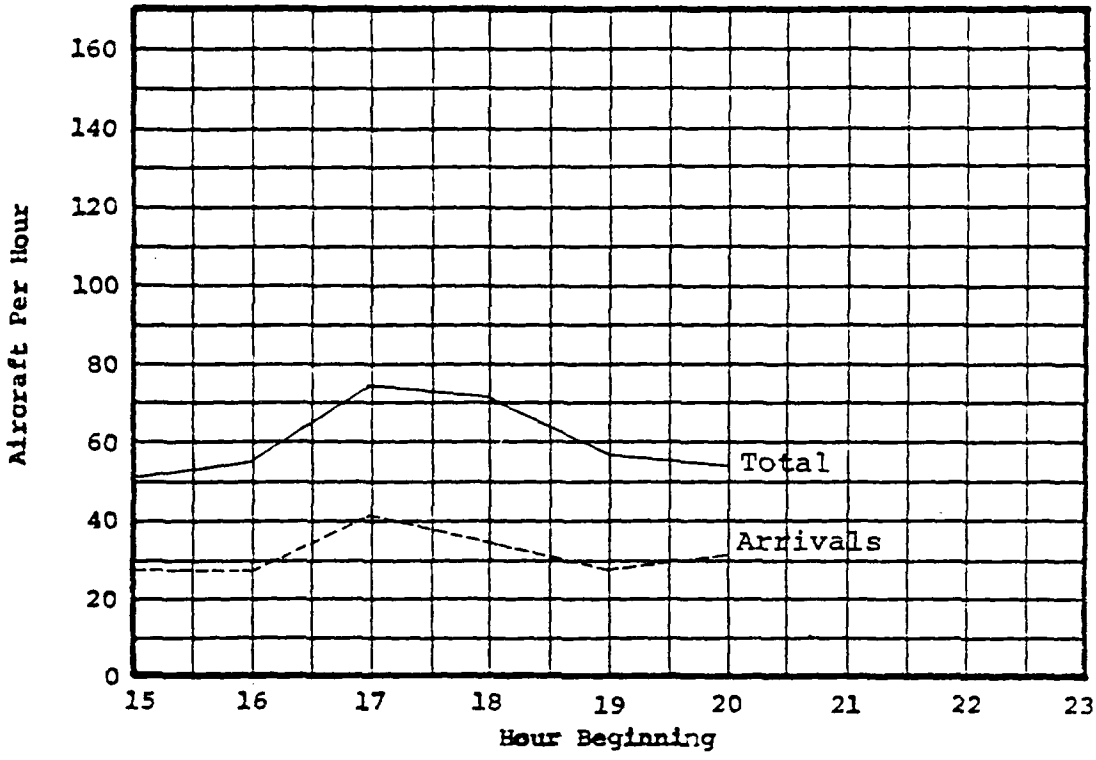
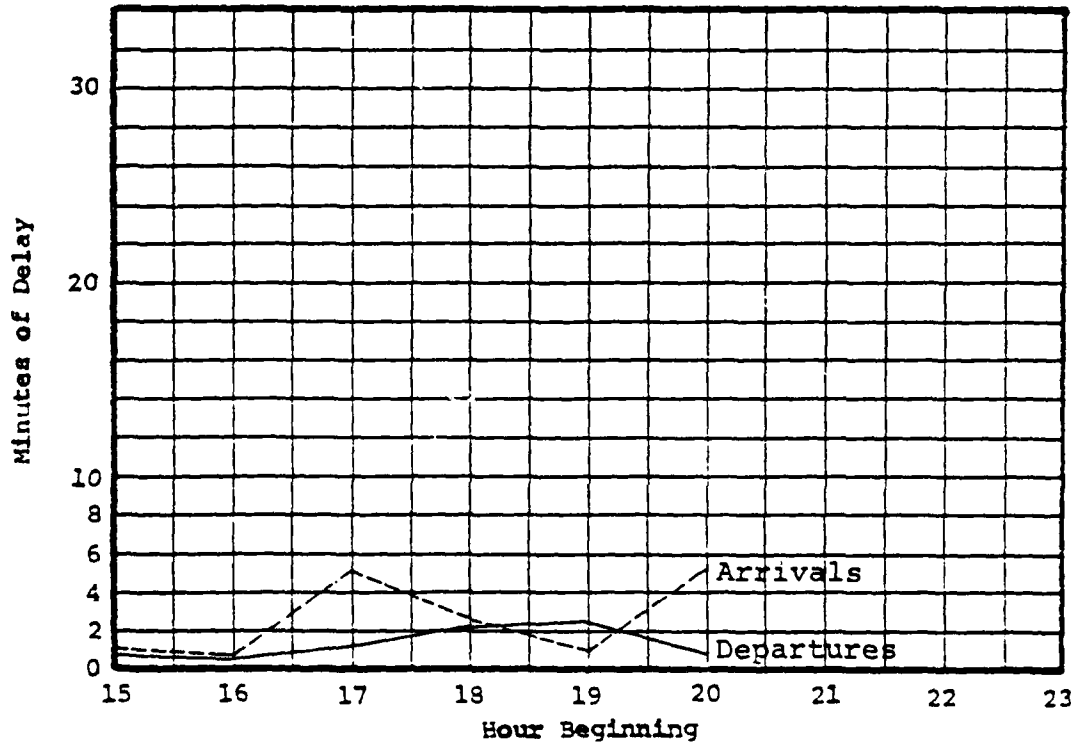


FIGURE 38B AVERAGE RUNWAY DELAYS



LGA STAGE - 2 EXPERIMENTS

Experiment No. 39

Objective:

To provide baseline delay estimates with 1987 demand, in VFR1 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
13	4

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours; and average values over the 6-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment	
			Average[a]	Peak[b]
Arrival	Flow Rate	a/c per hr.	31.5	43
Arrival	Air Delay	min.	2.3	3.8
Arrival	Taxi-In Delay	min.		0.1
Departure	Flow Rate	a/c per hr.	29.5	34
Departure	Runway Delay	min.	6.0	3.6
Departure	Taxi-Out Delay	min.		0.2

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 39A AVERAGE RUNWAY FLOW RATES

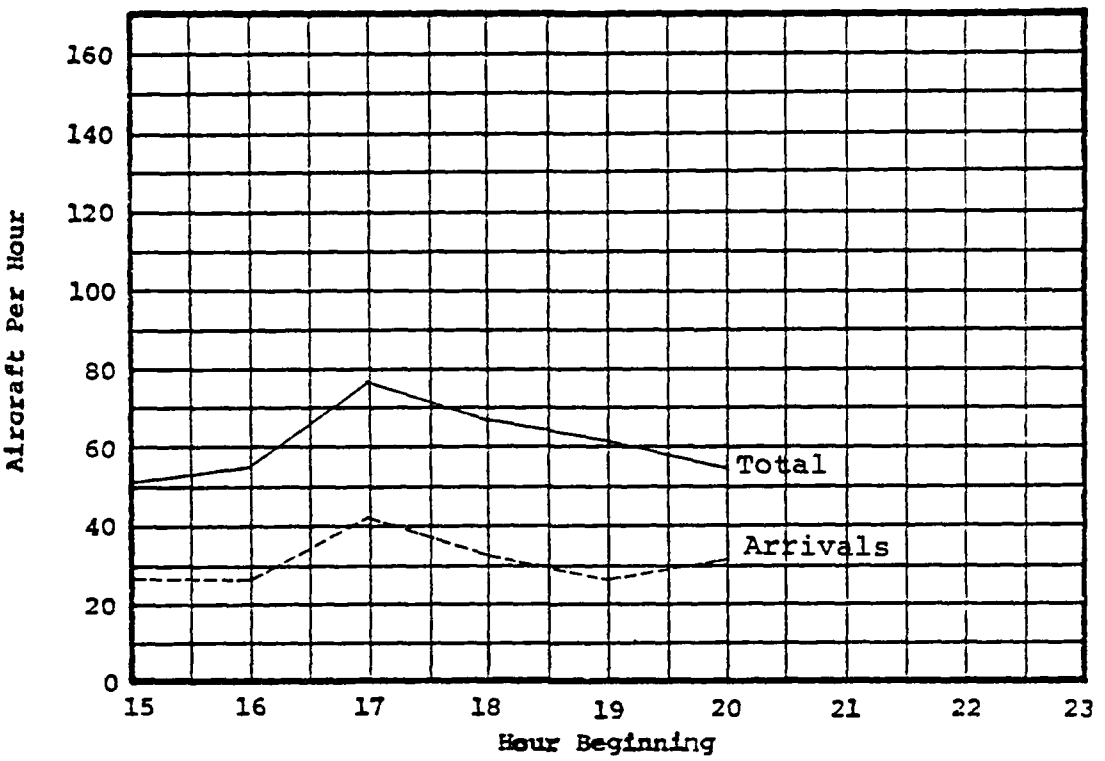
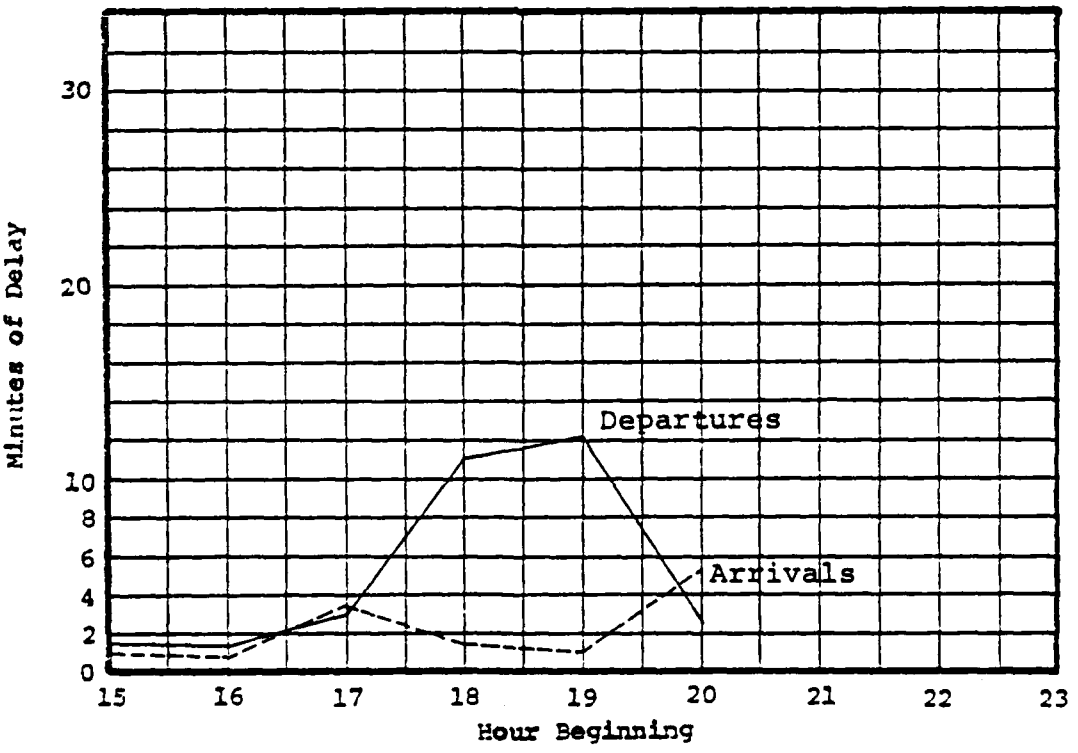


FIGURE 39B AVERAGE RUNWAY DELAYS



LGA STAGE - 2 EXPERIMENTS

Experiment No. 40

Objective:

To provide baseline delay estimates with 1987 demand, in IFR1 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
13	4

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours, and average values over the 6-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment	
			Average[a]	Peak[b]
Arrival	Flow Rate	a/c per hr.	31.5	42
Arrival	Air Delay	min.	2.9	4.9
Arrival	Taxi-In Delay	min.		0.0
Departure	Flow Rate	a/c per hr.	29.2	34
Departure	Runway Delay	min.	4.5	2.9
Departure	Taxi-Out Delay	min.		0.2

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 40A AVERAGE RUNWAY FLOW RATES

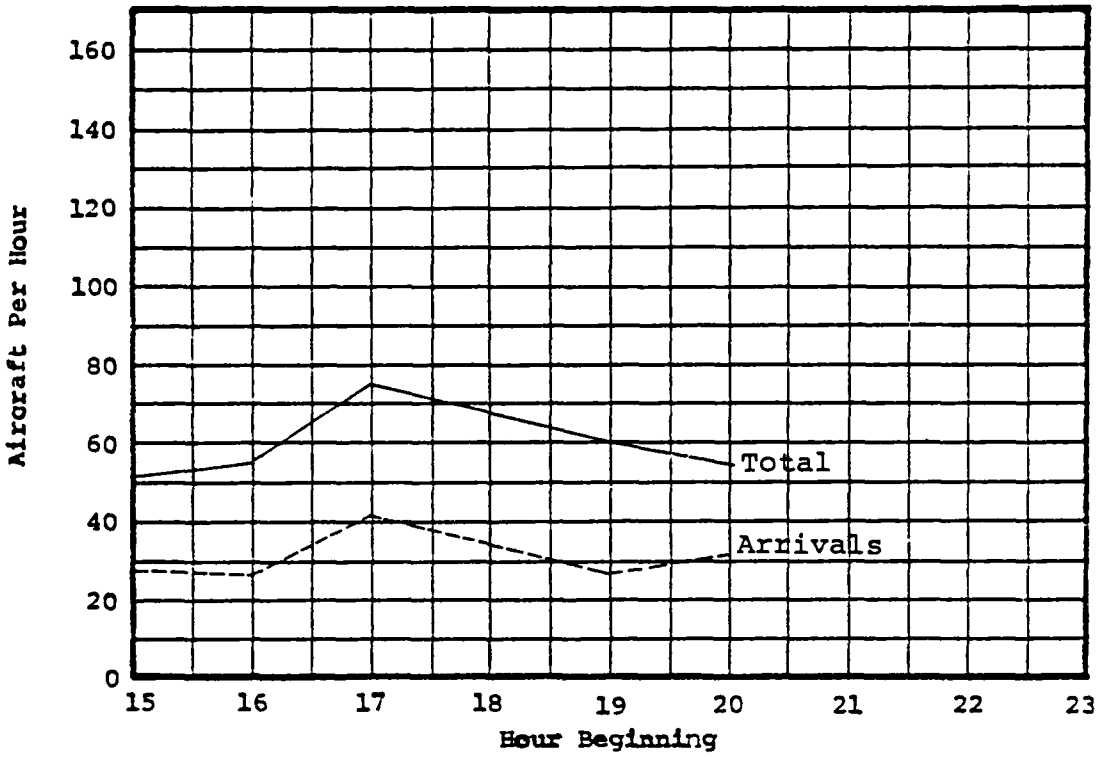
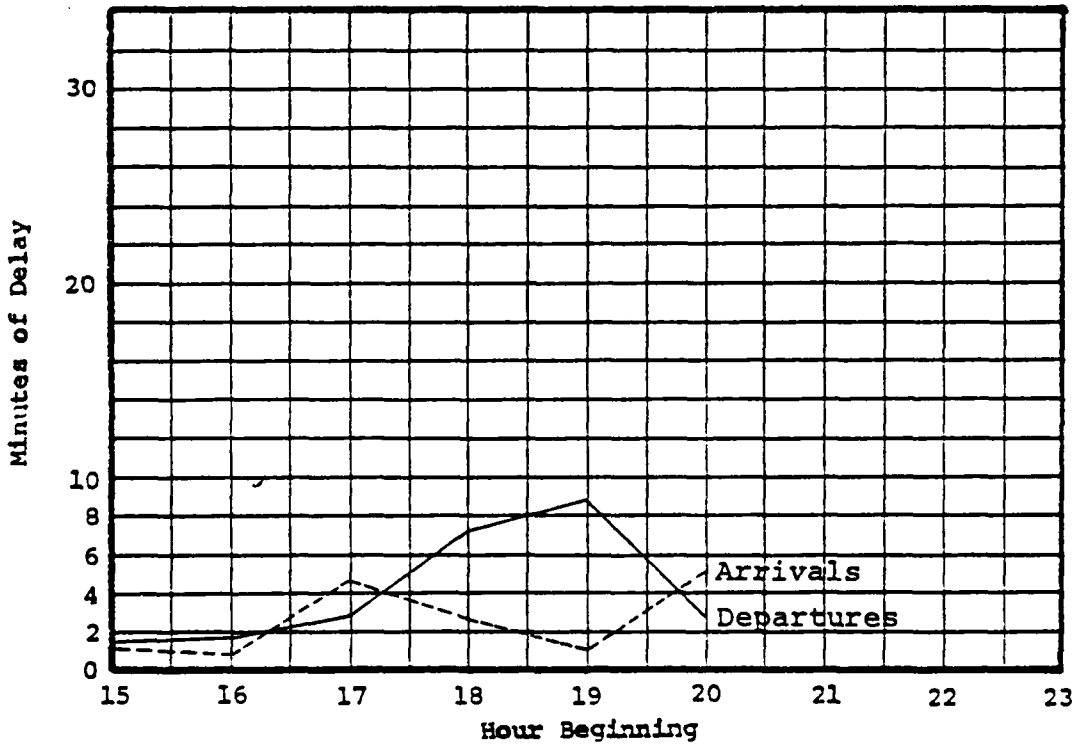


FIGURE 40B AVERAGE RUNWAY DELAYS



LGA STAGE - 2 EXPERIMENTS

Experiment No. 41

Objective:

To provide baseline delay estimates with 1987 demand, in IFR2 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
22	13

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours, and average values over the 6-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	28.7	34
Arrival	Air Delay	min.	9.9	11.2
Arrival	Taxi-In Delay	min.		0.0
Departure	Flow Rate	a/c per hr.	25.7	25
Departure	Runway Delay	min.	16.7	16.6
Departure	Taxi-Out Delay	min.		0.2

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 41A AVERAGE RUNWAY FLOW RATES

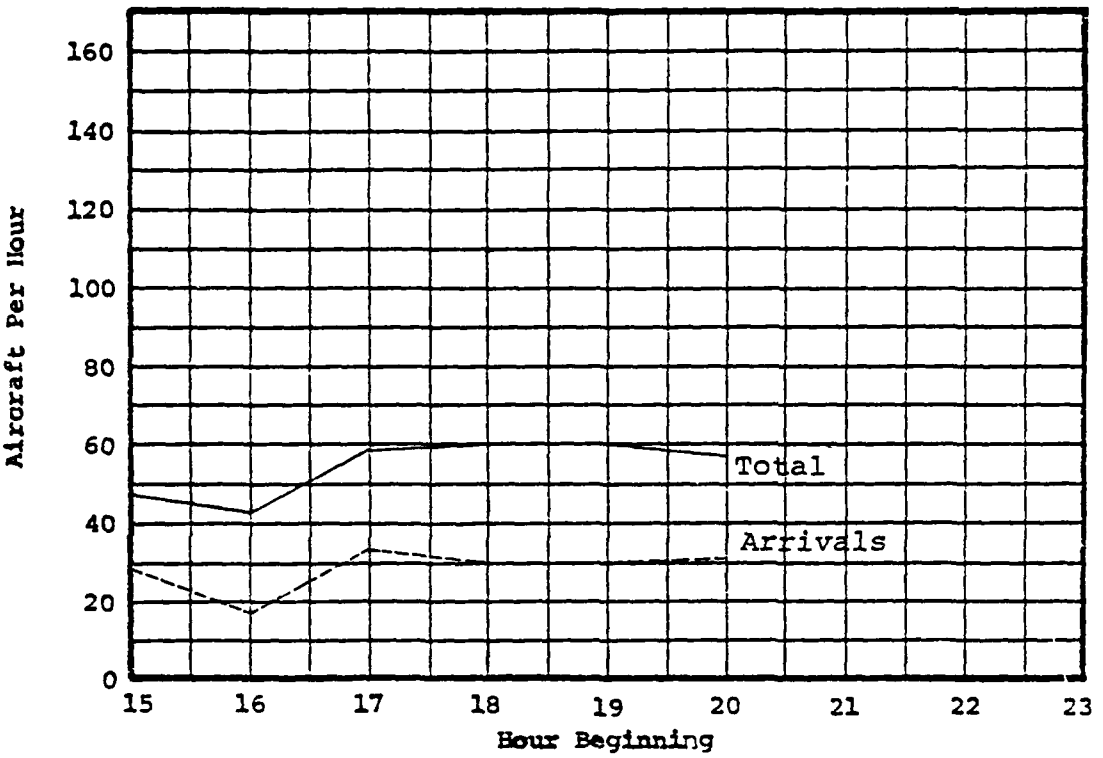
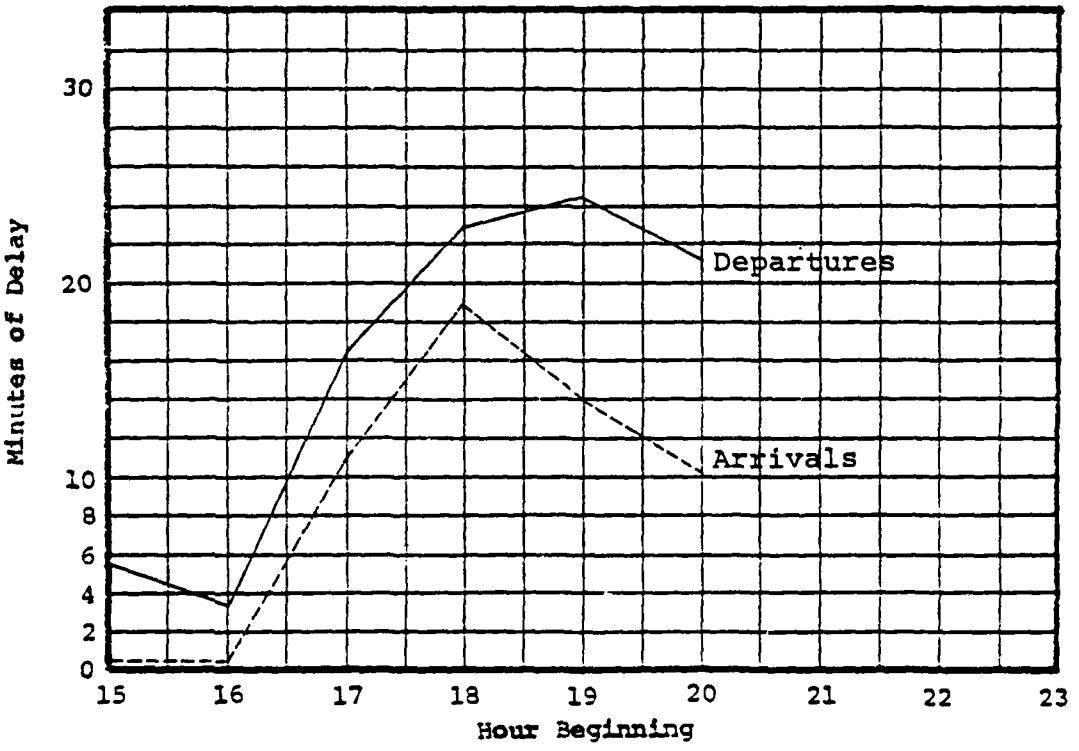


FIGURE 41B AVERAGE RUNWAY DELAYS



LGA STAGE - 2 EXPERIMENTS

Experiment No. 42

Objective:

To provide baseline delay estimates with 1978 demand, in VFR1 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
31	4

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours, and average values over the 6-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	29.5	37
Arrival	Air Delay	min.	28.3	16.7
Arrival	Taxi-In Delay	min.		0.1
Departure	Flow Rate	a/c per hr.	28.2	29
Departure	Runway Delay	min.	23.6	13.0
Departure	Taxi-Out Delay	min.		0.2

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 42A AVERAGE RUNWAY FLOW RATES

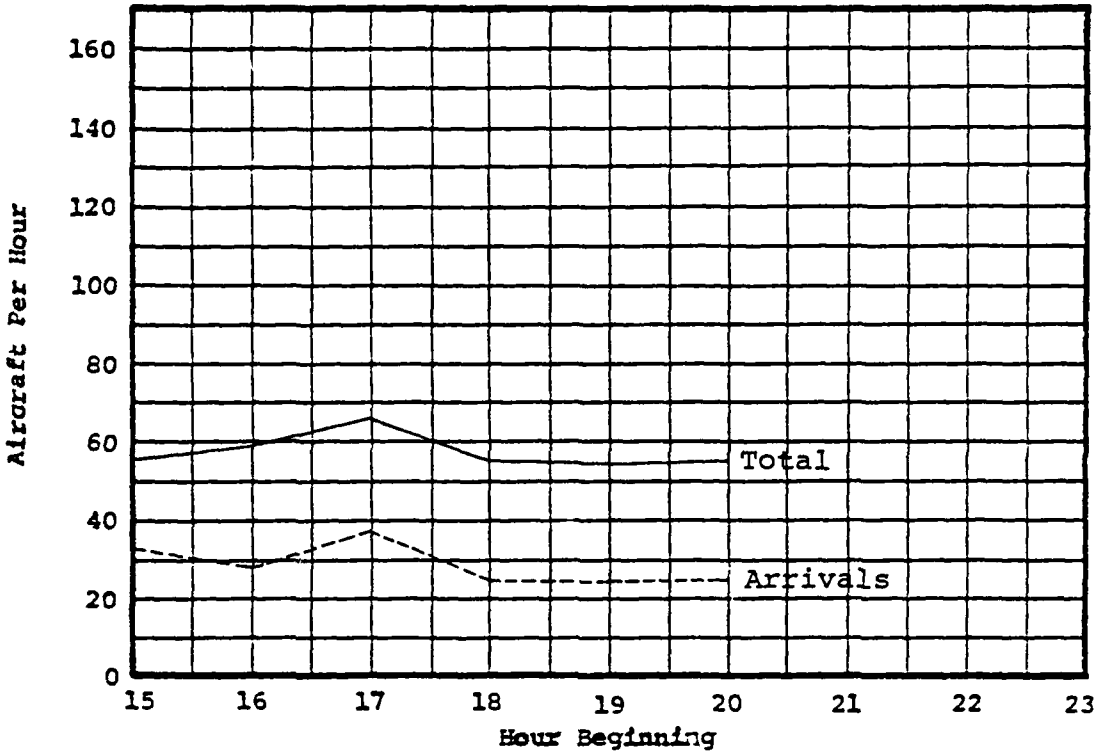
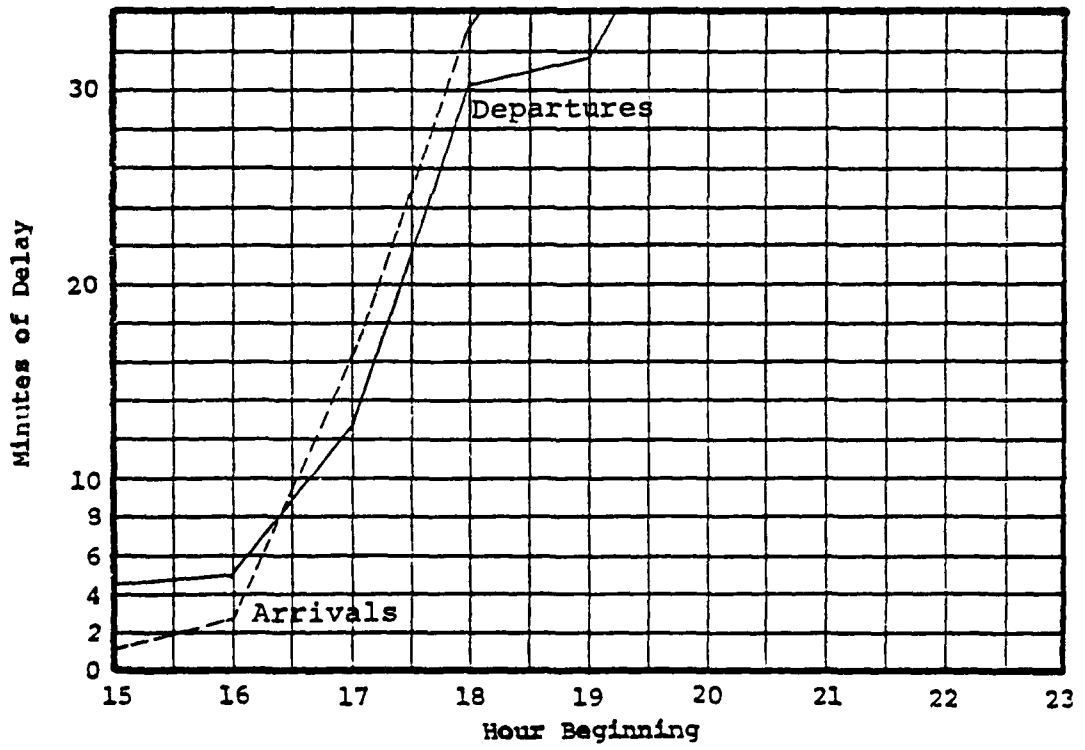


FIGURE 42B AVERAGE RUNWAY DELAYS



LGA STAGE - 2 EXPERIMENTS

Experiment No. 44

Objective:

To provide baseline delay estimates with 1987 demand, in VFR1 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
31	4

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours, and average values over the 6-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	31.5	43
Arrival	Air Delay	min.	2.3	3.6
Arrival	Taxi-In Delay	min.		0.1
Departure	Flow Rate	a/c per hr.	29.0	32
Departure	Runway Delay	min.	7.1	5.4
Departure	Taxi-Out Delay	min.		0.1

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 44A AVERAGE RUNWAY FLOW RATES

