

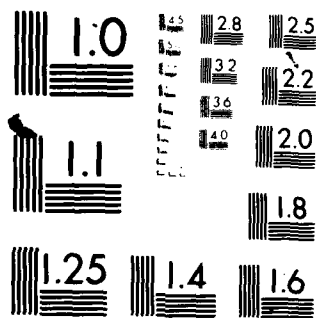
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NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATL--ETC F/6 1/2
LOS ANGELES INTERNATIONAL AIRPORT DATA PACKAGE NUMBER 2, AIRPOR--ETC(U)
JAN 79

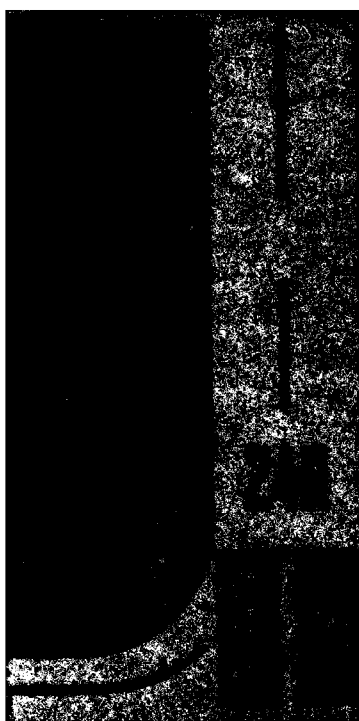
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



**DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION**

DATE: December 18, 1978

IN REPLY
REFER TO: ANA-220

**NATIONAL AVIATION FACILITIES
EXPERIMENTAL CENTER
ATLANTIC CITY, NEW JERSEY 08408**



SUBJECT: Los Angeles Simulation Model Calibration Results and
Input Data Summary for Stage 1 Experiments

FROM: NAFEC Program Manager, ANA-220

to: Ray Fowler, AEM-100

Enclosed are data packages for use during the third Task Force meeting on January 22, 1979.

Attachment A presents the results of the Simulation Model Calibration.

Attachment B contains the model input data for Configurations A, B, and C.

Attachment C contains the model input summary for the Los Angeles Stage 1 Experiments.

Attachment D contains preliminary data for the Los Angeles Stage 2 Experiments.

These attachments should be reviewed, revised, and approved by the Los Angeles Task Force prior to use in the model runs.

John R. Vanderveer
JOHN R. VANDERVEER

Enclosure

✓

A

Table of Contents

Item	Description	Page
1	Attachment A - Simulation Model Calibration Output	1
2	Attachment B - Configurations A, B, and C Model Input Data	7
3	Attachment C - Model Input Summaries for Stage 1 Experiments	35
4	Attachment D - Preliminary Model Input Data for Stage 2 Experiments	86

ATTACHMENT A

SIMULATION MODEL
CALIBRATION OUTPUT DATA

- A. FLOW RATES
- B. DELAYS
- C. TRAVEL TIMES

} SEE HOURLY SUMMARY (TABLE 1) AND
QUARTER HOUR FIGURES 1 TO 5

Los Angeles International Airport

Los Angeles
Airport Improvement Task Force Delay Studies

January 1979

Table 1

Hourly Comparison of Output Data
for Simulation Model Calibration

Time	Arrival Flow Rate <u>Data Model (S.D.)</u>			Departure Flow Rate <u>Data Model (S.D.)</u>		
1800-1900	50	50	(0.48)	51	50	(1.69)
1900-2000	34	34	(0.48)	53	58	(1.14)
2000-2100	39	39	(0.52)	52	49	(1.41)

Time	Average Arrival Air Delay (minutes) <u>Data Model (S.D.)</u>			Average Fix to Threshold Travel Time (minutes) <u>Data Model (S.D.)</u>		
1800-1900	0.92	1.69	(0.34)	9.33	7.84	(0.36)
1900-2000	1.31	1.04	(0.18)	9.69	9.39	(0.19)
2000-2100	1.12	0.60	(0.05)	9.75	8.72	(0.14)

Time	Average Arrival Threshold to Gate Travel Time (minutes) <u>Data Model (S. D.)</u>			Average Departure Gate to Roll Travel Times (minutes) <u>Data Model (S. D.)</u>		
1800-1900	3.56	3.46	(0.11)	8.82	10.67	(1.21)
1900-2000	3.96	3.64	(0.15)	10.93	10.61	(1.67)
2000-2100	2.87	3.56	(0.25)	8.63	7.32	(0.40)

Figure 1
9/20/78
ARRIVAL FLOW RATE

MODEL x-x

DATA —

TOTAL FLOW RATE IN QUARTER HOUR

17:00 (CONT) 18:00 19:00 20:00 21:00
TIME IN QUARTER HOUR

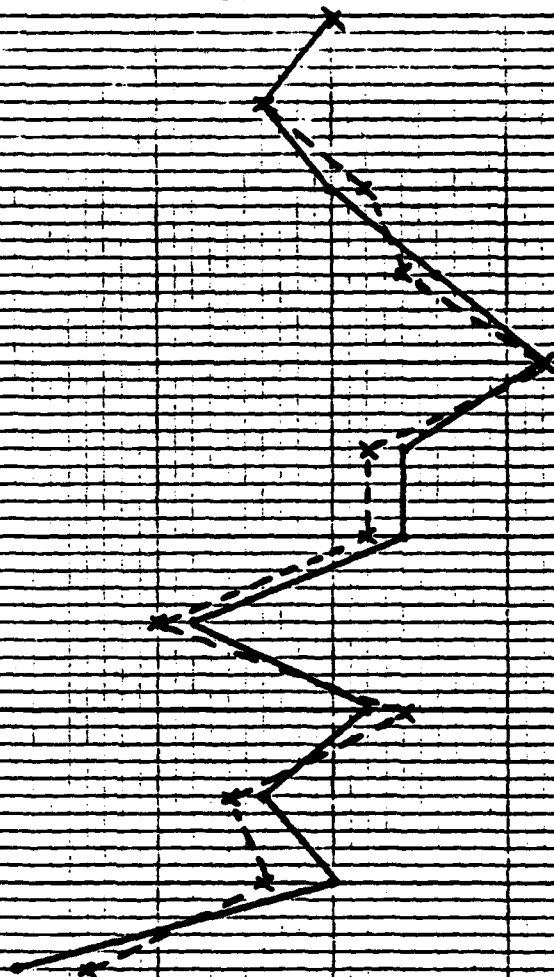


FIGURE
9/28/78

DEPARTURE FLOW RATE

MODEL $\cdots \times$

DATA ---

TOTAL FLOW RATE IN QUARTER HOUR

17:00 (ENT) 18:00 19:00 20:00 21:00
TIME IN QUARTER HOUR

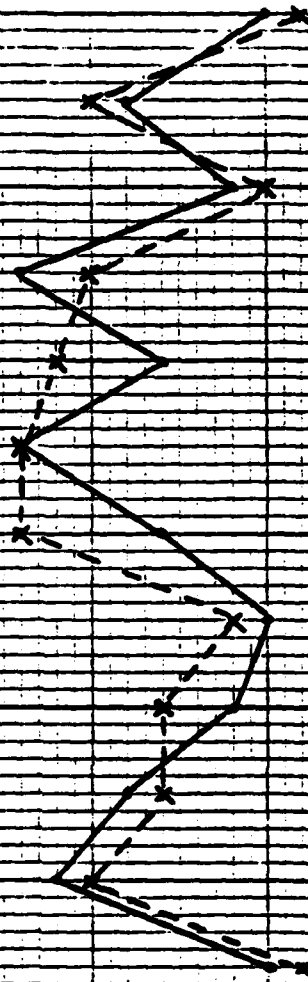


FIGURE 3
9/20/78

ARRIVAL DELAY

MODEL X-X

DATA —●—

MINUTES OF DELAY (AVERAGE)

17:00 (GMT)

18:00

19:00

20:00

21:00

TIME IN QUARTER HOUR

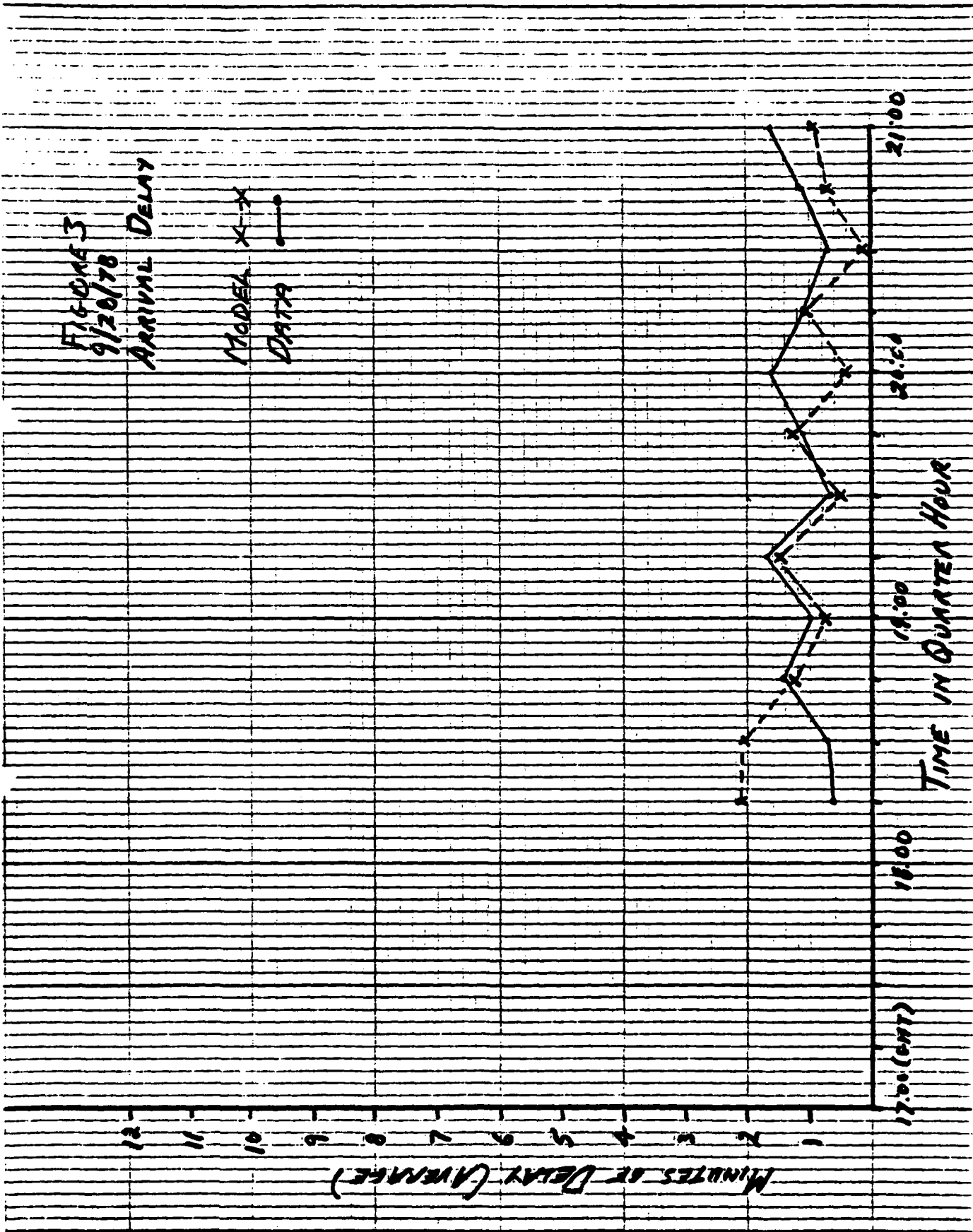


FIGURE 4
9/20/78
ARRIVAL TRAVEL TIMES

HARPER X-X
DATA - - -

MINUTES OF TRAVEL TIME (AVERAGE)

