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**USER DELAY COST MODEL AND
FACILITIES MAINTENANCE COST MODEL
FOR A TERMINAL CONTROL AREA**

**Volume II: User's Manual and Program Documentation
for the User Delay Cost Model**

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16. Abstract The User Delay Cost Model (UDCM) is a Monte Carlo simulation of certain classes of movement of air traffic in the Boston Terminal Control Area (TCA). It incorporates a weather module, an aircraft generation module, a facilities module, and an air control module to simulate delays, resulting from facility outage, imposed on four user classes: Air Carrier, Air Taxi, General Aviation, and Military Aircraft. The model can also be used to measure delays due to changing aircraft arrival rates, weather and other environmental considerations, approach types available, or any other factor that affects trail separation in final approach of the maximum number of aircraft an air controller can handle. This is the second of three volumes. Volume I documented the model formulation and demonstration. Volume III is a user's manual and program documentation for the facilities maintenance cost model.					
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PREFACE

The Federal Aviation Administration is responsible for operating and maintaining the airway facilities of the National Aviation System. The magnitude of annual operating and maintenance costs is such that means for reducing these costs are being sought.

This report documents the results of a study to model the relationship between airway facility maintenance practices and (1) aircraft delays in terminal areas, and (2) maintenance costs.

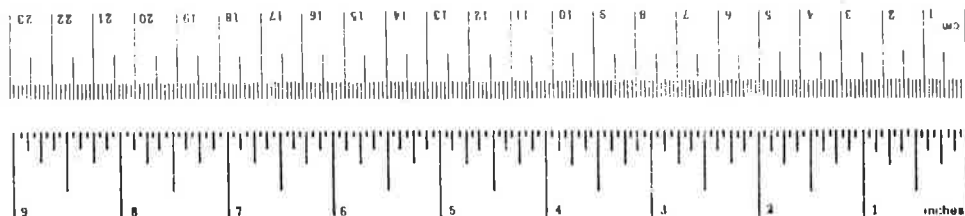
These models are intended to serve as tools for estimating the impact on system users and system operators of proposed maintenance cost reduction initiatives.

The models were formulated, demonstrated, and documented by ARINC Research Corporation under contract to the Transportation Systems Center. Mr. F. Frankel of the Transportation Systems Center provided the technical guidance. The dedication and expertise of Mr. L. B. Greene, Dr. J. Witt, and Mr. M. Sternberg-Powidzki of ARINC Research is acknowledged to be the major contribution to this work.

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
m ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cup	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³
TEMPERATURE (exact)				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
km	kilometers	1.1	miles	mi
		0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
		1.06	quarts	qt
		0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
		1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



CONTENTS

	<u>Page</u>
CHAPTER ONE: INTRODUCTION	1-1
CHAPTER TWO: PROBLEM DESCRIPTION	2-1
CHAPTER THREE: METHOD OF SOLUTION	3-1
3.1 Overview of Model and Its Capabilities	3-4
3.2 Weather Generation	3-5
3.3 Aircraft Generation	3-7
3.3.1 Aircraft Creation Time, Given Complete Data	3-9
3.3.2 Aircraft Creation Time, Complete Data Not Available	3-10
3.3.3 Destination Assignment	3-13
3.3.4 Assignment of User Types	3-15
3.3.5 Aircraft Origin	3-15
3.3.6 Aircraft Weight, Category, and Speed	3-16
3.4 Aircraft Control	3-18
3.4.1 Air Traffic Control	3-18
3.4.2 Runway Selection and Landing Sequencing	3-22
3.5 Data Required to Exercise the Model	3-26
3.6 Model Outputs	3-27
3.7 Model Limitations	3-27
CHAPTER FOUR: GENERAL PROGRAM DESCRIPTION	4-1
4.1 Operating Environment	4-1
4.2 Program Specification	4-1
4.3 Subprogram	4-2
4.4 Flow Charts	4-2
4.5 Source Listing	4-2

CONTENTS (continued)

	<u>Page</u>
CHAPTER FIVE: PROGRAM USE	5-1
5.1 Required UDCM Input Data	5-1
5.1.1 Weather Data	5-1
5.1.2 Arrival Rates	5-6
5.1.3 Destination Assignment	5-6
5.1.4 Assignment of User Types	5-10
5.1.5 Distribution of Weight Class as a Function of Type	5-10
5.1.6 Distribution of Approach Category as a Function of Type	5-11
5.1.7 Route Distances from Holding Fixes to Logan under Radar and Nonradar (VORTAC) Environments	5-11
5.1.8 Distances from Secondary Airports to Logan	5-12
5.1.9 Minima for Each Approach Serving Each Runway by Approach Category	5-12
5.1.10 Identity of All Facilities Necessary for Each Approach at Each Runway	5-12
5.1.11 MTBF and MTTR for Facility Status File	5-17
5.1.12 Table of Trail Separation and Numbers of Aircraft per Controller	5-19
5.1.13 Airport Definition Data	5-19
5.2 Model Outputs	5-19
5.2.1 Delay Data	5-21
5.2.2 Program Administrative Data	5-21
5.2.3 Current Contents of Program Parameters	5-21
5.3 Restrictions and/or Limitations	5-23
5.4 Editing and Diagnostics	5-23
CHAPTER SIX: SYMBOLS	6-1
6.1 Matrix Savevalues	6-1
6.2 Halfword Savevalue Symbols	6-2

CONTENTS (continued)

	<u>Page</u>
6.3 Boolean Variable Symbols	6-3
6.4 Function Symbols	6-3
6.5 Chain Symbols	6-4
6.6 Logic Switch Symbols	6-4
6.7 Variable Symbols	6-5
6.8 Savevalue Symbols	6-6
APPENDIX A: PROGRAM PRINTOUT	A-1
APPENDIX B: LIST OF REFERENCES	B-1

LIST OF ILLUSTRATIONS

<u>Figure</u>		<u>Page</u>
3-1	Generalized Flow Chart for the UDCM	3-3
3-2.	Weather Module Logic	3-6
3-3.	Aircraft Generation Module Logic	3-8
3-4.	Scheduled Arrival Rate at Logan	3-11
3-5.	Distribution of Aircraft Destinations and Overall Arrival Rates as a Function of Time of Day	3-12
3-6.	User Type by Destination	3-16
3-7.	Cumulative Frequency Distribution of Aircraft Approach Categories and Weight Classes	3-18
3-8.	Air Traffic Control Module	3-19
3-9.	Output Delay Matrix	3-28
4-1.	Weather Module	4-3
4-2.	Aircraft Generation Module	4-4
4-3.	Aircraft Acceptance Function	4-5

LIST OF ILLUSTRATIONS (continued)

<u>Figure</u>	<u>Page</u>
4-4. Main Control Logic	4-6
4-5. Landing to Take Off at Logan	4-11
4-6. Facility Status Module	4-12
5-1. Sample of National Climatic Survey Weather Data	5-2
5-2. Sample of Weather Matrix Inputs	5-5
5-3. Scheduled Arrival Rate at Logan	5-7
5-4. Distribution of Aircraft Destinations and Overall Arrival Rates as a Function of Time of Day	5-8
5-5. User Type by Destination	5-10
5-6. Cumulative Frequency Distribution of Aircraft Approach Categories and Weight Classes	5-12
5-7. Distance Table Holding Fixes and Secondary Airports to Primary Airport - Radar Down	5-13
5-8. Distance Table Holding Fixes and Secondary Airports to Primary Airport - Radar Up	5-13
5-9. Landing Approach Minima	5-15
5-10. Approach Definition Matrix	5-16
5-11. Facility Status File	5-18
5-12. Separation Matrix	5-19
5-13. Field Definition Matrix	5-20
5-14. Block Counts	5-22
5-15. User Chain Data	5-23
5-16. Non-Zero Halfword Savevalues	5-23
5-17. Matrix Facil	5-24

LIST OF TABLES

<u>Table</u>	<u>Page</u>
3-1. IFR Approaches in the Boston TCA for 1975	3-14
3-2. Percentage of Aircraft Bound for Logan Entering Over Holding Fixes	3-14
3-3. Frequency Distribution of Aircraft Weight Classes	3-17
3-4. Land Approach Category Distribution, by Type	3-17
3-5. Aircraft Separation Table	3-21
3-6. Explanation of Delay Measures	3-29
5-1. Frequency of Occurrence of Ceiling, Given Wind Direction (North), Speed, and Daylight Hours	5-3
5-2. Frequency of Occurrence of Visibility, Given Ceiling, Wind Direction (North), and Daylight Hours	5-3
5-3. Percentage of Aircraft Bound for Logan Entering Over Holding Fixes	5-9
5-4. Frequency Distribution of Aircraft Weight Classes	5-11
5-5. Frequency Distribution of Aircraft Approach Categories	5-11
5-6. Runway Approach Minima	5-14
5-7. Facility-Approach Definitions -- Boston (Logan), Runway 4R	5-16
5-8. Facility File	5-17

CHAPTER ONE

INTRODUCTION

The User Delay Cost Model (UDCM) is one of two programs prepared by ARINC Research Corporation for the DOT/Transportation Systems Center (TSC) under Project Number TSC/420-0137-WD. The purpose of the two programs or models is to provide the FAA Airway Facilities organization with management tools to estimate the effect of variations in airway facilities maintenance scenarios on:

Costs to the user community due to excessive delays caused by facility outage

Costs of preventive and corrective maintenance.

The UDCM is to be used to address the first issue, while the companion model, the Facilities Maintenance Cost Model (FMCM), addresses the second.

This report provides the documentation of the UDCM, including a description of the model, a program description, and an example application of the model. It is the second of three reports prepared under contract to TSC. The first report, entitled "User Delay Cost Model and Facilities Maintenance Cost Model for a Terminal Control Area", provides documentation of the entire model development efforts. The third report, entitled "Users' Manual and Program Documentation for the Facilities Maintenance Cost Model", provides data on the FMCM, comparable to that contained in this report.

CHAPTER TWO

PROBLEM DESCRIPTION

The FAA is currently spending \$1,000,000 a day, principally for labor, to maintain the facilities of the National Airways System. It was recognized that economies should be possible, particularly in the area of changing personnel and preventive maintenance policies, but that these economies might have an adverse effect on facility availability. If facility availability were reduced, an impact could be felt by the user community (defined here as air carriers, air taxis, general aviation, and military) in the form of delays over and above those attributable solely to weather and schedule. The UDCM is designed to measure these delays as the various navigation and landing aids and other facilities in a Terminal Control Area (TCA) fail and are restored to service.

The Boston TCA was used to provide guidance in the development of this model. However, the model is constructed in such a way that by changes in appropriate input data it can be made to reflect the characteristics of any comparable TCA.

CHAPTER THREE

METHOD OF SOLUTION

The UDCM is a Monte Carlo simulation model that combines the three primary stochastic processes that induce user delays:

- Facility outage
- Traffic intensity
- Weather.

The underlying premise of the model is that these three factors are intrinsically interrelated in the creation of delay and that the only way delay can be attributed to any one is to hold two constant and measure the differential delay caused by variations of the third. Differential delay associated with a facility outage depends not only on the change of facility status but also on the existing weather conditions and traffic intensity. The weather and levels of aircraft activity can be set in any manner, but a large quantity of recent historical weather data for Boston's Logan Airport is already incorporated in the model. Several options are available for assessing the impact of facility outage. One or more facilities can be taken out of the system, e.g., the Airport Surveillance Radar (ASR), to determine the consequences of their being inoperative. An alternative method would be to assign values of Mean Time Between Outages (MTBO) and Mean Time To Restore (MTTR) to all facilities simulated in the model and let the model treat the outage and restoration times as random variables.

The model logic duplicates the complex rules and procedures that govern the movement of aircraft as a function of the aircraft traffic intensity, the status of FAA facilities, and the prevailing weather. An aircraft is generated at the boundary of the Boston TCA (at one of five holding fixes about 40 miles from the airport), and its movement from there to Logan or one of the secondary airports is simulated. For aircraft landing at Logan, a randomized time delay is used to schedule a subsequent departure. Aircraft departing from secondary airports are not simulated in the model.

The basic questions that the model is concerned with in moving an aircraft are as follows:

- a. Will aircraft separation exceed the instantaneous traffic-handling capability of a controller (controller capacity)?

b. Will aircraft separation be in conformance with FAA standards? The answer to this question is dependent on the status of FAA facilities, the weather, and aircraft weight.

c. Can the aircraft land? The answer to this question is dependent on the status of FAA approach facilities and the weather.

As will be shown in the ensuing discussions of the model, there are a large number of detailed conditions or factors that must be considered in resolving these three key questions. For example, the aircraft type and approach category are needed to establish separation criteria, as are minimum weather conditions for landing. There are also many runways, combinations of facilities, and geographical factors to be considered. The model has been developed to consider the above issues in some detail. To expedite the model development and its execution time, however, it was decided not to simulate every step-by-step command (e.g., heading vectors) that a controller issues to an aircraft but rather the overall set of rules being followed in generating these commands.

Figure 3-1 is a generalized flow diagram for the UDCM. It illustrates the logical relationships among the main decision processes and files that constitute the model. More detailed discussions of these model elements are presented in the following paragraphs. As in nature, the weather assumes a major role. The state of the weather determines directly the level of air activity, especially among general aviation users. This is true because the level of general aviation activity declines during actual instrument conditions. Furthermore, wind direction and speed determine, in main part, the runway in use. The runway choice influences the types of approach available, which, interacting with the weather, determines the landing minima. For these reasons, Figure 3-1 shows weather generation as the first, or driving, model element.

The second program element is aircraft generation. This consists of determining, by random processes, and as a function of weather conditions (IFR or VFR) and time of day, the time of creation of the next arriving aircraft, its type (air carrier, air taxi, general aviation, or military), weight (small, large, or heavy), landing approach category (A, B, C, or D), destination, speed, and original position when first considered by the model.

The third program element, aircraft control, is more complex than the first two and is the heart of the model. It addresses, as a logical unit, the five questions that must be answered by tower and air control personnel in real life and by the model. These are:

What is the preferred landing or takeoff runway, taking into account wind speed and direction and other priorities, such as noise abatement?

If there are one or more instrument approaches for the preferred runway, is there at least one instrument approach for which all facilities required for landing are "up"?

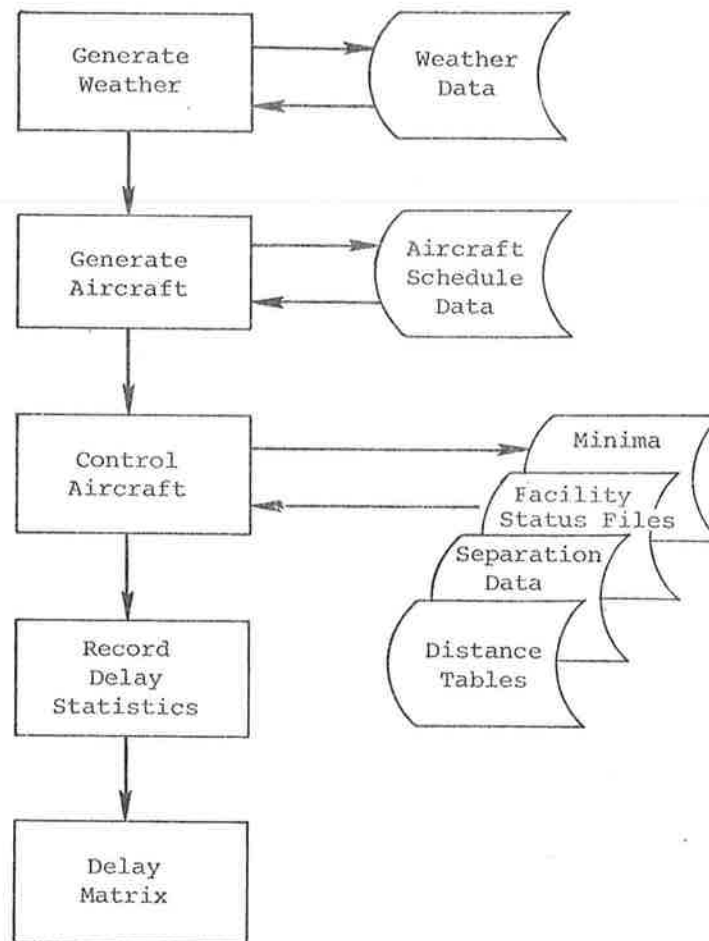


Figure 3-1. GENERALIZED FLOW CHART
FOR THE UDCM

Is the weather such that, for the preferred runway, it is above minima for at least one of the available approaches for the preferred runway?

Having a runway and usable instrument approach, how should the aircraft be moved to the runway and proper separation established in the final approach?

For aircraft taking off from Logan, how should proper separation be established between landing aircraft and other aircraft taking off?

There are, of course, many variations and details related to how these questions are dealt with and to other necessary program tasks. These are discussed in Section 3.4.

The remaining model elements shown in Figure 3-1 correspond to the input data required in the exercise of the model and the generation of the aircraft delay statistics.

3.1 OVERVIEW OF MODEL AND ITS CAPABILITIES

Although the model was developed to assess the impact of changing facility availabilities on user delays, it was recognized during model development that it would provide the ability to evaluate a number of additional issues as well. Therefore, the capabilities discussed in the following paragraphs should be kept in mind when the features of the model are being assessed.

The UDCM can be used to analyze the differential delays induced not only by facility outage but also by the effect of aircraft schedule and weather variations, as well as by a host of other related factors. For example, at Logan there is no ILS on runway 27. A typical question might be "What would be the delay impact of equipping runway 27 with an ILS?" All that is required to answer this question, using the present model, is to insert a set of ILS minima for a straight-in approach on 27 in the minima table. It is easy to extend this argument to "What would be the effect of replacing the ILS on runway 4R with a Category III ILS or the Microwave Landing System?" Here, too, all that is required is a simple change in the minima table.

Many other questions and issues may be addressed. In fact, anything that affects spacing in final approach, number of aircraft a controller can handle simultaneously, or minima can be examined by simple input-data changes. It is emphasized, however, that the model cannot determine what these data changes will be; this must be done by analysis external to the model. This being the case, the model could answer the question "What would be the benefit (as measured by aircraft delay reductions) of increasing the number of aircraft per controller from 10 to 20?", without regard for how it was to be done. If the savings were appreciable, this could be taken as justification to examine the feasibility of attempting to achieve this increased controller capacity.

The model can also serve as an aid in airport design and layout, such as runway orientation. In this use, in particular, accurate weather data are required for the weather module; but with such data, it would be possible to decide whether a runway array of (4,22), (15,33), (9,27), for example, is better than (5,23), (17,35), (11,22), where the numbers in parentheses are runway directions in tenths of degrees, magnetic.

The model is not all-encompassing, but enlarging the basic logic makes many new options possible at little cost in terms of incremental analysis and additional modeling.

3.2 WEATHER GENERATION

Figure 3-2 is a logic diagram of this module. The following set of assumptions were used in formulating this module.

Weather phenomena are associated with the presence and movement of pressure systems. Wind direction and velocity are a direct consequence of these movements and are correlated with one another.

Cloud cover and height are, through the movement of pressure systems, correlated with wind direction and velocity.

Visibility is correlated with wind direction and ceiling height.

There is a tendency to persistence in weather conditions.

These assumptions, while certainly not an exhaustive set, are deemed essential to a realistic model, or simulation, of weather phenomena (wind direction, velocity, ceiling, and visibility) in any locale. Fortunately, a good data base is available from Boston upon which a simulation of these phenomena can be based.*

The available data, samples of which are presented in Appendix A, consist of the frequencies of occurrence of wind direction, on a 16-point compass with associated frequencies of wind velocity, grouped as follows: 1 to 4, 5 to 9, 10 to 14, 15 to 29, and 30+ knots, as well as conditions of calm. For each wind direction-velocity combination, frequencies of occurrence of ceilings are provided. Ceilings are grouped as follows: 1000+, 600 to 900, 500, 400, 300, 200, and 100 feet. Visibilities are grouped as follows: 0 to 1/4, 5/16 to 1/2, 5/8 to 7/8, 1, 1-1/4 to 1-1/2, and 3+ nautical miles.

These frequencies are presented as conditional probabilities; thus they allow the calculation, by randomizing on the unit interval, of a particular wind direction; and, given the wind direction, a wind speed; and, given the wind direction and speed, a ceiling; and, given the wind direction and ceiling, a visibility. The data are presented to the computer through input matrices.

A related issue is when and how to simulate changes in the prevailing weather. Two studies, also performed by the National Climatic Center,

*A statistical summary prepared by the National Climatic Center, Asheville, North Carolina, "Special Ceiling-Visibility Wind Tabulation", was used for Boston. The period of observation was from January 1970 through December 1974. Observations were made for daytime hours at 1000, 1300, 1600, and 1900 Local Standard Time (LST), and for nighttime hours at 2200, 0100, 0400, and 0700 LST. The data are published in two separate sets of tables (night and day), each with 7304 observations.

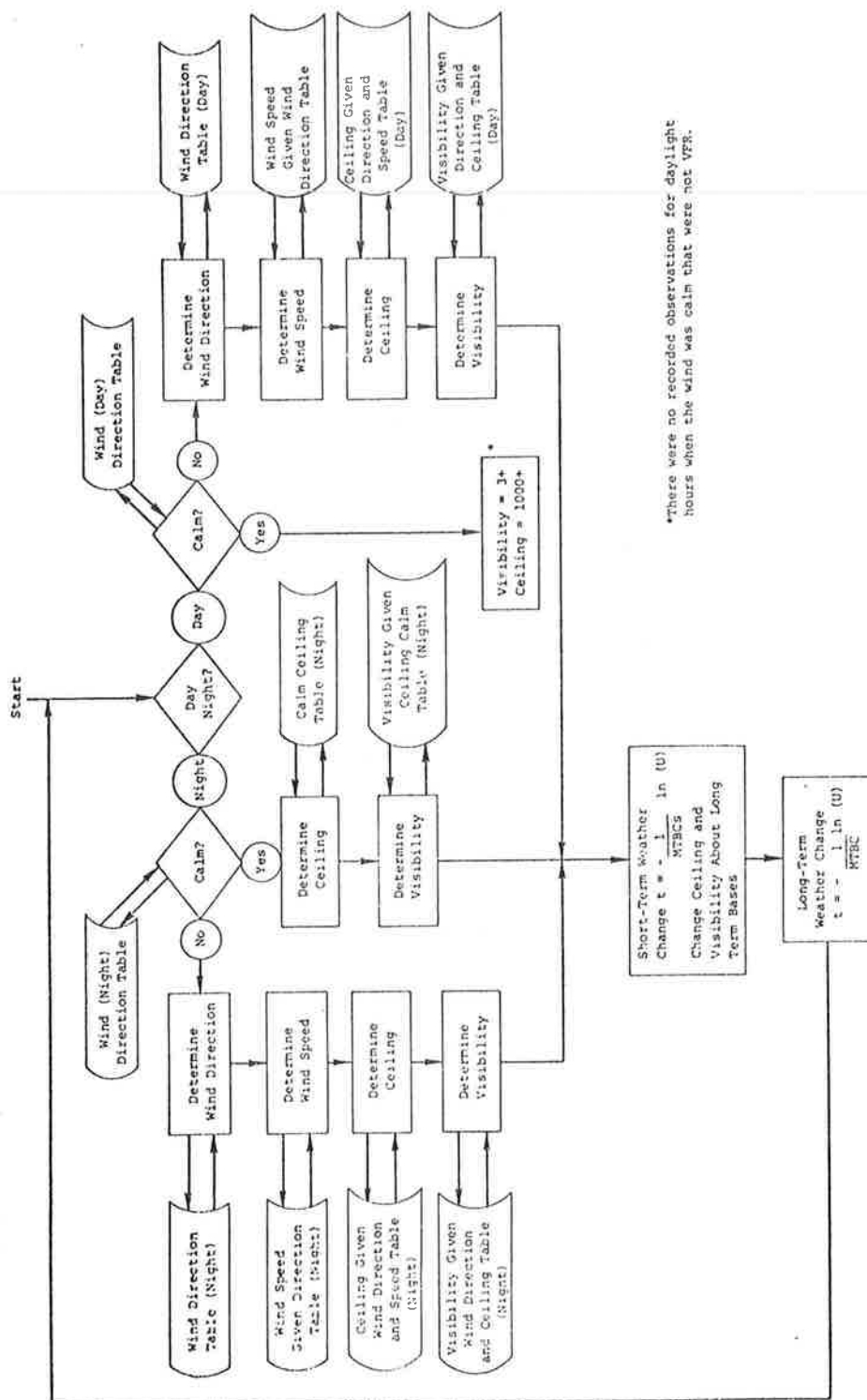


Figure 3-2. WEATHER MODULE LOGIC

suggested a basis for such simulation.* Under the assumption that wind direction and speed determine, in part at least, ceiling and visibility, the data provide a basis for answering the question of when to vary the weather. The wind persistence data fit an exponential decay curve fairly well with a Mean Time Between Changes (MTBC) of about 3 hours. The weather module, therefore, defines an exponentially distributed random variable called Time to Change the Weather. Its density function is

$$f(t) = \frac{1}{MTBC} e^{-t/MTBC}. \quad (3-1)$$

A nominal value of 3 hours for MTBC has been selected on the basis of these studies.

The question of how much to allow the weather to vary, once the time has been decided, is not so obvious and bears some discussion. In general, except when thunderstorms or strong fronts pass a station, the variation in wind and weather is gradual and highly correlated with past history. For example, an abrupt change from VFR to zero-zero would be rare. A completely realistic model would capture this historicity; however, the creation of such a model is not necessary. What is needed instead is a model that in the long run produces statistical similarity to the phenomena of interest. This has been done by merely allowing the weather to change randomly at the time selected, i.e., randomizing on the exponential Time to Change variable. As an added refinement, the model allows for small short-term variations. The model assumes that ceiling and visibility will vary uniformly about the basic "long term" values determined above. These "short term" variations are induced at times that are also exponentially distributed but with a nominal mean of 15 minutes. This is in conformance with observed short-term weather fluctuations and allows the model to simulate the conditions underlying a pilot's decision to wait for a short-term weather change if conditions are marginally below minima.

Figure 3-2 incorporates all of these weather factors. In the figure it can be seen that two sets of weather data tables, one each for night and day, are used in the model. The model checks the time first, then by a random process determines, in order, the wind direction, wind speed, ceiling, and visibility.

3.3 AIRCRAFT GENERATION

The objective of the aircraft generation module is to create aircraft to be routed through the Boston TCA in the exercise of the model. Figure 3-3

*The studies are "Seasonal and Annual Persistence of Surface Wind Direction by Wind Speed" at Binghamton, New York, for the period January 1960 to December 1964, with 24 observations per day; and "Duration of High Surface Wind Speeds" at Oscoda, Michigan AFB, for the period November 1950 to December 1970.

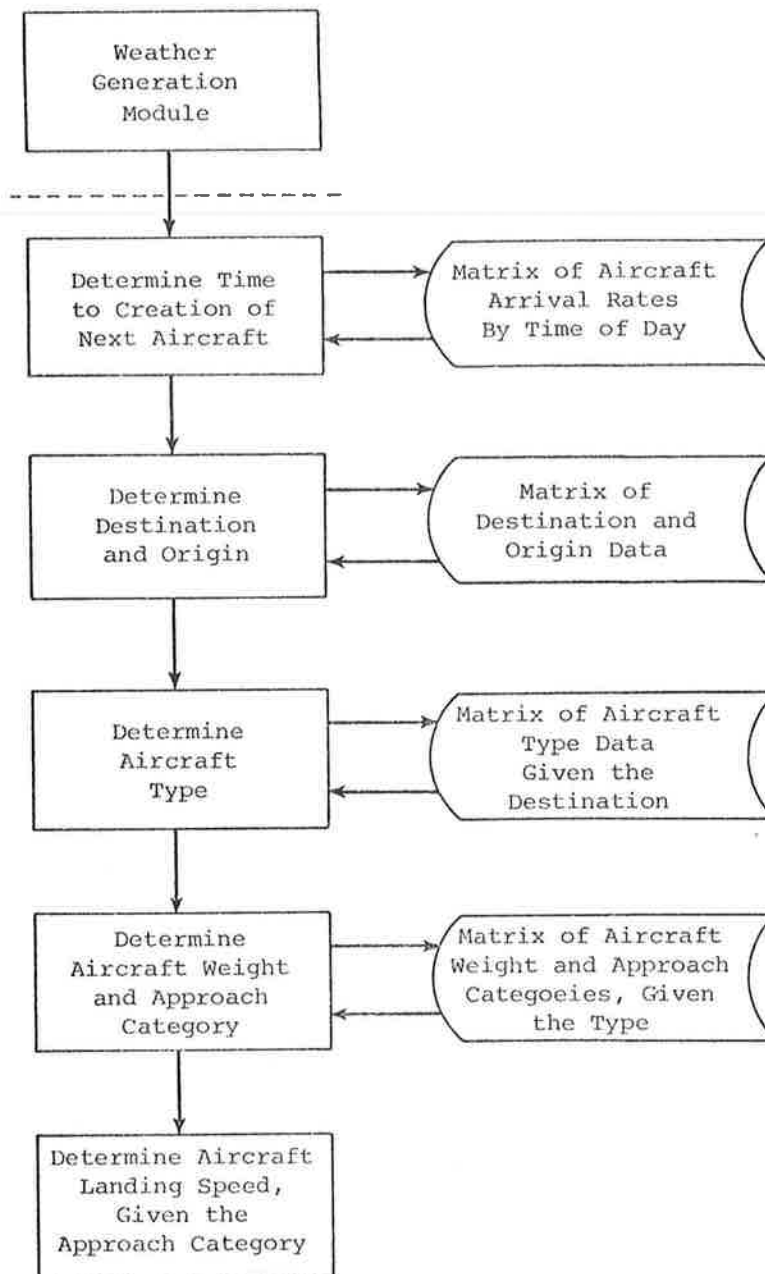


Figure 3-3. AIRCRAFT GENERATION MODULE LOGIC

displays the module logic. Each aircraft will be defined in terms of the following descriptors:

- a. Time of creation
- b. Destination
- c. Type
 - Air carrier
 - Air taxi
 - General aviation
 - Military
- d. Origin
- e. Aircraft characteristics
 - Weight
 - Landing approach category
 - Landing speed.

The following discussion explains two methods of simulating aircraft generation time. The first of these is a method that could be used if complete data were available. It is presented so that future data-gathering efforts by the FAA can be properly directed. The second method described is that which was actually used in the model. This method, though less direct, was considered necessary in order for the model demonstration to be representative and interpretable.

3.3.1 Aircraft Creation Time, Given Complete Data

The time to creation of the next aircraft will be considered a random variable having the exponential distribution, with the rate of creation a function of destination, time of day, and weather conditions. The rate of creation can be represented as

$$\lambda_{ijk},$$

where

- i = 1,2,...,n the destination airport, and n is the number of destination airports in the model
- j = 1,2,...,24 corresponding to the time periods 0000-0059, 0100-0159,..., 2300-2359
- k = 0,1 where 0 implies IFR conditions and 1 implies VFR conditions.

The time of day influences the intensity of air activity into all airports in the model. Most of the secondary airports, for example, shut down at night, thus

$$\lambda_{ijk} = 0,$$

for values of j lying in the period of shutdown for airport i .

If k is assigned a value, say 0, corresponding to IFR conditions, then the λ_{ij0} can be arrayed in an $n \times 24$ matrix.

$$\begin{array}{c} \text{Destination} \end{array} \begin{array}{c} \text{Time} \\ 1, \quad 2, \quad \dots, \quad 24 \end{array} \begin{bmatrix} 1 & \lambda_{1,1,0} & \lambda_{1,2,0}, \dots, & \lambda_{1,24,0} \\ 2 & \lambda_{2,1,0} & \lambda_{2,2,0}, \dots, & \lambda_{2,24,0} \\ \vdots & \vdots & \vdots & \vdots \\ n & \lambda_{n,1,0} & \lambda_{n,2,0}, \dots, & \lambda_{n,24,0} \end{bmatrix}.$$

For any time, e.g., $j = 23$, some airports will be closed and some open. If $\lambda_{i,23,0}$ is summed over i , then

$$\lambda_{.,23,0} = \sum_{i=1}^n \lambda_{i,23,0},$$

and is the overall arrival rate to all airports in IFR conditions in the hour 2200-2259. The time of arrival (creation) of the next aircraft, t_a , has the exponential distribution with parameter $\lambda_{.,23,0}$

$$f(t_a) = \lambda_{.,23,0} \left[\exp -t_a \lambda_{.,23,0} \right],$$

and t_a can be found by sampling the unit interval for a uniformly distributed random variable, U , and solving the equation

$$t_a = \frac{-1}{\lambda_{.,23,0}} (\ln U).$$

3.3.2 Aircraft Creation Time, Complete Data Not Available

Section 3.3.1 discussed how overall arrival rates could be calculated. The arrival rate data have not been collected in the form discussed there; that is, arrival rates for both weather conditions at all destination airports, by time of day, are not known. An approximation was used in the model demonstration. The source for this approximation was data from the

Performance Measurement System (PMS) for Airports, dated November 1975. Figure 3-4 was taken from this report and shows arrivals of scheduled aircraft as a function of time. This graph was converted by manual measurement into a table of approximate numbers. This table was extended quite arbitrarily to cover a 24-hour day. It was assumed that these rates could be made applicable to IFR or VFR conditions by multiplying them by a constant. This, in fact, was done in the demonstration runs. It is suggested that before the model is exercised for analysis that these data be collected in the form called for in the discussion contained in Section 3.3.1.

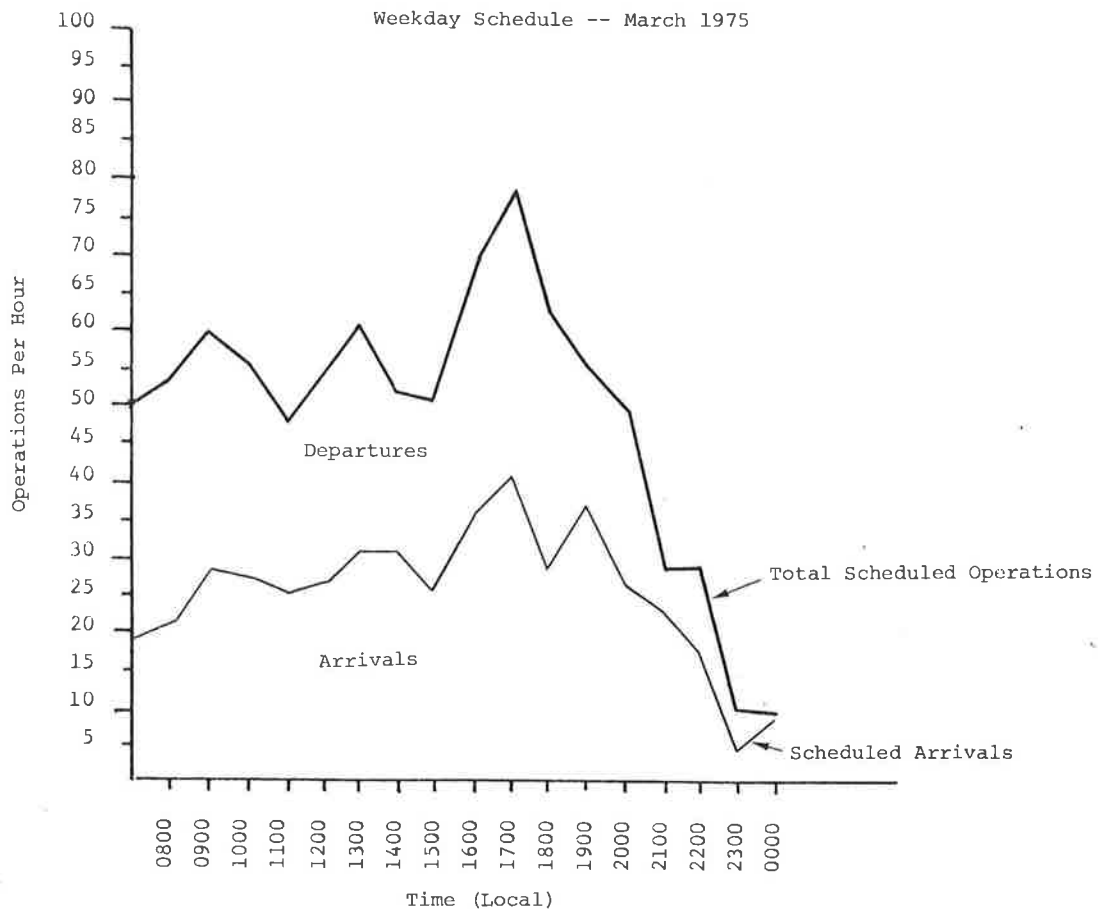


Figure 3-4. SCHEDULED ARRIVAL RATE AT LOGAN

The last column in Figure 3-5 shows the rate of arrival, derived from Figure 3-4, by time of day, for VFR conditions. These figures are the same as those used in the demonstration at TSC on 20-22 September 1976. Other uses of the matrix in Figure 3-5 are discussed in Section 3.3.3.2.

MATRIX HALFORD SAVEVALUEVFRAC																	
ROW	Secondary Airports																
	COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	297	597	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000
2	299	598	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000
3	299	598	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000
4	299	598	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000
5	299	598	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000
6	299	598	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000
7	299	598	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000
8	260	522	740	784	871	871	871	954	955	955	955	955	955	955	955	955	955
9	251	502	711	752	836	929	946	947	948	954	954	954	955	955	955	955	955
10	251	502	710	752	836	928	946	947	948	954	955	955	955	955	955	955	955
11	251	502	710	752	836	928	946	947	948	954	955	955	955	955	955	955	955
12	251	502	710	752	836	928	946	947	948	954	955	955	955	955	955	955	955
13	251	502	710	752	836	928	946	947	948	954	955	955	955	955	955	955	955
14	251	502	710	752	836	928	946	947	948	954	955	955	955	955	955	955	955
15	251	502	710	752	836	928	946	947	948	954	955	955	955	955	955	955	955
16	251	502	710	752	836	928	946	947	948	954	955	955	955	955	955	955	955
17	251	502	710	752	836	928	946	947	948	954	955	955	955	955	955	955	955
18	251	502	710	752	836	928	946	947	948	954	955	955	955	955	955	955	955
19	258	516	731	774	860	955	955	955	956	956	956	956	956	956	956	956	956
20	258	516	731	774	860	955	955	955	956	956	956	956	956	956	956	956	956
21	258	516	731	774	860	955	955	955	956	956	956	956	956	956	956	956	956
22	258	516	731	774	860	955	955	955	956	956	956	956	956	956	956	956	956
23	258	516	731	774	860	955	955	955	956	956	956	956	956	956	956	956	956
24	269	538	763	807	897	997	997	997	998	998	998	998	998	998	998	1000	1000

Number of aircraft
created in VFR
conditions

Default to Tew Mac

Figure 3-5. DISTRIBUTION OF AIRCRAFT DESTINATIONS AND OVERALL ARRIVAL RATES
AS A FUNCTION OF TIME OF DAY

3.3.3 Destination Assignment

3.3.3.1 Ideal Method of Destination Assignment

Just as the availability of the λ_{ijk} would have made the task of generating an arrival time simple and precise, it would also make the task of destination assignment simple and precise, as shown below.

Let P_i be the probability that the next aircraft will have airport i at its destination, then

$$P_i = \frac{\lambda_{ijk}}{\lambda_{.jk}}$$

A table of cumulative values of P_i can be formed from the function

$$F_m = \frac{\sum_{i=1}^m \lambda_{ijk}}{\lambda_{.jk}},$$

where

$m \leq n$ = the number of airports.

If a uniform random variable is again drawn from the unit interval, a destination is assigned by comparing U with this cumulative probability for all values of m . This method assures that aircraft will not be created with destination airports which are shut down because of time of day.

3.3.3.2 Pragmatic Method of Destination Assignment

Since the λ_{ijk} was not available, another method was used to take advantage of the data which were available. As will be seen, even with this method, the data were still incomplete.

The analysis, "FAA Air Traffic Activity for Calendar Year 1975", published by the FAA Office of Management Systems in March 1976, contained a number of statistical tables descriptive of various aircraft operations nationwide. Table 14 of this analysis identifies the number of instrument approaches handled by FAA-operated Approach Control Facilities, RAPCONS, and RATCCS. Table 3-1 is an extract from this FAA table and provides the data for Logan Airport and its secondary airports.

It can be seen that of the 31282 instrument approaches made in the Boston TCA, 26142 or 83.6 percent were made at Logan. At Bedford, 2902 or 9.3 percent instrument approaches were made, etc. A cumulative table was constructed to be used, in conjunction with a random number selection, to assign these destinations. Unfortunately, a similar table was not available for VFR approaches; therefore, the data in Table 3-1 were used for both cases.

Table 3-1. IFR APPROACHES IN THE BOSTON TCA FOR 1975					
Airport	Airport Totals	Air Carrier	Air Taxi	General Aviation	Military
<u>Primary Airport</u> (Boston Logan)	26142	20450	3012	2587	93
<u>Secondary Airports</u>					
Bedford	2902	87	235	2425	155
Beverly Municipal	548	0	1	446	101
Fitchburg	38	0	0	38	0
Fort Devens	26	0	0	1	25
Lawrence	200	0	38	162	0
Mansfield	12	0	0	12	0
Marshfield	19	0	0	19	0
Newburyport	1	0	0	1	0
Norwood	1275	2	12	1094	167
Plymouth	15	0	0	15	0
South Weymouth	69	0	0	12	57
Taunton	19	0	0	19	0
Tewkesbury	17	0	4	13	0
Area Totals	31283	20530	3302	6844	598

A further refinement was made in the model. Since aircraft bound for Logan appear at one of the five holding fixes situated around Logan, namely, Manjo, Millis, Bridgewater, Skipper, and Lawrence, and since their time of flight from the holding fix (an important program variable) is dependent on which fix they are leaving and to which runway they are proceeding, it is necessary to assign each aircraft created to one of these fixes.

For those aircraft destined for Logan, the percentages assigned to the five holding fixes are as presented in Table 3-2.

Table 3-2. PERCENTAGE OF AIRCRAFT BOUND FOR LOGAN ENTERING OVER HOLDING FIXES		
Fix	Fix Number	Percentage
Manjo	1	30
Millis	2	30
Bridgewater	3	25
Skipper	4	5
Lawrence	5	10

Combining these data with the percentages calculated from Table 3-1 shows that of all instrument approaches to be made in the Logan TCA (83.6 percent of the total), $0.3 \times 0.836 = .251$ will appear at Manjo and Millis; $0.25 \times 0.836 = .209$ at Bridgewater, etc. These numbers were then cumulated and are displayed in Figure 3-5. When all airports are open, between 0800 and 2000, .251 percent of IFR aircraft will appear at Manjo. In Figure 3-5, the unnumbered left column represents the time of day; column number 1 represents Manjo, column 2 is Millis, and so forth through column 5 (the order shown in Table 3-2). Consider, for example, row 13, representing the time from 1201 to 1300, where the number 251 represents the frequency, on a scale from 1 to 1000, of created IFR (or VRF) aircraft assigned to Manjo. Note that column 2 contains the value 502, which is the sum of 251 and 251, the latter number being the frequency of assignment to Millis. If a random number is drawn, e.g., 138, the aircraft would be assigned to Manjo. If it were 312, since $251 < 312 \leq 502$, it would indicate assignment to Millis. Each row is cumulative from left to right, where the columns from 6 through 17 represent, respectively, Bedford, Beverly, Fitchburg, Fort Devens, Lawrence, Mansfield, Marshfield, Newburyport (Plum Island), Norwood, Plymouth, South Weymouth, and Taunton. The last column, treated by the program as a default, is Tew-Mac and also shows the hourly rate of total arrivals.

3.3.4 Assignment of User Types

Having the destination, the user type can be assigned on the basis of the data in Table 3-1. Figure 3-6 shows the program selection matrix; its relationship to Table 3-1 is shown in the following program example.

Suppose the destination is Bedford, where 2902 is the total. Of these, 87 or 2.99 percent are air carriers, 235 or 8.09 percent are air taxis, 2425 or 83.56 percent are general aviation, and 155 or 5.34 percent are military. If these percentages are changed to numbers between 0 and 1000, the cumulative distribution is 30, 111, 947, and 1000. Row 6 of Figure 3-6 shows, for columns 1, 2, and 3, corresponding to air carrier, air taxi, and general aviation, respectively, the first three of these numbers. Military aircraft are treated as defaults.

3.3.5 Aircraft Origin

Aircraft proceeding to secondary airports are assumed to appear at the airport ready to land. The only question is whether or not they can, depending on facility status and weather conditions. On the other hand, aircraft destined for Logan appear at one of the five holding fixes that serve Logan -- Manjo, Millis, Bridgewater, Skipper, or Lawrence. For the purpose of the model configuration, these holding fixes are destinations from the point of view of creation, and are also origins of aircraft bound for Logan. No departures from secondary airports are simulated. Aircraft landing at Logan appear as Logan departures after a turnaround time is generated by the program function MODSP. At present, air carriers turn around uniformly in the interval of 10-15 minutes after landing, air taxis 180-240 minutes, general aviation 20-35 minutes, and military 240-300 minutes.

MATRIX HALFWORD SAVEVALUEVFRPT

		COL. 1	2	3
A/C Destinations	ROW 1	782	897	996
	2	782	897	996
	3	782	897	996
	4	782	897	996
	5	782	897	996
	6	30	111	947
	7	0	2	816
	8	0	0	1000
	9	0	0	38
	10	0	190	1000
	11	0	0	1000
	12	0	0	1000
	13	0	0	1000
	14	2	11	869
	15	0	0	1000
	16	0	0	174
	17	0	0	1000
	18	0	235	1000

A/C Type (Default = type 4)

Matrix is used to determine aircraft type once destination is known in VFR conditions.

Figure 3-6. USER TYPE BY DESTINATION

3.3.6 Aircraft Weight, Category, and Speed

With knowledge of the type of aircraft, three other pieces of information are required: the weight class, the aircraft approach category, and speed. The weight class is required to determine separation criteria in the final approach. The approach category is required to determine landing minima.

A small aircraft, designated S, is an aircraft whose maximum certified takeoff weight is 12,500 pounds or less. A large aircraft, L, weighs more than 12,500 pounds and no more than 300,000 pounds. A heavy aircraft, H, weighs more than 300,000 pounds.

Approach category definitions are tabulated as follows:

- Landing approach speed less than 91 knots, landing weight less than 30,001 pounds
- Landing approach speed 91 knots or more but less than 132 knots; landing weight 30,001 pounds or more but less than 60,001 pounds
- Landing approach speed 121 knots or more but less than 141 knots; landing weight 60,001 pounds or more but less than 150,001 pounds
- Landing approach speed 141 knots or more but less than 166 knots; landing weight 150,001 pounds or more
- Landing approach speed greater than 166 knots is not considered.

Both weight class and approach category are treated as a function of aircraft type. The model assigns aircraft weight class and approach category through two separate random processes. Although there could theoretically be a high correlation between these two factors, the actual mix of aircraft is such that there is little need to correlate the weight class and approach category selection. For example, all general aviation aircraft in the available Logan data base were both small and approach category a. The only problem concerned commercial aircraft, wherein some heavy aircraft could be erroneously assigned to approach category c. However, a model refinement in this one area did not seem to be warranted.

Table 3-3 presents aircraft distribution data derived from information supplied by TSC, and based in part on FAA equipment forecast for air carrier operations at Logan.

Table 3-3. FREQUENCY DISTRIBUTION OF AIRCRAFT WEIGHT CLASSES			
Type	Weight Class		
	Small	Large	Heavy
Air Carrier	0	.9	.1
Air Taxi	.1	.9	0
General Aviation	.9	.1	0
Military	.02	.9	.08

Table 3-4 presents approach category data which was also based on information supplied by TSC.

Table 3-4. LAND APPROACH CATEGORY DISTRIBUTION, BY TYPE				
Type	Approach Category			
	A	B	C	D
Air Carrier	0	.05	.1	.85
Air Taxi	.9	.1	0	0
General Aviation	.9	.07	.03	0
Military	.1	.3	.3	.3

Table 3-3 is combined with Table 3-4 as a single input matrix, and is displayed in Figure 3-7. The data are shown as cumulative probability distributions.

MATRIX HALFWORD SAVEVALUECATWT

		COL. 1	2	3	4	5	6	7	
A/C Type	ROW { 1	0	0	787	1000	0	787	1000	Air Carrier
	2	0	1000	1000	1000	0	1000	1000	Air Taxi
	3	1000	1000	1000	1000	1000	1000	1000	General Aviation
	4	300	500	1000	1000	500	1000	1000	Military
		Approach Category				Weight Class			

Matrix is used to define aircraft category and weight, once type has been determined.

Figure 3-7. CUMULATIVE FREQUENCY DISTRIBUTION OF AIRCRAFT APPROACH CATEGORIES AND WEIGHT CLASSES

With weight and approach category decided, an approach speed is all that remains to be assigned. The speed is selected on the basis of a uniform speed distribution applicable to the various approach categories:

Category	Speed (Knots)	Distribution Range (Knots)
A	71-90	20
B	91-120	30
C	121-140	20
D	141-165	25

3.4 AIRCRAFT CONTROL

3.4.1 Air Traffic Control

Figure 3-8 depicts the air traffic control module.

As described previously, when an aircraft bound for Logan is generated, it is assigned to one of the five inbound holding fixes, where it is held until it can be accepted by a controller for vectors to an approach. A central assumption of this model is that three factors primarily affect delays:

- The number of aircraft a controller can handle at one time

The longitudinal, or trail, separation of aircraft in final approach
Whether or not an approach can be made.

The number of aircraft per controller is determined by:

A controller's innate capability and training
Accuracy and information rate of the radar.

Interviews with personnel in Boston TRACON showed that while the capabilities of controllers varied considerably, an average controller, working with the ASR, ARTS-III, and SECRA all operable, could handle ten aircraft between the holding fixes and the point where the aircraft are handed over to the tower control. These same interviews revealed that as the several radars became inoperable (the Winthrop ARSR is included because its raw video can be displayed in the TRACON), the number of aircraft per controller diminished. The last column in Table 3-5 displays nominal numbers of aircraft per controller, as a function of the radar facility environment. To illustrate, suppose the ASR is down, the SECRA is up, the ARTS-III is down, and the Winthrop ARSR is down. The SECRA (beacon radar) is the only radar information available, and the number of aircraft per controller is reduced from a nominal, or average, value of ten to eight.

The manner in which the maximum number of aircraft per controller (MAPC) affects delay is readily seen. Assume that a controller is moving aircraft from a holding fix to a runway and that the runway acceptance rate is unlimited. If the distance from the fix to the runway is D and the aircraft speeds are S, define MAPC as the maximum number of aircraft per controller and NAPH as the number of aircraft moved per hour. If the aircraft the controller handles are assumed equally distant from one another, then this distance is D/MAPC. If the aircraft speed is divided by this quantity, the number of aircraft per hour that the controller can move to the runway, NAPH, is given; that is,

$$NAPH = \frac{S}{D/MAPC} = \frac{(MAPC)(S)}{D}$$

For given values of S and D, the rate of removing aircraft from the holding fixes is a linear function of MAPC. If a controller is receiving aircraft from more than one holding fix, then the rate at which he can remove aircraft from any one of these (assuming they are equidistant from the runway) is NAPH/N, where N is the number of holding fixes. If this rate is less than the rate at which aircraft are arriving at these fixes, then queues or stacks will develop. The longer the queues, the greater will be the delay. If the runway acceptance rate is finite and if NAPH is greater than the runway acceptance rate, then, of course, the runway acceptance rate becomes the limiting factor.

The runway acceptance rate is controlled primarily by:

Trail separation in final approach
Runway clearance rate.

Table 3-5. AIRCRAFT SEPARATION TABLE											
Row Number	Facility Status				Trail Separation Standards (Nautical Miles)						Number of Aircraft per Controller
	ASR	SECRA	ARTS-III	ARSR	Nominal Separation (I)	Differentials (Add to Nominal Separation)*					
						H,H** (II)	L,H** (III)	S,H** (IV)	L,L** (V)	S,L** (VI)	
1	Up	Up	Up	Up	3	1	2	3	0	1	10
2				Down	3	1	2	3	0	1	10
3			Down	Up	3	1	2	3	0	1	8
4				Down	3	1	2	3	0	1	8
5		Down	Up	Up	4	0	1	2	0	0	6
6				Down	4	0	1	2	0	0	6
7			Down	Up	4	0	1	2	0	0	6
8				Down	4	0	1	2	0	0	6
9	Down	Up	Up	Up	3	1	2	3	0	1	10
10				Down	3	1	2	3	0	1	10
11			Down	Up	5	0	0	1	0	0	8
12				Down	5	0	0	1	0	0	8
13		Down	Up	Up	5	0	0	1	0	0	5
14				Down	12	0	0	0	0	0	4
15			Down	Up	5	0	0	1	0	0	5
16				Down	12	0	0	0	0	0	4
*See Paragraph 1420, Air Traffic Control, 1770.65, 1 January 1976, FAA, Air Traffic Service.											
**H,H means a heavy aircraft following a heavy; L,H means a large aircraft following a heavy, etc.											

Trail separation in final approach, the only one of these two factors allowed to vary in the model, is controlled by several factors, among which are:

- Accuracy of navigation
- Precision and information rate of the radar
- Separation required for wake-vortex avoidance
- Runway clearance time.

Table 3-5 is also used by the model to determine separation. A nominal separation is given in column I as a function of radar status. If all radars are up, a nominal separation of 3 nautical miles is provided. Other radar outage combinations give different nominal separations up to a maximum of 5 nautical miles. In the event that all radars are down, radar vectors cannot be provided and the model acts as if any approach to Logan must be made on the Boston VORTAC. In this event, a nominal separation of 12 miles is called for. This is an approximation; it is understood that the actual separation in this case would be achieved by not clearing a following aircraft from a holding fix until the one ahead reports at some prescribed fix. The distance between the two aircraft would therefore be a variable dependent on the holding fix involved and the particular runway in use. The 12-nautical-mile separation is thought, however, to be an adequate approximation.

Columns II through VI of Table 3-5 are incremental separations that are added to the nominal separation determined by column I to provide wake-turbulence avoidance. For example, in the top row, with all radar equipment up, column IV represents a small aircraft following a heavy, and an additional 3-nautical-mile separation is provided, giving a total separation of 6 nautical miles.

The model utilizes the separation-table data to establish the landing sequence. How this sequencing is established is a key aspect of the model, as will be shown in Section 3.4.2. As mentioned earlier, in the description of the aircraft generation module, aircraft bound for Logan are placed at one of the five peripheral holding fixes for the purpose of determining the distance from the fix to Logan. It is not necessary, however, to establish five different queues in the model in order to simulate their handling. A single, first-in/first-out (FIFO) suffices. This reflects the fact that the two approach controllers are in communication with one another and coordinate their activity so that all aircraft handed off to them are allowed to proceed in approximately their order of appearance.

3.4.2 Runway Selection and Landing Sequencing

Before a simulated aircraft is released from the queue that represents the holding fixes, the following steps are taken:

- The controllers must be free to handle the aircraft.