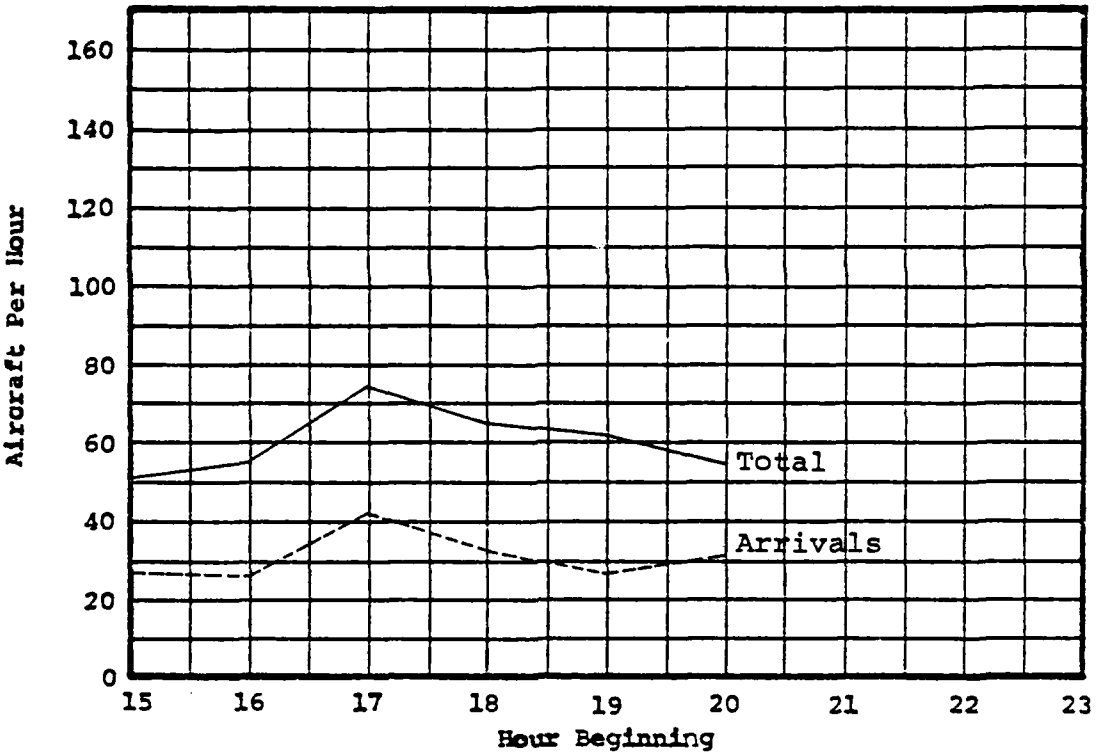
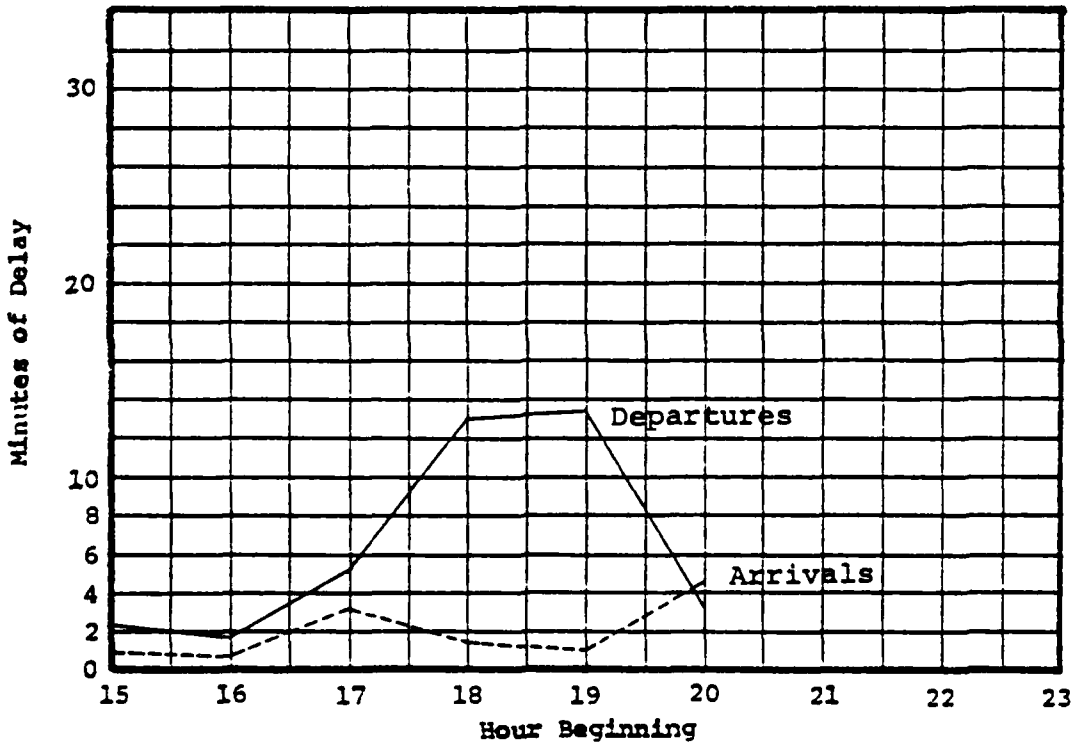


FIGURE 44B AVERAGE RUNWAY DELAYS



LGA STAGE - 2 EXPERIMENTS

Experiment No. 45

Objective:

To provide baseline delay estimates with 1978 demand, in VFR1 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
31	31

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours, and average values over the 6-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	30.7	33
Arrival	Air Delay	min.	31.8	22.7
Arrival	Taxi-In Delay	min.		0.0
Departure	Flow Rate	a/c per hr.	30.3	32
Departure	Runway Delay	min.	14.7	9.2
Departure	Taxi-Out Delay	min.		0.1

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 45A AVERAGE RUNWAY FLOW RATES

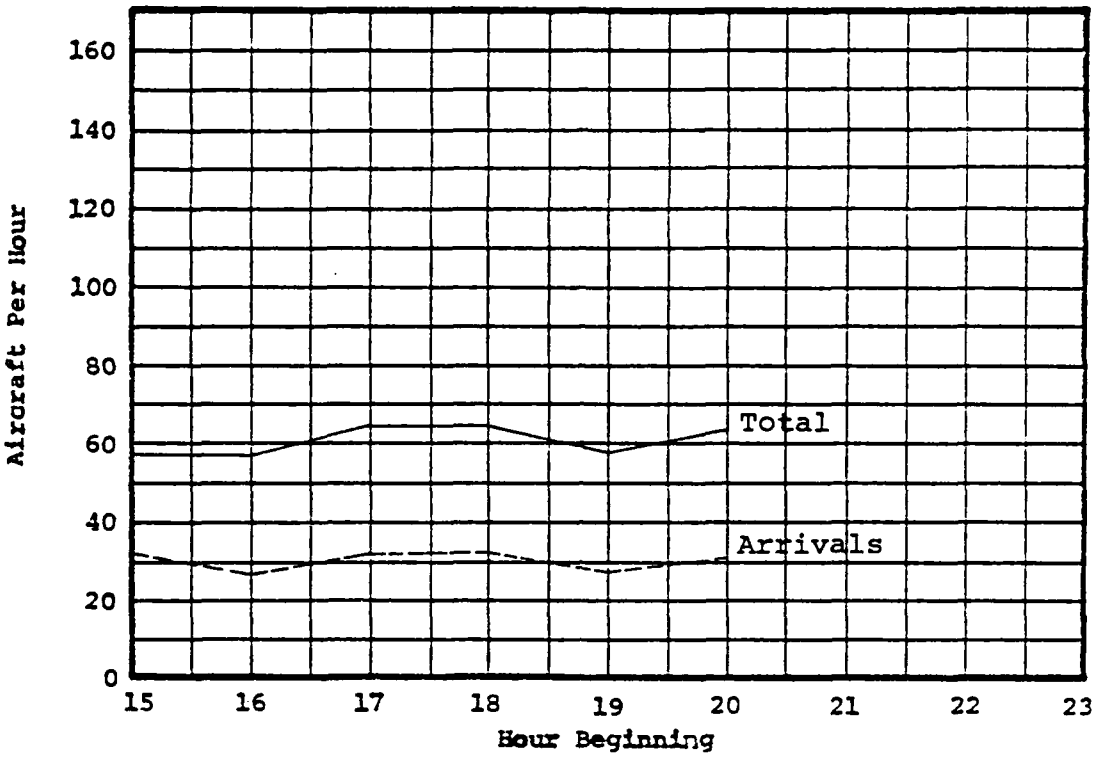
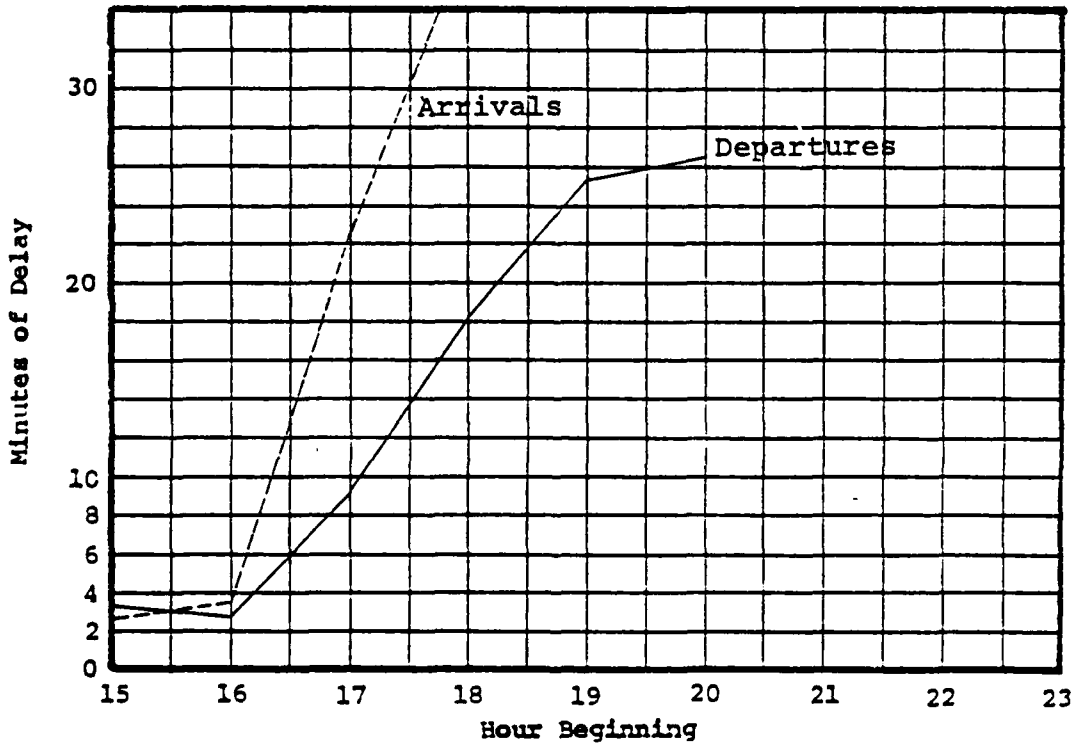


FIGURE 45B AVERAGE RUNWAY DELAYS



LGA STAGE - 2 EXPERIMENTS

Experiment No. 47

Objective:

To provide baseline delay estimates with 1987 demand, in VFR1 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
31	31

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours, and average values over the 6-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	31.5	38
Arrival	Air Delay	min.	5.7	8.8
Arrival	Taxi-In Delay	min.		0.0
Departure	Flow Rate	a/c per hr.	29.3	33
Departure	Runway Delay	min.	6.4	5.3
Departure	Taxi-Out Delay	min.		0.1

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 47A AVERAGE RUNWAY FLOW RATES

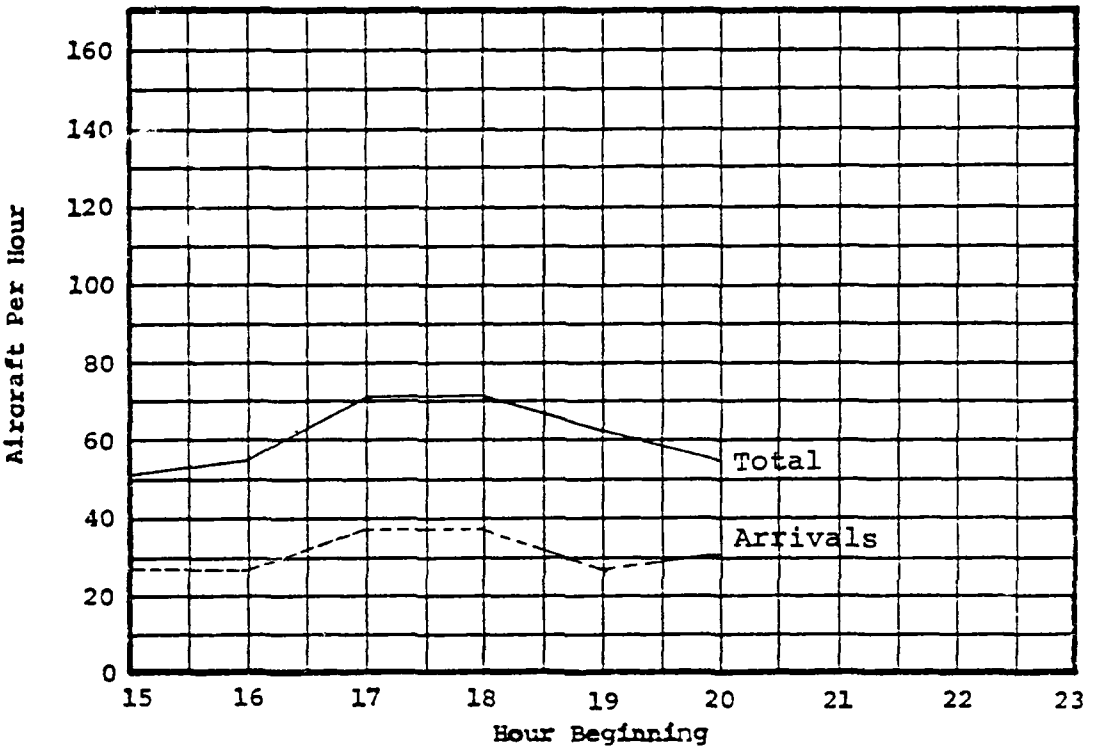
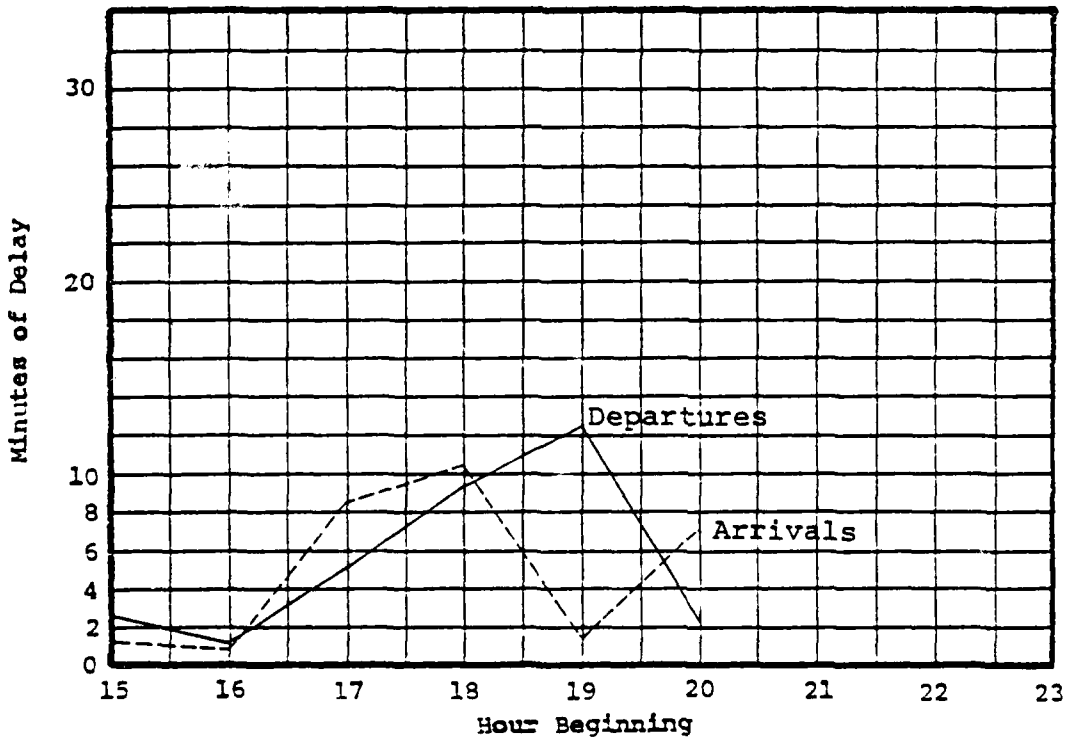


FIGURE 47B AVERAGE RUNWAY DELAYS



LGA STAGE - 2 EXPERIMENTS

Experiment No. 48

Objective:

To provide a sensitivity test on 1982-PNYNJ demand in IFR1 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
22	13

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours, and average values over the 6-hour simulation period.

Operation Type	*Performance* Measure	Units	1982-PNYNJ Average[a]	1982-PNYNJ Peak[b]	Experiment 32 Average[a]	Experiment 32 Peak[b]
Arrival	Flow Rate	a/c per hr.	28.3	30	29.0	31
Arrival	Air Delay	min.	18.8	19.0	19.3	16.4
Arrival	Taxi-In Delay	min.		0.0		0.0
Departure	Flow Rate	a/c per hr.	26.3	30	26.3	3.2
Departure	Runway Delay	min.	0.9	0.8	1.0	1.1
Departure	Taxi-Out Delay	min.		0.3		0.3

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 48a AVERAGE RUNWAY FLOW RATES

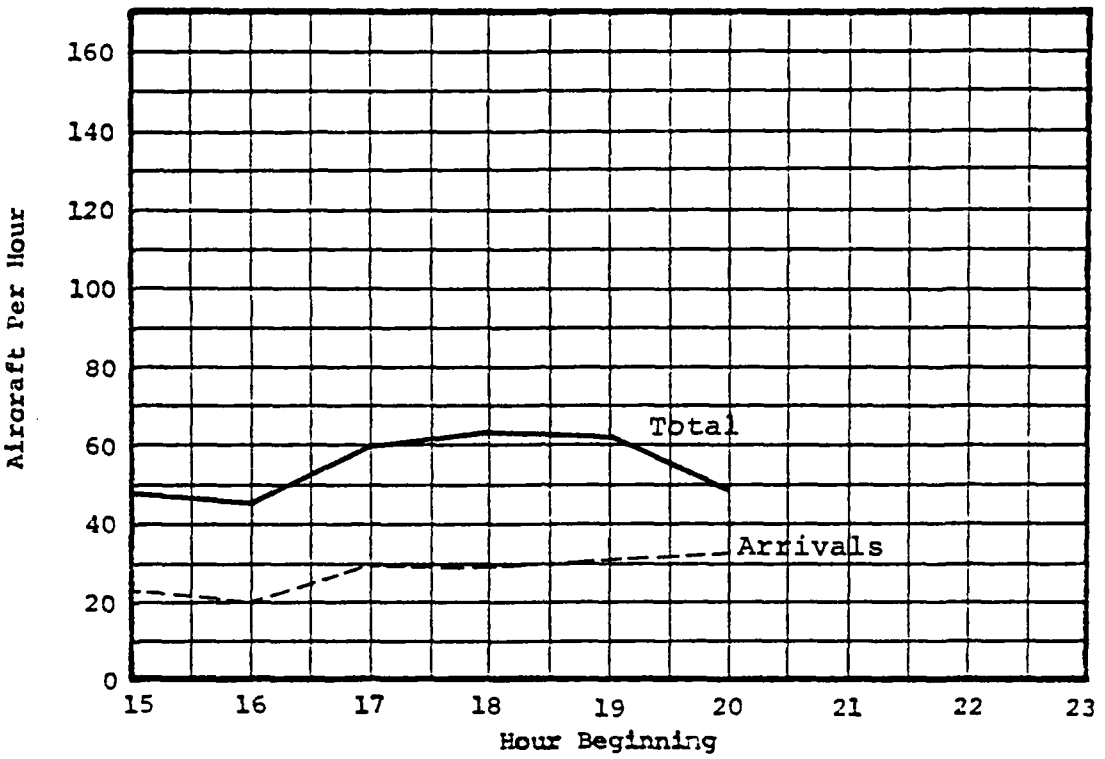
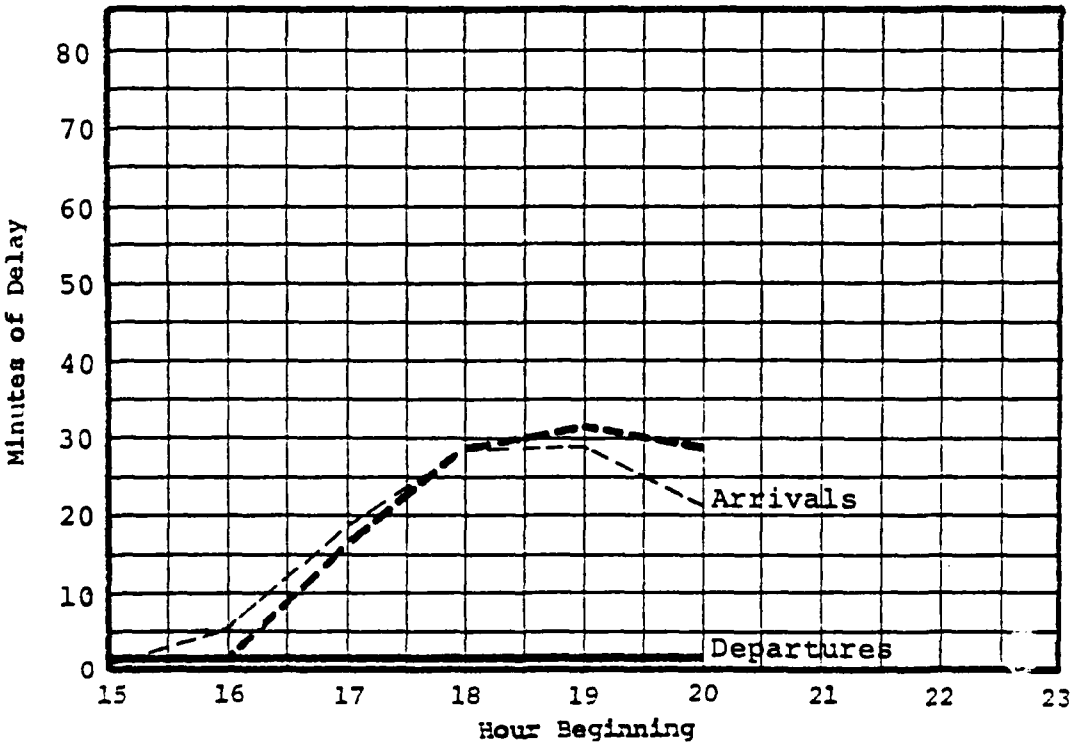


FIGURE 48b AVERAGE RUNWAY DELAYS



Experiment 32b Arrivals ----------
Departures ——————

LGA STAGE - 2 EXPERIMENTS

Experiment No. 49

Objective:

To provide a sensitivity test on 1987-PNYNJ demand in IFR1 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
22	13

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours, and average values over the 6-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment		Experiment 38	
			Average[a]	Peak[b]	Average[a]	Peak[b]
Arrival	Flow Rate	a/c per hr.	26.8	37	31.5	41
Arrival	Air Delay	min.	1.1	1.6	3.0	5.2
Arrival	Taxi-In Delay	min.		0.0		0.0
Departure	Flow Rate	a/c per hr.	25.2	29	29.3	34
Departure	Runway Delay	min.	1.1	0.6	1.5	1.2
Departure	Taxi-Out Delay	min.		0.4		0.4

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 49A AVERAGE RUNWAY FLOW RATES

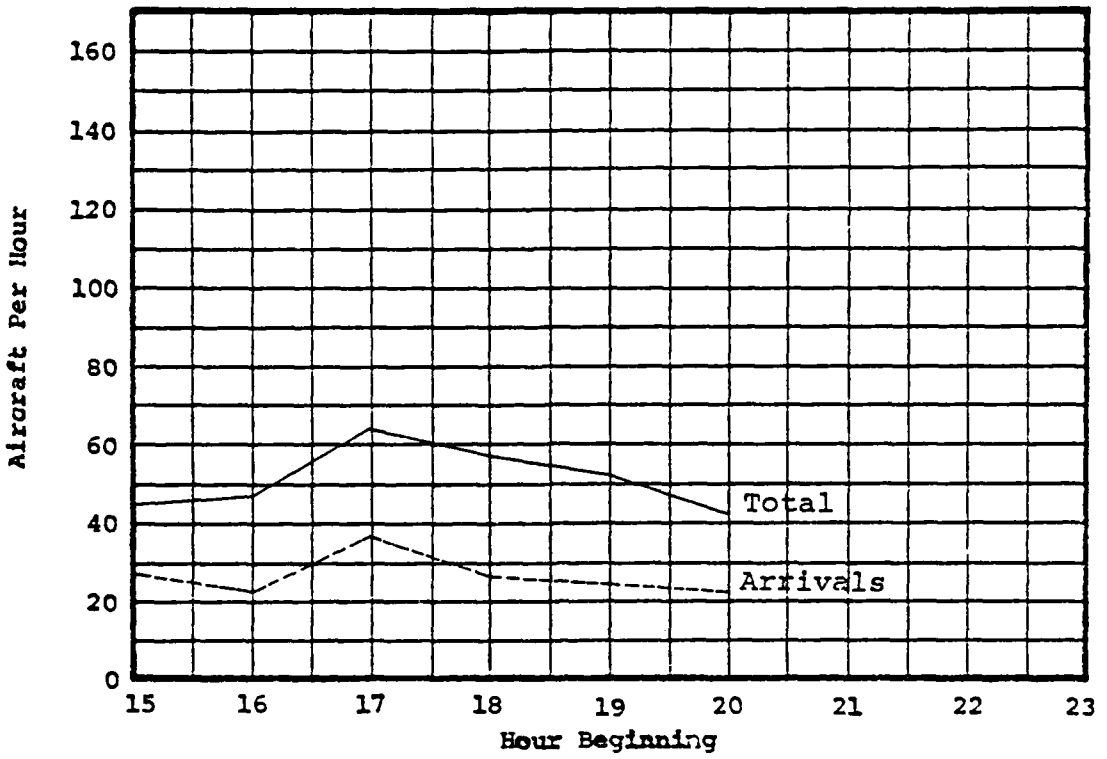
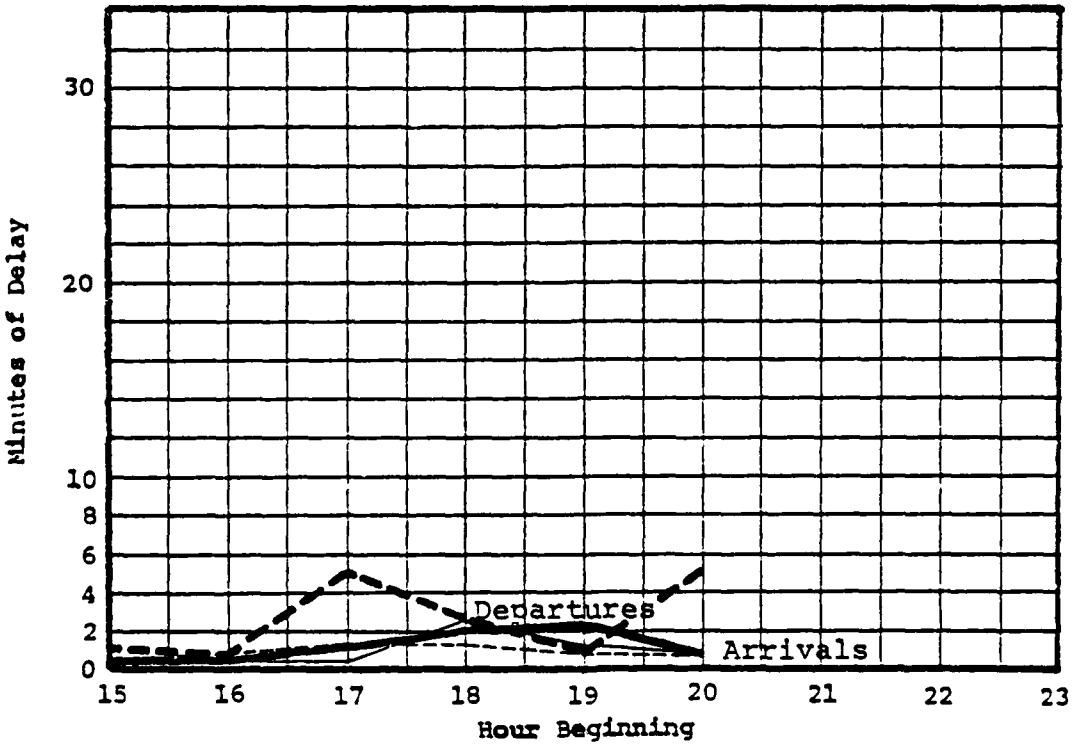


FIGURE 49B AVERAGE RUNWAY DELAYS



LGA STAGE - 2 EXPERIMENTS

Experiment No. 50

Objective:

To provide a sensitivity test on 1982 demand with the August 1978 level of general aviation operations in IFR1 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
22	13

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours, and average values over the 6-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment		Experiment 32	
			Average[a]	Peak[b]	Average[a]	Peak[b]
Arrival	Flow Rate	a/c per hr.	29.8	31	29.0	31
Arrival	Air Delay	min.	29.5	20.8	19.3	16.4
Arrival	Taxi-In Delay	min.		0.0		0.0
Departure	Flow Rate	a/c per hr.	31.3	34	27.7	32
Departure	Runway Delay	min.	1.0	1.1	1.0	1.1
Departure	Taxi-Out Delay	min.		0.3		0.3

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 50a AVERAGE RUNWAY FLOW RATES