FIX TO THRESHOLD

THRESHOLD TO GATE

TIME IN QUARTER HOUR

17:00 (GMT) 18:00 19:00 20:00 21:00

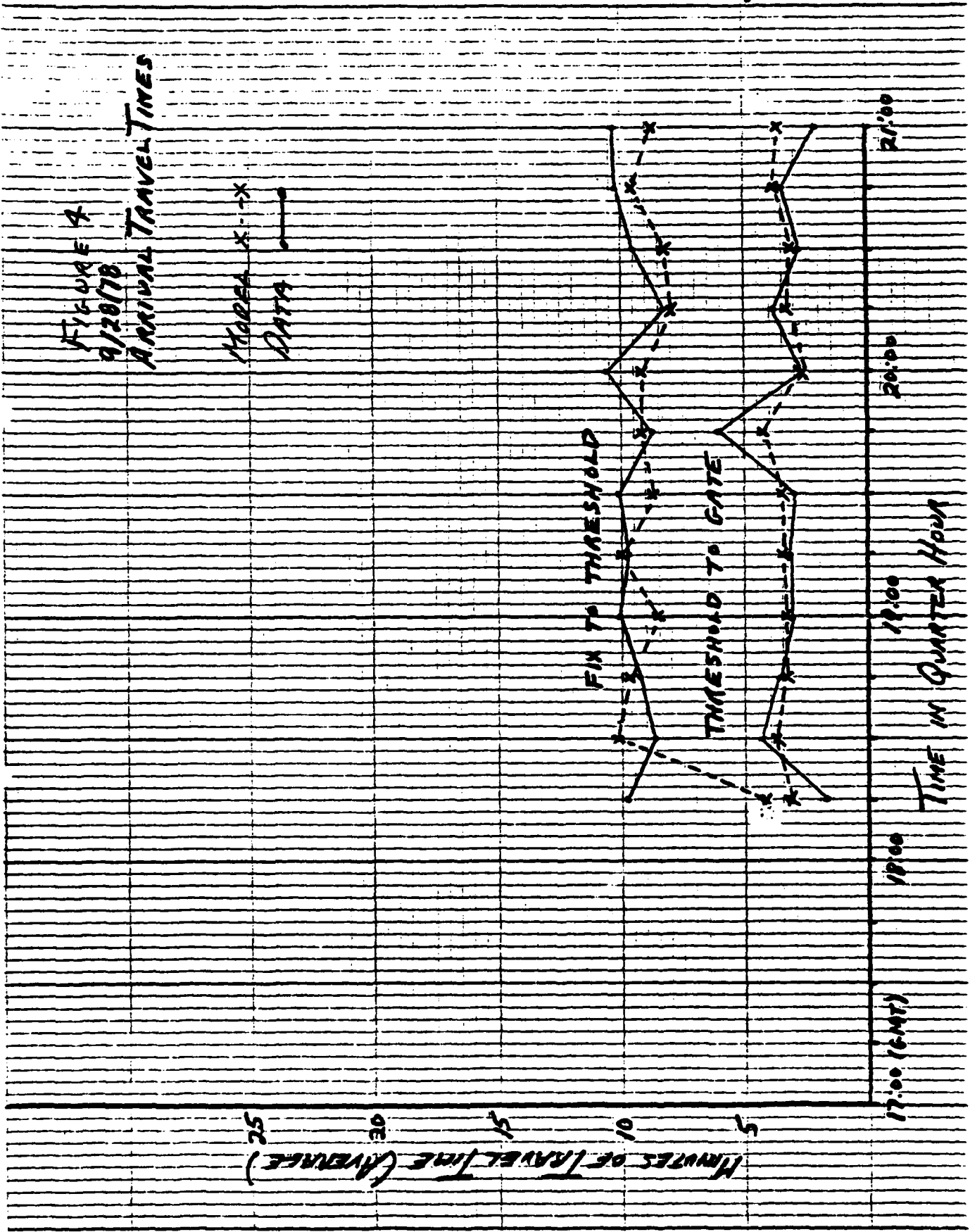


FIGURE 5
9/28/78

DEPARTURE TRAVEL TIME

MODEL x--x

DATA —

MINUTES OF TRAVEL TIME (AVERAGE)

GATE TO ROLL

17:00 (GMT)

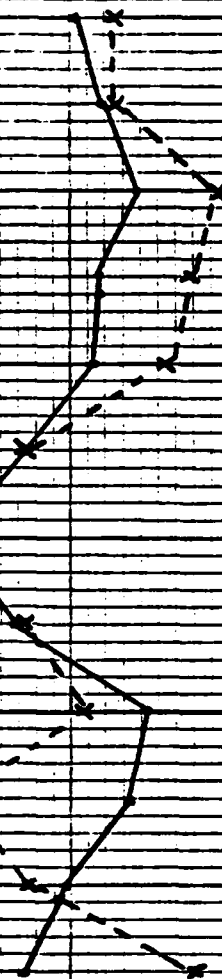
18:00

19:00

20:00

21:00

TIME IN QUARTER HOUR

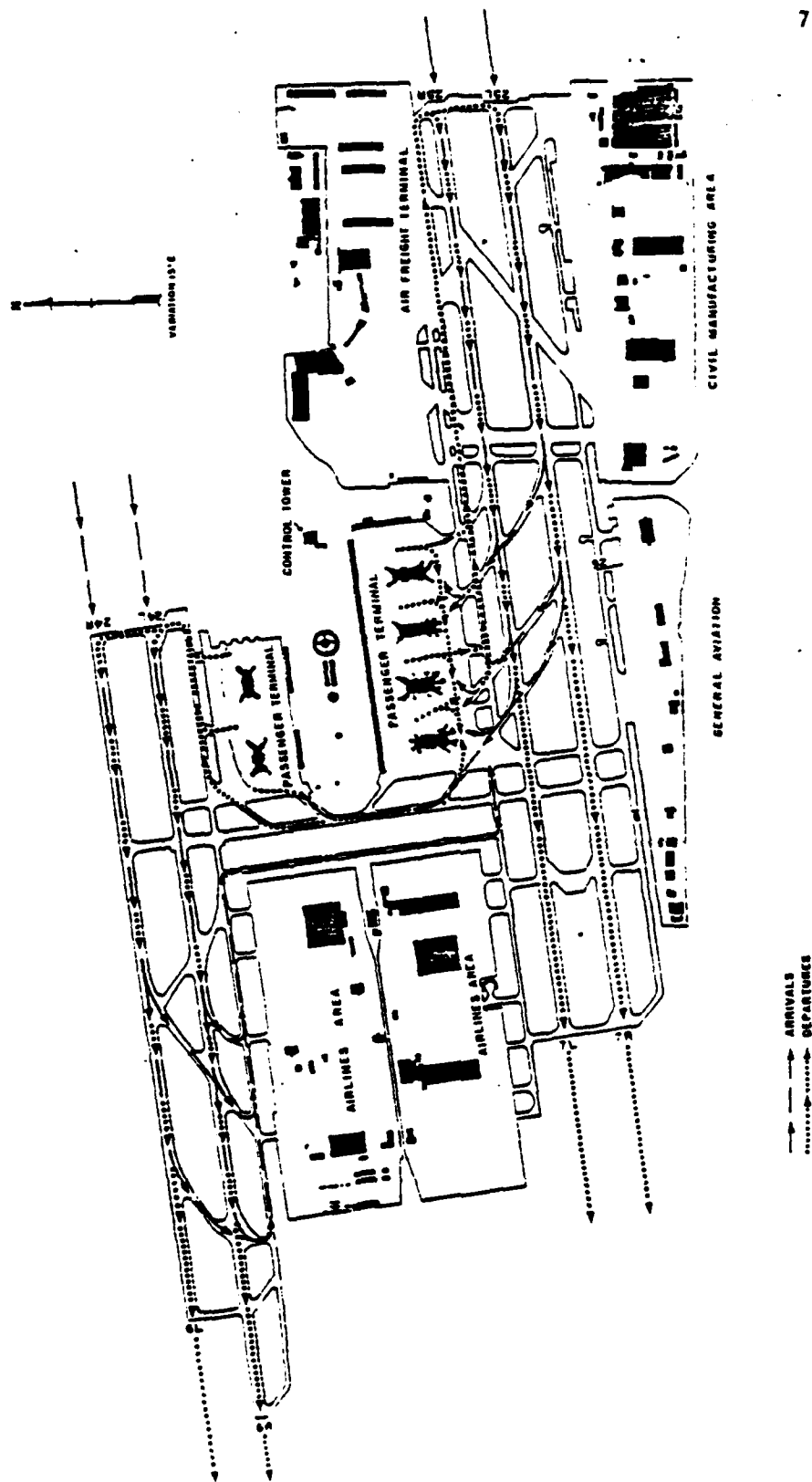


ATTACHMENT B
Configurations A, B, and C
Model Input Data

Los Angeles International Airport

Los Angeles
Airport Improvement Task Force Delay Studies

January 1979



Configuration A
Figure 6 ARRIVAL/DEPARTURE TAXI ROUTES

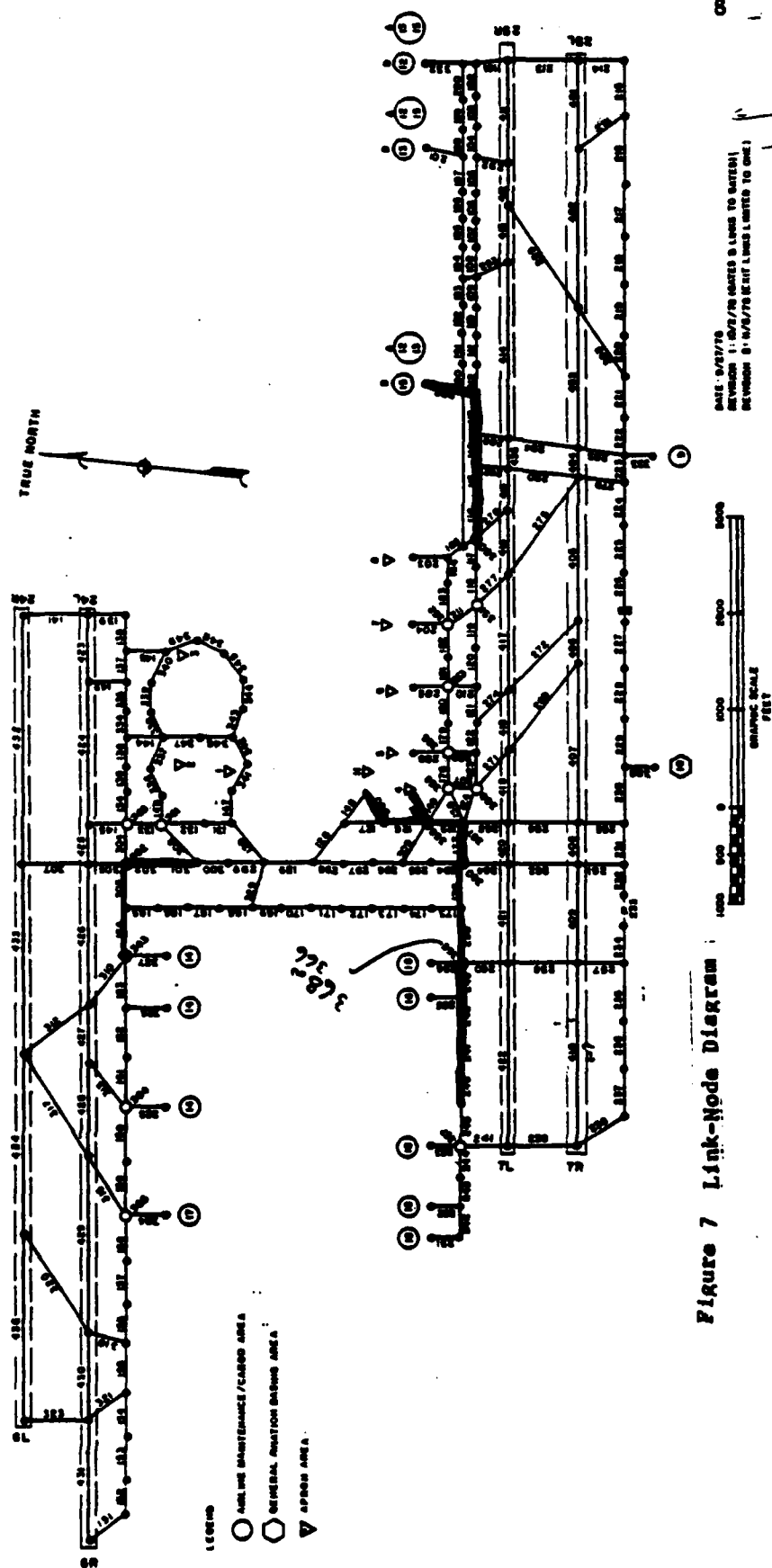


Figure 7 Link-Node Diagram

INPUT DATA

LCS ANGELES INTERNATIONAL AIRPORT SIMULATION MODEL CALIBRATION RUN

NUMBER OF RANDOM NUMBER SEEDS

RANDOM NUMBER SEEDS				
82651	91921	69011	92157	14577
			10493	27011
			40961	15011
				63661

START TIME AND FINISH TIME

103 0 213 5

Paint Options

100

NUMBER OF AIRLINES

61

[illegible]

NUMBER OF RUNWAYS

5.

RUNWAY NAMES	
26R	25L
26R	25R
26R	25L

SAFARIWAY END LINK NUMBERS

32	423	411	104
----	-----	-----	-----

RUNWAY CROSSING		LINKS--CLEARANCE		TIMES FOR A/C CROSSING		ACTIVE RUNWAY	
XV6	LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL		
307			25. 25.	331. 35.	22. 221. 23.	26. 20.	20. 20. 20.
XV0	LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL		
312			42. 42.	461. 35.	31. 31. 33.	42. 20.	20. 20. 20.
XV8	LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL		
317			52. 52.	461. 35.	36. 36. 39.	42. 20.	20. 20. 20.
XV8	LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL		
320			56. 54.	461. 35.	43. 43. 42.	42. 20.	20. 20. 20.
XV8	LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL		
323			56. 54.	461. 35.	46. 46. 42.	42. 20.	20. 20. 20.
XV8	LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL		
284			38. 38.	471. 45.	29. 291. 21.	42. 20.	20. 20. 20.
XV0	LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL		
275			51. 51.	601. 45.	35. 35. 37.	42. 20.	20. 20. 20.
XV0	LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL		
272			52. 56.	721. 45.	42. 42. 42.	42. 20.	20. 20. 20.
XV8	LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL		
269			52. 56.	721. 45.	43. 43. 42.	42. 20.	20. 20. 20.
XV8	LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL		
266			52. 56.	721. 45.	45. 45. 42.	42. 20.	20. 20. 20.
XV8	LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL		
262			67. 62.	601. 52.	461. 46. 42.	42. 20.	20. 20. 20.
XV8	LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL		
258			67. 62.	60. 52.	47. 47. 42.	42. 20.	20. 20. 20.
XV8	LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL		
265			67. 62.	601. 52.	44. 44. 42.	42. 20.	20. 20. 20.
XV0	LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL		
283			38. 38.	67. 52.	29. 29. 31.	42. 20.	20. 20. 20.