A runway is assigned, taking into account wind speed and direction, types of approach available, weather conditions, and facilities status.

When a runway is found, the distance to that runway from the assigned holding point is found in the distance table and, by use of the aircraft speed, a time of flight is calculated.

By summing the time of flight and present time, an ETA is found. This ETA is used to determine where the aircraft is placed in the landing sequence.

Runway selection is based on the current wind direction and speed coupled with a priority system. It also takes into account the status of facilities that define the several approaches available, the ceiling and visibility conditions, and landing minima. At Logan, the following landing runway priority system is used:

<u>Priority</u>	<u>Day</u>	<u>Night</u>
1	4R/L	33L
2	27-22L	4R
3	33R/L	22L
4	15R/L	

The model first makes a tentative runway selection by taking into account this priority system and wind constraints. It then determines whether or not a landing can actually be made on this runway under prevailing weather conditions and approach availability.

If the wind is 5 knots or less, it is assumed that the wind is calm, as is done at Logan. In this case the highest-priority runway is noted and a check is made, approach by approach, to determine if the facilities necessary for that approach are in an up status. As available approaches are found for the runway under consideration, the minima corresponding to each approach are examined. If the minima are lower than the prevailing ceiling and visibility conditions for that particular runway-approach combination, a viable approach exists and it is assumed that a landing can be made. If the first approach is not viable, the second is checked, and this cycle is continued until a viable approach is found or all approaches for that runway are exhausted. In this case, the next-lower-priority runway is examined. If no viable approach on any runway can be found, the aircraft is delayed at the holding fix until either a viable approach becomes available or 30 minutes have elapsed, at which time the aircraft is presumed to divert to its alternate.

If the wind is greater than 5 knots and is 15 knots or less, the highest-priority runway having the wind direction within ± 80 of its direction is selected and tested for the availability of a viable approach. If no viable approach exists on this runway, the next-highest-priority runway is

examined, etc., until either a viable approach is found or the aircraft is forced to wait for a weather or facility status change to take place.

When the wind is greater than 15 knots, the runway priority is not considered. The model cycles through each runway, searching for a viable approach, if one or more runways are found having a viable approach, the runway closest to the wind is chosen, regardless of wind direction and speed. Of course, if no viable approaches are available, the aircraft, as before, stays at the holding fix.

All of these checks are made before the aircraft is released from the holding fix. When a runway and approach have been found, a distance table is entered. This table contains the distances in nautical miles from all five holding fixes to all the runways at Logan. The data were taken by direct measurement from the Boston (Logan International), Mass., ASR-7 60-nautical-mile video map prepared by the National Ocean Survey, revised 4 February 1976. The routes were laid out in conformity with the Boston Tower Standard Operating Procedures, dated 15 March 1976, BOS TWR 7110.35. It is understood that these routes vary in length from approach to approach, but the tabulated distances are believed to be representative.

When the distance is found, a time of flight is calculated. In calculating the time of flight, the model increases the landing speed by some factor greater than 1; e.g., in the delivered version of the UDCM, time of flight is set equal to the distance divided by the landing speed doubled. This time of flight is added to the present time to obtain an ETA.

Assuming that there are aircraft ahead of the one being considered, there is a landing schedule that contains the landing time, speed, and weight class of the aircraft already en route to land. The ETA of the present aircraft is compared with those of the aircraft on the landing schedule. When the aircraft just ahead (the lead aircraft, with a landing time just less than this ETA) is found, the required separation between the two aircraft is looked up (see Table 3-5) and a calculation is made, using the two aircraft's speeds, to determine if the ETA will allow proper separation. If it does, then a similar calculation is made for the next, or trail, aircraft on the landing schedule. If separation is assured, the ETA is assigned as the landing time and the aircraft is released from the holding fix. Once an aircraft is released, it will be assumed to land regardless of any subsequent changes in weather or facilities. If it does not clear the lead aircraft, a delay is calculated to assure separation, and a check is made on the trailing aircraft, using the ETA plus the calculated delay. If separation is assured, the landing time is the ETA plus this delay. If separation for the trail aircraft is not assured, it is then treated as the lead aircraft and the cycle is continued until a landing time is found. The difference between the landing time and the ETA is the delay time due to spacing. When a delay is necessary, the aircraft is not automatically released from the holding fix at the termination of the delay, but the whole cycle is repeated to ensure that no weather or facility changes have taken place and that the landing schedule has not changed. If the originally determined conditions continue to prevail, the aircraft is released at the end of its delay time and is assumed to land.

If a viable landing runway cannot be found, aircraft are held for up to 30 minutes, during which time the weather may change or facilities may be restored to service, which will allow landings to be made. If no landing is possible within 30 minutes, the aircraft is scrubbed, as if it were going to an alternate airport. Aircraft bound for secondary airports that cannot land are either scrubbed, as if they are going to another secondary airport, or they are diverted to Logan. An arbitrary proportion, one-half in the present model, are assigned to Logan. For those which are diverted to Logan, a distance table is entered to enable calculation of a time of flight. They are put on the landing schedule in the usual way, with one exception: they are assigned a higher priority than other inbound aircraft. This has the effect of putting them ahead of aircraft waiting to be released from the holding fixes.

At Logan, several different situations are encountered in the assignment of runways for takeoff and landing. These assignments are based on wind conditions and states of the weather. For example, if the wind is less than 15 knots and the weather is VFR, landings are permitted on certain runways intersecting the primary, or preferred, runway. Under these conditions the model sets up another landing schedule to which it assigns small aircraft, and the assumption is made that they land on schedule, with separation at the intersection being maintained by the tower. It is also assumed that when the wind is less than 15 knots, landings and takeoffs are scheduled on different runways and collision is avoided on the landing and takeoff runway intersections by tower action. On the other hand, when the wind is greater than 15 knots, landing and takeoffs will be taking place only on the primary runway, and all landings occur on the primary runway.

If the landing and takeoff runways are different, departing aircraft will be allowed to depart as soon as the first landing aircraft lands, unless the first landing aircraft is two miles or more out in final approach. In this case, the departing aircraft will be allowed to take off ahead of it, given proper separation from any aircraft taking off. In a nonradar (VORTAC only) environment, three-minute separation will be simulated.

If landings and takeoffs are occurring on the same runway, when the wind speed is greater than fifteen knots, the model will simulate a one-minute roll-out and runway clearance time for landing aircraft; i.e., departures will be permitted one minute after prior landing if the next landing aircraft is two or more miles out at runway clearance time. Aircraft taking off are assumed to be handed off to ARTCC immediately. Takeoff is not permitted if the ceiling is less than 375 feet and visibility is less than 1 mile.

When three or more aircraft are in the takeoff queue, aircraft coming off the holding fix will go to five-miles separation or more in final.

3.5 DATA REQUIRED TO EXERCISE THE MODEL

A key element in any simulation model is the input data base. The input data must be complete enough to reflect the elements being simulated, and they must be accurate if the model is to have predictive value. This section will identify the nature of the data necessary to exercise the UDCM. Chapter Five discusses and explains the data in greater detail, while Appendix A, the program listing, displays all of the input data matrices with specific numerical values used during the model demonstration. Some of the data appearing in Chapter Five has already been presented in the previous discussions. The input data required by the model fall into the following categories:

- Weather data

- Arrival rates as a function of:

- Destination*

- Weather, VFR or IFR

- Time of day

- Distribution of aircraft types (air carrier, air taxi, general aviation, military) as a function of weather (VFR, IFR) and destination

- Distribution of weight class as a function of type

- Distribution of approach category as a function of type

- Turnaround time as a function of type

- Distribution of holding-fix assignment, e.g., percentage of Logan-bound aircraft coming in over each of the five holding fixes

- Distances from holding fixes to the primary airport under radar and nonradar (VORTAC) environment, by runway

- Minima for each approach serving each runway, by approach category

- Identity of all facilities necessary for each approach at each runway

- MTBF and MTTR of each facility for the Facility Status File

- Trial separations required in landing as a function of radar/VORTAC outage and leading/following aircraft weight classes, and maximum number of aircraft per controller as a function of radar outage

- Airport description data

- Turnaround times for landing aircraft by type.

*Note the discussion in Section 3.3.3.1.

3.6 MODEL OUTPUTS

The program produces and prints out three kinds of data:

Output data of the run, i.e., delay data of various kinds

Program administrative data*

Current values of program parameters*.

Run delay output data are presented in the form of a computer-printed matrix, an annotated example of which is shown in Figure 3-9. This matrix gives an overall synopsis of the model's operation. The four columns in this matrix signify aircraft type. Column 1 represents air carriers, Column 2 air taxis, Column 3 general aviation, and Column 4 military aircraft. The delay measures, with amplifying comments, are presented in Table 3-6.

3.7 MODEL LIMITATIONS

The model has several limitations, some minor, some larger in scope. The development effort was subject to constraints on time and money. The model development began with an identification of the possible features that could be included in the model. Then the time and budget constraints were used in formulating the required model limitations and basic assumptions. To illustrate the sort of questions considered, the issue of incorporating collision-avoidance logic in the route network was examined. Conversations with TSC personnel and persons in the academic community indicated that this would be a very extensive and unnecessary undertaking; it was therefore abandoned in favor of a simpler concept, namely, that "The aircraft will be assumed to be separated by the controller".

Another question was whether or not to simulate traffic through the TCA, understood to be a very large burden on the air controller. It was decided, however, that the first order of priority was what happened at Logan and, more particularly, what happened to aircraft landing at Logan. This priority also dictated the decision to assume that aircraft taking off from Logan are simply handed off to the Boston Center, thus disappearing from the model.

Secondary airport operations are dealt with in very simple fashion. The major simplifications are:

Aircraft appear at the airport at time of creation, rather than at the TCA boundary.

Takeoffs are not simulated at all.

The effect of secondary traffic in the Boston Sector on controller capacity is neglected.

*These outputs are explained in Chapter Five, Section 5.2.

MATRIX HALFWORD SAVEVALUEDELAY

		COL. 1	2	3	4
See accompanying explanation of rows	ROW 1	515	64	160	12
	2	514	56	87	8
	3	0	0	21	4
	4	0	0	462	83
	5	356	33	60	4
	6	7419	801	1418	91
	7	4694	629	968	49
	8	51	9	6	2
	9	462	47	81	6
	10	346	29	56	2
	11	1252	80	153	2
	12	39	2	4	0
	13	461	44	81	2
		Aircraft Type			

1. Number of aircraft created at holding fixes and secondary airports
2. Number of aircraft originally scheduled to the primary airport through the holding fixes
3. Number of aircraft diverted from secondary airport to primary airport
4. Time of flight accumulated by secondary-airport aircraft diverted to the primary airport
5. Number of aircraft landing at primary airport that experienced delay
6. Total delay of landing aircraft
7. Total delay accumulated, for both landing and diverting aircraft, due to separation criteria
8. Number of aircraft not able to land at primary airport and diverted
9. Number of aircraft that landed at primary airport
10. Number of aircraft that experienced takeoff delay at primary airport
11. Total takeoff delay time
12. Total takeoff delay time experienced by aircraft at head of takeoff queue waiting to achieve separation on aircraft taking off ahead
13. Number of aircraft entering the takeoff queue.

Figure 3-9. OUTPUT DELAY MATRIX

The reasons for a simplified secondary airport model are, as explained previously, the constraints of limited time and money, and the fact that the Logan events were considered paramount. All of these elements can be added to the model incrementally.

The placement of aircraft in the landing schedule does not take into account a system of priorities based on aircraft speed and weight. It is recognized that in practice the controllers do take these factors into account, but in a way that reflects the extreme complexity of the human decision process. Refinement is possible in this area.

Table 3-6. EXPLANATION OF DELAY MEASURES

Delay Measure	Comment
1. Number of aircraft created at holding fixes and secondary airports.	This is simply the sum of all aircraft-creation events in the program.
2. Number of aircraft originally scheduled to the primary airport through the holding fixes.	This number is contained in the total shown in line 1.
3. Number of aircraft diverted from secondary airports to primary airport.	When weather is below minimum at secondary airports, 50% divert to Logan. They are assigned a higher priority for air controller pick-up than aircraft at the holding fixes.
4. Time of flight accumulated by secondary-airport aircraft diverted to the primary airport.	A distance table in the program contains the distance from each secondary airport to the primary airport. When a diversion to Logan takes place, the time of flight is calculated. Line 4 is the sum of these times.
5. Number of aircraft landing at primary airport that experienced delay.	Delay is defined as the difference between time of creation plus time of flight and landing time. This line shows the number of aircraft for which this difference was not zero.
6. Total delay of landing aircraft	This is the sum of delay times experienced by aircraft delayed (reported in line 5).
7. Total delay accumulated, for both landing and diverting aircraft, due to separation criteria	The ETA is the sum of the time of acceptance by a controller and the time of flight. If the ETA will not fit the landing schedule, a later scheduled landing time is found. The difference is delay due to spacing. An aircraft may not be able to leave the holding fix at the end of its separation delay; a facility may have gone down in the interim. If it cannot leave the fix within 30 minutes, it diverts. Thus it is possible for both landing and diverting aircraft to accumulate spacing delays.
8. Number of aircraft not able to land at primary airport and diverted	If an aircraft is not released from a holding fix within 30 minutes of its creation time, it is assumed to divert. It is possible for an aircraft previously diverted to Logan from a secondary airport to subsequently be diverted from the primary airport.
9. Number of aircraft that landed at primary airport	This is the total number of aircraft landing at the primary airport. It includes aircraft previously diverted from secondary airports.
10. Number of aircraft that experienced takeoff delay at primary airport	Since takeoffs from secondary airports are not simulated in the model, this measure is applicable only to the primary airport. Delay here is defined as the difference between the time the aircraft enters the takeoff queue and its actual time of departure.
11. Total takeoff delay time	This is the sum of the delay times for all aircraft delayed taking off.
12. Total takeoff delay time experienced by aircraft at head of takeoff queue waiting to achieve separation on aircraft taking off ahead	If an aircraft otherwise ready for takeoff is delayed because the aircraft taking off ahead has not achieved proper time separation (1 minute in radar environment, 3 minutes in non-radar environment), it is delayed until this separation is assured.
13. Number of aircraft entering the takeoff queue	After an aircraft lands at the primary airport, it is assigned a random turnaround time. At this time it enters the takeoff queue. This measure is the total number of aircraft entering this queue. This line was not available for runs 1 through 5.

There is no provision in the model for the effect of deterioration in the quality of voice radio communications. Quantification of this phenomenon is the subject of a more sophisticated and extensive form of analysis, which has not been undertaken.

An important meteorological phenomenon is the cloud deck between 1000 and 3000 feet. A descent through such a deck must be IFR, and an IFR approach must be made to landing. The model does not recognize this, simply because data relating to the distribution of this condition were not known. The impact of this limitation is that IFR approaches are made less frequently by the model than in reality. Acquiring data for the weather module was a major source of delay in model development. Given more complete weather data, this limitation can be easily overcome.

The model is programmed in General Purpose Simulation System (GPSS) language. The basic cycling interval for the UDCM is one minute. This means that every clock GPSS pulse is interrupted as one minute of simulated real time. The use of a one-minute clock implies an analytical error in calculation because all calculations involving time are integer quantities. For example, any calculation, such as a distance divided by a speed, will truncate downward to the next lower integer so that, say, all times between 4.0 and 4.999 minutes will be interpreted as 4 minutes. Thus the same time of flight would be obtained over a range of distances and/or velocities. Obviously, then, some error is built into the model. This could be reduced by allowing one clock pulse to stand for 0.1 or 0.01 minute, or any other fraction of a minute. Such reduction would, however, increase the model's already very tight core constraints since, in order to obtain runs of any reasonable simulated duration, the halfword savevalues and matrices would have to be increased to fullword values.

In summary, it is believed that the limitations noted are important but that the model does handle the first-order effects and that, given the modular construction and central logic, second-order effects can easily be incorporated later.

CHAPTER FOUR

GENERAL PROGRAM DESCRIPTION

This section provides the program description, the operating environment, and flow charts. The program is written in GPSS IV and was demonstrated at TSC using the GPSS V compiler in the MITRE Corporation's IBM 360/165."

The program has a central logic that couples the three main delay factors of any Terminal Control Area; namely, weather, aircraft schedule, and facility status. This central logic is supported by input variable data matrices which carry the characteristics of a particular TCA. This arrangement makes it possible for the model to be easily changed or enlarged and made to reflect any TCA. It also enables the program to be used to evaluate a wide range of decision options, such as:

- Changing facility characteristics

- Adding facilities

- Airport design alternatives, e.g., runway location and direction.

4.1 OPERATING ENVIRONMENT

Any computer with GPSS 360 or GPSS V capability can be used to exercise the model. Approximately 280K bytes of core are required. This is variable and depends upon the number of transactions generated by a particular run. The only peripherals required are a card reader and printer. Since the card deck is in excess of 3000 cards, a high speed reader is a distinct advantage. The program can be stored on tape, but any changes must be made in the basic card deck.

4.2 PROGRAM SPECIFICATION

The program is written in standard GPSS IV and is completely self-contained and self-descriptive.

4.3 SUBPROGRAM

There are no subprograms.

4.4 FLOW CHARTS

Flow charts, shown in Figures 4-1 through 4-6 depict the logic at a medium level of depth. Each block or logic transaction is keyed by numerals to the program statements which are pertinent. The program listing serves, therefore, as the ultimate logic statement. If the flow charts are read in conjunction with the listing by an experienced GPSS programmer, there will be no difficulty interpreting the program.

4.5 SOURCE LISTING

The program listing is provided in Appendix A. The listing has annotated descriptions of all variables and functions. The logic section contains comments adjacent to each GPSS instruction. The data and output matrices are annotated with explanations of rows, columns, and data elements. With this information it is an easy task to change data inputs.

The listing, plus the flow charts and the model description provided in Chapter Three can be used jointly to understand the model. It should be noted, however, that any extensive changes contemplated for the model will require study and analysis by an experienced GPSS-oriented analyst.

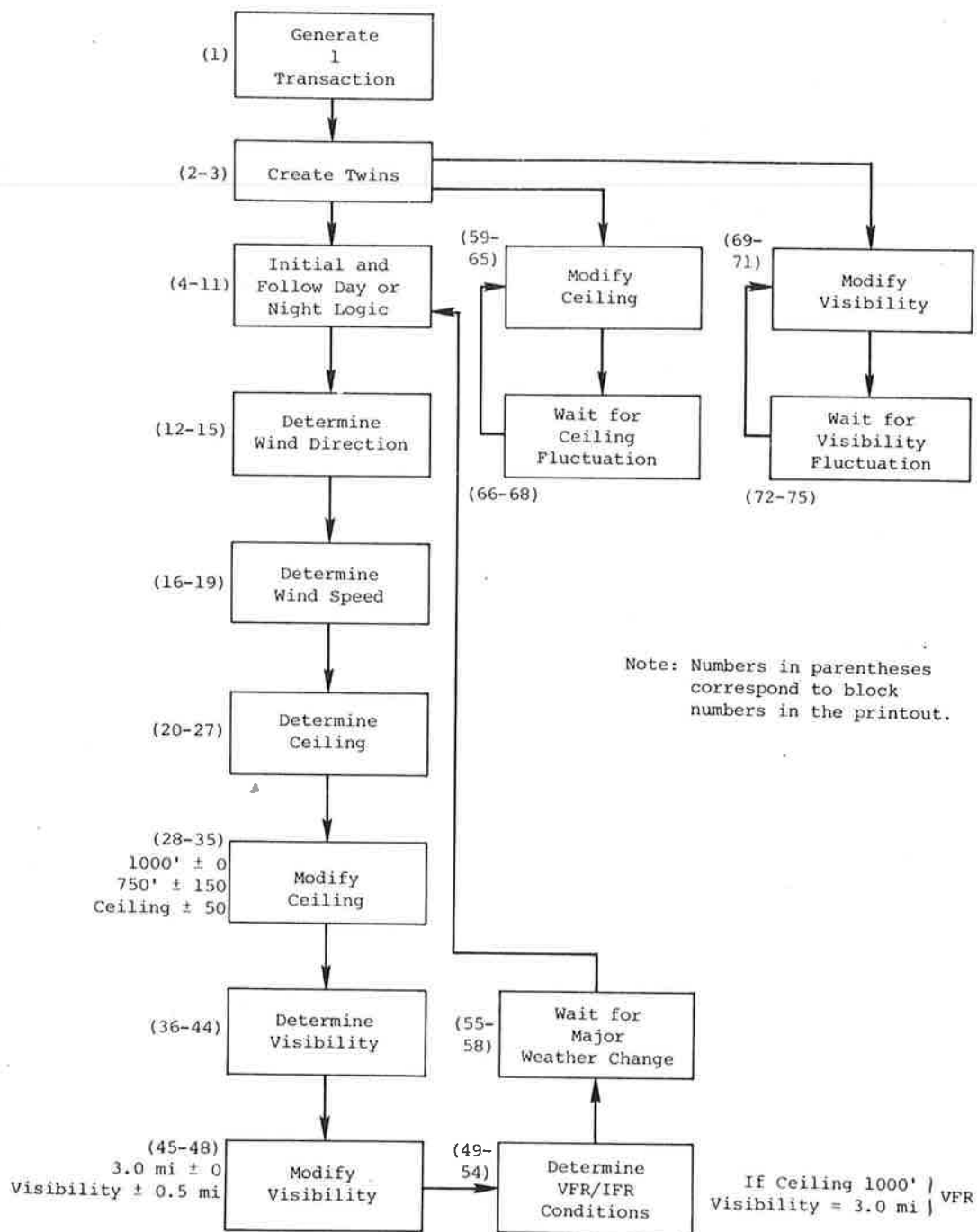
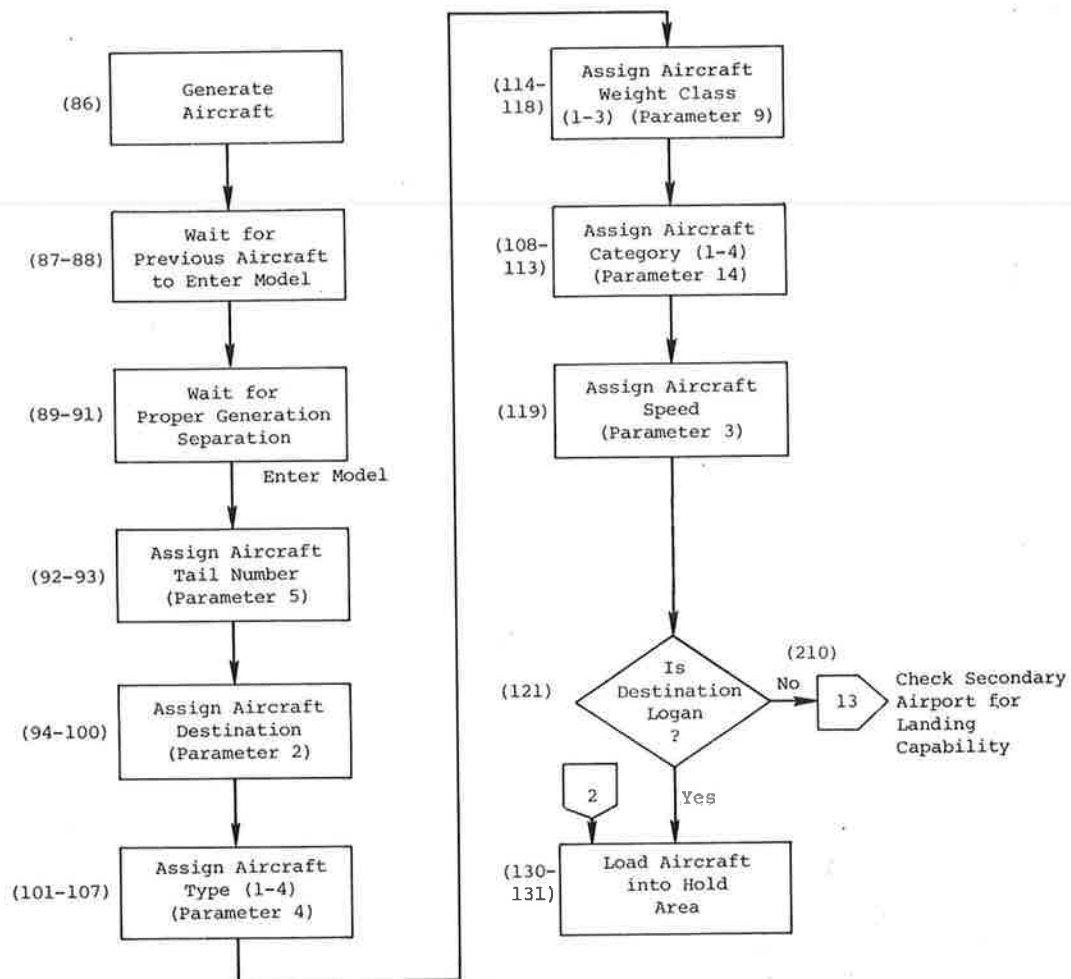
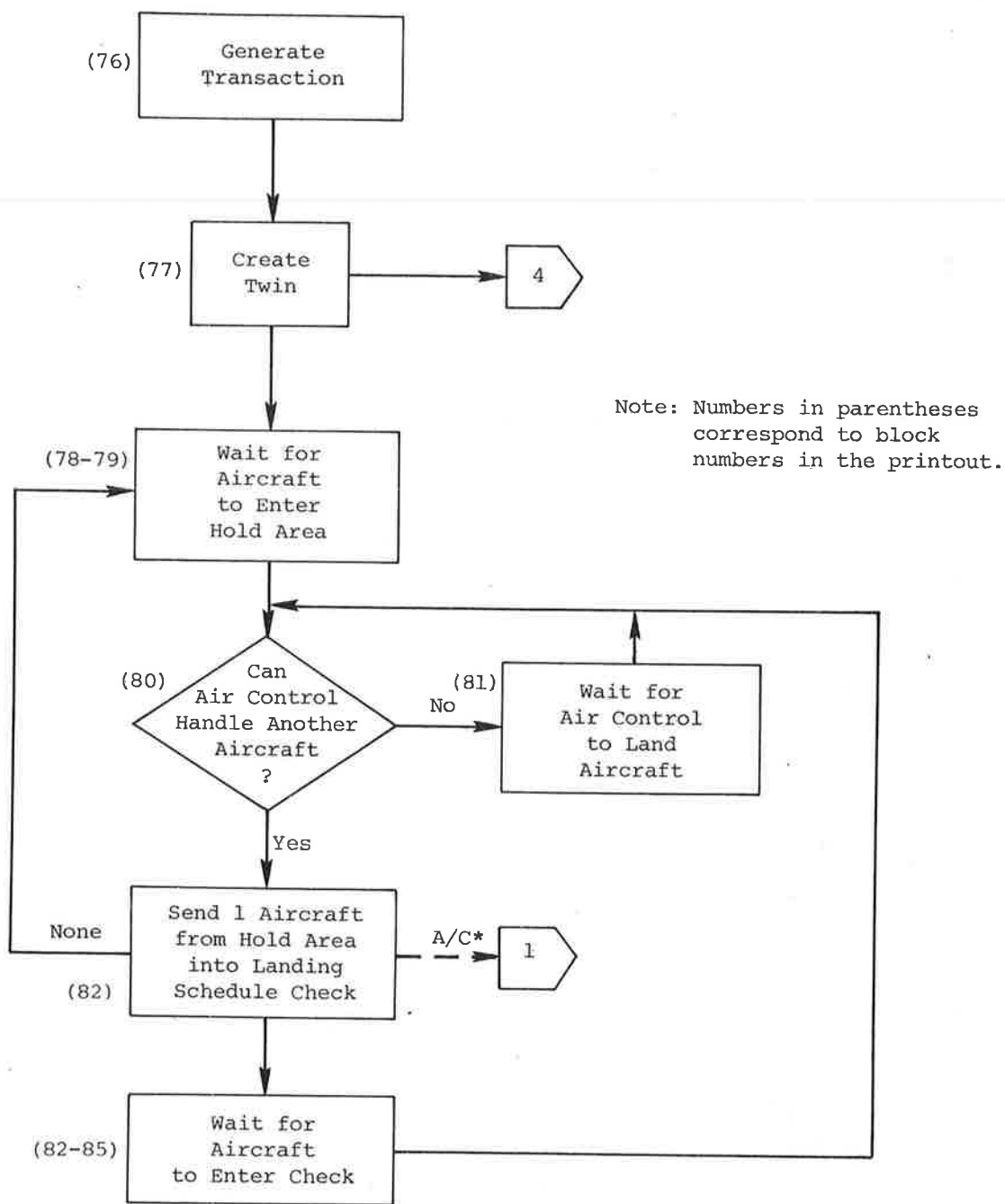


Figure 4-1. WEATHER MODULE



Note: Numbers in parentheses correspond to block numbers in printout.

Figure 4-2. AIRCRAFT GENERATION MODULE



*Dotted lines represent flow of aircraft transactions. Solid lines represent flow of logic transactions.

Figure 4-3. AIRCRAFT ACCEPTANCE FUNCTION

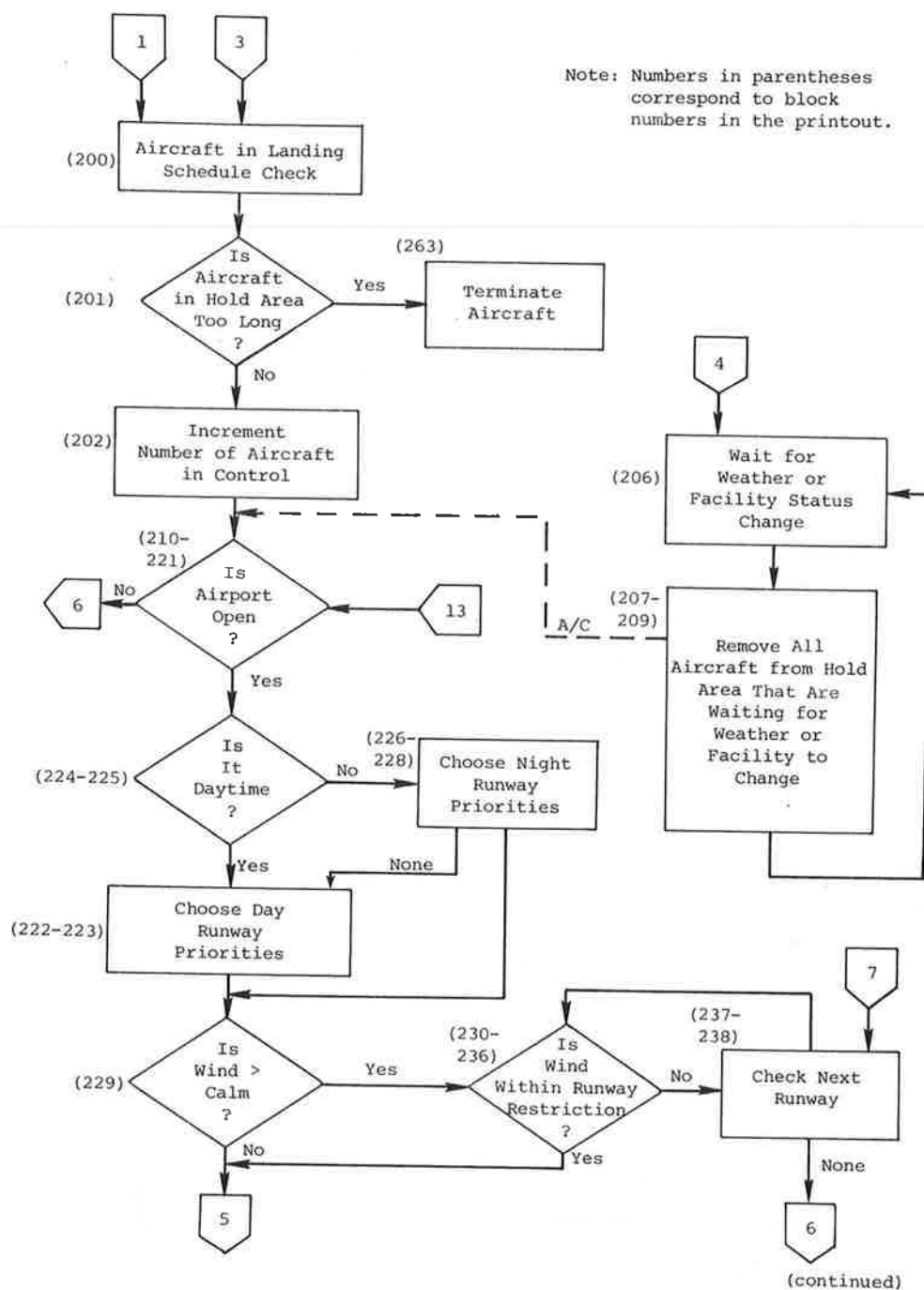


Figure 4-4. MAIN CONTROL LOGIC

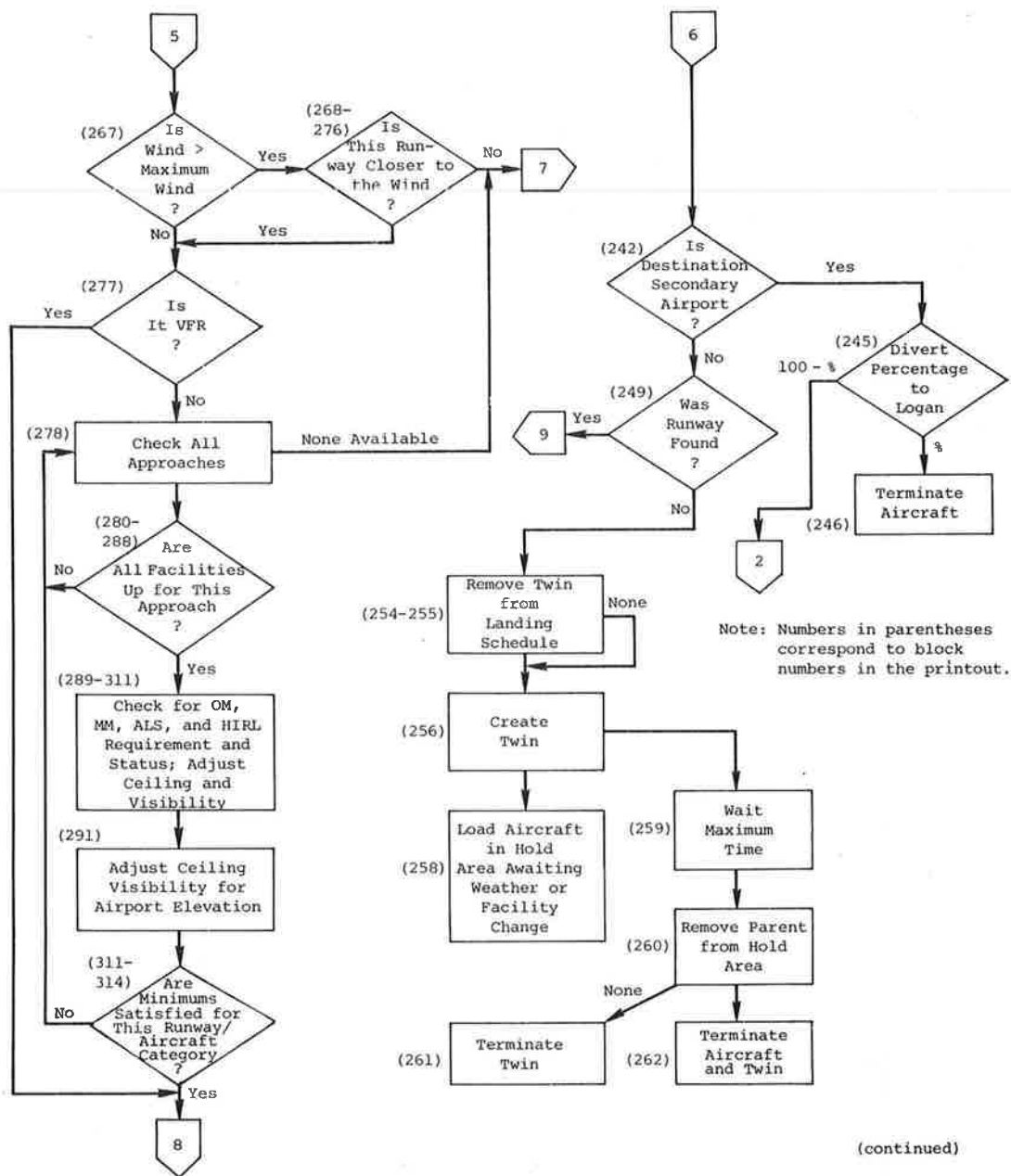


Figure 4-4. (continued)

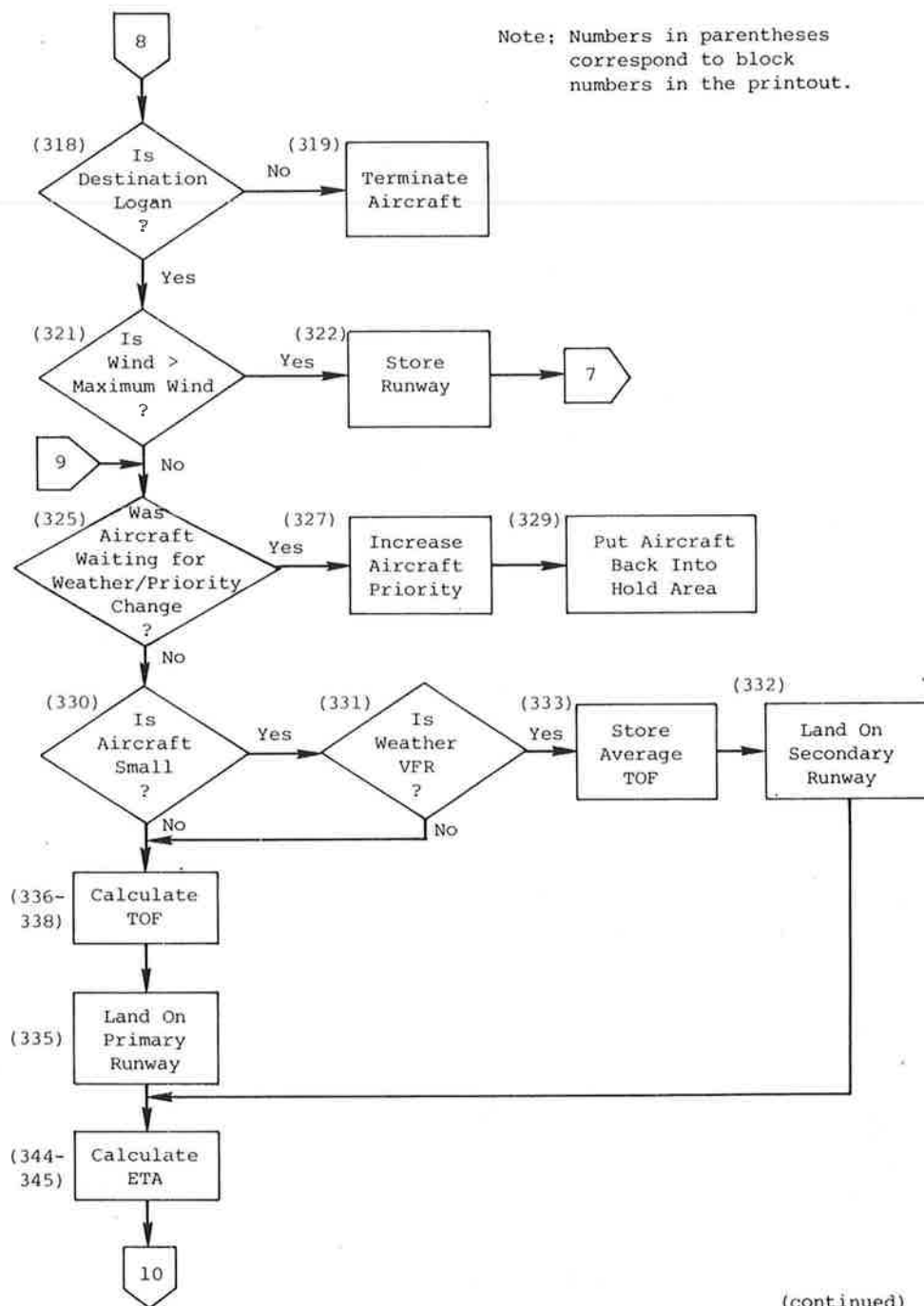


Figure 4-4. (continued)

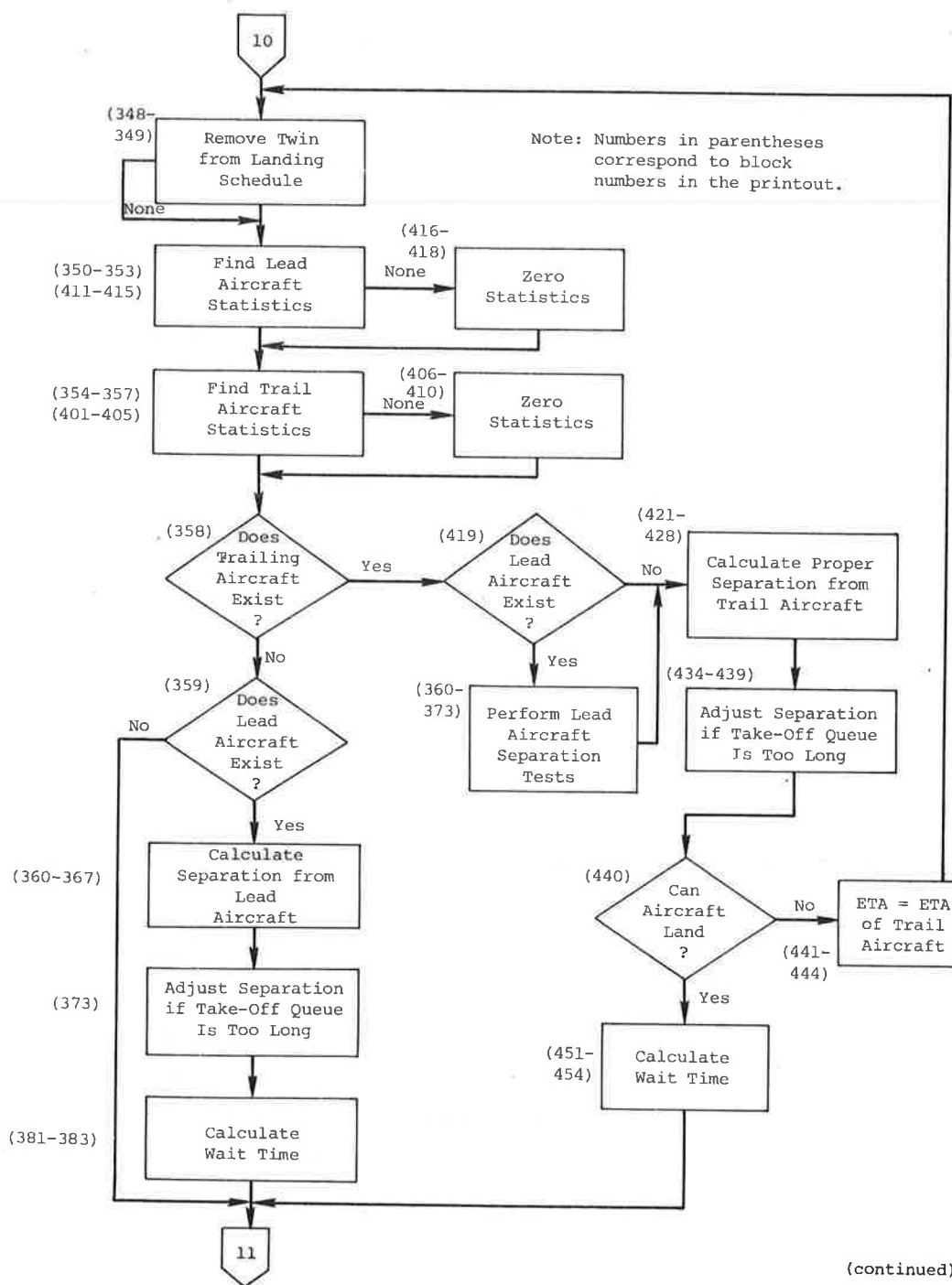


Figure 4-4. (continued)

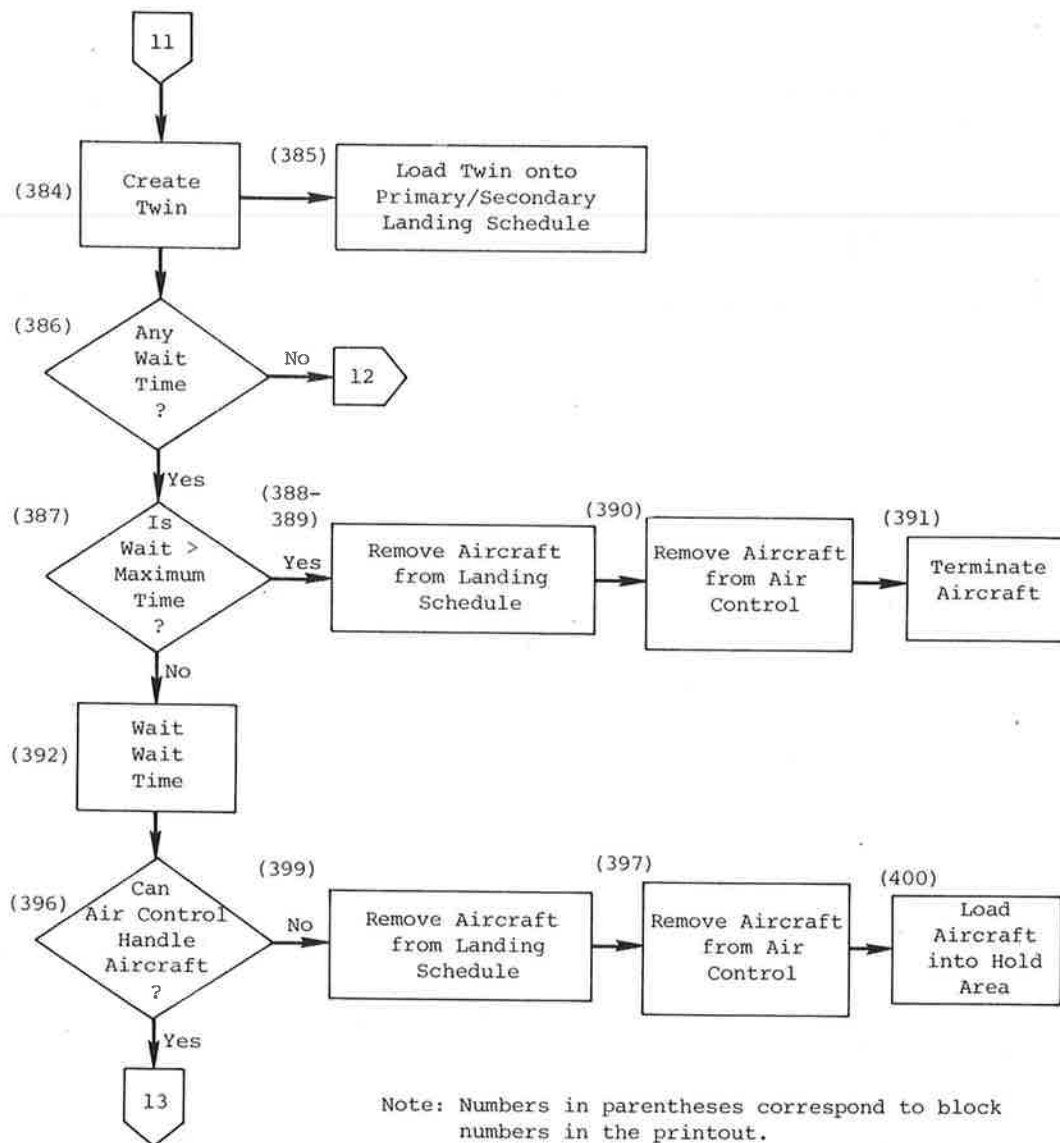


Figure 4-4. (continued)

INITIAL	MH14(5,1),848	1345
INITIAL	MH14(5,3),883	1346
INITIAL	MH14(5,4),979	1347
INITIAL	MH14(5,6),991	1348
INITIAL	MH14(5,7),857	1349
INITIAL	MH14(6,1),909	1350
INITIAL	MH14(6,3),961	1351
INITIAL	MH14(6,4),996	1352
INITIAL	MH14(6,5),969	1353
INITIAL	MH14(6,6),996	1354
INITIAL	MH14(6,7),905	1355
INITIAL	MH15(4-5,3),231	1356
INITIAL	MH15(2-4,4),91	1357
INITIAL	MH15(1-2,8),71	1358
INITIAL	MH15(6,9-14),1000	1359
INITIAL	MH15(2-4,10),167	1360
INITIAL	MH15(5,11-14),1000	1361
INITIAL	MH15(1,11-12),200	1362
INITIAL	MH15(2,11-12),600	1363
INITIAL	MH15(3,11-12),800	1364
INITIAL	MH15(4,12-14),1000	1365
INITIAL	MH15(1-3,13),1000	1366
INITIAL	MH15(2-3,14),750	1367
INITIAL	MH15(1,14),250	1368
INITIAL	MH15(2,2),2	1369
INITIAL	MH15(2,9),167	1370
INITIAL	MH15(3,2),5	1371
INITIAL	MH15(3,8),214	1372
INITIAL	MH15(3,9),333	1373
INITIAL	MH15(4,2),12	1374
INITIAL	MH15(4,7),250	1375
INITIAL	MH15(4,8),286	1376
INITIAL	MH15(4,9),500	1377
INITIAL	MH15(4,11),900	1378
INITIAL	MH15(5,2),18	1379
INITIAL	MH15(5,4),182	1380
INITIAL	MH15(5,5),125	1381
INITIAL	MH15(5,7),500	1382
INITIAL	MH15(5,8),643	1383
INITIAL	MH15(5,9),667	1384
INITIAL	MH15(5,10),333	1385
INITIAL	MH15(6,1),18	1386
INITIAL	MH15(6,2),29	1387
INITIAL	MH15(6,3),308	1388
INITIAL	MH15(6,4),500	1389
INITIAL	MH15(6,5),250	1390
INITIAL	MH15(6,7),750	1391
INITIAL	MH15(6,8),929	1392
INITIAL	MH16(1-2,1),879	1393
INITIAL	MH16(1-2,2),958	1394
INITIAL	MH16(5-6,1-2),1000	1395
INITIAL	MH16(3-4,2),1000	1396
INITIAL	MH16(2-5,4),996	1397
INITIAL	MH16(6,4-5),1000	1398
INITIAL	MH16(3-5,5),1000	1399
INITIAL	MH16(2-3,6),981	1400
INITIAL	MH16(4-6,6),990	1401
INITIAL	MH16(1-3,7),875	1402
INITIAL	MH16(4-6,7-10),1000	1403
INITIAL	MH16(4,10),500	1404
INITIAL	MH16(1-3,9),1000	1405
INITIAL	MH16(1,3),720	1406
INITIAL	MH16(1,4),964	1407
INITIAL	MH16(1,5),773	1408
INITIAL	MH16(1,6),942	1409
INITIAL	MH16(1,8),667	1410
INITIAL	MH16(2,3),853	1411
INITIAL	MH16(2,5),909	1412
INITIAL	MH16(2,8),917	1413
INITIAL	MH16(3,1),909	1414
INITIAL	MH16(3,3),893	1415
INITIAL	MH16(3,8),1000	1416
INITIAL	MH16(4,1),970	1417
INITIAL	MH16(4,3),907	1418
INITIAL	MH16(5,3),933	1419
INITIAL	MH16(6,3),973	1420
INITIAL	MH17(1-3,1),9	1421
INITIAL	MH17(3-5,2),6	1422
INITIAL	MH17(4-6,5),667	1423
INITIAL	MH17(5-6,7),250	1424
INITIAL	MH17(1-5,9),333	1425
INITIAL	MH17(1-3,11),333	1426
INITIAL	MH17(4-6,11-14),1000	1427
INITIAL	MH17(1-3,12-14),1000	1428
INITIAL	MH17(1,5),167	1429
INITIAL	MH17(2,5),333	1430

Initializes the ceiling and visibility matrixes for various wind directions and velocities.

(continued)

INITIAL	MH13(2-3,2),2	1259
INITIAL	MH13(2-4,3),57	1260
INITIAL	MH13(2-3,4),29	1261
INITIAL	MH13(2-4,5),133	1262
INITIAL	MH13(2-3,8),133	1263
INITIAL	MH13(2-3,9),250	1264
INITIAL	MH13(4-5,9),333	1265
INITIAL	MH13(3-4,10),286	1266
INITIAL	MH13(2-3,13),600	1267
INITIAL	MH13(2-3,13),900	1268
INITIAL	MH13(2-3,14),750	1269
INITIAL	MH13(4-5,14),833	1270
INITIAL	MH13(1,5),67	1271
INITIAL	MH13(1,11),438	1272
INITIAL	MH13(1,12),188	1273
INITIAL	MH13(1,13),400	1274
INITIAL	MH13(1,14),583	1275
INITIAL	MH13(2,1),7	1276
INITIAL	MH13(2,10),143	1277
INITIAL	MH13(2,11),688	1278
INITIAL	MH13(2,12),563	1279
INITIAL	MH13(3,1),14	1280
INITIAL	MH13(3,11),750	1281
INITIAL	MH13(3,12),688	1282
INITIAL	MH13(4,1),27	1283
INITIAL	MH13(4,2),5	1284
INITIAL	MH13(4,4),59	1285
INITIAL	MH13(4,8),267	1286
INITIAL	MH13(4,11),813	1287
INITIAL	MH13(4,12),813	1288
INITIAL	MH13(5,1),34	1289
INITIAL	MH13(5,2),13	1290
INITIAL	MH13(5,3),143	1291
INITIAL	MH13(5,4),118	1292
INITIAL	MH13(5,5),333	1293
INITIAL	MH13(5,6),222	1294
INITIAL	MH13(5,7),83	1295
INITIAL	MH13(5,8),400	1296
INITIAL	MH13(5,10),429	1297
INITIAL	MH13(5,11-12),875	1298
INITIAL	MH13(6,1),55	1299
INITIAL	MH13(6,2),37	1300
INITIAL	MH13(6,3),314	1301
INITIAL	MH13(6,4),324	1302
INITIAL	MH13(6,5),667	1303
INITIAL	MH13(6,6),778	1304
INITIAL	MH13(6,7),333	1305
INITIAL	MH13(6,8),800	1306
INITIAL	MH13(6,9),582	1307
INITIAL	MH13(6,10),714	1308
INITIAL	MH13(6,11-12),938	1309
INITIAL	MH13(6,13-14),1000	1310
INITIAL	MH14(2-3,1),788	1311
INITIAL	MH14(5-6,2),931	1312
INITIAL	MH14(4-5,5),938	1313
INITIAL	MH14(5-6,8-10),1000	1314
INITIAL	MH14(1-4,9-10),1000	1315
INITIAL	MH14(1,1),758	1316
INITIAL	MH14(1,2),724	1317
INITIAL	MH14(1,3),675	1318
INITIAL	MH14(1,4),896	1319
INITIAL	MH14(1,5),813	1320
INITIAL	MH14(1,6),930	1321
INITIAL	MH14(1,7),286	1322
INITIAL	MH14(1,8),902	1323
INITIAL	MH14(2,2),793	1324
INITIAL	MH14(2,3),727	1325
INITIAL	MH14(2,4),922	1326
INITIAL	MH14(2,5),875	1327
INITIAL	MH14(2,6),961	1328
INITIAL	MH14(2,7),571	1329
INITIAL	MH14(2,8),959	1330
INITIAL	MH14(3,2),828	1331
INITIAL	MH14(3,3),805	1332
INITIAL	MH14(3,4),942	1333
INITIAL	MH14(3,5),906	1334
INITIAL	MH14(3,6),969	1335
INITIAL	MH14(3,7),619	1336
INITIAL	MH14(3,8),975	1337
INITIAL	MH14(4,1),818	1338
INITIAL	MH14(4,2),897	1339
INITIAL	MH14(4,3),844	1340
INITIAL	MH14(4,4),971	1341
INITIAL	MH14(4,6),987	1342
INITIAL	MH14(4,7),762	1343
INITIAL	MH14(4,8),984	1344

Initializes the ceiling and visibility matrixes for various wind directions and velocities.