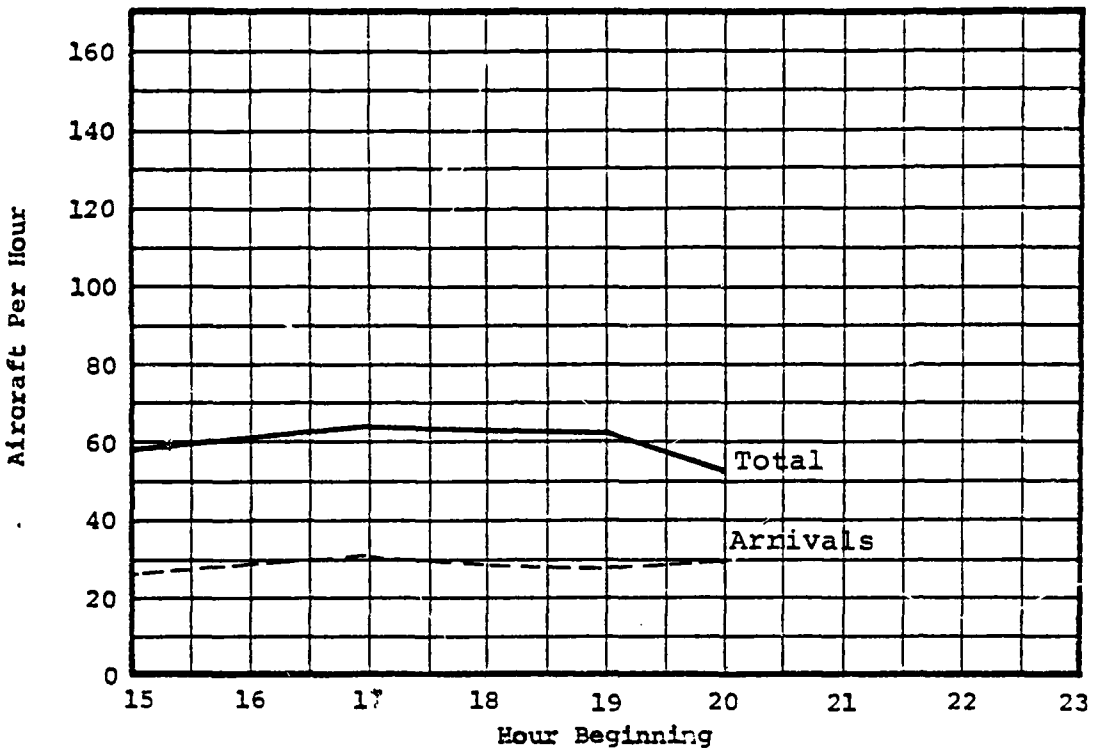
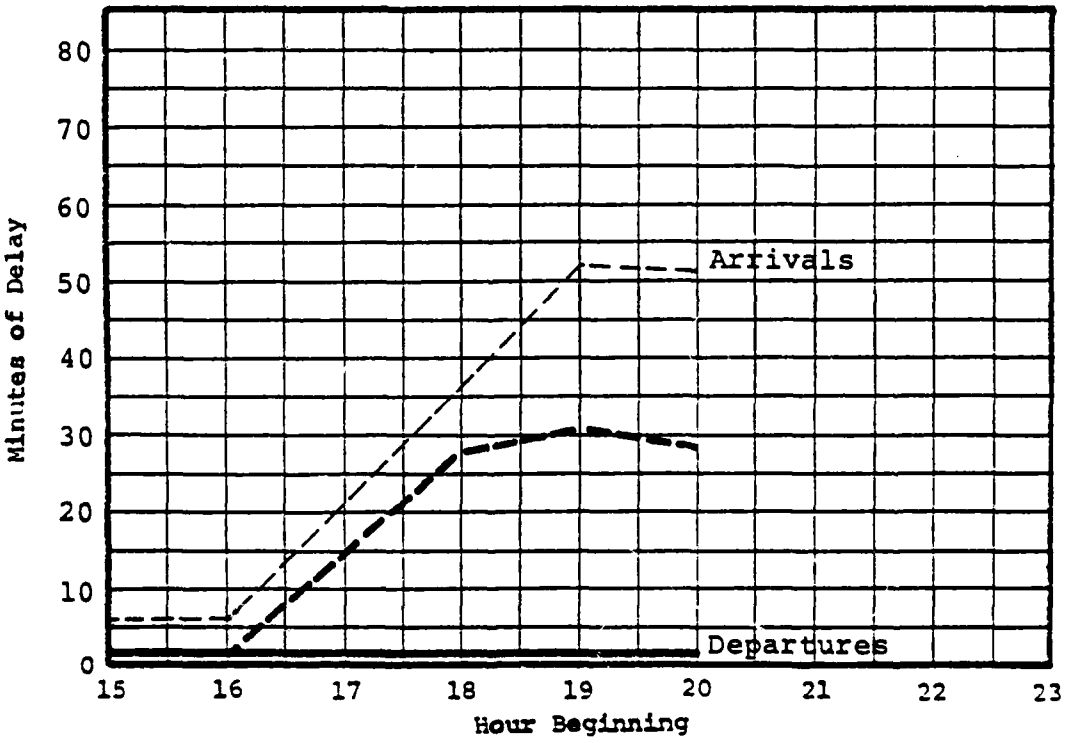


FIGURE 50b AVERAGE RUNWAY DELAYS



Experiment 32b Arrivals ----------
Departures ——————

LGA STAGE - 2 EXPERIMENTS

Experiment No. 51

Objective:

To provide a sensitivity test on 1987 demand with the August 1978 level of general aviation operations in IFR1 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
22	13

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours, and average values over the 6-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment		Experiment 38	
			Average[a]	Peak[b]	Average[a]	Peak[b]
Arrival	Flow Rate	a/c per hr.	36.3	41	31.5	41
Arrival	Air Delay	min.	4.4	7.7	3.0	5.2
Arrival	Taxi-In Delay	min.		0.0		0.0
Departure	Flow Rate	a/c per hr.	32.8	37	29.3	34
Departure	Runway Delay	min.	1.6	1.2	1.5	1.2
Departure	Taxi-Out Delay	min.		0.5		0.4

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 51a AVERAGE RUNWAY FLOW RATES

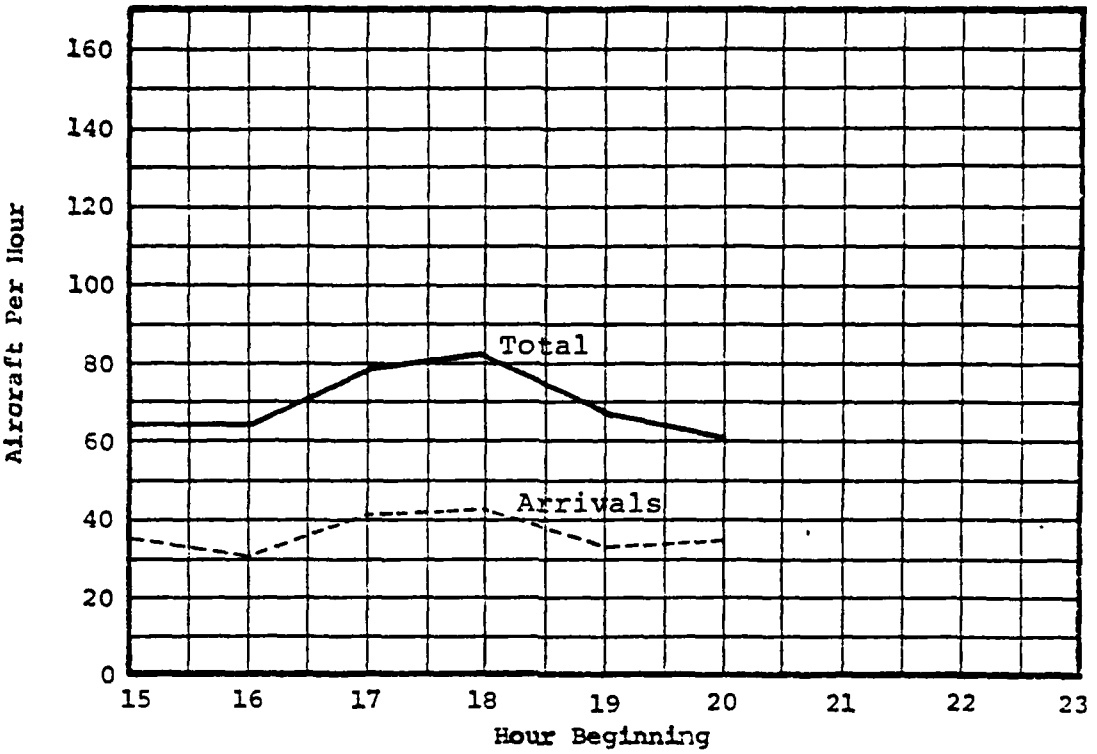
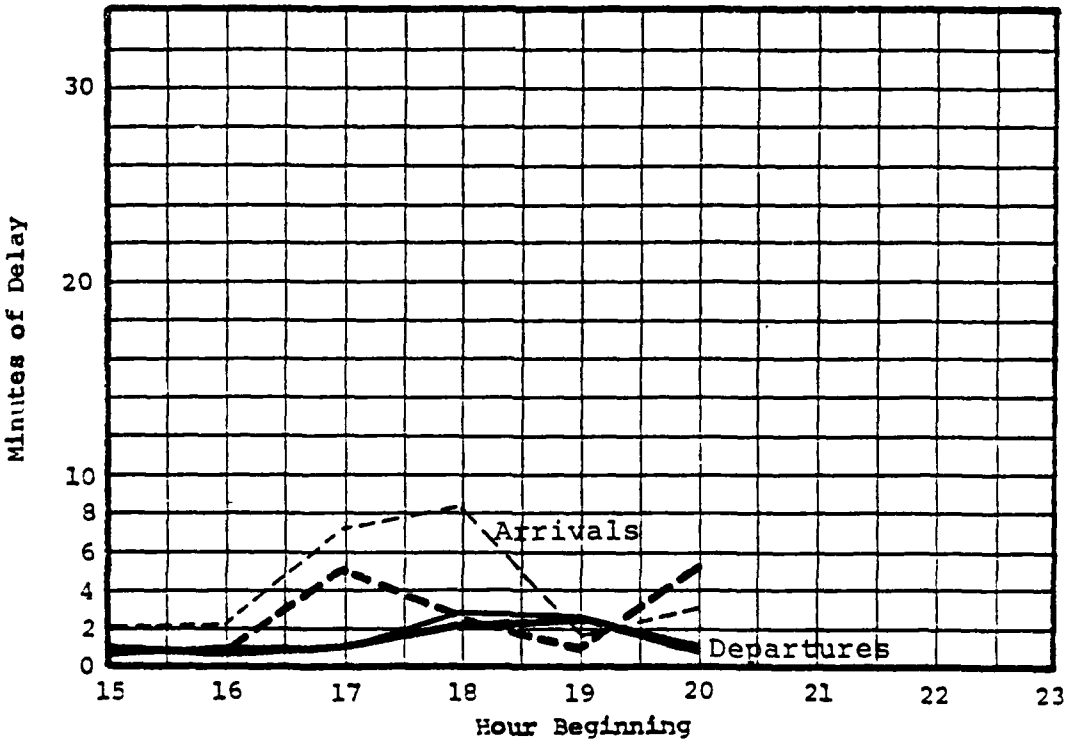


FIGURE 51b AVERAGE RUNWAY DELAYS



LGA STAGE - 2 EXPERIMENTS

Experiment No. 52

Objective:

To provide a sensitivity test on 1982 demand with the 1978 ATC Scenario (separations) in IFR1 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
22	13

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours, and average values over the 6-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment		Experiment 32	
			Average[a]	Peak[b]	Average[a]	Peak[b]
Arrival	Flow Rate	a/c per hr.	28.5	30	29.0	31
Arrival	Air Delay	min.	22.0	17.6	19.3	16.4
Arrival	Taxi-In Delay	min.		0.0		0.0
Departure	Flow Rate	a/c per hr.	27.5	33	27.7	32
Departure	Runway Delay	min.	0.9	1.0	1.0	1.1
Departure	Taxi-Out Delay	min.		0.4		0.3

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 52a AVERAGE RUNWAY FLOW RATES

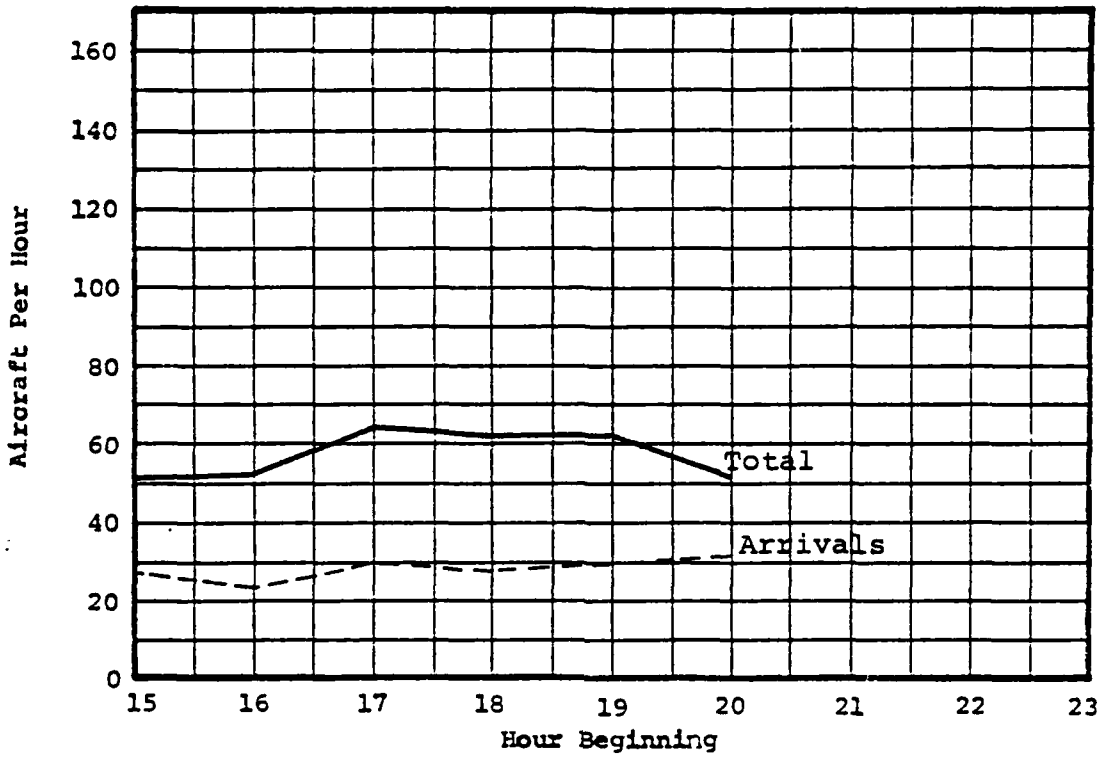
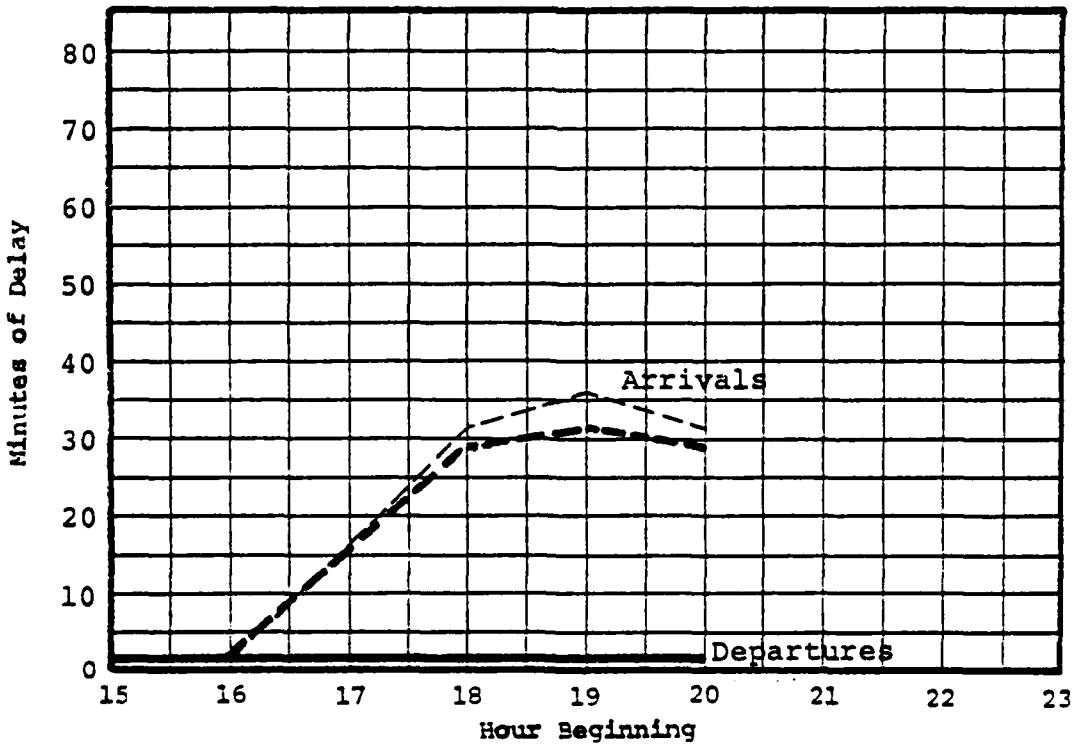


FIGURE 52b AVERAGE RUNWAY DELAYS



Experiment 32b Arrivals ----------
Departures ——————

LGA STAGE - 2 EXPERIMENTS

Experiment No. 53

Objective:

To provide a sensitivity test on 1987 demand with the 1978 ATC Scenario (separations) in IFR1 conditions, for the following runway-use configuration:

Arrival Runway	Departure Runways
22	13

Length and Level of Detail of Simulation Run:

From 1500 to 2100 with 1-hour summaries and a short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1700-1800 hours, and average values over the 6-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment		Experiment 38	
			Average[a]	Peak[b]	Average[a]	Peak[b]
Arrival	Flow Rate	a/c per hr.	28.7	29	31.5	41
Arrival	Air Delay	min.	24.3	17.9	3.0	5.2
Arrival	Taxi-In Delay	min.		0.0		0.0
Departure	Flow Rate	a/c per hr.	28.3	33	29.3	34
Departure	Runway Delay	min.	1.0	1.2	1.5	1.2
Departure	Taxi-Out Delay	min.		0.4		0.4

a. Average over the entire simulation period.
b. For the peak-demand hour, 1700-1800 hours, 3 hours into the simulation.

FIGURE 53a AVERAGE RUNWAY FLOW RATES

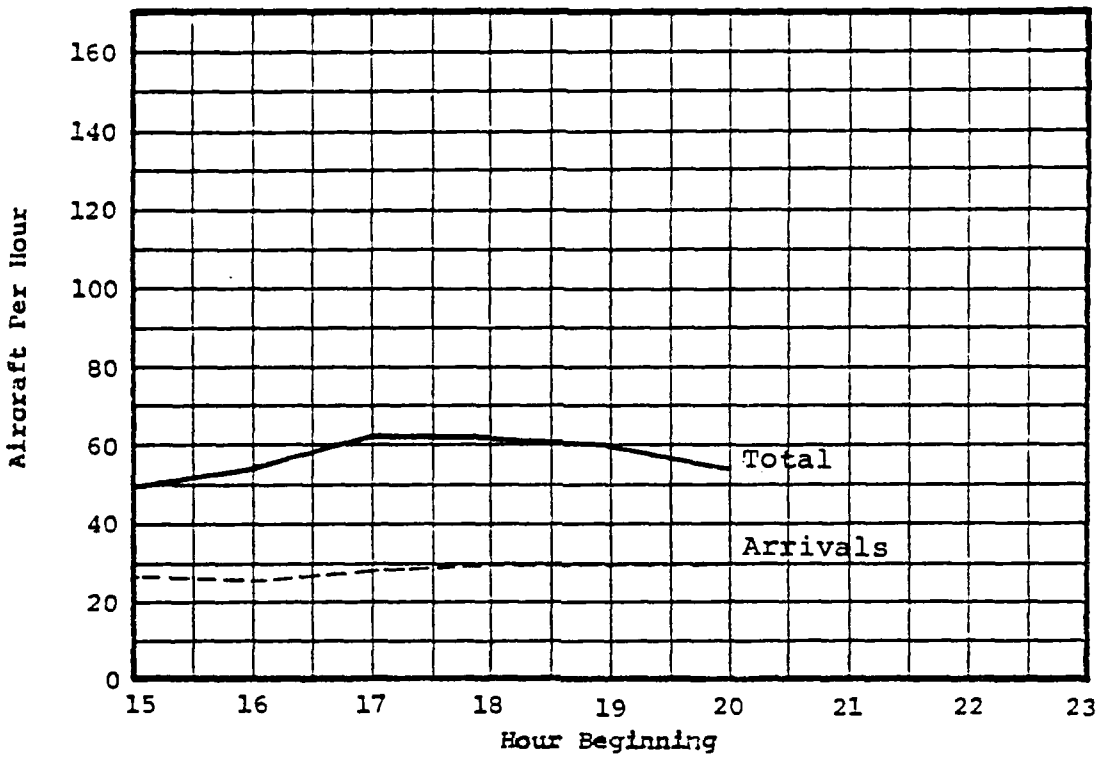
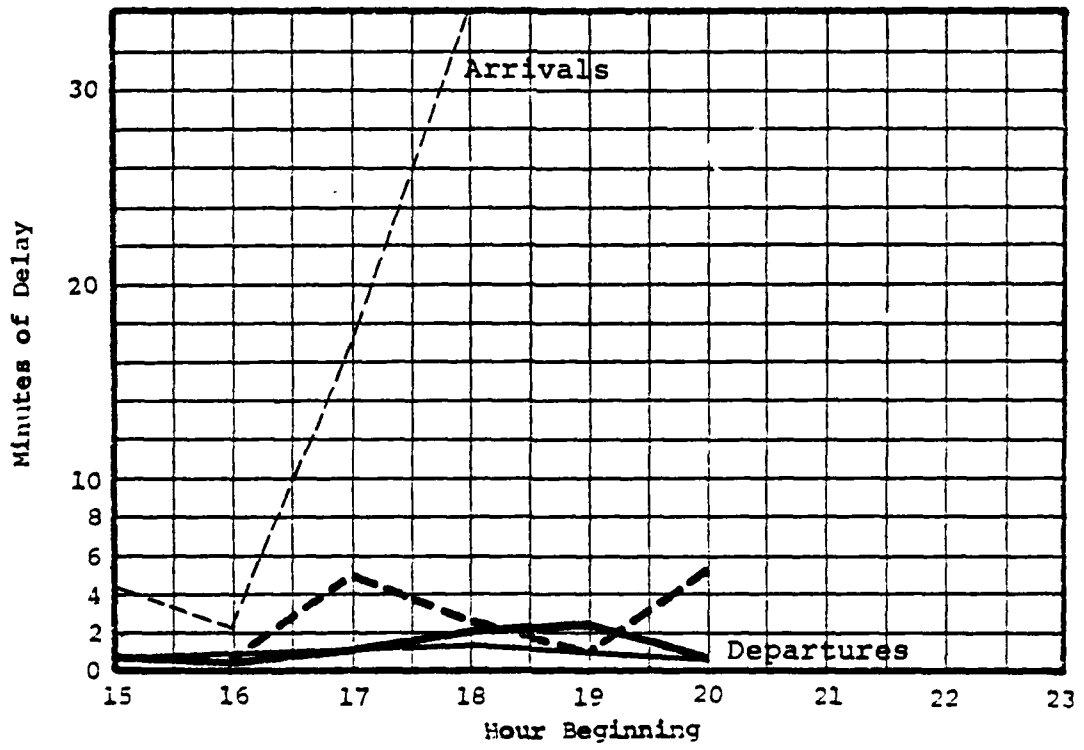


FIGURE 53b AVERAGE RUNWAY DELAYS



Experiment 38b Arrivals ----------
Departures ——————

Attachment B

LGA STAGE-2 SIMULATION EXPERIMENTS INPUT SCHEDULES (Hourly Demand by Class and by Operation) and SHORT-FORM AIRFIELD NETWORKS

LaGuardia Airport

New York

Airport Improvement Task Force Delay Studies

Peat, Marwick, Mitchell & Co.
San Francisco, California

June 1979

Table B-1 (a)

HOURLY DEMAND IN 1977 BY CLASS OF OPERATION
NEW YORK TASK FORCE DELAY STUDIES
LaGuardia Airport

Hour	No. of Aircraft By Class A	B	C	D	Total Operations	OAG Scheduled	General Aviation
1500-1600	2	21	39	0	62	44	18
1600-1700	3	23	46	2	74	54	20
1700-1800	2	26	48	3	79	59	20
1800-1900	4	27	41	4	76	59	17
1900-2000	3	21	44	2	70	57	13
2000-2100	2	20	36	2	60	48	12
Totals	16	138	254	13	421	321	100
Percents	3.8	32.8	60.3	3.1	100		

Table B-1 (b)

ACTUAL PMS COUNTS OF OPERATIONS
AVERAGE WEEKDAY
LaGuardia Airport

Hour	August 1977 OAG Scheduled	General Aviation	Total	August 1978 OAG Scheduled	General Aviation	Total
1500-1600	44	16	60	47	21	68
1600-1700	51	16	67	55	19	74
1700-1800	55	17	72	59	20	79
1800-1900	58	15	73	55	17	72
1900-2000	66	12	78	62	12	74
2000-2100	45	11	56	43	13	56
Totals	319	87	406	321	102	423

Table B-2

HOURLY DEMAND IN 1982 BY CLASS OF OPERATION
NEW YORK TASK FORCE DELAY STUDIES
LaGuardia Airport

Hour	No. of Aircraft By Class A	B	C	D	Total Operations	OAG Scheduled	General Aviation
1500-1600	2	9	40	4	55	47	8
1600-1700	2	12	48	1	63	52	11
1700-1800	3	15	51	1	70	55	15
1800-1900	2	11	44	1	58	49	9
1900-2000	1	7	47	2	57	51	6
2000-2100	1	8	39	4	52	46	6
Totals	11	62	269	13	355	300	55
Percents	3.1	17.4	75.8	3.7	100		

Table B-3

HOURLY DEMAND IN 1987 BY CLASS OF OPERATION
NEW YORK TASK FORCE DELAY STUDIES
LaGuardia Airport

Hour	No. of Aircraft By Class A	B	C	D	Total Operations	OAG Scheduled	General Aviation
1500-1600	2	9	41	5	57	49	8
1600-1700	2	12	46	3	63	52	11
1700-1800	3	15	52	2	72	57	15
1800-1900	2	11	44	3	60	51	9
1900-2000	1	7	47	4	59	53	6
2000-2100	3	8	40	5	56	50	6
Totals	13	62	270	22	367	312	55
Percents	3.5	16.9	73.6	6.0	100		

Table B-4

HOURLY DEMAND IN 1982-PNYNJ (HEAVY SENSITIVITY)
BY CLASS OF OPERATION
NEW YORK TASK FORCE DELAY STUDIES
LaGuardia Airport

Hour	No. of Aircraft By Class				Total Operations	OAG Scheduled	General Aviation
	A	B	C	D			
1500-1600	2	9	31	10	52	44	8
1600-1700	2	12	43	2	59	48	11
1700-1800	3	15	46	3	67	52	15
1800-1900	2	11	40	2	55	46	9
1900-2000	1	7	41	5	54	48	6
2000-2100	1	8	30	10	49	43	6
Totals	11	62	231	32	336	281	55
Percents	3.3	18.4	68.8	9.5	100		

Table B-5

HOURLY DEMAND IN 1987-PNYNJ (HEAVY SENSITIVITY)
BY CLASS OF OPERATION
NEW YORK TASK FORCE DELAY STUDIES
LaGuardia Airport

Hour	No. of Aircraft By Class				Total Operations	OAG Scheduled	General Aviation
	A	B	C	D			
1500-1600	2	9	14	24	49	41	8
1600-1700	2	12	28	14	56	45	11
1700-1800	3	15	35	9	62	47	15
1800-1900	2	11	24	14	51	42	9
1900-2000	1	7	23	19	50	44	6
2000-2100	3	8	13	24	48	42	6
Totals	13	62	137	104	316	261	55
Percents	4.1	19.6	43.4	32.9	100		

Table B-6

HOURLY DEMAND IN 1982 (GA SENSITIVITY)
BY CLASS OF OPERATION
NEW YORK TASK FORCE DELAY STUDIES
LaGuardia Airport

Hour	No. of Aircraft By Class A	B	C	D	Total Operations	OAG Scheduled	General Aviation
1500-1600	5	19	40	4	68	47	21
1600-1700	4	18	48	1	71	52	19
1700-1800	4	19	51	1	75	55	20
1800-1900	4	17	44	1	66	49	17
1900-2000	3	11	47	2	63	51	12
2000-2100	3	13	39	4	59	46	13
Totals	23	97	269	13	402	300	102
Percents	5.7	24.1	66.9	3.3	100		

Table B-7

HOURLY DEMAND IN 1987 (GA SENSITIVITY)
BY CLASS OF OPERATION
NEW YORK TASK FORCE DELAY STUDIES
LaGuardia Airport

Hour	No. of Aircraft By Class				Total Operations	OAG Scheduled	General Aviation
	A	B	C	D			
1500-1600	5	19	41	5	70	49	21
1600-1700	4	18	46	3	71	52	19
1700-1800	4	19	52	2	77	57	20
1800-1900	4	17	44	3	68	51	17
1900-2000	3	11	47	4	65	53	12
2000-2100	4	14	40	5	63	50	13
Totals	24	98	270	22	414	312	102
Percents	5.8	23.7	65.2	5.3	100		

PEAT, MARWICK, MITCHELL & CO.
P. O. BOX 8007
SAN FRANCISCO INTERNATIONAL AIRPORT
SAN FRANCISCO, CALIFORNIA 94128

Telephone: (415) 347-9521

June 15, 1979

Mr. Michael M. Scott, ATF-4
Federal Aviation Administration
800 Independence Avenue, S.W.
Washington, D.C. 20591

Re: New York Data Package No. 6, June 1979

Dear Mike:

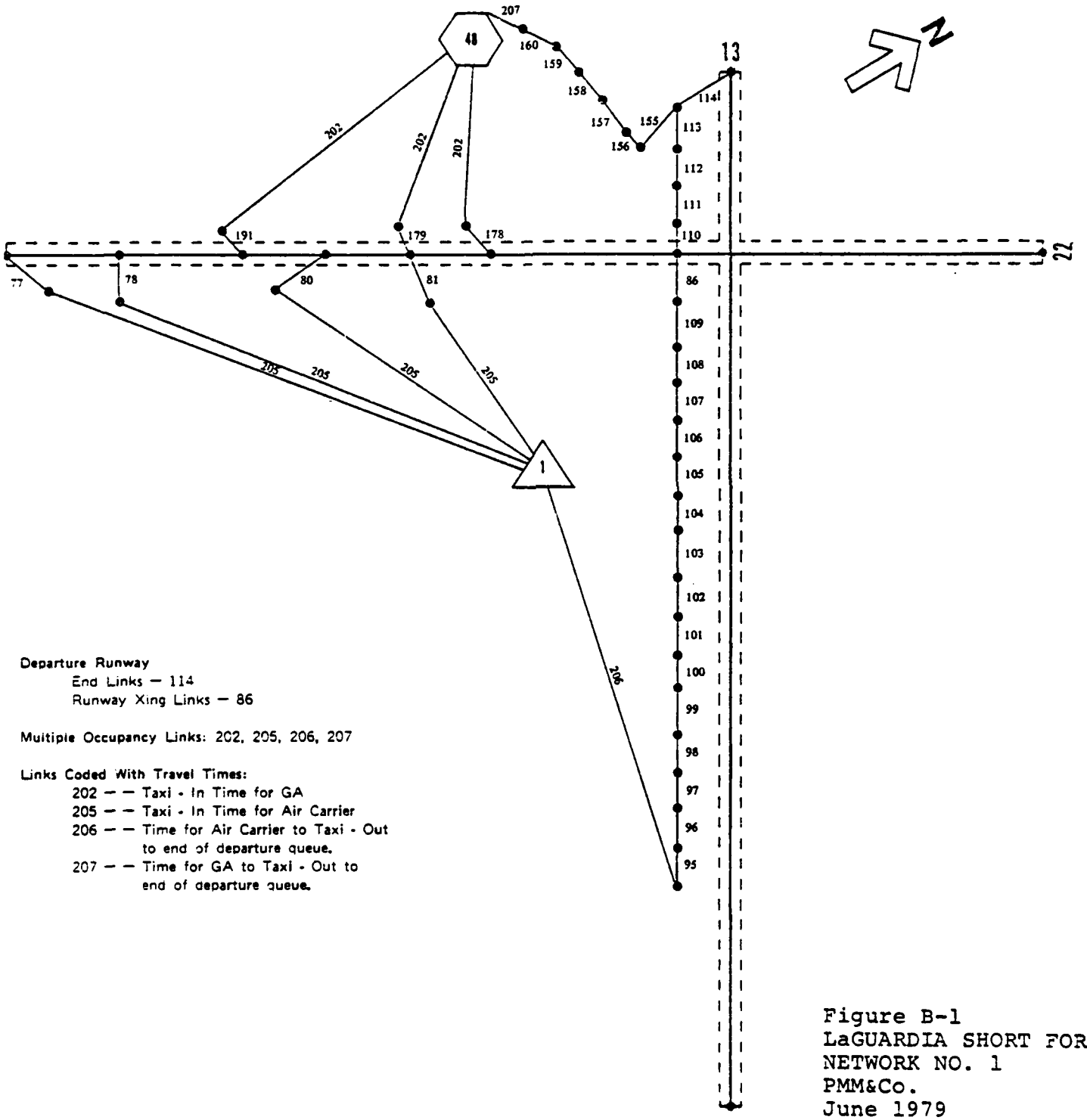
Attached is New York Data Package No. 6. The material in this Data Package is organized to correspond with the agenda for the June 22, 1979, meeting of the New York Task Force:

- Attachment A contains the LGA simulation results and graphics, minus the west-taxiway experiments
- Attachment B has the LGA demand inputs and the short-form networks
- Attachment C presents the JFK simulation results and graphics
- Attachment D contains the JFK demand inputs and short-form networks
- Attachments E and F present the aircraft separations used in the simulations for LGA and JFK, respectively

A brief summary of the highlights and conclusions of the LGA and JFK simulations is presented at the beginning of the Data Package.