RUNWAY CROSSING TIME AND INTERARRIVAL GAP

LINK	DELAY	MEAN	STD DEV
307	5.00	1.50	.50
312	5.00	1.50	.50
317	5.00	1.50	.50
320	5.00	1.50	.50
323	5.00	1.50	.50
324	5.00	1.50	.50
325	5.00	1.50	.50
327	5.00	1.50	.50
329	5.00	1.50	.50
336	5.00	1.50	.50
342	5.00	1.50	.50
345	5.00	1.50	.50
347	5.00	1.50	.50

NUMBER OF EXITS
21

LINK	CROSSING TIME	INTERARRIVAL GAP	EXIT LINK NO.	VERSUS DISTANCE
307	2500.0	312 4500.0	320 6400.0	323 8290.0
315	2200.0	305 2600.0	313 4600.0	315 5500.0
318	7500.0	277 5350.0	271 7550.0	268 7820.0
284	3000.0	275 4200.0	269 6150.0	266 7780.0
262	8250.0			

NUMBER OF HOLDING AREAS
1

HOLDING AREA NUMBERS
99

NUMBER OF B/A BASING AREAS
1

B/A BASING AREA NUMBERS
9

AIRLINE GATES

11	1	2
12	3	
13	10	
C1	11	
PS	2	
TE	0	
TD	2	
UA	7	0
WA	5	0
AA	6	
AR	1	
A2	6	
A1	5	
14	1	3
CO	7	
ND	6	
BA	2	
FT	12	
GA	9	

TRUNCATION LIMITS

UPPER LIMIT = 3100
LOWER LIMIT = 3100

DEPARTURE QUEUE LENGTH AND INTERARRIVAL GAP
QUEUE = 5 MEAN = 2.00 STD DEV = 0.00

LENGTHS OF COMMON APPROACH PATHS FROM OUTER MARKER THRESHOLD IN NAUTICAL MILES (RUNWAY) A/C CLASS. LENGTH

1	1	0.00
1	2	0.00
1	3	2.00
1	4	2.00
2	1	0.00
2	2	0.00
2	3	2.00
2	4	2.00
3	1	0.00
3	2	0.00
3	3	2.00
3	4	2.00
4	1	0.00
4	2	0.00
4	3	2.00
4	4	2.00

TAXIWAY PATH DATA

THIS AIRPORT USES THE FOLLOWING
 LINKS 266 PATHS 540
 AVERAGE PATH LENGTH IS 24.91 SEGMENTS

PATH SEGMENTS 13449

LINKS 5	110	115	116	113		
LINKS 6	300	362	303			
LINKS 4	362	304	360			
LINKS 6	300	362	303	164	363	
LINKS 6	160	303	362	304	300	
LINKS 10	300	362	303	164	363	163
LINKS 10	101	162	163	363	164	363
LINKS 14	300	362	303	164	363	163
LINKS 14	150	365	324			
LINKS 14	365	150	160	364	161	162
LINKS 14	363	304	300			363
LINKS 14						164

VECTORS DELAY INPUTS	FIX	DELAY EVALUATION LEVEL	HOLDING PCT.	MAXIMUM VECTORS DELAY	MINIMUM HOLDING DELAY
1	10.00	100.00	100.00	10.00	0.00
2	10.00	100.00	100.00	10.00	0.00
3	10.00	100.00	100.00	10.00	0.00
4	10.00	100.00	100.00	10.00	0.00
5	10.00	100.00	100.00	10.00	0.00
6	10.00	100.00	100.00	10.00	0.00
7	10.00	100.00	100.00	10.00	0.00
8	10.00	100.00	100.00	10.00	0.00
10	10.00	100.00	100.00	10.00	0.00

TAKE-OFF QUEUE SWITCH FOR RUNWAY 1 = 99

TAKE-OFF QUEUE SWITCH FOR RUNWAY 2 = 99

TAKE-OFF QUEUE SWITCH FOR RUNWAY 3 = 99

TAKE-OFF QUEUE SWITCH FOR RUNWAY 4 = 99

TAKE-OFF QUEUE SWITCH FOR RUNWAY 5 = 0

GATE HOLD LIMIT = 9 HOLD TIME = 2.00

GATE HOLD LIMIT = 9 HOLD TIME = 2.00

GATE HOLD LIMIT = 9 HOLD TIME = 2.00

GATE HOLD LIMIT = 9 HOLD TIME = 2.00

AIRSPACE DELAYS
FIX OCCURRENCE PERCENTAGE HOLD MEAN HOLD SIGMA

A/C DEPARTURE RUNWAY OCCUPANCY TIME IN SECONDS (A/C CLASS, MEAN, AND STD. DEV.)	1	30.00	4.00
	2	30.00	4.00
	3	34.00	4.00
	4	34.00	4.00

TOUCH-AND-GO RUNWAY OCCUPANCY TIME IN SECONDS (A/C CLASS, MEAN, AND STD. DEV.)

	1	0.00	0.00
	2	0.00	0.00
	3	0.00	0.00
	4	0.00	0.00

GATE SERVICE TIME DISTRIBUTION (PROBABILITY VS TIME)

CLASS 1	0.00
CLASS 2	0.00
CLASS 3	0.00
CLASS 4	0.00

A/C APPROACH SPEED IN KNOTS (A/C CLASS, MEAN, STD. DEV.)

	1	140.00	5.00
	2	120.00	5.00
	3	120.00	5.00
	4	120.00	5.00

RUNWAY EXIT SELECTION--USAGE PERCENTAGE BY EACH A. CLASS AND BY EACH RUNWAY EXIT LINK VERSUS PROBABILITY)

CLASS 1 RMY 1	320.	.93	323.	1.00		
CLASS 1 RMY 2	317.					
CLASS 2 RMY 1	312.	.35	317.	.67	320.	.97 323. 1.00
CLASS 2 RMY 2	307.					
CLASS 3 RMY 1	312.	.00	317.	1.00		
CLASS 3 RMY 2	317.	1.00				
CLASS 4 RMY 1	313.	.20	315.	.53	318.	1.00
CLASS 4 RMY 2	305.	.26	310.	.34	313.	.37 315. .67
CLASS 5 RMY 1	305.	.03	310.	.90	313.	.94 315. .97
CLASS 5 RMY 2	305.	1.00				
CLASS 6 RMY 1	271.	1.00				
CLASS 6 RMY 2	274.	.01	271.	1.00		
CLASS 7 RMY 1	274.	.50	271.	.00	268.	1.00
CLASS 7 RMY 2	271.	1.00				
CLASS 8 RMY 1	272.	.31	269.	.06	262.	1.00
CLASS 8 RMY 2	272.	.45	269.	.05	262.	1.00
CLASS 9 RMY 1	272.	.25	269.	.29	262.	.45 284. 1.00
CLASS 9 RMY 2	272.	.90	269.	.50	284.	1.00
CLASS 10 RMY 1	275.					
CLASS 10 RMY 2	275.					
CLASS 11 RMY 1	275.					
CLASS 11 RMY 2	275.					
CLASS 12 RMY 1	275.					
CLASS 12 RMY 2	275.					
CLASS 13 RMY 1	275.					
CLASS 13 RMY 2	275.					
CLASS 14 RMY 1	275.					
CLASS 14 RMY 2	275.					
CLASS 15 RMY 1	275.					
CLASS 15 RMY 2	275.					
CLASS 16 RMY 1	275.					
CLASS 16 RMY 2	275.					
CLASS 17 RMY 1	275.					
CLASS 17 RMY 2	275.					
CLASS 18 RMY 1	275.					
CLASS 18 RMY 2	275.					
CLASS 19 RMY 1	275.					
CLASS 19 RMY 2	275.					
CLASS 20 RMY 1	275.					
CLASS 20 RMY 2	275.					
CLASS 21 RMY 1	275.					
CLASS 21 RMY 2	275.					
CLASS 22 RMY 1	275.					
CLASS 22 RMY 2	275.					
CLASS 23 RMY 1	275.					
CLASS 23 RMY 2	275.					
CLASS 24 RMY 1	275.					
CLASS 24 RMY 2	275.					
CLASS 25 RMY 1	275.					
CLASS 25 RMY 2	275.					
CLASS 26 RMY 1	275.					
CLASS 26 RMY 2	275.					
CLASS 27 RMY 1	275.					
CLASS 27 RMY 2	275.					
CLASS 28 RMY 1	275.					
CLASS 28 RMY 2	275.					
CLASS 29 RMY 1	275.					
CLASS 29 RMY 2	275.					
CLASS 30 RMY 1	275.					
CLASS 30 RMY 2	275.					
CLASS 31 RMY 1	275.					
CLASS 31 RMY 2	275.					
CLASS 32 RMY 1	275.					
CLASS 32 RMY 2	275.					
CLASS 33 RMY 1	275.					
CLASS 33 RMY 2	275.					
CLASS 34 RMY 1	275.					
CLASS 34 RMY 2	275.					
CLASS 35 RMY 1	275.					
CLASS 35 RMY 2	275.					

THE ARRIVAL RUNWAY OCCUPANCY TIME IN SECONDS BY A/C CLASS (DISTANCE IN FEET FROM THRESHOLD TO EXIT TAXIWAY VERSUS TIME)

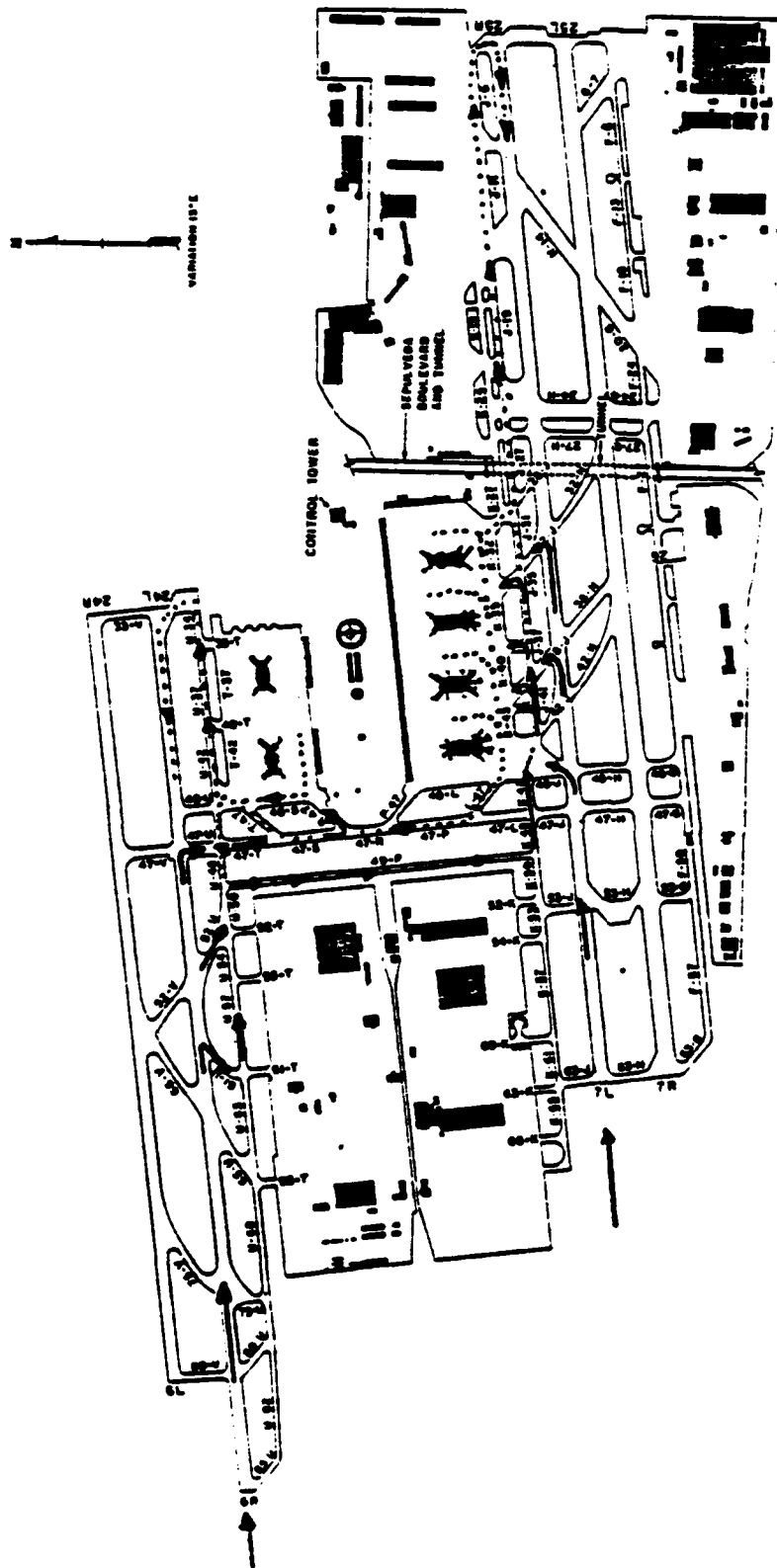
THE ARRIVAL REPORT OCCUPANCY TIME IN SECONDS BY A/C CLASS DISTANCE IN FEET FROM						
CLASS 1						
0000.0	37.00	4200.0	47.00	4500.0	54.40	5500.0
0100.0	42.00	6400.0	51.90	6500.0	49.20	7500.0
7000.0	54.20					
CLASS 2						
2200.0	34.50	2500.0	37.00	3000.0	52.00	4200.0
4501.0	46.00	5350.0	42.40	5500.0	30.50	5700.0
6400.0	40.20	6500.0	49.20	7550.0	51.60	7700.0
0250.0	50.00					
CLASS 3						
2200.0	31.60	2500.0	36.90	2600.0	35.00	3000.0
6200.0	59.30	6500.0	40.10	4501.0	30.00	4600.0
5700.0	60.00	7500.0	43.30	7700.0	06.00	
CLASS 4						
2000.0	35.00	2500.0	32.40	4200.0	30.50	4500.0
5700.0	52.00	7700.0	50.00			