(continued)

INITIAL	MH11(1,12),83	1173
INITIAL	MH11(1,13),667	1174
INITIAL	MH11(2,2),10	1175
INITIAL	MH11(2,4),77	1176
INITIAL	MH11(2,7),154	1177
INITIAL	MH11(2,10),308	1178
INITIAL	MH11(2,11),263	1179
INITIAL	MH11(2,12),250	1180
INITIAL	MH11(3,2),17	1181
INITIAL	MH11(3,7),231	1182
INITIAL	MH11(3,10),385	1183
INITIAL	MH11(3,11),526	1184
INITIAL	MH11(3,12),417	1185
INITIAL	MH11(4,2),24	1186
INITIAL	MH11(4,3),61	1187
INITIAL	MH11(4,6),63	1188
INITIAL	MH11(4,7),308	1189
INITIAL	MH11(4,10),538	1190
INITIAL	MH11(4,11),632	1191
INITIAL	MH11(4,12),500	1192
INITIAL	MH11(5,1),19	1193
INITIAL	MH11(5,2),31	1194
INITIAL	MH11(5,3),182	1195
INITIAL	MH11(5,6),125	1196
INITIAL	MH11(5,7),385	1197
INITIAL	MH11(5,9),444	1198
INITIAL	MH11(5,10),769	1199
INITIAL	MH11(5,11),789	1200
INITIAL	MH11(5,12),750	1201
INITIAL	MH11(6,1),39	1202
INITIAL	MH11(6,2),49	1203
INITIAL	MH11(6,3),303	1204
INITIAL	MH11(6,4),221	1205
INITIAL	MH11(6,5),71	1206
INITIAL	MH11(6,6),500	1207
INITIAL	MH11(6,7),462	1208
INITIAL	MH11(6,8),692	1209
INITIAL	MH11(6,9),667	1210
INITIAL	MH11(6,10),846	1211
INITIAL	MH11(6,11),947	1212
INITIAL	MH11(6,12),833	1213
INITIAL	MH12(3-4,1),854	1214
INITIAL	MH12(3-4,2),882	1215
INITIAL	MH12(2-3,4),916	1216
INITIAL	MH12(4-5,6),959	1217
INITIAL	MH12(5-6,7-10),1000	1218
INITIAL	MH12(1-4,9),1000	1219
INITIAL	MH12(1-3,10),333	1220
INITIAL	MH12(1,1),756	1221
INITIAL	MH12(1,2),676	1222
INITIAL	MH12(1,3),650	1223
INITIAL	MH12(1,4),885	1224
INITIAL	MH12(1,5),394	1225
INITIAL	MH12(1,6),891	1226
INITIAL	MH12(1,7),531	1227
INITIAL	MH12(1,8),826	1228
INITIAL	MH12(2,1),829	1229
INITIAL	MH12(2,2),824	1230
INITIAL	MH12(2,3),744	1231
INITIAL	MH12(2,5),606	1232
INITIAL	MH12(2,6),925	1233
INITIAL	MH12(2,7),796	1234
INITIAL	MH12(2,8),926	1235
INITIAL	MH12(2,9),167	1236
INITIAL	MH12(3,3),786	1237
INITIAL	MH12(3,5),667	1238
INITIAL	MH12(3,6),944	1239
INITIAL	MH12(3,7),837	1240
INITIAL	MH12(3,8),942	1241
INITIAL	MH12(4,3),829	1242
INITIAL	MH12(4,4),939	1243
INITIAL	MH12(4,5),758	1244
INITIAL	MH12(4,7),918	1245
INITIAL	MH12(4,8),975	1246
INITIAL	MH12(4,10),667	1247
INITIAL	MH12(5,1),878	1248
INITIAL	MH12(5,2),941	1249
INITIAL	MH12(5,3),880	1250
INITIAL	MH12(5,4),943	1251
INITIAL	MH12(5,5),788	1252
INITIAL	MH12(6,1),976	1253
INITIAL	MH12(6,2),971	1254
INITIAL	MH12(6,3),949	1255
INITIAL	MH12(6,4),966	1256
INITIAL	MH12(6,5),909	1257
INITIAL	MH12(6,6),993	1258

Initializes the ceiling and visibility matrixes for various wind directions and velocities.

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INITIAL	MH09(4,4),54	1087
INITIAL	MH09(4,6),83	1088
INITIAL	MH09(4,7),167	1089
INITIAL	MH09(4,8),176	1090
INITIAL	MH09(4,10),167	1091
INITIAL	MH09(4,11),500	1092
INITIAL	MH09(4,12),538	1093
INITIAL	MH09(4-6,13),929	1094
INITIAL	MH09(5,2),29	1095
INITIAL	MH09(5,4),81	1096
INITIAL	MH09(5,6-7),250	1097
INITIAL	MH09(5,8),294	1098
INITIAL	MH09(5,10),417	1099
INITIAL	MH09(5,11),545	1100
INITIAL	MH09(5,12),769	1101
INITIAL	MH09(6,1),21	1102
INITIAL	MH09(6,2),36	1103
INITIAL	MH09(6,3),200	1104
INITIAL	MH09(6,4),270	1105
INITIAL	MH09(6,5),222	1106
INITIAL	MH09(6,6),583	1107
INITIAL	MH09(6,7),333	1108
INITIAL	MH09(6,8),647	1109
INITIAL	MH09(6,9),455	1110
INITIAL	MH09(6,10),750	1111
INITIAL	MH09(6,11),773	1112
INITIAL	MH09(6,12),846	1113
INITIAL	MH09(6,14),1000	1114
INITIAL	MH10(1,1),762	1115
INITIAL	MH10(1-2,2),800	1116
INITIAL	MH10(1,3),575	1117
INITIAL	MH10(1,4),764	1118
INITIAL	MH10(1,5),644	1119
INITIAL	MH10(1,6),844	1120
INITIAL	MH10(1,7),576	1121
INITIAL	MH10(1,8),695	1122
INITIAL	MH10(1,9),200	1123
INITIAL	MH10(1,10),333	1124
INITIAL	MH10(2,1),857	1125
INITIAL	MH10(2,2),613	1126
INITIAL	MH10(2,4),831	1127
INITIAL	MH10(2,5),763	1128
INITIAL	MH10(2,6),877	1129
INITIAL	MH10(2,7),833	1130
INITIAL	MH10(2,8),829	1131
INITIAL	MH10(2,9),800	1132
INITIAL	MH10(2,10),667	1133
INITIAL	MH10(3-5,11),905	1134
INITIAL	MH10(3-5,2),933	1135
INITIAL	MH10(3,3),689	1136
INITIAL	MH10(3,4),872	1137
INITIAL	MH10(3,5),780	1138
INITIAL	MH10(3,6),902	1139
INITIAL	MH10(3,7),879	1140
INITIAL	MH10(3,8),878	1141
INITIAL	MH10(3-6,9-10),1000	1142
INITIAL	MH10(4,3),755	1143
INITIAL	MH10(4,4),905	1144
INITIAL	MH10(4,5),831	1145
INITIAL	MH10(4,6),918	1146
INITIAL	MH10(4,7),924	1147
INITIAL	MH10(4,8),951	1148
INITIAL	MH10(5,3),783	1149
INITIAL	MH10(5,4),939	1150
INITIAL	MH10(5,5),898	1151
INITIAL	MH10(5,6),959	1152
INITIAL	MH10(5,7),955	1153
INITIAL	MH10(5,8),988	1154
INITIAL	MH10(6,1),952	1155
INITIAL	MH10(6,2),1000	1156
INITIAL	MH10(6,3),906	1157
INITIAL	MH10(6,4),986	1158
INITIAL	MH10(6,5),949	1159
INITIAL	MH10(6,6),984	1160
INITIAL	MH10(6,7),985	1161
INITIAL	MH10(6,8),1000	1162
INITIAL	MH11(2-3,3),30	1163
INITIAL	MH11(3-5,4),115	1164
INITIAL	MH11(4-5,8),77	1165
INITIAL	MH11(2-4,9),111	1166
INITIAL	MH11(2-3,13),733	1167
INITIAL	MH11(4-6,13),1000	1168
INITIAL	MH11(1,2),3	1169
INITIAL	MH11(1,7),77	1170
INITIAL	MH11(1,10),154	1171
INITIAL	MH11(1,11),105	1172

Initializes the ceiling and visibility matrixes for various wind directions and velocities.

(continued)

INITIAL	MH07(3-4,9),63	1001
INITIAL	MH07(3-4,11),462	1002
INITIAL	MH07(3,12),667	1003
INITIAL	MH07(3,13),818	1004
INITIAL	MH07(4-5,10),273	1005
INITIAL	MH07(4-6,12),1000	1006
INITIAL	MH07(4-5,13),909	1007
INITIAL	MH07(5,1),13	1008
INITIAL	MH07(5,3),40	1009
INITIAL	MH07(5,4),37	1010
INITIAL	MH07(5,5),125	1011
INITIAL	MH07(5,8),625	1012
INITIAL	MH07(5,9),188	1013
INITIAL	MH07(5,11),846	1014
INITIAL	MH07(6,1),20	1015
INITIAL	MH07(6,2),14	1016
INITIAL	MH07(6,3),120	1017
INITIAL	MH07(6,4),74	1018
INITIAL	MH07(6,5-6),500	1019
INITIAL	MH07(6,8),750	1020
INITIAL	MH07(6,9),688	1021
INITIAL	MH07(6,10),909	1022
INITIAL	MH07(6,11-13),1000	1023
INITIAL	MH08(1,1),793	1024
INITIAL	MH08(1-4,2),857	1025
INITIAL	MH08(1,3),549	1026
INITIAL	MH08(1,4),629	1027
INITIAL	MH08(1,5),492	1028
INITIAL	MH08(1,6),547	1029
INITIAL	MH08(1,7),586	1030
INITIAL	MH08(1,8),593	1031
INITIAL	MH08(1,9-10),200	1032
INITIAL	MH08(2-3,1),862	1033
INITIAL	MH08(2,3),637	1034
INITIAL	MH08(2,4),743	1035
INITIAL	MH08(2,5),651	1036
INITIAL	MH08(2,6),693	1037
INITIAL	MH08(2,7),776	1038
INITIAL	MH08(2,8),765	1039
INITIAL	MH08(2,9-10),800	1040
INITIAL	MH08(3,3),725	1041
INITIAL	MH08(3,4),757	1042
INITIAL	MH08(3,5),762	1043
INITIAL	MH08(3,6),747	1044
INITIAL	MH08(3,7),810	1045
INITIAL	MH08(3,8),852	1046
INITIAL	MH08(3-5,9),800	1047
INITIAL	MH08(3-6,10),1000	1048
INITIAL	MH08(4,1),897	1049
INITIAL	MH08(4,3),775	1050
INITIAL	MH08(4,4),814	1051
INITIAL	MH08(4,5),794	1052
INITIAL	MH08(4,6),800	1053
INITIAL	MH08(4,7),879	1054
INITIAL	MH08(4,8),963	1055
INITIAL	MH08(5-6,1),931	1056
INITIAL	MH08(5-6,2),1000	1057
INITIAL	MH08(5,3),804	1058
INITIAL	MH08(5,4),857	1059
INITIAL	MH08(5,5),873	1060
INITIAL	MH08(5,6),893	1061
INITIAL	MH08(5,7),914	1062
INITIAL	MH08(5,8),975	1063
INITIAL	MH08(6,3),902	1064
INITIAL	MH08(6,4),943	1065
INITIAL	MH08(6,5),1000	1066
INITIAL	MH08(6,6),960	1067
INITIAL	MH08(6,7),966	1068
INITIAL	MH08(6,8-9),1000	1069
INITIAL	MH09(1-4,2),7	1070
INITIAL	MH09(1-5,5),56	1071
INITIAL	MH09(1-5,9),91	1072
INITIAL	MH09(1,11),182	1073
INITIAL	MH09(1,13),357	1074
INITIAL	MH09(1,14),714	1075
INITIAL	MH09(2-5,3),57	1076
INITIAL	MH09(2-3,8),59	1077
INITIAL	MH09(2,11),273	1078
INITIAL	MH09(2,12),154	1079
INITIAL	MH09(2,13),643	1080
INITIAL	MH09(2-5,14),857	1081
INITIAL	MH09(3-5,1),7	1082
INITIAL	MH09(3,10),83	1083
INITIAL	MH09(3,11),409	1084
INITIAL	MH09(3,12),385	1085
INITIAL	MH09(3,13),714	1086

Initializes the ceiling and visibility matrixes for various wind directions and velocities.

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INITIAL	MH5(4,7),136	915
INITIAL	MH5(4,8),143	916
INITIAL	MH5(4,9),238	917
INITIAL	MH5(4,10),286	918
INITIAL	MH5(4,11),564	919
INITIAL	MH5(4,12),333	920
INITIAL	MH5(4,13),910	921
INITIAL	MH5(4-6,14),1000	922
INITIAL	MH5(5,1),6	923
INITIAL	MH5(5,2),13	924
INITIAL	MH5(5,3),85	925
INITIAL	MH5(5,4),200	926
INITIAL	MH5(5,5),222	927
INITIAL	MH5(5,6),294	928
INITIAL	MH5(5,7),227	929
INITIAL	MH5(5,8),214	930
INITIAL	MH5(5,9),381	931
INITIAL	MH5(5,10),500	932
INITIAL	MH5(5,11),814	933
INITIAL	MH5(5,12),667	934
INITIAL	MH5(5,13),910	935
INITIAL	MH5(6,1),12	936
INITIAL	MH5(6,2),16	937
INITIAL	MH5(6,3),171	938
INITIAL	MH5(6,4),260	939
INITIAL	MH5(6,5),389	940
INITIAL	MH5(6,6),412	941
INITIAL	MH5(6,7),485	942
INITIAL	MH5(6,8),429	943
INITIAL	MH5(6,9),810	944
INITIAL	MH5(6,10),500	945
INITIAL	MH5(6,11),877	946
INITIAL	MH5(6,12-13),1000	947
INITIAL	MH06(1-2,1),771	948
INITIAL	MH06(1,2),867	949
INITIAL	MH06(1,3),638	950
INITIAL	MH06(1,4),744	951
INITIAL	MH06(1,5),628	952
INITIAL	MH06(1,6),553	953
INITIAL	MH06(1,7),625	954
INITIAL	MH06(1,8),813	955
INITIAL	MH06(1-6,9-10),1000	956
INITIAL	MH06(2-3,2),933	957
INITIAL	MH06(2,3),732	958
INITIAL	MH06(2,4),849	959
INITIAL	MH06(2,5),857	960
INITIAL	MH06(2,6),766	961
INITIAL	MH06(2,7),750	962
INITIAL	MH06(2,8),983	963
INITIAL	MH06(3-4,1),800	964
INITIAL	MH06(3,3),764	965
INITIAL	MH06(3,4),860	966
INITIAL	MH06(3,5),884	967
INITIAL	MH06(3,6),809	968
INITIAL	MH06(3,7),72	969
INITIAL	MH06(3,8),938	970
INITIAL	MH06(4-6,2),1000	971
INITIAL	MH06(4,3),795	972
INITIAL	MH06(4,4),884	973
INITIAL	MH06(4,5),907	974
INITIAL	MH06(4,6),894	975
INITIAL	MH06(4,7),875	976
INITIAL	MH06(4,8),979	977
INITIAL	MH06(5,1),829	978
INITIAL	MH06(5,3),874	979
INITIAL	MH06(5,4),953	980
INITIAL	MH06(5,5),977	981
INITIAL	MH06(5,6),979	982
INITIAL	MH06(5,7),958	983
INITIAL	MH06(5-6,8),1000	984
INITIAL	MH06(6,1),914	985
INITIAL	MH06(6,3),939	986
INITIAL	MH06(6,4),977	987
INITIAL	MH06(6,5-7),1000	988
INITIAL	MH07(1,8),250	989
INITIAL	MH07(1,11),231	990
INITIAL	MH07(1,13),545	991
INITIAL	MH07(1,14),500	992
INITIAL	MH07(2-5,2),7	993
INITIAL	MH07(2,8),375	994
INITIAL	MH07(2,11),385	995
INITIAL	MH07(2,12),333	996
INITIAL	MH07(2,13),818	997
INITIAL	MH07(2-6,14),1000	998
INITIAL	MH07(3-5,6),167	999
INITIAL	MH07(3-4,8),500	1000

Initializes the ceiling and visibility matrixes for various wind directions and velocities.

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INITIAL	MH3(6,1-2),143	829
INITIAL	MH3(6,5-10),1000	830
INITIAL	MH3(4-5,7-10),1000	831
INITIAL	MH3(1-3,9-10),500	832
INITIAL	MH3(1-6,13-14),1000	833
INITIAL	MH4(1,1),825	834
INITIAL	MH4(1,2),733	835
INITIAL	MH4(1,3),798	836
INITIAL	MH4(1,4),841	837
INITIAL	MH4(1,5),762	838
INITIAL	MH4(1,6),752	839
INITIAL	MH4(1,7),714	840
INITIAL	MH4(1,8),640	841
INITIAL	MH4(1-6,9),1000	842
INITIAL	MH4(2,1),850	843
INITIAL	MH4(2,2),800	844
INITIAL	MH4(2,3),857	845
INITIAL	MH4(2,4),911	846
INITIAL	MH4(2,5),878	847
INITIAL	MH4(2,6),883	848
INITIAL	MH4(2,7),876	849
INITIAL	MH4(2,8),820	850
INITIAL	MH4(2-3,10),750	851
INITIAL	MH4(3,1),850	852
INITIAL	MH4(3,2),833	853
INITIAL	MH4(3,3),881	854
INITIAL	MH4(3,4),943	855
INITIAL	MH4(3,5),901	856
INITIAL	MH4(3,6),905	857
INITIAL	MH4(3,7),933	858
INITIAL	MH4(3,8),910	859
INITIAL	MH4(4,1),850	860
INITIAL	MH4(4,2),866	861
INITIAL	MH4(4,3),914	862
INITIAL	MH4(4,4),956	863
INITIAL	MH4(4,5),948	864
INITIAL	MH4(4,6),956	865
INITIAL	MH4(4,7),962	866
INITIAL	MH4(4,8),944	867
INITIAL	MH4(4-6,10),1000	868
INITIAL	MH4(5,1),875	869
INITIAL	MH4(5,2),900	870
INITIAL	MH4(5,3),950	871
INITIAL	MH4(5,4),981	872
INITIAL	MH4(5,5),977	873
INITIAL	MH4(5,6),992	874
INITIAL	MH4(5,7),991	875
INITIAL	MH4(5,8),989	876
INITIAL	MH4(6,1),950	877
INITIAL	MH4(6,2),967	878
INITIAL	MH4(6,3),977	879
INITIAL	MH4(6,4),981	880
INITIAL	MH4(6,5),994	881
INITIAL	MH4(6,6-7),1000	882
INITIAL	MH4(6,8),989	883
INITIAL	MH5(1,8),71	884
INITIAL	MH5(1,11),63	885
INITIAL	MH5(1,13),455	886
INITIAL	MH5(1,14),400	887
INITIAL	MH5(2,1),2	888
INITIAL	MH5(2,4),60	889
INITIAL	MH5(2,6),59	890
INITIAL	MH5(2,8),143	891
INITIAL	MH5(2,11),313	892
INITIAL	MH5(2,12),333	893
INITIAL	MH5(2,13),728	894
INITIAL	MH5(2,14),600	895
INITIAL	MH5(3,1),2	896
INITIAL	MH5(3,3),17	897
INITIAL	MH5(3,4),80	898
INITIAL	MH5(3,5),56	899
INITIAL	MH5(3,6),118	900
INITIAL	MH5(3,7),91	901
INITIAL	MH5(3,8),143	902
INITIAL	MH5(3,9),48	903
INITIAL	MH5(3,10),71	904
INITIAL	MH5(3,11),501	905
INITIAL	MH5(3,12),333	906
INITIAL	MH5(3,13),819	907
INITIAL	MH5(3,14),800	908
INITIAL	MH5(4,1),6	909
INITIAL	MH5(4,2),6	910
INITIAL	MH5(4,3),51	911
INITIAL	MH5(4,4),120	912
INITIAL	MH5(4,5),111	913
INITIAL	MH5(4,6),176	914

Initializes the ceiling and visibility matrixes for various wind directions and velocities.

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INITIAL MH01(12,3),591
INITIAL MH01(12,4),48
INITIAL MH01(12,5),17
INITIAL MH01(12,6),479
INITIAL MH01(12,7),195
INITIAL MH01(12,8),779
INITIAL MH01(12,9),510
INITIAL MH01(12,10),998
INITIAL MH01(12,11),1000
INITIAL MH01(12,12),24
INITIAL MH01(12,13),25
INITIAL MH01(13,1),247
INITIAL MH01(13,2),616
INITIAL MH01(13,3),663
INITIAL MH01(13,4),15
INITIAL MH01(13,5),15
INITIAL MH01(13,6),439
INITIAL MH01(13,7),302
INITIAL MH01(13,8),827
INITIAL MH01(13,9),645
INITIAL MH01(13,10),999
INITIAL MH01(13,11),992
INITIAL MH01(13,12),26
INITIAL MH01(13,13),27
INITIAL MH01(14,1),270
INITIAL MH01(14,2),776
INITIAL MH01(14,3),777
INITIAL MH01(14,4),69
INITIAL MH01(14,5),14
INITIAL MH01(14,6),312
INITIAL MH01(14,7),211
INITIAL MH01(14,8),651
INITIAL MH01(14,9),498
INITIAL MH01(14,10),990
INITIAL MH01(14,11),966
INITIAL MH01(14,12),28
INITIAL MH01(14,13),29
INITIAL MH01(15,1),292
INITIAL MH01(15,2),836
INITIAL MH01(15,3),874
INITIAL MH01(15,4),33
INITIAL MH01(15,5),101
INITIAL MH01(15,6),295
INITIAL MH01(15,7),184
INITIAL MH01(15,8),649
INITIAL MH01(15,9),439
INITIAL MH01(15,10),974
INITIAL MH01(15,11),577
INITIAL MH01(15,12),30
INITIAL MH01(15,13),31
INITIAL MH01(16,1),315
INITIAL MH01(16,2),937
INITIAL MH01(16,3),958
INITIAL MH01(16,4),26
INITIAL MH01(16,5),20
INITIAL MH01(16,6),396
INITIAL MH01(16,7),225
INITIAL MH01(16,8),734
INITIAL MH01(16,9),554
INITIAL MH01(16,10),996
INITIAL MH01(16,11),993
INITIAL MH01(16,12),32
INITIAL MH01(16,13),33
INITIAL MH01(17,1),337
INITIAL MH01(17,2),1000
INITIAL MH01(17,3),1000
INITIAL MH01(17,4),30
INITIAL MH01(17,5),13
INITIAL MH01(17,6),413
INITIAL MH01(17,7),835
INITIAL MH01(17,8),835
INITIAL MH01(17,9),658
INITIAL MH01(17,10),1000
INITIAL MH01(17,11),1000
INITIAL MH01(17,12),34
INITIAL MH01(17,13),35
INITIAL MH2(1,1-2),857
INITIAL MH2(2,1-2),877
INITIAL MH2(3,1-2),918
INITIAL MH2(4,1-2),938
INITIAL MH2(5-6,1-2),979
INITIAL MH3(1,1-2),24
INITIAL MH3(2,1-2),48
INITIAL MH3(3,1-2),48
INITIAL MH3(4,1-2),72
INITIAL MH3(5,1-2),119

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Initializes weather matrix to determine wind direction and velocity. Also directs which ceiling and visibility matrix to calculate ceiling and visibility.

Initializes the ceiling and visibility matrixes for various wind directions and velocities.

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INITIAL	MH01(5,8),724	657
INITIAL	MH01(5,9),770	658
INITIAL	MH01(5,10),981	659
INITIAL	MH01(5,11),992	660
INITIAL	MH01(5,12),10	661
INITIAL	MH01(5,13),11	662
INITIAL	MH01(6,1),90	663
INITIAL	MH01(6,2),232	664
INITIAL	MH01(6,3),263	665
INITIAL	MH01(6,4),167	666
INITIAL	MH01(6,5),49	667
INITIAL	MH01(6,6),642	668
INITIAL	MH01(6,7),431	669
INITIAL	MH01(6,8),776	670
INITIAL	MH01(6,9),820	671
INITIAL	MH01(6,10),976	672
INITIAL	MH01(6,11),996	673
INITIAL	MH01(6,12),12	674
INITIAL	MH01(6,13),13	675
INITIAL	MH01(7,1),112	676
INITIAL	MH01(7,2),254	677
INITIAL	MH01(7,3),348	678
INITIAL	MH01(7,4),207	679
INITIAL	MH01(7,5),47	680
INITIAL	MH01(7,6),671	681
INITIAL	MH01(6,7),437	682
INITIAL	MH01(7,8),866	683
INITIAL	MH01(7,9),804	684
INITIAL	MH01(7,10),994	685
INITIAL	MH01(7,11),1000	686
INITIAL	MH01(7,12),14	687
INITIAL	MH01(7,13),15	688
INITIAL	MH01(8,1),135	689
INITIAL	MH01(8,2),272	690
INITIAL	MH01(8,3),398	691
INITIAL	MH01(8,4),237	692
INITIAL	MH01(8,5),66	693
INITIAL	MH01(8,6),777	694
INITIAL	MH01(8,7),680	695
INITIAL	MH01(8,8),935	696
INITIAL	MH01(8,9),962	697
INITIAL	MH01(8,10),993	698
INITIAL	MH01(8,11),995	699
INITIAL	MH01(8,12),16	700
INITIAL	MH01(8,13),17	701
INITIAL	MH01(9,1),157	702
INITIAL	MH01(9,2),296	703
INITIAL	MH01(9,3),425	704
INITIAL	MH01(9,4),153	705
INITIAL	MH01(9,5),101	706
INITIAL	MH01(9,6),736	707
INITIAL	MH01(9,7),641	708
INITIAL	MH01(9,8),939	709
INITIAL	MH01(9,9),924	710
INITIAL	MH01(9,10),1000	711
INITIAL	MH01(9,11),995	712
INITIAL	MH01(9,12),18	713
INITIAL	MH01(9,13),19	714
INITIAL	MH01(10,1),180	715
INITIAL	MH01(10,2),365	716
INITIAL	MH01(10,3),489	717
INITIAL	MH01(10,4),109	718
INITIAL	MH01(10,5),53	719
INITIAL	MH01(10,6),757	720
INITIAL	MH01(10,7),456	721
INITIAL	MH01(10,8),949	722
INITIAL	MH01(10,9),803	723
INITIAL	MH01(10,10),1000	724
INITIAL	MH01(10,11),985	725
INITIAL	MH01(10,12),20	726
INITIAL	MH01(10,13),21	727
INITIAL	MH01(11,1),202	728
INITIAL	MH01(11,2),424	729
INITIAL	MH01(11,3),550	730
INITIAL	MH01(11,4),58	731
INITIAL	MH01(11,5),20	732
INITIAL	MH01(11,6),569	733
INITIAL	MH01(11,7),211	734
INITIAL	MH01(11,8),845	735
INITIAL	MH01(11,9),602	736
INITIAL	MH01(11,10),1000	737
INITIAL	MH01(11,11),998	738
INITIAL	MH01(11,12),22	739
INITIAL	MH01(11,13),23	740
INITIAL	MH01(12,1),225	741
INITIAL	MH01(12,2),496	742

Initializes weather matrix to determine wind direction and velocity. Also directs which ceiling and visibility matrix to calculate ceiling and visibility.

(continued)

INITIAL	MH\$ARSEP(15,3),40	571
INITIAL	MH\$ARSEP(1,4),38	572
INITIAL	MH\$ARSEP(3,4),38	573
INITIAL	MH\$ARSEP(5,4),38	574
INITIAL	MH\$ARSEP(7,4),38	575
INITIAL	MH\$ARSEP(9,4),38	576
INITIAL	MH\$ARSEP(11,4),38	577
INITIAL	MH\$ARSEP(13,4),38	578
INITIAL	MH\$ARSEP(14,4),38	579
INITIAL	MH\$ARSEP(1-10,5),3	580
INITIAL	MH\$ARSEP(5-8,5),4	581
INITIAL	MH\$ARSEP(11-14,5),5	582
INITIAL	MH\$ARSEP(15,5),12	583
INITIAL	MH\$ARSEP(16,5),12	584
INITIAL	MH\$ARSEP(1-4,6),1	585
INITIAL	MH\$ARSEP(9-10,6),1	586
INITIAL	MH\$ARSEP(1-4,7),2	587
INITIAL	MH\$ARSEP(5-8,7),1	588
INITIAL	MH\$ARSEP(9-10,7),2	589
INITIAL	MH\$ARSEP(1-4,8),3	590
INITIAL	MH\$ARSEP(5-8,8),2	591
INITIAL	MH\$ARSEP(9-10,8),3	592
INITIAL	MH\$ARSEP(11-16,8),1	593
INITIAL	MH\$ARSEP(1-4,10),1	594
INITIAL	MH\$ARSEP(9-10,10),1	595
INITIAL	MH\$ARSEP(1-12,11),16	596
INITIAL	MH\$ARSEP(1-2,11),20	597
INITIAL	MH\$ARSEP(5-6,11),10	598
INITIAL	MH\$ARSEP(7-8,11),12	599
INITIAL	MH\$ARSEP(9-10,11),20	600
INITIAL	MH\$ARSEP(13,11),10	601
INITIAL	MH\$ARSEP(14,11),8	602
INITIAL	MH\$ARSEP(15,11),10	603
INITIAL	MH\$ARSEP(16,11),8	604
INITIAL	MH01(1,1),360	605
INITIAL	MH01(1,2),7	606
INITIAL	MH01(1,3),1	607
INITIAL	MH01(1,4-11),1000	608
INITIAL	MH01(1,12),2	609
INITIAL	MH01(1,13),3	610
INITIAL	MH01(2,2),96	611
INITIAL	MH01(2,3),58	612
INITIAL	MH01(2,4),61	613
INITIAL	MH01(2,5),7	614
INITIAL	MH01(2,6),576	615
INITIAL	MH01(2,7),448	616
INITIAL	MH01(2,8),839	617
INITIAL	MH01(2,9),777	618
INITIAL	MH01(2,10),1000	619
INITIAL	MH01(2,10),1000	620
INITIAL	MH01(2,11),990	621
INITIAL	MH01(2,12),4	622
INITIAL	MH01(2,13),5	623
INITIAL	MH01(3,1),22	624
INITIAL	MH01(3,2),128	625
INITIAL	MH01(3,3),85	626
INITIAL	MH01(3,4),152	627
INITIAL	MH01(3,5),76	628
INITIAL	MH01(3,6),704	629
INITIAL	MH01(3,7),510	630
INITIAL	MH01(3,8),891	631
INITIAL	MH01(3,9),753	632
INITIAL	MH01(3,10),996	633
INITIAL	MH01(3,11),995	634
INITIAL	MH01(3,12),6	635
INITIAL	MH01(3,13),7	636
INITIAL	MH01(4,1),45	637
INITIAL	MH01(4,2),163	638
INITIAL	MH01(4,3),118	639
INITIAL	MH01(4,4),113	640
INITIAL	MH01(4,5),29	641
INITIAL	MH01(4,6),510	642
INITIAL	MH01(4,7),324	643
INITIAL	MH01(4,8),755	644
INITIAL	MH01(4,9),639	645
INITIAL	MH01(4,10),981	646
INITIAL	MH01(4,11),979	647
INITIAL	MH01(4,12),8	648
INITIAL	MH01(4,13),9	649
INITIAL	MH01(5,1),67	650
INITIAL	MH01(5,2),198	651
INITIAL	MH01(5,3),169	652
INITIAL	MH01(5,4),82	653
INITIAL	MH01(5,5),41	654
INITIAL	MH01(5,6),494	655
INITIAL	MH01(5,5),441	656

Initializes the separation matrix used to determine, for equipment outages, the separation between aircraft and the maximum number of aircraft under air control.

Initializes weather matrix to determine wind direction and velocity. Also directs which ceiling and visibility matrix to calculate ceiling and visibility.

(continued)

INITIAL	MH\$IFRAC(23,18),6	485
INITIAL	MH\$IFRAC(24,18),10	486
INITIAL	MH\$VFRAC(1,1),297	487
INITIAL	MH\$VFRAC(1,2),597	488
INITIAL	MH\$VFRAC(1-7,3),847	489
INITIAL	MH\$VFRAC(1-7,4),897	490
INITIAL	MH\$VFRAC(1-7,5-8),996	491
INITIAL	MH\$VFRAC(1-7,9-15),997	492
INITIAL	MH\$VFRAC(1-7,16-17),1000	493
INITIAL	MH\$VFRAC(2-7,1),299	494
INITIAL	MH\$VFRAC(2-7,2),598	495
INITIAL	MH\$VFRAC(8,1),260	496
INITIAL	MH\$VFRAC(8,2),522	497
INITIAL	MH\$VFRAC(8,3),740	498
INITIAL	MH\$VFRAC(8,4),784	499
INITIAL	MH\$VFRAC(8,5-7),871	500
INITIAL	MH\$VFRAC(8,8),954	501
INITIAL	MH\$VFRAC(8,9-13),955	502
INITIAL	MH\$VFRAC(8,14-15),998	503
INITIAL	MH\$VFRAC(8,16-17),1000	504
INITIAL	MH\$VFRAC(9-18,1),251	505
INITIAL	MH\$VFRAC(9-18,2),502	506
INITIAL	MH\$VFRAC(9,3),711	507
INITIAL	MH\$VFRAC(10-18,3),710	508
INITIAL	MH\$VFRAC(9-18,4),752	509
INITIAL	MH\$VFRAC(9-18,5),836	510
INITIAL	MH\$VFRAC(9,6),929	511
INITIAL	MH\$VFRAC(10-18,6),928	512
INITIAL	MH\$VFRAC(9-18,7),946	513
INITIAL	MH\$VFRAC(9-18,8),947	514
INITIAL	MH\$VFRAC(9-18,9),948	515
INITIAL	MH\$VFRAC(9,10),954	516
INITIAL	MH\$VFRAC(10-18,10),954	517
INITIAL	MH\$VFRAC(9-18,11-13),955	518
INITIAL	MH\$VFRAC(9,11),954	519
INITIAL	MH\$VFRAC(9-18,14),996	520
INITIAL	MH\$VFRAC(9-18,15),997	521
INITIAL	MH\$VFRAC(9-18,16),998	522
INITIAL	MH\$VFRAC(9-18,17),999	523
INITIAL	MH\$VFRAC(19-23,1),258	524
INITIAL	MH\$VFRAC(19-23,2),516	525
INITIAL	MH\$VFRAC(19-23,3),731	526
INITIAL	MH\$VFRAC(19-23,4),774	527
INITIAL	MH\$VFRAC(19-23,5),860	528
INITIAL	MH\$VFRAC(19-23,6-8),955	529
INITIAL	MH\$VFRAC(19-23,9-13),956	530
INITIAL	MH\$VFRAC(19-24,14-15),998	531
INITIAL	MH\$VFRAC(19-24,16-17),1000	532
INITIAL	MH\$VFRAC(24,1),269	533
INITIAL	MH\$VFRAC(24,2),538	534
INITIAL	MH\$VFRAC(24,3),763	535
INITIAL	MH\$VFRAC(24,4),807	536
INITIAL	MH\$VFRAC(24,5),897	537
INITIAL	MH\$VFRAC(24,6-8),997	538
INITIAL	MH\$VFRAC(24,9-13),998	539
INITIAL	MH\$VFRAC(1,18),7	540
INITIAL	MH\$VFRAC(2,18),6	541
INITIAL	MH\$VFRAC(3,18),6	542
INITIAL	MH\$VFRAC(4,18),8	543
INITIAL	MH\$VFRAC(5,18),11	544
INITIAL	MH\$VFRAC(6,18),17	545
INITIAL	MH\$VFRAC(7,18),25	546
INITIAL	MH\$VFRAC(8,18),30	547
INITIAL	MH\$VFRAC(9,18),41	548
INITIAL	MH\$VFRAC(10,18),40	549
INITIAL	MH\$VFRAC(11,18),39	550
INITIAL	MH\$VFRAC(12,18),40	551
INITIAL	MH\$VFRAC(13,18),46	552
INITIAL	MH\$VFRAC(14,18),46	553
INITIAL	MH\$VFRAC(15,18),40	554
INITIAL	MH\$VFRAC(16,18),53	555
INITIAL	MH\$VFRAC(17,18),60	556
INITIAL	MH\$VFRAC(18,18),43	557
INITIAL	MH\$VFRAC(19,18),53	558
INITIAL	MH\$VFRAC(20,18),46	559
INITIAL	MH\$VFRAC(21,18),33	560
INITIAL	MH\$VFRAC(22,18),26	561
INITIAL	MH\$VFRAC(23,18),7	562
INITIAL	MH\$VFRAC(24,18),12	563
INITIAL	MH\$ARSEP(1-8,1),37	564
INITIAL	MH\$ARSEP(1-4,2),39	565
INITIAL	MH\$ARSEP(9-12,2),39	566
INITIAL	MH\$ARSEP(1-2,3),40	567
INITIAL	MH\$ARSEP(5-6,3),40	568
INITIAL	MH\$ARSEP(9-10,3),40	569
INITIAL	MH\$ARSEP(13,3),40	570

Initializes the number of aircraft to generate per hour in both IFR and VFR conditions and the aircraft destinations.

Initializes the separation matrix used to determine, for equipment outages, the separation between aircraft and the maximum number of aircraft under air control.

(continued)

INITIAL	MH\$IFRPT(14,2),11	399
INITIAL	MH\$IFRPT(18,2),235	400
INITIAL	MH\$IFRPT(6,3),947	401
INITIAL	MH\$IFRPT(7,3),816	402
INITIAL	MH\$IFRPT(8,3),1000	403
INITIAL	MH\$IFRPT(9,3),38	404
INITIAL	MH\$IFRPT(10-13,3),1000	405
INITIAL	MH\$IFRPT(14,3),869	406
INITIAL	MH\$IFRPT(15,3),1000	407
INITIAL	MH\$IFRPT(16,3),174	408
INITIAL	MH\$IFRPT(17-18,3),1000	409
INITIAL	MH\$IFRAC(1,1),297	410
INITIAL	MH\$IFRAC(1,2),597	411
INITIAL	MH\$IFRAC(1-7,3),847	412
INITIAL	MH\$IFRAC(1-7,4),897	413
INITIAL	MH\$IFRAC(1-7,5-8),996	414
INITIAL	MH\$IFRAC(1-7,9-15),997	415
INITIAL	MH\$IFRAC(1-7,16-17),1000	416
INITIAL	MH\$IFRAC(2-7,1),299	417
INITIAL	MH\$IFRAC(2-7,2),598	418
INITIAL	MH\$IFRAC(8,1),260	419
INITIAL	MH\$IFRAC(8,2),522	420
INITIAL	MH\$IFRAC(8,3),740	421
INITIAL	MH\$IFRAC(8,4),784	422
INITIAL	MH\$IFRAC(8,5-7),871	423
INITIAL	MH\$IFRAC(8,8),954	424
INITIAL	MH\$IFRAC(8,9-13),955	425
INITIAL	MH\$IFRAC(8,14-15),998	426
INITIAL	MH\$IFRAC(8,16-17),1000	427
INITIAL	MH\$IFRAC(9-18,1),251	428
INITIAL	MH\$IFRAC(9-18,2),502	429
INITIAL	MH\$IFRAC(9,3),711	430
INITIAL	MH\$IFRAC(10-18,3),710	431
INITIAL	MH\$IFRAC(9-18,4),752	432
INITIAL	MH\$IFRAC(9-18,5),836	433
INITIAL	MH\$IFRAC(9,6),929	434
INITIAL	MH\$IFRAC(10-18,6),928	435
INITIAL	MH\$IFRAC(9-18,7),946	436
INITIAL	MH\$IFRAC(9-18,8),947	437
INITIAL	MH\$IFRAC(9-18,9),948	438
INITIAL	MH\$IFRAC(9,10),954	439
INITIAL	MH\$IFRAC(10-18,10),954	440
INITIAL	MH\$IFRAC(9-18,11-13),955	441
INITIAL	MH\$IFRAC(9,11),954	442
INITIAL	MH\$IFRAC(9-18,14),996	443
INITIAL	MH\$IFRAC(9-18,15),997	444
INITIAL	MH\$IFRAC(9-18,16),998	445
INITIAL	MH\$IFRAC(9-18,17),999	446
INITIAL	MH\$IFRAC(19-23,1),258	447
INITIAL	MH\$IFRAC(19-23,2),516	448
INITIAL	MH\$IFRAC(19-23,3),731	449
INITIAL	MH\$IFRAC(19-23,4),774	450
INITIAL	MH\$IFRAC(19-23,5),860	451
INITIAL	MH\$IFRAC(19-23,6-8),955	452
INITIAL	MH\$IFRAC(19-23,9-13),956	453
INITIAL	MH\$IFRAC(19-24,14-15),998	454
INITIAL	MH\$IFRAC(19-24,16-17),1000	455
INITIAL	MH\$IFRAC(24,1),269	456
INITIAL	MH\$IFRAC(24,2),538	457
INITIAL	MH\$IFRAC(24,3),763	458
INITIAL	MH\$IFRAC(24,4),807	459
INITIAL	MH\$IFRAC(24,5),897	460
INITIAL	MH\$IFRAC(24,6-8),997	461
INITIAL	MH\$IFRAC(24,9-13),998	462
INITIAL	MH\$IFRAC(1,18),3	463
INITIAL	MH\$IFRAC(2,18),5	464
INITIAL	MH\$IFRAC(3,18),5	465
INITIAL	MH\$IFRAC(4,18),7	466
INITIAL	MH\$IFRAC(5,18),9	467
INITIAL	MH\$IFRAC(6,18),14	468
INITIAL	MH\$IFRAC(7,18),20	469
INITIAL	MH\$IFRAC(8,18),24	470
INITIAL	MH\$IFRAC(9,18),33	471
INITIAL	MH\$IFRAC(10,18),32	472
INITIAL	MH\$IFRAC(11,18),30	473
INITIAL	MH\$IFRAC(12,18),32	474
INITIAL	MH\$IFRAC(13,18),37	475
INITIAL	MH\$IFRAC(14,18),37	476
INITIAL	MH\$IFRAC(15,18),31	477
INITIAL	MH\$IFRAC(16,18),43	478
INITIAL	MH\$IFRAC(17,18),48	479
INITIAL	MH\$IFRAC(18,18),35	480
INITIAL	MH\$IFRAC(19,18),43	481
INITIAL	MH\$IFRAC(20,18),37	482
INITIAL	MH\$IFRAC(21,18),27	483
INITIAL	MH\$IFRAC(22,18),20	484

Initializes matrix used to determine from generated aircraft destinations the aircraft type based on VFR and IFR conditions.

Initializes the number of aircraft to generate per hour in both IFR and VFR conditions and the aircraft destinations.

(continued)

INITIAL	MH\$DSTNR(3,6),28	313
INITIAL	MH\$DSTNR(3,7),14	314
INITIAL	MH\$DSTNR(3,8),49	315
INITIAL	MH\$DSTNR(3,9),45	316
INITIAL	MH\$DSTNR(3,10),27	317
INITIAL	MH\$DSTNR(3,11),55	318
INITIAL	MH\$DSTNR(3,12),41	319
INITIAL	MH\$DSTNR(3,13),27	320
INITIAL	MH\$DSTNR(3,14),48	321
INITIAL	MH\$DSTNR(3,15),52	322
INITIAL	MH\$DSTNR(3,16),38	323
INITIAL	MH\$DSTNR(3,17),55	324
INITIAL	MH\$DSTNR(3,18),24	325
INITIAL	MH\$DSTNR(4,1),19	326
INITIAL	MH\$DSTNR(4,2),18	327
INITIAL	MH\$DSTNR(4,3),29	328
INITIAL	MH\$DSTNR(4,4),25	329
INITIAL	MH\$DSTNR(4,5),39	330
INITIAL	MH\$DSTNR(4,6),45	331
INITIAL	MH\$DSTNR(4,7),35	332
INITIAL	MH\$DSTNR(4,8),66	333
INITIAL	MH\$DSTNR(4,9),62	334
INITIAL	MH\$DSTNR(4,10),51	335
INITIAL	MH\$DSTNR(4,11),34	336
INITIAL	MH\$DSTNR(4,12),21	337
INITIAL	MH\$DSTNR(4,13),48	338
INITIAL	MH\$DSTNR(4,14),28	339
INITIAL	MH\$DSTNR(4,15),31	340
INITIAL	MH\$DSTNR(4,16),17	341
INITIAL	MH\$DSTNR(4,17),34	342
INITIAL	MH\$DSTNR(4,18),45	343
INITIAL	MH\$DSTNR(5,1),27	344
INITIAL	MH\$DSTNR(5,2),38	345
INITIAL	MH\$DSTNR(5,3),29	346
INITIAL	MH\$DSTNR(5,4),44	347
INITIAL	MH\$DSTNR(5,5),27	348
INITIAL	MH\$DSTNR(5,6),15	349
INITIAL	MH\$DSTNR(5,7),24	350
INITIAL	MH\$DSTNR(5,8),38	351
INITIAL	MH\$DSTNR(5,9),48	352
INITIAL	MH\$DSTNR(5,10),28	353
INITIAL	MH\$DSTNR(5,11),42	354
INITIAL	MH\$DSTNR(5,12),55	355
INITIAL	MH\$DSTNR(5,13),38	356
INITIAL	MH\$DSTNR(5,14),28	357
INITIAL	MH\$DSTNR(5,15),58	358
INITIAL	MH\$DSTNR(5,16),38	359
INITIAL	MH\$DSTNR(5,17),52	360
INITIAL	MH\$DSTNR(5,18),17	361
INITIAL	MH\$CATWT(1-4,1-7),1000	362
INITIAL	MH\$CATWT(1,1-2),0	363
INITIAL	MH\$CATWT(1,3),787	364
INITIAL	MH\$CATWT(1,5),0	365
INITIAL	MH\$CATWT(1,6),787	366
INITIAL	MH\$CATWT(2,1),0	367
INITIAL	MH\$CATWT(2,5),0	368
INITIAL	MH\$CATWT(4,1),300	369
INITIAL	MH\$CATWT(4,2),500	370
INITIAL	MH\$CATWT(4,5),500	371
INITIAL	MH\$VFRPT(1-5,1),782	372
INITIAL	MH\$VFRPT(1-5,2),897	373
INITIAL	MH\$VFRPT(1-5,3),996	374
INITIAL	MH\$VFRPT(6,1),30	375
INITIAL	MH\$VFRPT(14,1),2	376
INITIAL	MH\$VFRPT(6,2),111	377
INITIAL	MH\$VFRPT(7,2),2	378
INITIAL	MH\$VFRPT(10,2),190	379
INITIAL	MH\$VFRPT(14,2),11	380
INITIAL	MH\$VFRPT(18,2),235	381
INITIAL	MH\$VFRPT(6,3),947	382
INITIAL	MH\$VFRPT(7,3),816	383
INITIAL	MH\$VFRPT(8,3),1000	384
INITIAL	MH\$VFRPT(9,3),38	385
INITIAL	MH\$VFRPT(10-13,3),1000	386
INITIAL	MH\$VFRPT(14,3),869	387
INITIAL	MH\$VFRPT(15,3),1000	388
INITIAL	MH\$VFRPT(16,3),174	389
INITIAL	MH\$VFRPT(17-18,3),1000	390
INITIAL	MH\$IFRPT(1-5,1),782	391
INITIAL	MH\$IFRPT(1-5,2),897	392
INITIAL	MH\$IFRPT(1-5,3),996	393
INITIAL	MH\$IFRPT(6,1),30	394
INITIAL	MH\$IFRPT(14,1),2	395
INITIAL	MH\$IFRPT(6,2),111	396
INITIAL	MH\$IFRPT(7,2),2	397
INITIAL	MH\$IFRPT(10,2),190	398

Same as DSTN matrix, except distances are for a non-radar environment.

Initializes matrix used to determine from generated aircraft destinations the aircraft type based on VFR and IFR conditions.

(continued)

INITIAL	MH\$DSTN(4,5),44	227
INITIAL	MH\$DSTN(4,6),43	228
INITIAL	MH\$DSTN(4,7),35	229
INITIAL	MH\$DSTN(4,8),68	230
INITIAL	MH\$DSTN(4,9),63	231
INITIAL	MH\$DSTN(4,10),43	232
INITIAL	MH\$DSTN(4,11),29	233
INITIAL	MH\$DSTN(4,12),20	234
INITIAL	MH\$DSTN(4,13),40	235
INITIAL	MH\$DSTN(4,14),26	236
INITIAL	MH\$DSTN(4,15),29	237
INITIAL	MH\$DSTN(4,16),30	238
INITIAL	MH\$DSTN(4,17),32	239
INITIAL	MH\$DSTN(4,18),49	240
INITIAL	MH\$DSTN(5,1),25	241
INITIAL	MH\$DSTN(5,2),32	242
INITIAL	MH\$DSTN(5,3),47	243
INITIAL	MH\$DSTN(5,4),41	244
INITIAL	MH\$DSTN(5,5),26	245
INITIAL	MH\$DSTN(5,6),16	246
INITIAL	MH\$DSTN(5,7),22	247
INITIAL	MH\$DSTN(5,8),37	248
INITIAL	MH\$DSTN(5,9),31	249
INITIAL	MH\$DSTN(5,10),25	250
INITIAL	MH\$DSTN(5,11),36	251
INITIAL	MH\$DSTN(5,12),51	252
INITIAL	MH\$DSTN(5,13),34	253
INITIAL	MH\$DSTN(5,14),34	254
INITIAL	MH\$DSTN(5,15),55	255
INITIAL	MH\$DSTN(5,16),35	256
INITIAL	MH\$DSTN(5,17),52	257
INITIAL	MH\$DSTN(5,18),17	258
INITIAL	MH\$DSTN(6,1-5),101	259
INITIAL	MH\$DSTN(6,6),106	260
INITIAL	MH\$DSTN(6,7),107	261
INITIAL	MH\$DSTN(6,8),108	262
INITIAL	MH\$DSTN(6,9),109	263
INITIAL	MH\$DSTN(6,10),110	264
INITIAL	MH\$DSTN(6,11),111	265
INITIAL	MH\$DSTN(6,12),112	266
INITIAL	MH\$DSTN(6,13),113	267
INITIAL	MH\$DSTN(6,14),114	268
INITIAL	MH\$DSTN(6,15),115	269
INITIAL	MH\$DSTN(6,16),116	270
INITIAL	MH\$DSTN(6,17),117	271
INITIAL	MH\$DSTN(6,18),118	272
INITIAL	MH\$DSTNR(1,1),26	273
INITIAL	MH\$DSTNR(1,2),49	274
INITIAL	MH\$DSTNR(1,3),39	275
INITIAL	MH\$DSTNR(1,4),55	276
INITIAL	MH\$DSTNR(1,5),26	277
INITIAL	MH\$DSTNR(1,6),15	278
INITIAL	MH\$DSTNR(1,7),14	279
INITIAL	MH\$DSTNR(1,8),38	280
INITIAL	MH\$DSTNR(1,9),49	281
INITIAL	MH\$DSTNR(1,10),27	282
INITIAL	MH\$DSTNR(1,11),34	283
INITIAL	MH\$DSTNR(1,12),31	284
INITIAL	MH\$DSTNR(1,13),27	285
INITIAL	MH\$DSTNR(1,14),28	286
INITIAL	MH\$DSTNR(1,15),31	287
INITIAL	MH\$DSTNR(1,16),28	288
INITIAL	MH\$DSTNR(1,17),45	289
INITIAL	MH\$DSTNR(1,18),24	290
INITIAL	MH\$DSTNR(2,1),38	291
INITIAL	MH\$DSTNR(2,2-3),39	292
INITIAL	MH\$DSTNR(2,4),38	293
INITIAL	MH\$DSTNR(2,5),36	294
INITIAL	MH\$DSTNR(2,6),38	295
INITIAL	MH\$DSTNR(2,7),21	296
INITIAL	MH\$DSTNR(2,8),62	297
INITIAL	MH\$DSTNR(2,9),55	298
INITIAL	MH\$DSTNR(2,10),38	299
INITIAL	MH\$DSTNR(2,11),45	300
INITIAL	MH\$DSTNR(2,12),31	301
INITIAL	MH\$DSTNR(2,13),35	302
INITIAL	MH\$DSTNR(2,14),38	303
INITIAL	MH\$DSTNR(2,15),42	304
INITIAL	MH\$DSTNR(2,16),28	305
INITIAL	MH\$DSTNR(2,17),45	306
INITIAL	MH\$DSTNR(2,18),35	307
INITIAL	MH\$DSTNR(3,1),26	308
INITIAL	MH\$DSTNR(3,2),38	309
INITIAL	MH\$DSTNR(3,3),46	310
INITIAL	MH\$DSTNR(3,4),26	311
INITIAL	MH\$DSTNR(3,5),43	312

Initializes the Distance Matrix [distance from holding points and secondary airports to the 5 runways at Logan (radar environment)].

Same as DSTN matrix, except distances are for a non-radar environment.