A supplement to this Data Package, which contains the results of the LGA west-taxiway experiments and annual delay results, will be presented at the June 22 meeting.

LA GUARDIA AIRPORT
Stage - 2 Experiments 31, 32, 36, 37, 38, and 41
Arrivals — Runway 22
Departures — Runway 13



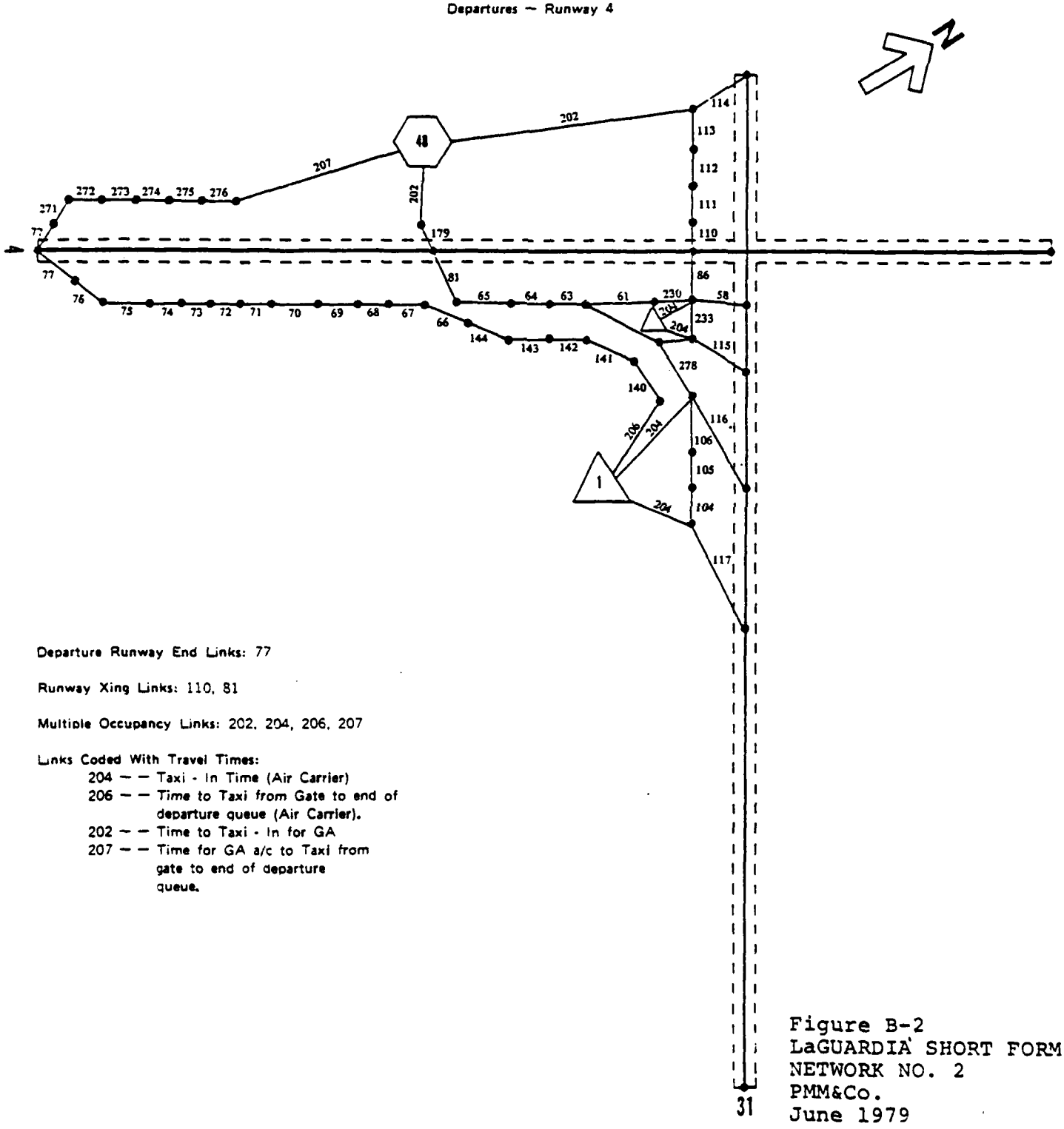
Departure Runway
End Links — 114
Runway Xing Links — 86

Multiple Occupancy Links: 202, 205, 206, 207

Links Coded With Travel Times:
202 — — Taxi - In Time for GA
205 — — Taxi - In Time for Air Carrier
206 — — Time for Air Carrier to Taxi - Out to end of departure queue.
207 — — Time for GA to Taxi - Out to end of departure queue.

Figure B-1
LaGUARDIA SHORT FORM
NETWORK NO. 1
PMM&Co.
June 1979

LA GUARDIA AIRPORT
Stage - 2 Experiments 42 and 44
Arrivals — Runway 31
Departures — Runway 4



Departure Runway End Links: 77

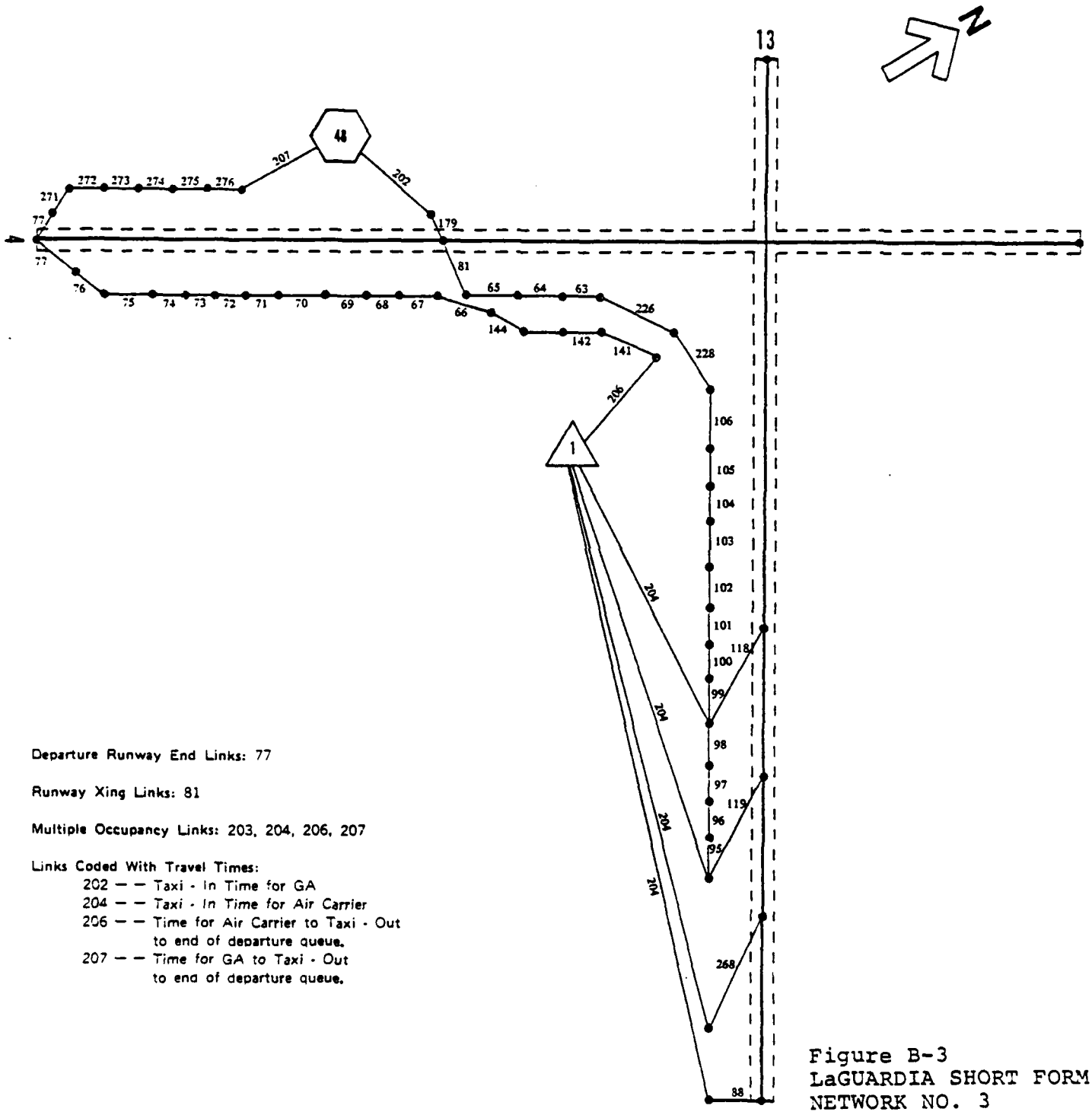
Runway Xing Links: 110, 81

Multiple Occupancy Links: 202, 204, 206, 207

Links Coded With Travel Times:
- 204 — — Taxi - In Time (Air Carrier)
- 206 — — Time to Taxi from Gate to end of departure queue (Air Carrier).
- 202 — — Time to Taxi - In for GA
- 207 — — Time for GA a/c to Taxi from gate to end of departure queue.

Figure B-2
LaGUARDIA SHORT FORM
NETWORK NO. 2
PMM&Co.
June 1979

LA GUARDIA AIRPORT
Stage - 2Experiments 33, 34, 35, 39, and 40
Arrivals — Runway 13
Departures — Runway 4



Departure Runway End Links: 77

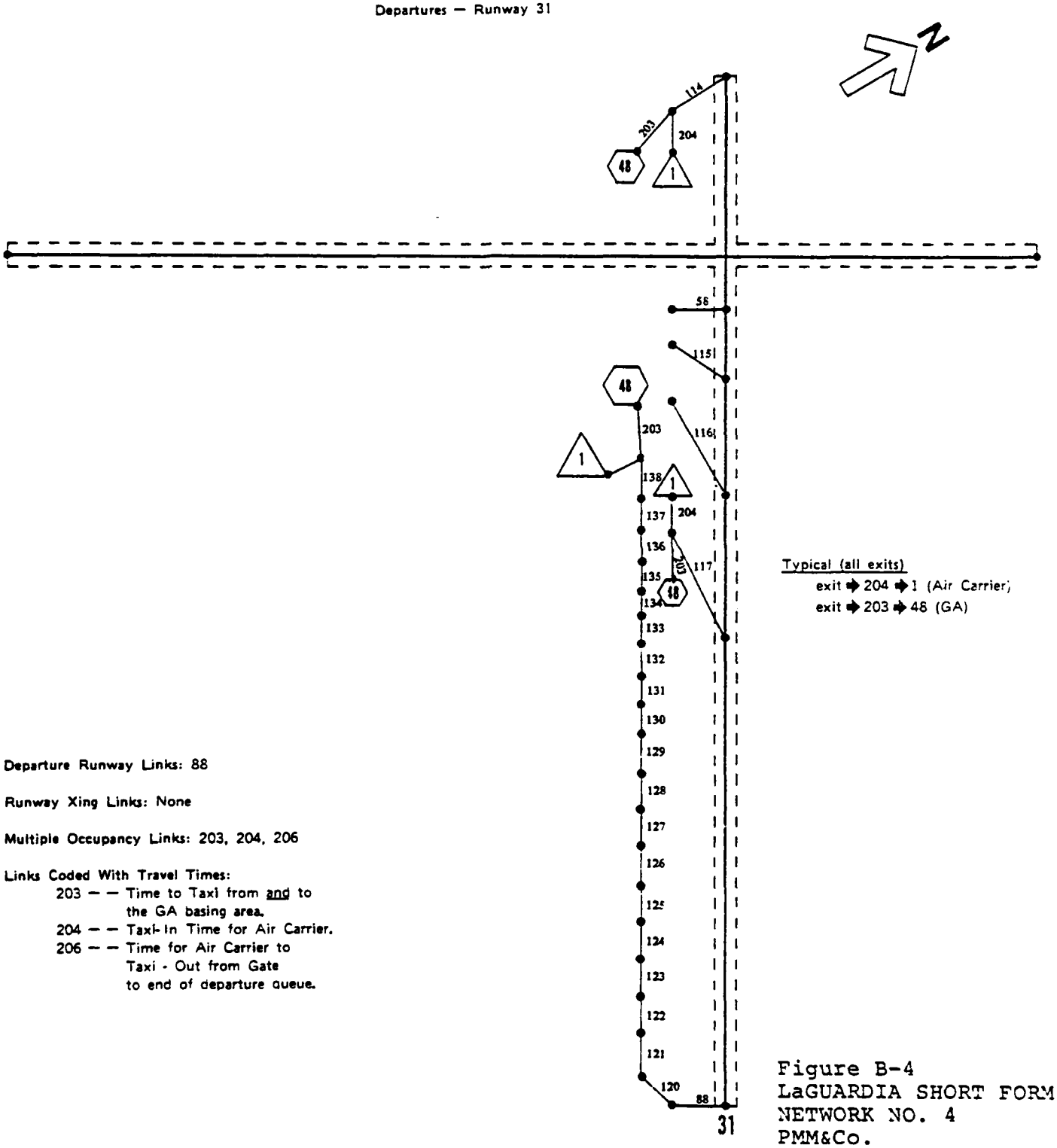
Runway Xing Links: 81

Multiple Occupancy Links: 203, 204, 206, 207

Links Coded With Travel Times:
202 — — Taxi - In Time for GA
204 — — Taxi - In Time for Air Carrier
206 — — Time for Air Carrier to Taxi - Out to end of departure queue.
207 — — Time for GA to Taxi - Out to end of departure queue.

Figure B-3
LaGUARDIA SHORT FORM
NETWORK NO. 3
PMM&Co.
June 1979

LA GUARDIA AIRPORT
Stage - 2 Experiments 45 and 47
Arrivals — Runway 31
Departures — Runway 31



Typical (all exits)
exit ➡ 204 ➡ 1 (Air Carrier)
exit ➡ 203 ➡ 48 (GA)

Departure Runway Links: 88

Runway Xing Links: None

Multiple Occupancy Links: 203, 204, 206

Links Coded With Travel Times:
203 — — Time to Taxi from and to the GA basing area.
204 — — Taxi-In Time for Air Carrier.
206 — — Time for Air Carrier to Taxi - Out from Gate to end of departure queue.

Figure B-4
LaGUARDIA SHORT FORM
NETWORK NO. 4
PMM&Co.
June 1979

Attachment C

JFK STAGE-2 SIMULATION EXPERIMENTS RESULTS AND GRAPHICS

John F. Kennedy International Airport

New York

Airport Improvement Task Force Delay Studies

Peat, Marwick, Mitchell & Co.
San Francisco, California

June 1979

Table C-1

NEW YORK TASK FORCE DELAY STUDIES
JOHN F. KENNEDY INTERNATIONAL AIRPORT
Summary Results of Stage-2 Experiments
Airfield Simulation Model Runs

Experiment No.	Description	Runways Used		Time Frame	Weather Conditions	Highest Hourly Flow Rates					Average Runway Delays[a] (minutes)	
								Combined Total				
		Arrivals	Departures			Arrivals[b]	Departures[b]	Arrivals	Departures	Total	Arrivals	Departures
2	1978 baseline	22L	22R	1978	IFR1	29	38	26	38	64	83.0	3.1
26	1982 baseline	22L	22R	1982	IFR1	33	40	33	39	72	95.1	5.9
44[c]	Separation Sensitivity	22L	22R	1982	IFR1	27	38	36	38	64	122.0	4.2
35	1987 baseline	22L	22R	1987	IFR1	47	46	47	45	92	32.5	4.4
45[d]	Separation Sensitivity	22L	22R	1987	IFR1	27	38	27	38	65	131.9	5.2
18[e]	2 n.m. stagger in 1978	4L,4R	4L	1978	IFR1	36	28	36	26	62	32.4	37.8
27[e]	2 n.m. stagger in 1982	4L,4R	4L	1982	IFR1	36	38	35	37	62	76.7	44.2
36[e]	2 n.m. stagger in 1987	4L,4R	4L	1987	IFR1	43	33	41	37	78	36.7	39.6
1	1978 baseline	13R,22L,22R	22R	1978	VFR1	50	43	50	29	79	0.8	5.5
30	1982 baseline	13R,22L,22R	22R	1982	VFR1	61	39	61	29	90	0.9	25.4
39	1987 baseline	13R,22L,22R	22R	1987	VFR1	64	40	52	44	96	0.5	3.9
7[f]	1978 baseline	13L,13R	13R	1978	VFR1	37	43	35	43	78	38.5	2.9
31[f]	1982 baseline	13L,13R	13R	1982	VFR1	39	44	39	42	81	65.3	4.0
40[f]	1987 baseline	13L,13R	13R	1987	VFR1	46	52	46	52	98	32.4	1.5
16	Independent departures on 31L, 31R	31L,31R	31L,31R	1978	VFR1	49	44	49	31	80	1.3	2.0
32	Independent departures on 31L, 31R	31L,31R	31L,31R	1982	VFR1	60	51	55	44	99	1.0	5.2
41	Independent departures on 31L, 31R	31L,31R	31L,31R	1987	VFR1	62	52	54	44	98	0.8	5.6
4	1978 baseline	4R	4L	1978	IFR1	25	38	24	38	62	91.2	3.5
33	1982 baseline	4R	4L	1982	IFR1	32	39	32	39	71	101.2	6.2
42	1987 baseline	4R	4L	1987	IFR1	43	46	41	46	87	42.0	4.2
15	Independent operations on 31L, 31R	31L,31R	31L,31R	1978	IFR1	50	45	50	32	82	2.8	2.8
34	Independent operations on 31L, 31R	31L,31R	31L,31R	1982	IFR1	59	52	56	34	90	2.8	14.9
43	Independent operations on 31L, 31R	31L,31R	31L,31R	1987	IFR1	63	59	49	44	93	0.8	8.8

a. For the entire 8 hours of the simulation.
b. Highest arrival flow rate is usually not in same hour as highest departure flow rate.
c. Sensitivity run with 1978 ATC Scenario and 1982 demand.
d. Sensitivity run with 1978 ATC Scenario and 1987 demand.
e. Staggered arrival-arrival separations of 2 n.m.
f. Single Arrival Airspace track.

JFK STAGE - 1 EXPERIMENTS

Experiment No. 7

Objective:

To obtain baseline delay estimates, in VFR1 conditions, for the following runway-use configuration:

Arrival Runways	Departure Runways
13L, 13R	13R

Related Comparison Experiments:

Experiment 8 has the same basic runway-use configuration in IFR1 conditions.

Length and Level of Detail of Simulation Run:

From 1500 to 2300 with 1-hour summaries and short-form network.

Results:

Below is a table that shows selected results for the peak-demand hour, 1900-2000 hours, and average values over the 8-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	32.0	35
Arrival	Air Delay	min.	38.5	56.8
Arrival	Taxi-In Delay	min.		0.0
Departure	Flow Rate	a/c per hr.	30.6	43
Departure	Runway Delay	min.	2.9	7.3
Departure	Taxi-Out Delay	min.		0.3

a. Average over the entire simulation period.
b. For the peak-demand hour, 1900-2000 hours, 5 hours into the simulation.

FIGURE 7a AVERAGE RUNWAY FLOW RATES

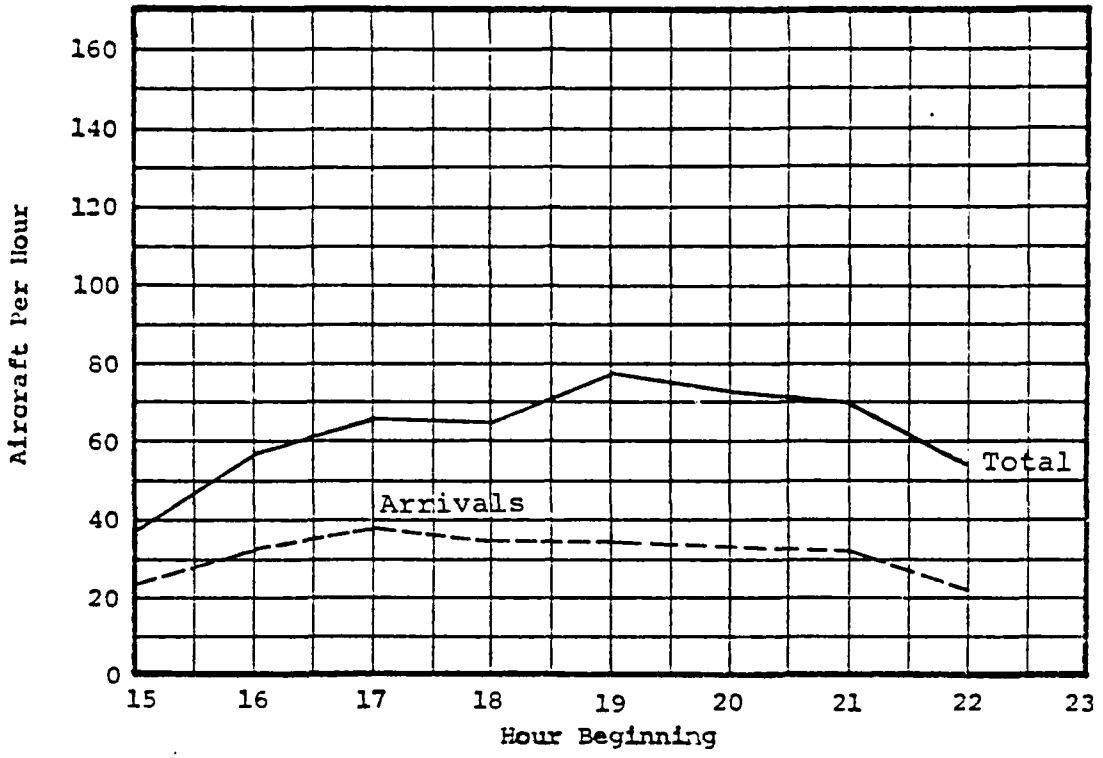
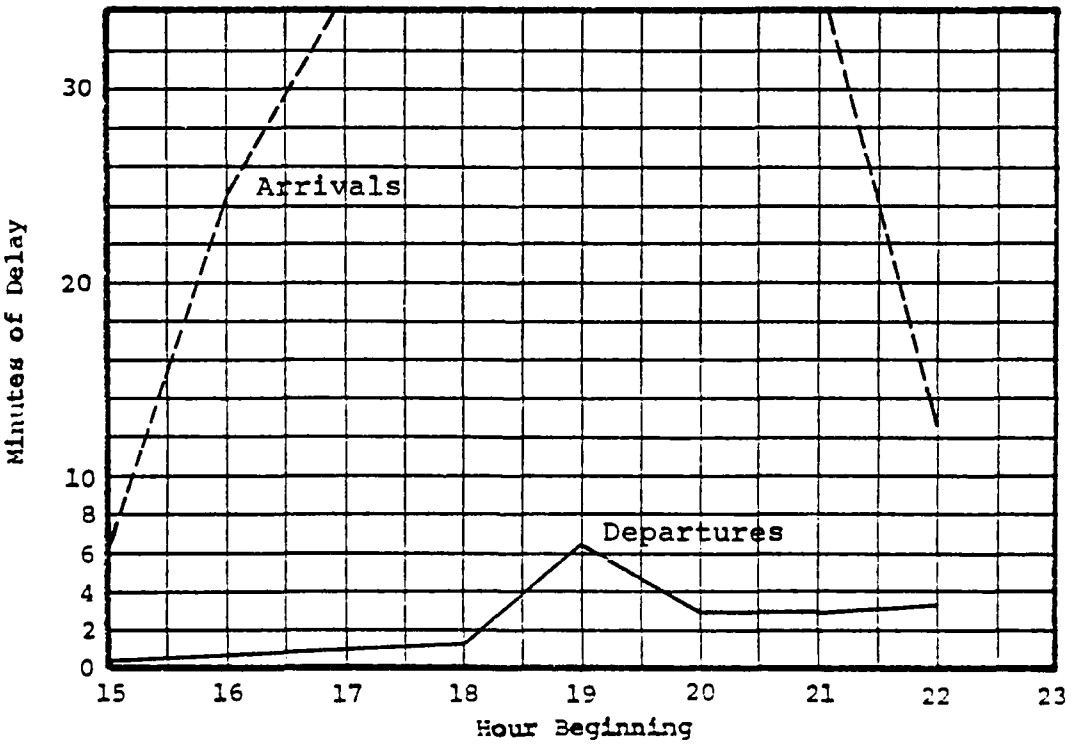


FIGURE 7b AVERAGE RUNWAY DELAYS



JFK - STAGE 2

Experiment No. 26

Objective:

To obtain 1982 delay estimates for the following runway-use configuration in IFR1:

Arrival Runways	Departure Runways
22L	22R

Related Comparison Experiments:

Experiments 2 (Stage 1) and 35 (1987) are for the same runway-use configuration and weather conditions.

Length and Level of Detail of Simulation Run:

From 1500 to 2300 with 1-hour summaries.

Results:

Below is a table that shows selected results for the peak-demand hour, 1900-2000 hours, and average values over the 8-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	31.7	33
Arrival	Air Delay	min.	95.1	114.6
Arrival	Taxi-In Delay	min.		0.1
Departure	Flow Rate	a/c per hr.	31.7	38
Departure	Runway Delay	min.	5.9	9.2
Departure	Taxi-Out Delay	min.		0.4

a. Average over the entire simulation period.
b. For the peak-demand hour, 1900-2000 hours, 5 hours into the simulation.

FIGURE 26a AVERAGE RUNWAY FLOW RATES

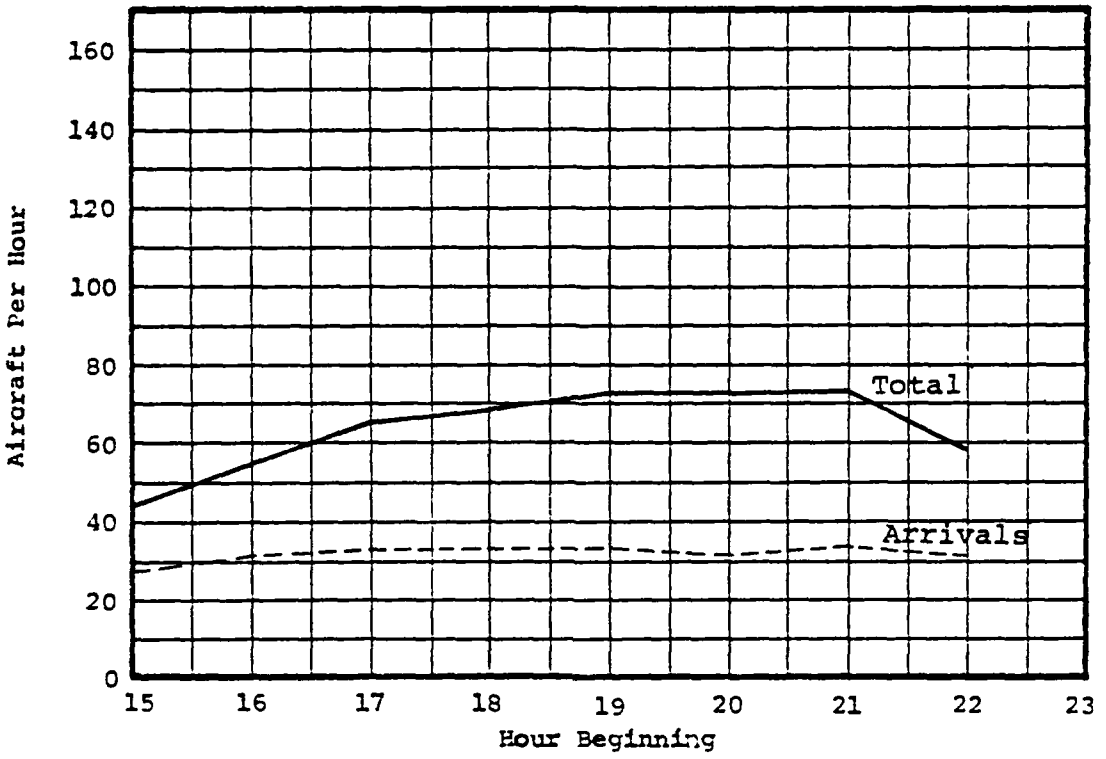
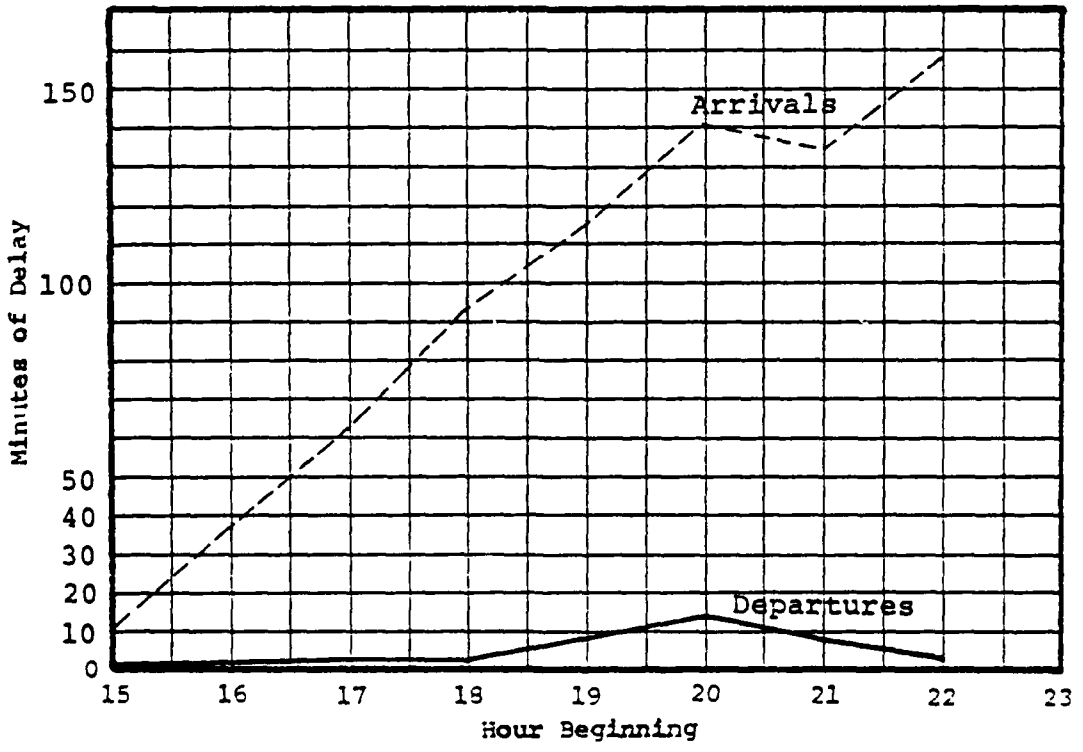


FIGURE 26b AVERAGE RUNWAY DELAYS



JFK STAGE - 2 EXPERIMENTS

Experiment No. 27

Objective:

To provide estimates for 1982 of the expected delay reduction associated with using 2-mile staggered separations on Runways 4L and 4R in less than visual conditions.