TAXIING SPEEDS IN MPH

ING SPEEDS IN MPH

5.00	10.00	15.00	20.00	25.00	35.00
------	-------	-------	-------	-------	-------

A/C LATENCY DISTRIBUTION IN MINUTES (RANDOM NUMBER VERSUS TIME)



Configuration B
Figure 8

01/11/79

RAY NAMES

06R 07L 24L 25R

RAY-END LINKS

151 422 423 411

TAXIWAY INGRESS

LOS ANGELES CONFIGURATION B

002

359 331

002

331 359

002

355 206

002

206 355

002

353 205

002

205 353

002

352 204

002

204 352

002

361 146

002

146 361

002

01/11/79

206 355 208

003

206 355 206

003

205 353 210

003

210 353 205

004

204 352 211 351

004

351 211 352 204

003

203 185 350

003

350 185 203

005

113 114 115 116 350

005

350 116 115 118 113

006

202 113 114 115 116 350

006

350 116 115 118 113 202

005

330 126 352 125 357

005

357 125 352 126 330

01/11/79

4	1	3			
310	0.54	305	0.37	145	0.09
1	2	4			
274	0.67	270	0.20	202	0.07
2	2	4			
274	0.67	270	0.20	202	0.07
3	2	4			
274	0.25	277	0.25	202	0.25
4	2	2			
260	0.99	260	0.01		

53NVS1910-11X3-740-00-EXIT-01STANCES

310	6630	305	7080	145	7490	274	4920	278	6650
282	7130	286	7400	277	6030	260	1970	268	3410

~~FIX-TRAVEL-TIMES-CONFIGURATION: 01:~~

4	2	1	25.5	204.0
4	2	2	25.5	191.3
4	2	3	25.5	180.0
4	2	4	25.5	180.0
3	2	1	25.5	191.3
3	2	2	25.5	191.3
3	2	3	25.5	191.3
3	2	4	25.5	180.0
2	2	1	20.5	180.0
2	2	2	20.5	180.0
2	2	3	20.5	180.0
2	2	4	20.5	180.0

01/11/79

1	2	1	36.0	196.4
1	2	2	36.0	180.0
1	2	3	36.0	180.0
1	2	4	-	-
5	2	1	-	-
5	2	2	10.0	180.0
5	2	3	10.0	180.0
5	2	4	10.0	180.0
0	2	1	-	-
0	2	2	-	-
0	2	3	10.0	180.0
0	2	4	-	-
4	1	1	24.0	192.0
4	1	2	24.0	192.0
4	1	3	24.0	180.0
4	1	4	24.0	180.0
3	1	1	22.5	192.9
3	1	2	22.5	192.9
3	1	3	22.5	180.0
3	1	4	-	-
2	1	1	-	-
2	1	2	-	-
2	1	3	31.5	180.0
2	1	4	-	-
1	1	1	33.0	180.0
1	1	2	33.0	180.0
1	1	3	-	-

01/11/79

25

01/11/79

5 4 3 10.0 100.0

5 4 4 - - -

5 4 1 - - -

5 4 2 10.0 100.0

5 4 3 - - -

5 4 4 - - -

4 3 1 24.0 192.0

4 3 2 24.0 192.0

4 3 3 24.0 100.0

4 3 4 24.0 100.0

3 3 1 10.0 100.0

3 3 2 10.0 100.0

3 3 3 10.0 100.0

3 3 4 10.0 100.0

2 3 1 - - -

2 3 2 - - -

2 3 3 10.0 100.0

2 3 4 - - -

1 3 1 - - -

1 3 2 31.5 100.0

1 3 3 31.5 100.0

1 3 4 - - -

5 3 1 - - -

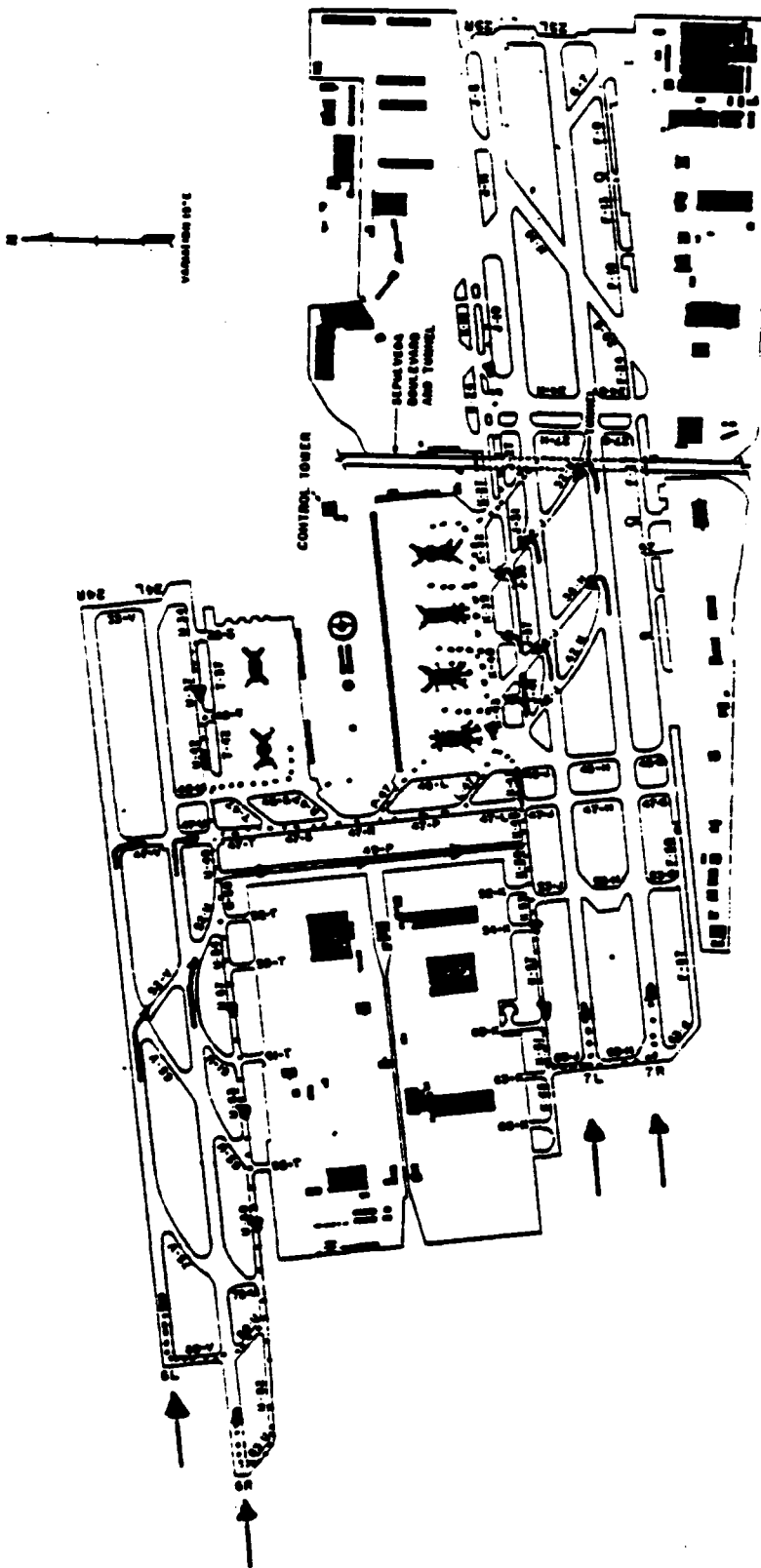
5 3 2 21.0 100.0

5 3 3 - - -

5 3 4 - - -

4 3 1 - - -

0	3	2	-
0	3	3	10.0 100.0
0	3	4	10.0 100.0
7	3	1	-
7	3	2	10.0 100.0
7	3	3	-
7	3	4	10.0 100.0



Configuration C
Figure 9

01/11/79

RAT NAMES

06R 06L 07R 07L

RAT END LINKS

151 323 010 022

TAXIWAY IN-O-WAY

LOS ANGELES CONFIGURATION C

004

363 164 303 362

004

362 303 164 363

006

363 164 303 362 302 301

006

301 302 362 303 164 363

005

164 303 362 302 301

005

301 302 362 303 164

002

360 250

002

250 366

006

364 250 176 360 177 357

004

357 177 360 176 250 366

000

01/11/79

330 126 359 125 357 177 360 176

006

176 360 177 357 125 350 126 330

005

330 126 359 125 357

008

357 126 359 126 330

007

331 350 125 357 177 360 176

007

176 360 177 357 125 350 331

004

331 359 125 357

004

357 126 359 331

010

296 287 290 299 366 290 176 360 177 387

010

357 177 360 176 280 366 290 297 296

008

296 297 290 299 366 290 176 360

30

008

360 176 290 366 292 290 297 296

006

292 113 119 115 116 390

006

350 116 115 119 113 292

01/11/79

006
112 114 115 116 350
005
350 116 115 114 112

BUY LINKS LINKS

LAX CONFIGURATION 101

1 312
1 307
3 263
3 265
3 250
4 250
4 269
4 272
4 275
4 280

BUY EXIT SELECTION

1 1 1 3
310 0.30 305 0.40 145 0.30
2 1 1 3
310 0.50 305 0.37 145 0.09
3 1 1 3
310 0.50 305 0.37 145 0.09
4 1 1 3
310 0.50 305 0.37 145 0.09
1 2 2 2
312 0.30 307 0.70

01/11/79

2 2 2
312 0.54 307 0.46

3 2 2
312 0.54 307 0.46

4 2 2
312 0.54 307 0.46

1 3 3
312 0.87 275 0.07 284 0.06

2 3 3
312 0.87 275 0.07 284 0.06

3 3 3
312 0.50 272 0.25 250 0.25

4 3 3
312 0.90 266 0.01

1 4 4
312 0.67 270 0.20 282 0.07 286 0.06

2 4 4
312 0.67 270 0.20 282 0.07 286 0.06

3 4 4
312 0.25 277 0.25 282 0.25 260 0.25

4 4 2
312 0.99 264 0.01

MAX EXIT DISTANCES

010
310 5630 305 7050 155 7490 312 3810 307 5800
272 5500 273 7430 285 7300 269 4090 258 1970
277 6030 278 6650 282 7130 286 7400 274 4820

01/11/79

260 1970 268 3440 266 3440

FIX TRAVEL TIMES CONFIGURATION JCI

4 1 1 24.0 192.0

4 1 2 24.0 192.0

4 1 3 24.0 180.0

4 1 4 24.0 180.0

3 1 1 22.5 192.0

3 1 2 22.5 192.0

3 1 3 22.5 180.0

3 1 4 22.5 180.0

2 1 1 21.0 180.0

2 1 2 21.0 180.0

2 1 3 21.0 180.0

2 1 4 21.0 180.0

1 1 1 20.0 180.0

1 1 2 20.0 180.0

1 1 3 20.0 180.0

1 1 4 20.0 180.0

5 1 1 19.0 180.0

5 1 2 19.0 180.0

5 1 3 19.0 180.0

5 1 4 19.0 180.0

4 1 1 18.0 180.0

4 1 2 18.0 180.0

4 1 3 18.0 180.0

4 1 4 18.0 180.0

4 2 1 24.0 192.0

01/11/79

4	2	2	25.0	192.0
4	2	3	24.0	192.0
4	2	4	24.0	180.0
3	2	1	-	-
3	2	2	21.0	210.0
3	2	3	21.0	180.0
3	2	4	-	-
2	2	1	-	-
2	2	2	36.0	180.0
2	2	3	36.0	180.0
2	2	4	-	-
1	2	1	-	-
1	2	2	34.5	197.1
1	2	3	34.5	180.0
1	2	4	-	-
5	2	1	-	-
5	2	2	18.0	180.0
5	2	3	18.0	180.0
5	2	4	-	-
4	2	1	-	-
4	2	2	18.0	180.0
4	2	3	-	-
4	2	4	-	-