(continued)

INITIAL	MX\$FACIL(25-35,2),2100000	141
INITIAL	MX\$FACIL(25-35,3),660	142
INITIAL	MX\$FACIL(36,2),24600	143
INITIAL	MX\$FACIL(36,3),534	144
INITIAL	MX\$FACIL(37,2),36300	145
INITIAL	MX\$FACIL(37,3),96	146
INITIAL	MX\$FACIL(38,2),5160	147
INITIAL	MX\$FACIL(38,3),180	148
INITIAL	MX\$FACIL(39,2),29100	149
INITIAL	MX\$FACIL(39,3),120	150
INITIAL	MX\$FACIL(40,2),20100	151
INITIAL	MX\$FACIL(40,3),114	152
INITIAL	MX\$FACIL(41-48,2),25200	153
INITIAL	MX\$FACIL(49-50,2),2100000	154
INITIAL	MX\$FACIL(54-55,2),25200	155
INITIAL	MX\$FACIL(58-61,2),25200	156
INITIAL	MX\$FACIL(63,2),25200	157
INITIAL	MX\$FACIL(41-48,3),780	158
INITIAL	MX\$FACIL(49-50,3),616	159
INITIAL	MX\$FACIL(54-55,3),780	160
INITIAL	MX\$FACIL(58-61,3),780	161
INITIAL	MX\$FACIL(63,3),780	162
INITIAL	MX\$FACIL(51-53,2),2100000	163
INITIAL	MX\$FACIL(51-53,3),660	164
INITIAL	MX\$FACIL(56-57,2),25200	165
INITIAL	MX\$FACIL(56-57,3),780	166
INITIAL	MX\$FACIL(62,2),25200	167
INITIAL	MX\$FACIL(62,3),780	168
INITIAL	MH\$DSTN(1,1),34	169
INITIAL	MH\$DSTN(1,2),25	170
INITIAL	MH\$DSTN(1,3),19	171
INITIAL	MH\$DSTN(1,4),31	172
INITIAL	MH\$DSTN(1,5),49	173
INITIAL	MH\$DSTN(1,6),27	174
INITIAL	MH\$DSTN(1,7),36	175
INITIAL	MH\$DSTN(1,8),46	176
INITIAL	MH\$DSTN(1,9),39	177
INITIAL	MH\$DSTN(1,10),46	178
INITIAL	MH\$DSTN(1,11),22	179
INITIAL	MH\$DSTN(1,12),29	180
INITIAL	MH\$DSTN(1,13),55	181
INITIAL	MH\$DSTN(1,14),12	182
INITIAL	MH\$DSTN(1,15),33	183
INITIAL	MH\$DSTN(1,16),14	184
INITIAL	MH\$DSTN(1,17),30	185
INITIAL	MH\$DSTN(1,18),38	186
INITIAL	MH\$DSTN(2,1),39	187
INITIAL	MH\$DSTN(2,2),45	188
INITIAL	MH\$DSTN(2,3),41	189
INITIAL	MH\$DSTN(2,4),18	190
INITIAL	MH\$DSTN(2,5),33	191
INITIAL	MH\$DSTN(2,6),16	192
INITIAL	MH\$DSTN(2,7),22	193
INITIAL	MH\$DSTN(2,8),37	194
INITIAL	MH\$DSTN(2,9),31	195
INITIAL	MH\$DSTN(2,10),25	196
INITIAL	MH\$DSTN(2,11),22	197
INITIAL	MH\$DSTN(2,12),29	198
INITIAL	MH\$DSTN(2,13),34	199
INITIAL	MH\$DSTN(2,14),12	200
INITIAL	MH\$DSTN(2,15),33	201
INITIAL	MH\$DSTN(2,16),14	202
INITIAL	MH\$DSTN(2,17),30	203
INITIAL	MH\$DSTN(2,18),38	204
INITIAL	MH\$DSTN(3,1),33	205
INITIAL	MH\$DSTN(3,2),45	206
INITIAL	MH\$DSTN(3,3),41	207
INITIAL	MH\$DSTN(3,4),20	208
INITIAL	MH\$DSTN(3,5),26	209
INITIAL	MH\$DSTN(3,6),26	210
INITIAL	MH\$DSTN(3,7),16	211
INITIAL	MH\$DSTN(3,8),38	212
INITIAL	MH\$DSTN(3,9),43	213
INITIAL	MH\$DSTN(3,10),23	214
INITIAL	MH\$DSTN(3,11),47	215
INITIAL	MH\$DSTN(3,12),36	216
INITIAL	MH\$DSTN(3,13),28	217
INITIAL	MH\$DSTN(3,14),43	218
INITIAL	MH\$DSTN(3,15),45	219
INITIAL	MH\$DSTN(3,16),35	220
INITIAL	MH\$DSTN(3,17),49	221
INITIAL	MH\$DSTN(3,18),24	222
INITIAL	MH\$DSTN(4,1),50	223
INITIAL	MH\$DSTN(4,2),29	224
INITIAL	MH\$DSTN(4,3),25	225
INITIAL	MH\$DSTN(4,4),20	226

Initializes the Facility Matrix with MTBPs and MTTRs.

Initializes the Distance Matrix [distance from holding points and secondary airports to the 5 runways at Logan (radar environment)].

(continued)

31	MATRIX	H,6,14	57
33	MATRIX	H,6,14	58
35	MATRIX	H,6,14	59
158	MATRIX	H,2,8	60
157	MATRIX	H,2,8	61
111	MATRIX	H,4,4	62
112	MATRIX	H,4,4	63
113	MATRIX	H,4,4	64
117	MATRIX	H,4,4	65
118	MATRIX	H,6,4	66
106	MATRIX	H,6,4	67
107	MATRIX	H,6,4	68
109	MATRIX	H,6,4	69
110	MATRIX	H,6,4	70
114	MATRIX	H,6,4	71
115	MATRIX	H,6,4	72
116	MATRIX	H,6,4	73
108	MATRIX	H,5,4	74
101	MATRIX	H,18,4	75
148	MATRIX	H,2,8	76
149	MATRIX	H,1,8	77
150	MATRIX	H,1,8	78
151	MATRIX	H,4,8	79
152	MATRIX	H,1,8	80
153	MATRIX	H,3,8	81
159	MATRIX	H,3,8	82
160	MATRIX	H,3,8	83
161	MATRIX	H,3,8	84
154	MATRIX	H,3,8	85
155	MATRIX	H,2,8	86
133	MATRIX	H,7,8	87
134	MATRIX	H,7,8	88
135	MATRIX	H,7,8	89
136	MATRIX	H,7,8	90
137	MATRIX	H,7,8	91
138	MATRIX	H,7,8	92
139	MATRIX	H,7,8	93
140	MATRIX	H,7,8	94
141	MATRIX	H,7,8	95
142	MATRIX	H,7,8	96
143	MATRIX	H,5,8	97
156	MATRIX	H,5,8	98
144	MATRIX	H,4,8	99
145	MATRIX	H,1,8	100
146	MATRIX	H,1,8	101
147	MATRIX	H,2,8	102
DSTN	MATRIX	H,6,18	103
DSTNR	MATRIX	H,5,18	104
VFRAC	MATRIX	H,24,19	105
IFRAC	MATRIX	H,24,18	106
CATWT	MATRIX	H,4,7	107
VFRPT	MATRIX	H,18,3	108
IFRPT	MATRIX	H,18,3	109
ARSEP	MATRIX	H,16,11	110
DELAY	MATRIX	H,13,4	111
FACIL	MATRIX	X,63,3	112
1	MATRIX	X,28,5	113
2	MATRIX	X,20,4	114
3	MATRIX	X,16,4	115
4	MATRIX	X,4,4	116
5	MATRIX	X,4,4	117
6	MATRIX	X,8,4	118
7	MATRIX	X,8,2	119
8	MATRIX	X,4,2	120
9	MATRIX	X,4,2	121
10	MATRIX	X,16,4	122
11	MATRIX	X,4,4	123
12	MATRIX	X,12,4	124
13	MATRIX	X,12,2	125
14	MATRIX	X,8,4	126

Defines matrixes, rows and columns, size, and halfword or fullword.
Halfword allows entries up to $(2^{15} - 1)$.
Fullword allows entries up to $(2^{31} - 1)$.

INITIAL	MX\$FACIL(1-4,2),60300	127
INITIAL	MX\$FACIL(1-4,3),318	128
INITIAL	MX\$FACIL(5,2),72300	129
INITIAL	MX\$FACIL(5,3),402	130
INITIAL	MX\$FACIL(6-7,2),24600	131
INITIAL	MX\$FACIL(6-7,3),534	132
INITIAL	MX\$FACIL(8-11,2),28500	133
INITIAL	MX\$FACIL(8-11,3),1260	134
INITIAL	MX\$FACIL(12-16,2),23400	135
INITIAL	MX\$FACIL(12-16,3),900	136
INITIAL	MX\$FACIL(17-20,2),111900	137
INITIAL	MX\$FACIL(17-20,3),1920	138
INITIAL	MX\$FACIL(21-24,2),130500	139
INITIAL	MX\$FACIL(21-24,3),2580	140

Initializes the Facility Matrix with MTBFs and MTRs.

(continued)

// JOB 1324 LOGAN SIMULATION MARTIN STERNBERG-POWIDZKI

DATE 11/01/76,CLOCK 02/01/16

```
// ASSIGN SYS000,X'131'
// ASSIGN SYS001,X'131'
// ASSIGN SYS002,X'131'
// ASSIGN SYS003,X'131'
// DLBL IJSYS00,'SYSTEM WORK FILE NO. 0',0,SD
// EXTENT SYS000,999999,1,0,00020,00600
// DLBL INTER01,'SYSTEM WORK FILE NO. 0',0,SD
// EXTENT SYS000,999999,1,0,00020,00600
// DLBL IJSYS01,'SYSTEM WORK FILE NO. 1',0,SD
// EXTENT SYS001,999999,1,0,00620,01200
// DLBL SIMIN11,'SYSTEM WORK FILE NO. 1',0,SD
// EXTENT SYS001,999999,1,0,00620,01200
// DLBL IJSYS02,'SYSTEM WORK FILE NO. 2',0,SD
// EXTENT SYS002,999999,1,0,01820,00600
// DLBL SYMTAB1,'SYSTEM WORK FILE NO. 2',0,SD
// EXTENT SYS002,999999,1,0,01820,00600
// DLBL IJSYS03,'SYSTEM WORK FILE NO. 3',0,SD
// EXTENT SYS003,999999,1,0,02420,01200
// DLBL REPOG1,'SYSTEM WORK FILE NO. 3',0,SD
// EXTENT SYS003,999999,1,0,02420,01200
// EXEC DAR01V2
```

```
REALLOCATE XAC,300
REALLOCATE BLO,490
REALLOCATE FAC,0
REALLOCATE FSV,5
REALLOCATE VAR,31
REALLOCATE LOG,14
REALLOCATE CHA,4
REALLOCATE FUN,12
REALLOCATE FMS,15
REALLOCATE HMS,165
REALLOCATE GRP,0
REALLOCATE STO,0
REALLOCATE QUE,0
REALLOCATE TAB,0
REALLOCATE BVR,5
REALLOCATE HSV,45
```

1
2
3
4
5
6
7
8
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12
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14
15
16

BLOCK NUMBER	*LOC	OPERATION	A,B,C,D,E,F,G	COMMENTS	CARD NUMBER
		SIMULATE	30		17
	LDSCD	EQU	1(2),C	Assigns numbers to GPSS entity names.	18
	MINMA	EQU	1(14),M		19
	AIRO1	EQU	101(1),Y		20
	AIRO3	EQU	133(29),Y		21
	AIRO2	EQU	106(13),Y		22
	SPEED	EQU	1(4),Z		23
	DIRVL	EQU	1(5),Y		24
	1	MATRIX	H,18,13	Defines matrixes, rows and columns, size, and halfword or fullword. Halfword allows entries up to $(2^{15} - 1)$. Fullword allows entries up to $(2^{31} - 1)$.	25
	2	MATRIX	H,6,10		26
	4	MATRIX	H,6,10		27
	6	MATRIX	H,6,10		28
	8	MATRIX	H,6,10		29
	10	MATRIX	H,6,10		30
	12	MATRIX	H,6,10		31
	14	MATRIX	H,6,10		32
	16	MATRIX	H,6,10		33
	18	MATRIX	H,6,10		34
	20	MATRIX	H,6,10		35
	22	MATRIX	H,6,10		36
	24	MATRIX	H,6,10		37
	26	MATRIX	H,6,10		38
	28	MATRIX	H,6,10		39
	30	MATRIX	H,6,10		40
	32	MATRIX	H,6,10		41
	34	MATRIX	H,6,10		42
	3	MATRIX	H,6,14		43
	5	MATRIX	H,6,14		44
	7	MATRIX	H,6,14		45
	9	MATRIX	H,6,14		46
	11	MATRIX	H,6,14		47
	13	MATRIX	H,6,14		48
	15	MATRIX	H,6,14		49
	17	MATRIX	H,6,14		50
	19	MATRIX	H,6,14		51
	21	MATRIX	H,6,14		52
	23	MATRIX	H,6,14		53
	25	MATRIX	H,6,14		54
	27	MATRIX	H,6,14		55
	29	MATRIX	H,6,14		56

(continued)

APPENDIX A

PROGRAM PRINTOUT

TYPEA } Variables used to assign an aircraft type based on the aircraft
 TYPED } destination
 VISAB - Variable used to vary the visibility ± 0.25 miles
 VISAT - Variable used to convert minima matrix entry into miles of
 visibility
 WTCHG - Variable used to determine the number of minutes until the
 next major weather change
 WTVAR - Variable used to determine the number of minutes until the
 next minor weather variation.

6.8 SAVEVALUE SYMBOLS

LEDTM - Dummy counter used to store lead aircraft landing time
 LNDTM - Dummy counter used to store approach aircraft landing time
 TESS - Dummy counter used to store wind direction
 TMCTR - Dummy counter used to store aircraft landing time
 TRLTM - Dummy counter used to store trailing aircraft landing time.

6.7 VARIABLE SYMBOLS

APPCT - Dummy variable used to store row number of minima matrix based on aircraft category

ARSEP - Variable used to calculate separation between lead aircraft and aircraft of interest

CEIL - Variable used to modify ceiling ± 50 feet

CEILO - Variable used to modify ceiling ± 150 feet

CEILT - Variable used to convert minima matrix entry into feet of ceiling

CLOCK - Variable which converts the computer clock time into simulated hour in the day

DELAY - Variable used to determine if an aircraft has experienced any delay

DELTN }
DELT1 } Variables used to determine elapsed time between aircraft arrivals
DELT2 }

DESTN }
DEST1 } Variables used to determine aircraft destination

DIRWN - Dummy variable used to square difference between wind direction and runway direction

LNDSP - Variable used to calculate the approaching aircraft distance from touch down

MORWN - Dummy variable used to change the sign of the wind direction off the runway direction

MOD - Variable used to calculate the turnaround time of a landing aircraft

MTBF - Variable used to determine the minutes until next failure for a facility

MTTR - Variable used to determine the minutes required to repair a downed facility

SEPAR - Variable used to calculate separation between aircraft of interest and trailing aircraft

SPRED - Variable used to put a spread on the variable MOD

TAKDY - Variable used to determine if an aircraft experienced any delay during takeoff

TOF - Variable used to calculate the time of flight of an aircraft in a radar environment

TOFNR - Variable used to calculate the time of flight of an aircraft in a non-radar environment

PMFTY - Function randomly chooses between 50 and 150
PMOFY - Function randomly chooses between 150 and 300
SPEED - Function defines speed of aircraft based on aircraft type
VISAB - Function converts column number to visibility in miles
WNVEL - Function converts column number to wind velocity.

6.5 CHAIN SYMBOLS

HDARC - Hold area chain
LDSCD - Landing schedule chain (1 - primary runway, 2 - secondary runway)
TAKOF - Departure chain.

6.6 LOGIC SWITCH SYMBOLS

ARCGO - Logic switch is set when air control can accept aircraft
CHANG - Logic switch is set when there is a change in facility status or weather
CLRD - Logic switch is set when aircraft is allowed to take off
ENTER - Logic switch is set when an aircraft is in the hold area
FCHAN - Logic switch is set when there is a change in facility status
FINI1 - Logic switch which allows only one transaction at a time to examine the landing schedule.
FINI2 - Logic switch prevents next generated aircraft into the system until previous aircraft is in the system
FINI3 - Logic switch used to hold an aircraft transaction until trail aircraft statistics are gathered
FINI4 - Logic switch used to hold an aircraft transaction until lead aircraft statistics are gathered
FINI5 - Logic switch used to allow aircraft into the landing schedule before air control checks next aircraft
FINI6 - Logic switch prevents generation of aircraft until all facilities are created
LNDSP - Logic switch prevents aircraft takeoff on land runway until landing aircraft has cleared
TAKOF - Logic switch is set when proper separation is experienced between taking off aircraft.

RADOW - Last row in separation matrix
 RUNWY - The number of runways at Logan
 TAKCL - Maximum takeoff ceiling
 TAKOF - Departing aircraft counter
 TAKQII - Maximum number of aircraft in takeoff queue before landing separation increases
 TAKVS - Minimum takeoff visibility
 TOF - Time of flight from holding fix or secondary airport to Logan
 TRLVL - Dummy counter used to store trailing aircraft velocity
 TRLWT - Dummy counter used to store trailing aircraft weight
 TYPCT - Dummy counter used in the generation of aircraft
 VFRWT - Dummy counter is equal to zero in IFR and one in VFR conditions
 VISAB - Present visibility in miles
 VISAP - Present visibility in column number
 VISAT - Dummy counter used to manipulate the visibility
 WNDIR - Present wind direction in degrees
 WNMAX - Wind speed above which aircraft land on runway closest to the wind
 WNVEL - Present wind velocity
 WTCHG - Mean time between major weather change
 WTVAR - Mean time between minor weather change.

6.3 BOOLEAN VARIABLE SYMBOLS

CLRD - Boolean variable used to find approaching aircraft
 LEDAC - Boolean variable used to find lead aircraft
 TRLAC - Boolean variable used to find trailing aircraft
 WEATH - Boolean variable used to determine if weather is below minimum for approach in question.

6.4 FUNCTION SYMBOLS

CEIL - Function converts column number to ceiling in feet
 LOGRN - Function converts random number into a logarithm of the random number
 MODSP - Function defines the modifier and spread of aircraft turnaround time

Fullword

FACIL - Define facilities by number, MTBF, MTTR, and current status.
MINMA - Contains minima for each airport runway and approach.

6.2 HALFWORD SAVEVALUE SYMBOLS

ACCTR - Accumulator used to count aircraft going to Logan
ACNUM - Counts aircraft created
AIRPT - Number of holding fixes and secondary airports
ARCGO - Counter used to count number of aircraft under air control
ARSEP - Pointer used to determine which row of the separation matrix is in use
CALM - Maximum wind speed for calm
CEIL - Present ceiling in feet
CEILP - Present ceiling column number
CEILT - Dummy counter used to manipulate the ceiling
DAYEN - End of day, time, for weather determination
DAYST - Start of day, time, for weather determination
DIRWN - Dummy counter used to manipulate the wind direction and runway direction
DIVRT - Number, out of 1000 aircraft, that divert to Logan from secondary airport
ERROR - Dummy counter used to bomb model if an impossible situation exists
FACIL - Number of facilities modeled
HOLD - Number of Logan holding fixes
IFRWT - Dummy counter is equal to zero in VFR and one if IFR conditions
LEDWT - Dummy counter used to store the lead aircraft's weight
LNDSP - Separation in miles between landing and taking off aircraft
LNDST - Separation increase if takeoff queue is greater than TAKQU
LNDVL - Dummy counter used to store the approach aircraft's landing velocity
MAXTM - Maximum holding time
MNONE - Dummy input
NORAD - Row number in the separation matrix where no radar condition exists

CHAPTER SIX

SYMBOLS

All symbols, variables, and matrices appear in the program listing, shown in Appendix A, and are summarized in this chapter for convenience.

6.1 MATRIX SAVEVALUES

Halfword

- DSTN - Contains distance from holding fixes and secondary airports to Logan runway thresholds, radar environment.
- DSTNR - Same as DSTN, but for all radar facilities down.
- VFRAC - Contains cumulative probabilities for aircraft assignment to Logan holding fixes and secondary airports. Also, in last column, contains aircraft arrival rates. VFR conditions.
- IFRAC - Same as VFRAC, except IFR conditions.
- CATWT - Contains cumulative probabilities for assignment of aircraft weight and landing categories, by aircraft user type.
- VFRPT - Contains cumulative probabilities for assignment of aircraft type, given the destination, VFR.
- IFRPT - Same as VFRPT, except IFR conditions.
- DIRVL - Contains cumulative probabilities to assign wind direction and speed.
- DELAY - Output delay matrix.
- ARSEP - Contains nominal and incremental trail separation distances as a function of radar status. Also contains numbers of aircraft a controller can handle.
- AlRO1 }
AlRO2 } Contain airport definition data, facilities required for
AlRO3 } approaches, and approach definitions.

MATRIX FULLWORD SAVEVALUE FACIL		
		COLUMN 1
ROW 1		1
2		1
3		1
4		1
5		1
6		1
7		1
8		1
9		1
10		1
11		1
12		1
13		1
14		1
15		1
16		1
17		1
18		1
19		1
20		1
21		1
22		1
23		1
24		1
25		1
26		1
27		1
28		1
29		1
30		1
31		1
32		1
33		1
34		1
35		1
36		1
37		0
38		1
39		1
40		1
41		1
42		1
43		1
44		1
45		1
46		1
47		1
48		1
49		1
50		1
51		1
52		1
53		1
54		1
55		1
56		1
57		1
58		1
59		1
60		1
61		1
62		1
63		1

Figure 5-17. MATRIX FACIL

USER CHAIN	TOTAL ENTRIES	AVERAGE TIME/TRANS	CURRENT CONTENTS	AVERAGE CONTENTS	MAXIMUM CONTENTS
LCSCD	57661	.258	1	10.363	20
HDZPC	665	7.458		3.444	34
TAKCF	568	2.528		1.032	9

Figure 5-15. USER CHAIN DATA

CONTENTS OF HALFWORD SAVEVALUES (NON-ZERO)											
SAVEVALUE	NR. VALUE	NR. VALUE	NR. VALUE	NR. VALUE	NR. VALUE	NR. VALUE	NR. VALUE	NR. VALUE	NR. VALUE	NR. VALUE	NR. VALUE
RUNNY	5	DIVRT	500	ATPPT	18	HOLD	5	NORAD	15	RADDW	16
MAXTY	30	TAKOU	3	LNDST	5	MNONE	-1	LNDSP	2	TAKVS	100
TYPCT	2	IFRNT	1	DIPWN	-70	LNDVL	129	CEILT	467	VISAT	150
VISAB	150	ARSEP	9	ACNUM	751	ACCTS	665	ARCGD	1	TAKOF	588
										DUMMY	2
										LEOHT	3

Figure 5-16. NON-ZERO HALFWORD SAVEVALUES

A complete list of halfword savevalues is given in Chapter Six. The Matrix FACIL inputs the MTBF and MTR for each facility. Column 1 is the present status of each facility -- 1 indicates facility operational; 0 indicates facility down. This matrix is shown in Figure 5-17.

5.3 RESTRICTIONS AND/OR LIMITATIONS

The basic cycling interval for the UDCM is one minute. This means that every clock GPSS pulse is interpreted as one minute of simulated real time. The use of a one-minute clock implies an analytic error in calculation because all calculations involving time are integer quantities. For example, any calculation, such as a distance divided by a speed, will truncate downward to the next lower integer, and all times between 4.0 and 4.999 minutes, for example, will be interpreted as 4 minutes. Thus the same time of flight would be obtained over a range of distances and/or velocities. Obviously, then, some error is built into the model. This could be reduced by allowing one clock pulse to stand for .1 or .01 minute, or any other fraction of a minute. Such reduction would, however, increase the model's already tight core constraints, since, in order to obtain runs of any reasonable simulated duration, the halfword savevalues and matrices would have to be increased to fullword values.

5.4 EDITING AND DIAGNOSTICS

With the exception of the ERR statement, which is used for debug purposes in the takeoff and landing schedules, all error outputs and program diagnostics are standard GPSS. When the error statement is reached in the model the UDCM stops and prints output error statistics. It is only reached when an anomaly exists in the model logic, i.e., when a transaction twin* cannot be found.

*A transaction twin is an exact duplicate of a GPSS transaction.

Block printout prints, for each GPSS statement number, the number of transactions currently at each block, and the total number of transactions passing through that block.

BLOCK COUNTS		451 TO		466 BLOCK		1 TERMINATIONS TO GO		1		TOTAL		BLOCK CURRENT		TOTAL		BLOCK CURRENT		TOTAL		BLOCK CURRENT		TOTAL	
BLOCK COUNTS		451 TO		466 BLOCK		1 TERMINATIONS TO GO		1		TOTAL		BLOCK CURRENT		TOTAL		BLOCK CURRENT		TOTAL		BLOCK CURRENT		TOTAL	
1	0	1	1	11	0	1	21	0	1	31	0	31	0	1	41	0	41	0	7	0	0	0	0
2	0	1	1	12	0	1	22	0	1	32	0	32	0	1	42	0	42	0	7	0	0	0	0
3	0	2	1	13	0	6	23	0	1	33	0	33	0	0	43	0	43	0	1	0	0	0	0
4	0	1	1	14	0	1	24	0	1	34	0	34	0	0	44	0	44	0	1	0	0	0	0
5	0	1	1	15	0	1	25	0	1	35	0	35	0	0	45	0	45	0	1	0	0	0	0
6	0	1	1	16	0	2	26	0	1	36	0	36	0	1	46	0	46	0	1	0	0	0	0
7	0	1	1	17	0	2	27	0	1	37	0	37	0	1	47	0	47	0	1	0	0	0	0
8	0	0	0	18	0	2	28	0	1	38	0	38	0	1	48	0	48	0	1	0	0	0	0
9	0	0	0	19	0	1	29	0	1	39	0	39	0	1	49	0	49	0	1	0	0	0	0
10	0	0	0	20	0	1	30	0	1	40	0	40	0	1	50	0	50	0	1	0	0	0	0
51	0	1	1	61	0	0	71	0	0	81	0	81	0	0	91	0	91	0	0	0	0	0	0
52	0	1	1	62	0	0	72	0	0	82	0	82	0	0	92	0	92	0	0	0	0	0	0
53	0	1	1	63	0	0	73	0	0	83	0	83	0	0	93	0	93	0	0	0	0	0	0
54	0	1	1	64	0	0	74	0	0	84	0	84	0	0	94	0	94	0	0	0	0	0	0
55	0	1	1	65	0	0	75	0	0	85	0	85	0	0	95	0	95	0	0	0	0	0	0
56	0	1	1	66	0	1	76	0	1	86	0	86	0	1	96	0	96	0	0	0	0	0	0
57	0	1	1	67	0	1	77	0	1	87	0	87	0	1	97	0	97	0	0	0	0	0	0
58	0	0	0	68	0	1	78	0	1	88	0	88	0	1	98	0	98	0	0	0	0	0	0
59	0	1	1	69	0	1	79	0	1	89	0	89	0	1	99	0	99	0	0	0	0	0	0
60	0	1	1	70	0	1	80	0	1	90	0	90	0	1	100	0	100	0	0	0	0	0	0
101	0	0	0	111	0	0	121	0	0	131	0	131	0	0	141	0	141	0	0	0	0	0	0
102	0	0	0	112	0	0	122	0	0	132	0	132	0	0	142	0	142	0	0	0	0	0	0
103	0	0	0	113	0	0	123	0	0	133	0	133	0	0	143	0	143	0	0	0	0	0	0
104	0	0	0	114	0	0	124	0	0	134	0	134	0	0	144	0	144	0	0	0	0	0	0
105	0	0	0	115	0	0	125	0	0	135	0	135	0	0	145	0	145	0	0	0	0	0	0
106	0	0	0	116	0	0	126	0	0	136	0	136	0	0	146	0	146	0	0	0	0	0	0
107	0	0	0	117	0	0	127	0	0	137	0	137	0	0	147	0	147	0	0	0	0	0	0
108	0	0	0	118	0	0	128	0	0	138	0	138	0	0	148	0	148	0	0	0	0	0	0
109	0	0	0	119	0	0	129	0	0	139	0	139	0	0	149	0	149	0	0	0	0	0	0
110	0	0	0	120	0	0	130	0	0	140	0	140	0	0	150	0	150	0	0	0	0	0	0
151	0	0	0	161	0	0	171	0	0	181	0	181	0	0	191	0	191	0	0	0	0	0	0
152	0	0	0	162	0	0	172	0	0	182	0	182	0	0	192	0	192	0	0	0	0	0	0
153	0	0	0	163	0	0	173	0	0	183	0	183	0	0	193	0	193	0	0	0	0	0	0
154	0	0	0	164	0	0	174	0	0	184	0	184	0	0	194	0	194	0	0	0	0	0	0
155	0	0	0	165	0	0	175	0	0	185	0	185	0	0	195	0	195	0	0	0	0	0	0
156	0	0	0	166	0	0	176	0	0	186	0	186	0	0	196	0	196	0	0	0	0	0	0
157	0	0	0	167	0	0	177	0	0	187	0	187	0	0	197	0	197	0	0	0	0	0	0
158	0	0	0	168	0	0	178	0	0	188	0	188	0	0	198	0	198	0	0	0	0	0	0
159	0	0	0	169	0	0	179	0	0	189	0	189	0	0	199	0	199	0	0	0	0	0	0
160	0	0	0	170	0	0	180	0	0	190	0	190	0	0	200	0	200	0	0	0	0	0	0
201	0	0	0	211	0	0	221	0	0	231	0	231	0	0	241	0	241	0	0	0	0	0	0
202	0	0	0	212	0	0	222	0	0	232	0	232	0	0	242	0	242	0	0	0	0	0	0
203	0	0	0	213	0	0	223	0	0	233	0	233	0	0	243	0	243	0	0	0	0	0	0
204	0	0	0	214	0	0	224	0	0	234	0	234	0	0	244	0	244	0	0	0	0	0	0
205	0	0	0	215	0	0	225	0	0	235	0	235	0	0	245	0	245	0	0	0	0	0	0
206	0	1	1	216	0	0	226	0	0	236	0	236	0	0	246	0	246	0	0	0	0	0	0
207	0	1	1	217	0	0	227	0	0	237	0	237	0	0	247	0	247	0	0	0	0	0	0
208	0	1	1	218	0	0	228	0	0	238	0	238	0	0	248	0	248	0	0	0	0	0	0
209	1	1	1	219	0	0	229	0	0	239	0	239	0	0	249	0	249	0	0	0	0	0	0
210	0	0	0	220	0	0	230	0	0	240	0	240	0	0	250	0	250	0	0	0	0	0	0

Figure 5-14. BLOCK COUNTS

5.2.1 Delay Data

The delay matrix and its contents were described and discussed in Section 3.6, Chapter Three.

5.2.2 Program Administrative Data

Block Counts (Figure 5-14) show the number of transactions that passed through each block in the model. The figure gives the number of transactions that passed through the block, under the "TOTAL" columns, and the number of transactions presently at the block, under the columns labelled "CURRENT".

User Chain Data (Figure 5-15) is an example of this printout. Three user chains, or queues, are shown. Four may actually appear, depending on events within the program. The user chain identified as "LDSCD" is the landing schedule for the primary runway. If a secondary runway were used during a program run, the symbol "2" would be printed under LDSCD -- this is the fourth possible chain. HDARC is the user chain used for the holding fixes; TAKOF represents the take-off queue.

The column labelled "AVERAGE TIME/TRANS" gives the average time the transaction remains in the queue. The very low time associated with LDSCD is, again, reflective of the fact that a transaction may be placed on the chain several times before a vacancy is found. For the other two chains these numbers may be thought of as average waiting times, with one proviso. The HDARC queue is not as active as LDSCD; nonetheless, the same transaction may appear more than once on their chain. Only TAKOF has the property that a transaction can enter only once.

The column labelled "CURRENT CONTENTS" is self explanatory, as are the columns labelled "AVERAGE CONTENTS" and "MAXIMUM CONTENTS".

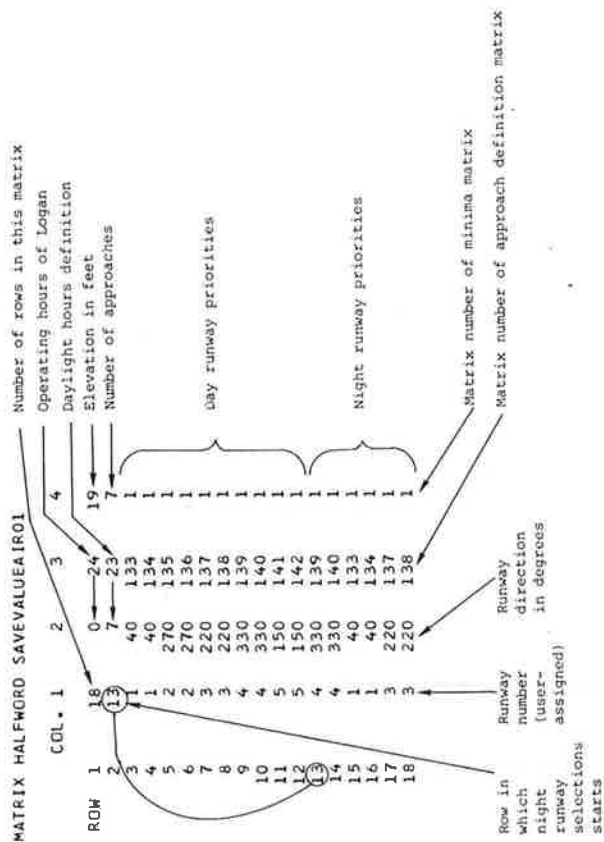
5.2.3 Current Contents of Program Parameters

Figure 5-16 is a typical printout of program parameters. The output "Contents of Halfword Savevalues" gives the present value of all non-zero halfword savevalues.* Most of these outputs are input data or dummy counters used in the model; however, the user may input savevalues of his own to gather data of interest. The following is a partial list of outputs of interest:

ARSEP - Row of present separation assignment
WDIR - Wind direction in degrees at current clock time
WNVEL - Wind velocity in knots at current clock time
VISAB - Visibility in (miles/100) at current clock time
ACNOM - Number of aircraft created
ACCTR - Number of aircraft landing at primary airport
ARCGO - Number of aircraft under air control at current clock time
TAKOF - Number of aircraft that took off.

*A halfword savevalue is a GPSS term for a 2-byte program variable.

Logan Definition Matrix



Airport Definition Matrix (General Case)				
Column	1	2	3	4
Row	1	2	3	4
1	Number of Rows (n)	Opening Time	Closing Time	Elevation (in feet)
2	Night Runways (M)	Day Start	Night Start	Number of Approaches
3	Runway Number (Consecutive)	Runway Direction (Degrees)	Approach Matrix Number	Minima Matrix Number
...	...	...	...	...
M-1	...	...	...	...
M	...	...	...	...
...	...	...	...	...
n	...	...	...	...

Figure 5-13. FIELD DEFINITION MATRIX

5.1.12 Table of Trail Separation and Numbers of Aircraft per Controller

Table 3-2 in Chapter Three lists the data used in this model. Figure 5-12 shows the same data as an input matrix.

MATRIX HALFWORD SAVEVALUEARSEP

	COL. 1	2	3	4	5	6	7	8	9	10	11	
Radar Conditions	1	37	39	40	38	3	1	2	3	0	1	20
	2	37	39	40	0	3	1	2	3	0	1	20
	3	37	39	0	38	3	1	2	3	0	1	16
	4	37	39	0	0	3	1	2	3	0	1	16
	5	37	0	40	38	4	0	1	2	0	0	10
	6	37	0	40	0	4	0	1	2	0	0	10
	7	37	0	0	38	4	0	1	2	0	0	12
	8	37	0	0	0	4	0	1	2	0	0	12
Non-Radar Conditions	9	0	39	40	38	3	1	2	3	0	1	20
	10	0	39	40	0	3	1	2	3	0	1	20
	11	0	39	0	38	5	0	0	1	0	0	16
	12	0	39	0	0	5	0	0	1	0	0	16
	13	0	0	40	38	5	0	0	1	0	0	10
	14	0	0	0	38	5	0	0	1	0	0	8
	15	0	0	40	0	12	0	0	1	0	0	10
	16	0	0	0	0	12	0	0	1	0	0	8
	Equipment required up to determine which separation criteria to use (row number)				Required separation in miles	Additional separation in miles for various weights of aircraft				Number of aircraft air control can handle at one time		

Figure 5-12. SEPARATION MATRIX

5.1.13 Airport Definition Data

Figure 5-13 displays the matrix used by the model to define the airport layout. Two different matrix formats are used, one for a principal airport such as Logan, and another for the secondary airports. The matrices are self-explanatory. One note of importance is that the field elevation number is used in conjunction with the minima tables to determine ceiling heights above the ground.

5.2 MODEL OUTPUTS

As was mentioned in Chapter Three, the model produces three kinds of output data:

- Output data of the run; i.e., delay data
- Program administrative data
- Current values of program parameters.

MATRIX FULLWORD SAVEVALUE FACIL

ROW	Facility Number	COLUMN			MTBF in minutes		MTTR in minutes	
		1	2	3				
1		1	60300	318				
2		1	60300	318				
3		1	60300	318				
4		1	60300	318				
5		1	72300	402				
6		1	24600	534				
7		1	24600	534				
8		1	28500	1260				
9		1	28500	1260				
10		1	28500	1260				
11		1	28500	1260				
12		1	23400	900				
13		1	23400	900				
14		0	23400	900				
15		0	23400	900				
16		0	23400	900				
17		0	111900	1920				
18		0	111900	1920				
19		0	111900	1920				
20		0	111900	1920				
21		0	130500	2580				
22		0	130500	2580				
23		0	130500	2580				
24		0	130500	2580				
25		0	2100000	660				
26		0	2100000	660				
27		0	2100000	660				
28		0	2100000	660				
29		0	2100000	660				
30		0	2100000	660				
31		0	2100000	660				
32		0	2100000	660				
33		0	2100000	660				
34		0	2100000	660				
35		0	2100000	660				
36		0	24600	534				
37		0	36300	96				
38		0	5160	180				
39		0	29100	120				
40		0	20100	114				
41		0	25200	780				
42		0	25200	780				
43		0	25200	780				
44		0	25200	780				
45		0	25200	780				
46		0	25200	780				
47		0	25200	780				
48		0	25200	780				
49		0	2100000	616				
50		0	2100000	616				
51		0	2100000	660				
52		0	2100000	660				
53		0	2100000	660				
54		0	25200	780				
55		0	25200	780				
56		0	25200	780				
57		0	25200	780				
58		0	25200	780				
59		0	25200	780				
60		0	25200	780				
61		0	25200	780				
62		0	25200	780				
63		0	25200	780				

Facility Status Matrix

Figure 5-11. FACILITY STATUS FILE

5.1.11 MTBF and MTTR for Facility Status File

These two failure and repair parameters are required for each of the following facilities or functions. Table 5-8* shows the facilities carried in the Facility Status File. Figure 5-11 shows the program matrix.

Table 5-8. FACILITY FILE									
Facility Number	Type	Location	ID	Frequency	Facility Number	Type	Location	ID	Frequency
1	VOR	Lawrence	LWM	112.0	33	SDF	Beverly	BVY	108.7
2	VOR	Whitman	HTM	109.0	34	SDF	Norwood	OWD	108.3
3	VOR	Manchester	MHT	114.2	35	NDB	Boston	SEW	382
4	VOR	Boston	BOS	112.7	36	TACAN	S. Weymouth	IAF	Ch.67
5	DME	Whitman		Ch.27	37	ASR	Boston		
6	DME	Manchester		Ch.89	38	ARSR	Boston		
7	DME	Boston		Ch.74	39	SECRA	Boston		
8	GS	Bedford			40	ARTS-3	Boston		
9	GS	Boston 15R			41	HIRL	Lawrence 5		
10	GS	Boston 4R			42	HIRL	Lawrence 23		
11	GS	Boston 33L			43	HIRL	Boston 4R		
12	LOC	Bedford	I-BED	109.5	44	HIRL	Boston 22L		
13	LOC	Lawrence	I-LWM	111.7	45	HIRL	Boston 15R		
14	LOC	Boston 15R	I-MDC	110.7	46	HIRL	Boston 33L		
15	LOC	Boston 4R	I-BOS	110.3	47	HIRL	Boston 9		
16	LOC	Boston 33L	I-LIP	110.7	48	HIRL	Boston 27		
17	LOM	Bedford	BE	332	49	FDEA	Boston		
18	LOM	Boston 15R	MD	375	50	DEDS	Boston		
19	LOM	Boston 4R	BO	221	51	FM	Beverly		
20	LOM	Boston 33L	LI	346	52	FM	Norwood		
21	MM	Bedford			53	NDB	Bedford	SKR	251
22	MM	Boston 15R			54	HIRL	Lawrence 5		
23	MM	Boston 4R			55	HIRL	Lawrence 23		
24	MM	Boston 22L			56	ALS	Boston 4R		
25	NDB	Beverly	TOF	269	57	ALS	Boston 33L		
26	NDB	Devens	DKO	352	58	HIRL	S. Weymouth 8		
27	NDB	S. Weymouth	IAF	236	59	HIRL	S. Weymouth 26		
28	NDB	Tew-Mac	HRX	402	60	HIRL	S. Weymouth 17		
29	NDB	Taunton	TAN	227	61	HIRL	S. Weymouth 35		
30	NDB	Plymouth	PYM	257	62	ALS	S. Weymouth 26		
31	NDB	Norwood	SOG	201	63	HIRL	Bedford 22		
32	NDB	Fitchburg	FIT	206					

*The data source is "Air Navigation and Air Traffic Control Facility Performance and Availability" (RIS:SM 6040-20), Report for Calendar Year 1975, prepared by the Airways Facilities Service, FAA, Washington, D.C.

Table 5-7. FACILITY-APPROACH DEFINITIONS -- BOSTON (LOGAN), RUNWAY 4R									
Facility	ID	Frequency	Approach Type						
			1	2	3	4	5	6	7
			VOR	VOR DME	ILS	LOC	NDB	LOC BC	ASR
LOC	I-BOS	110.3	0	0	15	15	0	15	0
LOC	I-LIP	110.7	0	0	0	0	0	0	0
LOC	I-MDC	110.7	0	0	0	0	0	0	0
GS			0	0	0	0	0	0	0
GS			0	0	10	0	0	0	0
GS			0	0	0	0	0	0	0
VOR	HTM	109.0	2	0	0	0	0	0	0
VOR	BOS	112.7	4	4	0	0	0	0	0
VOR	LWM	112.0	0	0	0	0	0	0	0
VOR	MHT	114.2	0	0	0	0	0	0	0
DME	BOS	Ch.27	0	7	7	7	0	7	0
NDB	SEW	382	0	0	0	0	35	35	0
ASR-7			0	0	0	0	0	0	37
LOM			0	0	19	0	19	0	0
MM			0	0	23	23	0	0	0
ALS			0	0	56	56	56	0	0
HIRL			0	0	43	43	0	0	0

MATRIX HALFWORD SAVEVALUEAIR03

		COL. 1	2	3	4	5	6	7	8	Approach Definition Matrixes (matrix AIR03 to matrix 161)
ROW Approaches { 1 2 3 4 5 6 7	1	2	4	0	0	0	0	0	0	
	2	4	7	0	0	0	0	0	0	
	3	15	10	7	0	19	23	56	43	
	4	15	7	0	0	0	0	56	43	
	5	35	0	0	0	19	0	56	0	
	6	15	7	35	0	0	0	0	0	
	7	37	0	0	0	0	0	0	0	
		Facility number required up for approach to be used				Outer marker facility number (if required by approach)	Middle marker facility number (if required by approach)	ALS facility number (if required by approach)	HIRL facility number (if required by approach)	

Figure 5-10. APPROACH DEFINITION MATRIX

MATRIX FULLWORD SAVEVALUE MINMA

ROW	COLUMN					Runway Number	(22L)	(33L)	(15R)
	1	2	3	4	5				
VOR 1	1	680100	460100	680100	680100	680100	680100	680100	680100
	2	680100	460100	680100	680100	680100	680100	680100	680100
	3	820150	460100	820150	820150	820150	820150	820150	820150
	4	820200	460100	820200	820200	820200	820200	820200	820200
VOR 2	5	680100	680100	680100	680100	680100	680100	680100	780100
	6	680100	680100	680100	680100	680100	680100	680100	780125
	7	820150	820150	820150	820150	820150	820150	820150	780150
	8	820200	820200	820200	820200	820200	820200	820200	780175
ILS 3	9	216050	680100	680100	680100	680100	680100	680100	268075
	10	216050	680100	680100	680100	680100	680100	680100	268075
	11	216050	820150	820150	820150	820150	820150	820150	268075
	12	216050	820200	820200	820200	820200	820200	820200	268075
LOC 4	13	460075	680100	680100	680100	680100	680100	680100	580100
	14	460075	680100	680100	680100	680100	680100	680100	580100
	15	460075	820150	820150	820150	820150	820150	820150	580100
	16	460075	820200	820200	820200	820200	820200	820200	580125
NDB 5	17	680100	680100	680100	680100	680100	680100	680100	680100
	18	680100	680100	680100	680100	680100	680100	680100	680100
	19	820150	820150	820150	820150	820150	820150	820150	820150
	20	820200	820200	820200	820200	820200	820200	820200	820200
LOC 6 BC	21	680100	680100	680100	680100	680100	680100	680100	680100
	22	680100	680100	680100	680100	680100	680100	680100	680100
	23	820150	820150	820150	820150	820150	820150	820150	820150
	24	820200	820200	820200	820200	820200	820200	820200	820200
ASR 7	25	620050	460100	460100	460100	460100	460050	800100	800100
	26	620050	460100	460100	460100	460050	460050	800175	800175
	27	620050	460100	460100	460100	460050	460050	800150	800150
	28	620100	460100	460100	460100	460100	460100	800175	800175
Approach Type	A/C Category	Minimum ceiling requirement (in feet)							Minimum visibility requirement (in 100ths of a mile)

Minimum ceiling requirement (in feet)

Logan Minima Matrix

Figure 5-9. LANDING APPROACH MINIMA

Table 5-6. RUNWAY APPROACH MINIMA						
Approach	Runway					Approach Category
	27	22L	33L	4R	15R	
VOR	460 - 1	680 - 1	680 - 01	680 - 01	680 - 1	A
	460 - 1	680 - 1	680 - 01	680 - 01	680 - 1	B
	460 - 1	820 - 1-1/2	820 - 1-1/2	820 - 1-1/2	820 - 1-1/2	C
	460 - 1	820 - 2	820 - 2	820 - 2	820 - 2	D
VOR DME	680 - 1	560 - 1	560 - 1	560 - 1	780 - 1	A
	680 - 1	560 - 1	560 - 1	560 - 1	780 - 1-1/4	B
	820 - 1-1/2	560 - 1	560 - 1	560 - 1	780 - 1-1/2	C
	820 - 2	560 - 1-1/4	560 - 1-1/2	560 - 1-1/2	780 - 1-3/4	D
ILS	680 - 1	680 - 1	680 - 1	216 - 1/2	268 - 3/4	A
	680 - 1	680 - 1	680 - 1	216 - 1/2	268 - 3/4	B
	820 - 1-1/2	820 - 1-1/2	820 - 1-1/2	216 - 1/2	268 - 3/4	C
	820 - 2	820 - 2	820 - 2	216 - 1/2	268 - 3/4	D
LOC	680 - 1	680 - 1	820 - 2	466 - 3/4	580 - 1	A
	680 - 1	680 - 1	820 - 2	466 - 3/4	580 - 1	B
	820 - 1-1/2	820 - 1-1/2	820 - 2	466 - 3/4	580 - 1	C
	820 - 2	820 - 2	820 - 2	466 - 3/4	580 - 1-1/4	D
NDB	680 - 1	680 - 1	680 - 1	680 - 1	680 - 1	A
	680 - 1	680 - 1	680 - 1	680 - 1	680 - 1	B
	820 - 1-1/2	820 - 1-1/2	820 - 1-1/2	820 - 1-1/2	820 - 1-1/2	C
	820 - 2	820 - 2	820 - 2	820 - 2	820 - 2	D
LOC BC	680 - 1	420 - 1	420 - 1	420 - 1	420 - 1	A
	680 - 1	420 - 1	420 - 1	420 - 1	420 - 1	B
	820 - 1-1/2	420 - 1	420 - 1	420 - 1	420 - 1	C
	820 - 2	420 - 1	420 - 1	420 - 1	420 - 1	D
ASR	460 - 1	540 - 1	480 - 1/2	620 - 1/2	800 - 1	A
	460 - 1	540 - 1	480 - 1/2	620 - 1/2	800 - 1-3/4	B
	460 - 1	540 - 1	480 - 1/2	620 - 1/2	800 - 1-1/2	C
	460 - 1	540 - 1-1/4	480 - 1	620 - 1	800 - 1-3/4	D

It is possible that a different set of facilities may define the same approach on the same runway. For example, when lacking a DME, the necessary fixes can be established either with another DME or from bearing information solely. For this reason, the model contains more than one matrix of the form of Figure 5-10. The separate entries are a requirement to maintain unique program look-up logic.

MATRIX HALFWORD SAVEVALUE DSTN

	COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
ROW 1	26	49	39	55	26	15	14	38	49	27	34	31	27	28	31	28	45	24
2	38	39	39	38	36	38	21	62	55	38	45	31	35	38	42	28	45	35
3	26	38	46	26	43	28	14	49	45	27	55	41	27	48	52	38	55	24
4	19	18	29	25	39	45	35	66	62	51	34	21	48	28	31	17	34	45
5	27	38	29	44	27	15	24	38	48	28	42	55	38	28	58	38	52	17

Same as DSTN matrix

Figure 5-7. DISTANCE TABLE HOLDING FIXES AND SECONDARY AIRPORTS TO PRIMARY AIRPORT - RADAR DOWN

MATRIX HALFWORD SAVEVALUE DSTN

	COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
ROW 1	4	34	25	19	31	49	27	36	46	46	22	29	55	12	33	14	30	38
2	27	39	45	41	18	33	16	22	37	31	25	22	34	12	33	14	30	38
3	22	33	45	41	20	26	26	16	38	43	23	47	28	43	45	35	49	24
4	33	50	29	25	20	44	43	35	68	63	43	29	40	26	29	30	32	49
5	15	25	32	47	41	26	16	22	37	31	25	36	51	34	55	35	52	17
6	101	101	101	101	101	106	107	108	109	110	111	112	113	114	115	116	117	118

Airport
definition
matrix
number (Row)

Distance from hold area/secondary airport to Logan in a radar environment

Column Headings

1	Manjo	10	Lawrence
2	Millis	11	Mansfield
3	Bridgewater	12	Marshfield
4	Skipper	13	Newburyport
5	LWM	14	Norwood
6	Bedford	15	Plymouth
7	Beverly	16	S. Weymouth
8	Fitchburg	17	Taunton
9	Ft. Devens	18	Tew-Mac

Figure 5-8. DISTANCE TABLE HOLDING FIXES AND SECONDARY AIRPORTS TO PRIMARY AIRPORT - RADAR UP

MATRIX HALFWORD SAVEVALUECATWT

		COL. 1	2	3	4	5	6	7		
A/C Type	ROW	1	0	0	787	1000	0	787	1000	Air Carrier
		2	0	1000	1000	1000	0	1000	1000	Air Taxi
		3	1000	1000	1000	1000	1000	1000	1000	General Aviation
		4	300	500	1000	1000	500	1000	1000	Military
		Approach Category				Weight Class				

Matrix is used to define aircraft category and weight, once type has been determined.

Figure 5-6. CUMULATIVE FREQUENCY DISTRIBUTION OF AIRCRAFT APPROACH CATEGORIES AND WEIGHT CLASSES

5.1.8 Distances from Secondary Airports to Logan

The distances from the secondary airports to Logan are also shown in Figures 5-7 and 5-8.

5.1.9 Minima for Each Approach Serving Each Runway by Approach Category

Ceiling-visibility and landing approach data are tabulated for each runway at each airport. Table 5-6 shows these minima for Logan, and Figure 5-9 shows the same data displayed as they are presented to the computer except that the order of the runways is different. In Table 5-6, different minima are shown for the same type of approach on different runways. This is because the minima depend on whether a straight-in or circling approach is used.

5.1.10 Identity of All Facilities Necessary for Each Approach at Each Runway

Table 5-7 was compiled by examination of the Instrument Approach Procedure Charts, and defines those facilities which are necessary for a particular approach. The numbers are either zero or non-zero. A zero indicates that the facility is not necessary. A non-zero entry is the number of the facility as carried in the Facility Status File.

Figure 5-10 displays the same data in the form of the program input matrix. The first four columns show those facilities essential to the approach. The last four columns are facilities which, if down, have only the effect of raising the minima for the approach, as prescribed by FAA regulations.

Table 5-4. FREQUENCY DISTRIBUTION OF AIRCRAFT WEIGHT CLASSES			
Type	Weight Class		
	Small	Large	Heavy
Air Carrier	0	.9	.1
Air Taxi	.1	.9	0
General Aviation	.9	.1	0
Military	.02	.9	.08

5.1.6 Distribution of Approach Category as a Function of Type

Table 5-5 presents approach category data which was also based on information supplied by TSC. The figures are approximations; therefore, before the model is used for analysis, they should be verified.

Table 5-5. FREQUENCY DISTRIBUTION OF AIRCRAFT APPROACH CATEGORIES				
Type	Approach Category			
	A	B	C	D
Air Carrier	0	.05	.1	.85
Air Taxi	.9	.1	0	0
General Aviation	.9	.07	.03	0
Military	.1	.3	.3	.3

Table 5-4 is combined with Table 5-5 as a single input matrix, and is displayed in Figure 5-6. The data are shown as cumulative probability distributions.

5.1.7 Route Distances from Holding Fixes to Logan under Radar and Nonradar (VORTAC) Environments

The distance tables are shown in Figures 5-7 and 5-8 as program input matrices. The numbers in row 6 (Figure 5-8) define the matrices that carry airport data.

5.1.4 Assignment of User Types

Having the destination, the user type can be assigned on the basis of the data in Table 3-1 of Chapter Three. Figure 5-5 shows the selection matrix. Its relationship to Table 3-1 can be seen in the following example.

Suppose the destination is Bedford, where 2902 is the total. Of these, 87 or 2.99 percent are air carriers, 235 or 8.09 percent are air taxis, 2425 or 83.56 percent are general aviation, and 155 or 5.34 percent are military. If these percentages are changed to numbers between 0 and 1000, the cumulative distribution is 30, 111, 947, and 1000. Row 6 of Figure 5-5 shows, for columns 1, 2, and 3, corresponding to air carrier, air taxi, and general aviation, respectively, the first three of these numbers. Military aircraft are treated as defaults.

MATRIX HALFWORD SAVEVALUEVFRPT

		COL. 1	2	3
A/C Destinations	ROW 1	782	897	996
	2	782	897	996
	3	782	897	996
	4	782	897	996
	5	782	897	996
	6	30	111	947
	7	0	2	816
	8	0	0	1000
	9	0	0	38
	10	0	190	1000
	11	0	0	1000
	12	0	0	1000
	13	0	0	1000
	14	2	11	869
	15	0	0	1000
	16	0	0	174
	17	0	0	1000
	18	0	235	1000

A/C Type (Default = type 4)

Matrix is used to determine aircraft type once destination is known in VFR conditions.

Figure 5-5. USER TYPE BY DESTINATION

Since no VFR data, corresponding to Table 3-1 exists, the matrix corresponding to IFR conditions is identical to Figure 5-4.

5.1.5 Distribution of Weight Class as a Function of Type

Table 5-4 presents aircraft distribution data derived from information supplied by TSC, and based in part on FAA equipment forecast for air carrier operations at Logan. The weight classes were assigned to the forecast aircraft types in accordance with Appendix 3 to Reference 5. The figures are approximations; therefore, before the model is used for analysis, they should be verified.