Related Comparison Experiments:

Experiments 18 (Stage 1) and 36 (1987) have the same runway configuration.

Length and Level of Details of Simulation Run:

From 1500 to 2300 with 1-hour summaries.

Summary of Results:

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	34.2	32
Arrival	Air Delay	min.	76.7	95.2
Arrival	Taxi-In Delay	min.		0.2
Departure	Flow Rate	a/c per hr.	23.6	28
Departure	Runway Delay	min.	44.2	52.6
Departure	Taxi-Out Delay	min.		0.7

a. Average over the entire simulation period.
b. For the peak-demand hour, 1900-2000 hours, 5 hours into the simulation.

FIGURE 27A AVERAGE RUNWAY FLOW RATES

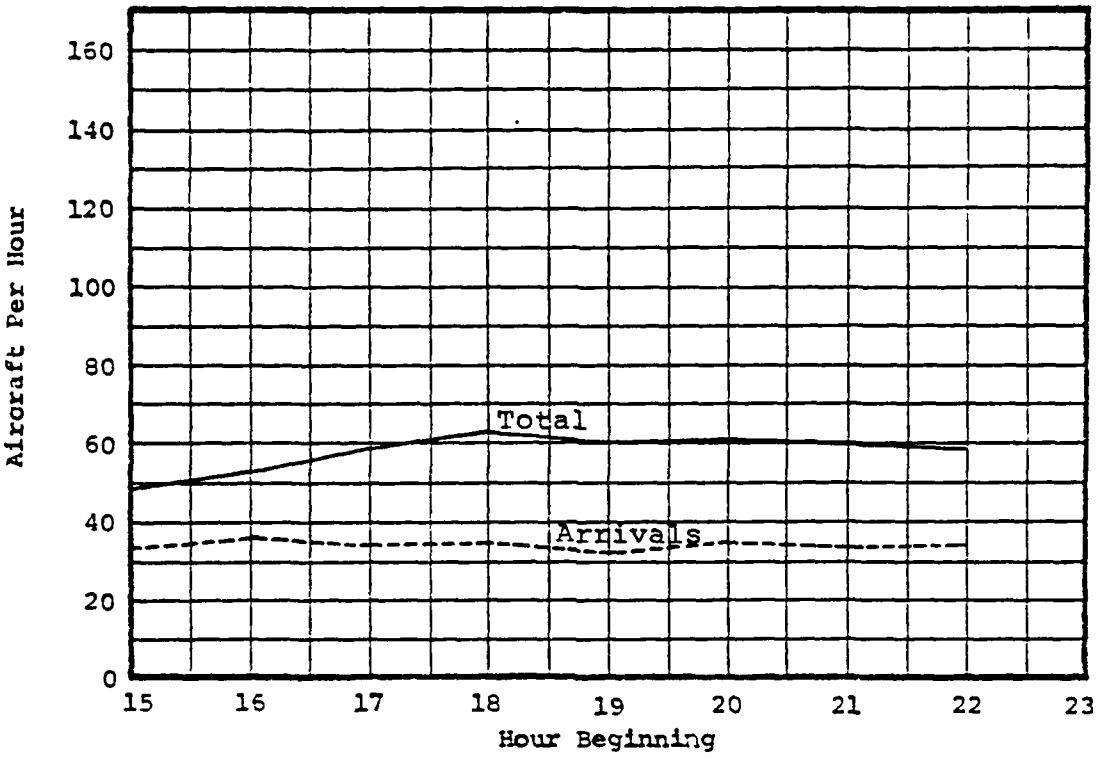
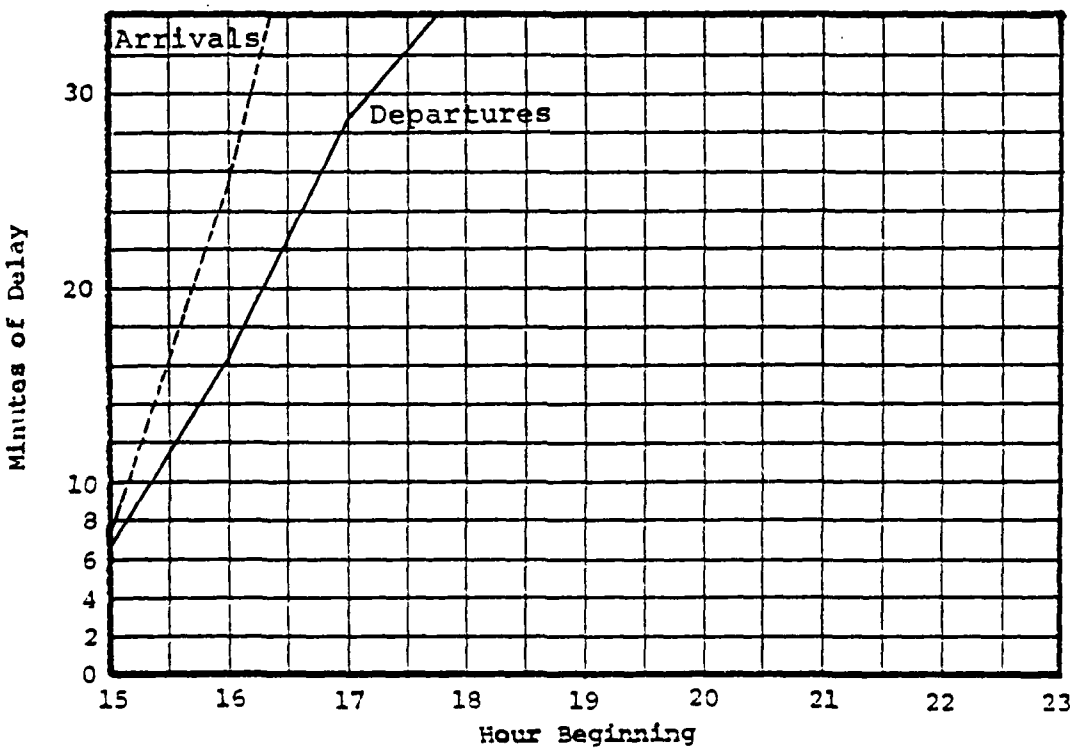


FIGURE 27B AVERAGE RUNWAY DELAYS



JFK - STAGE 2

Experiment No. 30

Objective:

To obtain 1982 delay estimates for the following runway configuration in VFR1:

Arrival Runways	Departure Runways
13R, 22L, 22R	22R

Related Comparison Experiments:

Experiments 1 (Stage 1) and 39 (1987) have the same runway-use configuration and weather conditions.

Length and Level of Detail of Simulation Run:

From 1500 to 2300 with 1-hour summaries.

Results:

Below is a table that shows selected results for the peak-demand hour, 1900-2000 hours, and average values over the 8-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	39.2	46
Arrival	Air Delay	min.	0.9	1.0
Arrival	Taxi-In Delay	min.		0.1
Departure	Flow Rate	a/c per hr.	34.6	39
Departure	Runway Delay	min.	25.4	26.8
Departure	Taxi-Out Delay	min.		0.8

a. Average over the entire simulation period.
b. For the peak-demand hour, 1900-2000 hours, 5 hours into the simulation.

FIGURE 30A AVERAGE RUNWAY FLOW RATES

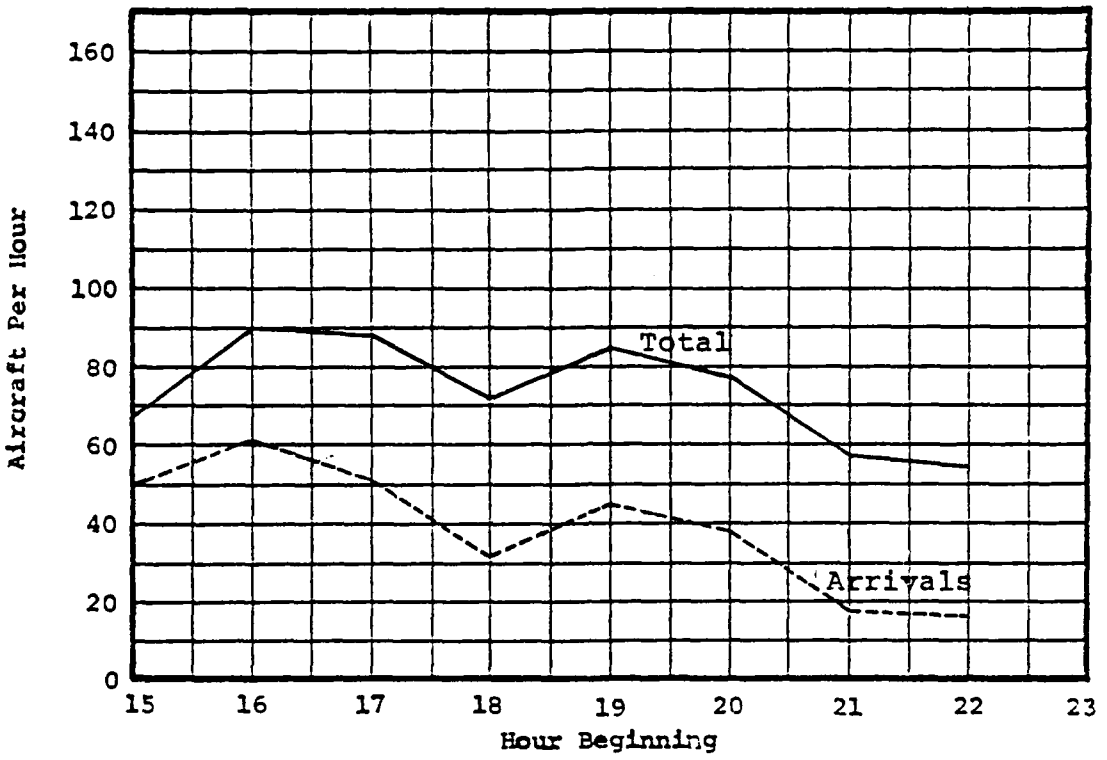
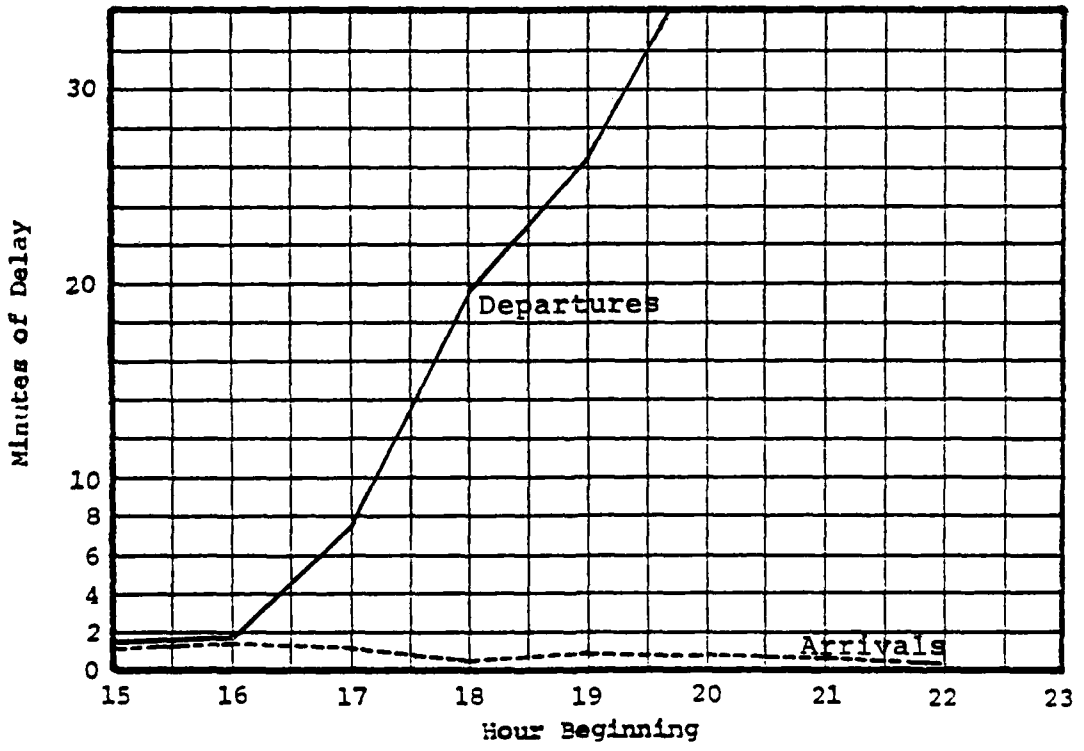


FIGURE 30B AVERAGE RUNWAY DELAYS



JFK STAGE - 2 EXPERIMENTS

Experiment No. 31

Objective:

To obtain 1982 delay estimates, in VFR1 conditions for the following runway-use configuration;

Arrival Runways	Departure Runways
13L, 13R	13R

Related Comparison Experiments:

Experiments 7 (Stage 1) and 40 (1987) have the same runway-use configuration.

Length and Level of Detail of Simulation Run:

From 1500 to 2300 with 1-hour summaries.

Results:

Below is a table that shows selected results for the peak-demand hour, 1900-2000 hours, and average values over the 8-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	37.1	39
Arrival	Air Delay	min.	65.3	85.8
Arrival	Taxi-In Delay	min.		0.4
Departure	Flow Rate	a/c per hr.	33.9	42
Departure	Runway Delay	min.	4.0	10.1
Departure	Taxi-Out Delay	min.		0.6

a. Average over the entire simulation period.
b. For the peak-demand hour, 1900-2000 hours, 5 hours into the simulation period.

FIGURE 31a AVERAGE RUNWAY FLOW RATES

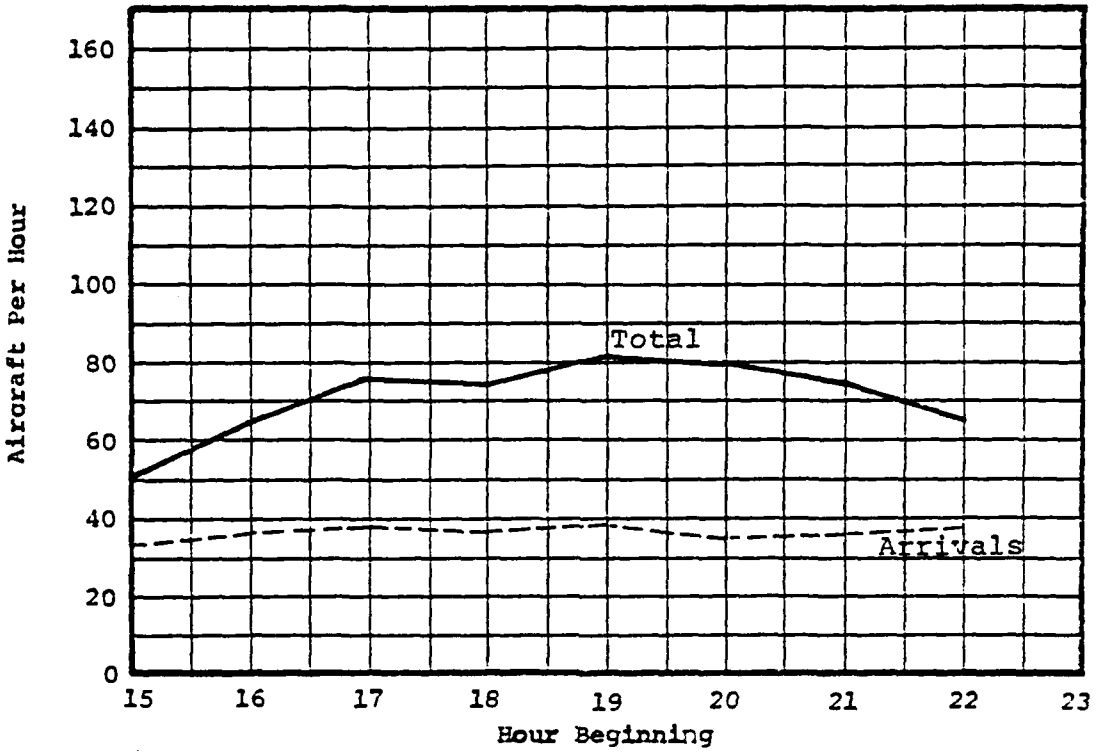
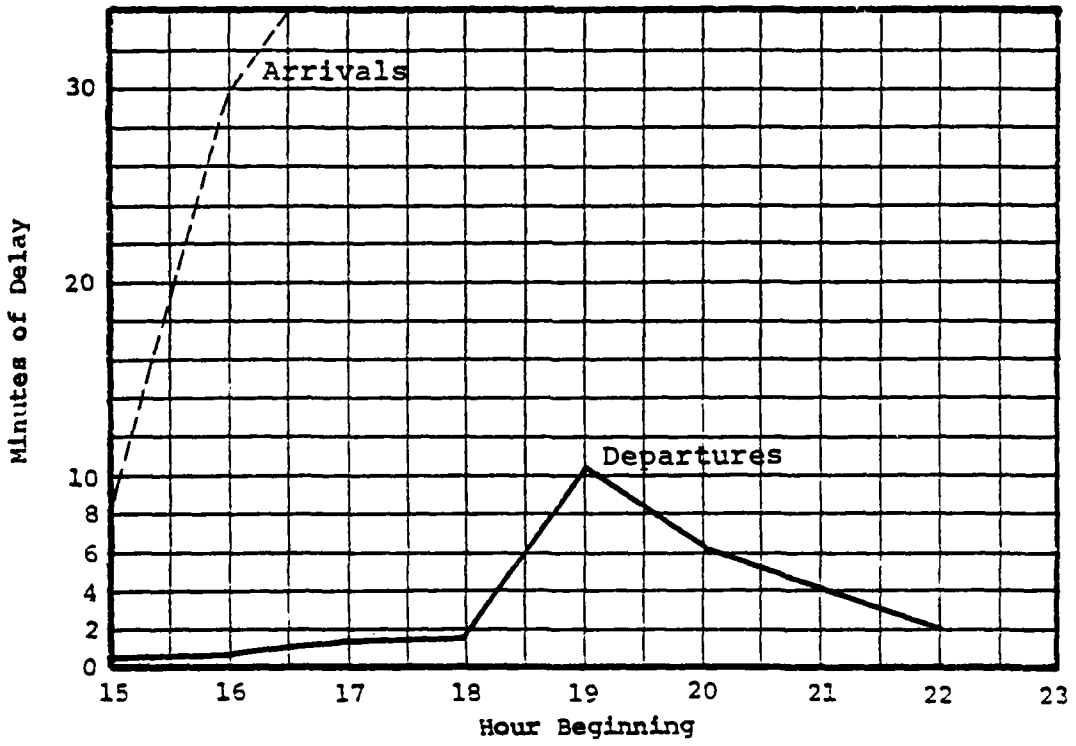


FIGURE 31b AVERAGE RUNWAY DELAYS



JFK STAGE - 2 EXPERIMENTS

Experiment No. 32

Objective:

To investigate the potential benefits in 1982 of independent departure tracks on Runways 31L and 31R (31R used for short-range departures) in VFR1 conditions and the following runway-use configurations:

Arrival Runways	Departure Runways
31L, 31R	31L, 31R

Related Comparison Experiments

Experiments 16 (Stage 1) and 41 (1987) have the same runway configuration and weather conditions.

Length and Level of Detail of Simulation Run:

From 1500 to 2300 with 1-hour summaries.

Summary of Results:

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	39.2	46
Arrival	Air Delay	min.	1.0	0.7
Arrival	Taxi-In Delay	min.		0.0
Departure	Flow Rate	a/c per hr.	35	46
Departure	Runway Delay	min.	5	9.9
Departure	Taxi-Out Delay	min.		0.5

a. Average over the entire simulation period.
b. For the peak-demand hour, 1900-2000 hours, 5 hours into the simulation.

FIGURE 32A AVERAGE RUNWAY FLOW RATES

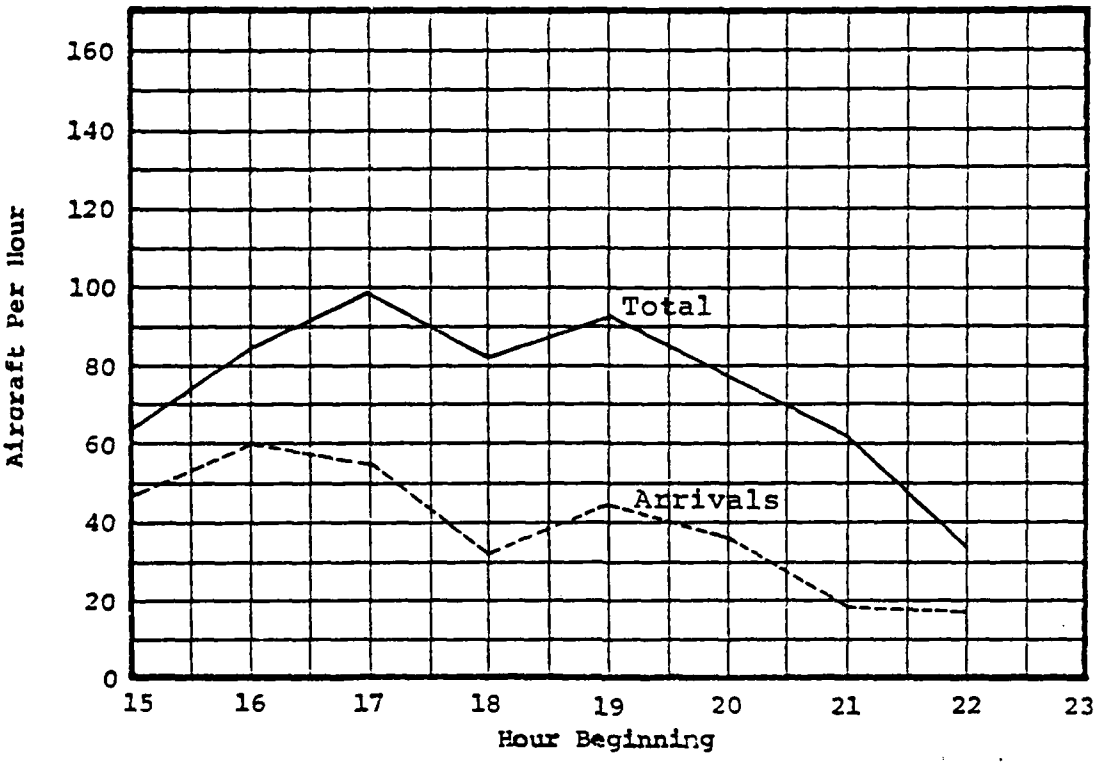
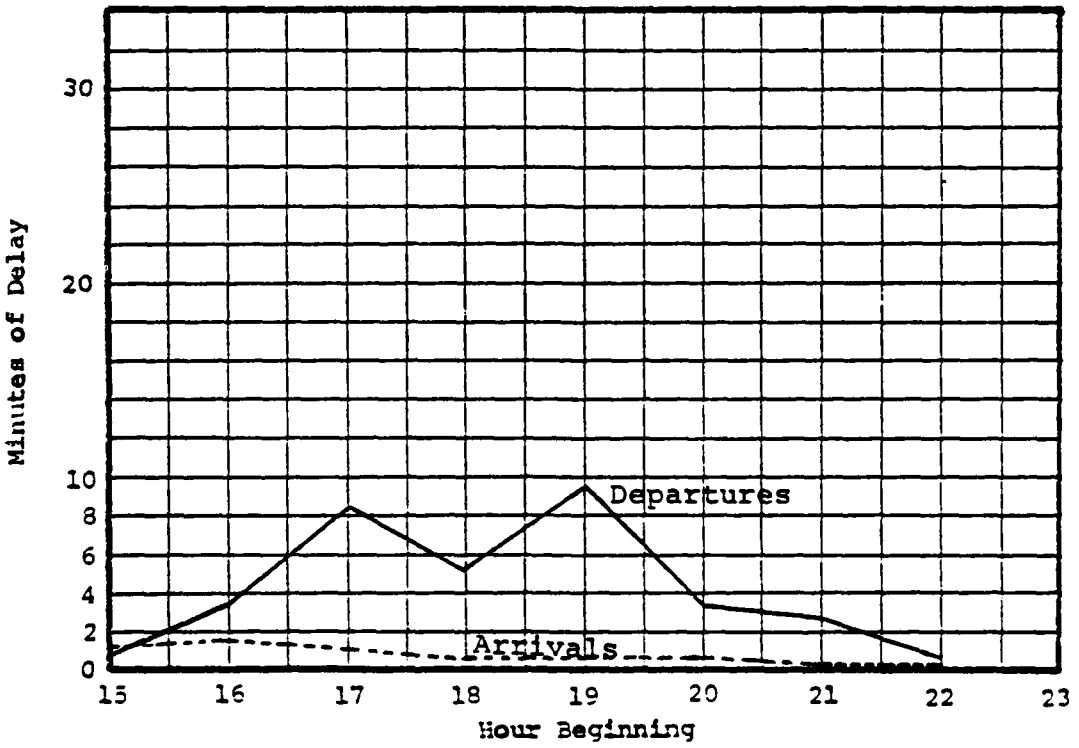


FIGURE 32B AVERAGE RUNWAY DELAYS



JFK STAGE - 2 EXPERIMENTS

Experiment No. 33

Objective:

To obtain 1982 delay estimates in IFR1 conditions for the following runway-use configurations:

Arrival Runways	Departure Runways
4R	4L

Related Comparison Experiments:

Experiments 4 (Stage 1) and 42 (1987) have the same runway-use configuration and weather conditions.

Length and Level of Detail of Simulation Run:

From 1500 to 2300 with 1-hour summaries.

Results:

Below is a table that shows selected results for the peak-demand hour, 1900-2000 hours, and average values over the 8-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment	
			Average[a]	Peak[b]
Arrival	Flow Rate	a/c per hr.	30.9	31
Arrival	Air Delay	min.	101.2	122.3
Arrival	Taxi-In Delay	min.		0.2
Departure	Flow Rate	a/c per hr.	31.5	38
Departure	Runway Delay	min.	6.2	9.6
Departure	Taxi-Out Delay	min.		0.4

a. Average over the entire simulation period.
b. For the peak-demand hour, 1900-2000 hours, 5 hours into the simulation.