Attachment C

INPUT DATA SUMMARY
STAGE 1 EXPERIMENTS

Los Angeles International Airport

Los Angeles
Airport Improvement Task Force Delay Studies

January 1979

LAX

INDEX OF STAGE 1 EXPERIMENTS

Sequence No.	Experiment No.	Study Case No.	Model	Type of Input Description	Page
1	1	1	ASM	Change-Sheet	38
2	7	1	"	"	47
3	11	1	"	"	49
4	13	1	"	"	53
5	2	2	"	"	56
6	8	2	"	"	59
7	12	2	"	"	61
8	3	3	"	"	64
9	4	5	"	Full	66
10	10	5	"	Change-Sheet	69
11	15	5	"	"	71
12	5	6	"	"	74
13	10A	6	"	"	76
14	6	4	"	Full	78
15	9	4	"	Change-Sheet	80
16	16	4	"	Change-Sheet	82

Table 2
LOS ANGELES DELAY EXPERIMENTS

Experiment number	Model	Study case ^a	Arrival runways	Departure runways	Weather	Demand	ATC System ^b scenario	Near Term Improvements
Stage I Experiments								
1	ASM	1	24L, 24R, 25L, 25R	24L, 24R, 25L, 25R	VFR1	1978	1978	None
2	ASM	2	24L, 24R, 25L, 25R	24L, 25R	IFR1	1978	1978	None
3	ASM	3	24R, 25L	24L, 25R	IFR2	1978	1978	None
4	ASM	5	6R, 7L	24L, 25R	VFR1	1978	1978	None
5	ASM	6	6R, 7L	24L, 25R	IFR1	1978	1978	None
6	ASM	4	6L, 6R, 7L, 7R	6L, 6R, 7L, 7R	VFR1	1978	1978	None
7	ASM	1	24L, 24R, 25L, 25R	24L, 24R, 25L, 25R	VFR1	1982	1978	None
8	ASM	2	24L, 24R, 25L, 25R	24L, 25R	IFR1	1982	1978	None
9	ASM	4	6L, 6R, 7L, 7R	6L, 6R, 7L, 7R	VFR1	1982	1978	None
10	ASM	5	6R, 7L	24L, 25R	VFR1	1982	1978	None
10A	ASM	6	6R, 7L	24L, 25R	IFR1	1982	1978	None
11	ASM	1	24L, 24R, 25L, 25R	24L, 24R, 25L, 25R	VFR1	1982	1982	None
12	ASM	2	24L, 24R, 25L, 25R	24L, 25R	IFR1	1982	1982	None
13	ASM	1	24L, 24R, 25L, 25R	24L, 24R, 25L, 25R	VFR1	1982	1982	2, 3
15	ASM	5	6R, 7L	24L, 25R	VFR1	1982	1978	5, 7 ^c Change
16	ASM	4	6L, 6R, 7L, 7R	6L, 6R, 7L, 7R	VFR1	1982	1978	5, 7, 8 ^d
17	ADM ^h	n.a.	n.a.	n.a.	n.a.	1978	1978	None
17A	RCM ⁱ	7	24L, 24R, 25L	24L, 24R, 25L	VFR1	1982	1982	Tunnel Construction ^j
17B	RCM	7	24L, 24R, 25L, 25 ^k	24L, 24R, 25L, 25X	VFR1	1982	1982	Tunnel Construction
17C	RCM	7	24L, 24R, 25L, 26	24L, 24R, 25L, 26	VFR1	1982	1982	Comments-Usage for Light

n.a. = not applicable.

a. Study cases (combinations of runway use and weather conditions) are defined in Figure III-1.

b. FAA will describe impact of 1982 and post-1987 ATC systems on model inputs.

c. Potential near-term improvements are identified in the Los Angeles International Airport Improvement Task Force Interim Report, and in Appendix B.

d. Airfield Simulation Model.

e. Task Force establishes packages of near-term improvements most likely to be implemented in 1982 and 1987 time frames. The 1982 package includes improvement # 2 (high-speed taxiway off Runway 25L to the south), improvement # 3 (strengthening of the Sepulveda Tunnel), (cont.)

Table 2 (continued)

- e. (cont.) new taxiway access to threshold of Runway 24R, and temporary holding areas on future Taxiway 75. The 1987 package includes all 1982 improvements plus Satellite 1, International Terminal, and/or remote parking for 20 aircraft at west end of airport. These packages of improvements are subject to Task Force review and revision.
- f. Impact of absence of Improvements # 2 and #3 (high-speed taxiway of Runway 25L and strengthening of the Sepulveda Tunnel).
- g. Improvement # 5 is a high-speed taxi exit off Runway 7. Improvement # 7 is a high-speed taxi exit to Taxiway 47 from Runway 6R. Improvement #8 is a bypass area on the north side of Runway 7L.
- h. Annual Delay Model.
- i. Runway Capacity Model.
- j. Runway 25R closed for tunnel construction.
- k. During closure of 25R for tunnel construction, parts of Runway 25 are open for small aircraft arrivals and departures.

LAX - STAGE 1EXPERIMENT NO. 1Objective:

To obtain baseline delay estimates for the following runway configuration in VFR-1 for 1978 demand.

ARRIVAL RUNWAYS

24R, 24L, 25R, 25L

DEPARTURE RUNWAYS

24R, 24L, 25R, 25L

Related Comparison Experiments:

Calibration was performed using this configuration ("A") (Inputs should be similar but with a 1978 demand).

Experiment 7 uses configuration "A" with 1982 demand.

Remaining Data Items:

- . Time period to be simulated
- . Demand input distributions (arrival fix, runways, and gates)
- . Lateness distribution

Experiment Number:

1

(Input changes from experiment number

39

CALIBRATION

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	Los Angeles Delay Exper - Stage 1
2. Random number seeds	
3. Start and finish times	Required Data from Task Force
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	Required Data from Task Force
38. Demand	1978 Demand with Demand Input Distributions (Required Data from Task Force)

TABLE 3

40

% of Class 1: Arrival Fix/Runway Distribution

Runway (RWY)	Ontario (T)	Seal Beach (G)	Ventura (V)	Fillmore (F)	Van Nuys (VNY)	Northeast Quadrant (NE)	Southeast Quadrant (SE)	Northwest Quadrant (NW)	Southwest Quadrant (SW)
24R	36.8 (7)	5.3 (1)	5.3 (1)	52.6 (10)					
24L	53.8 (7)	7.7 (1)		38.5 (5)					
25R	100.0 (2)								
25L	89.3 (67)	10.7 (8)							

% of Class 2: Arrival Fix/Runway Distribution

Runway (RWY)	Ontario (T)	Seal Beach (G)	Ventura (V)	Fillmore (F)	Van Nuys (VNY)	Northeast Quadrant (NE)	Southeast Quadrant (SE)	Northwest Quadrant (NW)	Southwest Quadrant (SW)
24R	25.0 (6)	8.3 (2)	12.5 (3)	50.0 (12)	4.2 (1)				
24L	46.2 (6)	7.7 (1)		38.5 (5)	7.6 (1)				
25R	28.0 (63)	6.2 (14)	1.8 (4)	62.2 (140)	1.3 (3)	0.5 (1)			
25L	73.9 (128)	13.3 (23)		9.8 (17)	1.7 (3)		1.3 (2)		

Table 3 (continued)

41

% of Class 3: Arrival Fix/Runway Distribution

Runway (RWY)	Ontario (T)	Seal Beach (G)	Ventura (V)	Fillmore (F)	Van Nuys (VNY)	Northeast Quadrant (NE)	Southeast Quadrant (SE)	Northwest Quadrant (NW)	Southwest Quadrant (SW)
24R	28.1 (18)	21.9 (14)	32.8 (21)	12.5 (8)	3.0 (2)	1.7 (1)			
24L	31.8 (7)	45.5 (10)	13.6 (3)		4.6 (1)	4.5 (1)			
25R	13.3 (2)	33.3 (5)	33.3 (5)	13.3 (2)	6.8 (1)				
25L	54.7 (23)	16.7 (7)	11.9 (5)	9.5 (4)		7.2 (3)			

% of Class 4: Arrival Fix/Runway Distribution

Runway (RWY)	Ontario (T)	Seal Beach (G)	Ventura (V)	Fillmore (F)	Van Nuys (VNY)	Northeast Quadrant (NE)	Southeast Quadrant (SE)	Northwest Quadrant (NW)	Southwest Quadrant (SW)
24R	33.3 (2)	33.3 (2)			33.4 (2)				
24L	50.0 (1)					50.0 (1)			
25R	100.0 (1)								
25L	33.3 (3)	44.5 (4)			11.1 (1)	11.1 (1)			

% of Class 1: Arrival and Departure
Runway/Gate Distributions

	Arrivals				Departures			
Rwy	24R	24L	25R	25L	24R	24L	25R	25L
Gate Area	(No. of Arcft)	()	()	()	()	()	()	()
1	1.1 (1)							
2	7.4 (7)	2.1 (2)		9.6 (9)		19.2 (48)	0.4 (1)	
3	6.4 (6)	1.1 (1)				10.4 (26)		
4	1.1 (1)	3.2 (3)		16.0 (15)	0.8 (2)	21.6 (54)		0.4 (1)
5				6.4 (6)		8.4 (21)		
6	3.2 (3)			10.6 (10)	0.8 (2)	6.0 (15)		1.2 (3)
7	1.1 (1)		1.1 (1)	19.1 (18)		8.8 (22)		
8		1.1 (1)		9.5 (9)	0.8 (2)	17.2 (43)	0.4 (1)	
9								
10						2.4 (6)		
11						0.8 (2)		
12							0.4 (1)	
13								

[illegible]

Table 4 (continued)

% of Class 3: Arrival and Departure
Runway/Gate Distributions

	Arrivals				Departures			
Rwy	24R	24L	25R	25L	24R	24L	25R	25L
Gate Area	(No. of Acft)	()	()	()	()	()	()	()
1								
2					0.5 (1)			
3								
4			2.7 (4)	1.4 (2)		0.5 (1)		1.0 (2)
5				0.7 (1)	0.5 (1)		0.5 (1)	1.0 (2)
6			1.4 (2)	0.7 (1)			2.2 (4)	
7			1.4 (2)	1.4 (2)			0.5 (1)	
8					0.5 (1)	0.5 (1)		
9			2.0 (3)	18.3 (27)			10.3 (19)	18.9 (35)
10	0.7 (1)			3.4 (5)		0.5 (1)	0.5 (1)	1.0 (2)
11	51.0 (75)	13.5 (20)	0.7 (1)		16.2 (30)	10.8 (20)	19.5 (36)	14.1 (26)
12				0.7 (1)			0.5 (1)	
13								

Table 4 (continued)

% of Class 4: Arrival and Departure
Runway/Gate Distributions

	Arrivals				Departures			
Rwy	24R	24L	25R	25L	24R	24L	25R	25L
Gate Area	(No. of Acrft)	()	()	()	()	()	()	()
1								
2								
3								
4								
5								
6								
7								
8								
9			5.9 (1)	5.9 (1)	2.2 (1)	2.2 (1)		27.3 (12)
10	5.9 (1)				2.3 (1)	2.3 (1)	2.3 (1)	
11	64.7 (11)	17.6 (3)			22.7 (10)	18.2 (8)	6.8 (3)	11.4 (5)
12								2.3 (1)

Table 5

ARRIVAL AIRCRAFT LATENESS DISTRIBUTION
(Average deviation from schedule, excluding
delays due to destination airport)

<u>Amount of time late or early</u>	<u>Percent of flights late or early (%)</u>
More than 15 min. early	0
less than 15 min. early	5
On time	24
less than 5 minutes late	29
5 to 10 minutes late	15
10 to 15 minutes late	9
15 to 30 minutes late	9
30 to 45 minutes late	4
45 to 60 minutes late	2
more than 60 minutes late	3

Source: Peat, Marwick, Mitchell & Co., analysis of data
provided by Stapleton Task Force

LAX - STAGE 1EXPERIMENT NO. 7Objective:

To obtain baseline delay estimates for the following runway configurations in VFR 1 for 1982 demand.

To obtain delay estimates for 1982 with no improvements to the airport.

ARRIVAL RUNWAYS

24R, 24L, 25R, 25L

DEPARTURE RUNWAYS

24R, 24L, 25R, 25L

Related Comparison Experiments:

Experiment 11 is similar with an improved ATC system scenario (1982) and the 1982 near-term improvements.

Prior Experiment 1 is similar for the 1978 demand.

Remaining Data Items:

- . Demand input distributions
- . Lateness distribution

Experiment Number:

7(Input changes from experiment number ⁴⁸1)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	1982 Demand with Demand Input Distributions (Required from Task Force)

LAX - STAGE 1EXPERIMENT NO. 11Objective:

To assess delays to aircraft in 1982 for the following runway configuration in VFR 1 with an improved ATC system scenario and the 1982 near-term improvements.

ARRIVAL RUNWAYS

24R, 24L, 25R, 25L

DEPARTURE RUNWAYS

24R, 24L, 25R, 25L

Related Comparison Experiments:

Experiment 13 is identical less improvements #2 (high-speed taxiway off runway 25L) and improvements #3 (strengthening of the Sepulverda tunnel).

Prior Experiment 7 is similar without the noted improvements.