These data are incorporated in Figure 5-4 in the following way. Of the 31283 aircraft arriving in the Boston TCA, 26142 or 83.6 percent, are destined for Logan. It is assumed that this condition prevails when all airports are open. When some of the secondary airports are closed, the percentage will be higher. The first five columns of Figure 5-4 correspond to holding fixes serving Logan. Between the hours of 0800 and 1800 all airports are open, and in column five the figure 836, corresponding to 83.6 percent, tells the model to assign that percentage of all aircraft to Logan. These aircraft are assigned to each holding fix on the basis of information supplied by Logan approach control personnel. For those aircraft destined for Logan, the percentages assigned to the five holding fixes are as presented in Table 5-3.

Table 5-3. PERCENTAGE OF AIRCRAFT BOUND FOR LOGAN ENTERING OVER HOLDING FIXES		
Fix	Fix Number	Percentage
Manjo	1	30
Millis	2	30
Bridgewater	3	25
Skipper	4	5
Lawrence	5	10

The figures are then reflected in the cumulative percentages in the first five columns of Figure 5-4. For example, Manjo, holding fix number 1 in Figure 5-4, gets 30 percent of Logan traffic, thus $.3 \times .836 = .251$, and this number 251 is seen in the first column between the hours of 0800 and 1800. For times of day when some of the secondary airports are closed, the traffic totals were distributed over the airports which were open.

To find a destination, a uniform random number is drawn and is compared for the time of day with the cumulative distributions shown in Figure 5-4. For example, at 0915 the number 943 is drawn. Entering row 10 it can be seen that $928 < 943 \leq 946$, hence the destination is airport number 7 — Beverly.

Columns 1 through 5 correspond, respectively, to Manjo, Millis, Bridgewater, Skipper, and Lawrence. Columns 6 through 17 correspond to Bedford, Beverly, Fitchburg, Fort Devens, Lawrence, Mansfield, Marshfield, Newburyport (Plum Island), Norwood, Plymouth, South Weymouth, and Taunton, respectively. The last column, treated by the program as a default, is Tew-Mac, and shows the hourly rate of total arrivals.

MATRIX HALFWORD SAVEVALUEVFRAC																		
ROW	COL. 1					Hold Areas.					Secondary Airports					18	Default to Tew Mac	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			16
1	297	597	847	897	996	996	996	997	997	997	997	997	997	997	997	997	997	1000
2	299	598	847	897	996	996	996	997	997	997	997	997	997	997	997	997	997	1000
3	299	598	847	897	996	996	996	997	997	997	997	997	997	997	997	997	997	1000
4	299	598	847	897	996	996	996	997	997	997	997	997	997	997	997	997	997	1000
5	299	598	847	897	996	996	996	997	997	997	997	997	997	997	997	997	997	1000
6	299	598	847	897	996	996	996	997	997	997	997	997	997	997	997	997	997	1000
7	299	598	847	897	996	996	996	997	997	997	997	997	997	997	997	997	997	1000
8	260	522	740	784	871	871	954	955	955	955	955	955	955	955	955	955	955	1000
9	251	502	711	752	836	929	946	947	948	954	954	955	955	956	956	998	998	1000
10	251	502	710	752	836	928	946	947	948	954	954	955	955	956	997	998	999	1000
11	251	502	710	752	836	928	946	947	948	954	954	955	955	956	997	998	999	1000
12	251	502	710	752	836	928	946	947	948	954	954	955	955	956	997	998	999	1000
13	251	502	710	752	836	928	946	947	948	954	954	955	955	956	997	998	999	1000
14	251	502	710	752	836	928	946	947	948	954	954	955	955	956	997	998	999	1000
15	251	502	710	752	836	928	946	947	948	954	954	955	955	956	997	998	999	1000
16	251	502	710	752	836	928	946	947	948	954	954	955	955	956	997	998	999	1000
17	251	502	710	752	836	928	946	947	948	954	954	955	955	956	997	998	999	1000
18	251	502	710	752	836	928	946	947	948	954	954	955	955	956	997	998	999	1000
19	258	516	731	774	860	955	955	955	956	956	956	956	956	956	997	998	999	1000
20	258	516	731	774	860	955	955	955	956	956	956	956	956	956	998	998	998	1000
21	258	516	731	774	860	955	955	955	956	956	956	956	956	956	998	998	998	1000
22	258	516	731	774	860	955	955	955	956	956	956	956	956	956	998	998	998	1000
23	258	516	731	774	860	955	955	955	956	956	956	956	956	956	998	998	998	1000
24	269	538	763	807	897	997	997	997	998	998	998	998	998	998	998	998	998	1000
Time of Day																		
Number of aircraft created in VFR conditions																		

510

Number of aircraft
created in VFR
conditions

Figure 5-4. DISTRIBUTION OF AIRCRAFT DESTINATIONS AND OVERALL ARRIVAL RATES
AS A FUNCTION OF TIME OF DAY

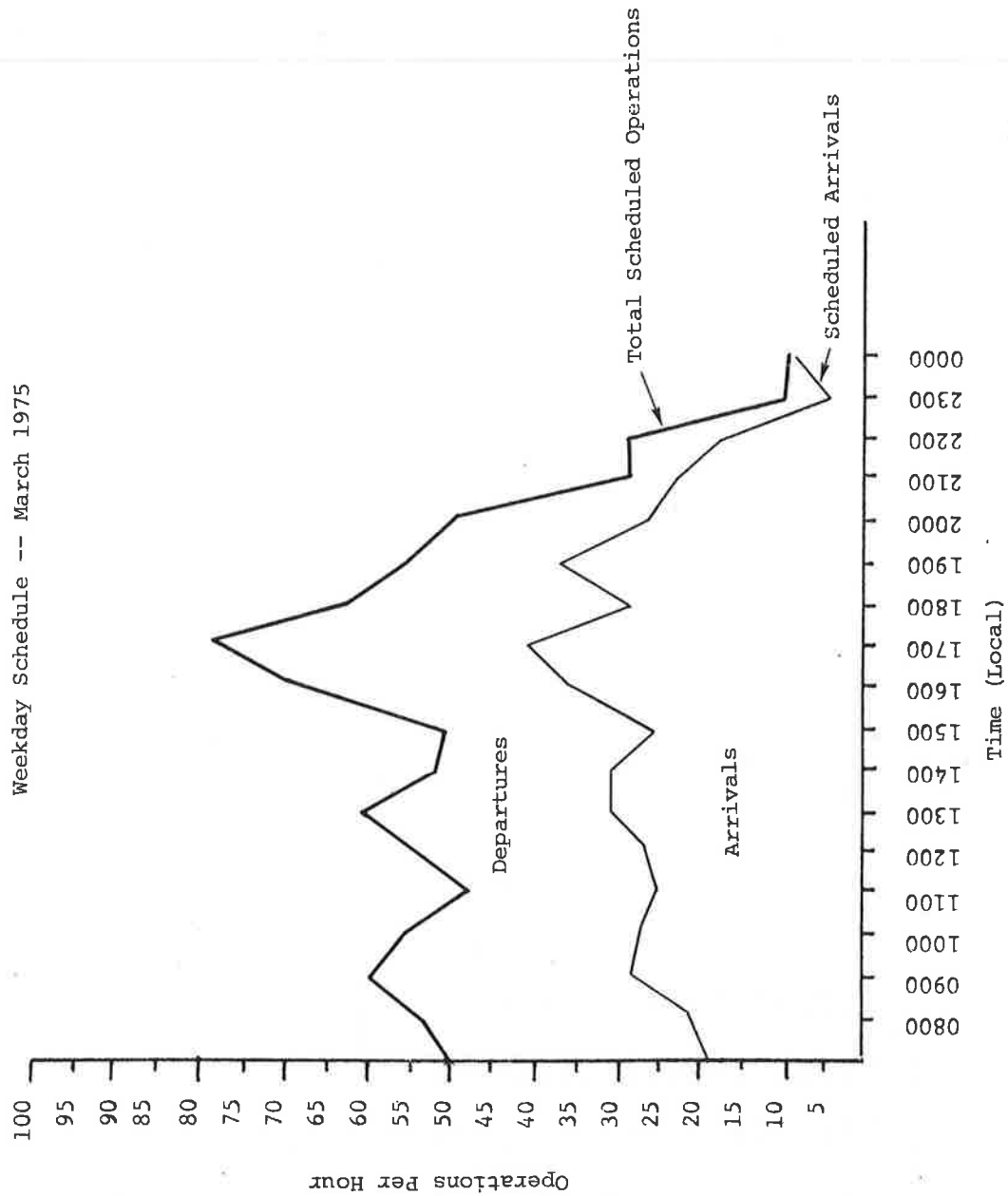


Figure 5-3. SCHEDULED ARRIVAL RATE AT LOGAN

the computer as nominal values to which, within their respective ranges of values, a random uniform increment is added or subtracted. As mentioned in Section 3.2 of Chapter Three, between wind changes, ceiling and visibility are allowed to fluctuate randomly within their ranges by an exponential process with a mean time of change of 15 minutes.

5.1.2 Arrival Rates

Chapter Three discussed how overall arrival rates can be calculated. The arrival rate data were not collected in the form discussed; that is, arrival rates for both weather conditions at all destination airports by time of day were not known. Were these available, the overall arrival rate for any hour, both VFR and IFR, could be found by summing λ_{ijk} over i — the destination airports. An approximation was used in the model demonstration. The source for this approximation was data from the Performance Measurement System (PMS) for Airports, dated November 1975. Figure 5-3 was taken from this report and shows arrivals of scheduled aircraft as a function of time. This graph was converted, by manual measurement, into a table of approximate numbers. The table was extended quite arbitrarily to cover a 24-hour day. It was assumed that these rates could be made applicable to IFR or VFR conditions by multiplying them by a constant. This, in fact, was done in the demonstration runs. In other words, at present, these data are not authoritative. The last column in Figure 5-4 shows the rate of arrival, by time of day, for VFR conditions. These figures are the same as those used in the demonstration at TSC on September 20-22, 1976. Other uses of the matrix in Figure 5-4 are discussed in the following section. It is suggested that before the model is exercised for analysis that these data be collected in the form called for in the previous discussions. Assuming the total arrival rates for weather conditions and time of day for each destination airport were available, the model could be expected to simulate accurately the phenomenon of arrival time creation.

5.1.3 Destination Assignment

Although it was desired to have the percentage of aircraft, by type, time of day, and weather condition, landing at each airport, this information was not available.

Table 3-1 of Chapter Three gives some of the requisite data for instrument approaches. No corresponding data was available for VFR approaches. Thus, while it can be surmised that, for example, the relative number of general aviation aircraft would materially increase under VFR conditions, more so relatively than air carriers, the factor is unknown. For lack of better information, the data in Table 3-1 was used for both weather conditions.

MATRIX HALFWORD SAVEVALUECIRVL													
	NT	DY	NT	DY	NT	DY	NT	DY	NT	DY			
COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	
Wind Direction in Degrees													
Calm 1	360	7	1	1000	1000	1000	1000	1000	1000	1000	1000	2	3
N 2	0	96	58	61	7	576	448	839	777	1000	990	4	5
NNE 3	22	128	85	152	76	704	510	891	753	996	995	6	7
NE 4	45	163	118	113	29	510	324	755	639	981	979	8	9
ENE 5	67	198	169	82	441	494	0	724	770	981	992	10	11
E 6	90	232	263	167	49	642	437	776	820	976	996	12	13
ESE 7	112	254	348	207	47	671	0	866	804	994	1000	14	15
SE 8	135	272	398	237	66	777	680	935	962	993	995	16	17
SSE 9	157	296	425	153	101	736	641	939	924	1000	995	18	19
S 10	180	365	489	109	53	757	456	949	803	1000	985	20	21
SSW 11	202	424	550	58	20	569	211	845	602	1000	998	22	23
SW 12	225	496	591	48	17	479	195	779	510	998	1000	24	25
WSW 13	247	616	663	19	15	439	302	827	645	999	992	26	27
W 14	270	776	777	69	14	312	211	651	498	990	966	28	29
WNW 15	292	836	874	33	101	295	184	649	439	974	977	30	31
NW 16	315	937	958	26	20	396	225	734	554	996	993	32	33
NNW 17	337	1000	1000	30	13	413	835	835	658	1000	1000	34	35
18	0	0	0	0	0	0	0	0	0	0	0	0	0

Wind direction in degrees
 Number of cumulative occurrences, out of 1000, of wind direction in Day/Night
 3 Knots
 7 Knots
 12 Knots
 22 Knots
 Default = 30 Knots
 Wind Velocity

MATRIX HALFWORD SAVEVALUE 4													
	NT	DY	NT	DY	NT	DY	NT	DY	NT	DY			
Ceiling COL. 1	2	3	4	5	6	7	8	9	10				
1000' 1	825	733	798	841	762	752	714	640	1000	0			
750' 2	850	800	857	911	878	883	876	820	1000	750			
500' 3	850	833	881	943	901	905	933	910	1000	750			
400' 4	850	866	914	956	948	956	962	944	1000	1000			
300' 5	875	900	950	981	977	992	991	989	1000	1000			
200' 6	950	967	977	981	994	1000	1000	989	1000	1000			

Default = 50'
 Wind Velocity
 3 Knots
 7 Knots
 12 Knots
 22 Knots
 30 Knots

Ceiling matrix for wind N

MATRIX HALFWORD SAVEVALUE 5															
	NT	DY	NT	DY	NT	DY	NT	DY	NT	DY	NT	DY	NT	DY	
Visibility in Miles COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14		
.25 1	0	0	0	0	0	0	71	0	0	63	0	455	400		
.50 2	2	0	0	60	0	59	0	143	0	0	313	333	728	600	
.80 3	2	0	17	80	56	118	91	143	48	71	501	333	819	800	
1.00 4	6	6	51	120	111	176	136	143	238	286	564	333	910	1000	
1.50 5	6	13	85	200	222	294	227	214	381	500	814	667	910	1000	
2.00 6	12	16	171	260	389	412	485	429	810	500	877	1000	1000	1000	

Default = 3.00
 Ceiling
 1000'
 750'
 500'
 400'
 300'
 200'
 50'

Visibility matrix for wind N

Figure 5-2. SAMPLE OF WEATHER MATRIX INPUTS

Table 5-2 is derived from Table 5-1. Given the ceiling of, for example, 1000+, a total of 314 observations occur, as can be seen by summing over the first row of Table 5-1. Of these, 309 occurred when the visibility was 3+, 1 when the ceiling was 1-3/4 - 2-1/2 nautical mile, and so on. These data were converted to cumulative percentages, expressed as numbers 000 to 999, for computer utilization.* Figure 5-2 shows an example of such a table, expressed as a matrix, as printed out in a program run.

The top matrix in this figure is first used to find the wind direction, or whether it is calm. Column 1 displays 17 entries, row 1 representing a calm condition, and each of the others display one of the 16 points of the compass. Columns 2 and 3 contain cumulative percentages of occurrences for each of these conditions -- column 3 for daylight hours, column 2 for night. A uniform random variable, U, is drawn from the unit interval and compared with the numbers in column 2 or 3. For example, assume daylight hours, and let the number drawn be .045, or equivalently 045 and, thus, since $045 \leq 058$ (row 2, column 3), the wind is from the north. To determine wind speed, another U is drawn and compared with the odd-numbered column elements in row 2. If $U = 720$, and $448 < 720 \leq 777$ (where 448 is in row 2, column 7 and 777 is in row 2, column 9) the wind speed is 12 knots.

To determine ceiling, columns 12 and 13 identify the ceiling and visibility matrices for each wind direction and matrix 4 (the middle table of the figure) is used for ceiling determination with a north wind. Column 6 corresponding to a speed of 12 knots, daylight, is entered with another value of U, for example 921. Since $905 < 921 \leq 956$, the ceiling is 400 feet.

When the ceiling is determined, matrix 5 (the last table in the figure) is used to find the visibility. A new U is obtained and compared with the entries in column 8, which corresponds to a 400-foot ceiling, north wind, daylight hours. If $U = 415$, and $214 < 415 \leq 429$, the visibility is 2 miles.

There is no row in the wind direction, ceiling, and visibility matrices corresponding to 30 knots, 50 feet, and 3 miles, respectively. These are defaults which, if U is greater than any number in the column, the value associated with these quantities is assigned. The tabulated values of wind direction and speed, ceiling and visibility are thus found and treated by

*Using a portable calculator, the cumulative distributions shown in the weather matrices were derived from the National Climatic Service (NCS) data. For future applications of the model to TCAs other than Boston, it is recommended that the weather data base be acquired from NCS on magnetic tape and the conversion be made by computer. A simple FORTRAN program could be written to convert the data to the desired format and punch a card deck for GPSS input.

Table 5-1. FREQUENCY OF OCCURRENCE OF CEILING, GIVEN WIND DIRECTION (NORTH), SPEED, AND DAYLIGHT HOURS					
Ceiling (Feet)	Velocity (Knots)				
	1-4	5-9	10-14	15-29	30+
1000+	22	132	103	57	0
600-900	2	11	18	16	3
500	1	5	3	8	0
400	1	2	7	3	1
300	1	4	5	4	0
200	2	0	1	0	0
0-100	1	3	0	1	0
Total	30	157	137	89	4

Table 5-2. FREQUENCY OF OCCURRENCE OF VISIBILITY, GIVEN CEILING, WIND DIRECTION (NORTH), AND DAYLIGHT HOURS							
Visibility (Nautical Miles)	Ceiling (Feet)						
	1000+	600-900	500	400	300	200	0-100
0 to 1/4	0	0	0	1	0	0	2
5/16 to 1/2	0	3	1	1	0	1	1
5/8 to 7/8	0	1	1	0	1	0	1
1	2	3	1	0	3	0	1
1-1/4 to 1-1/2	2	3	2	1	3	1	0
1-3/4 to 2-1/2	1	4	2	3	0	1	0
3	309	36	10	8	7	0	0
Total	314	50	17	14	14	3	5

		CEILING VEL		VISIBILITY GROUPS IN MILFS							TOT	
STA	DIR	GROUPS IN FEET	GROUPS M.P.H.	0-1/4	5/16- 1/2	5/8- 7/8	1	1 1/4- 1 1/2	1 3/4- 2 1/2	3+	OPS	
14739	N	1000+	1-4					1		21	22	
			5-9				1			131	132	
			10-14				1	1	1	100	103	
			15-29							57	57	
			30+									
			TOT				2	2	1	309	314	
		600-900	1-4								2	2
			5-9		1		1	1	2	6	11	
			10-14		1	1			1	15	18	
			15-29		1		2	2	1	10	16	
			30+							3	3	
			TOT		3	1	3	3	4	36	50	
		500	1-4								1	1
			5-9				1		1	3	5	
			10-14							3	3	
			15-29		1	1		2	1	3	8	
			30+									
			TOT		1	1	1	2	2	10	17	
		400	1-4						1			1
			5-9							1	1	2
			10-14	1	1					2	3	7
			15-29								3	3
			30+								1	1
			TOT	1	1			1	3	8	14	
		300	1-4								1	1
			5-9					3			1	4
			10-14						2		3	5
			15-29			1			1		2	4
			30+									
			TOT			1	3	3		7	14	
		200	1-4		1						1	2
			5-9									
			10-14						1			1
			15-29									
			30+									
			TOT		1			1	1		3	
14739	N	0-100	1-4	1							1	
			5-9		1	1	1				3	
			10-14									
			15-29	1							1	
			30+									
	TOT	2	1	1	1				5			
TOT VIS				3	7	4	10	12	11	370	417	
VEL GRPS					1-4	5-9	10-14	15-29	30+	CALM		
TOT VEL					30	157	137	89	4		417	
% VEL					7.2	37.6	32.9	21.3	1.0		100.0	
% DIR											5.7	

Figure 5-1. SAMPLE OF NATIONAL CLIMATIC SURVEY WEATHER DATA

CHAPTER FIVE

PROGRAM USE

The deck set up for any GPSS program consists of the GPSS card deck with the Job Control Language (JCL) cards. The JCL will vary from machine to machine. Instructions concerning how to use the JCL deck will depend, therefore, on the machine in use.

Unlike most computer languages, GPSS does not use conventional input data cards at the end of the program. Input data in GPSS is organic to the model in the form of matrices and savevalues which are initialized at the beginning of the source program (GPSS does not have an object program). Descriptions of these inputs are provided in Section 5.1. The model can produce outputs tailored to the user's need. Outputs are presented in Section 5.2.

5.1 REQUIRED UDCM INPUT DATA

This section describes the nature of the data required by the UDCM. The numerical quantities presented herein are those used in the model as it was configured for demonstration. Examples of input matrices are included in their respective subsections. A complete listing of the input data matrices is included in the program printout in Appendix A.

5.1.1 Weather Data

Figure 5-1 provides a sample of how weather data was received from the National Climatic Survey. This figure shows weather conditions during daylight hours with the wind from the North. The study used 32 such tables, corresponding to all 16 points of the compass for day and night.

Table 5-1 is derived from Figure 5-1. The derivation was performed manually and displays ceiling frequencies as a function of wind direction and velocity. For example, summing over the columns of Figure 5-1 for a wind speed of 10-14 knots, wind column under ceiling category 1000⁺, gives a frequency of 103 observations. This figure is displayed in the first row, third column of Table 5-1. The same procedure is repeated for all entries in Table 5-1.

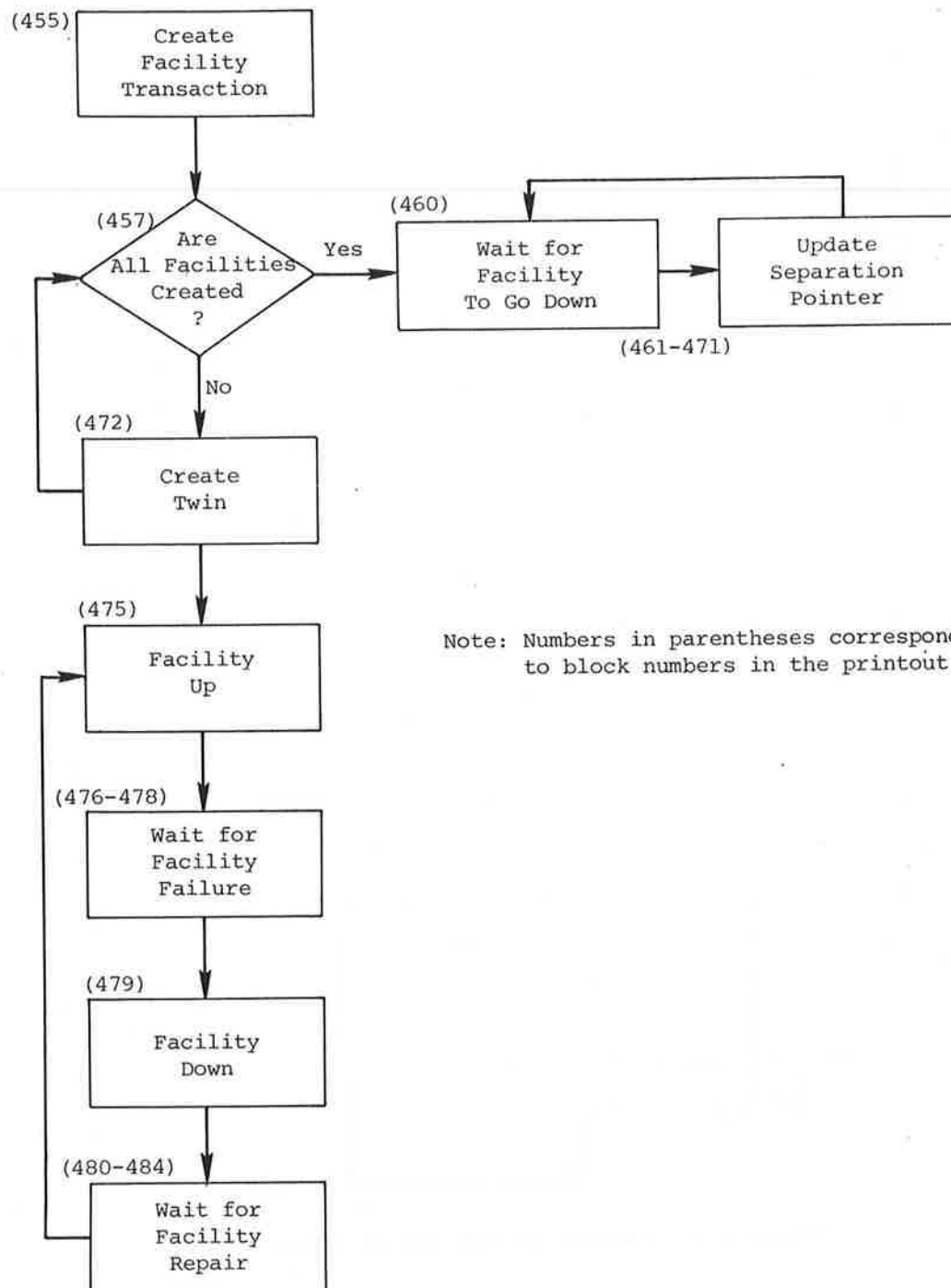


Figure 4-6. FACILITY STATUS MODULE

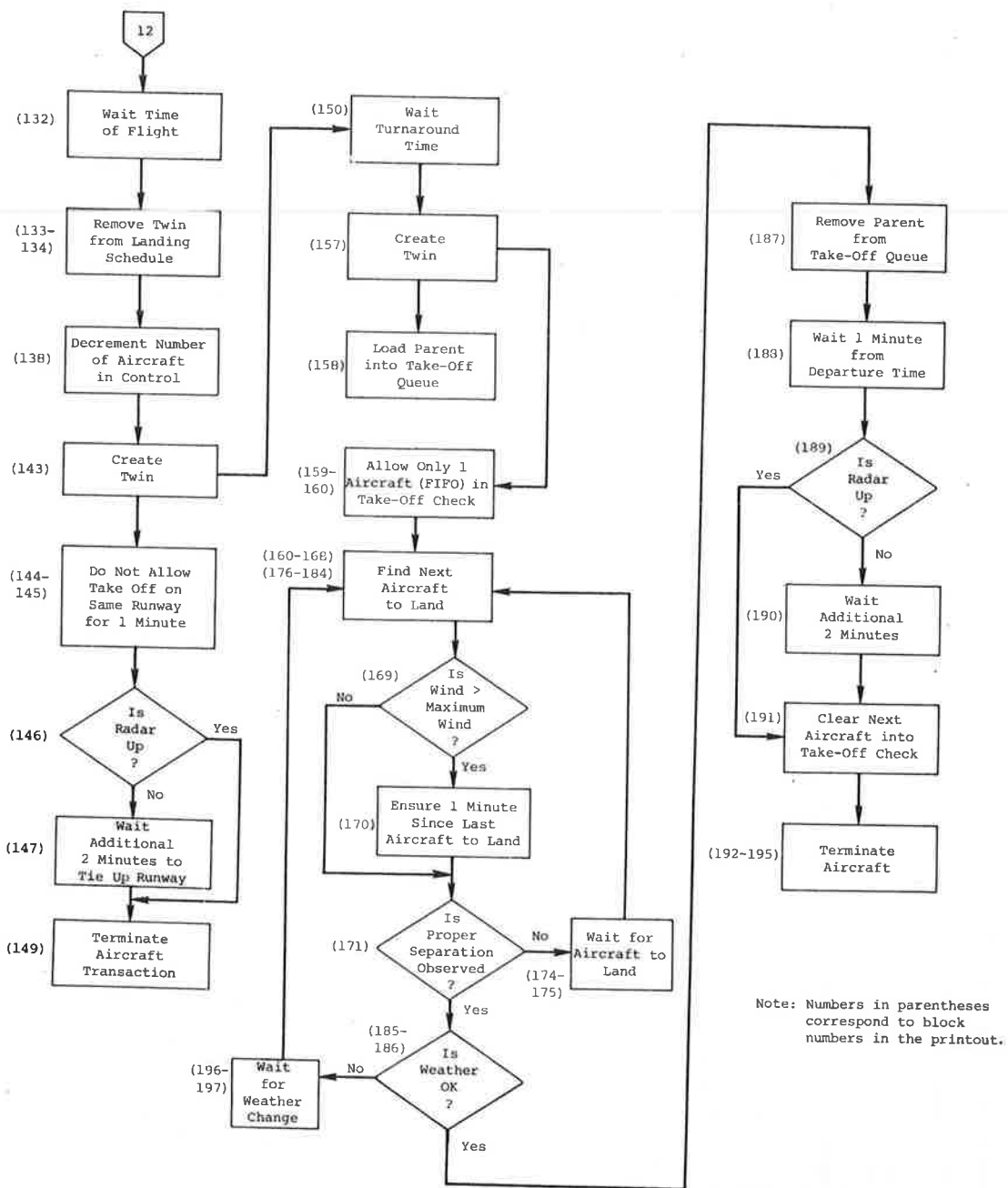


Figure 4-5. LANDING TO TAKE OFF AT LOGAN

INITIAL	MH17(3,5),500	1431
INITIAL	MH17(4,1),18	1432
INITIAL	MH17(4,4),71	1433
INITIAL	MH17(5,1),27	1434
INITIAL	MH17(5,4),143	1435
INITIAL	MH17(6,1),106	1436
INITIAL	MH17(6,2),35	1437
INITIAL	MH17(6,3),143	1438
INITIAL	MH17(6,4),214	1439
INITIAL	MH17(6,6),500	1440
INITIAL	MH17(6,8),500	1441
INITIAL	MH17(6,9),1000	1442
INITIAL	MH18(6,1-10),1000	1443
INITIAL	MH18(6,2),989	1444
INITIAL	MH18(1-5,2),1000	1445
INITIAL	MH18(2-3,4),981	1446
INITIAL	MH18(4-5,4),991	1447
INITIAL	MH18(2-3,5),938	1448
INITIAL	MH18(4-5,5),969	1449
INITIAL	MH18(2-3,6),964	1450
INITIAL	MH18(4-5,6),1000	1451
INITIAL	MH18(2-5,7),900	1452
INITIAL	MH18(3-5,8-10),1000	1453
INITIAL	MH18(1-2,9-10),1000	1454
INITIAL	MH18(1,3),817	1455
INITIAL	MH18(1,4),935	1456
INITIAL	MH18(1,5),781	1457
INITIAL	MH18(1,6),893	1458
INITIAL	MH18(1,7),800	1459
INITIAL	MH18(1,8),643	1460
INITIAL	MH18(2,1),750	1461
INITIAL	MH18(2,3),946	1462
INITIAL	MH18(2,8),929	1463
INITIAL	MH18(3,1),857	1464
INITIAL	MH18(3,3),957	1465
INITIAL	MH18(4,1),893	1466
INITIAL	MH18(4,3),968	1467
INITIAL	MH18(5,1),929	1468
INITIAL	MH18(5,3),978	1469
INITIAL	MH19(4-5,2),11	1470
INITIAL	MH19(1-2,3),56	1471
INITIAL	MH19(3-5,3),111	1472
INITIAL	MH19(4-5,7),333	1473
INITIAL	MH19(5-6,8-14),1000	1474
INITIAL	MH19(1-4,10),1000	1475
INITIAL	MH19(1-4,12-14),1000	1476
INITIAL	MH19(2,11),400	1477
INITIAL	MH19(3,2),6	1478
INITIAL	MH19(3,11),600	1479
INITIAL	MH19(4,4),385	1480
INITIAL	MH19(4,8),667	1481
INITIAL	MH19(4,11),800	1482
INITIAL	MH19(5,4),692	1483
INITIAL	MH19(6,1),1000	1484
INITIAL	MH19(6,2),28	1485
INITIAL	MH19(6,3),278	1486
INITIAL	MH19(6,4),1000	1487
INITIAL	MH19(6,5),250	1488
INITIAL	MH19(6,7),667	1489
INITIAL	MH20(6,1-10),1000	1490
INITIAL	MH20(5-6,4),995	1491
INITIAL	MH20(3-5,2),1000	1492
INITIAL	MH20(5,5-10),1000	1493
INITIAL	MH20(2-3,6),981	1494
INITIAL	MH20(1-4,7-10),1000	1495
INITIAL	MH20(1,8),965	1496
INITIAL	MH20(1,1),800	1497
INITIAL	MH20(1,2),828	1498
INITIAL	MH20(1,3),987	1499
INITIAL	MH20(1,4),947	1500
INITIAL	MH20(1,5),825	1501
INITIAL	MH20(1,6),957	1502
INITIAL	MH20(2,1),891	1503
INITIAL	MH20(2,2),862	1504
INITIAL	MH20(2,3),948	1505
INITIAL	MH20(2,4),979	1506
INITIAL	MH20(2,5),918	1507
INITIAL	MH20(3,1),927	1508
INITIAL	MH20(3,3),960	1509
INITIAL	MH20(3,4),984	1510
INITIAL	MH20(3,5),959	1511
INITIAL	MH20(4,1),945	1512
INITIAL	MH20(4,3),979	1513
INITIAL	MH20(4,4),989	1514
INITIAL	MH20(4,5),990	1515
INITIAL	MH20(4,6),994	1516

Initializes the ceiling and visibility matrixes for
various wind directions and velocities.

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INITIAL MH20(5,1),964
INITIAL MH20(5,3),988
INITIAL MH21(4-5,8),667
INITIAL MH21(4-5,10-11),500
INITIAL MH21(1-6,12-14),1000
INITIAL MH21(2,1),2
INITIAL MH21(2,11),167
INITIAL MH21(3,1),5
INITIAL MH21(3,8),333
INITIAL MH21(3,11),333
INITIAL MH21(4,1),7
INITIAL MH21(5,1),11
INITIAL MH21(5,3),29
INITIAL MH21(5,4),727
INITIAL MH21(5,9),200
INITIAL MH21(6,1),20
INITIAL MH21(6,2),11
INITIAL MH21(6,3),88
INITIAL MH21(6,4),909
INITIAL MH21(6,5),100
INITIAL MH21(6,6),600
INITIAL MH21(6,7),500
INITIAL MH21(6,8),1000
INITIAL MH21(6,9),600
INITIAL MH21(6,10),1000
INITIAL MH21(6,11),667
INITIAL MH22(1-5,1),960
INITIAL MH22(6,1-2),1000
INITIAL MH22(2-5,2),1000
INITIAL MH22(6,4-5),1000
INITIAL MH22(4-5,4),1000
INITIAL MH22(4-6,6-10),1000
INITIAL MH22(1-3,9-10),1000
INITIAL MH22(1,2),889
INITIAL MH22(1,3),891
INITIAL MH22(1,4),940
INITIAL MH22(1,5),866
INITIAL MH22(1,6),959
INITIAL MH22(1,7),955
INITIAL MH22(1,8),971
INITIAL MH22(2,3),950
INITIAL MH22(2,4),952
INITIAL MH22(2,5),975
INITIAL MH22(2,6),994
INITIAL MH22(2,7),985
INITIAL MH22(2,8),989
INITIAL MH22(3,3),968
INITIAL MH22(3,4),976
INITIAL MH22(3,5),983
INITIAL MH22(3,6),1000
INITIAL MH22(3,7),985
INITIAL MH22(3,8),1000
INITIAL MH22(4,3),982
INITIAL MH22(4,5),983
INITIAL MH22(5,3),991
INITIAL MH22(5,5),992
INITIAL MH22(6,3),995
INITIAL MH23(2-5,1),3
INITIAL MH23(1-6,10-14),1000
INITIAL MH23(1-5,11),333
INITIAL MH23(1-3,13),0
INITIAL MH23(5,3),71
INITIAL MH23(5,5),200
INITIAL MH23(5,9),333
INITIAL MH23(6,1),5
INITIAL MH23(6,2),7
INITIAL MH23(6,3),107
INITIAL MH23(6,4),1000
INITIAL MH23(6,5),400
INITIAL MH23(6,6),200
INITIAL MH23(6,7),250
INITIAL MH23(6,9),667
INITIAL MH24(1-6,1-2),1000
INITIAL MH24(2-6,4),1000
INITIAL MH24(4-6,5),994
INITIAL MH24(2-3,6),989
INITIAL MH24(4-6,6),1000
INITIAL MH24(3-4,7),991
INITIAL MH24(5-6,7),1000
INITIAL MH24(1-6,8-10),1000
INITIAL MH24(1-2,8),986
INITIAL MH24(1,3),930
INITIAL MH24(1,4),981
INITIAL MH24(1,5),930
INITIAL MH24(1,6),958
INITIAL MH24(1,7),965

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Initializes the ceiling and visibility matrixes for various wind directions and velocities.

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(continued)

INITIAL	MH24(2,3),965	1603
INITIAL	MH24(2,5),975	1604
INITIAL	MH24(2,7),983	1605
INITIAL	MH24(3,3),974	1606
INITIAL	MH24(3,5),981	1607
INITIAL	MH24(4,3),982	1608
INITIAL	MH24(5,3),987	1609
INITIAL	MH24(6,3),991	1610
INITIAL	MH25(1-5,1),2	1611
INITIAL	MH25(5-6,5),250	1612
INITIAL	MH25(1-6,6-14),1000	1613
INITIAL	MH25(1-4,7),0	1614
INITIAL	MH25(1-4,9),0	1615
INITIAL	MH25(1,11),667	1616
INITIAL	MH25(6,1),14	1617
INITIAL	MH25(6,3),118	1618
INITIAL	MH25(6,4),167	1619
INITIAL	MH26(1-6,1),944	1620
INITIAL	MH26(1-6,2),1000	1621
INITIAL	MH26(5-6,3),995	1622
INITIAL	MH26(3-4,4),987	1623
INITIAL	MH26(5-6,4),993	1624
INITIAL	MH26(6,5-10),1000	1625
INITIAL	MH26(2-5,6-10),1000	1626
INITIAL	MH26(2,7),993	1627
INITIAL	MH26(1-3,8),995	1628
INITIAL	MH26(1,9-10),1000	1629
INITIAL	MH26(1,3),935	1630
INITIAL	MH26(1,4),947	1631
INITIAL	MH26(1,5),953	1632
INITIAL	MH26(1,6),967	1633
INITIAL	MH26(1,7),980	1634
INITIAL	MH26(2,3),973	1635
INITIAL	MH26(2,4),980	1636
INITIAL	MH26(2,5),974	1637
INITIAL	MH26(3,3),976	1638
INITIAL	MH26(3,5),985	1639
INITIAL	MH26(4,3),984	1640
INITIAL	MH26(4,5),988	1641
INITIAL	MH26(5,5),997	1642
INITIAL	MH27(3-5,2),2	1643
INITIAL	MH27(3-4,3),43	1644
INITIAL	MH27(5-6,5),500	1645
INITIAL	MH27(4-5,7),286	1646
INITIAL	MH27(2-6,8-14),1000	1647
INITIAL	MH27(2-4,9),0	1648
INITIAL	MH27(1,12),1000	1649
INITIAL	MH27(5,1),1	1650
INITIAL	MH27(5,3),130	1651
INITIAL	MH27(6,1),5	1652
INITIAL	MH27(6,2),8	1653
INITIAL	MH27(6,3),174	1654
INITIAL	MH27(6,4),182	1655
INITIAL	MH27(6,7),857	1656
INITIAL	MH28(4-6,1),1000	1657
INITIAL	MH28(1-6,2),1000	1658
INITIAL	MH28(2-3,3),985	1659
INITIAL	MH28(5-6,3),995	1660
INITIAL	MH28(2-4,4),994	1661
INITIAL	MH28(5-6,4-10),1000	1662
INITIAL	MH28(2-4,5-10),1000	1663
INITIAL	MH28(1-3,6),996	1664
INITIAL	MH28(2-3,8),997	1665
INITIAL	MH28(1-2,10),996	1666
INITIAL	MH28(4,3),990	1667
INITIAL	MH28(3,1),946	1668
INITIAL	MH28(2,1),973	1669
INITIAL	MH28(1,1),892	1670
INITIAL	MH28(1,3),964	1671
INITIAL	MH28(1,4),982	1672
INITIAL	MH28(1,5),989	1673
INITIAL	MH28(1,7),997	1674
INITIAL	MH28(1,8),995	1675
INITIAL	MH28(1,9),875	1676
INITIAL	MH29(4-5,3),91	1677
INITIAL	MH29(5-6,4),333	1678
INITIAL	MH29(5-6,5),1000	1679
INITIAL	MH29(5-6,8),1000	1680
INITIAL	MH29(1-6,11-14),1000	1681
INITIAL	MH29(1,13),0	1682
INITIAL	MH29(4,1),1	1683
INITIAL	MH29(5,1),1	1684
INITIAL	MH29(5,2),2	1685
INITIAL	MH29(6,1),5	1686
INITIAL	MH29(6,2),7	1687
INITIAL	MH29(6,3),182	1688

Initializes the ceiling and visibility matrixes for various wind directions and velocities.

(continued)

INITIAL	MH29(6,7),500	1689
INITIAL	MH30(1-6,1-2),1000	1690
INITIAL	MH30(1,1),626	1691
INITIAL	MH30(1,2),963	1692
INITIAL	MH30(1-2,4),968	1693
INITIAL	MH30(2-3,5),986	1694
INITIAL	MH30(5-6,6-10),1000	1695
INITIAL	MH30(1-4,7-10),1000	1696
INITIAL	MH30(1,7),996	1697
INITIAL	MH30(1,8),995	1698
INITIAL	MH30(1,3),953	1699
INITIAL	MH30(1,5),976	1700
INITIAL	MH30(1,6),967	1701
INITIAL	MH30(2,3),967	1702
INITIAL	MH30(2,6),978	1703
INITIAL	MH30(3,3),972	1704
INITIAL	MH30(3,4),976	1705
INITIAL	MH30(3,6),983	1706
INITIAL	MH30(4,3),981	1707
INITIAL	MH30(4,4),984	1708
INITIAL	MH30(4,5),990	1709
INITIAL	MH30(4,6),989	1710
INITIAL	MH30(5,3),991	1711
INITIAL	MH30(5,4),992	1712
INITIAL	MH30(5,5),993	1713
INITIAL	MH30(6,3),1000	1714
INITIAL	MH30(6,4),992	1715
INITIAL	MH30(6,5),997	1716
INITIAL	MH31(3-5,2),1	1717
INITIAL	MH31(5-6,3),222	1718
INITIAL	MH31(6,4-5),500	1719
INITIAL	MH31(6,6-14),1000	1720
INITIAL	MH31(5-6,10),667	1721
INITIAL	MH31(1-5,12-14),1000	1722
INITIAL	MH31(3-4,7),333	1723
INITIAL	MH31(3-4,8),500	1724
INITIAL	MH31(3-4,9-11),333	1725
INITIAL	MH31(4,11),667	1726
INITIAL	MH31(1-2,11),333	1727
INITIAL	MH31(4,3),111	1728
INITIAL	MH31(5,4),250	1729
INITIAL	MH31(5,7),667	1730
INITIAL	MH31(5,8),1000	1731
INITIAL	MH31(5,9),667	1732
INITIAL	MH31(5,11),1000	1733
INITIAL	MH31(6,1),5	1734
INITIAL	MH31(6,2),7	1735
INITIAL	MH32(1-6,1),947	1736
INITIAL	MH32(2-3,2),917	1737
INITIAL	MH32(4-6,2),1000	1738
INITIAL	MH32(5-6,4),992	1739
INITIAL	MH32(6,5-10),1000	1740
INITIAL	MH32(4-5,5),1000	1741
INITIAL	MH32(3-4,6),985	1742
INITIAL	MH32(4-5,7),1000	1743
INITIAL	MH32(3-4,8),996	1744
INITIAL	MH32(1-5,9-10),1000	1745
INITIAL	MH32(1,2),833	1746
INITIAL	MH32(1,3),937	1747
INITIAL	MH32(1,4),888	1748
INITIAL	MH32(1,5),960	1749
INITIAL	MH32(1,6),965	1750
INITIAL	MH32(1,7),969	1751
INITIAL	MH32(1,8),974	1752
INITIAL	MH32(2,3),952	1753
INITIAL	MH32(2,4),944	1754
INITIAL	MH32(2,5),988	1755
INITIAL	MH32(2,6),980	1756
INITIAL	MH32(2,7),990	1757
INITIAL	MH32(2,8),989	1758
INITIAL	MH32(3,3),956	1759
INITIAL	MH32(3,4),976	1760
INITIAL	MH32(3,5),992	1761
INITIAL	MH32(3,7),995	1762
INITIAL	MH32(4,3),967	1763
INITIAL	MH32(4,4),984	1764
INITIAL	MH32(5,3),993	1765
INITIAL	MH32(5,6),995	1766
INITIAL	MH32(6,3),996	1767
INITIAL	MH33(3-4,1),1	1768
INITIAL	MH33(2-4,2),3	1769
INITIAL	MH33(2-3,4),67	1770
INITIAL	MH33(4-6,5),333	1771
INITIAL	MH33(1-2,7),167	1772
INITIAL	MH33(4-6,7),500	1773
INITIAL	MH33(2-5,8),500	1774

Initializes the ceiling and visibility matrixes for
various wind directions and velocities.

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INITIAL MH33(2-3,9),125
INITIAL MH33(4-5,10),500
INITIAL MH33(5-6,11-14),1000
INITIAL MH33(5,12),0
INITIAL MH33(1-4,13-14),1000
INITIAL MH33(1-2,13),500
INITIAL MH33(1,2),2
INITIAL MH33(3,7),333
INITIAL MH33(3,10),250
INITIAL MH33(4,4),133
INITIAL MH33(4,6),143
INITIAL MH33(4,9),375
INITIAL MH33(5,1),6
INITIAL MH33(5,2),5
INITIAL MH33(5,3),67
INITIAL MH33(5,4),200
INITIAL MH33(5,6),286
INITIAL MH33(5,9),500
INITIAL MH33(6,1),10
INITIAL MH33(6,2),12
INITIAL MH33(6,3),200
INITIAL MH33(6,4),267
INITIAL MH33(6,6),571
INITIAL MH33(6,8),1000
INITIAL MH33(6,9),750
INITIAL MH33(6,10),750
INITIAL MH34(1-5,1),786
INITIAL MH34(6,1-3),1000
INITIAL MH34(1-5,2),1000
INITIAL MH34(5-6,4),989
INITIAL MH34(6,5-10),1000
INITIAL MH34(5,6-10),1000
INITIAL MH34(4,7-10),1000
INITIAL MH34(1-3,8-10),1000
INITIAL MH34(1,3),903
INITIAL MH34(1,4),828
INITIAL MH34(1,5),918
INITIAL MH34(1,6),879
INITIAL MH34(1,7),934
INITIAL MH34(1,8),962
INITIAL MH34(2,3),938
INITIAL MH34(2,4),892
INITIAL MH34(2,5),964
INITIAL MH34(2,6),935
INITIAL MH34(2,7),974
INITIAL MH34(3,3),955
INITIAL MH34(3,4),946
INITIAL MH34(3,5),969
INITIAL MH34(3,6),972
INITIAL MH34(3,7),987
INITIAL MH34(4,3),983
INITIAL MH34(4,4),968
INITIAL MH34(4,5),974
INITIAL MH34(4,6),991
INITIAL MH34(5,3),994
INITIAL MH34(5,5),990
INITIAL MH35(1-4,2),4
INITIAL MH35(4-5,3),125
INITIAL MH35(5-6,5),400
INITIAL MH35(1-2,6),111
INITIAL MH35(4-5,6),333
INITIAL MH35(4-5,7),143
INITIAL MH35(2-4,8),250
INITIAL MH35(5-6,8),500
INITIAL MH35(3-6,10),667
INITIAL MH35(3-4,11),333
INITIAL MH35(1-6,12-14),1000
INITIAL MH35(1,14),0
INITIAL MH35(2,10),333
INITIAL MH35(2,11),167
INITIAL MH35(3,6),222
INITIAL MH35(4,5),200
INITIAL MH35(5,1),10
INITIAL MH35(5,2),14
INITIAL MH35(5,9),200
INITIAL MH35(5,11),500
INITIAL MH35(6,1),14
INITIAL MH35(6,2),25
INITIAL MH35(6,3),56
INITIAL MH35(6,4),188
INITIAL MH35(6,6),556
INITIAL MH35(6,7),429
INITIAL MH35(6,9),400
INITIAL MH35(6,11),833

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Initializes the ceiling and visibility matrixes for various wind directions and velocities.

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* LOGAN			1859
INITIAL	MH101(1,1),18		1860
INITIAL	MH101(2,1),13		1861
INITIAL	MH101(1,3),24		1862
INITIAL	MH101(1,4),19		1863
INITIAL	MH101(2,2),7		1864
INITIAL	MH101(2,3),23		1865
INITIAL	MH101(2,4),7		1866
INITIAL	MH101(3-4,1),1		1867
INITIAL	MH101(3-4,2),40		1868
INITIAL	MH101(3,3),133		1869
INITIAL	MH101(3-18,4),1		1870
INITIAL	MH101(4,3),134		1871
INITIAL	MH101(5-6,1),2		1872
INITIAL	MH101(5-6,2),270		1873
INITIAL	MH101(5,3),135		1874
INITIAL	MH101(6,3),136	Initializes airport definition matrix for Logan.	1875
INITIAL	MH101(7-8,1),3		1876
INITIAL	MH101(7-8,2),220		1877
INITIAL	MH101(7,3),137		1878
INITIAL	MH101(8,3),138		1879
INITIAL	MH101(9-10,1),4		1880
INITIAL	MH101(9,3),139		1881
INITIAL	MH101(9-10,2),330		1882
INITIAL	MH101(10,3),140		1883
INITIAL	MH101(11-12,1),5		1884
INITIAL	MH101(11-12,2),150		1885
INITIAL	MH101(11,3),141		1886
INITIAL	MH101(12,3),142		1887
INITIAL	MH101(13-14,1),4		1888
INITIAL	MH101(13,3),139		1889
INITIAL	MH101(13-14,2),330		1890
INITIAL	MH101(14,3),140		1891
INITIAL	MH101(15-16,1),1		1892
INITIAL	MH101(15-16,2),40		1893
INITIAL	MH101(15,3),133		1894
INITIAL	MH101(16,3),134		1895
INITIAL	MH101(17-18,1),3		1896
INITIAL	MH101(17-18,2),220		1897
INITIAL	MH101(17,3),137		1898
INITIAL	MH101(18,3),138		1899
INITIAL	MX001(1-22,1-5),680100		1900
INITIAL	MX001(3,1-5),820150		1901
INITIAL	MX001(4,1-5),820200		1902
INITIAL	MX001(1-4,2),460100		1903
INITIAL	MX001(5-7,3),560100		1904
INITIAL	MX001(5,5),780100		1905
INITIAL	MX001(6,5),780125		1906
INITIAL	MX001(7,1-2),820150		1907
INITIAL	MX001(7,4),820150		1908
INITIAL	MX001(7,5),780150		1909
INITIAL	MX001(8,1-2),820200		1910
INITIAL	MX001(8,3),560125		1911
INITIAL	MX001(8,4),820200		1912
INITIAL	MX001(8,5),780175		1913
INITIAL	MX001(9-12,1),216050		1914
INITIAL	MX001(9-12,5),268075		1915
INITIAL	MX001(11,2-4),820150	Initializes the minimum ceiling and visibility for the various approaches and runways at Logan.	1916
INITIAL	MX001(12,2-4),820200		1917
INITIAL	MX001(13-16,1),460075		1918
INITIAL	MX001(13-15,5),580100		1919
INITIAL	MX001(13-15,5),580100		1920
INITIAL	MX001(15,2-4),820150		1921
INITIAL	MX001(16,2-4),820200		1922
INITIAL	MX001(16,5),580125		1923
INITIAL	MX001(19,1-5),820150		1924
INITIAL	MX001(20,1-5),820200		1925
INITIAL	MX001(23,1-5),820150		1926
INITIAL	MX001(24,1-5),820200		1927
INITIAL	MX001(21-24,3),420100		1928
INITIAL	MX001(25-27,1),620050		1929
INITIAL	MX001(25-28,2),460100		1930
INITIAL	MX001(25-27,3),540100		1931
INITIAL	MX001(25-27,4),480050		1932
INITIAL	MX001(25,5),800100		1933
INITIAL	MX001(26,5),800175		1934
INITIAL	MX001(27,5),800150		1935
INITIAL	MX001(28,5),800175		1936
INITIAL	MX001(28,4),480100		1937
INITIAL	MX001(28,3),540125		1938
INITIAL	MX001(28,1),620100		1939
INITIAL	MH133(1,1),2	Initializes the matrixes needed for determining the facilities required for various approaches to Logan.	1940
INITIAL	MH133(1,2),4		1941
INITIAL	MH133(2,1),4		1942
INITIAL	MH133(2,2),7		1943
INITIAL	MH133(3-4,1),15		1944

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INITIAL	MH133(3,2),10	1945
INITIAL	MH133(3,3),7	1946
INITIAL	MH133(3,5),19	1947
INITIAL	MH133(3,6),23	1948
INITIAL	MH133(3-5,7),56	1949
INITIAL	MH133(3-4,8),43	1950
INITIAL	MH133(4,2),7	1951
INITIAL	MH133(5,1),35	1952
INITIAL	MH133(5,5),19	1953
INITIAL	MH133(6,1),15	1954
INITIAL	MH133(6,2),7	1955
INITIAL	MH133(6,3),35	1956
INITIAL	MH133(7,1),37	1957
INITIAL	MH134(1,1),2	1958
INITIAL	MH134(1,2),4	1959
INITIAL	MH134(2,1),4	1960
INITIAL	MH134(2,2),7	1961
INITIAL	MH134(3-4,1),15	1962
INITIAL	MH134(3-4,2),2	1963
INITIAL	MH134(3-4,3),3	1964
INITIAL	MH134(3,5),19	1965
INITIAL	MH134(3,6),23	1966
INITIAL	MH134(3-5,7),56	1967
INITIAL	MH134(3-4,8),43	1968
INITIAL	MH134(4,4),10	1969
INITIAL	MH134(5,1),35	1970
INITIAL	MH134(5,5),19	1971
INITIAL	MH134(6,1),15	1972
INITIAL	MH134(6,2),2	1973
INITIAL	MH134(6,3),3	1974
INITIAL	MH134(7,1),37	1975
INITIAL	MH135(1-2,1),4	1976
INITIAL	MH135(1-2,2),7	1977
INITIAL	MH135(1,8),48	1978
INITIAL	MH135(3-4,1),16	1979
INITIAL	MH135(3,2),11	1980
INITIAL	MH135(3,3),2	1981
INITIAL	MH135(3,4),3	1982
INITIAL	MH135(3,5),20	1983
INITIAL	MH135(3,6),24	1984
INITIAL	MH135(4,2),7	1985
INITIAL	MH135(5,1),7	1986
INITIAL	MH135(6,1),15	1987
INITIAL	MH135(6,2),2	1988
INITIAL	MH135(6,3),3	1989
INITIAL	MH135(6,4),35	1990
INITIAL	MH135(7,1),37	1991
INITIAL	MH136(1-2,1),4	1992
INITIAL	MH136(1,2),2	1993
INITIAL	MH136(1,8),48	1994
INITIAL	MH136(2,2),7	1995
INITIAL	MH136(3-4,1),16	1996
INITIAL	MH136(3,2),11	1997
INITIAL	MH136(3,3),2	1998
INITIAL	MH136(3,4),3	1999
INITIAL	MH136(3,5),20	2000
INITIAL	MH136(3,6),24	2001
INITIAL	MH136(4,2),7	2002
INITIAL	MH136(5,1),7	2003
INITIAL	MH136(5,5),20	2004
INITIAL	MH136(6,1),15	2005
INITIAL	MH136(6,2),7	2006
INITIAL	MH136(6,3),35	2007
INITIAL	MH136(7,1),37	2008
INITIAL	MH137(1-2,1),2	2009
INITIAL	MH137(1-2,2),4	2010
INITIAL	MH137(2-3,3),7	2011
INITIAL	MH137(2,8),44	2012
INITIAL	MH137(3-4,1),15	2013
INITIAL	MH137(3,2),10	2014
INITIAL	MH137(3,5),19	2015
INITIAL	MH137(3,6),23	2016
INITIAL	MH137(4,2),7	2017
INITIAL	MH137(5-6,1),35	2018
INITIAL	MH137(5,5),19	2019
INITIAL	MH137(6,2),15	2020
INITIAL	MH137(6,3),7	2021
INITIAL	MH137(6,8),44	2022
INITIAL	MH137(7,1),37	2023
INITIAL	MH138(1-2,1),2	2024
INITIAL	MH138(1-2,2),4	2025
INITIAL	MH138(2,8),44	2026
INITIAL	MH138(3-4,1),15	2027
INITIAL	MH138(3-4,2),2	2028
INITIAL	MH138(3-4,3),3	2029
INITIAL	MH138(3,4),10	2030

Initializes the matrixes needed for determining the facilities required for various approaches to Logan.