FIGURE 33A AVERAGE RUNWAY FLOW RATES

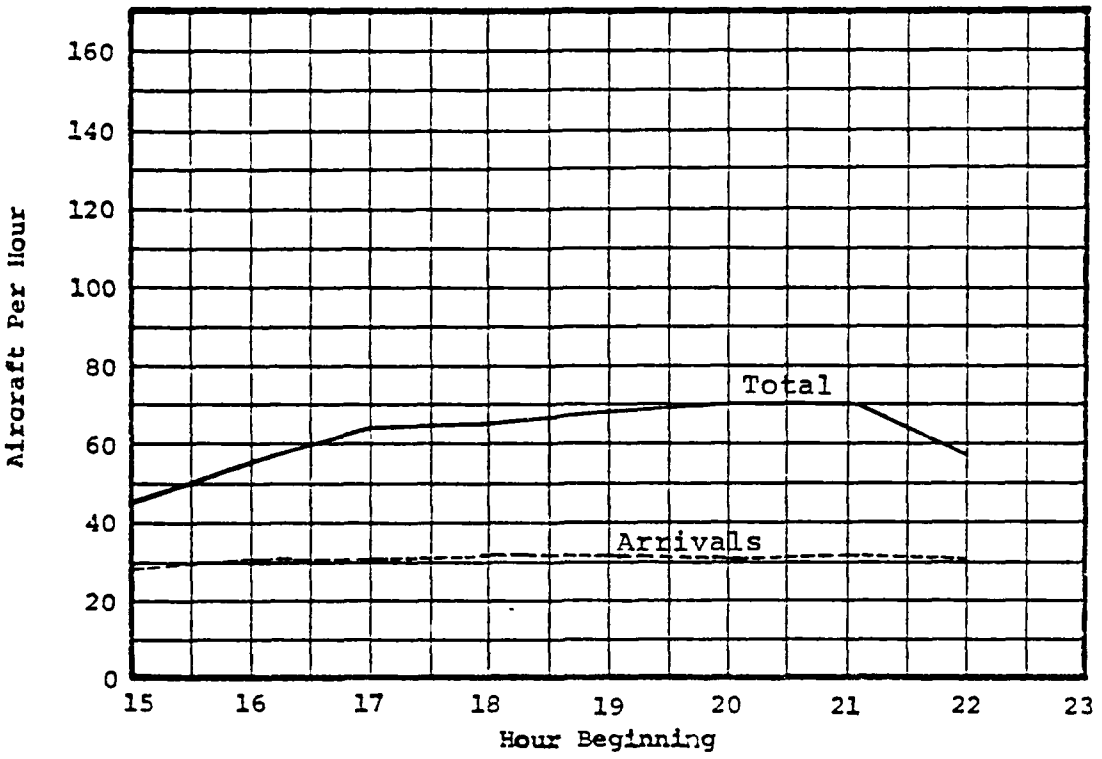
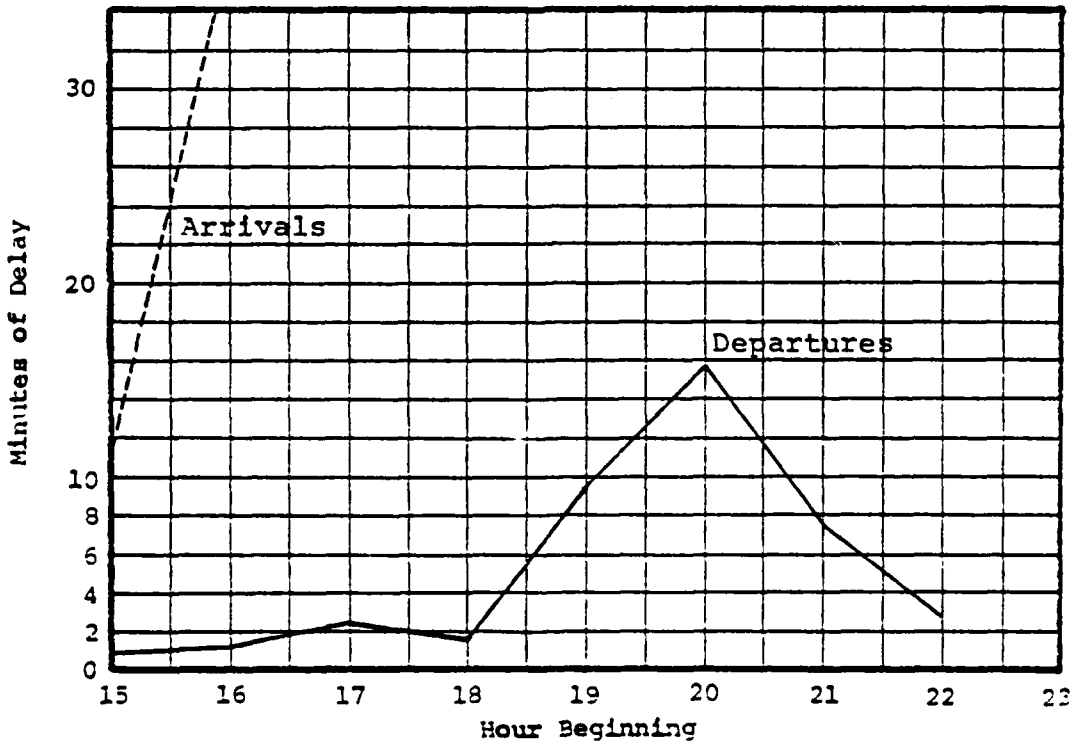


FIGURE 33B AVERAGE RUNWAY DELAYS



JFK STAGE - 2 EXPERIMENTS

Experiment No. 34

Objective:

To estimate the delays in 1982 associated with having independent arrivals, independent departures, and independent missed approach tracks on Runways 31R and 31L in IFR1 conditions.

Related Comparison Experiments:

Experiments 15 (Stage 1) and 43 (1987) have the same runway-use configuration and weather conditions.

Length and Level of Detail of Simulation Run:

From 1500 to 2300 with 1-hour summaries.

Summary of Results:

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	39.2	45
Arrival	Air Delay	min.	2.8	1.6
Arrival	Taxi-In Delay	min.		0.0
Departure	Flow Rate	a/c per hr.	35.1	43
Departure	Runway Delay	min.	14.9	21.3
Departure	Taxi-Out Delay	min.		0.3

a. Average over the entire simulation period.
b. For the peak-demand hour, 1900-2000 hours, 5 hours into the simulation.

FIGURE 34a AVERAGE RUNWAY FLOW RATES

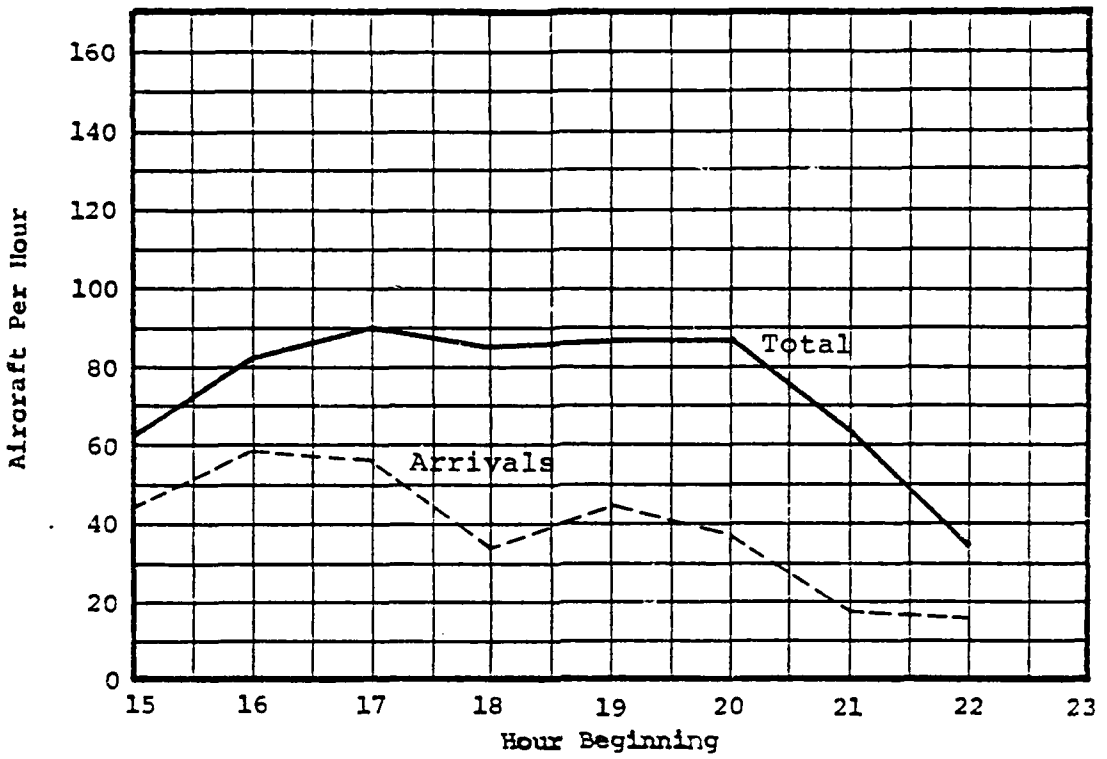
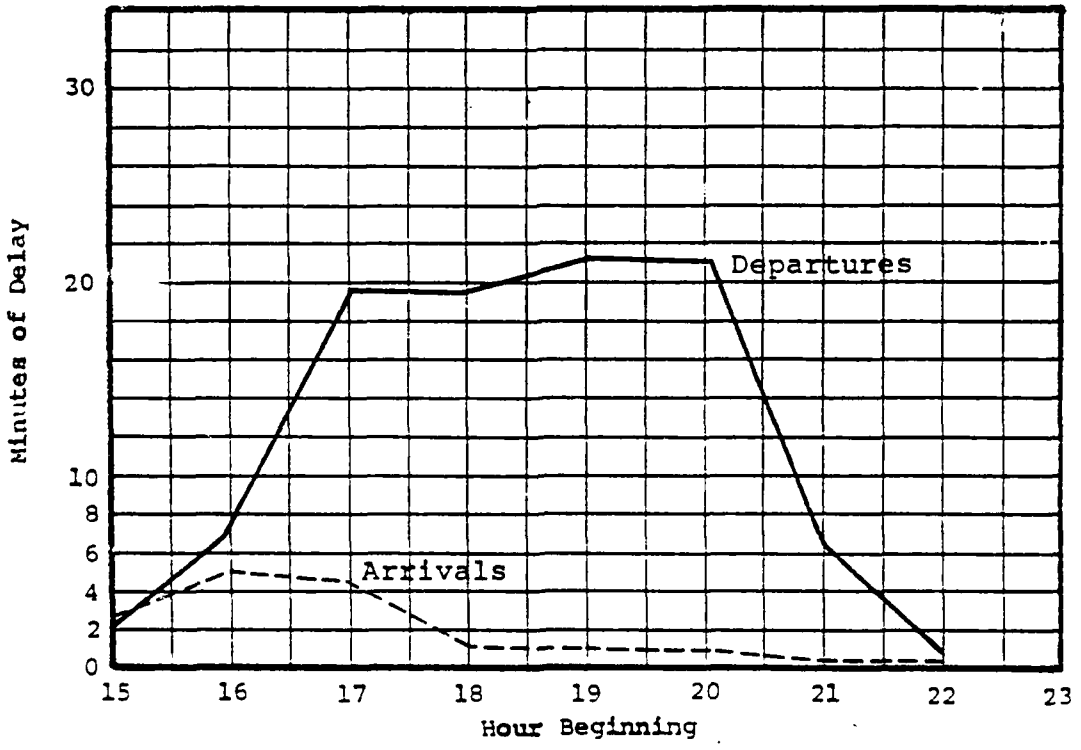


FIGURE 34b AVERAGE RUNWAY DELAYS



JFK - STAGE 2

Experiment No. 35

Objective:

To obtain 1987 delay estimates for the following runway-use configuration in IFR1:

Arrival Runways	Departure Runways
22L	22R

Related Comparison Experiments:

Experiments 2 (Stage 1) and 26 (1987) are for the same runway-use configuration and weather.

Length and Level of Detail of Simulation Run:

From 1500 to 2300 with 1-hour summaries.

Results:

Below is a table tht shows selected results for the peak-demand hour, 1900-2000 hours, and average values over the 8-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	39.6	47
Arrival	Air Delay	min.	32.5	41.8
Arrival	Taxi-In Delay	min.		0.2
Departure	Flow Rate	a/c per hr.	35.9	45
Departure	Runway Delay	min.	4.4	8.6
Departure	Taxi-Out Delay	min.		0.3

a. Average over the entire simulation period.
b. For the peak-demand hour, 1900-2000 hours, 5 hours into the simulation.

FIGURE 35a AVERAGE RUNWAY FLOW RATES

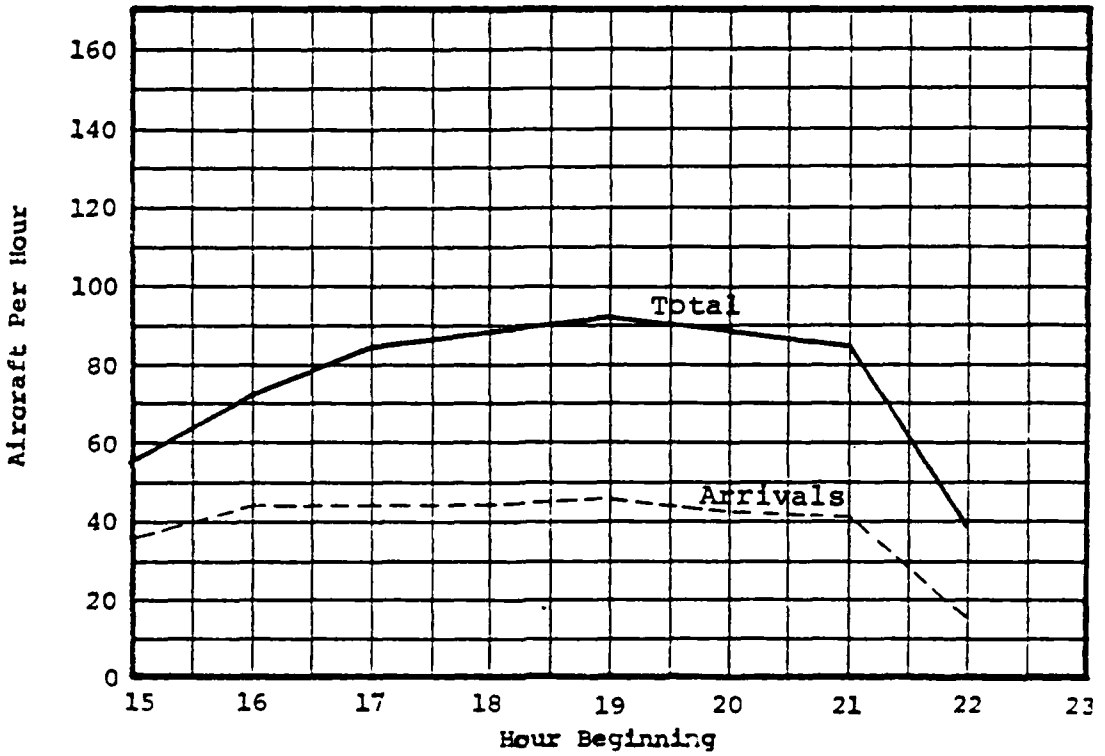
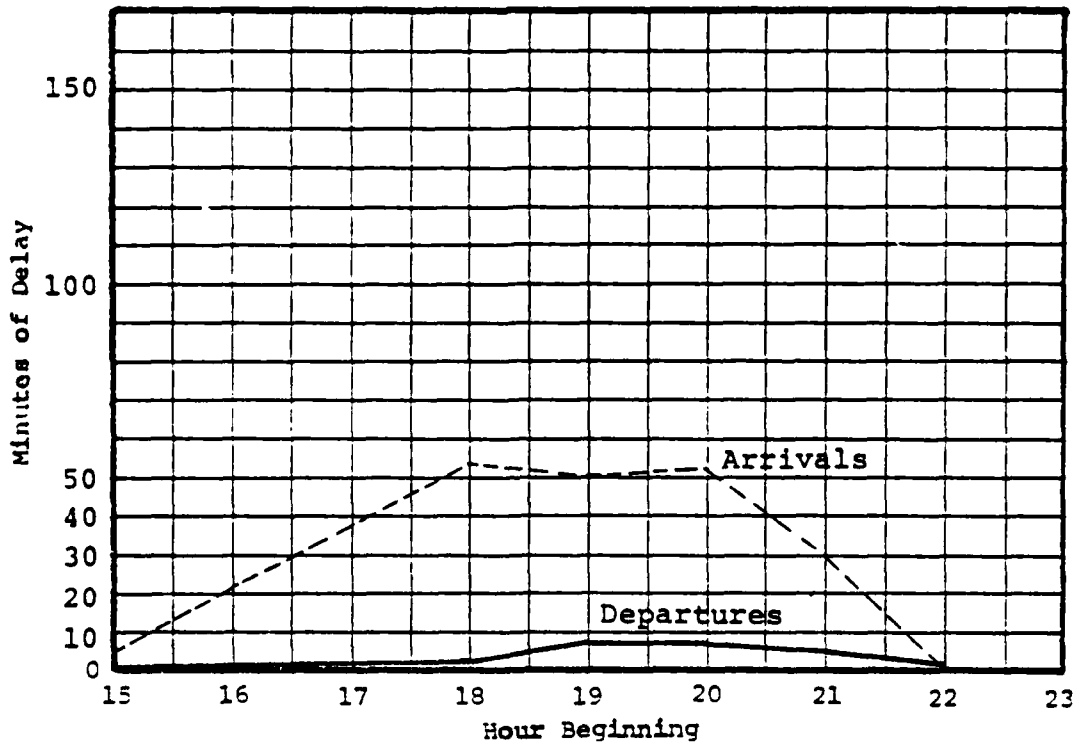


FIGURE 35b AVERAGE RUNWAY DELAYS



JFK STAGE - 2 EXPERIMENTS

Experiment No. 36

Objective:

To provide estimates of the expected delays in 1987 associated with using 2-mile staggered separations on Runways 4L and 4R in less than visual conditions.

Related Comparison Experiments:

Experiments 18 (Stage 1) and 27 (1982) have the same runway configuration and weather conditions.

Length and Level of Detail of Simulation Run:

From 1500 to 2300 with 1-hour summaries.

Summary of Results:

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	39.6	42
Arrival	Air Delay	min.	36.7	41.5
Arrival	Taxi-In Delay	min.		0.2
Departure	Flow Rate	a/c per hr.	30.1	33
Departure	Runway Delay	min.	39.6	48.6
Departure	Taxi-Out Delay	min.		1.0

a. Average over the entire simulation period.
b. For the peak-demand hour, 1900-2000 hours, 5 hours into the simulation.

FIGURE 36a AVERAGE RUNWAY FLOW RATES

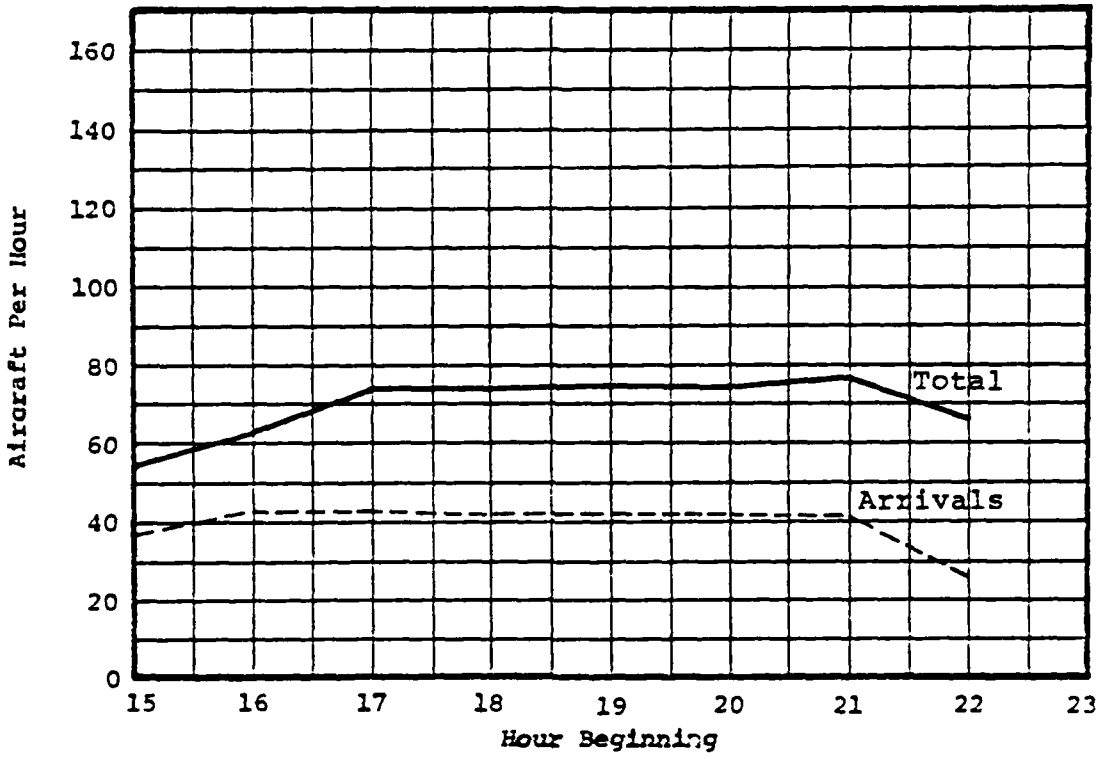
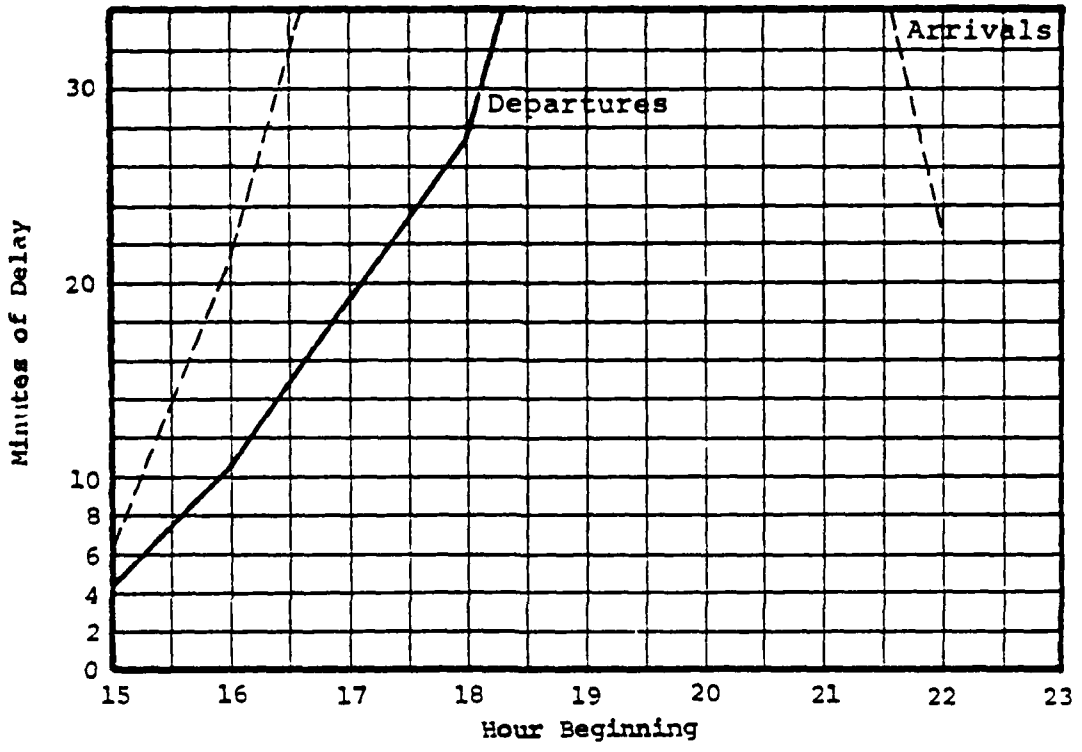


FIGURE 36b AVERAGE RUNWAY DELAYS



JFK - STAGE 2

Experiment No. 39

Objective:

To obtain 1987 delay estimates for the following runway configuration in VFR1:

Arrival Runways	Departure Runways
13R, 22L, 22R	22R

Related Comparison Experiments

Experiments 1 (Stage 1) and 30 (1982) have the same runway-use configurations and weather conditions.

Length and Level of Detail of Simulation Run:

From 1500 to 2300 with 1-hour summaries.

Results:

Below is a table that shows selected results for the peak-demand hour, 1900-2000 hours, and average values over the 8-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	39.5	47
Arrival	Air Delay	min.	0.5	0.7
Arrival	Taxi-In Delay	min.		0.1
Departure	Flow Rate	a/c per hr.	35.6	47
Departure	Runway Delay	min.	3.9	7.9
Departure	Taxi-Out Delay	min.		0.7

a. Average over the entire simulation period.
b. For the peak-demand hour, 1900-2000 hours, 5 hours into the simulation.

FIGURE 39a AVERAGE RUNWAY FLOW RATES

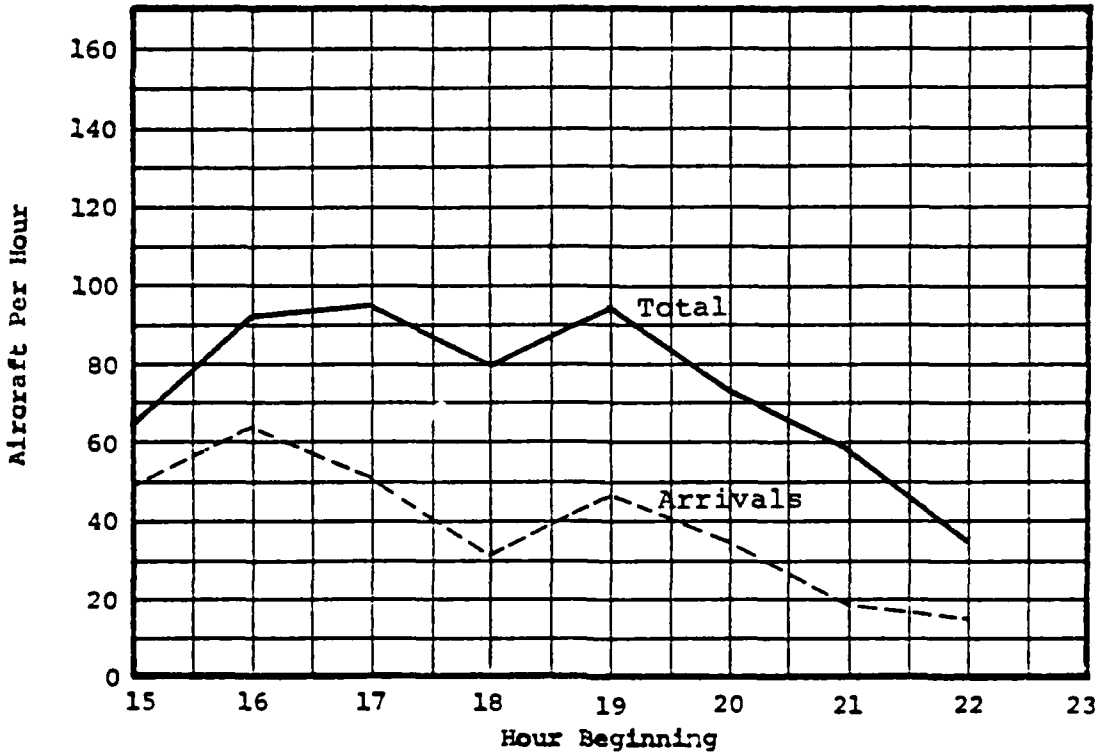
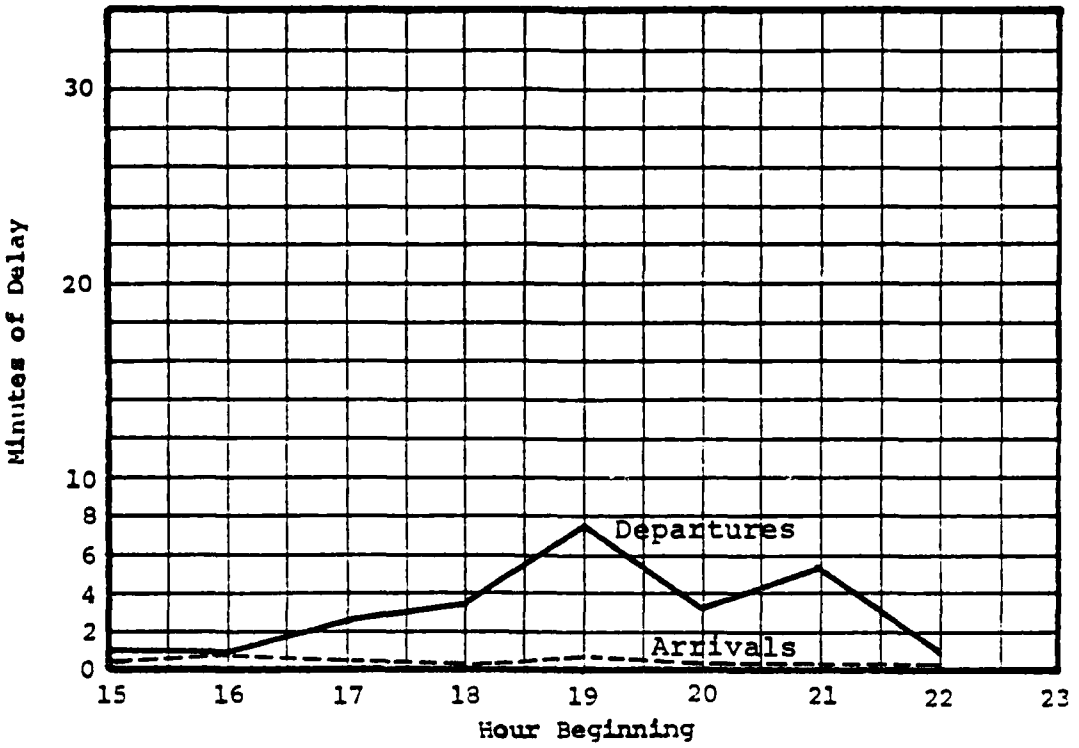


FIGURE 39b AVERAGE RUNWAY DELAYS



JFK STAGE - 2 EXPERIMENTS

Experiment No. 40

Objective:

To obtain 1987 delay estimates, in VFR1 conditions, for the following runway-use configuration:

Arrival Runways	Departure Runways
13L, 13R	13R

Related Comparison Experiments:

Experiments 7 (Stage 1) and 31 (1982) have the same runway-use configuration and weather conditions.

Length and Level of Detail of Simulation Run:

From 1500 to 2300 with 1-hour summaries.

Results:

Below is a table that shows selected results for the peak-demand hour, 1900-2000 hours, and average values over the 8-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment	
			Average[a]	Peak[b]
Arrival	Flow Rate	a/c per hr.	39.5	46
Arrival	Air Delay	min.	32.4	41.7
Arrival	Taxi-In Delay	min.		0.3
Departure	Flow Rate	a/c per hr.	36.0	52
Departure	Runway Delay	min.	1.5	3.6
Departure	Taxi-Out Delay	min.		0.8

a. Average over the entire simulation period.
b. For the peak-demand hour, 1900-2000 hours, 5 hours into the simulation.