Prior Experiment 1 is similar without the noted improvements and a 1978 demand.

Remaining Data Items:

- . 1982 near-term improvements
- . 1982 demand input distributions

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	See Attached Figure for Access to 24D
13. Runway crossing links	
14. Exit taxiway location	See attached Figure for Improvement # 2
15. Holding areas	See attached figure for Improvement to Taxiway 13
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	New route data to reflect improvements
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	New Exit Class 4 Rwy 4 Prob. of use 0.28
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	

TABLE 6
PRE-1985 VFR SEPARATION VALUES*

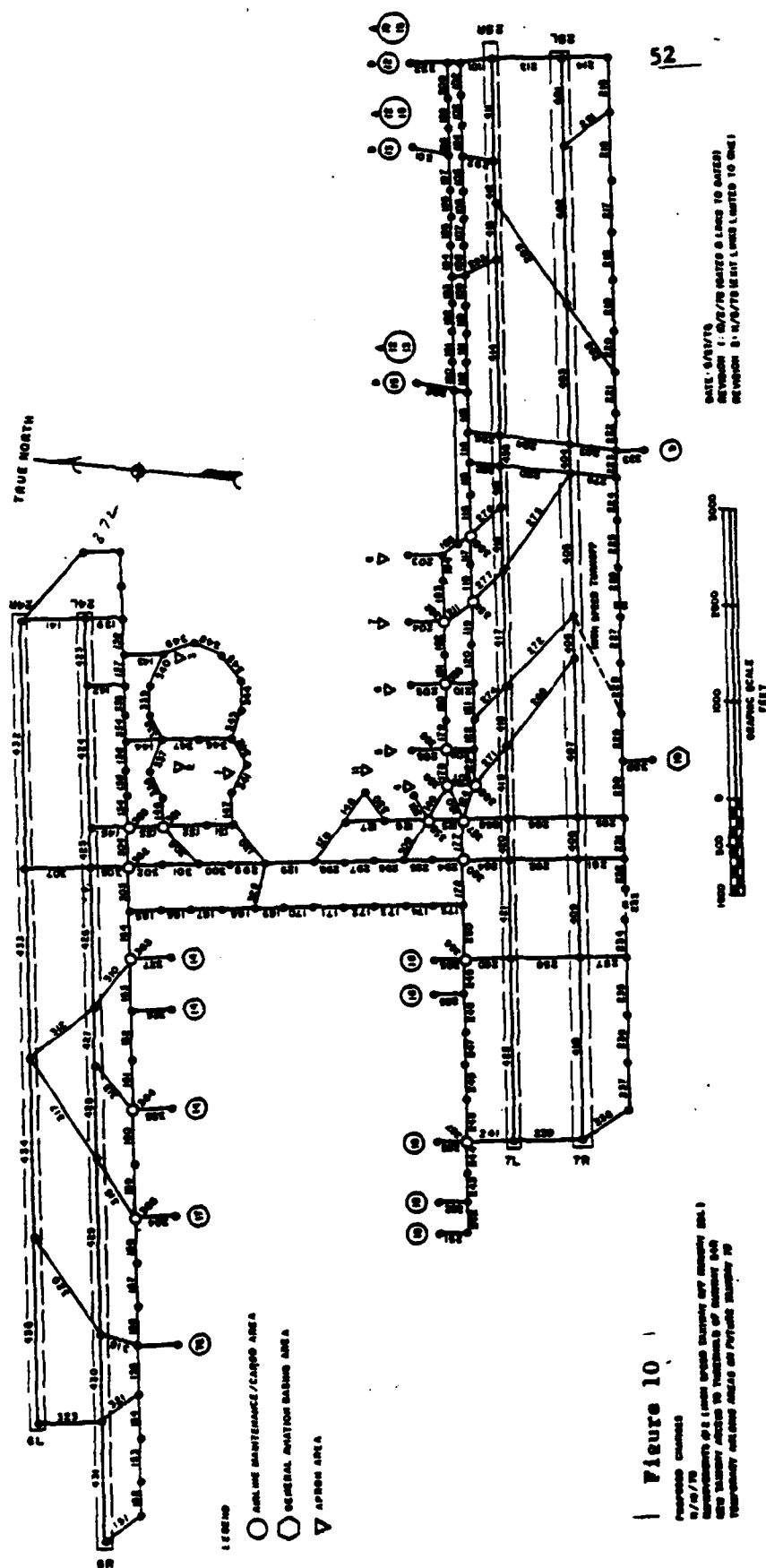
A. Arrival-Arrival Separation (nmi) - VFR - Without Buffer

		<u>Trail Aircraft Class</u>			
		A	B	C	D
Lead	A	1.9	1.9	1.9	1.9
Aircraft	B	1.9	1.9	1.9	1.9
Class	C	2.7	2.7	1.9	1.9
	D	4.0	4.0	3.0	2.7

B. Departure-Departure Separations (seconds) - VFR

		<u>Trail Aircraft Class</u>			
		A	B	C	D
Lead	A	35	35	45	50
Aircraft	B	35	35	45	50
Class	C	50	50	60	60
	D	120	120	120	90

* The separations shown are minimum values.



LAX - STAGE 13EXPERIMENT NO. 13Objective:

To assess the delay impact to aircraft in 1982 for the following runway configuration in VFR 1 with an improved ATC system scenario and the 1982 near-term improvement less improvement #2 and #3.

ARRIVAL RUNWAYS

24R, 24L, 25R, 25L

DEPARTURE RUNWAYS

24R, 24L, 25R, 25L

Related Comparison Experiments:

Prior Experiment 11 is similar except improvements #2 and #3 are included in run.

Remaining Data Items:

None

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	Less Improvement #2 and #3
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	Less Improvement Exit
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	Restrict Heavy Aircraft (Class 1) to Runways 24R and 24L (noise restriction on 24L)

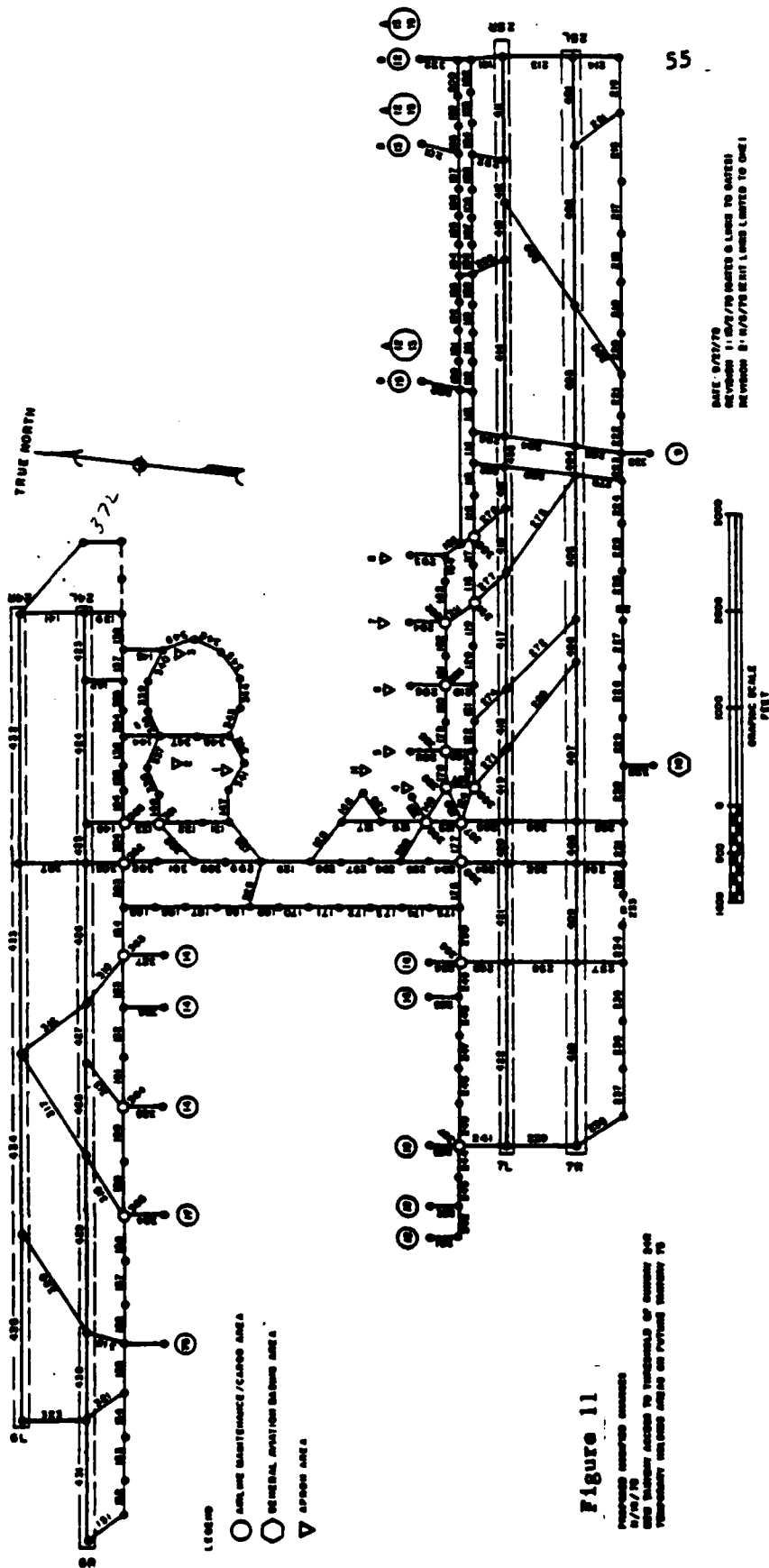


Figure 11

PROPOSED INSURED AREAS
8/28/79
AND INSURED AREAS TO TERRITORY OF INSURANCE 8-40
TERRITORY INSURED AREAS ON FUTURE INSURANCE TO

LAX - STAGE 1EXPERIMENT NO. 2Objective:

To obtain baseline delay estimates for the following runway configuration in IFR 1 for 1978 demand.

ARRIVAL RUNWAYS

24R, 24L, 25R, 25L

DEPARTURE RUNWAYS

24L, 25R

Related Comparison Experiments:

Experiment 8 is identical except for a 1982 demand. Experiment 3 is similar with IFR 2 weather conditions and restriction on arrival runway use.

Remaining Data Items:

- . IFR 1 values for arrival runway occupancy times and new lateness distributions
- . Demand input distributions for departure runways and gates

Experiment Number: 2 (Input changes from experiment number ⁵⁷ 1)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	No Departures on 24R and 25L
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	IFR 1 Weather Conditions
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	IFR 1 Values
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	Shift Departure demand from 24R to 24L and 25 L to 25R

Table 7

C. ATC PROCEDURES

18. Aircraft Separations: These values are based on Report No. FAA-EM-78-8A.

Arrival-Arrival Separation (nmi) - IFR - Without Buffer

		<u>Trail Aircraft Class</u>			
		4	3	2	1
		(A)	(B)	(C)	(D)
Lead	4 (A)	3.0	3.0	3.0	3.0
Aircraft	3 (B)	3.0	3.0	3.0	3.0
Class	2 (C)	4.0	3.0 _{4.0}	3.0	3.0
	1 (D)	6.0	5.0 _{4.0}	5.0	4.0

Departure-Departure Separations (seconds) - IFR

		<u>Trail Aircraft Class</u>			
		4	3	2	1
		(A)	(B)	(C)	(D)
Lead	4 (A)	60	60	60	60
Aircraft	3 (B)	60	60	60	60
Class	2 (C)	60	60	60	60
	1 (D)	120	120	120	90

* The separations shown are minimum values.

Departure/Arrival separations assume VFR values + 0.5 nmi.
 Arrival/Departure separations assume IFR runway occupancy time equals VFR runway occupancy time + 5 seconds.

LAX - STAGE 1

59

EXPERIMENT NO. 8

Objective:

To obtain baseline delay estimates for the following runway configurations in IFR 1 for 1982 demand.

To obtain delay estimates for 1982 with no improvements to the airport.

ARRIVAL RUNWAYS

24R, 24L, 25R, 25L

DEPARTURE RUNWAYS

24L, 25R

Related Comparison Experiments:

Experiment 12 is identical but with an improved ATC system scenario and the 1982 near-term improvements.

Prior Experiment #2 is identical except for a 1978 demand.

Remaining Data Items:

- . 1982 demand input distributions (arrival fix, runways, and gates)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	1982 Demand with Arrival Fix and Runway Distributions (Required from Task Force)

LAX - STAGE 1EXPERIMENT NO. 12Objective:

To assess delays to aircraft in 1982 for the following runway configuration in IFR 1 with an improved ATC system scenario and the 1982 near-term improvements.

ARRIVAL RUNWAYS

24R, 24L, 25R, 25L

DEPARTURE RUNWAYS

24L, 25R

Related Comparison Experiments:

Prior Experiment #8 is similar except for the noted improvements.

Remaining Data Items:

- . Arrival demand distributions for heavys (arrival fix, runways, and gates)

Experiment Number:

12(Input changes from experiment number ⁶²8)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	See Attached Figure for Access to 24R
13. Runway crossing links	
14. Exit taxiway location	See Attached Figure for Improvement # 2
15. Holding areas	See Attached Figure for Improvement to Taxiway (FS)
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	New Route Data to Reflect Improvements
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	New Exit Class 4 Rwy 4 Prob. of use 0.28
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	Demand Distribution for Heavy Aircraft Shared by 25L and 25R

LAX - STAGE 1EXPERIMENT NO. 3Objective:

To obtain baseline delay estimates for the following runway configuration in IFR 2 with 1978 demand.