(continued)

INITIAL	MH138(3,5),19	2031
INITIAL	MH138(3,6),23	2032
INITIAL	MH138(5,1),35	2033
INITIAL	MH138(5,5),19	2034
INITIAL	MH138(6,1),15	2035
INITIAL	MH138(6,2),2	2036
INITIAL	MH138(6,3),3	2037
INITIAL	MH138(6,8),44	2038
INITIAL	MH138(7,1),37	2039
INITIAL	MH139(1-2,1),4	2040
INITIAL	MH139(1-2,2),7	2041
INITIAL	MH139(1,7),57	2042
INITIAL	MH139(1,8),46	2043
INITIAL	MH139(3-4,1),16	2044
INITIAL	MH139(3,2),11	2045
INITIAL	MH139(3,3),2	2046
INITIAL	MH139(3,4),3	2047
INITIAL	MH139(3,5),20	2048
INITIAL	MH139(3,6),24	2049
INITIAL	MH139(3,7),57	2050
INITIAL	MH139(4,2),7	2051
INITIAL	MH139(5,1),7	2052
INITIAL	MH139(5,5),20	2053
INITIAL	MH139(5,7),57	2054
INITIAL	MH139(6,1),15	2055
INITIAL	MH139(6,2),2	2056
INITIAL	MH139(6,3),3	2057
INITIAL	MH139(6,4),35	2058
INITIAL	MH139(7,1),37	2059
INITIAL	MH140(1,1),2	2060
INITIAL	MH140(1-2,2),4	2061
INITIAL	MH140(1,7),57	2062
INITIAL	MH140(1,8),46	2063
INITIAL	MH140(2-6,1),7	2064
INITIAL	MH140(3-4,2),16	2065
INITIAL	MH140(3,3),11	2066
INITIAL	MH140(3,5),20	2067
INITIAL	MH140(3,6),24	2068
INITIAL	MH140(3,7),57	2069
INITIAL	MH140(5,5),20	2070
INITIAL	MH140(5,7),57	2071
INITIAL	MH140(6,2),15	2072
INITIAL	MH140(6,3),35	2073
INITIAL	MH140(7,1),37	2074
INITIAL	MH141(1-2,1),4	2075
INITIAL	MH141(1-4,2),7	2076
INITIAL	MH141(2,8),45	2077
INITIAL	MH141(3-4,1),14	2078
INITIAL	MH141(3,3),9	2079
INITIAL	MH141(3,5),18	2080
INITIAL	MH141(3,6),22	2081
INITIAL	MH141(4,8),45	2082
INITIAL	MH141(6,1),15	2083
INITIAL	MH141(6,2),7	2084
INITIAL	MH141(6,3),35	2085
INITIAL	MH141(7,1),37	2086
INITIAL	MH142(1-2,1),4	2087
INITIAL	MH142(1,2),2	2088
INITIAL	MH142(2,2),7	2089
INITIAL	MH142(2,8),45	2090
INITIAL	MH142(3-4,1),14	2091
INITIAL	MH142(3-4,2),2	2092
INITIAL	MH142(3-4,3),1	2093
INITIAL	MH142(3,4),9	2094
INITIAL	MH142(3,5),18	2095
INITIAL	MH142(3,6),22	2096
INITIAL	MH142(4,8),45	2097
INITIAL	MH142(6,1),15	2098
INITIAL	MH142(6,2),2	2099
INITIAL	MH142(6,3),1	2100
INITIAL	MH142(6,4),35	2101
INITIAL	MH142(7,1),37	2102
* BEDFORD		2103
INITIAL	MH106(1-2,1),6	2104
INITIAL	MH106(1,2),7	2105
INITIAL	MH106(1-2,3),24	2106
INITIAL	MH106(1,4),133	2107
INITIAL	MH106(2,4),5	2108
INITIAL	MH106(3,1),1	2109
INITIAL	MH106(3,2),110	2110
INITIAL	MH106(3,3),143	2111
INITIAL	MH106(4-6,3),156	2112
INITIAL	MH106(3-6,4),2	2113
INITIAL	MH106(4,1),2	2114
INITIAL	MH106(4,2),290	2115
INITIAL	MH106(5,2),230	2116

Initializes the matrixes needed for determining the facilities required for various approaches to Logan.

Initializes matrixes, as in Logan, to define the Bedford airport, weather minimums, and approach facilities required.

(continued)

INITIAL	MH106(5,1),3	2117
INITIAL	MH106(6,2),50	2118
INITIAL	MH106(6,1),4	2119
INITIAL	MH143(1,1),53	2120
INITIAL	MH143(1-4,5),17	2121
INITIAL	MH143(2-3,1),12	2122
INITIAL	MH143(2,2),8	2123
INITIAL	MH143(2,3),1	2124
INITIAL	MH143(2,6),21	2125
INITIAL	MH143(2,8),64	2126
INITIAL	MH143(3,2),1	2127
INITIAL	MH143(4,1),4	2128
INITIAL	MH143(4,2),53	2129
INITIAL	MH143(5,1),1	2130
INITIAL	MH143(5,2),4	2131
INITIAL	MX002(1-2,1-4),700100	2132
INITIAL	MX002(3,1),700100	2133
INITIAL	MX002(3,2-4),720150	2134
INITIAL	MX002(4,1),700125	2135
INITIAL	MX002(4,2-4),760200	2136
INITIAL	MX002(5-8,1),383100	2137
INITIAL	MX002(9-11,1),660100	2138
INITIAL	MX002(9-10,2-4),680100	2139
INITIAL	MX002(11,2-4),720150	2140
INITIAL	MX002(12,1),660125	2141
INITIAL	MX002(12,2-4),760200	2142
INITIAL	MX002(13-14,1-4),800100	2143
INITIAL	MX002(15,1-4),800150	2144
INITIAL	MX002(15,2),800125	2145
INITIAL	MX002(16,1-4),800200	2146
INITIAL	MX002(16,2),800150	2147
INITIAL	MX002(17-18,1-4),680100	2148
INITIAL	MX002(19,1-4),720150	2149
INITIAL	MX002(19,2-3),680100	2150
INITIAL	MX002(20,1-4),760200	2151
INITIAL	MX002(20,3),680125	2152
INITIAL	MH156(1,1),53	2153
INITIAL	MH156(1-4,5),53	2154
INITIAL	MH156(1-4,5),17	2155
INITIAL	MH156(2-3,1),1	2156
INITIAL	MH156(2-3,2),12	2157
INITIAL	MH156(2,3),8	2158
INITIAL	MH156(4-5,1),4	2159
INITIAL	MH156(4,2),53	2160
INITIAL	MH156(5,2),1	2161
* BEVERLY		2162
INITIAL	MH107(1-2,1),6	2163
INITIAL	MH107(1,2),8	2164
INITIAL	MH107(1,3),18	2165
INITIAL	MH107(1,4),108	2166
INITIAL	MH107(2,3),24	2167
INITIAL	MH107(2,4),4	2168
INITIAL	MH107(3,1),1	2169
INITIAL	MH107(3,2),160	2170
INITIAL	MH107(3-6,3),144	2171
INITIAL	MH107(3-6,4),3	2172
INITIAL	MH107(4,1),2	2173
INITIAL	MH107(4,2),340	2174
INITIAL	MH107(5,1),3	2175
INITIAL	MH107(5,2),90	2176
INITIAL	MH107(6,1),4	2177
INITIAL	MH107(6,2),270	2178
INITIAL	MH144(1,1),25	2179
INITIAL	MH144(2-4,1),4	2180
INITIAL	MH144(2,2),3	2181
INITIAL	MH144(2,3),6	2182
INITIAL	MH144(3-4,2),33	2183
INITIAL	MH144(3-4,3),1	2184
INITIAL	MH144(4,4),1	2185
INITIAL	MX003(1-2,1-4),600100	2186
INITIAL	MX003(3,1-4),600150	2187
INITIAL	MX003(4,1-4),700200	2188
INITIAL	MX003(5-7,1-4),640100	2189
INITIAL	MX003(7,2-4),640150	2190
INITIAL	MX003(8,1),640125	2191
INITIAL	MX003(8,2-4),700200	2192
INITIAL	MX003(9-12,1),580100	2193
INITIAL	MX003(9-10,2-4),600100	2194
INITIAL	MX003(11,2-4),600150	2195
INITIAL	MX003(12,2-4),700200	2196
INITIAL	MX003(13-16,1),500100	2197
INITIAL	MX003(13-14,2-4),600100	2198
INITIAL	MX003(15,2-4),600150	2199
INITIAL	MX003(16,2-4),700200	2200

Bedford continued

Initializes matrixes, as in Logan, to define the Beverly airport, weather minimums, and approach facilities required.

(continued)

* FITCHBURG			2201
INITIAL	MH108(1-2,1),5		2202
INITIAL	MH108(1,2),8		2203
INITIAL	MH108(1,3),18		2204
INITIAL	MH108(1,4),350		2205
INITIAL	MH108(2,3),24		2206
INITIAL	MH108(2,4),1		2207
INITIAL	MH108(3,1),1		2208
INITIAL	MH108(3,2),140		2209
INITIAL	MH108(3-5,3),145	Initializes matrixes, as in Logan, to define the Fitchburg airport, weather minimums, and approach facilities required.	2210
INITIAL	MH108(3-5,4),4		2211
INITIAL	MH108(4,1),2		2212
INITIAL	MH108(4,2),320		2213
INITIAL	MH108(5,1),3		2214
INITIAL	MH108(5,2),200		2215
INITIAL	MX004(1,1-4),1140100		2216
INITIAL	MX004(2,1-4),1400175		2217
INITIAL	MX004(3,1-4),1420200		2218
INITIAL	MX004(4,1-4),1600200		2219
INITIAL	MH145(1,1),32		2220
* FT DEVENS			2221
INITIAL	MH109(1-2,1),6		2222
INITIAL	MH109(1-2,3),24		2223
INITIAL	MH109(1,4),268		2224
INITIAL	MH109(2,4),1		2225
INITIAL	MH109(3,1),1		2226
INITIAL	MH109(3,2),140		2227
INITIAL	MH109(3-6,3),146	Initializes matrixes, as in Logan, to define the Ft. Devens airport, weather minimums, and approach facilities required.	2228
INITIAL	MH109(3-6,4),5		2229
INITIAL	MH109(4,1),2		2230
INITIAL	MH109(4,2),320		2231
INITIAL	MH109(5,1),3		2232
INITIAL	MH109(5,2),20		2233
INITIAL	MH109(6,1),4		2234
INITIAL	MH109(6,2),200		2235
INITIAL	MX005(1-2,1-4),940100		2236
INITIAL	MX005(3,1),940125		2237
INITIAL	MX005(3,2-4),940150		2238
INITIAL	MX005(4,1),940150		2239
INITIAL	MX005(4,2-4),940200		2240
INITIAL	MH146(1,1),26		2241
* LAWRENCE			2242
INITIAL	MH110(1-2,1),6		2243
INITIAL	MH110(1,2),8		2244
INITIAL	MH110(1,3),21		2245
INITIAL	MH110(1,4),147		2246
INITIAL	MH110(2,3),24		2247
INITIAL	MH110(2,4),2		2248
INITIAL	MH110(3,1),1		2249
INITIAL	MH110(3,2),230		2250
INITIAL	MH110(3,3),147		2251
INITIAL	MH110(4,3),157		2252
INITIAL	MH110(5-6,3),158		2253
INITIAL	MH110(3-6,4),6		2254
INITIAL	MH110(4,1),2		2255
INITIAL	MH110(4,2),50		2256
INITIAL	MH110(5,1),3		2257
INITIAL	MH110(5,2),140		2258
INITIAL	MH110(6,2),320		2259
INITIAL	MH110(6,1),4		2260
INITIAL	MX006(1-3,1),700100		2261
INITIAL	MX006(1-2,2-4),780100	Initializes matrixes, as in Logan, to define the Lawrence airport, weather minimums, and approach facilities required.	2262
INITIAL	MX006(3,2-4),780150		2263
INITIAL	MX006(4,1),700125		2264
INITIAL	MX006(4,2-4),780200		2265
INITIAL	MX006(5-6,1),780100		2266
INITIAL	MX006(5-7,2),760100		2267
INITIAL	MX006(5-6,3-4),780100		2268
INITIAL	MX006(7,1),780150		2269
INITIAL	MX006(7,3-4),780125		2270
INITIAL	MX006(8,1),780200		2271
INITIAL	MX006(8,2),760125		2272
INITIAL	MX006(8,3-4),780200		2273
INITIAL	MH158(1,1),1		2274
INITIAL	MH158(1,2),3		2275
INITIAL	MH158(2,1),13		2276
INITIAL	MH158(2,2),26		2277
INITIAL	MH157(1,1),1		2278
INITIAL	MH157(1,2),3		2279
INITIAL	MH157(2,1),13		2280
INITIAL	MH157(2,2),28		2281
INITIAL	MH157(2,8),41		2282
INITIAL	MH147(1,1),1		2283
INITIAL	MH147(1,2),3		2284
INITIAL	MH147(1,8),41		2285
INITIAL	MH147(2,1),13		2286
INITIAL	MH147(2,2),28		2287

(continued)

* MANSFIELD			2288
INITIAL	MH111(1-2,1),4		2289
INITIAL	MH111(1,2),8		2290
INITIAL	MH111(1,3),18		2291
INITIAL	MH111(1,4),124		2292
INITIAL	MH111(2,3),24		2293
INITIAL	MH111(2,4),2		2294
INITIAL	MH111(3,1),1		2295
INITIAL	MH111(3,2),140		2296
INITIAL	MH111(3-4,3),148		2297
INITIAL	MH111(3-4,4),7		2298
INITIAL	MH111(4,2),320		2299
INITIAL	MH111(4,1),2		2300
INITIAL	MX007(1-2,1-2),860100	Initializes matrixes, as in Logan, to define the Mansfield	2301
INITIAL	MX007(3,1-2),860150	airport, weather minimums, and approach facilities required.	2302
INITIAL	MX007(4,1-2),860200		2303
INITIAL	MX007(5-6,1-2),780100		2304
INITIAL	MX007(7,1-2),780150		2305
INITIAL	MX007(8,1-2),800200		2306
INITIAL	MH148(1-2,1),2		2307
INITIAL	MH148(2,2),5		2308
* MARSHFIELD			2309
INITIAL	MH112(1-2,1),4		2310
INITIAL	MH112(1,2),8		2311
INITIAL	MH112(1,3),18		2312
INITIAL	MH112(1,4),9		2313
INITIAL	MH112(2,3),24		2314
INITIAL	MH112(2,4),1		2315
INITIAL	MH112(3,1),1		2316
INITIAL	MH112(3,2),60	Initializes matrixes, as in Logan, to define the Marshfield	2317
INITIAL	MH112(3-4,3),149	airport, weather minimums, and approach facilities required.	2318
INITIAL	MH112(3-4,4),8		2319
INITIAL	MH112(4,1),2		2320
INITIAL	MH112(4,2),240		2321
INITIAL	MX008(1-2,1-2),600100		2322
INITIAL	MX008(3,1-2),600150		2323
INITIAL	MX008(4,1-2),640200		2324
INITIAL	MH149(1,1),2		2325
INITIAL	MH149(1,2),5		2326
* NEW BURYPORT			2327
INITIAL	MH113(1-2,1),4		2328
INITIAL	MH113(1,2),8		2329
INITIAL	MH113(1,3),18		2330
INITIAL	MH113(1,4),11		2331
INITIAL	MH113(2,3),24		2332
INITIAL	MH113(2,4),1		2333
INITIAL	MH113(3,1),1	Initializes matrixes, as in Logan, to define the Newburyport	2334
INITIAL	MH113(3,2),100	airport, weather minimums, and approach facilities required.	2335
INITIAL	MH113(3-4,3),150		2336
INITIAL	MH113(3-4,4),9		2337
INITIAL	MH113(4,1),2		2338
INITIAL	MH113(4,2),280		2339
INITIAL	MX009(1,1-2),740100		2340
INITIAL	MX009(2-4,1-2),1500500		2341
INITIAL	MH150(1,1),13		2342
INITIAL	MH150(1,2),17		2343
* NORWOOD			2344
INITIAL	MH114(1-2,1),6		2345
INITIAL	MH114(1,2),7		2346
INITIAL	MH114(1,3),23		2347
INITIAL	MH114(1,4),49	Initializes matrixes, as in Logan, to define the Norwood	2348
INITIAL	MH114(2,3),24	airport, weather minimums, and approach facilities required.	2349
INITIAL	MH114(2,4),4		2350
INITIAL	MH114(3,1),1		2351
INITIAL	MH114(3,2),350		2352
INITIAL	MH114(3-6,3),151		2353
INITIAL	MH114(3-6,4),10		2354
INITIAL	MH114(4,1),2		2355
INITIAL	MH114(4,2),170		2356
INITIAL	MH114(5,1),3		2357
INITIAL	MH114(5,2),100		2358
INITIAL	MH114(6,1),4		2359
INITIAL	MH114(6,2),280		2360
INITIAL	MX010(1-3,1-4),640100		2361
INITIAL	MX010(3,2-4),640150		2362
INITIAL	MX010(4,1),640125		2363
INITIAL	MX010(4,2-4),740200		2364
INITIAL	MX010(5-7,1),580100		2365
INITIAL	MX010(5-6,2-4),640100		2366
INITIAL	MX010(7,2-4),640150		2367
INITIAL	MX010(8,1),580125		2368
INITIAL	MX010(8,2-4),740200		2369
INITIAL	MX010(9,1-4),840100		2370
INITIAL	MX010(10,1-4),840125		2371
INITIAL	MX010(11,1-4),840150		2372
INITIAL	MX010(12,1-4),840175		2373

(continued)

INITIAL	MX010(13-15,1),580100	2374
INITIAL	MX010(16,1),580125	2375
INITIAL	MH151(1-2,1),31	2376
INITIAL	MH151(2,2),34	2377
INITIAL	MH151(2,4),52	2378
INITIAL	MH151(3-4,1),2	2379
INITIAL	MH151(4,2),5	2380
* PLYMOUTH		2381
INITIAL	MH151(1-2,1),6	2382
INITIAL	MH151(1,2),8	2383
INITIAL	MH151(1,3),18	2384
INITIAL	MH151(1,4),149	2385
INITIAL	MH151(2,3),24	2386
INITIAL	MH151(2,4),1	2387
INITIAL	MH151(3,1),1	2388
INITIAL	MH151(3,2),60	2389
INITIAL	MH151(3-6,3),152	2390
INITIAL	MH151(3-6,4),11	2391
INITIAL	MH151(4,1),2	2392
INITIAL	MH151(4,2),330	2393
INITIAL	MH151(5,1),3	2394
INITIAL	MH151(5,2),240	2395
INITIAL	MH151(6,1),4	2396
INITIAL	MH151(6,2),150	2397
INITIAL	MH152(1,1),30	2398
INITIAL	MX011(1-3,1-4),600100	2399
INITIAL	MX011(3,2-4),600150	2400
INITIAL	MX011(4,1-4),1500500	2401
* S. WEYMOUTH		2402
INITIAL	MH116(1-2,1),6	2403
INITIAL	MH116(1-2,3),24	2404
INITIAL	MH116(1,4),161	2405
INITIAL	MH116(2,4),3	2406
INITIAL	MH116(3,1),1	2407
INITIAL	MH116(3,2),350	2408
INITIAL	MH116(3,3),153	2409
INITIAL	MH116(3-6,4),12	2410
INITIAL	MH116(4,1),2	2411
INITIAL	MH116(4,2),80	2412
INITIAL	MH116(5,1),3	2413
INITIAL	MH116(5,2),260	2414
INITIAL	MH116(6,1),4	2415
INITIAL	MH116(6,2),170	2416
INITIAL	MH116(4,3),159	2417
INITIAL	MH116(5,3),160	2418
INITIAL	MH116(6,3),161	2419
INITIAL	MX012(1-4,1),620100	2420
INITIAL	MX012(1-2,2-4),640100	2421
INITIAL	MX012(3,2-4),640150	2422
INITIAL	MX012(4,2-4),720200	2423
INITIAL	MX012(5-6,1-4),640100	2424
INITIAL	MX012(7,1-4),640150	2425
INITIAL	MX012(8,1-4),720200	2426
INITIAL	MX012(9-12,1),520100	2427
INITIAL	MX012(9-12,2),540100	2428
INITIAL	MX012(9-12,3),560100	2429
INITIAL	MX012(9-10,4),640100	2430
INITIAL	MX012(11,4),640150	2431
INITIAL	MX012(12,4),720200	2432
INITIAL	MH153(1-2,1),2	2433
INITIAL	MH153(1-2,2),5	2434
INITIAL	MH153(1,3),36	2435
INITIAL	MH153(3,1),27	2436
INITIAL	MH153(1,1),27	2437
INITIAL	MH153(3,1),2	2438
INITIAL	MH153(3,2),5	2439
INITIAL	MH153(3,3),36	2440
INITIAL	MH153(3,8),61	2441
INITIAL	MH153(1,2-3),0	2442
INITIAL	MH159(1,1),27	2443
INITIAL	MH159(2-3,1),2	2444
INITIAL	MH159(2-3,2),5	2445
INITIAL	MH159(3,3),36	2446
INITIAL	MH159(3,8),58	2447
INITIAL	MH160(1,1),27	2448
INITIAL	MH160(2-3,1),2	2449
INITIAL	MH160(2-3,2),5	2450
INITIAL	MH160(3,3),36	2451
INITIAL	MH160(3,7),62	2452
INITIAL	MH160(3,8),59	2453
INITIAL	MH161(1,1),27	2454
INITIAL	MH161(2-3,1),2	2455
INITIAL	MH161(2-3,2),5	2456
INITIAL	MH161(3,3),36	2457

Norwood continued

Initializes matrixes, as in Logan, to define the Plymouth airport, weather minimums, and approach facilities required.

Initializes matrixes, as in Logan, to define the S. Weymouth airport, weather minimums, and approach facilities required.

(continued)

* TAUNTON		2458
INITIAL	MH117(1-2,1),4	2459
INITIAL	MH117(1,2),8	2460
INITIAL	MH117(1,3),18	2461
INITIAL	MH117(1,4),92	2462
INITIAL	MH117(2,3),24	2463
INITIAL	MH117(2,4),3	2464
INITIAL	MH117(3,1),1	2465
INITIAL	MH117(3,2),300	2466
INITIAL	MH117(3-4,3),154	2467
INITIAL	MH117(3-4,4),13	2468
INITIAL	MH117(4,1),2	2469
INITIAL	MH117(4,2),120	2470
INITIAL	MH154(1,1),29	2471
INITIAL	MH154(2-3,1),2	2472
INITIAL	MH154(3,2),5	2473
INITIAL	MX013(1-3,1-2),660100	2474
INITIAL	MX013(3,2),660150	2475
INITIAL	MX013(4,1),660125	2476
INITIAL	MX013(4,2),660200	2477
INITIAL	MX013(5-7,1-2),760150	2478
INITIAL	MX013(8,1-2),760200	2479
INITIAL	MX013(9,1-2),580150	2480
INITIAL	MX013(10-11,1-2),620150	2481
INITIAL	MX013(12,1-2),620200	2482
* TEW-MAL		2483
INITIAL	MH118(1-2,1),6	2484
INITIAL	MH118(1,2),8	2485
INITIAL	MH118(1,3),18	2486
INITIAL	MH118(1,4),92	2487
INITIAL	MH118(2,3),24	2488
INITIAL	MH118(2,4),2	2489
INITIAL	MH118(3,1),1	2490
INITIAL	MH118(3,2),210	2491
INITIAL	MH118(3-6,3),155	2492
INITIAL	MH118(3-6,4),14	2493
INITIAL	MH118(4,1),2	2494
INITIAL	MH118(4,2),30	2495
INITIAL	MH118(5,1),3	2496
INITIAL	MH118(5,2),180	2497
INITIAL	MH118(6,1),4	2498
INITIAL	MH118(6,2),360	2499
INITIAL	MH155(1,1),1	2500
INITIAL	MH155(1,2),3	2501
INITIAL	MH155(2,1),28	2502
INITIAL	MX014(1-3,1-4),640100	2503
INITIAL	MX014(3,2-4),640150	2504
INITIAL	MX014(4,2-4),920200	2505
INITIAL	MX014(4,1),640175	2506
INITIAL	MX014(5-6,1-4),760100	2507
INITIAL	MX014(7,1-4),760150	2508
INITIAL	MX014(8,1-4),920200	2509
INITIAL	XH\$FACIL,63	2510
INITIAL	XH\$ARSEP,1	2511
INITIAL	XH\$WTCRG,180	2512
INITIAL	XH\$WTVAR,15	2513
INITIAL	XH\$DAYST,8	2514
INITIAL	XH\$DAYEN,18	2515
INITIAL	XH\$RUNWY,5	2516
INITIAL	XH\$DIVRT,500	2517
INITIAL	XH\$AIRPT,18	2518
INITIAL	XH\$HOLD,5	2519
INITIAL	XH\$NORAD,15	2520
INITIAL	XH\$RADDW,16	2521
INITIAL	XH\$TOF,10	2522
INITIAL	XH\$WNMAX,15	2523
INITIAL	XH\$MAXTM,30	2524
INITIAL	XH\$TAKQU,3	2525
INITIAL	XH\$LNDST,5	2526
INITIAL	XH\$MNONE,-1	2527
INITIAL	XH\$LNOSP,2	2528
INITIAL	XH\$TAKVS,100	2529
INITIAL	XH\$TAKCL,375	2530
INITIAL	XH\$CALM,5	2531
PMFTY FUNCTION	RN2,C2	2532
0,50/.999,150		2533
WNYEL FUNCTION	P1,D10	2534
4,3/5,3/6,7/7,7/8,12/9,12/10,22/11,22/12,30/13,30		2535
CEIL FUNCTION	P3,D7	2536
1,1000/2,750/3,500/4,400/5,300/6,200/7,50		2537
VISAB FUNCTION	P1,D7	2538
1,25/2,50/3,80/4,100/5,150/6,200/7,300		2539
PMQFY FUNCTION	RN2,C2	2540
0,150/.999,450		2541
MODSP FUNCTION	P1,D4	2542

Initializes matrixes, as in Logan, to define the Taunton airport, weather minimums, and approach facilities required.

Initializes matrixes, as in Logan, to define the Tew-Mac airport, weather minimums, and approach facilities required.

(continued)

1,1005/2,18060/3,2015/4,24060		2543
LOGRN FUNCTION P1,C13		2544
0,100/1,7/10,4.6/100,2.3/200,1.61/300,1.2/400,.92/500,.69/600,.51/		2545
700,.36/800,.22/900,.11/999,.001		2546
1 FUNCTION RN1,C2		2547
0,71/1,92		2548
2 FUNCTION RN1,C2		2549
0,91/1,122		2550
3 FUNCTION RN1,C2		2551
0,121/1,142		2552
4 FUNCTION RN1,C2		2553
0,141/1,167		2554
CLOCK VARIABLE (C1/60)*24+1		2555
CEILO FVARIABLE FN\$CEIL+FN\$PMOFY-300		2556
MTBF FVARIABLE FN\$LOGRN*P3		2557
MTTR FVARIABLE FN\$LOGRN*P4		2558
VISAB FVARIABLE FN\$VISAB+(FN\$PMFTY-100)/2		2559
WTVAR FVARIABLE FN\$LOGRN*XH\$WTVAR		2560
CEIL FVARIABLE FN\$CEIL+FN\$PMFTY-100		2561
WTCNG FVARIABLE FN\$LOGRN*XH\$WTCNG		2562
TYPEA FVARIABLE XH\$VFRWT*MH\$VFRPT(P2,XH\$TYPCT)+V\$TYPED		2563
TYPED FVARIABLE XH\$IFRWT*MH\$IFRPT(P2,XH\$TYPCT)		2564
DESTN FVARIABLE XH\$VFRWT*MH\$VFRAC(V\$CLOCK,XH\$TYPCT)+V\$DEST1		2565
DEST1 FVARIABLE XH\$IFRWT*MH\$IFRAC(V\$CLOCK,XH\$TYPCT)		2566
DELTN FVARIABLE 60*V\$DELT2		2567
DELT2 FVARIABLE FN\$LOGRN/(XH\$VFRWT*MH\$VFRAC(V\$CLOCK,18)+V\$DELT1)		2568
DELT1 FVARIABLE XH\$IFRWT*MH\$IFRAC(V\$CLOCK,18)		2569
TOF FVARIABLE (600*(MH\$DSTN(P15,P2)/P3)+5)/10		2570
TOFNR FVARIABLE (600*(MH\$DSTNR(P15,P2)/P3)+5)/10		2571
TAKDY VARIABLE M1-1		2572
DELAY VARIABLE M1-P7		2573
DIRWN VARIABLE XH\$DIRWN*XH\$DIRWN		2574
MOD FVARIABLE FN\$MODSP/100+RN7*V\$SPRED/1000		2575
SPRED VARIABLE FN\$MODSP*100		2576
LNDSF FVARIABLE (10*(X\$LNDSF*XH\$LNDSF/60)+5)/10		2577
CLRD BARIABLE X\$TMCTP*L*P6		2578
TRLAC BARIABLE X\$TMCTR*L*P6		2579
LEOAC BARIABLE X\$TMCTR*GE*P6		2580
ARSEP FVARIABLE (600*P1/P3+5)/10		2581
SEPAR FVARIABLE (600*P1/XH\$TRLVL+5)/10		2582
MDRWN FVARIABLE XH\$MNONE*XH\$DIRWN		2583
WEATH BARIABLE XH\$CEILT*GE*V\$CEILT*XH\$VISAT*GE*V\$VISAT		2584
APPT FVARIABLE 4*(P16-1)+P14		2585
CEILT VARIABLE X\$TESS/1000		2586
VISAT VARIABLE X\$TESS*1000		2587
*		2588
* WEATHER MODULE		2589
* WEATHER PARAMETERS		2590
* P1-COUNTER		2591
* P2-RANDOM NUMBER COUNTER		2592
* P3-COUNTER		2593
* P4-CEILING MATRIX NUMBER		2594
* P5-VISIBILITY MATRIX NUMBER		2595
* P6-DAY/NIGHT COUNTER		2596
*		2597
1 GENERATE ,,,1,,6	CREATE WEATHER TRANSACT	2598
2 SPLIT 1,WTC	SEND TWIN TO CEIL CALC	2599
3 SPLIT 1,WTVS	SEND TWIN TO VIS CALC	2600
4 WTA ASSIGN 1,2	INITIAL NIGHT TIME	2601
5 ASSIGN 6,0	INITIAL PARAMETER 6	2602
6 ASSIGN 3,0	INITIAL PARAMETER 3	2603
7 TEST GE V\$CLOCK,XH\$DAYST,WTE	IS IT DAYTIME	2604
8 TEST L V\$CLOCK,XH\$DAYEN,WTE	IS IT DAYTIME	2605
9 ASSIGN 1,3	INITIAL DAY TIME	2606
10 ASSIGN 6,1	DAY COUNTER	2607
11 WTB ASSIGN 2,RN2	GET RANDOM NUMBER	2608
12 WTC ASSIGN 3+,1	INCREMENT COUNTER	2609
13 TEST LE P2,MH1(P3,P1),WTC	IS WIND FROM THIS DIREC	2610
14 SAVEVALUE WNDIR,MH1(P3,1),H	STORE WIND DIRECTION	2611
15 ASSIGN 2,RN2	GET RANDOM NUMBER	2612
16 WTD ASSIGN 1+,2	INCREMENT COUNTER	2613
17 TEST LE P1,11,WTE	IS VELOCITY DEFAULTED	2614
18 TEST LE P2,MH1(P3,P1),WTD	IS IT THIS VELOCITY	2615
19 WTE SAVEVALUE WNVEL,FN\$WNVEL,H	STORE WIND VELOCITY	2616
20 ASSIGN 1-,3	ASSIGN CEILING COUNTER	2617
21 ASSIGN 2,RN2	GET RANDOM NUMBER	2618
22 ASSIGN 4,MH1(P3,12)	STORE CEILING MATRIX	2619
23 ASSIGN 5,MH1(P3,13)	STORE VISIBILITY MATRIX	2620
24 ASSIGN 3,0	INITIAL COUNTER	2621
25 WTF ASSIGN 3+,1	INCREMENT COUNTER	2622
26 TEST LE P3,6,WTE	IS CEILING DEFAULTED	2623
27 TEST LE P2,MH1(P3,P1),WTF	IS THIS THE CEILING	2624
28 WTG SAVEVALUE CEIL,P3,H	STORE CEILING	2625
29 TEST E P3,1,WTE	IS IT VFR	2626
30 SAVEVALUE CEIL,FN\$CEIL,H	SET CEIL TC MAX	2627
31 TRANSFER ,WTEGG	GO TO VISAB CALC	2628

(continued)

32	WTGG	TEST NE	P3,2,WTGGA	IS CEILING 750	2629
33		SAVEVALUE	CEIL,V\$CEIL,H	STORE CEILING	2630
34		TRANSFER	,WTGGG	GO TO VISAB CALC	2631
35	WTGGA	SAVEVALUE	CEIL,V\$CEILO,H	STORE CEILING	2632
36	WTGGG	ASSIGN	3+,P3	CALC VISIBILITY COUNTER	2633
37		ASSIGN	3+,P6	ACOUNT FOR DAYTIME	2634
38		ASSIGN	3-,1	MICKEY MOUSE	2635
39		ASSIGN	1,0	INITIAL COUNTER	2636
40		ASSIGN	2,RN2	GET RANDOM NUMBER	2637
41	WTH	ASSIGN	1+,1	INCREMENT COUNTER	2638
42		TEST LE	P1,6,WTI	IS VISIBILITY DEFAULTED	2639
43		TEST LE	P2,MH*5(P1,P3),WTH	IS THIS THE VISIBILITY	2640
44	WTI	SAVEVALUE	VISAP,P1,H	STORE VISIBILITY	2641
45		TEST E	P1,7,WTJ	IS IT VFR	2642
46		SAVEVALUE	VISAB,FN\$VISAB,H	SET VISAB TO MAX	2643
47		TRANSFER	,WTJJ	GO TO VFR CHECK	2644
48	WTJ	SAVEVALUE	VISAB,V\$VISAB,H	STORE VISAB	2645
49	WTJJ	SAVEVALUE	IFRWT,1,H	INITIAL IFR CONDITIONS	2646
50		SAVEVALUE	VFRWT,0,H	INITIAL IFR CONDITIONS	2647
51		TEST E	XH\$VISAP,7,WTK	IS VISAB AT MAX	2648
52		TEST E	XH\$CEILP,1,WTK	IS CEIL AT MAX	2649
53		SAVEVALUE	IFRWT,0,H	INITIAL VFR CONDITIONS	2650
54		SAVEVALUE	VFRWT,1,H	INITIAL VFR CONDITIONS	2651
55	WTK	ASSIGN	1,RN2	GET RANDOM NUMBER	2652
56		LOGIC S	CHANG	WEATHER CHANGE	2653
57		ADVANCE	V\$WTCHG	WAIT FOR WEATHER TO CHA	2654
58		TRANSFER	,WTA	GO TO WEATHER CALC	2655
59	WTCL	ASSIGN	3,XH\$CEILP	STORE CEILING PARAMETER	2656
60		TEST NE	P3,1,WTCLL	IS CEIL AT MAX	2657
61		TEST NE	P3,2,WTCLA	IS CEILING 750	2658
62		SAVEVALUE	CEIL,V\$CEIL,H	STORE CEILING	2659
63		TRANSFER	,WTCLB	GO TO WEATHER CHANGE	2660
64	WTCLA	SAVEVALUE	CEIL,V\$CEILO,H	STORE CEILING	2661
65	WTCLB	LOGIC S	CHANG	WEATHER CHANGE	2662
66	WTCLL	ASSIGN	1,RN2	GET RANDOM NUMBER	2663
67		ADVANCE	V\$WTVAR	WAIT FOR WEATHER CHANGE	2664
68		TRANSFER	,WTCL	GO CALC CEILING	2665
69	WTVS	ASSIGN	1,XH\$VISAP	STORE VIS PARAMETER	2666
70		TEST NE	P1,7,WTVSS	IS VISAB AT MAX	2667
71		SAVEVALUE	VISAB,V\$VISAB,H	STORE VISIBILITY	2668
72	WTVSS	ASSIGN	1,RN2	GET RANDOM NUMBER	2669
73		LOGIC S	CHANG	WEATHER CHANGE	2670
74		ADVANCE	V\$WTVAR	WAIT FOR WEATHER CHANGE	2671
75		TRANSFER	,WTVS	GO CALC VISSIBILITY	2672
* CONTROL A/C'S LEAVING HOLD AREA ENTERING AIR CONTROLLED APPROACH					2673
* GENERATE ,,,,1					2674
76		GENERATE	,,,,1	CREATE TRANSACTION	2675
77		SPLIT	1,ADI	SEND TWIN TO RUNWAY MOD	2676
78		GATE LS	FINI6	WAIT FOR FACILITIES	2677
79	AABF	LOGIC R	ENTER	RESET A/C IN HOLD SWITC	2678
80		GATE LS	ENTER	WAIT FOR A/C TO ENTER H	2679
81	AABG	GATE LR	ARCGO	WAIT FOR AIR CONTROLLER	2680
* AIR CONTROLLER TAKES CONTROL OF A/C					2681
82		UNLINK	HOARC,AAA,1,13,0,AABF	RELEASE A/C FROM HOLD	2682
83		GATE LS	FINI5	WAIT FOR A/C IN TEST	2683
84		LOGIC R	FINI5	A/C IN TEST	2684
85		TRANSFER	,AABG	CHECK FOR NEXT A/C	2685
* CREATE A/C AND LOAD INTO HOLD AREAS					2686
* GENERATE ,,,,16					2687
86		GENERATE	,,,,16	CREATE A/C'S	2688
87		GATE LR	FINI2	WAIT FOR PREV A/C	2689
88		LOGIC S	FINI2	A/C IN CREATION	2690
89		ASSIGN	1,RN1	GET RANDOM NUMBER	2691
90		ADVANCE	V\$DELTM	WAIT FOR A/C IN HOLD	2692
91		LOGIC R	FINI2	A/C CREATED	2693
* ASSIGN A/C TAIL NUMBER					2694
92		SAVEVALUE	ACNUM+,1,H	INCREMENT A/C TAIL NUM	2695
93		ASSIGN	5,XH\$ACNUM	ASSIGN A/C TAIL NUM	2696
* ASSIGN A/C DESTINATION					2697
94		ASSIGN	1,RN1	CHOOSE RANDOM NUMBER	2700
95		SAVEVALUE	TYPCT,0,H	INITIAL AIRPORT COUNTER	2701
96	ACC	SAVEVALUE	TYPCT+,1,H	INCREMENT AIRPORT	2702
97		TEST NE	XH\$TYPCT,XH\$AIRPT,ACD	CHECK ALL AIRPORTS	2703
98		TEST G	P1,V\$DESTN,ACD	IS THIS THE AIRPORT	2704
99		TRANSFER	,ACC	GO CHECK AGAIN	2705
100	ACD	ASSIGN	2,XH\$TYPCT	ASSIGN DESTINATION	2706
* ASSIGN A/C TYPE					2707
101		SAVEVALUE	TYPCT,0,H	INITIAL COUNTER	2708
102		ASSIGN	1,RN1	GET RANDOM NUMBER	2709
103	AAD	SAVEVALUE	TYPCT+,1,H	INCREMENT TYPE COUNTER	2710
104		TEST G	P1,V\$TYPEA,AAG	IS THIS THE TYPE	2711
105		TEST G	XH\$TYPCT,3,AAD	IS IT TYPE 4	2712
106		SAVEVALUE	TYPCT,4,H	TYPE 4 A/C	2713

(continued)

107	AAG	ASSIGN	4,XH\$TYPCT	ASSIGN A/C TYPE	2714
	*	ASSIGN	A/C WEIGHT CLASS AND CATEGORY		2715
108		ASSIGN	1,RN1	GET RANDOM NUMBER	2716
109		ASSIGN	8,0	INITIAL PARAMETER 8	2717
110	ABA	ASSIGN	8+,1	INCREMENT COUNTER	2718
111		TEST LE	P1,MH\$CATWT(P4,P8),ABA	FIND CATEGORY OF A/C	2719
112		ASSIGN	14,P8	STORE CATEGORY	2720
113		ASSIGN	8,4	INITIAL COUNTER	2721
114		ASSIGN	1,RN1	GET RANDOM NUMBER	2722
115	ABB	ASSIGN	8+,1	INCREMENT COUNTER	2723
116		TEST LE	P1,MH\$CATWT(P4,P8),ABB	FIND WEIGHT CLASS	2724
117		ASSIGN	9,P8	STORE WEIGHT CLASS	2725
118		ASSIGN	9-,4	CALC WEIGHT CLASS	2726
	*	ASSIGN	A/C SPEED		2727
119		ASSIGN	3,FN*14	CALC A/C SPEED	2728
	*	LOAD	DISPLAY MATRIX		2729
120		MSAVEVALUE	DELAY+,1,P4,1,H	STORE NUM A/C CREATED	2730
121		TEST LE	P2,XH\$HOLD,AEA	IS DESTINATION SECONDARY	2731
122	ABC	SAVEVALUE	ACCTR+,1,H	INCREMENT DISPLAY COUNT	2732
123		MSAVEVALUE	DELAY+,2,P4,1,H	STORE NUM PRI A/C	2733
124		ASSIGN	15,1	A/C DESTINATION CHANGED	2734
125		ASSIGN	10,P5	LOAD A/C TAIL NUMBER	2735
126		ASSIGN	5,XH\$ACCTR	ASSIGN DISPLAY COUNTER	2736
127		ASSIGN	8,0	INITIAL PARAMETER 8	2737
128		ASSIGN	1,0	INITIAL PARAMETER 1	2738
129		LOGIC S	ENTER	A/C IN HOLD AREA	2739
130		MARK		A/C MARK TIME	2740
131		LINK	HDARC,P10	LOAD A/C INTO HOLD AREA	2741
	*				2742
	*	UNLOAD	HOLD AREAS AND LAND A/C		2743
	*				2744
132	AAB	ADVANCE	P7	LAND A/C	2745
133		GATE LR	FINI1	ENSURE ALL A/C'S IN SCH	2746
134		UNLINK	P11,TERM,1,5,P5,ERR	A/C OFF LAND SCHEDULE	2747
135		TEST NE	V\$DELAY,0,NOLY	TEST FOR DELAY	2748
136		MSAVEVALUE	DELAY+,5,P4,1,H	STORE NUM A/C DELAYED	2749
137		MSAVEVALUE	DELAY+,6,P4,V\$DELAY,H	STORE DELAY TIME	2750
138	NOLY	SAVEVALUE	ARCGD-,1,H	A/C NOT IN CONTROL	2751
139		TEST L	XH\$ARCGO,MH\$ARSEP(XH\$ARSEP,11),	TERM1 CAN AIR CONTROL N	2752
140		LOGIC R	ARCGO	ALLOW NEXT A/C	2753
141	TERM1	ASSIGN	1,P4	STORE A/C TYPE	2754
142		MSAVEVALUE	DELAY+,9,P4,1,H	STORE NUM A/C LANDED	2755
143		SPLIT	1,TAA,3	REDUCE XACT SIZE	2756
144		LOGIC S	LNDSF	NO SAME RUNWAY TAKEOFFS	2757
145		ADVANCE	1	WAIT ONE MINUTE	2758
146		TEST GE	XH\$ARSEP,XH\$NORAD,AABA	IS IT RADAR CONTROL	2759
147		ADVANCE	2	WAIT ADDITIONAL 2 MINUT	2760
148	AABA	LOGIC R	LNDSF	A/C CLEARED FOR TAKEOFF	2761
149		TERMINATE		TERMINATE A/C	2762
	*				2763
	*	TAKE OFF	A/C		2764
	*				2765
150	TAA	ADVANCE	V\$MOD	WAIT FOR TURN AROUND	2766
151		PRIORITY	0	DECREASE PRIORITY	2767
152		MSAVEVALUE	DELAY+,13,P1,1,H		2768
153		MARK		A/C MARK TIME	2769
154		ASSIGN	2,C1	STORE CLOCK	2770
155		SAVEVALUE	TAKOF+,1,H	INCREMENT A/C COUNTER	2771
156		ASSIGN	3,XH\$TAKOF	STORE A/C NUMBER	2772
157		SPLIT	1,TAB	SEND TWIN TO SCH CHECK	2773
158		LINK	TAKOF,P2	A/C IN QUEUE	2774
159	TAB	GATE LR	TAKOF	IS A/C READY	2775
160		LOGIC S	TAKOF	NO MORE A/C'S	2776
161	TACC	GATE LR	FINI1	IS CHECK CLEARED	2777
162		LOGIC S	FINI1	A/C IN CHECK	2778
163		SAVEVALUE	TMCTR,P2	STORE ETA	2779
164		UNLINK	1,TAD,1,BV\$CLRD,,TBKOF	FIND NEXT LANDING A/C	2780
165		GATE LS	CLRD	WAIT FOR A/C FOUND	2781
166		LOGIC R	FINI1	TEST COMPLETED	2782
167		LOGIC R	CLRD	A/C RETURNED TO CHAIN	2783
168		SAVEVALUE	LNDRM-,C1	MINUTES TO LAND TIME	2784
169	TACD	TEST G	XH\$WNVEL,XH\$WNMAX,TACA	IS WIND ABOVE MAX	2785
170		GATE LR	LNDRM	WAIT FOR TAKEOFF	2786
171	TACA	TEST NE	V\$LNDRM,0,TAKOF	ANY LANDING A/C	2787
172		TEST L	V\$LNDRM,XH\$LNDRM,TAKOF	ARE SEPAR OBSERVED	2788
173		MSAVEVALUE	DELAY+,12,P1,X\$LNDRM,H	STORE DELAY TIME	2789
174		ADVANCE	X\$LNDRM	WAIT FOR A/C TO LAND	2790
175		TRANSFER	,TACC	GO TRY NEXT A/C	2791
176	TAD	SAVEVALUE	LNDRM,P6	STORE LANDING TIME	2792
177		SAVEVALUE	LNDRM,P3,H	STORE LANDING VELOCITY	2793
178		LOGIC S	CLRD	A/C RECORDED	2794
179		LINK	P11,P6	RETURN A/C TO CHAIN	2795
180	TBKOF	LOGIC R	FINI1	TEST COMPLETED	2796
181		LOGIC R	CLRD	A/C RETURNED TO CHAIN	2797
182		SAVEVALUE	LNDRM,0	ZERO LAND TIME	2798
183		SAVEVALUE	LNDRM,0,H	ZERO LAND SPEED	2799

(continued)

184		TRANSFER	,TACD	GO TO TAKE OFF CHECK	2800
185	TAKOF	TEST LE	XH\$TAKVS,XH\$VISAB,NOTAK	CHECK VISIBILITY	2801
186		TEST LE	XH\$TAKCL,XH\$CEIL,NOTAK	CHECK CEILING	2802
187		UNLINK	TAKOF,TERM,1,3,,ERR	TAKE OFF A/C	2803
188		ADVANCE	1	WAIT 1 MINUTE	2804
189		TEST GE	XH\$ARSEP,XH\$NORAD,TAE	IS IT RADAR ENVIRONMENT	2805
190		ADVANCE	2	WAIT ANOTHER 2 MINUTES	2806
191	TAE	LOGIC R	TAKOF	NEXT A/C INTC CHECK	2807
192		TEST NE	V\$TAKDY,0,TAF	ANY DELAYS	2808
193		MSAVEVALUE	DELAY+,10,P1,1,H	STORE NUM A/C DELAYED	2809
194		MSAVEVALUE	DELAY+,11,P1,V\$TAKDY,H	STORE DELAY TIME	2810
195	TAF	TERMINATE		TERMINATE A/C	2811
196	NOTAK	GATE LS	CHANG	WAIT FOR WEATHER TO CHA	2812
197		TRANSFER	,TACC	GU CHECK TAKE OFF	2813
198	TERM	TERMINATE		TERMINATE TWIN	2814
199	ERR	ASSIGN	XH\$ERROR,101	THIS STATE BOMBS MODEL	2815
	*				2816
	*	TEST AND LOAD LANDING SCHEDULE			2817
	*				2818
200	AAA	LOGIC S	FINIS	A/C IN TEST	2819
201		TEST LE	M1,XH\$MAXTH,AEDH	HAS A/C WAITED TOO LONG	2820
202		SAVEVALUE	ARCGO+,1,H	A/C IN CONTROL	2821
203		TEST GE	XH\$ARCGO,MH\$ARSEP(XH\$ARSEP,11),	AEA CAN CONTROL HANDLE	2822
204		LOGIC S	ARCGO	DO NOT LET IN NEXT A/C	2823
205		TRANSFER	,AEA	GO TO RUNWAY CHECK	2824
206	ADI	GATE LS	CHANG	WAIT FOR WEATHER CHANGE	2825
207		LOGIC R	CHANG	RESET WEATHER CHANGE	2826
208		UNLINK	HDARC,AEA,ALL,13,1	CHECK ALL A/C WAITING	2827
209		TRANSFER	,ADI	GO TO WAIT FOR CHANGE	2828
	*	DETERMINE LANDING RUNWAY			2829
210	AEA	ASSIGN	1,XH\$RUNWY	STORE RUNWAYS	2830
211		PRIORITY	0	DECREASE PRIORITY	2831
212		ASSIGN	8,0	INITIAL PARAMETER 8	2832
213		ASSIGN	1+,1	INCREMENT RUNWAYS BY 1	2833
214		ASSIGN	1,MH\$DSTN(P1,P2)	STORE ARPRT MATRIX NUMB	2834
215		TEST NE	P15,0,AEAA	IS ARPRT PRIMARY	2835
216		TEST G	P2,XH\$HOLD,AEAA	HAS ORIGIN CHANGED	2836
217		ASSIGN	1,XH\$RUNWY	STORE RUNWAYS	2837
218		ASSIGN	1+,1	INCREMENT RUNWAYS BY 1	2838
219		ASSIGN	1,MH\$DSTN(P1,1)	STORE HOLD AREA 1	2839
220	AEAA	TEST GE	V\$CLOCK,MH*1(1,2),AEDD	IS ARPRT OPEN	2840
221		TEST LE	V\$CLOCK,MH*1(1,3),AEDD	IS ARPRT OPEN	2841
222		ASSIGN	6,3	STORE DAY TIME ROW	2842
223		ASSIGN	7,MH*1(2,1)	STORE MAX ROW	2843
224		TEST GE	V\$CLOCK,MH*1(2,2),AEB	IS IT DAY TIME	2844
225		TEST G	V\$CLOCK,MH*1(2,3),AED	IS IT DAY TIME	2845
226	AEB	ASSIGN	6,MH*1(2,1)	STORE NIGHT ROW	2846
227		ASSIGN	7,MH*1(1,1)	STORE MAX ROW	2847
228		ASSIGN	7+,1	INCREMENT MAX ROW	2848
229	AED	TEST G	XH\$WVEL,XH\$CALM,AEF	IS WIND ABOVE MAX	2849
230	AEDB-	SAVEVALUE	DIRWN,XH\$WDIR,H	STORE WIND DIRECTION	2850
231		SAVEVALUE	DIRWN-,MH*1(P6,2),H	SUBTRACT RUNWAY HEADING	2851
232		TEST L	XH\$DIRWN,0,AEDBB	IS IT NEGATIVE	2852
233		SAVEVALUE	DIRWN,V\$MORWN,H	MAKE IT POSITIVE	2853
234	AEDBB	TEST GE	XH\$DIRWN,180,AEDBC	IS IT GREATER THAN 180	2854
235		SAVEVALUE	DIRWN-,360,H	SUBTRACT 360	2855
236	AEDBC	TEST G	V\$DIRWN,6400,AEF	IS RUNWAY IN 80 DEGREES	2856
237	AEDA	ASSIGN	6+,1	INCREMENT ROW COUNTER	2857
238		TEST GE	P6,P7,AEDB	IS ROW COUNTER AT MAX	2858
239		TEST NE	P8,0,AEDD	ANY OTHER RUNWY SELECTI	2859
240		ASSIGN	15,MH*1(P8,1)	STORE LANDING RUNWAY	2860
241		TRANSFER	,ADDC	GO TO CHECK	2861
242	AEDD	TEST E	P15,0,AEDE	IS A/C DESTINATION PRIM	2862
243		PRIORITY	2	INCREASE PRIORITY	2863
244		ASSIGN	15,RN5	CHOOSE RANDOM NUMBER	2864
245		TEST LE	P15,XH\$DIVRT,AEDDD	DIVERT A/C TO PRI ARPRT	2865
246		TERMINATE		TERMINATE REMAINDER	2866
247	AEDDD	MSAVEVALUE	DELAY+,3,P4,1,H	STORE NUM DIVERTED	2867
248		TRANSFER	,ABC	GO TO PRI ARPRT	2868
249	AEDE	TEST E	P13,0,AEDF	IS A/C WAITING	2869
250		SAVEVALUE	ARCGO-,1,H	REMOVE A/C FM CONTROL	2870
251		TEST LE	XH\$ARCGO,MH\$ARSEP(XH\$ARSEP,11),	AEDEE CAN A/C ENTER	2871
252		LOGIC R	ARCGO	CLEAR NEXT A/C	2872
253	AEDEE	GATE LR	FINI1	ALLOW 1 A/C IN TEST	2873
254		UNLINK	1,TERM,1,10	REMOVE TWIN FM LAND SCH	2874
255		UNLINK	2,TERM,1,10	REMOVE TWIN FM LAND SCH	2875
256		SPLIT	1,AEDG	CREATE TWIN	2876
257		ASSIGN	13,1	A/C IS WAITING	2877
258	AEDF	LINK	HDARC,P10	PUT BACK INTO HOLD	2878
259	AEDG	ADVANCE	XH\$MAXTH	WAIT MAX TIME	2879
260		UNLINK	HDARC,TERM,1,10,,AEDH	REMOVE A/C FM HOLD AREA	2880
261		MSAVEVALUE	DELAY+,8,P4,1,H	STORE NUM A/C CAN'T LAN	2881
262		TERMINATE		TERMINATE A/C	2882
263	AEDH	PRIORITY	0,BUFFER	DECREASE PRIORITY	2883
264		UNLINK	HDARC,TERM,1,10	REMOVE A/C FM HOLD AREA	2884
265		MSAVEVALUE	DELAY+,8,P4,1,H	STORE NUM A/C CAN'T LAN	2885