FIGURE 40a AVERAGE RUNWAY FLOW RATES

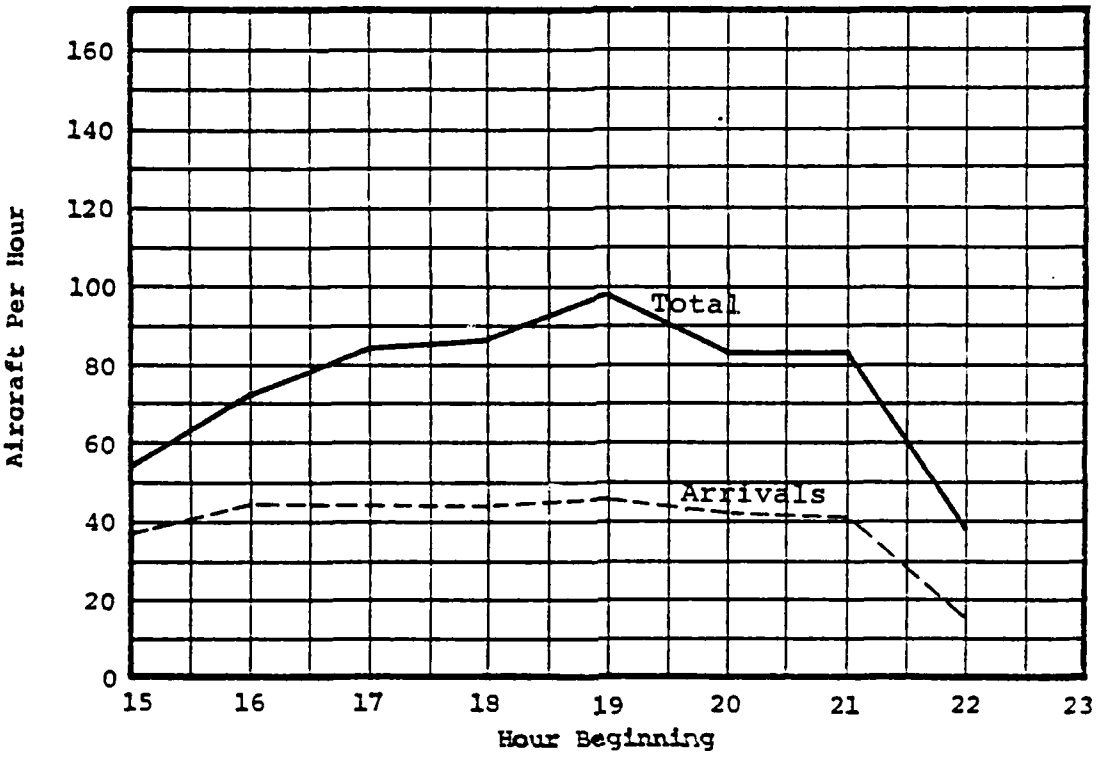
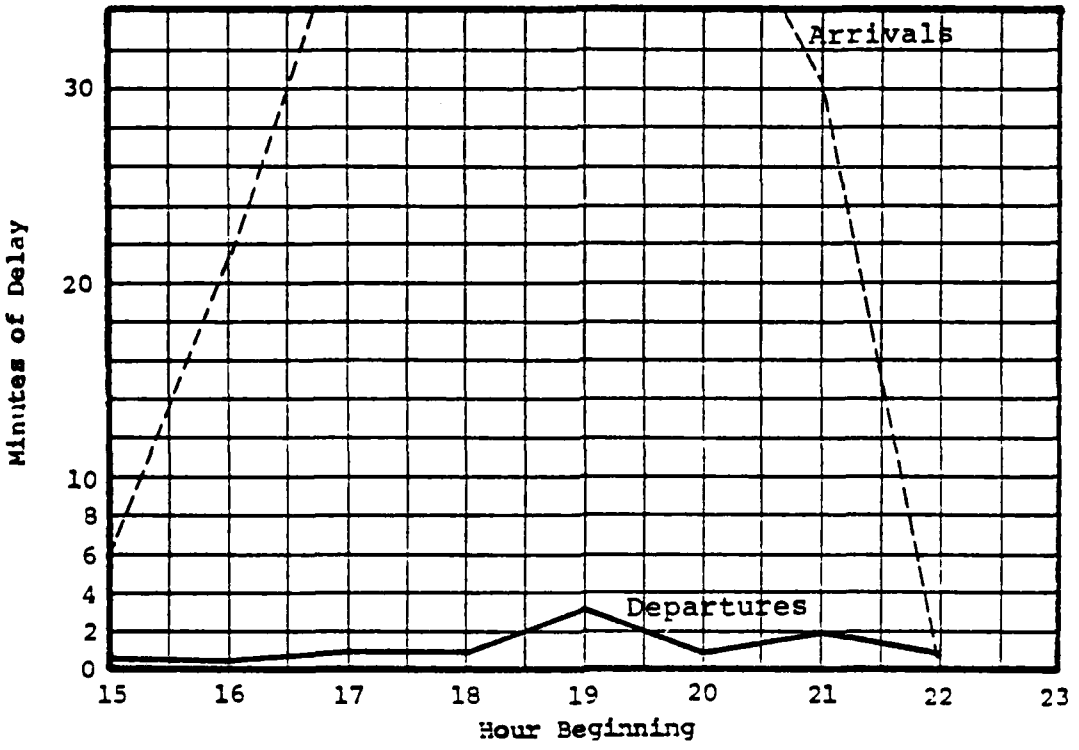


FIGURE 40b AVERAGE RUNWAY DELAYS



JFK STAGE - 2 EXPERIMENTS

Experiment No. 41

Objective:

To investigate the potential benefits in 1987 of independent departure tracks on Runways 31L and 31R (31R used for short-range departures) in VFR1 conditions and the following runway-use configurations:

Arrival Runways	Departure Runways
31L, 31R	31L, 31R

Related Comparison Experiments

Experiments 16 (Stage 1) and 32 (1987) have the same runway-use configurations and weather conditions.

Length and Level of Detail of Simulation Run:

From 1500 to 2300 with 1-hour summaries.

Summary of Results:

Operation Type	Performance Measure	Units	This Experiment Average[a]	This Experiment Peak[b]
Arrival	Flow Rate	a/c per hr.	39.6	49
Arrival	Air Delay	min.	0.8	0.7
Arrival	Taxi-In Delay	min.		0.4
Departure	Flow Rate	a/c per hr.	35.8	47
Departure	Runway Delay	min.	5.6	9.5
Departure	Taxi-Out Delay	min.		0.3

a. Average over the entire simulation period.
b. For the peak-demand hour, 1900-2000 hours, 5 hours into the simulation.

FIGURE 41a AVERAGE RUNWAY FLOW RATES

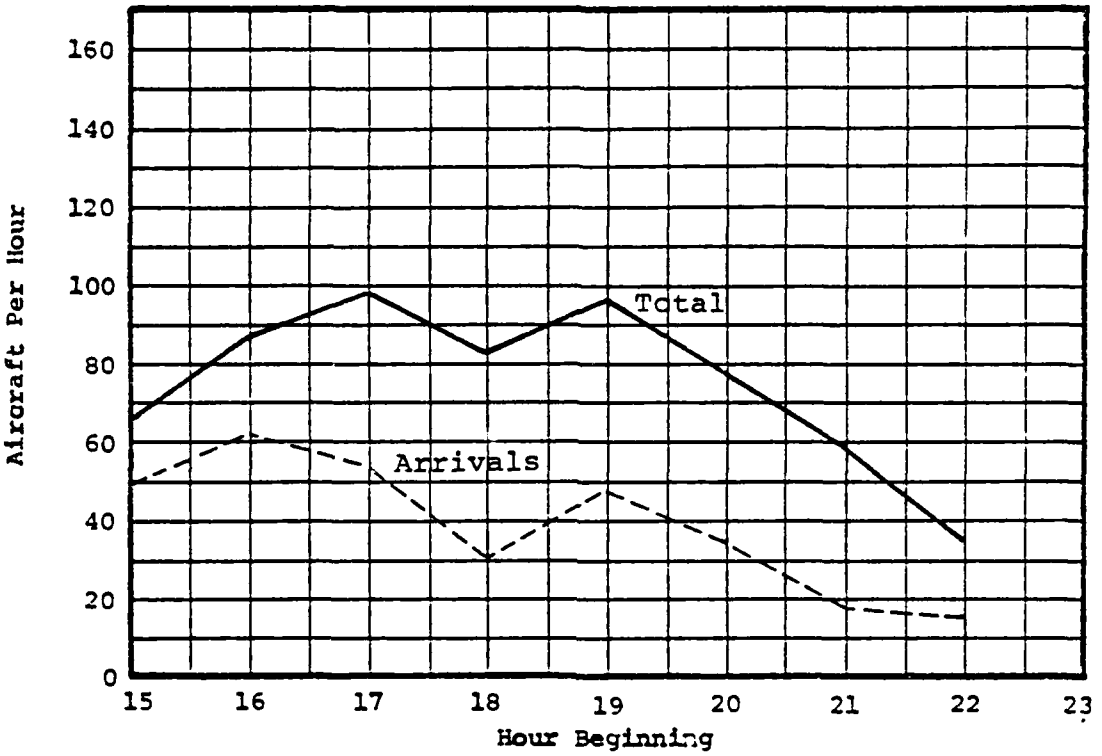
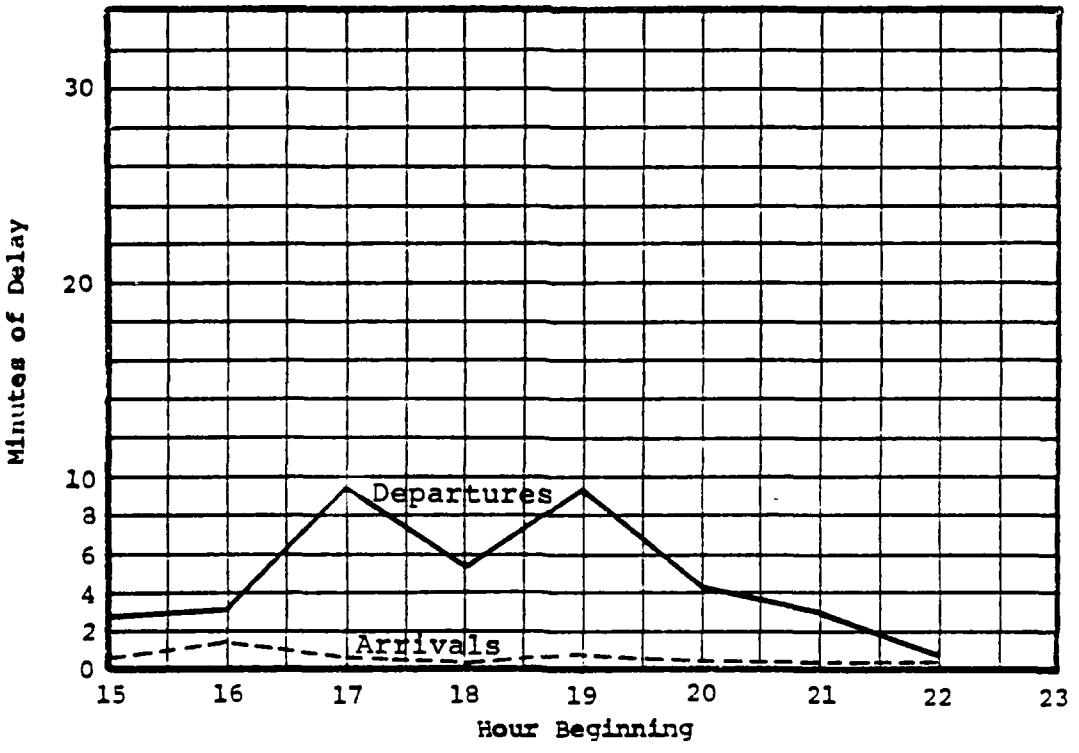


FIGURE 41b AVERAGE RUNWAY DELAYS



JFK STAGE - 2 EXPERIMENTS

Experiment No. 42

Objective:

To obtain 1987 delay estimates in IFR1 conditions for the following runway-use configurations:

Arrival Runways	Departure Runways
4R	4L

Related Comparison Experiments:

Experiments 4 (Stage 1) and 33 (1982) have the same runway-use configurations and weather conditions.

Length and Level of Detail of Simulation Run:

From 1500 to 2300 with 1-hour summaries.

Results:

Below is a table that shows selected results for the peak-demand hour, 1900-2000 hours, and average values over the 8-hour simulation period.

Operation Type	Performance Measure	Units	This Experiment	
			Average[a]	Peak[b]
Arrival	Flow Rate	a/c per hr.	39.6	43
Arrival	Air Delay	min.	42.0	57.8
Arrival	Taxi-In Delay	min.		0.2
Departure	Flow Rate	a/c per hr.	35.2	43
Departure	Runway Delay	min.	4.2	8.1
Departure	Taxi-Out Delay	min.		0.4

a. Average over the entire simulation period.
b. For the peak-demand hour, 1900-2000 hours, 5 hours into the simulation.

FIGURE 42a AVERAGE RUNWAY FLOW RATES

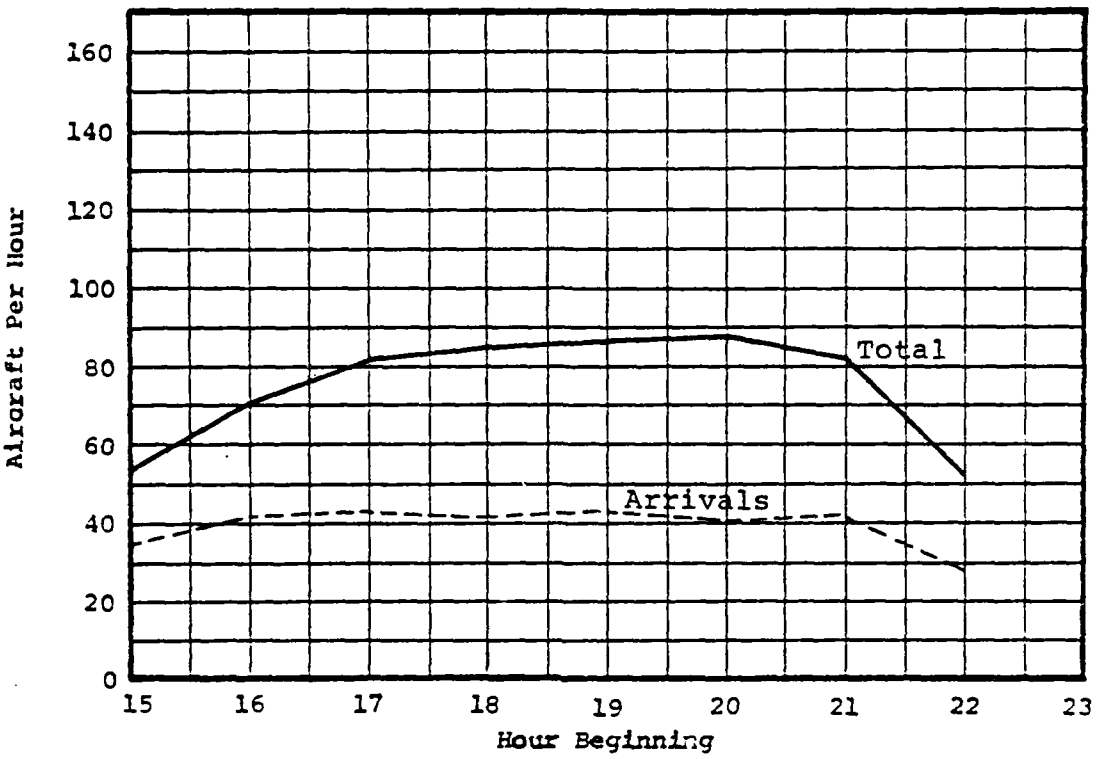
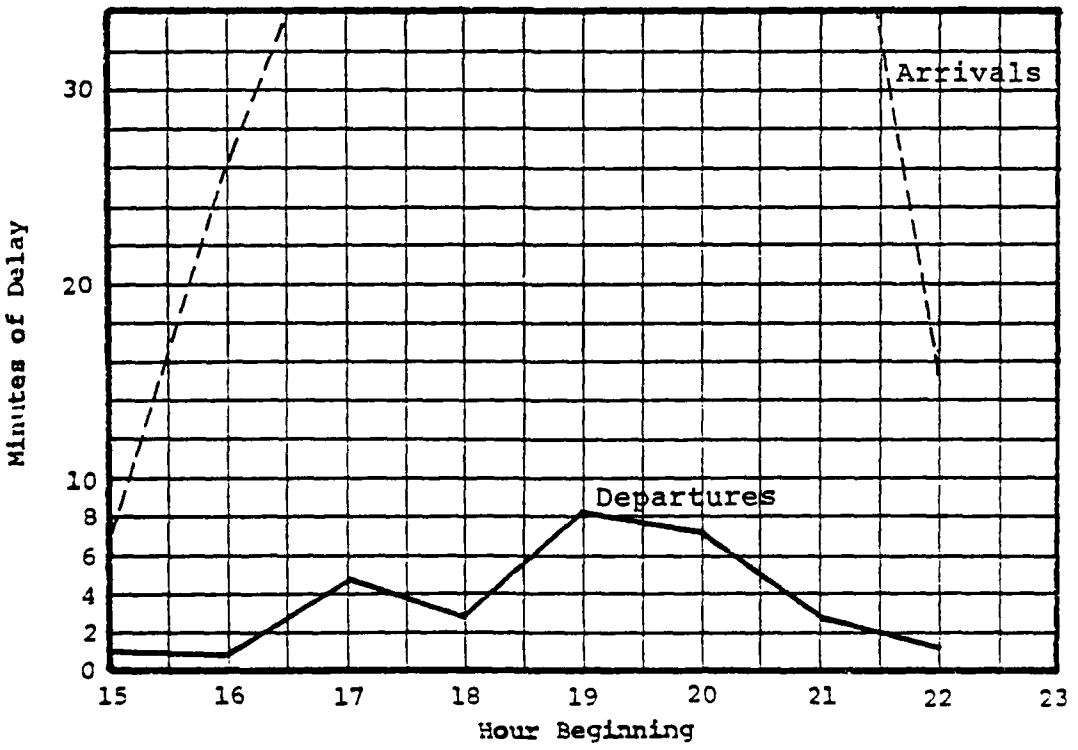


FIGURE 42b AVERAGE RUNWAY DELAYS



JFK STAGE - 2 EXPERIMENTS

Experiment No. 43

Objective:

To estimate the delays in 1987 associated with having independent arrivals, independent departures, and independent missed approach tracks on Runways 31R and 31L in IFR1 conditions.

Related Comparison Experiments:

Experiments 15 (Stage 1) and 34 (1982) have the same runway-use configuration and weather conditions.

Length and Level of Detail of Simulation Run:

From 1500 to 2300 with 1-hour summaries.

Summary of Results:

Operation Type	Performance Measure	Units	This Experiment	
			Average[a]	Peak[b]
Arrival	Flow Rate	a/c per hr.	39.6	49
Arrival	Air Delay	min.	0.8	0.8
Arrival	Taxi-In Delay	min.		0.0
Departure	Flow Rate	a/c per hr.	36.0	44
Departure	Runway Delay	min.	8.8	10.7
Departure	Taxi-Out Delay	min.		0.3

a. Average over the entire simulation period.
b. For the peak-demand hour, 1900-2000 hours, 5 hours into the simulation.

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NEW YORK AIRPORTS DATA PACKAGE NUMBER 6, JOHN F. KENNEDY INTERN--ETC(U)
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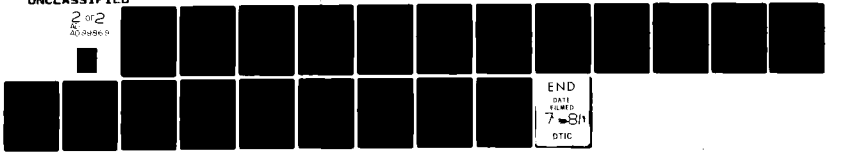


FIGURE 43a AVERAGE RUNWAY FLOW RATES

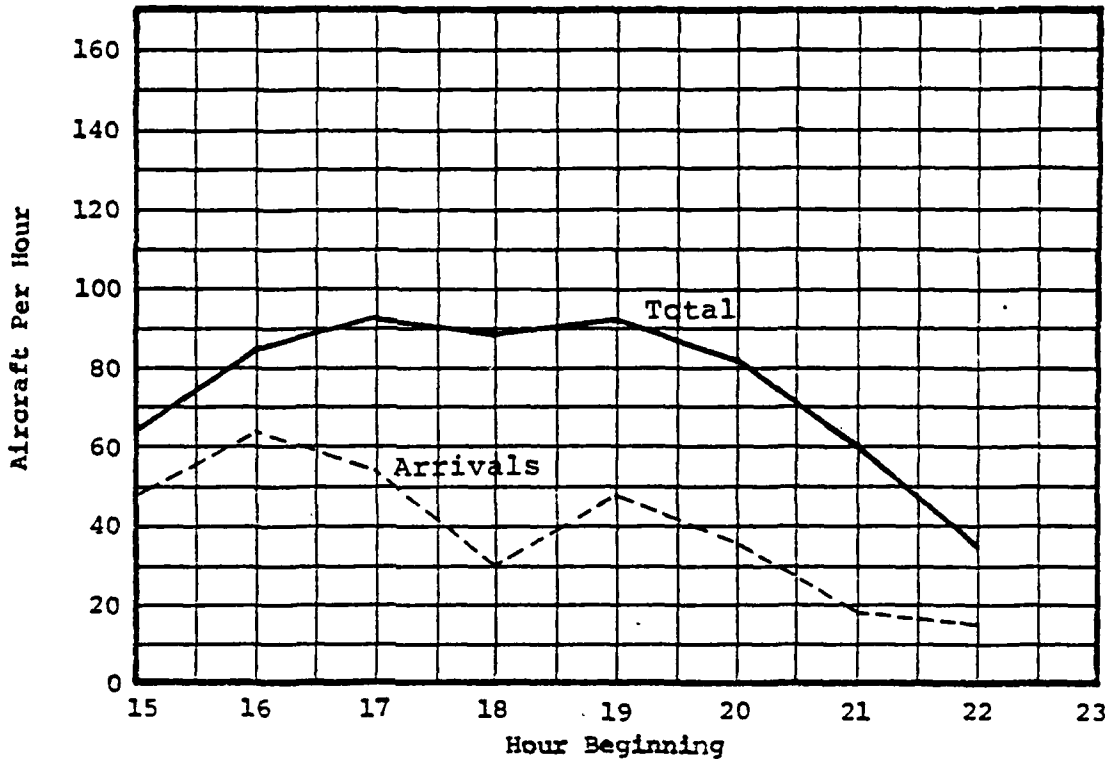
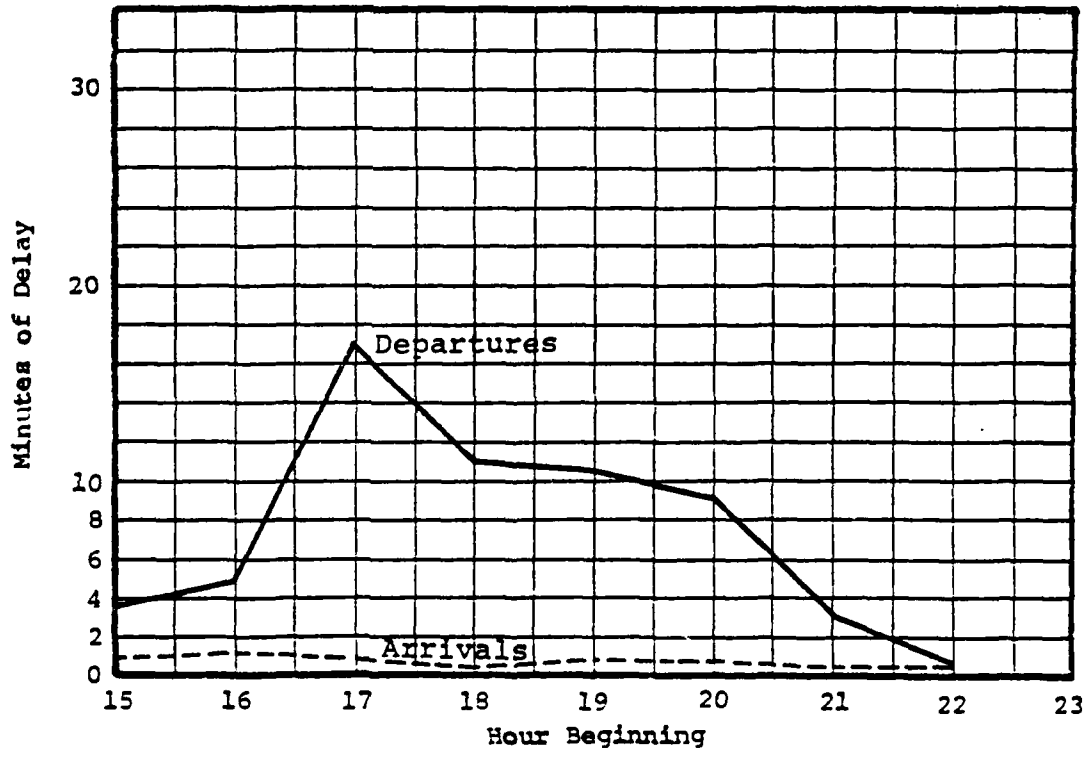


FIGURE 43b AVERAGE RUNWAY DELAYS



JFK - STAGE 2

Experiment No. 44

Objective:

To provide a sensitivity test of 1982 demand with the 1978 ATC Scenario (separations) in IFR1 weather.

Related Comparison Experiments:

Experiment 26 provides the comparison case with the 1982 ATC Scenario.

Length and Level of Detail of Simulation Run:

From 1500 to 2300 with 1-hour summaries.

Anticipated Results:

Greater arrival delays than in Experiment 26.

Summary Comparison:

Operation Type	Performance Measure	Units	This Experiment		Experiment No. 26	
			Average[a]	Peak[b]	Average[a]	Peak[b]
Arrival	Flow Rate	a/c per hr.	26.4	26	31.7	33
Arrival	Air Delay	min.	122.0	111.9	95.1	114.6
Arrival	Taxi-In Delay	min.		0.1		0.1
Departure	Flow Rate	a/c per hr.	29.6	38	31.7	38
Departure	Runway Delay	min.	4.2	7.9	5.9	9.2
Departure	Taxi-Out Delay	min.		0.4		0.4

a. Average over the entire simulation period.
b. For the peak-demand hour, 1900-2000, 5 hours into the simulation.

FIGURE 44a AVERAGE RUNWAY FLOW RATES

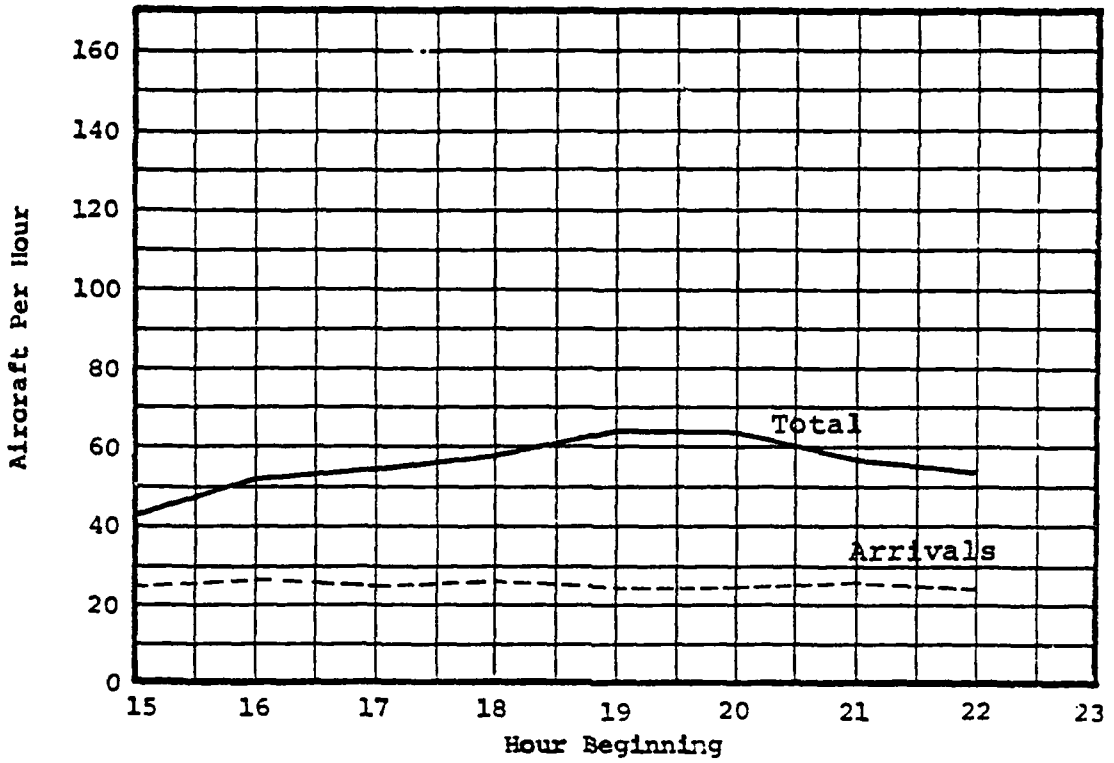
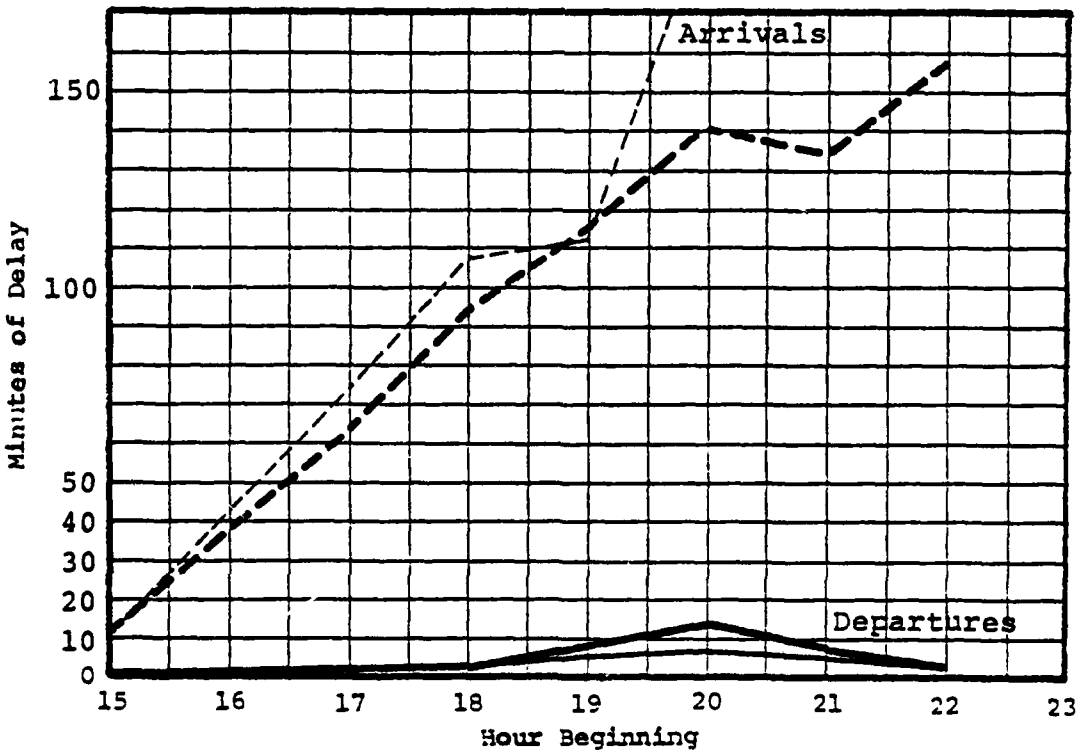


FIGURE 44b AVERAGE RUNWAY DELAYS



Experiment 26b Arrivals ▬ ▬ ▬ ▬
Departures ▬▬▬▬

JFK - STAGE 2

Experiment No. 45

Objective:

To provide a sensitivity test of 1987 demand with the 1978 ATC Scenario (separations) in IFR1 weather.

Related Comparison Experiments:

Experiment 35 provides the comparison case with the 1982 ATC Scenario.