ARRIVAL RUNWAYS

24R, 25L

DEPARTURE RUNWAYS

24L, 25R

Related Comparison Experiments:

Prior Experiment 2 is similar except for IFR 1 conditions.

Remaining Data Items:

- . IFR 2 separation values and lateness distributions
- . Arrival demand distributions
- . IFR 2 arrival runway occupancy times

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Experiment Number: 3 (Input changes from experiment number ⁶⁵2)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	IFR 2 Weather Conditions (special missed approach procedure)
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	IFR 2 Values if different
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	IFR 2 Values if Different
38. Demand	No Arrivals on 24L and 25R (Shift Arrival Demand)

LAX - STAGE 1
EXPERIMENT NO. 4

Objective:

To obtain baseline delay estimates for the following runway configuration in VFR 1 for 1978 demand for nighttime operations.

ARRIVAL RUNWAYS

6R, 7L

DEPARTURE RUNWAYS

24L, 25R

Related Comparison Experiments:

Experiment 5 is identical except for IFR 1 weather conditions.

Experiment 10 is identical except for 1982 demand.

Remaining Data Items:

- . New model inputs (See configuration B)
- . Demand input distributions
- . Time of simulation (0000 (a.m.) to 0600 (a.m.))
(0500 G.m.t. to 1100 G.m.t.)
- . VFR 1 (special) separations for departure/arrival dependency on 6R-24L, 7L-25R

Experiment Number:

4

(Input changes from experiment number

67

New)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "B"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	VER1 (Special)
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	New Data from night time data collection
29. Arrival runway occupancy times	New Data from night time data collection
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	1978

EXIT TAXIWAY UTILIZATION:

Table 9

68

RUNWAY 7L

EXIT LINK NO.

OBSERVED PROBABILITY OF USE

(NUMBER OF AIRCRAFT)

AVERAGE RUNWAY OCCUPANCY (SEC)

CLASS	274	277	278	282	260	286
1 (D)						
2 (C)	0.67 (10) 60		0.20 (3) 66	0.07 (1) 76		0.06 (1) 76
3 (B)	0.25 (1) 64	0.25 (1) 63		0.25 (1) 139	0.25 (1) 42	
4 (A)					1.00 (1) 42	

RUNWAY 6R

EXIT LINK NO.

OBSERVED PROBABILITY OF USE

(NUMBER OF AIRCRAFT)

AVERAGE RUNWAY OCCUPANCY (SEC)

CLASS	310	305	145			
1 (D)	.30 (3) 47	.40 (4) 70	.30 (3) 70			
2 (C)	.54 (13) 48	.37 (9) 61	.09 (2) 75			
3 (B)						
4 (A)						

LAX - STAGE 1
EXPERIMENT NO. 10

Objective:

To obtain baseline delay estimates for the following runway configurations in VFR 1 for 1982 demand.

To obtain delay estimates for 1982 with no improvements to the airport.

ARRIVAL RUNWAYS

6R, 7L

DEPARTURE RUNWAYS

24L, 25R

Related Comparison Experiments:

Experiment 10A is identical except for IFR 1 weather conditions.

Experiment 15 is identical except for near-term improvements #5 and #7.

Prior Experiment 4 is identical except for 1978 demand.

Remaining Data Items:

- . Demand input distributions

Experiment Number:

10

(Input changes from experiment number

70

4)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "B"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	1982 Demand

LAX - STAGE 1

71

EXPERIMENT NO. 15

Objective:

To assess delays to aircraft in 1982 for the following runway configuration in VFR 1 with an improved 1978 ATC system scenario and near-term improvements #5 and #7 for nighttime operations.

ARRIVAL RUNWAYS

6R, 7L

DEPARTURE RUNWAYS

24L, 25R

Related Comparison Experiments:

Prior Experiment 10 is similar without the noted improvements.

Remaining Data Items:

- . Bypass area north of runway 7L
Improvement #8 omitted from this experiment. (Must be defined by Task Force)

New Exit Probabilities

Runway 6R (Combining link
exits 310 & 305)

Class 1 - 0.70
Class 2 - 0.99
Class 3 - 0.99
Class 4 - 0.99

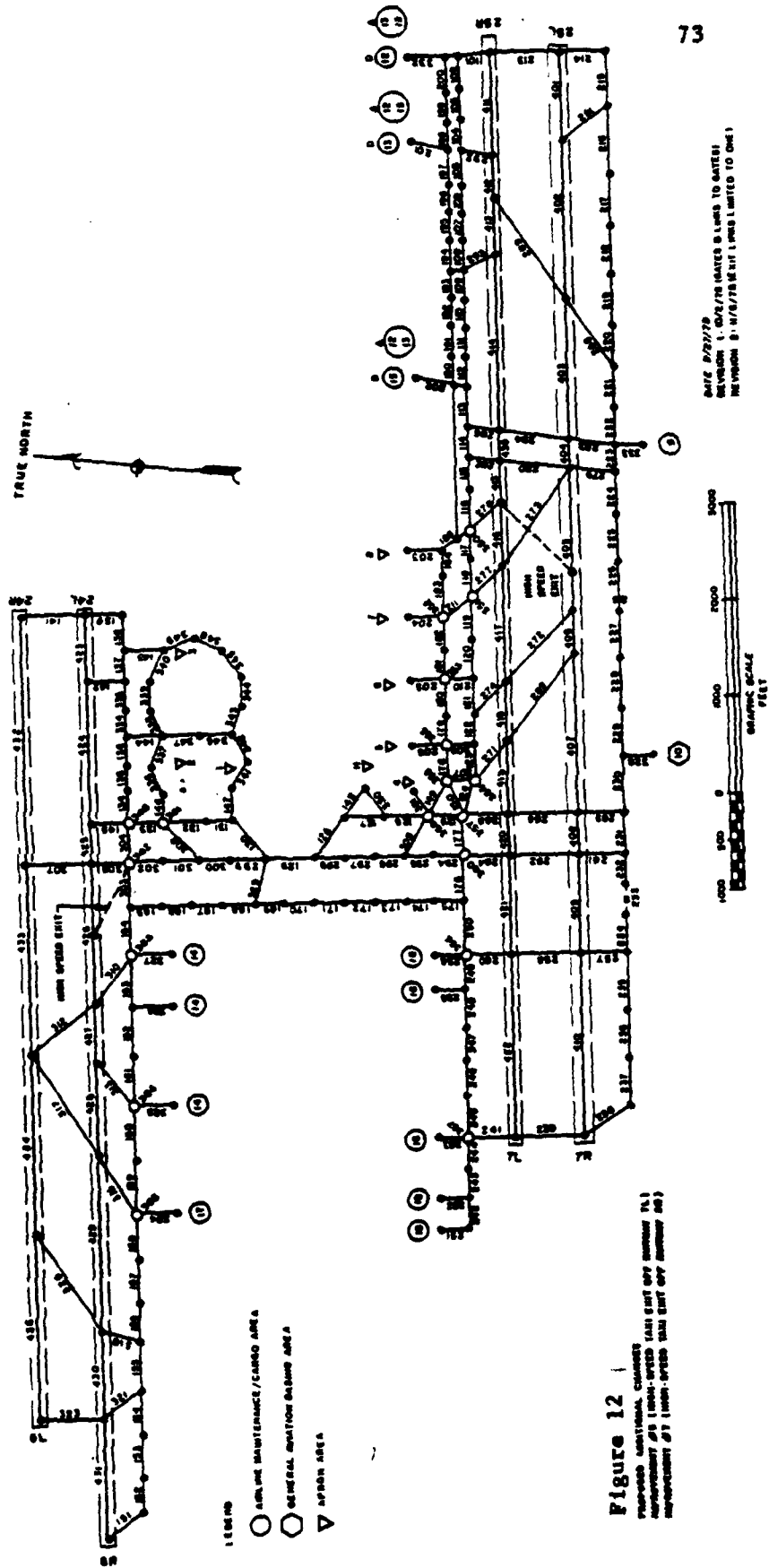
Runway 7R

Class 1 - 0.87
Class 2 - 0.87
Class 3 - 0.50
Class 4 - 0.50

Experiment Number:

15(Input changes from experiment number ⁷²10)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "B"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	New Routes for Improvement #5 & #7
14. Exit taxiway location	New Exit for Improvements # 5, & #7
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	New Values for Exit Utilization
29. Arrival runway occupancy times	New Exit
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	



LAX - STAGE 1

EXPERIMENT NO. 5

Objective:

To obtain baseline delay estimates for the following runway configuration in IFR1 for 1978 demand.

ARRIVAL RUNWAYS

6R, 7L

DEPARTURE RUNWAYS

24L, 25R

Related Comparison Experiments:

Experiment # 10A is identical except for the 1982 demand.

Remaining Data Items:

- . Demand Input Distributions
- . IFR 1 Separations

Experiment Number:

5(Input changes from experiment number ⁷⁵

(4)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "B"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	IFR 1 (Special) departure/arrival depen-
19. Route data	dency to be developed
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	

LAX - STAGE 1EXPERIMENT NO. 10AObjective:

To obtain baseline delay estimates for the following runway configuration in IFR 1 for 1982 demand.

To obtain delay estimates for 1982 with no improvements to the airport.

ARRIVAL RUNWAYS

6R, 7L

DEPARTURE RUNWAYS

24L, 25R

Related Comparison Experiments:

Prior Experiment 5 is similar with a 1978 demand.

Remaining Data Items:

- . 1982 Demand
- . Demand input distribution

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "B"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	1982

LAX - STAGE 1EXPERIMENT NO. 6Objective:

To obtain baseline delay estimates for the following runway configuration in VFR 1 for 1978 demand for east operations.

ARRIVAL RUNWAYS

6R, 6L, 7R, 7L

DEPARTURE RUNWAYS

6R, 6L, 7R, 7L

Related Comparison Experiments:

Experiment #9 is identical except for the 1982 demand.

Remaining Data Items:

- . New model inputs (See configuration C)
- . Demand input distributions
- . Time of simulation

Experiment Number:

6(Input changes from experiment number ⁷⁹(New))

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	Required from Task Force
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "C"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	1978 Demand and Demand Input Distributions (Required from Task Force)

LAX - STAGE 1EXPERIMENT NO. 9Objective:

To obtain baseline delay estimates for the following runway configurations in VFR 1 for 1982 demand for east operations.

To obtain delay estimates for 1982 with no improvements to the airport for east operations.

ARRIVAL RUNWAYS

6R, 6L, 7R, 7L

DEPARTURE RUNWAYS

6R, 6L, 7R, 7L

Related Comparison Experiments:

Experiment #16 is identical except for near-term improvements #5, #7, and #8.

Prior Experiment #6 is similar with a 1978 demand.

Remaining Data Items:

- . New model inputs (See configuration C)

Experiment Number:

9(Input changes from experiment number ⁸¹6)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "C"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	1982 Demand and Demand Input Distributions (Required from Task Force)

LAX - STAGE 1EXPERIMENT NO. 16Objective:

To assess delays to aircraft in two of the following runway configurations in VFR 1 with near-term improvements #5, #7, and #8 for east operations.

ARRIVAL RUNWAYS

6R, 6L, 7R, 7L

DEPARTURE RUNWAYS

6R, 6L, 7R, 7L

Related Comparison Experiments:

Prior Experiment #9 is identical except for noted improvements to the airport.