(continued)

266		TERMINATE		TERMINATE A/C	2886
267	AEF	TEST NE	P8,0,AEFF	WAS RUNWAY SELECTED	2887
268		SAVEVALUE	TESS,V\$DIRWN	STORE WIND DIRECTION	2888
269		SAVEVALUE	DIRWN,XH\$WINDIR,H	STORE WIND DIRECTION	2889
270		SAVEVALUE	DIRWN,MH*1(P8,2),H	SUBTRACT RUNWAY DIRECTI	2890
271		TEST L	XH\$DIRWN,0,AEFD	IS IT NEGATIVE	2891
272		SAVEVALUE	DIRWN,V\$MORWN,H	MAKE IT POSITIVE	2892
273	AEFD	TEST GE	XH\$DIRWN,180,AEFB	IS IT GREATER THAN 180	2893
274		SAVEVALUE	DIRWN,-360,H	SUBTRACT 360	2894
275	AEFB	SAVEVALUE	TESS,V\$DIRWN	SUBTRACT WIND DIFFERENT	2895
276		TEST L	X\$TESS,0,AEDA	IS THIS RUNWAY CLOSER	2896
277	AEFF	TEST NE	XH\$VFRWT,1,ADD	IS IT VFR	2897
278		ASSIGN	16,0	INITIAL PARAMATER 16	2898
279		ASSIGN	12,MH*1(P6,3)	STORE FACILITY MATRIX	2899
280	AEF	ASSIGN	16+,1	INCREMENT PARAMETER 16	2900
281		TEST LE	P16,MH*1(2,4),AEDA	CHECK ALL APPROACHES	2901
282		ASSIGN	11,0	INITIAL COUNTER	2902
283	AEH	ASSIGN	11+,1	INCREMENT COUNTER	2903
284		TEST LE	P11,4,AEK	TEST ALL FACILITIES	2904
285		TEST NE	MH*12(P16,P11),0,AEH	IS FACILITY ZERO	2905
286		SAVEVALUE	DUMMY,MH*12(P16,P11),H	DUMMY STORE	2906
287		TEST NE	MX\$FACIL(XH\$DUMMY,1),1,AEH	IS FACILITY DOWN	2907
288		TRANSFER	,AEG	CHECK NEXT APPROACH	2908
289	AEK	SAVEVALUE	CEILT,XH\$CEIL,H	STORE CEILING	2909
290		SAVEVALUE	VISAT,XH\$VISAB,H	STORE VISIBILITY	2910
291		SAVEVALUE	CEILT-,MH*1(1,4),H	SUBTRACT ARPRT ELEVATIO	2911
292		TEST NE	MH*12(P16,5),0,AEL	IS OM REQUIRED	2912
293		SAVEVALUE	DUMMY,MH*12(P16,5),H	DUMMY STORER	2913
294		TEST NE	MX\$FACIL(XH\$DUMMY,1),1,AEL	IS OM UP	2914
295		SAVEVALUE	VISAT-,25,H	UPDATE VISAB	2915
296		SAVEVALUE	CEILT-,50,H	UPDATE CEILING	2916
297	AEL	TEST NE	MH*12(P16,6),0,AEM	IS MM REQUIRED	2917
298		SAVEVALUE	DUMMY,MH*12(P16,6),H	DUMMY STORER	2918
299		TEST NE	MX\$FACIL(XH\$DUMMY,1),1,AEM	IS MM UP	2919
300		SAVEVALUE	VISAT-,25,H	UPDATE VISAB	2920
301		SAVEVALUE	CEILT-,50,H	UPDATE CEIL	2921
302	AEM	TEST NE	MH*12(P16,7),0,AEO	IS ALS REQUIRED	2922
303		SAVEVALUE	DUMMY,MH*12(P16,7),H	DUMMY STORER	2923
304		TEST NE	MX\$FACIL(XH\$DUMMY,1),1,AEO	IS ALS UP	2924
305		SAVEVALUE	CEILT-,50,H	UPDATE CEIL	2925
306		SAVEVALUE	VISAT-,50,H	UPDATE VISAB	2926
307	AEO	TEST NE	MH*12(P16,8),0,AEP	IS HIRL REQUIRED	2927
308		SAVEVALUE	DUMMY,MH*12(P16,8),H	DUMMY STORER	2928
309		TEST NE	MX\$FACIL(XH\$DUMMY,1),1,AEP	IS HIRL UP	2929
310		SAVEVALUE	VISAT-,50,H	UPDATE VISAB	2930
311	AEP	ASSIGN	12,MH*1(P6,4)	STORE MINMA TABLE	2931
312		SAVEVALUE	DUMMY,MH*1(P6,1),H	DUMMY STORER	2932
313		SAVEVALUE	TESS,MX*12(V\$APPCT,XH\$DUMMY)	DUMMY STORER	2933
314		TEST NE	BV\$WEATH,1,ADD	IS WEATHER CK	2934
315		ASSIGN	12,MH*1(P6,3)	STORE RUNWAY SELECTED	2935
316		TRANSFER	,AEG	CHECK NEXT APPROACH	2936
317	ADD	ASSIGN	12,0	INITIAL PARAMETER 12	2937
318		TEST E	P15,0,ADDA	IS A/C DESTINATION PRIM	2938
319		TERMINATE		TERMINATE SECONDARY AC	2939
320	ADDA	ASSIGN	15,MH*1(P6,1)	STORE RUNWAY SELECTED	2940
321		TEST G	XH\$WVEL,XH\$WMAX,ADDC	IS WIND MAXIMUM	2941
322		ASSIGN	8,P6	STORE RUNWAY SELECTED	2942
323		TRANSFER	,AEDA	GO CHECK FOR CLOSER RUN	2943
324	ADDC	ASSIGN	1,0	INITIAL PARAMETER 1	2944
325		TEST E	P13,1,ADDB	IS A/C IN HCLD	2945
326		ASSIGN	13,0	A/C CLEARC TO LAND	2946
327		PRIORITY	2	INCREASE PRIORITY	2947
328		LOGIC S	ENTER	A/C IN HOLD AREA	2948
329		LINK	HDARC,P10	PUT A/C INTO HOLD	2949
330	ADDB	TEST E	P9,1,ADE	IS AIR WEIGHT CLASS 1	2950
331		TEST E	XH\$VFRWT,1,ADE	IS IT VFR	2951
332		ASSIGN	11,2	USE SECONDARY RUNWAY	2952
333		ASSIGN	7,XH\$TOF	STORE AVERAGE TOF	2953
334		TRANSFER	,ADF	GO TO CALC ETA	2954
335	ADE	ASSIGN	11,1	USE PRIMARY RUNWAY	2955
336		MSAVEVALUE	VFRAC,V\$CLOCK,19,P15,H		2956
337		TEST GE	XH\$ARSEP,XH\$NORAD,ADEE	IS RADAR UP	2957
338		ASSIGN	7,V\$TOFNR	CALC TCF NON RADAR	2958
339		TRANSFER	,ADF	GO TO CALC ETA	2959
340	ADEE	ASSIGN	7,V\$TOF	ASSIGN TIME OF FLIGHT	2960
		* CALCULATE ETA AND CONFLICTS			2961
341	ADF	ASSIGN	6,P7	RECORD TIME OF FLIGHT	2962
342		ASSIGN	8,0		2963
343		TEST G	P2,XH\$HOLC,ADG	IS A/C DIVERTED	2964
344		MSAVEVALUE	DELAY+,4,P4,P7,H	STORE TOF FM SEC ARPRT	2965
345	ADG	ASSIGN	6+,C1	ASSIGN EST TIME OF ARIV	2966
346	BBB	GATE LR	FIN11	ALLOW 1 A/C IN TEST	2967
347		LOGIC S	FIN11	A/C IN TEST	2968
348		UNLINK	1,TERM,1,10	REMOVE A/C FM LAND SCHE	2969
349		UNLINK	2,TERM,1,10	REMOVE A/C FM LAND SCHE	2970
350		SAVEVALUE	TMCTR,P6	STORE ETA	2971

351	BBBB	UNLINK	P11,BBD,ALL,BV\$LEDAC,,BBI	FETCH LEAD A/C'S	2972
352		GATE LS	FINI4	WAIT FOR CALC COMPLETE	2973
353	BBA	LOGIC R	FINI4	RESET SWITCH	2974
354		UNLINK	P11,BBC,1,BV\$TRLAC,,BBJ	FETCH TRAIL A/C	2975
355	BBAA	GATE LS	FINI3	WAIT FOR CALC COMPLETE	2976
356		LOGIC R	FINI3	RESET SWITCH	2977
357		LOGIC R	FINI1	A/C OUT OF TEST	2978
358		TEST E	X\$TRLTM,0,CCC	DOES TRAIL A/C EXIST	2979
		* TRAILING A/C DOES NOT EXIST			2980
359		TEST NE	X\$LEDTM,0,BBF	DOES LEAD A/C EXIST	2981
		* LEAD A/C EXISTS			2982
360	BBAD	ASSIGN	1,0	INITIAL PARAMETER 1	2983
361		TEST LE	P9,XH\$LEDWT,BBAC	IS LEAD A/C SMALLER	2984
362		TEST E	XH\$LEDWT,3,BBAB	IS LEAD A/C WEIGHT 3	2985
363		ASSIGN	1,6	ASSIGN 6 TC PARAMETER 1	2986
364		ASSIGN	1+,XH\$LEDWT	ADD LEAD A/C WEIGHT	2987
365		ASSIGN	1-,P9	SUBTRACT A/C WEIGHT	2988
366		ASSIGN	1,MH\$ARSEP(XH\$ARSEP,P1)	DETERMINE ADD SEPARATION	2989
367		TRANSFER	,BBAC	GO TO CALC TOTAL SEPARA	2990
368	BBAB	TEST E	XH\$LEDWT,2,BBAC	IS LEAD A/C WEIGHT 2	2991
369		ASSIGN	1,9	ASSIGN 9 TC PARAMETER 1	2992
370		ASSIGN	1+,XH\$LEDWT	ADD LEAD A/C WEIGHT	2993
371		ASSIGN	1-,P9	SUBTRACT A/C WEIGHT	2994
372		ASSIGN	1,MH\$ARSEP(XH\$ARSEP,P1)	DETERMINE ADD SEPARATIO	2995
373	BBAC	ASSIGN	1+,MH\$ARSEP(XH\$ARSEP,5)	DETERMINE TOTAL SEPARAT	2996
374		TEST L	P1,XH\$LNDST,BBAE	IS LAND SEPAR OK	2997
375		TEST G	CH\$TAKOF,XH\$TAKQU,BBAE	IS TAKE OFF QUEUE FULL	2998
376		ASSIGN	1,XH\$LNDST	INCREASE SEPARATION	2999
377	BBAE	ASSIGN	1,V\$ARSEP	CONVERT SEPAR TO TIME	3000
378		ASSIGN	1+,X\$LEDTM	ADD SEPAR TO LEAD A/C	3001
379		TEST NE	P12,1,CDE	DOES TRAILING A/C EXIST	3002
380		TEST G	P1,P6,BBF	IS PROPER SEPAR OBSERVE	3003
		* CALCULATE WAIT TIME			3004
381		ASSIGN	1-,P6	ASSIGN WAIT TIME	3005
382		ASSIGN	6+,P1	CALCULATE TA	3006
383		ASSIGN	8+,P1	STORE WAIT TIME	3007
384	BBF	SPLIT	1,BBE	SEND TWIN TO LAND SCHED	3008
385		LINK	P11,P6	A/C IN LAND SCHEDULE	3009
386	BBE	TEST G	P8,0,AAB	ANY WAIT TIME	3010
387		TEST G	P8,XH\$MAXTM,BBEE	WILL A/C WAIT TOO LONG	3011
388		GATE LR	FINI1	WAIT FOR TRANSACTIONS	3012
389		UNLINK	P11,TERM,1,5,,ERR	REMOVE TWIN FM LAND SCH	3013
390		SAVEVALUE	ARCGO-,1,H	REMOVE A/C FM CONTROL	3014
391		TRANSFER	,AEDH	RECORD A/C	3015
392	BBEE	ADVANCE	P8	WAIT WAIT TIME	3016
393		MSAVEVALUE	DELAY+,7,P4,P8,H	STORE WAIT TIME	3017
394		PRIORITY	2	INCREASE PRIORITY	3018
395		ASSIGN	8,0	ZERO WAIT TIME	3019
396		TEST G	XH\$ARCGO,MH\$ARSEP(XH\$ARSEP,11),	AEA CAN AIR CONTROL	3020
397		SAVEVALUE	ARCGO-,1,H	A/C NOT IN AIR CONTROL	3021
398		GATE LR	FINI1	WAIT FOR TRANSACTIONS	3022
399		UNLINK	P11,TERM,1,5,,ERR	REMOVE A/C FM LAND SCH	3023
400		LINK	HDARC,P10	LOAD A/C INTO HOLD AREA	3024
401	BBC	SAVEVALUE	TRLTM,P6	STORE TRAIL A/C TA	3025
402		SAVEVALUE	TRLWT,P9,H	STORE TRAIL A/C WEIGHT	3026
403		SAVEVALUE	TRLVL,P3,H	STORE TRL A/C SPEED	3027
404		LOGIC S	FINI3	CALCULATIONS COMPLETED	3028
405		LINK	P11,P6	A/C IN LAND SCHEDULE	3029
406	BBJ	SAVEVALUE	TRLTM,0	ZERO TRAIL A/C TA	3030
407		SAVEVALUE	TRLWT,0,H	ZERO TRAIL A/C WEIGHT	3031
408		SAVEVALUE	TRLVL,0,H	ZERO TRAIL A/C SPEED	3032
409		LOGIC S	FINI3	CALCULATIONS COMPLETE	3033
410		TRANSFER	,BBAA	GO TO CONTINUE TEST	3034
411	BBD	SAVEVALUE	LEDTM,P6	STORE LEAD A/C TA	3035
412		SAVEVALUE	LEDWT,P9,H	STORE LEAD A/C WEIGHT	3036
413		TEST E	W\$BBBB,1,BBDD	RETURN ALL A/C INTO HOL	3037
414		LOGIC S	FINI4	CALCULATIONS COMPLETE	3038
415	BBDD	LINK	P11,P6	A/C IN LANDING SCHEDULE	3039
416	BBI	SAVEVALUE	LEDTM,0	ZERO LEAD A/C TA	3040
417		SAVEVALUE	LEDWT,0,H	ZERO LEAD A/C WEIGHT	3041
418		TRANSFER	,BBA	GO TO TRAIL A/C CALC	3042
		* TRAILING A/C EXISTS			3043
		* TRAILING A/C EXISTS			3044
419	CCC	TEST E	X\$LEDTM,0,CDD	DOES LEAD A/C EXIST	3045
		* TEST TRAILING A/C			3046
420	CCD	ASSIGN	1,0	INITIAL PARAMETER 1	3047
421		TEST L	P6,X\$TRLTM,BBB	IS TLR TIME VALID	3048
422		TEST LE	XH\$TRLWT,P9,CCF	IS TRAILING A/C SMALLER	3049
423		TEST E	P9,3,CCE	IS LEAD A/C WEIGHT 3	3050
424		ASSIGN	1,6	ASSIGN 6 TC PARAMETER 1	3051
425		ASSIGN	1+,P9	ADD LEAD A/C WEIGHT	3052
426		ASSIGN	1-,XH\$TRLWT	SUB TRAIL A/C WEIGHT	3053
427		ASSIGN	1,MH\$ARSEP(XH\$ARSEP,P1)	DETERMINE ADD SEPARATIO	3054
428		TRANSFER	,CCF	GO TO CALC TOTAL SEPARA	3055
429	CCE	TEST E	P9,2,CCF	IS LEAD A/C WEIGHT 2	3056
					3057

(continued)

430	ASSIGN	1,9	ASSIGN 9 TO PARAMETER 1	3058
431	ASSIGN	1+,P9	ADD LEAD A/C WEIGHT	3059
432	ASSIGN	1-,XH\$TRLWT	SUBTRACT TRAIL A/C WEIG	3060
433	ASSIGN	1,MH\$ARSEP(XH\$ARSEP,P1)	DETERMINE ADD SEPARATIO	3061
434	CCF	ASSIGN 1+,MH\$ARSEP(XH\$ARSEP,5)	DETERMINE TOTAL SEPARAT	3062
435	TEST L	P1,XH\$LNDST,CCG	IS LAND SEPAR OK	3063
436	TEST G	CH\$TAKOF,XH\$TAKQU,CCG	IS TAKE OFF QUEUE FULL	3064
437	ASSIGN	1,XH\$LNDST	INCREASE SEPARATION	3065
438	CCG	ASSIGN 1,V\$SEPAR	CONVERT SEPAR TO TIME	3066
439	ASSIGN	1+,P6	ADD SEPAR TO ETA	3067
440	TEST G	P1,X\$TRLTM,BBF	IS SEPAR OBSERVED	3068
	* CALCULATE WAIT TIME			3069
441	ASSIGN	8+,X\$TRLTM	ADD TRAIL A/C TA	3070
442	ASSIGN	8-,P6	SUB ETA	3071
443	ASSIGN	6,X\$TRLTM	REINITIALIZE ETA	3072
444	TRANSFER	,BBB	GO TO TEST	3073
	* LEAD A/C EXISTS			3074
445	CDD	ASSIGN 12,1	LOAD DUMMY COUNTER	3075
446	TRANSFER	,BBAD	GO TO DETERMINE SEPARAT	3076
447	CDE	ASSIGN 12,0	REINITIALIZE PARAMETER	3077
448	SAVEVALUE	LEDWT,0,H	ZERO LEAD A/C WEIGHT	3078
449	SAVEVALUE	LEDTM,0	ZERO LEAD A/C TA	3079
450	TEST G	P1,P6,CCD	IS SEPAR OBSERVED	3080
	* CALCULATE WAIT TIME			3081
451	ASSIGN	1-,P6	ASSIGN WAIT TIME	3082
452	ASSIGN	6+,P1	CALCULATE TA	3083
453	ASSIGN	8+,P1	STORE WAIT TIME	3084
454	TRANSFER	,CCD	GO TO TRAIL A/C TEST	3085
	* FACILITIES OUTAGE MODULE			3086
	* GENERATE			3087
455	GENERATE	1,1,4,F	CREATE FACIL XACT	3088
456	DAA	ASSIGN 2+,1	INCREMENT COUNTER	3089
457	TEST G	P2,XH\$FACIL,DAB	ARE ALL FACIL CREATED	3090
458	LOGIC S	FINI6	ALL FACIL CREATED	3091
459	SAVEVALUE	ARSEP,1,H	RADAR ENVIRONMENT	3092
460	DAAA	GATE LS FCHAN	WAIT FOR FACIL DOWN	3093
461	LOGIC R	FCHAN	RESET SWITCH	3094
462	SAVEVALUE	ARSEP,0,H	INITIAL PIGNTER	3095
463	DAAB	SAVEVALUE ARSEP+,1,H	INCREMENT POINTER	3096
464	TEST L	XH\$ARSEP,XH\$RADW,DAAA	CHECK ALL FACILITIES	3097
465	ASSIGN	1,0	INITIAL PARAMETER 1	3098
466	DAAC	ASSIGN 1+,1	INCREMENT PARAMETER 1	3099
467	TEST LE	P1,4,DAAA	CHECK ALL FACILITIES	3100
468	ASSIGN	2,MH\$ARSEP(XH\$ARSEP,P1)	STORE FACILITY NUMBER	3101
469	TEST NE	P2,0,DAAC	IS FACILITY REQUIRED	3102
470	TEST E	MX\$FACIL(P2,1),0,DAAC	IS FACILITY UP	3103
471	TRANSFER	,DAAB	CHECK NEXT CONDITION	3104
472	DAB	SPLIT 1,DAA	CREATE NEXT FACILITY	3105
473	ASSIGN	3,MX\$FACIL(P2,2)	STORE MTBF	3106
474	ASSIGN	4,MX\$FACIL(P2,3)	STORE MTTR	3107
475	DAC	MSAVEVALUE FACIL,P2,1,1	FACIL IS UP	3108
476	ASSIGN	1,RN4	GET RANDOM NUMBER	3109
477	ADVANCE	V\$MTBF	WAIT FOR FACILITY DOWN	3110
478	LOGIC S	FCHAN	FACILITY HAS CHANGED	3111
479	MSAVEVALUE	FACIL,P2,1,0	RECORD FACIL DOWN	3112
480	ASSIGN	1,RN4	GET RANDGM NUMBER	3113
481	ADVANCE	V\$MTTR	REPAIR FACIL	3114
482	LOGIC S	CHANG	FACILITY DOWN	3115
483	LOGIC S	FCHAN	FACILITY DOWN	3116
484	TRANSFER	,DAC	GO TO MTBF CALC	3117
	* MODEL RUN CONSTRAINTS			3118
	* GENERATE			3119
485	GENERATE	1440,1,1	SIMULATE 1440 MINUTES	3120
486	TERMINATE	1		3121
	START	1,1,1		3122
	END			3123
				3124
				3125

BLOCK NUMBER	SYMBOL	REFERENCES BY CARD NUMBER
200	AAA	2683
132	AAB	3010
148	AABA	2759
79	AABF	2683
81	AABG	2686
103	AAD	2712
107	AAG	2711
110	ABA	2719
115	ABB	2724
122	ABC	2868
96	ACC	2705
100	ACD	2703 2704
317	ADD	2897 2934
320	ADDA	2938
330	ADDB	2945
324	ADDC	2861 2941
335	ADE	2950 295
340	ADDE	2957
341	ADF	2954 2959
345	ADG	2964
206	ADI	2677 2828
210	AEA	2731 2822 824 2827 3020
220	AEAA	2835 2836
226	AEB	2844
229	AED	2845
237	AECA	2896 2901 2943
230	AEDB	2858
234	AEDBB	2852
236	AEDBC	2854
242	AEDD	2840 2841 2859
247	AEDDD	2865
249	AEDE	2862
253	AEDEE	2871
258	AEDF	2869
259	AEDG	2876
263	AEDH	2820 2880 3015
267	AEF	2849 2856
275	AEFB	2893
273	AEFD	2891
277	AEFF	2887
280	AEH	2908 2936
283	AEH	2905 2907
289	AEK	2904
297	AEL	2912 2914
302	AEM	2917 2919
307	AEO	2922 2924
311	AEP	2927 2929
353	BBA	3042
355	BBA A	3034
368	BBAB	2985
373	BBAC	2984 2990 2991
360	BBAO	3076
377	BBAE	2997 2998
346	BBB	3049 3073
351	BBBB	3037
401	BBC	2975
411	BBD	2972
415	BBDD	3037
386	BBE	3008
392	BBEE	3011
384	BBF	2981 3003 3068
416	BBI	2972
406	BBJ	2975
419	CCC	2979
420	CCD	3080 3085
429	CCE	3051
434	CCF	3050 3056 3057
438	CCG	3063 3064
445	CDD	3046
447	CDE	3002
456	DAA	3106
460	DAAA	3098 3101
463	DAAB	3105
466	DAAC	3103 3104
472	DAB	3091
475	DAC	3118
199	ERR	2747 2803 3013 3023
138	NDLY	2748
196	NOTAK	2801 2802
150	TAA	2756
159	TAB	2773
171	TACA	2785

(continued)

161	TACC	2791	2813				
169	TACD	2800					
176	TAD	2780					
191	TAE	2805					
195	TAF	2808					
185	TAKOF	2787	2788				
180	TBKOF	2780					
198	TERM	2747	2803	2874	2875	2880	2884 2969
		2970	3013	3023			
141	TERM1	2752					
4	WTA	2655					
11	WTB	2604	2605				
12	WTC	2610					
59	WTCL	2599	2665				
64	WTCLA	2658					
65	WTCLB	2660					
66	WTCLL	2657					
16	WTO	2615					
19	WTE	2614					
25	WTF	2624					
28	WTG	2623					
32	WTGG	2626					
35	WTGGA	2629					
36	WTGGG	2628	2631				
41	WTH	2640					
44	WTI	2639					
48	WTJ	2642					
49	WTJJ	2644					
55	WTK	2648	2649				
69	WTVS	2600	2672				
72	WTVSS	2667					

SAVEVALUE SYMBOLS

5	LEDTM	- Dummy counter used to store lead aircraft landing time
1	LNDTM	- Dummy counter used to store approach aircraft landing time
3	TESS	- Dummy counter used to store wind direction
2	TMCTR	- Dummy counter used to store aircraft landing time
4	TRLTM	- Dummy counter used to store trailing aircraft landing time

VARIABLE SYMBOLS

29	APPCT	- Dummy variable used to store row number of minima matrix based on aircraft category
24	ARSEP	- Variable used to calculate separation between lead aircraft and aircraft of interest
7	CEIL	- Variable used to modify ceiling ± 50 feet
2	CEILO	- Variable used to modify ceiling ± 150 feet
27	CEILT	- Variable used to convert minima matrix entry into feet of ceiling
1	CLOCK	- Variable which converts the computer clock time into simulated hour in the day
19	DELAY	- Variable used to determine if an aircraft has experienced any delay
13	DELTm	- Variables used to determine elapsed time between aircraft arrivals
15	DELT1	
14	DELT2	
11	DESTN	- Variables used to determine aircraft destination
12	DEST1	
20	DIRWN	- Dummy variable used to square difference between wind direction and runway direction
23	LNDSP	- Variable used to calculate the approaching aircraft distance from touch down
26	MDRWN	- Dummy variable used to change the sign of the wind direction off the runway direction
21	MOD	- Variable used to calculate the turnaround time of a landing aircraft
3	MTBF	- Variable used to determine the minutes until next failure for a facility
4	MTTR	- Variable used to determine the minutes required to repair a downed facility
25	SEPAR	- Variable used to calculate separation between aircraft of interest and trailing aircraft
22	SPRED	- Variable used to put a spread on the variable MOD
18	TAKDY	- Variable used to determine if an aircraft experienced any delay during takeoff
16	TOF	- Variable used to calculate the time of flight of an aircraft in a radar environment
17	TOFNR	- Variable used to calculate the time of flight of an aircraft in a non-radar environment
9	TYPEA	- Variables used to assign an aircraft type based on the aircraft destination
10	TYPED	
5	VISAB	- Variable used to vary the visibility $\pm .25$ mile
28	VISAT	- Variable used to convert minima matrix entry into miles of visibility
8	WTCHG	- Variable used to determine the number of minutes until the next major weather change
6	WTVAR	- Variable used to determine the number of minutes until the next minor weather variation

LOGIC SWITCH SYMBOLS

ARCGO - Logic switch is set when air control can accept aircraft
 CHANG - Logic switch is set when there is a change in facility status or weather
 CLRD - Logic switch is set when aircraft is allowed to take off
 ENTER - Logic switch is set when an aircraft is in the hold area
 FCHAN - Logic switch is set when there is a change in facility status
 FINI1 - Logic switch which allows only one transaction to examine the landing schedule at a time
 FINI2 - Logic switch prevents next generated aircraft into the system until previous aircraft is in the system
 FINI3 - Logic switch used to hold an aircraft transaction until trail aircraft statistics are gathered
 FINI4 - Logic switch used to hold an aircraft transaction until lead aircraft statistics are gathered
 FINI5 - Logic switch used to allow aircraft into the landing schedule before air control checks next aircraft
 FINI6 - Logic switch prevents generation of aircraft until all facilities are created
 LNDSP - Logic switch prevents aircraft takeoff on land runway until landing aircraft has cleared
 TAKOF - Logic switch is set when proper separation is experienced between taking off aircraft

CHAIN SYMBOLS AND CORRESPONDING NUMBERS

3 HDARC - Hold area chain
 1 LDSCD - Landing schedule chain (1 - primary runway, 2 - secondary runway)
 4 TAKOF - Departure chain

FUNCTION SYMBOLS AND CORRESPONDING NUMBERS

7 CEIL - Function converts column number to ceiling in feet
 11 LOGRN - Function converts random number into a logarithm of the random number
 10 MODSP - Function defines the modifier and spread of aircraft turnaround time
 5 PMFTY - Function randomly chooses between 50 and 150
 9 PMOFY - Function randomly chooses between 150 and 300
 1 SPEED - Function defines speed of aircraft based on aircraft type
 8 VISAB - Function converts column number to visibility in miles
 6 WNVEL - Function converts column number to wind velocity

MATRIX SAVEVALUE SYMBOLS AND CORRESPONDING NUMBERS

15 FACIL - Facility matrix
 1 MINMA - Minimum matrixes for each airport (1-14)

HALF WORD MATRIX SAVEVALUE SYMBOLS AND CORRESPONDING NUMBERS

101 AIRO1)
 106 AIRO2) - Matrixes used to define airports, facilities required, and approaches
 133 AIRO3)
 43 ARSEP - Separation matrix
 40 CATWT - Matrix used to determine category and weight of created aircraft
 44 DELAY - Matrix used to total delays
 1 DIRVL - Matrix used to determine weather conditions
 36 DSTN - Matrix used to determine the distances from secondary airports and hold areas to Logan runways
 37 DSTNR - Same as above except in a non-radar environment
 39 IFRAC - Matrix used to determine aircraft generated and destination under IFR conditions
 42 IFRPT - Matrix used to determine aircraft type based on destination under IFR conditions
 38 VFRAC)
 41 VFRPT) - Same as above except under VFR conditions

BOOLEAN VARIABLE SYMBOLS AND CORRESPONDING NUMBERS

1 CLRD - Boolean variable used to find approaching aircraft
 3 LEDAC - Boolean variable used to find lead aircraft
 2 TRILAC - Boolean variable used to find trailing aircraft
 4 WEATH - Boolean variable used to determine if weather is below minimum for approach in question

**** ASSEMBLY TIME = 14.35 MINUTES ****

HALF WORD SAVEVALUE SYMBOLS

ACCTR - Accumulator used to count aircraft going to Logan
 ACNUM - Counts aircraft created
 AIRPT - Number of holding fixes and secondary airports
 ARCGO - Counter used to count number of aircraft under alt control
 ARSEP - Pointer used to determine which row of the separation matrix is in use
 CALM - Maximum wind speed for calm
 CEIL - Present ceiling in feet
 CEILP - Present ceiling column number
 CEILT - Dummy counter used to manipulate the ceiling
 DAYEN - End of day, time, for weather determination
 DAYST - Start of day, time, for weather determination
 DIRWN - Dummy counter used to manipulate the wind direction and runway direction
 DIVRT - Number, out of 1000 aircraft, that divert to Logan from secondary airport
 ERROR - Dummy counter used to bomb model if an impossible situation exists
 FACIL - Number of facilities modeled
 HOLD - Number of Logan holding fixes
 IFRWT - Dummy counter is equal to zero in VFR and one in IFR conditions
 LEDWT - Dummy counter used to store the lead aircraft's weight
 LNDSP - Separation in miles between landing and taking off aircraft
 LNDST - Separation increase if takeoff queue is greater than TAKQU
 LNDVL - Dummy counter used to store the approach aircraft's landing velocity
 MAXTM - Maximum holding time
 MNONE - Dummy input
 NORAD - Row number in the separation matrix where no radar condition exists
 RADDW - Last row in separation matrix
 RUNWY - the number of runways at Logan
 TAKCL - Maximum takeoff ceiling
 TAKOF - Departing aircraft counter
 TAKQU - Maximum number of aircraft in takeoff queue before landing separation increases
 TAKVS - Minimum takeoff visibility
 TOF - Time flight from holding fix or secondary airport to Logan
 TRILVL - Dummy counter used to store trailing aircraft velocity
 TRLWT - Dummy counter used to store trailing aircraft weight
 TYPCT - Dummy counter used in the generation of aircraft
 VFRWT - Dummy counter is equal to zero in IFR and one in VFR conditions
 VISAB - Present visibility in miles
 VISAP - Present visibility in column number
 VISAT - Dummy counter used to manipulate the visibility
 WNDIR - Present wind direction in degrees
 WNMAR - Wind speed above which aircraft land on runway closest to the wind.
 WNVEL - Present wind velocity
 WTCMG - Mean time between major weather change
 WTVAR - Mean time between minor weather change

Assembly of Program

	SIMULATE	30		
1	MATRIX	H	18	13
2	MATRIX	H	6	10
4	MATRIX	H	6	10
6	MATRIX	H	6	10
8	MATRIX	H	6	10
10	MATRIX	H	6	10
12	MATRIX	H	6	10
14	MATRIX	H	6	10
16	MATRIX	H	6	10
18	MATRIX	H	6	10
20	MATRIX	H	6	10
22	MATRIX	H	6	10
24	MATRIX	H	6	10
26	MATRIX	H	6	10
28	MATRIX	H	6	10
30	MATRIX	H	6	10
32	MATRIX	H	6	10
34	MATRIX	H	6	10
3	MATRIX	H	6	14
5	MATRIX	H	6	14
7	MATRIX	H	6	14
9	MATRIX	H	6	14
11	MATRIX	H	6	14
13	MATRIX	H	6	14
15	MATRIX	H	6	14
17	MATRIX	H	6	14
19	MATRIX	H	6	14
21	MATRIX	H	6	14
23	MATRIX	H	6	14
25	MATRIX	H	6	14
27	MATRIX	H	6	14
29	MATRIX	H	6	14
31	MATRIX	H	6	14
33	MATRIX	H	6	14
35	MATRIX	H	6	14
158	MATRIX	H	2	8
157	MATRIX	H	2	8
111	MATRIX	H	4	4
112	MATRIX	H	4	4
113	MATRIX	H	4	4
117	MATRIX	H	4	4
118	MATRIX	H	6	4
106	MATRIX	H	6	4
107	MATRIX	H	6	4
109	MATRIX	H	6	4
110	MATRIX	H	6	4
114	MATRIX	H	6	4
115	MATRIX	H	6	4
116	MATRIX	H	6	4
108	MATRIX	H	5	4
101	MATRIX	H	18	4
148	MATRIX	H	2	8
149	MATRIX	H	1	8
150	MATRIX	H	1	8
151	MATRIX	H	4	8
152	MATRIX	H	1	8
153	MATRIX	H	3	8
159	MATRIX	H	3	8
160	MATRIX	H	3	8
161	MATRIX	H	3	8
154	MATRIX	H	3	8
155	MATRIX	H	2	8
133	MATRIX	H	7	8
134	MATRIX	H	7	8
135	MATRIX	H	7	8
136	MATRIX	H	7	8
137	MATRIX	H	7	8
138	MATRIX	H	7	8
139	MATRIX	H	7	8
140	MATRIX	H	7	8
141	MATRIX	H	7	8
142	MATRIX	H	7	8
143	MATRIX	H	5	8
156	MATRIX	H	5	8
144	MATRIX	H	4	8
145	MATRIX	H	1	8
146	MATRIX	H	1	8
147	MATRIX	H	2	8
36	MATRIX	H	6	18
37	MATRIX	H	5	18
38	MATRIX	H	24	19
39	MATRIX	H	24	18
40	MATRIX	H	4	7

(continued)

41	MATRIX	H	18	3
42	MATRIX	H	18	3
43	MATRIX	H	16	11
44	MATRIX	H	13	4
15	MATRIX	X	63	3
1	MATRIX	X	28	5
2	MATRIX	X	20	4
3	MATRIX	X	16	4
4	MATRIX	X	4	4
5	MATRIX	X	4	4
6	MATRIX	X	8	4
7	MATRIX	X	8	2
8	MATRIX	X	4	2
9	MATRIX	X	4	2
10	MATRIX	X	16	4
11	MATRIX	X	4	4
12	MATRIX	X	12	4
13	MATRIX	X	12	2
14	MATRIX	X	8	4
	INITIAL		MX15(1-4,2),	60300
	INITIAL		MX15(1-4,3),	318
	INITIAL		MX15(5,2),	72300
	INITIAL		MX15(5,3),	402
	INITIAL		MX15(6-7,2),	24600
	INITIAL		MX15(6-7,3),	534
	INITIAL		MX15(8-11,2),	28500
	INITIAL		MX15(8-11,3),	1260
	INITIAL		MX15(12-16,2),	23400
	INITIAL		MX15(12-16,3),	900
	INITIAL		MX15(17-20,2),	111900
	INITIAL		MX15(17-20,3),	1920
	INITIAL		MX15(21-24,2),	130500
	INITIAL		MX15(21-24,3),	2580
	INITIAL		MX15(25-35,2),	2100000
	INITIAL		MX15(25-35,3),	660
	INITIAL		MX15(36,2),	24600
	INITIAL		MX15(36,3),	534
	INITIAL		MX15(37,2),	36300
	INITIAL		MX15(37,3),	96
	INITIAL		MX15(38,2),	5160
	INITIAL		MX15(38,3),	180
	INITIAL		MX15(39,2),	29100
	INITIAL		MX15(39,3),	120
	INITIAL		MX15(40,2),	20100
	INITIAL		MX15(40,3),	114
	INITIAL		MX15(41-48,2),	25200
	INITIAL		MX15(49-50,2),	2100000
	INITIAL		MX15(54-55,2),	25200
	INITIAL		MX15(58-61,2),	25200
	INITIAL		MX15(63,2),	25200
	INITIAL		MX15(41-48,3),	780
	INITIAL		MX15(49-50,3),	616
	INITIAL		MX15(54-55,3),	780
	INITIAL		MX15(58-61,3),	780
	INITIAL		MX15(63,3),	780
	INITIAL		MX15(51-53,2),	2100000
	INITIAL		MX15(51-53,3),	660
	INITIAL		MX15(56-57,2),	25200
	INITIAL		MX15(56-57,3),	780
	INITIAL		MX15(62,2),	25200
	INITIAL		MX15(62,3),	780
	INITIAL		MH36(1,1),	34
	INITIAL		MH36(1,2),	25
	INITIAL		MH36(1,3),	19
	INITIAL		MH36(1,4),	31
	INITIAL		MH36(1,5),	49
	INITIAL		MH36(1,6),	27
	INITIAL		MH36(1,7),	36
	INITIAL		MH36(1,8),	46
	INITIAL		MH36(1,9),	39
	INITIAL		MH36(1,10),	46
	INITIAL		MH36(1,11),	22
	INITIAL		MH36(1,12),	29
	INITIAL		MH36(1,13),	55
	INITIAL		MH36(1,14),	12
	INITIAL		MH36(1,15),	33
	INITIAL		MH36(1,16),	14
	INITIAL		MH36(1,17),	30
	INITIAL		MH36(1,18),	38
	INITIAL		MH36(2,1),	39
	INITIAL		MH36(2,2),	45
	INITIAL		MH36(2,3),	41
	INITIAL		MH36(2,4),	18
	INITIAL		MH36(2,5),	33
	INITIAL		MH36(2,6),	16
	INITIAL		MH36(2,7),	22

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INITIAL	MH36(2,16),14
INITIAL	MH36(2,17),30
INITIAL	MH36(2,18),38
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INITIAL	MH36(3,2),45
INITIAL	MH36(3,3),41
INITIAL	MH36(3,4),20
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INITIAL	MH36(3,6),26
INITIAL	MH36(3,7),16
INITIAL	MH36(3,8),38
INITIAL	MH36(3,9),43
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INITIAL	MH36(3,12),36
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INITIAL	MH36(4,3),25
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INITIAL	MH36(4,5),44
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INITIAL	MH36(4,7),35
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INITIAL	MH36(4,18),49
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INITIAL	MH36(6,17),117
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INITIAL	MH37(1,7),14

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INITIAL	MH37(2,7),21
INITIAL	MH37(2,8),62
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INITIAL	MH37(2,13),35
INITIAL	MH37(2,14),38
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INITIAL	MH37(5,9),48
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INITIAL	MH40(1,3),787
INITIAL	MH40(1,5),0

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INITIAL	MH40(4,2),500
INITIAL	MH40(4,5),500
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INITIAL	MH41(1-5,2),897
INITIAL	MH41(1-5,3),996
INITIAL	MH41(6,1),30
INITIAL	MH41(14,1),2
INITIAL	MH41(6,2),111
INITIAL	MH41(7,2),2
INITIAL	MH41(10,2),190
INITIAL	MH41(14,2),11
INITIAL	MH41(18,2),235
INITIAL	MH41(6,3),947
INITIAL	MH41(7,3),816
INITIAL	MH41(8,3),1000
INITIAL	MH41(9,3),38
INITIAL	MH41(10-13,3),1000
INITIAL	MH41(14,3),869
INITIAL	MH41(15,3),1000
INITIAL	MH41(16,3),174
INITIAL	MH41(17-18,3),1000
INITIAL	MH42(1-5,1),782
INITIAL	MH42(1-5,2),897
INITIAL	MH42(1-5,3),996
INITIAL	MH42(6,1),30
INITIAL	MH42(14,1),2
INITIAL	MH42(6,2),111
INITIAL	MH42(7,2),2
INITIAL	MH42(10,2),190
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INITIAL	MH42(15,3),1000
INITIAL	MH42(16,3),174
INITIAL	MH42(17-18,3),1000
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INITIAL	MH39(1,2),597
INITIAL	MH39(1-7,3),847
INITIAL	MH39(1-7,4),897
INITIAL	MH39(1-7,5-8),996
INITIAL	MH39(1-7,9-15),997
INITIAL	MH39(1-7,16-17),1000
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INITIAL	MH39(2-7,2),598
INITIAL	MH39(8,1),260
INITIAL	MH39(8,2),522
INITIAL	MH39(8,3),740
INITIAL	MH39(8,4),784
INITIAL	MH39(8,5-7),871
INITIAL	MH39(8,8),954
INITIAL	MH39(8,9-13),955
INITIAL	MH39(8,14-15),998
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INITIAL	MH39(9,3),711
INITIAL	MH39(10-18,3),710
INITIAL	MH39(9-18,4),752
INITIAL	MH39(9-18,5),836
INITIAL	MH39(9,6),929
INITIAL	MH39(10-18,6),928
INITIAL	MH39(9-18,7),946
INITIAL	MH39(9-18,8),947
INITIAL	MH39(9-18,9),948
INITIAL	MH39(9,10),954
INITIAL	MH39(10-18,10),954
INITIAL	MH39(9-18,11-13),955
INITIAL	MH39(9,11),954
INITIAL	MH39(9-18,14),996
INITIAL	MH39(9-18,15),997
INITIAL	MH39(9-18,16),998
INITIAL	MH39(9-18,17),999
INITIAL	MH39(19-23,1),258
INITIAL	MH39(19-23,2),516
INITIAL	MH39(19-23,3),731
INITIAL	MH39(19-23,4),774
INITIAL	MH39(19-23,5),860

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INITIAL	MH39(24,2),538
INITIAL	MH39(24,3),763
INITIAL	MH39(24,4),807
INITIAL	MH39(24,5),897
INITIAL	MH39(24,6-8),997
INITIAL	MH39(24,9-13),998
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INITIAL	MH39(3,18),5
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INITIAL	MH39(5,18),9
INITIAL	MH39(6,18),14
INITIAL	MH39(7,18),20
INITIAL	MH39(8,18),24
INITIAL	MH39(9,18),33
INITIAL	MH39(10,18),32
INITIAL	MH39(11,18),30
INITIAL	MH39(12,18),32
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INITIAL	MH39(19,18),43
INITIAL	MH39(20,18),37
INITIAL	MH39(21,18),27
INITIAL	MH39(22,18),20
INITIAL	MH39(23,18),6
INITIAL	MH39(24,18),10
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INITIAL	MH38(1,2),597
INITIAL	MH38(1-7,3),847
INITIAL	MH38(1-7,4),897
INITIAL	MH38(1-7,5-8),996
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INITIAL	MH38(9-18,8),947
INITIAL	MH38(9-18,9),948
INITIAL	MH38(9,10),954
INITIAL	MH38(10-18,10),954
INITIAL	MH38(9-18,11-13),955
INITIAL	MH38(9,11),954
INITIAL	MH38(9-18,14),996
INITIAL	MH38(9-18,15),997
INITIAL	MH38(9-18,16),998
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INITIAL	MH38(19-23,3),731
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INITIAL	MH38(19-23,5),860
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INITIAL	MH38(19-23,9-13),956
INITIAL	MH38(19-24,14-15),998
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INITIAL	MH38(24,3),763
INITIAL	MH38(24,4),807
INITIAL	MH38(24,5),897

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INITIAL	MH38(4,18),8
INITIAL	MH38(5,18),11
INITIAL	MH38(6,18),17
INITIAL	MH38(7,18),25
INITIAL	MH38(8,18),30
INITIAL	MH38(9,18),41
INITIAL	MH38(10,18),40
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INITIAL	MH38(12,18),40
INITIAL	MH38(13,18),46
INITIAL	MH38(14,18),46
INITIAL	MH38(15,18),40
INITIAL	MH38(16,18),53
INITIAL	MH38(17,18),60
INITIAL	MH38(18,18),43
INITIAL	MH38(19,18),53
INITIAL	MH38(20,18),46
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INITIAL	MH38(22,18),26
INITIAL	MH38(23,18),7
INITIAL	MH38(24,18),12
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INITIAL	MH43(9-12,2),39
INITIAL	MH43(1-2,3),40
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INITIAL	MH43(9-10,3),40
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INITIAL	MH43(14,4),38
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INITIAL	MH43(5-8,5),4
INITIAL	MH43(11-14,5),5
INITIAL	MH43(15,5),12
INITIAL	MH43(16,5),12
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INITIAL	MH43(9-10,6),1
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INITIAL	MH43(5-8,7),1
INITIAL	MH43(9-10,7),2
INITIAL	MH43(1-4,8),3
INITIAL	MH43(5-8,8),2
INITIAL	MH43(9-10,8),3
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INITIAL	MH43(1-4,10),1
INITIAL	MH43(9-10,10),1
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INITIAL	MH43(5-6,11),10
INITIAL	MH43(7-8,11),12
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INITIAL	MH01(1,13),3
INITIAL	MH01(2,2),96
INITIAL	MH01(2,3),58
INITIAL	MH01(2,4),61
INITIAL	MH01(2,5),7
INITIAL	MH01(2,6),576
INITIAL	MH01(2,7),448
INITIAL	MH01(2,8),839
INITIAL	MH01(2,9),777
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INITIAL	MH01(2,10),1000
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INITIAL	MH01(2,12),4
INITIAL	MH01(2,13),5

(continued)

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INITIAL	MH01(3,6),704
INITIAL	MH01(3,7),510
INITIAL	MH01(3,8),891
INITIAL	MH01(3,9),753
INITIAL	MH01(3,10),996
INITIAL	MH01(3,11),995
INITIAL	MH01(3,12),6
INITIAL	MH01(3,13),7
INITIAL	MH01(4,1),45
INITIAL	MH01(4,2),163
INITIAL	MH01(4,3),118
INITIAL	MH01(4,4),113
INITIAL	MH01(4,5),29
INITIAL	MH01(4,6),510
INITIAL	MH01(4,7),324
INITIAL	MH01(4,8),755
INITIAL	MH01(4,9),639
INITIAL	MH01(4,10),981
INITIAL	MH01(4,11),979
INITIAL	MH01(4,12),8
INITIAL	MH01(4,13),9
INITIAL	MH01(5,1),67
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INITIAL	MH01(5,3),169
INITIAL	MH01(5,4),82
INITIAL	MH01(5,5),41
INITIAL	MH01(5,6),494
INITIAL	MH01(5,7),441
INITIAL	MH01(5,8),724
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INITIAL	MH01(6,7),431
INITIAL	MH01(6,8),776
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INITIAL	MH01(8,11),995
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(continued)

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INITIAL	MH01(10,4),109
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INITIAL	MH01(10,6),757
INITIAL	MH01(10,7),456
INITIAL	MH01(10,8),949
INITIAL	MH01(10,9),803
INITIAL	MH01(10,10),1000
INITIAL	MH01(10,11),985
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INITIAL	MH01(10,13),21
INITIAL	MH01(11,1),202
INITIAL	MH01(11,2),424
INITIAL	MH01(11,3),550
INITIAL	MH01(11,4),58
INITIAL	MH01(11,5),20
INITIAL	MH01(11,6),569
INITIAL	MH01(11,7),211
INITIAL	MH01(11,8),845
INITIAL	MH01(11,9),602
INITIAL	MH01(11,10),1000
INITIAL	MH01(11,11),998
INITIAL	MH01(11,12),22
INITIAL	MH01(11,13),23
INITIAL	MH01(12,1),225
INITIAL	MH01(12,2),496
INITIAL	MH01(12,3),591
INITIAL	MH01(12,4),48
INITIAL	MH01(12,5),17
INITIAL	MH01(12,6),479
INITIAL	MH01(12,7),195
INITIAL	MH01(12,8),779
INITIAL	MH01(12,9),510
INITIAL	MH01(12,10),998
INITIAL	MH01(12,11),1000
INITIAL	MH01(12,12),24
INITIAL	MH01(12,13),25
INITIAL	MH01(13,1),247
INITIAL	MH01(13,2),616
INITIAL	MH01(13,3),663
INITIAL	MH01(13,4),19
INITIAL	MH01(13,5),15
INITIAL	MH01(13,6),439
INITIAL	MH01(13,7),302
INITIAL	MH01(13,8),827
INITIAL	MH01(13,9),645
INITIAL	MH01(13,10),999
INITIAL	MH01(13,11),992
INITIAL	MH01(13,12),26
INITIAL	MH01(13,13),27
INITIAL	MH01(14,1),270
INITIAL	MH01(14,2),776
INITIAL	MH01(14,3),777
INITIAL	MH01(14,4),69
INITIAL	MH01(14,5),14
INITIAL	MH01(14,6),312
INITIAL	MH01(14,7),211
INITIAL	MH01(14,8),651
INITIAL	MH01(14,9),498
INITIAL	MH01(14,10),990
INITIAL	MH01(14,11),966
INITIAL	MH01(14,12),28
INITIAL	MH01(14,13),29
INITIAL	MH01(15,1),292
INITIAL	MH01(15,2),836
INITIAL	MH01(15,3),874
INITIAL	MH01(15,4),33
INITIAL	MH01(15,5),101
INITIAL	MH01(15,6),295
INITIAL	MH01(15,7),184
INITIAL	MH01(15,8),649
INITIAL	MH01(15,9),439
INITIAL	MH01(15,10),974
INITIAL	MH01(15,11),977
INITIAL	MH01(15,12),30
INITIAL	MH01(15,13),31
INITIAL	MH01(16,1),315
INITIAL	MH01(16,2),937
INITIAL	MH01(16,3),958

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INITIAL	MH01(16,4),26
INITIAL	MH01(16,5),20
INITIAL	MH01(16,6),396
INITIAL	MH01(16,7),225
INITIAL	MH01(16,8),734
INITIAL	MH01(16,9),554
INITIAL	MH01(16,10),996
INITIAL	MH01(16,11),993
INITIAL	MH01(16,12),32
INITIAL	MH01(16,13),33
INITIAL	MH01(17,1),337
INITIAL	MH01(17,2),1000
INITIAL	MH01(17,3),1000
INITIAL	MH01(17,4),30
INITIAL	MH01(17,5),13
INITIAL	MH01(17,6),413
INITIAL	MH01(17,7),835
INITIAL	MH01(17,8),835
INITIAL	MH01(17,9),658
INITIAL	MH01(17,10),1000
INITIAL	MH01(17,11),1000
INITIAL	MH01(17,12),34
INITIAL	MH01(17,13),35
INITIAL	MH2(1,1-2),857
INITIAL	MH2(2,1-2),877
INITIAL	MH2(3,1-2),918
INITIAL	MH2(4,1-2),938
INITIAL	MH2(5-6,1-2),979
INITIAL	MH3(1,1-2),24
INITIAL	MH3(2,1-2),48
INITIAL	MH3(3,1-2),48
INITIAL	MH3(4,1-2),72
INITIAL	MH3(5,1-2),119
INITIAL	MH3(6,1-2),143
INITIAL	MH3(6,5-10),1000
INITIAL	MH3(4-5,7-10),1000
INITIAL	MH3(1-3,9-10),500
INITIAL	MH3(1-6,13-14),1000
INITIAL	MH4(1,1),825
INITIAL	MH4(1,2),733
INITIAL	MH4(1,3),798
INITIAL	MH4(1,4),841
INITIAL	MH4(1,5),762
INITIAL	MH4(1,6),752
INITIAL	MH4(1,7),714
INITIAL	MH4(1,8),640
INITIAL	MH4(1-6,9),1000
INITIAL	MH4(2,1),850
INITIAL	MH4(2,2),800
INITIAL	MH4(2,3),857
INITIAL	MH4(2,4),911
INITIAL	MH4(2,5),878
INITIAL	MH4(2,6),883
INITIAL	MH4(2,7),876
INITIAL	MH4(2,8),820
INITIAL	MH4(2-3,10),750
INITIAL	MH4(3,1),850
INITIAL	MH4(3,2),833
INITIAL	MH4(3,3),881
INITIAL	MH4(3,4),943
INITIAL	MH4(3,5),901
INITIAL	MH4(3,6),905
INITIAL	MH4(3,7),933
INITIAL	MH4(3,8),910
INITIAL	MH4(4,1),850
INITIAL	MH4(4,2),866
INITIAL	MH4(4,3),914
INITIAL	MH4(4,4),956
INITIAL	MH4(4,5),948
INITIAL	MH4(4,6),956
INITIAL	MH4(4,7),962
INITIAL	MH4(4,8),944
INITIAL	MH4(4-6,10),1000
INITIAL	MH4(5,1),875
INITIAL	MH4(5,2),900
INITIAL	MH4(5,3),950
INITIAL	MH4(5,4),981
INITIAL	MH4(5,5),977
INITIAL	MH4(5,6),992
INITIAL	MH4(5,7),991
INITIAL	MH4(5,8),989
INITIAL	MH4(6,1),950
INITIAL	MH4(6,2),967
INITIAL	MH4(6,3),977
INITIAL	MH4(6,4),981
INITIAL	MH4(6,5),994