Length and Level of Detail of Simulation Run:

From 1500 to 2300 with 1-hour summaries.

Anticipated Results:

Greater arrival delays than in Experiment 35.

Summary Comparison:

Operation Type	Performance Measure	Units	This Experiment		Experiment No. 35	
			Average[a]	Peak[b]	Average[a]	Peak[b]
Arrival	Flow Rate	a/c per hr.	25.8	27	39.6	47
Arrival	Air Delay	min.	131.9	144.0	32.5	41.8
Arrival	Taxi-In Delay	min.		0.2		0.2
Departure	Flow Rate	a/c per hr.	29.5	38	35.9	45
Departure	Runway Delay	min.	5.2	10.3	4.4	8.6
Departure	Taxi-Out Delay	min.		0.3		0.3

a. Average over the entire simulation period.
b. For the peak-demand hour, 1900-2000 hours, 5 hours into the simulation.

FIGURE 45a AVERAGE RUNWAY FLOW RATES

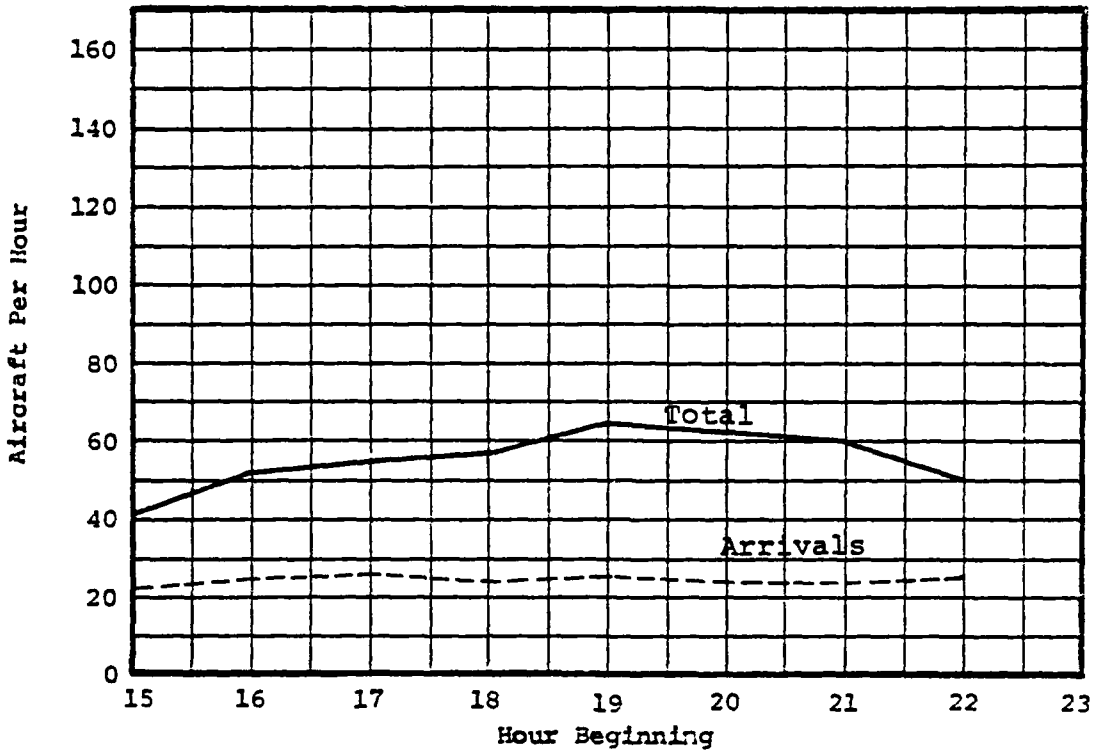
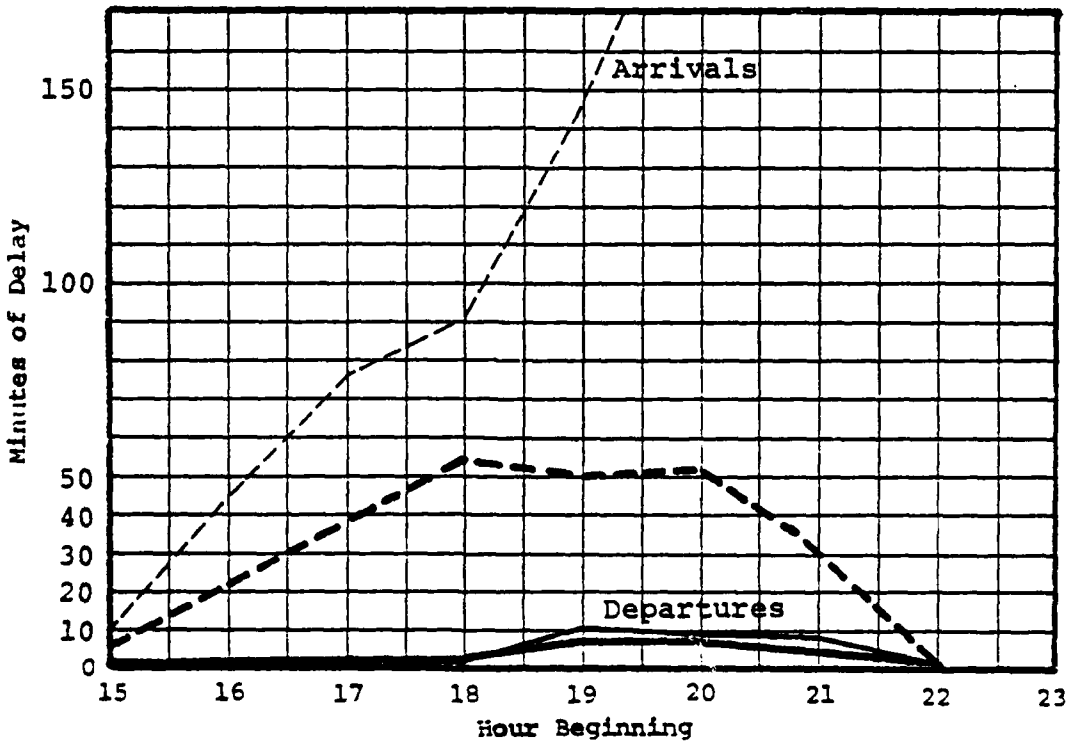


FIGURE 45b AVERAGE RUNWAY DELAYS



Expermiment 35b Arrivals ------
Departures ——————

Attachment D

JFK STAGE-2 SIMULATION EXPERIMENTS
INPUT SCHEDULES
(Hourly Demand by Class of Operation)
and
SHORT-FORM AIRFIELD NETWORKS

John F. Kennedy International Airport

New York

Airport Improvement Task Force Delay Studies

Peat, Marwick, Mitchell & Co.
San Francisco, California

June 1979

Table D-1

HOURLY DEMAND IN 1977 BY CLASS OF OPERATION
NEW YORK TASK FORCE DELAY STUDIES
John F. Kennedy International Airport

Hour	No. of Aircraft By Class A	B	C	D	Total Operations	OAG Scheduled	General Aviation
1500-1600	1	4	21	31	57	56	1
1600-1700	4	4	36	31	75	71	4
1700-1800	14	5	33	27	79	65	14
1800-1900	6	5	21	29	61	55	6
1900-2000	5	6	30	40	81	76	5
2000-2100	6	2	10	32	50	44	6
2100-2200	3	3	24	34	64	61	3
2200-2300	2	0	8	24	34	32	2
Totals	41	29	183	248	501	460	41
Percents	8.2	5.8	36.5	49.5	100		

Table D-2

HOURLY DEMAND IN 1982 BY CLASS OF OPERATION
NEW YORK TASK FORCE DELAY STUDIES
John F. Kennedy International Airport

Hour	No. of Aircraft By Class A	B	C	D	Total Operations	OAG Scheduled	General Aviation
1500-1600	5	11	29	22	67	57	10
1600-1700	5	8	28	50	91	83	8
1700-1800	5	10	38	46	99	88	11
1800-1900	4	8	31	29	72	67	5
1900-2000	5	10	39	48	102	94	8
2000-2100	2	4	34	31	71	68	3
2100-2200	2	4	29	28	63	61	2
2200-2300	0	1	12	17	30	30	0
Totals	28	56	240	271	595	548	47
Percents	4.7	9.4	40.3	45.6	100		

Table D-3

HOURLY DEMAND IN 1987 BY CLASS OF OPERATION
NEW YORK TASK FORCE DELAY STUDIES
John F. Kennedy International Airport

Hour	No. of Aircraft By Class				Total Operations	OAG Scheduled	General Aviation
	A	B	C	D			
1500-1600	3	13	7	45	68	58	10
1600-1700	3	10	14	66	93	85	8
1700-1800	4	11	14	71	100	89	11
1800-1900	3	9	7	54	73	68	5
1900-2000	4	11	14	74	103	95	8
2000-2100	2	4	15	51	72	69	3
2100-2200	2	4	9	49	64	62	2
2200-2300	0	1	7	22	30	30	0
Totals	21	63	87	432	603	556	47
Percents	3.5	10.5	14.4	71.6	100		

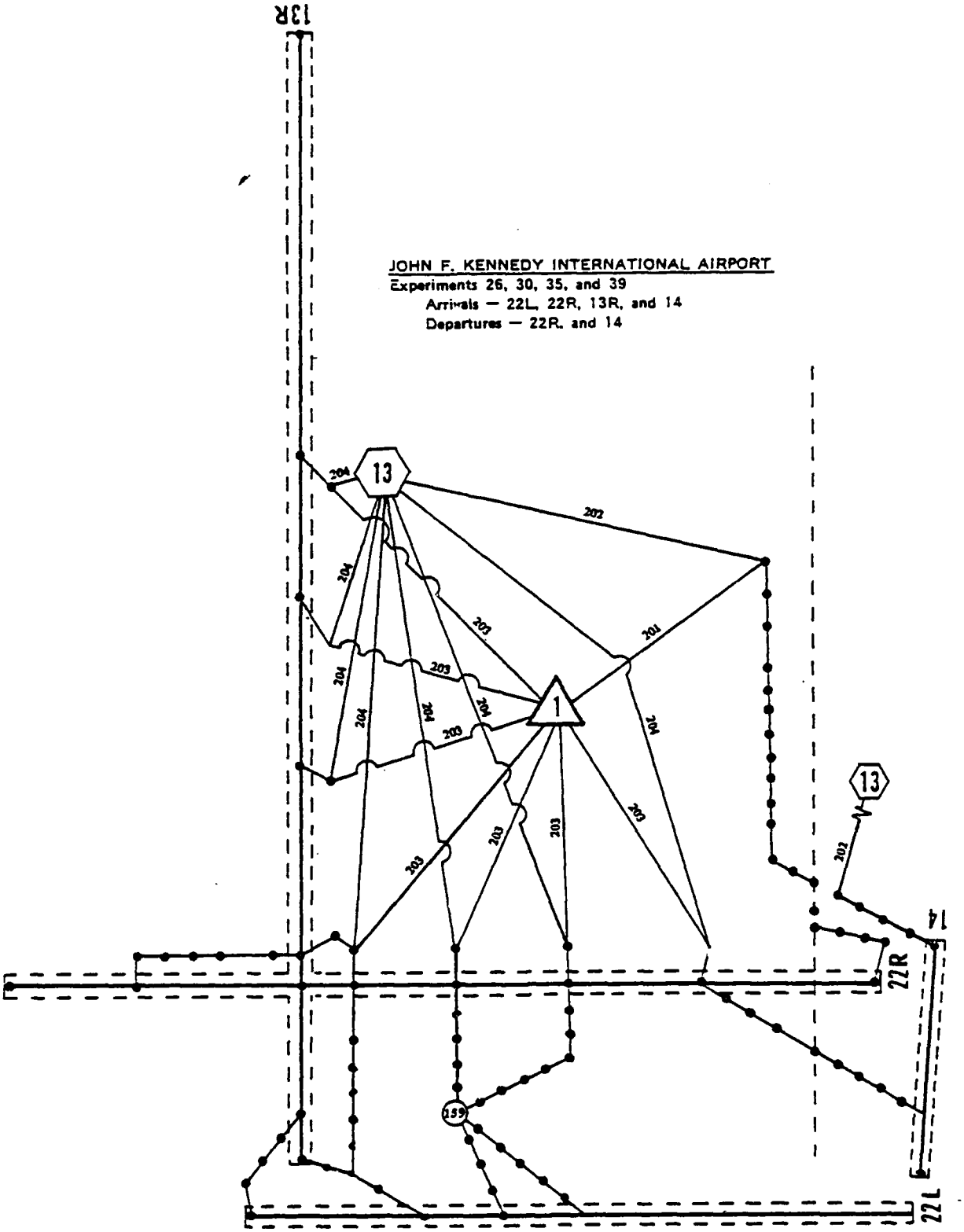


Figure D-1
JFK SHORT FORM
NETWORK NO. 1
PMM&Co.
June 1979

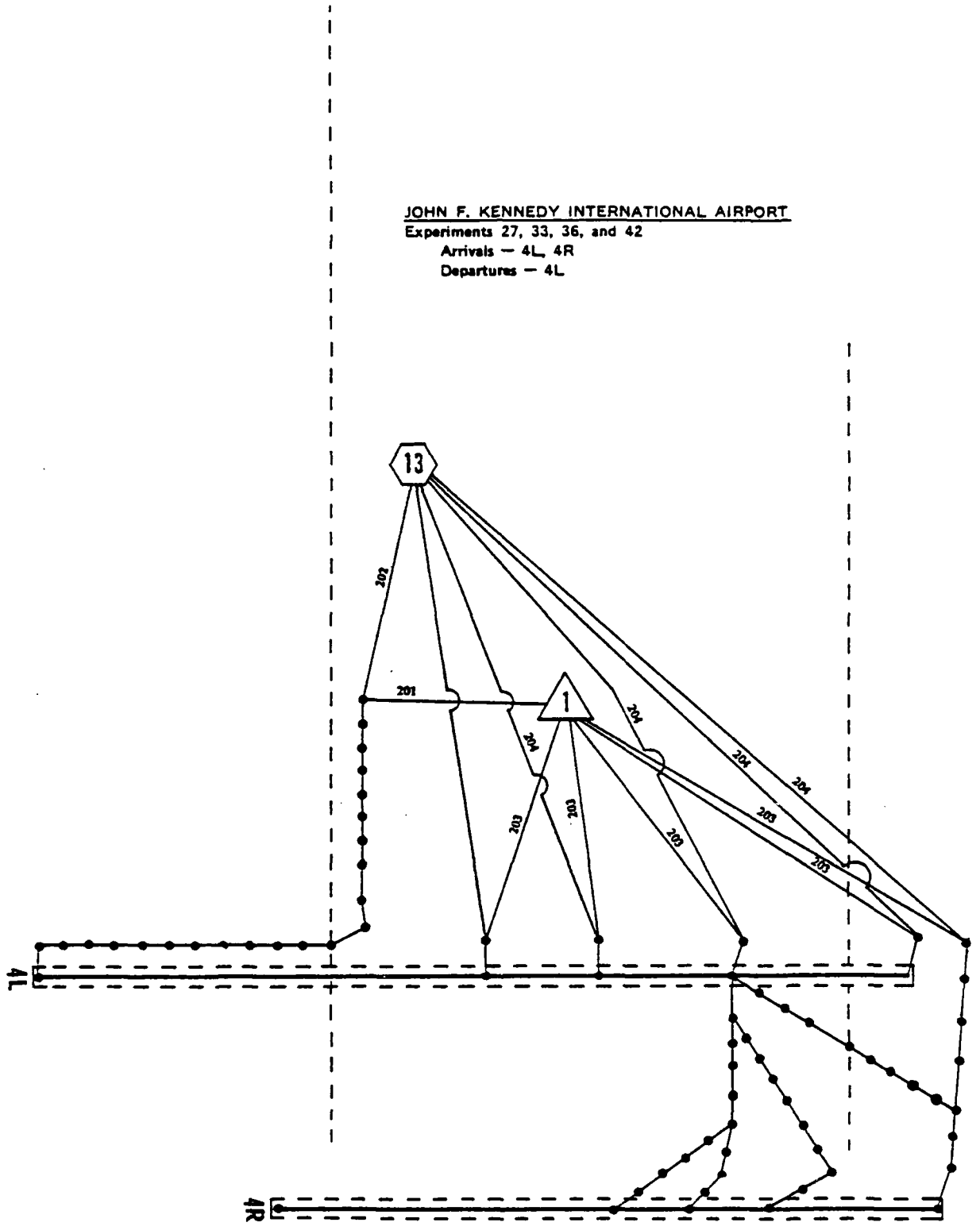


Figure D-2
JFK SHORT FORM
NETWORK NO. 2
PMM&Co.
June 1979

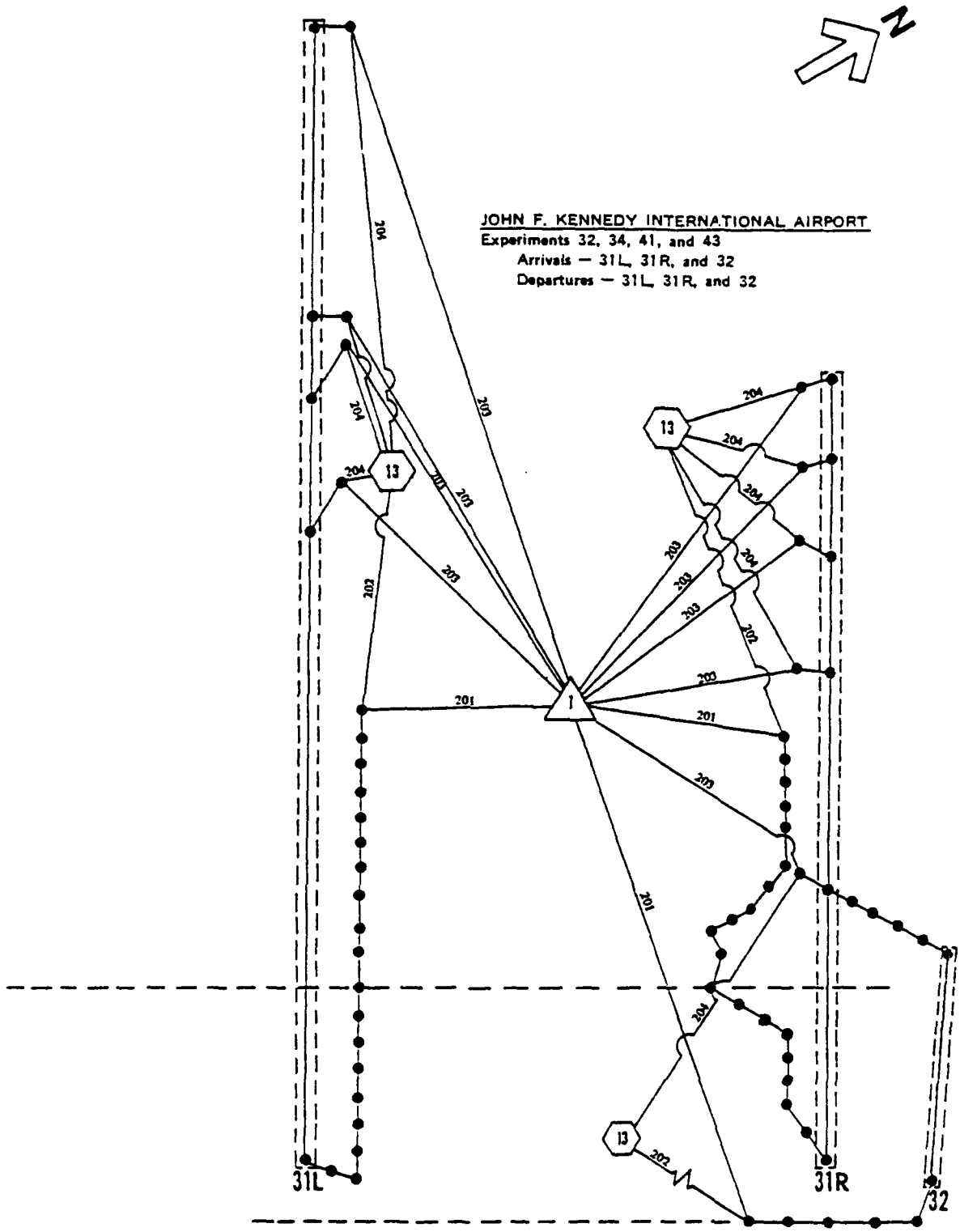


Figure D-3
JFK SHORT FORM
NETWORK NO. 3
PMM&Co.
June 1979

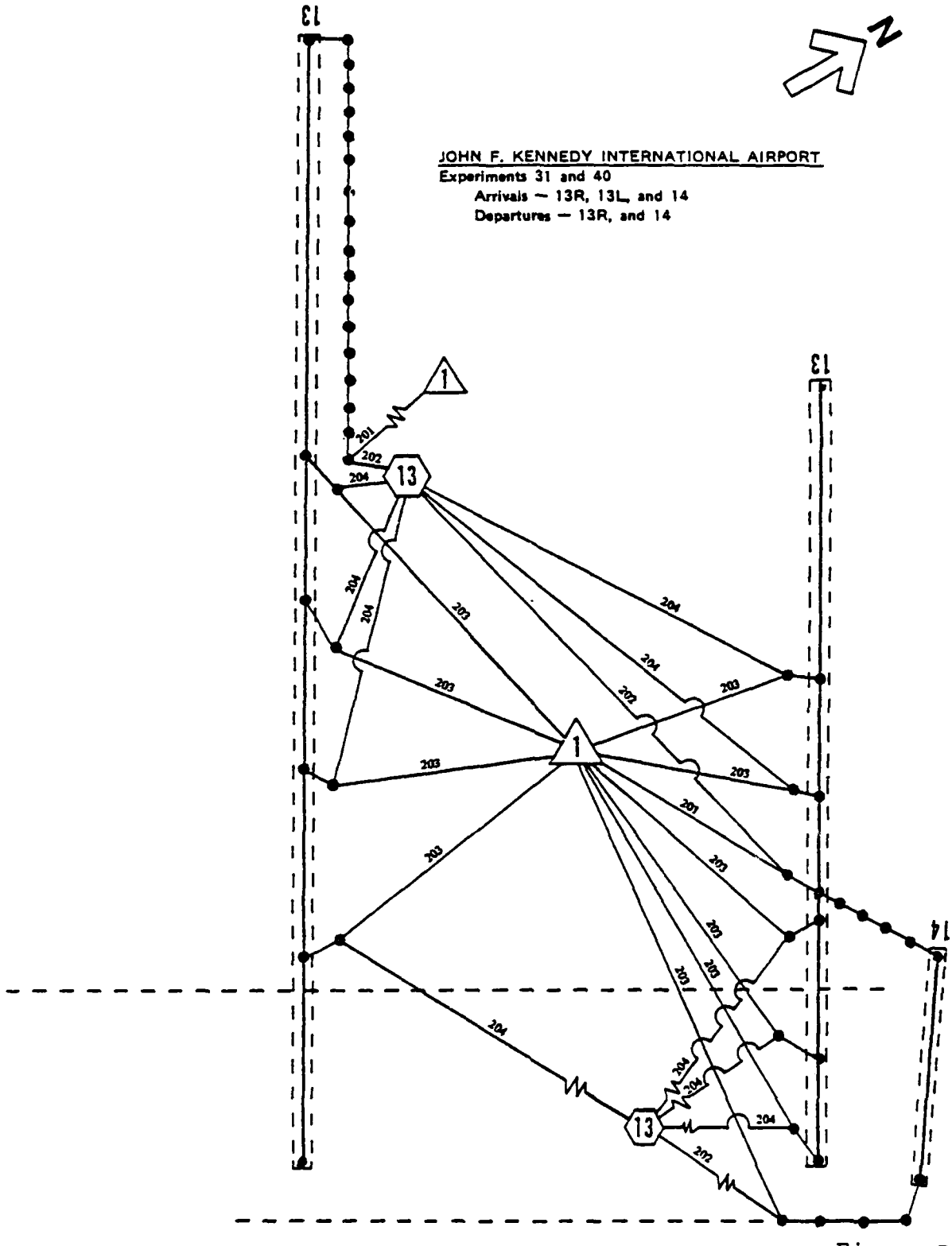


Figure D-4
JFK SHORT FORM
NETWORK NO. 4
PMM&Co.
June 1979

Attachment E

LGA STANDARD SEPARATION INPUTS

LaGuardia Airport

New York

Airport Improvement Task Force Delay Studies

Peat, Marwick, Mitchell & Co.
San Francisco, California

June 1979

Table E-1

NEW YORK TASK FORCE DELAY STUDIES
LaGUARDIA AIRPORT
Separation Inputs

(1) The average arrival-arrival separations used in the Stage-2 simulation experiments are from the Report No. FAA-EM-78-8A as follows (numbers are in nautical miles):

VFR (1978)

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	2.8	2.9	3.0	3.1
	B	3.6	2.9	3.0	3.1
	C	3.6	2.9	3.0	3.1
	D	5.4	4.6	4.7	3.9

IFR (1978)

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	3.8	3.8	3.9	4.0
	B	4.8	3.8	3.9	4.0
	C	4.8	3.8	3.9	4.0
	D	6.8	5.8	5.9	5.0

VFR (1982)

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	2.7	2.8	2.8	2.9
	B	3.5	2.8	2.8	2.9
	C	3.5	2.8	2.8	2.9
	D	4.8	3.9	3.9	3.7

Table E-1 (continued)

IFR (1982)

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	3.9	3.9	3.9	4.0
	B	3.9	3.9	3.9	4.0
	C	3.9	3.9	3.9	4.0
	D	4.9	3.9	3.9	4.0

VFR (1987)

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	2.5	2.5	2.6	2.6
	B	3.1	2.5	2.6	2.6
	C	3.1	2.5	2.6	2.6
	D	3.6	3.1	3.2	2.7

IFR (1987)

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	2.6	2.6	2.7	2.7
	B	3.1	2.6	2.7	2.7
	C	3.1	2.6	2.7	2.7
	D	3.6	3.1	3.2	2.7

(2) The average departure-departure separations used in the Stage-2 simulation experiments are the same as those used in the Phase I Capacity Study; or as specified in Report No. FAA-EM-78-8A, whichever gives the larger values, as follows (numbers are in seconds):

VFR (1978 and 1982)

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	40	45	75	86
	B	45	70	70	79
	C	45	70	70	79
	D	120	120	120	90

Table E-1 (continued)

IFR (1978 and 1982)

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	60	60	75	86
	B	60	70	70	79
	C	60	70	70	79
	D	120	120	120	90

VFR (1987)

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	40	45	75	86
	B	45	70	70	79
	C	45	70	70	79
	D	60	70	70	79

IFR (1987)

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	60	60	75	86
	B	60	70	70	79
	C	60	70	70	79
	D	60	70	70	79

(3) The departure-arrival and arrival-departure separations are the same as those used in the Phase I Capacity Study, except as corrected in discussions with LGA Tower personnel.

Attachment F

JFK STANDARD SEPARATION INPUTS

John F. Kennedy International Airport

New York

Airport Improvement Task Force Delay Studies

Peat, Marwick, Mitchell & Co.
San Francisco, California

June 1979

Table F-1

NEW YORK TASK FORCE DELAY STUDIES
JOHN F. KENNEDY INTERNATIONAL AIRPORT
Separation Inputs

(1) The average arrival-arrival separations used in the Stage-2 simulation experiments are from the Report No. FAA-EM-78-8A, as follows (numbers are in nautical miles):

VFR (1978)

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	2.9	2.9	3.0	3.1
	B	3.7	2.9	3.0	3.1
	C	3.7	2.9	3.0	3.1
	D	5.5	4.6	4.7	3.9

IFR (1978)

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	4.0	4.0	4.1	4.2
	B	5.0	4.0	4.1	4.2
	C	5.0	4.0	4.1	4.2
	D	7.0	6.0	6.1	5.2

VFR (1982)

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	2.8	2.8	2.8	2.9
	B	3.6	2.8	2.8	2.9
	C	3.6	2.8	2.8	2.9
	D	4.9	3.9	3.9	3.7

Table F-1 (continued)

IFR (1982)

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	3.9	3.9	3.9	4.0
	B	3.9	3.9	3.9	4.0
	C	3.9	3.9	3.9	4.0
	D	4.9	3.9	3.9	4.0

VFR (1987)

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	2.5	2.5	2.6	2.6
	B	3.1	2.5	2.6	2.6
	C	3.1	2.5	2.6	2.6
	D	3.6	3.1	3.2	2.7

IFR (1987)

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	2.6	2.6	2.7	2.7
	B	3.1	2.6	2.7	2.7
	C	3.1	2.6	2.7	2.7
	D	3.6	3.1	3.2	2.7

(2) The average departure-departure separations used in the Stage-2 simulation experiments are the same as those used in the Phase I Capacity Study; or as specified in Report No. FAA-EM-78-8A, whichever gives the larger values, as follows (numbers are in seconds):

VFR (1978 and 1982)

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	35	45	45	50
	B	50	60	60	60
	C	50	60	60	60
	D	120	120	120	90

Table F-1 (continued)

IFR (1978 and 1982)

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	60	60	60	60
	B	60	60	60	60
	C	60	60	60	60
	D	120	120	120	90

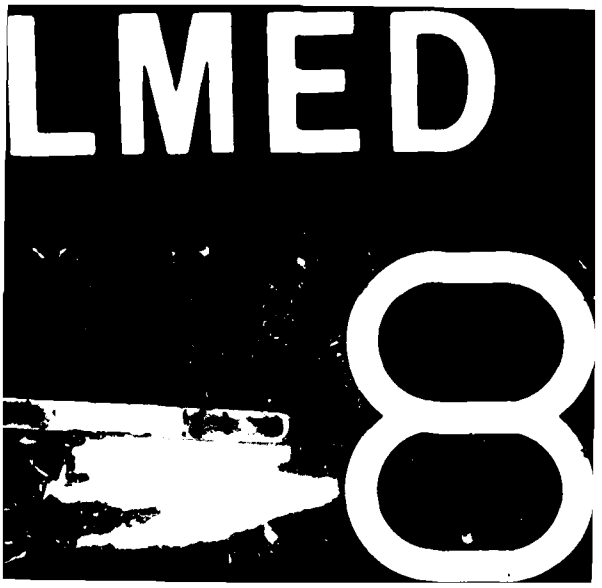
VFR (1987)

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	35	45	45	50
	B	50	60	60	60
	C	50	60	60	60
	D	60	60	60	60

IFR (1987)

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	60	60	60	60
	B	60	60	60	60
	C	60	60	60	60
	D	60	60	60	60

(3) The departure-arrival and arrival-departure separations are the same as those used in the Phase I Capacity Study, except as corrected in discussions with JFK Tower personnel.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