Remaining Data Items:

- . By pass area on Runway 7L
Must be defined by Task Force

Experiment Number:

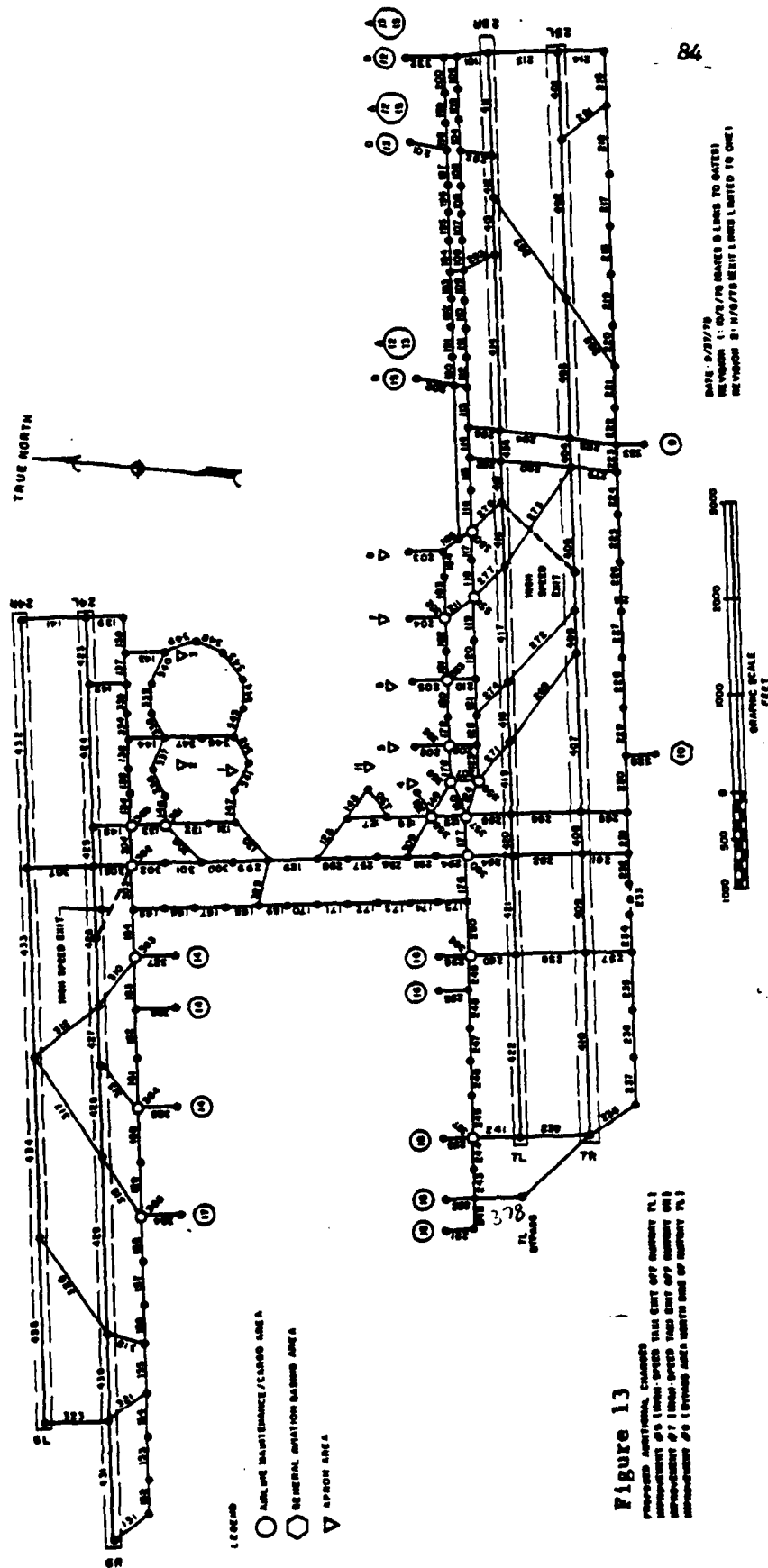
16

(Input changes from experiment number

83

(9)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "C"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	New Routes for 71.
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	



Attachment D

PRELIMINARY MODEL INPUT DATA
FOR STAGE 2 EXPERIMENTS

Los Angeles International Airport

Los Angeles
Airport Improvement Task Force Delay Studies

January 1979

Table 10
LOS ANGELES DELAY EXPERIMENTS

Experiment number	Model	Study case ^a	Arrival Runways	Departure Runways	Weather	Demand	ATC System scenario ^b	Near-term Improvements ^c
Stage 2 Experiments								
18	ASM	1	24L, 24R, 25L, 25R	24L, 24R, 25L, 25R	VFR1	1982	1982	10 ¹
19	ASM	1	24L, 24R, 25L, 25R	24L, 24R, 25L, 25R	VFR1	1982	1982	11 ^m
20	ASM	1	24L, 24R, 25L, 25R	24L, 24R, 25L, 25R	VFR1	1982	1982	Terminal Expansion ⁿ
21	ASM	1	24L, 24R, 25L, 25R	24L, 24R, 25L, 25R	VFR1	1982	1982	Remote Terminal ^o
22	ASM	7	24L, 24R, 25L	24L, 24R, 25L	VFR1	1978	1978	Tunnel Construction ^p
22A	ASM	8	24L, 24R, 25L	24L, 24R, 25L	VFR1	1982	1982	Dual Taxiway ^p
23	ASM	8	24R, 25L	24L, 25L	IFR1	1978	1978	Tunnel Construction 25R
24	ASM	9	24R, 25R	24L, 25R	IFR1	1978	1978	Tunnel Construction 25L
25	ASM	1	24L, 24R, 25L, 25R	24L, 24R, 25L, 25R	VFR1	1987	1987	1987 ^e
26	ASM	2	24L, 24R, 25L, 25R	24L, 25R	IFR1	1987	1987	1987 * Change
27	ADM	n.a.	n.a.	n.a.	n.a.	1982	1982	1982
28	ADM	n.a.	n.a.	n.a.	n.a.	1982	1982	None
29	ADM	n.a.	n.a.	n.a.	n.a.	1982	1978	1982
30	ADM	n.a.	n.a.	n.a.	n.a.	1982	1978	None
31	ADM	n.a.	n.a.	n.a.	n.a.	1987	1987	1987
32	ADM	n.a.	n.a.	n.a.	n.a.	1987	1987	None
33	ADM	n.a.	n.a.	n.a.	n.a.	1987	1978	1987
34	ADM	n.a.	n.a.	n.a.	n.a.	1987	1988	None

1. Improvement #10 consists of a series of taxiway improvements identified in Appendix B.

m. Improvement #11 contains temporary holding areas on present Taxiway 47 west of Satellites 3 and 4. The need for this experiment will be reviewed by the Task Force after consideration of temporary holding areas on future Taxiway 75.

n. Construction of Satellite 1 and International Terminal. The need for this experiment will be reviewed by the Task Force after consideration of future airline terminal locations.

o. Remote parking for 20 aircraft at west end of Airport.

p. Additional experiment may be needed to test value of dual taxiway system around Satellite 4 during tunnel construction!

LAX

INDEX OF STAGE 2 EXPERIMENTS

Sequence Number	Experiment Number	Study Case Number	Model	Type of Input Description	Page
1	18	1	ASM	Change-sheet	87
2	19	1	ASM	Change-sheet	89
3	20	1	ASM	Change-sheet	91
4	21	1	ASM	Change-sheet	93
5	25	1	ASM	Change-sheet	95
6	26	2	ASM	Change-sheet	97
7	22	7	ASM	Change-sheet	99
8	22A	8	ASM	Change-sheet	101
9	23	8	ASM	Change-sheet	103
10	24	8	ASM	Change-sheet	105

LAX - STAGE 2EXPERIMENT NO. 18Objective:

To assess delays to aircraft in 1982 for the following runway configuration in VFR 1 with an improved ATC system scenario and improvement #10 (taxiways).

ARRIVAL RUNWAYS

24R, 24L, 25R, 25L

DEPARTURE RUNWAYS

24R, 24L, 25R, 25L

Related Comparison Experiments:

Experiment #19 is identical except for improvement #11 (temporary holding areas on taxiway 47 west of satellites 3 and 4).

Prior Experiment #11 is identical except for improvement #10 (taxiway improvements).

Remaining Data Items:

- . New route structure

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	New routes
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	

LAX - STAGE 2EXPERIMENT NO. 19Objective:

To assess delays to aircraft in 1982 for the following runway configuration in VFR 1 with an improved ATC system scenario and improvement #11 (temporary holding areas on taxiway 47).

ARRIVAL RUNWAYS

24R, 24L, 25R, 25L

DEPARTURE RUNWAYS

24R, 24L, 25R, 25L

Related Comparison Experiments:

Experiment #20 is identical except for terminal expansion.
(Construction of satellite 1 and international terminal)

Prior Experiment #18 is identical except for improvement #11
(temporary holding areas on taxiway 47 west of satellites 3 and 4).

Remaining Data Items:

- . New holding area
(on present taxiway 47 west of satellites 3 and 4)

Experiment Number:

19(Input changes from experiment number ⁹⁰18)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	New holding area
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	

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NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATL--ETC F/G 1/2
LOS ANGELES INTERNATIONAL AIRPORT DATA PACKAGE NUMBER 2, AIRPOR--ETC(U)
JAN 79

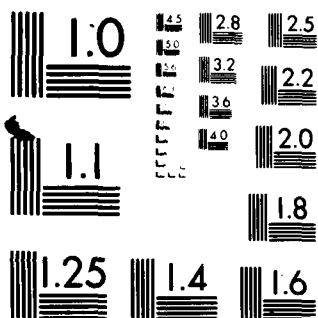
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NATIONAL BUREAU OF STANDARDS 1963-A

LAX - STAGE 2EXPERIMENT NO. 20Objective:

To assess delays to aircraft in 1982 for the following runway configuration in VFR 1 with an improved ATC system scenario and terminal expansion.

ARRIVAL RUNWAYS

24R, 24L, 25R, 25L

DEPARTURE RUNWAYS

24R, 24L, 25R, 25L

Related Comparison Experiments:

Experiment #21 is identical except for remote parking for 20 aircraft at west end of airport.

Prior Experiment #19 is identical except for terminal expansion.

Remaining Data Items:

- . New demand distributions
(Gate area assignments)
- . New route structure

Experiment Number:

20(Input changes from experiment number ⁹²19)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	New routes
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	New demand distribution

LAX - STAGE 2EXPERIMENT NO. 21Objective:

To assess delays to aircraft in 1982 for the following runway configuration in VFR 1 with an improved ATC system scenario and remote parking for 20 aircraft.

ARRIVAL RUNWAYS

24R, 24L, 25R, 25L

DEPARTURE RUNWAYS

24R, 24L, 25R, 25L

Related Comparison Experiments:

Prior Experiment #20 is identical except for remote parking for 20 aircraft at west end of airport.

Remaining Data Items:

- . New route structure
(Gate area assignments)
- . New demand distribution

Experiment Number:

21(Input changes from experiment number ⁹⁴20)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	New routes to gate area
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	New demand distribution

LAX - STAGE 2EXPERIMENT NO. 25Objective:

To assess delays to aircraft in 1987 for the following runway configuration in VFR 1 with an improved 1987 ATC system scenario and 1982 improvements plus the satellite terminal and/or remote parking for 20 aircraft.

ARRIVAL RUNWAYS

24R, 24L, 25R, 25L

DEPARTURE RUNWAYS

24R, 24L, 25R, 25L

Related Comparison Experiments:

Prior Experiment #11 is identical except for the improvements from 1982 to 1987 and the demand.

Remaining Data Items:

- . Demand distributions

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	1987 Demand

LAX - STAGE 2EXPERIMENT NO. 26Objective:

To assess delays to aircraft in 1987 for the following runway configuration in IFR 1 with an improved 1987 ATC system scenario and 1982 improvements plus the satellite terminal and/or remote parking for 20 aircraft.

ARRIVAL RUNWAYS

24R, 24L, 25R, 25L

DEPARTURE RUNWAYS

24L, 25R

Related Comparison Experiments:

Prior Experiment #12 is identical except for the improvements from 1982 to 1987 and the demand.

Remaining Data Items:

- . Demand distributions

Experiment Number: 26 (Input changes from experiment number ⁹⁸12)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	1987 Demand

LAX - STAGE 2

99

EXPERIMENT NO. 22

Objective:

To assess the delay impact to aircraft in 1978 for the following runway configuration in VFR 1 due to the runway closure of 25R during work on the Spulveda Tunnel.

ARRIVAL RUNWAYS

24R, 24L, 25L

DEPARTURE RUNWAYS

24R, 24L, 25L

Related Comparison Experiments:

Prior Experiment #1 is identical except for closure of 25R for tunnel construction.

Remaining Data Items:

Experiment Number:

22

(Input changes from experiment number

100

1)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	Reassign arrivals and departures from 25R to 25L

LAX - STAGE 2EXPERIMENT NO. 22AObjective:

To assess the delay impact to aircraft in 1982 for the following runway configuration in VFR 1 due to the runway closure of 25R during work on the Sepulveda Tunnel with a dual taxiway system around satellite 4.

ARRIVAL RUNWAYS

24L, 24R, 25L

DEPARTURE RUNWAYS

24L, 24R, 25L

Related Comparison Experiments:

Prior Experiment #22 is identical except for a dual taxiway system and a 1982 demand.

Remaining Data Items:

Experiment Number:

22A

(Input changes from experiment number

102

. 22)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	New route structure
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	Reassign arrivals and departures from 25R to 25L (1982 Demand)

LAX - STAGE 2EXPERIMENT NO. 23Objective:

To assess the delay impact to aircraft in 1978 for the following runway configuration in IFR 1 due to the runway closure of 25R during work on the Sepulveda Tunnel.

ARRIVAL RUNWAYS

24R, 25L

DEPARTURE RUNWAYS

24L, 25L

Related Comparison Experiments:

Prior experiment #2 is identical except for the closure of runway 25R.

Remaining Data Items:

Experiment Number:

23

(Input changes from experiment number

104

2)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	New departure routes to 25R for Class A
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	Reassign arrival and departures from 25R to 25L

LAX - STAGE 2EXPERIMENT NO. 24Objective:

To assess the delay impact to aircraft in 1978 for the following runway configuration in IFR 1 due to the runway closure of 25L during work on the Sepulveda Tunnel (in 79).

ARRIVAL RUNWAYS

24R, 25R

DEPARTURE RUNWAYS

24L, 25R

Related Comparison Experiments:

Prior Experiment #2 is identical except for the closure of runway 25L for tunnel construction.

Remaining Data Items:

Experiment Number:

24(Input changes from experiment number ¹⁰⁶2

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SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
5. Airfield Physical Characteristics	Configuration "A"
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	Reassign arrival and departures from 25L to 25R