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INITIAL	MH4(6,6-7),1000
INITIAL	MH4(6,8),989
INITIAL	MH5(1,8),71
INITIAL	MH5(1,11),63
INITIAL	MH5(1,13),455
INITIAL	MH5(1,14),400
INITIAL	MH5(2,1),2
INITIAL	MH5(2,4),60
INITIAL	MH5(2,6),59
INITIAL	MH5(2,8),143
INITIAL	MH5(2,11),313
INITIAL	MH5(2,12),933
INITIAL	MH5(2,13),728
INITIAL	MH5(2,14),600
INITIAL	MH5(3,1),2
INITIAL	MH5(3,3),17
INITIAL	MH5(3,4),80
INITIAL	MH5(3,5),56
INITIAL	MH5(3,6),118
INITIAL	MH5(3,7),91
INITIAL	MH5(3,8),143
INITIAL	MH5(3,9),48
INITIAL	MH5(3,10),71
INITIAL	MH5(3,11),501
INITIAL	MH5(3,12),333
INITIAL	MH5(3,13),819
INITIAL	MH5(3,14),800
INITIAL	MH5(4,1),6
INITIAL	MH5(4,2),6
INITIAL	MH5(4,3),51
INITIAL	MH5(4,4),120
INITIAL	MH5(4,5),111
INITIAL	MH5(4,6),176
INITIAL	MH5(4,7),136
INITIAL	MH5(4,8),143
INITIAL	MH5(4,9),238
INITIAL	MH5(4,10),286
INITIAL	MH5(4,11),564
INITIAL	MH5(4,12),333
INITIAL	MH5(4,13),910
INITIAL	MH5(4-6,14),1000
INITIAL	MH5(5,1),6
INITIAL	MH5(5,2),13
INITIAL	MH5(5,3),85
INITIAL	MH5(5,4),200
INITIAL	MH5(5,5),222
INITIAL	MH5(5,6),294
INITIAL	MH5(5,7),227
INITIAL	MH5(5,8),214
INITIAL	MH5(5,9),381
INITIAL	MH5(5,10),500
INITIAL	MH5(5,11),814
INITIAL	MH5(5,12),667
INITIAL	MH5(5,13),910
INITIAL	MH5(6,1),12
INITIAL	MH5(6,2),16
INITIAL	MH5(6,3),171
INITIAL	MH5(6,4),260
INITIAL	MH5(6,5),389
INITIAL	MH5(6,6),412
INITIAL	MH5(6,7),485
INITIAL	MH5(6,8),429
INITIAL	MH5(6,9),810
INITIAL	MH5(6,10),500
INITIAL	MH5(6,11),877
INITIAL	MH5(6,12-13),1000
INITIAL	MH06(1-2,1),771
INITIAL	MH06(1,2),867
INITIAL	MH06(1,3),638
INITIAL	MH06(1,4),744
INITIAL	MH06(1,5),628
INITIAL	MH06(1,6),553
INITIAL	MH06(1,7),625
INITIAL	MH06(1,8),813
INITIAL	MH06(1-6,9-10),1000
INITIAL	MH06(2-3,2),933
INITIAL	MH06(2,3),732
INITIAL	MH06(2,4),849
INITIAL	MH06(2,5),857
INITIAL	MH06(2,6),766
INITIAL	MH06(2,7),750
INITIAL	MH06(2,8),983
INITIAL	MH06(3-4,1),800
INITIAL	MH06(3,3),764
INITIAL	MH06(3,4),860
INITIAL	MH06(3,5),884

(continued)

INITIAL	MH06(3,6),809
INITIAL	MH06(3,7),72
INITIAL	MH06(3,8),938
INITIAL	MH06(4-6,2),1000
INITIAL	MH06(4,3),795
INITIAL	MH06(4,4),884
INITIAL	MH06(4,5),907
INITIAL	MH06(4,6),894
INITIAL	MH06(4,7),875
INITIAL	MH06(4,8),979
INITIAL	MH06(5,1),829
INITIAL	MH06(5,3),874
INITIAL	MH06(5,4),953
INITIAL	MH06(5,5),977
INITIAL	MH06(5,6),979
INITIAL	MH06(5,7),958
INITIAL	MH06(5-6,8),1000
INITIAL	MH06(6,1),914
INITIAL	MH06(6,3),939
INITIAL	MH06(6,4),977
INITIAL	MH06(6,5-7),1000
INITIAL	MH07(1,8),250
INITIAL	MH07(1,11),231
INITIAL	MH07(1,13),545
INITIAL	MH07(1,14),500
INITIAL	MH07(2-5,2),7
INITIAL	MH07(2,8),375
INITIAL	MH07(2,11),385
INITIAL	MH07(2,12),333
INITIAL	MH07(2,13),818
INITIAL	MH07(2-6,14),1000
INITIAL	MH07(3-5,6),167
INITIAL	MH07(3-4,8),500
INITIAL	MH07(3-4,9),63
INITIAL	MH07(3-4,11),462
INITIAL	MH07(3,12),667
INITIAL	MH07(3,13),818
INITIAL	MH07(4-5,10),273
INITIAL	MH07(4-6,12),1000
INITIAL	MH07(4-5,13),909
INITIAL	MH07(5,1),13
INITIAL	MH07(5,3),40
INITIAL	MH07(5,4),37
INITIAL	MH07(5,5),125
INITIAL	MH07(5,8),625
INITIAL	MH07(5,9),188
INITIAL	MH07(5,11),846
INITIAL	MH07(6,1),20
INITIAL	MH07(6,2),14
INITIAL	MH07(6,3),120
INITIAL	MH07(6,4),74
INITIAL	MH07(6,5-6),500
INITIAL	MH07(6,8),750
INITIAL	MH07(6,9),688
INITIAL	MH07(6,10),909
INITIAL	MH07(6,11-13),1000
INITIAL	MH08(1,1),793
INITIAL	MH08(1-4,2),857
INITIAL	MH08(1,3),549
INITIAL	MH08(1,4),629
INITIAL	MH08(1,5),492
INITIAL	MH08(1,6),547
INITIAL	MH08(1,7),586
INITIAL	MH08(1,8),593
INITIAL	MH08(1,9-10),200
INITIAL	MH08(2-3,1),862
INITIAL	MH08(2,3),637
INITIAL	MH08(2,4),743
INITIAL	MH08(2,5),651
INITIAL	MH08(2,6),693
INITIAL	MH08(2,7),776
INITIAL	MH08(2,8),765
INITIAL	MH08(2,9-10),800
INITIAL	MH08(3,3),725
INITIAL	MH08(3,4),757
INITIAL	MH08(3,5),762
INITIAL	MH08(3,6),747
INITIAL	MH08(3,7),810
INITIAL	MH08(3,8),852
INITIAL	MH08(3-5,9),800
INITIAL	MH08(3-6,10),1000
INITIAL	MH08(4,1),897
INITIAL	MH08(4,3),775
INITIAL	MH08(4,4),814
INITIAL	MH08(4,5),794
INITIAL	MH08(4,6),800

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INITIAL	MH08(4,7),879
INITIAL	MH08(4,8),963
INITIAL	MH08(5-6,1),931
INITIAL	MH08(5-6,2),1000
INITIAL	MH08(5,3),804
INITIAL	MH08(5,4),857
INITIAL	MH08(5,5),873
INITIAL	MH08(5,6),893
INITIAL	MH08(5,7),914
INITIAL	MH08(5,8),975
INITIAL	MH08(6,3),902
INITIAL	MH08(6,4),943
INITIAL	MH08(6,5),1000
INITIAL	MH08(6,6),960
INITIAL	MH08(6,7),966
INITIAL	MH08(6,8-9),1000
INITIAL	MH09(1-4,2),7
INITIAL	MH09(1-5,5),56
INITIAL	MH09(1-5,9),91
INITIAL	MH09(1,11),182
INITIAL	MH09(1,13),357
INITIAL	MH09(1,14),714
INITIAL	MH09(2-5,3),57
INITIAL	MH09(2-3,8),59
INITIAL	MH09(2,11),273
INITIAL	MH09(2,12),154
INITIAL	MH09(2,13),643
INITIAL	MH09(2-5,14),857
INITIAL	MH09(3-5,1),7
INITIAL	MH09(3,10),83
INITIAL	MH09(3,11),409
INITIAL	MH09(3,12),385
INITIAL	MH09(3,13),714
INITIAL	MH09(4,4),54
INITIAL	MH09(4,6),83
INITIAL	MH09(4,7),167
INITIAL	MH09(4,8),176
INITIAL	MH09(4,10),167
INITIAL	MH09(4,11),500
INITIAL	MH09(4,12),538
INITIAL	MH09(4-6,13),929
INITIAL	MH09(5,2),29
INITIAL	MH09(5,4),81
INITIAL	MH09(5,6-7),250
INITIAL	MH09(5,8),294
INITIAL	MH09(5,10),417
INITIAL	MH09(5,11),545
INITIAL	MH09(5,12),769
INITIAL	MH09(6,1),21
INITIAL	MH09(6,2),36
INITIAL	MH09(6,3),200
INITIAL	MH09(6,4),270
INITIAL	MH09(6,5),222
INITIAL	MH09(6,6),583
INITIAL	MH09(6,7),333
INITIAL	MH09(6,8),647
INITIAL	MH09(6,9),455
INITIAL	MH09(6,10),750
INITIAL	MH09(6,11),773
INITIAL	MH09(6,12),846
INITIAL	MH09(6,14),1000
INITIAL	MH10(1,1),762
INITIAL	MH10(1-2,2),800
INITIAL	MH10(1,3),575
INITIAL	MH10(1,4),764
INITIAL	MH10(1,5),644
INITIAL	MH10(1,6),844
INITIAL	MH10(1,7),576
INITIAL	MH10(1,8),695
INITIAL	MH10(1,9),200
INITIAL	MH10(1,10),333
INITIAL	MH10(2,1),857
INITIAL	MH10(2,2),613
INITIAL	MH10(2,4),831
INITIAL	MH10(2,5),763
INITIAL	MH10(2,6),877
INITIAL	MH10(2,7),833
INITIAL	MH10(2,8),829
INITIAL	MH10(2,9),800
INITIAL	MH10(2,10),667
INITIAL	MH10(3-5,1),905
INITIAL	MH10(3-5,2),933
INITIAL	MH10(3,3),689
INITIAL	MH10(3,4),872
INITIAL	MH10(3,5),780
INITIAL	MH10(3,6),902

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INITIAL	MH10(3,7),879
INITIAL	MH10(3,8),878
INITIAL	MH10(3-6,9-10),1000
INITIAL	MH10(4,3),755
INITIAL	MH10(4,4),905
INITIAL	MH10(4,5),831
INITIAL	MH10(4,6),918
INITIAL	MH10(4,7),924
INITIAL	MH10(4,8),951
INITIAL	MH10(5,3),783
INITIAL	MH10(5,4),939
INITIAL	MH10(5,5),898
INITIAL	MH10(5,6),959
INITIAL	MH10(5,7),955
INITIAL	MH10(5,8),988
INITIAL	MH10(6,1),952
INITIAL	MH10(6,2),1000
INITIAL	MH10(6,3),906
INITIAL	MH10(6,4),986
INITIAL	MH10(6,5),949
INITIAL	MH10(6,6),984
INITIAL	MH10(6,7),985
INITIAL	MH10(6,8),1000
INITIAL	MH11(2-3,3),30
INITIAL	MH11(3-5,4),115
INITIAL	MH11(4-5,8),77
INITIAL	MH11(2-4,9),111
INITIAL	MH11(2-3,13),733
INITIAL	MH11(4-6,13),1000
INITIAL	MH11(1,2),3
INITIAL	MH11(1,7),77
INITIAL	MH11(1,10),154
INITIAL	MH11(1,11),105
INITIAL	MH11(1,12),83
INITIAL	MH11(1,13),667
INITIAL	MH11(2,2),10
INITIAL	MH11(2,4),77
INITIAL	MH11(2,7),154
INITIAL	MH11(2,10),308
INITIAL	MH11(2,11),263
INITIAL	MH11(2,12),250
INITIAL	MH11(3,2),17
INITIAL	MH11(3,7),231
INITIAL	MH11(3,10),385
INITIAL	MH11(3,11),526
INITIAL	MH11(3,12),417
INITIAL	MH11(4,2),24
INITIAL	MH11(4,3),61
INITIAL	MH11(4,6),63
INITIAL	MH11(4,7),308
INITIAL	MH11(4,10),538
INITIAL	MH11(4,11),632
INITIAL	MH11(4,12),500
INITIAL	MH11(5,1),19
INITIAL	MH11(5,2),31
INITIAL	MH11(5,3),182
INITIAL	MH11(5,6),125
INITIAL	MH11(5,7),385
INITIAL	MH11(5,9),444
INITIAL	MH11(5,10),769
INITIAL	MH11(5,11),789
INITIAL	MH11(5,12),750
INITIAL	MH11(6,1),39
INITIAL	MH11(6,2),49
INITIAL	MH11(6,3),303
INITIAL	MH11(6,4),221
INITIAL	MH11(6,5),71
INITIAL	MH11(6,6),500
INITIAL	MH11(6,7),462
INITIAL	MH11(6,8),692
INITIAL	MH11(6,9),667
INITIAL	MH11(6,10),846
INITIAL	MH11(6,11),947
INITIAL	MH11(6,12),833
INITIAL	MH12(3-4,1),854
INITIAL	MH12(3-4,2),882
INITIAL	MH12(2-3,4),916
INITIAL	MH12(4-5,6),959
INITIAL	MH12(5-6,7-10),1000
INITIAL	MH12(1-4,9),1000
INITIAL	MH12(1-3,10),333
INITIAL	MH12(1,1),756
INITIAL	MH12(1,2),676
INITIAL	MH12(1,3),650
INITIAL	MH12(1,4),885
INITIAL	MH12(1,5),394

(continued)

INITIAL	MH12(1,6),891
INITIAL	MH12(1,7),531
INITIAL	MH12(1,8),826
INITIAL	MH12(2,1),829
INITIAL	MH12(2,2),824
INITIAL	MH12(2,3),744
INITIAL	MH12(2,5),606
INITIAL	MH12(2,6),925
INITIAL	MH12(2,7),796
INITIAL	MH12(2,8),926
INITIAL	MH12(2,9),167
INITIAL	MH12(3,3),786
INITIAL	MH12(3,5),667
INITIAL	MH12(3,6),944
INITIAL	MH12(3,7),837
INITIAL	MH12(3,8),942
INITIAL	MH12(4,3),829
INITIAL	MH12(4,4),939
INITIAL	MH12(4,5),758
INITIAL	MH12(4,7),918
INITIAL	MH12(4,8),975
INITIAL	MH12(4,10),667
INITIAL	MH12(5,1),878
INITIAL	MH12(5,2),941
INITIAL	MH12(5,3),880
INITIAL	MH12(5,4),943
INITIAL	MH12(5,5),788
INITIAL	MH12(6,1),976
INITIAL	MH12(6,2),971
INITIAL	MH12(6,3),949
INITIAL	MH12(6,4),966
INITIAL	MH12(6,5),909
INITIAL	MH12(6,6),993
INITIAL	MH13(2-3,2),2
INITIAL	MH13(2-4,3),57
INITIAL	MH13(2-3,4),29
INITIAL	MH13(2-4,5),133
INITIAL	MH13(2-3,8),133
INITIAL	MH13(2-3,9),250
INITIAL	MH13(4-5,9),333
INITIAL	MH13(3-4,10),286
INITIAL	MH13(2-3,13),600
INITIAL	MH13(2-3,13),900
INITIAL	MH13(2-3,14),750
INITIAL	MH13(4-5,14),833
INITIAL	MH13(1,5),67
INITIAL	MH13(1,11),438
INITIAL	MH13(1,12),188
INITIAL	MH13(1,13),400
INITIAL	MH13(1,14),583
INITIAL	MH13(2,1),7
INITIAL	MH13(2,10),143
INITIAL	MH13(2,11),688
INITIAL	MH13(2,12),563
INITIAL	MH13(3,1),14
INITIAL	MH13(3,11),750
INITIAL	MH13(3,12),688
INITIAL	MH13(4,1),27
INITIAL	MH13(4,2),5
INITIAL	MH13(4,4),59
INITIAL	MH13(4,8),267
INITIAL	MH13(4,11),813
INITIAL	MH13(4,12),813
INITIAL	MH13(5,1),34
INITIAL	MH13(5,2),13
INITIAL	MH13(5,3),143
INITIAL	MH13(5,4),118
INITIAL	MH13(5,5),333
INITIAL	MH13(5,6),222
INITIAL	MH13(5,7),83
INITIAL	MH13(5,8),400
INITIAL	MH13(5,10),429
INITIAL	MH13(5,11-12),875
INITIAL	MH13(6,1),55
INITIAL	MH13(6,2),37
INITIAL	MH13(6,3),314
INITIAL	MH13(6,4),324
INITIAL	MH13(6,5),667
INITIAL	MH13(6,6),778
INITIAL	MH13(6,7),333
INITIAL	MH13(6,8),800
INITIAL	MH13(6,9),582
INITIAL	MH13(6,10),714
INITIAL	MH13(6,11-12),938
INITIAL	MH13(6,13-14),1000
INITIAL	MH14(2-3,1),788

(continued)

INITIAL	MH14(5-6,2),931
INITIAL	MH14(4-5,5),938
INITIAL	MH14(5-6,8-10),1000
INITIAL	MH14(1-4,9-10),1000
INITIAL	MH14(1,1),758
INITIAL	MH14(1,2),724
INITIAL	MH14(1,3),675
INITIAL	MH14(1,4),896
INITIAL	MH14(1,5),813
INITIAL	MH14(1,6),930
INITIAL	MH14(1,7),286
INITIAL	MH14(1,8),902
INITIAL	MH14(2,2),793
INITIAL	MH14(2,3),727
INITIAL	MH14(2,4),922
INITIAL	MH14(2,5),875
INITIAL	MH14(2,6),961
INITIAL	MH14(2,7),571
INITIAL	MH14(2,8),959
INITIAL	MH14(3,2),828
INITIAL	MH14(3,3),805
INITIAL	MH14(3,4),942
INITIAL	MH14(3,5),906
INITIAL	MH14(3,6),969
INITIAL	MH14(3,7),619
INITIAL	MH14(3,8),975
INITIAL	MH14(4,1),818
INITIAL	MH14(4,2),897
INITIAL	MH14(4,3),844
INITIAL	MH14(4,4),971
INITIAL	MH14(4,6),987
INITIAL	MH14(4,7),762
INITIAL	MH14(4,8),984
INITIAL	MH14(5,1),848
INITIAL	MH14(5,3),883
INITIAL	MH14(5,4),979
INITIAL	MH14(5,6),991
INITIAL	MH14(5,7),857
INITIAL	MH14(6,1),909
INITIAL	MH14(6,3),961
INITIAL	MH14(6,4),996
INITIAL	MH14(6,5),969
INITIAL	MH14(6,6),996
INITIAL	MH14(6,7),905
INITIAL	MH15(4-5,3),231
INITIAL	MH15(2-4,4),91
INITIAL	MH15(1-2,8),71
INITIAL	MH15(6,9-14),1000
INITIAL	MH15(2-4,10),167
INITIAL	MH15(5,11-14),1000
INITIAL	MH15(1,11-12),200
INITIAL	MH15(2,11-12),600
INITIAL	MH15(3,11-12),800
INITIAL	MH15(4,12-14),1000
INITIAL	MH15(1-3,13),1000
INITIAL	MH15(2-3,14),750
INITIAL	MH15(1,14),250
INITIAL	MH15(2,2),2
INITIAL	MH15(2,9),167
INITIAL	MH15(3,2),5
INITIAL	MH15(3,8),214
INITIAL	MH15(3,9),333
INITIAL	MH15(4,2),12
INITIAL	MH15(4,7),250
INITIAL	MH15(4,8),286
INITIAL	MH15(4,9),500
INITIAL	MH15(4,11),900
INITIAL	MH15(5,2),18
INITIAL	MH15(5,4),182
INITIAL	MH15(5,5),125
INITIAL	MH15(5,7),500
INITIAL	MH15(5,8),643
INITIAL	MH15(5,9),667
INITIAL	MH15(5,10),333
INITIAL	MH15(6,1),18
INITIAL	MH15(6,2),29
INITIAL	MH15(6,3),308
INITIAL	MH15(6,4),500
INITIAL	MH15(6,5),250
INITIAL	MH15(6,7),750
INITIAL	MH15(6,8),929
INITIAL	MH16(1-2,1),879
INITIAL	MH16(1-2,2),958
INITIAL	MH16(5-6,1-2),1000
INITIAL	MH16(3-4,2),1000
INITIAL	MH16(2-5,4),996

(continued)

INITIAL	MH16(6,4-5),1000
INITIAL	MH16(3-5,5),1000
INITIAL	MH16(2-3,6),981
INITIAL	MH16(4-6,6),990
INITIAL	MH16(1-3,7),875
INITIAL	MH16(4-6,7-10),1000
INITIAL	MH16(4,10),500
INITIAL	MH16(1-3,9),1000
INITIAL	MH16(1,3),720
INITIAL	MH16(1,4),964
INITIAL	MH16(1,5),773
INITIAL	MH16(1,6),942
INITIAL	MH16(1,8),667
INITIAL	MH16(2,3),853
INITIAL	MH16(2,5),909
INITIAL	MH16(2,8),917
INITIAL	MH16(3,1),909
INITIAL	MH16(3,3),893
INITIAL	MH16(3,8),1000
INITIAL	MH16(4,1),970
INITIAL	MH16(4,3),907
INITIAL	MH16(5,3),933
INITIAL	MH16(6,3),973
INITIAL	MH17(1-3,1),9
INITIAL	MH17(3-5,2),6
INITIAL	MH17(4-6,5),667
INITIAL	MH17(5-6,7),250
INITIAL	MH17(1-5,9),333
INITIAL	MH17(1-3,11),333
INITIAL	MH17(4-6,11-14),1000
INITIAL	MH17(1-3,12-14),1000
INITIAL	MH17(1,5),167
INITIAL	MH17(2,5),333
INITIAL	MH17(3,5),500
INITIAL	MH17(4,1),18
INITIAL	MH17(4,4),71
INITIAL	MH17(5,1),27
INITIAL	MH17(5,4),143
INITIAL	MH17(6,1),106
INITIAL	MH17(6,2),35
INITIAL	MH17(6,3),143
INITIAL	MH17(6,4),214
INITIAL	MH17(6,6),500
INITIAL	MH17(6,8),500
INITIAL	MH17(6,9),1000
INITIAL	MH18(6,1-10),1000
INITIAL	MH18(6,2),989
INITIAL	MH18(1-5,2),1000
INITIAL	MH18(2-3,4),981
INITIAL	MH18(4-5,4),991
INITIAL	MH18(2-3,5),938
INITIAL	MH18(4-5,5),969
INITIAL	MH18(2-3,6),964
INITIAL	MH18(4-5,6),1000
INITIAL	MH18(2-5,7),900
INITIAL	MH18(3-5,8-10),1000
INITIAL	MH18(1-2,9-10),1000
INITIAL	MH18(1,3),817
INITIAL	MH18(1,4),935
INITIAL	MH18(1,5),781
INITIAL	MH18(1,6),893
INITIAL	MH18(1,7),800
INITIAL	MH18(1,8),643
INITIAL	MH18(2,1),750
INITIAL	MH18(2,3),946
INITIAL	MH18(2,8),929
INITIAL	MH18(3,1),857
INITIAL	MH18(3,3),957
INITIAL	MH18(4,1),893
INITIAL	MH18(4,3),968
INITIAL	MH18(5,1),929
INITIAL	MH18(5,3),978
INITIAL	MH19(4-5,2),11
INITIAL	MH19(1-2,3),56
INITIAL	MH19(3-5,3),111
INITIAL	MH19(4-5,7),333
INITIAL	MH19(5-6,8-14),1000
INITIAL	MH19(1-4,10),1000
INITIAL	MH19(1-4,12-14),1000
INITIAL	MH19(2,11),400
INITIAL	MH19(3,2),6
INITIAL	MH19(3,11),600
INITIAL	MH19(4,4),385
INITIAL	MH19(4,8),667
INITIAL	MH19(4,11),800
INITIAL	MH19(5,4),692

(continued)

INITIAL	MH19(6,1),1000
INITIAL	MH19(6,2),28
INITIAL	MH19(6,3),278
INITIAL	MH19(6,4),1000
INITIAL	MH19(6,5),250
INITIAL	MH19(6,7),667
INITIAL	MH20(6,1-10),1000
INITIAL	MH20(5-6,4),995
INITIAL	MH20(3-5,2),1000
INITIAL	MH20(5,5-10),1000
INITIAL	MH20(2-3,6),981
INITIAL	MH20(1-4,7-10),1000
INITIAL	MH20(1,8),965
INITIAL	MH20(1,1),800
INITIAL	MH20(1,2),828
INITIAL	MH20(1,3),987
INITIAL	MH20(1,4),947
INITIAL	MH20(1,5),825
INITIAL	MH20(1,6),957
INITIAL	MH20(2,1),891
INITIAL	MH20(2,2),862
INITIAL	MH20(2,3),948
INITIAL	MH20(2,4),979
INITIAL	MH20(2,5),918
INITIAL	MH20(3,1),927
INITIAL	MH20(3,3),960
INITIAL	MH20(3,4),984
INITIAL	MH20(3,5),959
INITIAL	MH20(4,1),945
INITIAL	MH20(4,3),979
INITIAL	MH20(4,4),989
INITIAL	MH20(4,5),990
INITIAL	MH20(4,6),994
INITIAL	MH20(5,1),964
INITIAL	MH20(5,3),988
INITIAL	MH21(4-5,8),667
INITIAL	MH21(4-5,10-11),500
INITIAL	MH21(1-6,12-14),1000
INITIAL	MH21(2,1),2
INITIAL	MH21(2,11),167
INITIAL	MH21(3,1),5
INITIAL	MH21(3,8),333
INITIAL	MH21(3,11),333
INITIAL	MH21(4,1),7
INITIAL	MH21(5,1),11
INITIAL	MH21(5,3),29
INITIAL	MH21(5,4),727
INITIAL	MH21(5,9),200
INITIAL	MH21(6,1),20
INITIAL	MH21(6,2),11
INITIAL	MH21(6,3),88
INITIAL	MH21(6,4),909
INITIAL	MH21(6,5),100
INITIAL	MH21(6,6),600
INITIAL	MH21(6,7),500
INITIAL	MH21(6,8),1000
INITIAL	MH21(6,9),600
INITIAL	MH21(6,10),1000
INITIAL	MH21(6,11),667
INITIAL	MH22(1-5,1),960
INITIAL	MH22(6,1-2),1000
INITIAL	MH22(2-5,2),1000
INITIAL	MH22(6,4-5),1000
INITIAL	MH22(4-5,4),1000
INITIAL	MH22(4-6,6-10),1000
INITIAL	MH22(1-3,9-10),1000
INITIAL	MH22(1,2),889
INITIAL	MH22(1,3),891
INITIAL	MH22(1,4),940
INITIAL	MH22(1,5),866
INITIAL	MH22(1,6),959
INITIAL	MH22(1,7),955
INITIAL	MH22(1,8),971
INITIAL	MH22(2,3),950
INITIAL	MH22(2,4),952
INITIAL	MH22(2,5),975
INITIAL	MH22(2,6),994
INITIAL	MH22(2,7),985
INITIAL	MH22(2,8),989
INITIAL	MH22(3,3),968
INITIAL	MH22(3,4),976
INITIAL	MH22(3,5),983
INITIAL	MH22(3,6),1000
INITIAL	MH22(3,7),985
INITIAL	MH22(3,8),1000
INITIAL	MH22(4,3),982

(continued)

INITIAL	MH22(4,5),983
INITIAL	MH22(5,3),991
INITIAL	MH22(5,5),992
INITIAL	MH22(6,3),995
INITIAL	MH23(2-5,1),3
INITIAL	MH23(1-6,10-14),1000
INITIAL	MH23(1-5,11),333
INITIAL	MH23(1-3,13),0
INITIAL	MH23(5,3),71
INITIAL	MH23(5,5),200
INITIAL	MH23(5,9),333
INITIAL	MH23(6,1),5
INITIAL	MH23(6,2),7
INITIAL	MH23(6,3),107
INITIAL	MH23(6,4),1000
INITIAL	MH23(6,5),400
INITIAL	MH23(6,6),200
INITIAL	MH23(6,7),250
INITIAL	MH23(6,9),667
INITIAL	MH24(1-6,1-2),1000
INITIAL	MH24(2-6,4),1000
INITIAL	MH24(4-6,5),994
INITIAL	MH24(2-3,6),989
INITIAL	MH24(4-6,6),1000
INITIAL	MH24(3-4,7),991
INITIAL	MH24(5-6,7),1000
INITIAL	MH24(1-6,8-10),1000
INITIAL	MH24(1-2,8),986
INITIAL	MH24(1,3),930
INITIAL	MH24(1,4),981
INITIAL	MH24(1,5),930
INITIAL	MH24(1,6),958
INITIAL	MH24(1,7),965
INITIAL	MH24(2,3),965
INITIAL	MH24(2,5),975
INITIAL	MH24(2,7),983
INITIAL	MH24(3,3),974
INITIAL	MH24(3,5),981
INITIAL	MH24(4,3),982
INITIAL	MH24(5,3),987
INITIAL	MH24(6,3),991
INITIAL	MH25(1-5,1),2
INITIAL	MH25(5-6,5),250
INITIAL	MH25(1-6,6-14),1000
INITIAL	MH25(1-4,7),0
INITIAL	MH25(1-4,9),0
INITIAL	MH25(1,11),667
INITIAL	MH25(6,1),14
INITIAL	MH25(6,3),118
INITIAL	MH25(6,4),167
INITIAL	MH26(1-6,1),944
INITIAL	MH26(1-6,2),1000
INITIAL	MH26(5-6,3),995
INITIAL	MH26(3-4,4),987
INITIAL	MH26(5-6,4),993
INITIAL	MH26(6,5-10),1000
INITIAL	MH26(2-5,6-10),1000
INITIAL	MH26(2,7),993
INITIAL	MH26(1-3,8),995
INITIAL	MH26(1,9-10),1000
INITIAL	MH26(1,3),935
INITIAL	MH26(1,4),947
INITIAL	MH26(1,5),953
INITIAL	MH26(1,6),967
INITIAL	MH26(1,7),980
INITIAL	MH26(2,3),973
INITIAL	MH26(2,4),980
INITIAL	MH26(2,5),974
INITIAL	MH26(3,3),976
INITIAL	MH26(3,5),985
INITIAL	MH26(4,3),984
INITIAL	MH26(4,5),988
INITIAL	MH26(5,5),997
INITIAL	MH27(3-5,2),2
INITIAL	MH27(3-4,3),43
INITIAL	MH27(5-6,5),500
INITIAL	MH27(4-5,7),286
INITIAL	MH27(2-6,8-14),1000
INITIAL	MH27(2-4,9),0
INITIAL	MH27(1,12),1000
INITIAL	MH27(5,1),1
INITIAL	MH27(5,3),130
INITIAL	MH27(6,1),5
INITIAL	MH27(6,2),8
INITIAL	MH27(6,3),174
INITIAL	MH27(6,4),182

(continued)

INITIAL	MH27(6,7),857
INITIAL	MH28(4-6,1),1000
INITIAL	MH28(1-6,2),1000
INITIAL	MH28(2-3,3),985
INITIAL	MH28(5-6,3),995
INITIAL	MH28(2-4,4),994
INITIAL	MH28(5-6,4-10),1000
INITIAL	MH28(2-4,5-10),1000
INITIAL	MH28(1-3,6),996
INITIAL	MH28(2-3,8),997
INITIAL	MH28(1-2,10),996
INITIAL	MH28(4,3),990
INITIAL	MH28(3,1),946
INITIAL	MH28(2,1),973
INITIAL	MH28(1,1),892
INITIAL	MH28(1,3),964
INITIAL	MH28(1,4),982
INITIAL	MH28(1,5),989
INITIAL	MH28(1,7),997
INITIAL	MH28(1,8),995
INITIAL	MH28(1,9),875
INITIAL	MH29(4-5,3),91
INITIAL	MH29(5-6,4),333
INITIAL	MH29(5-6,5),1000
INITIAL	MH29(5-6,8),1000
INITIAL	MH29(1-6,11-14),1000
INITIAL	MH29(1,13),0
INITIAL	MH29(4,1),1
INITIAL	MH29(5,1),1
INITIAL	MH29(5,2),2
INITIAL	MH29(6,1),5
INITIAL	MH29(6,2),7
INITIAL	MH29(6,3),182
INITIAL	MH29(6,7),500
INITIAL	MH30(1-6,1-2),1000
INITIAL	MH30(1,1),626
INITIAL	MH30(1,2),963
INITIAL	MH30(1-2,4),968
INITIAL	MH30(2-3,5),986
INITIAL	MH30(5-6,6-10),1000
INITIAL	MH30(1-4,7-10),1000
INITIAL	MH30(1,7),996
INITIAL	MH30(1,8),995
INITIAL	MH30(1,3),953
INITIAL	MH30(1,5),976
INITIAL	MH30(1,6),967
INITIAL	MH30(2,3),967
INITIAL	MH30(2,6),978
INITIAL	MH30(3,3),972
INITIAL	MH30(3,4),976
INITIAL	MH30(3,6),983
INITIAL	MH30(4,3),981
INITIAL	MH30(4,4),984
INITIAL	MH30(4,5),990
INITIAL	MH30(4,6),989
INITIAL	MH30(5,3),991
INITIAL	MH30(5,4),992
INITIAL	MH30(5,5),993
INITIAL	MH30(6,3),1000
INITIAL	MH30(6,4),992
INITIAL	MH30(6,5),997
INITIAL	MH31(3-5,2),1
INITIAL	MH31(5-6,3),222
INITIAL	MH31(6,4-5),500
INITIAL	MH31(6,6-14),1000
INITIAL	MH31(5-6,10),667
INITIAL	MH31(1-5,12-14),1000
INITIAL	MH31(3-4,7),333
INITIAL	MH31(3-4,8),500
INITIAL	MH31(3-4,9-11),333
INITIAL	MH31(4,11),667
INITIAL	MH31(1-2,11),333
INITIAL	MH31(4,3),111
INITIAL	MH31(5,4),250
INITIAL	MH31(5,7),667
INITIAL	MH31(5,8),1000
INITIAL	MH31(5,9),667
INITIAL	MH31(5,11),1000
INITIAL	MH31(6,1),5
INITIAL	MH31(6,2),7
INITIAL	MH32(1-6,1),947
INITIAL	MH32(2-3,2),917
INITIAL	MH32(4-6,2),1000
INITIAL	MH32(5-6,4),992
INITIAL	MH32(6,5-10),1000
INITIAL	MH32(4-5,5),1000

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INITIAL	MH32(3-4,6),985
INITIAL	MH32(4-5,7),1000
INITIAL	MH32(3-4,8),996
INITIAL	MH32(1-5,9-10),1000
INITIAL	MH32(1,2),833
INITIAL	MH32(1,3),937
INITIAL	MH32(1,4),888
INITIAL	MH32(1,5),960
INITIAL	MH32(1,6),965
INITIAL	MH32(1,7),969
INITIAL	MH32(1,8),974
INITIAL	MH32(2,3),952
INITIAL	MH32(2,4),944
INITIAL	MH32(2,5),988
INITIAL	MH32(2,6),980
INITIAL	MH32(2,7),990
INITIAL	MH32(2,8),989
INITIAL	MH32(3,3),956
INITIAL	MH32(3,4),976
INITIAL	MH32(3,5),992
INITIAL	MH32(3,7),995
INITIAL	MH32(4,3),967
INITIAL	MH32(4,4),984
INITIAL	MH32(5,3),993
INITIAL	MH32(5,6),995
INITIAL	MH32(6,3),996
INITIAL	MH33(3-4,1),1
INITIAL	MH33(2-4,2),3
INITIAL	MH33(2-3,4),67
INITIAL	MH33(4-6,5),333
INITIAL	MH33(1-2,7),167
INITIAL	MH33(4-6,7),500
INITIAL	MH33(2-5,8),500
INITIAL	MH33(2-3,9),125
INITIAL	MH33(4-5,10),500
INITIAL	MH33(5-6,11-14),1000
INITIAL	MH33(5,12),0
INITIAL	MH33(1-4,13-14),1000
INITIAL	MH33(1-2,13),500
INITIAL	MH33(1,2),2
INITIAL	MH33(3,7),333
INITIAL	MH33(3,10),250
INITIAL	MH33(4,4),133
INITIAL	MH33(4,6),143
INITIAL	MH33(4,9),375
INITIAL	MH33(5,1),6
INITIAL	MH33(5,2),5
INITIAL	MH33(5,3),67
INITIAL	MH33(5,4),200
INITIAL	MH33(5,6),286
INITIAL	MH33(5,9),500
INITIAL	MH33(6,1),10
INITIAL	MH33(6,2),12
INITIAL	MH33(6,3),200
INITIAL	MH33(6,4),267
INITIAL	MH33(6,6),571
INITIAL	MH33(6,8),1000
INITIAL	MH33(6,9),750
INITIAL	MH33(6,10),750
INITIAL	MH34(1-5,1),786
INITIAL	MH34(6,1-3),1000
INITIAL	MH34(1-5,2),1000
INITIAL	MH34(5-6,4),989
INITIAL	MH34(6,5-10),1000
INITIAL	MH34(5,6-10),1000
INITIAL	MH34(4,7-10),1000
INITIAL	MH34(1-3,8-10),1000
INITIAL	MH34(1,3),903
INITIAL	MH34(1,4),828
INITIAL	MH34(1,5),918
INITIAL	MH34(1,6),879
INITIAL	MH34(1,7),934
INITIAL	MH34(1,8),962
INITIAL	MH34(2,3),938
INITIAL	MH34(2,4),892
INITIAL	MH34(2,5),964
INITIAL	MH34(2,6),935
INITIAL	MH34(2,7),974
INITIAL	MH34(3,3),955
INITIAL	MH34(3,4),946
INITIAL	MH34(3,5),969
INITIAL	MH34(3,6),972
INITIAL	MH34(3,7),987
INITIAL	MH34(4,3),983
INITIAL	MH34(4,4),968
INITIAL	MH34(4,5),974

(continued)

INITIAL	MH34(4,6),991
INITIAL	MH34(5,3),994
INITIAL	MH34(5,5),990
INITIAL	MH35(1-4,2),4
INITIAL	MH35(4-5,3),125
INITIAL	MH35(5-6,5),400
INITIAL	MH35(1-2,6),111
INITIAL	MH35(4-5,6),333
INITIAL	MH35(4-5,7),143
INITIAL	MH35(2-4,8),250
INITIAL	MH35(5-6,8),500
INITIAL	MH35(3-6,10),667
INITIAL	MH35(3-4,11),333
INITIAL	MH35(1-6,12-14),1000
INITIAL	MH35(1,14),0
INITIAL	MH35(2,10),333
INITIAL	MH35(2,11),167
INITIAL	MH35(3,6),222
INITIAL	MH35(4,5),200
INITIAL	MH35(5,1),10
INITIAL	MH35(5,2),14
INITIAL	MH35(5,9),200
INITIAL	MH35(5,11),500
INITIAL	MH35(6,1),14
INITIAL	MH35(6,2),25
INITIAL	MH35(6,3),56
INITIAL	MH35(6,4),188
INITIAL	MH35(6,6),556
INITIAL	MH35(6,7),429
INITIAL	MH35(6,9),400
INITIAL	MH35(6,11),833
* LOGAN	
INITIAL	MH101(1,1),18
INITIAL	MH101(2,1),13
INITIAL	MH101(1,3),24
INITIAL	MH101(1,4),19
INITIAL	MH101(2,2),7
INITIAL	MH101(2,3),23
INITIAL	MH101(2,4),7
INITIAL	MH101(3-4,1),1
INITIAL	MH101(3-4,2),40
INITIAL	MH101(3,3),133
INITIAL	MH101(3-18,4),1
INITIAL	MH101(4,3),134
INITIAL	MH101(5-6,1),2
INITIAL	MH101(5-6,2),270
INITIAL	MH101(5,3),135
INITIAL	MH101(6,3),136
INITIAL	MH101(7-8,1),3
INITIAL	MH101(7-8,2),220
INITIAL	MH101(7,3),137
INITIAL	MH101(8,3),138
INITIAL	MH101(9-10,1),4
INITIAL	MH101(9,3),139
INITIAL	MH101(9-10,2),330
INITIAL	MH101(10,3),140
INITIAL	MH101(11-12,1),5
INITIAL	MH101(11-12,2),150
INITIAL	MH101(11,3),141
INITIAL	MH101(12,3),142
INITIAL	MH101(13-14,1),4
INITIAL	MH101(13,3),139
INITIAL	MH101(13-14,2),330
INITIAL	MH101(14,3),140
INITIAL	MH101(15-16,1),1
INITIAL	MH101(15-16,2),40
INITIAL	MH101(15,3),133
INITIAL	MH101(16,3),134
INITIAL	MH101(17-18,1),3
INITIAL	MH101(17-18,2),220
INITIAL	MH101(17,3),137
INITIAL	MH101(18,3),138
INITIAL	MX001(1-22,1-5),680100
INITIAL	MX001(3,1-5),820150
INITIAL	MX001(4,1-5),820200
INITIAL	MX001(1-4,2),460100
INITIAL	MX001(5-7,3),560100
INITIAL	MX001(5,5),780100
INITIAL	MX001(6,5),780125
INITIAL	MX001(7,1-2),820150
INITIAL	MX001(7,4),820150
INITIAL	MX001(7,5),780150
INITIAL	MX001(8,1-2),820200
INITIAL	MX001(8,3),560125
INITIAL	MX001(8,4),820200
INITIAL	MX001(8,5),780175

(continued)

INITIAL	MX001(9-12,1),216050
INITIAL	MX001(9-12,5),268075
INITIAL	MX001(11,2-4),820150
INITIAL	MX001(12,2-4),820200
INITIAL	MX001(13-16,1),460075
INITIAL	MX001(13-15,5),580100
INITIAL	MX001(13-15,5),580100
INITIAL	MX001(15,2-4),820150
INITIAL	MX001(16,2-4),820200
INITIAL	MX001(16,5),580125
INITIAL	MX001(19,1-5),820150
INITIAL	MX001(20,1-5),820200
INITIAL	MX001(23,1-5),820150
INITIAL	MX001(24,1-5),820200
INITIAL	MX001(21-24,3),420100
INITIAL	MX001(25-27,1),620050
INITIAL	MX001(25-28,2),460100
INITIAL	MX001(25-27,3),540100
INITIAL	MX001(25-27,4),480050
INITIAL	MX001(25,5),800100
INITIAL	MX001(26,5),800175
INITIAL	MX001(27,5),800150
INITIAL	MX001(28,5),800175
INITIAL	MX001(28,4),480100
INITIAL	MX001(28,3),540125
INITIAL	MX001(28,1),620100
INITIAL	MH133(1,1),2
INITIAL	MH133(1,2),4
INITIAL	MH133(2,1),4
INITIAL	MH133(2,2),7
INITIAL	MH133(3-4,1),15
INITIAL	MH133(3,2),10
INITIAL	MH133(3,3),7
INITIAL	MH133(3,5),19
INITIAL	MH133(3,6),23
INITIAL	MH133(3-5,7),56
INITIAL	MH133(3-4,8),43
INITIAL	MH133(4,2),7
INITIAL	MH133(5,1),35
INITIAL	MH133(5,5),19
INITIAL	MH133(6,1),15
INITIAL	MH133(6,2),7
INITIAL	MH133(6,3),35
INITIAL	MH133(7,1),37
INITIAL	MH134(1,1),2
INITIAL	MH134(1,2),4
INITIAL	MH134(2,1),4
INITIAL	MH134(2,2),7
INITIAL	MH134(3-4,1),15
INITIAL	MH134(3-4,2),2
INITIAL	MH134(3-4,3),3
INITIAL	MH134(3,5),19
INITIAL	MH134(3,6),23
INITIAL	MH134(3-5,7),56
INITIAL	MH134(3-4,8),43
INITIAL	MH134(4,4),10
INITIAL	MH134(5,1),35
INITIAL	MH134(5,5),19
INITIAL	MH134(6,1),15
INITIAL	MH134(6,2),2
INITIAL	MH134(6,3),3
INITIAL	MH134(7,1),37
INITIAL	MH135(1-2,1),4
INITIAL	MH135(1-2,2),7
INITIAL	MH135(1,8),48
INITIAL	MH135(3-4,1),16
INITIAL	MH135(3,2),11
INITIAL	MH135(3,3),2
INITIAL	MH135(3,4),3
INITIAL	MH135(3,5),20
INITIAL	MH135(3,6),24
INITIAL	MH135(4,2),7
INITIAL	MH135(5,1),7
INITIAL	MH135(6,1),15
INITIAL	MH135(6,2),2
INITIAL	MH135(6,3),3
INITIAL	MH135(6,4),35
INITIAL	MH135(7,1),37
INITIAL	MH136(1-2,1),4
INITIAL	MH136(1,2),2
INITIAL	MH136(1,8),48
INITIAL	MH136(2,2),7
INITIAL	MH136(3-4,1),16
INITIAL	MH136(3,2),11
INITIAL	MH136(3,3),2
INITIAL	MH136(3,4),3

(continued)

INITIAL	MH136(3,5),20
INITIAL	MH136(3,6),24
INITIAL	MH136(4,2),7
INITIAL	MH136(5,1),7
INITIAL	MH136(5,5),20
INITIAL	MH136(6,1),15
INITIAL	MH136(6,2),7
INITIAL	MH136(6,3),35
INITIAL	MH136(7,1),37
INITIAL	MH137(1-2,1),2
INITIAL	MH137(1-2,2),4
INITIAL	MH137(2-3,3),7
INITIAL	MH137(2,8),44
INITIAL	MH137(3-4,1),15
INITIAL	MH137(3,2),10
INITIAL	MH137(3,5),19
INITIAL	MH137(3,6),23
INITIAL	MH137(4,2),7
INITIAL	MH137(5-6,1),35
INITIAL	MH137(5,5),19
INITIAL	MH137(6,2),15
INITIAL	MH137(6,3),7
INITIAL	MH137(6,8),44
INITIAL	MH137(7,1),37
INITIAL	MH138(1-2,1),2
INITIAL	MH138(1-2,2),4
INITIAL	MH138(2,8),44
INITIAL	MH138(3-4,1),15
INITIAL	MH138(3-4,2),2
INITIAL	MH138(3-4,3),3
INITIAL	MH138(3,4),10
INITIAL	MH138(3,5),19
INITIAL	MH138(3,6),23
INITIAL	MH138(5,1),35
INITIAL	MH138(5,5),19
INITIAL	MH138(6,1),15
INITIAL	MH138(6,2),2
INITIAL	MH138(6,3),3
INITIAL	MH138(6,8),44
INITIAL	MH138(7,1),37
INITIAL	MH139(1-2,1),4
INITIAL	MH139(1-2,2),7
INITIAL	MH139(1,7),57
INITIAL	MH139(1,8),46
INITIAL	MH139(3-4,1),16
INITIAL	MH139(3,2),11
INITIAL	MH139(3,3),2
INITIAL	MH139(3,4),3
INITIAL	MH139(3,5),20
INITIAL	MH139(3,6),24
INITIAL	MH139(3,7),57
INITIAL	MH139(4,2),7
INITIAL	MH139(5,1),7
INITIAL	MH139(5,5),20
INITIAL	MH139(5,7),57
INITIAL	MH139(6,1),15
INITIAL	MH139(6,2),2
INITIAL	MH139(6,3),3
INITIAL	MH139(6,4),35
INITIAL	MH139(7,1),37
INITIAL	MH140(1,1),2
INITIAL	MH140(1-2,2),4
INITIAL	MH140(1,7),57
INITIAL	MH140(1,8),46
INITIAL	MH140(2-6,1),7
INITIAL	MH140(3-4,2),16
INITIAL	MH140(3,3),11
INITIAL	MH140(3,5),20
INITIAL	MH140(3,6),24
INITIAL	MH140(3,7),57
INITIAL	MH140(5,5),20
INITIAL	MH140(5,7),57
INITIAL	MH140(6,2),15
INITIAL	MH140(6,3),35
INITIAL	MH140(7,1),37
INITIAL	MH141(1-2,1),4
INITIAL	MH141(1-4,2),7
INITIAL	MH141(2,8),45
INITIAL	MH141(3-4,1),14
INITIAL	MH141(3,3),9
INITIAL	MH141(3,5),18
INITIAL	MH141(3,6),22
INITIAL	MH141(4,8),45
INITIAL	MH141(6,1),15
INITIAL	MH141(6,2),7
INITIAL	MH141(6,3),35

(continued)

INITIAL	MH141(7,1),37
INITIAL	MH142(1-2,1),4
INITIAL	MH142(1,2),2
INITIAL	MH142(2,2),7
INITIAL	MH142(2,6),45
INITIAL	MH142(3-4,1),14
INITIAL	MH142(3-4,2),2
INITIAL	MH142(3-4,3),1
INITIAL	MH142(3,4),9
INITIAL	MH142(3,5),18
INITIAL	MH142(3,6),22
INITIAL	MH142(4,8),45
INITIAL	MH142(6,1),15
INITIAL	MH142(6,2),2
INITIAL	MH142(6,3),1
INITIAL	MH142(6,4),35
INITIAL	MH142(7,1),37
* BEDFORD	
INITIAL	MH106(1-2,1),6
INITIAL	MH106(1,2),7
INITIAL	MH106(1-2,3),24
INITIAL	MH106(1,4),133
INITIAL	MH106(2,4),5
INITIAL	MH106(3,1),1
INITIAL	MH106(3,2),110
INITIAL	MH106(3,3),143
INITIAL	MH106(4-6,3),156
INITIAL	MH106(3-6,4),2
INITIAL	MH106(4,1),2
INITIAL	MH106(4,2),290
INITIAL	MH106(5,2),230
INITIAL	MH106(5,1),3
INITIAL	MH106(6,2),50
INITIAL	MH106(6,1),4
INITIAL	MH143(1,1),53
INITIAL	MH143(1-4,5),17
INITIAL	MH143(2-3,1),12
INITIAL	MH143(2,2),8
INITIAL	MH143(2,3),1
INITIAL	MH143(2,6),21
INITIAL	MH143(2,8),64
INITIAL	MH143(3,2),1
INITIAL	MH143(4,1),4
INITIAL	MH143(4,2),53
INITIAL	MH143(5,1),1
INITIAL	MH143(5,2),4
INITIAL	MX002(1-2,1-4),700100
INITIAL	MX002(3,1),700100
INITIAL	MX002(3,2-4),720150
INITIAL	MX002(4,1),700125
INITIAL	MX002(4,2-4),760200
INITIAL	MX002(5-8,1),383100
INITIAL	MX002(9-11,1),660100
INITIAL	MX002(9-10,2-4),680100
INITIAL	MX002(11,2-4),720150
INITIAL	MX002(12,1),660125
INITIAL	MX002(12,2-4),760200
INITIAL	MX002(13-14,1-4),800100
INITIAL	MX002(15,1-4),800150
INITIAL	MX002(15,2),800125
INITIAL	MX002(16,1-4),800200
INITIAL	MX002(16,2),800150
INITIAL	MX002(17-18,1-4),680100
INITIAL	MX002(19,1-4),720150
INITIAL	MX002(19,2-3),680100
INITIAL	MX002(20,1-4),760200
INITIAL	MX002(20,3),680125
INITIAL	MH156(1,1),53
INITIAL	MH156(1-4,5),53
INITIAL	MH156(1-4,5),17
INITIAL	MH156(2-3,1),1
INITIAL	MH156(2-3,2),12
INITIAL	MH156(2,3),8
INITIAL	MH156(4-5,1),4
INITIAL	MH156(4,2),53
INITIAL	MH156(5,2),1
* BEVERLY	
INITIAL	MH107(1-2,1),6
INITIAL	MH107(1,2),8
INITIAL	MH107(1,3),18
INITIAL	MH107(1,4),108
INITIAL	MH107(2,3),24
INITIAL	MH107(2,4),4
INITIAL	MH107(3,1),1
INITIAL	MH107(3,2),160
INITIAL	MH107(3-6,3),144

(continued)

INITIAL	MH107(3-6,4),3
INITIAL	MH107(4,1),2
INITIAL	MH107(4,2),340
INITIAL	MH107(5,1),3
INITIAL	MH107(5,2),90
INITIAL	MH107(6,1),4
INITIAL	MH107(6,2),270
INITIAL	MH144(1,1),25
INITIAL	MH144(2-4,1),4
INITIAL	MH144(2,2),3
INITIAL	MH144(2,3),6
INITIAL	MH144(3-4,2),33
INITIAL	MH144(3-4,3),1
INITIAL	MH144(4,4),1
INITIAL	MX003(1-2,1-4),600100
INITIAL	MX003(3,1-4),600150
INITIAL	MX003(4,1-4),700200
INITIAL	MX003(5-7,1-4),640100
INITIAL	MX003(7,2-4),640150
INITIAL	MX003(8,1),640125
INITIAL	MX003(8,2-4),700200
INITIAL	MX003(9-12,1),580100
INITIAL	MX003(9-10,2-4),600100
INITIAL	MX003(11,2-4),600150
INITIAL	MX003(12,2-4),700200
INITIAL	MX003(13-16,1),500100
INITIAL	MX003(13-14,2-4),600100
INITIAL	MX003(15,2-4),600150
INITIAL	MX003(16,2-4),700200
* FITCHBURG	
INITIAL	MH108(1-2,1),5
INITIAL	MH108(1,2),8
INITIAL	MH108(1,3),18
INITIAL	MH108(1,4),350
INITIAL	MH108(2,3),24
INITIAL	MH108(2,4),1
INITIAL	MH108(3,1),1
INITIAL	MH108(3,2),140
INITIAL	MH108(3-5,3),145
INITIAL	MH108(3-5,4),4
INITIAL	MH108(4,1),2
INITIAL	MH108(4,2),320
INITIAL	MH108(5,1),3
INITIAL	MH108(5,2),200
INITIAL	MX004(1,1-4),1140100
INITIAL	MX004(2,1-4),1400175
INITIAL	MX004(3,1-4),1420200
INITIAL	MX004(4,1-4),1600200
INITIAL	MH145(1,1),32
* FT DEVENS	
INITIAL	MH109(1-2,1),6
INITIAL	MH109(1-2,3),24
INITIAL	MH109(1,4),268
INITIAL	MH109(2,4),1
INITIAL	MH109(3,1),1
INITIAL	MH109(3,2),140
INITIAL	MH109(3-6,3),146
INITIAL	MH109(3-6,4),5
INITIAL	MH109(4,1),2
INITIAL	MH109(4,2),320
INITIAL	MH109(5,1),3
INITIAL	MH109(5,2),20
INITIAL	MH109(6,1),4
INITIAL	MH109(6,2),200
INITIAL	MX005(1-2,1-4),940100
INITIAL	MX005(3,1),940125
INITIAL	MX005(3,2-4),940150
INITIAL	MX005(4,1),940150
INITIAL	MX005(4,2-4),940200
INITIAL	MH146(1,1),26
* LAWRENCE	
INITIAL	MH110(1-2,1),6
INITIAL	MH110(1,2),8
INITIAL	MH110(1,3),21
INITIAL	MH110(1,4),147
INITIAL	MH110(2,3),24
INITIAL	MH110(2,4),2
INITIAL	MH110(3,1),1
INITIAL	MH110(3,2),230
INITIAL	MH110(3,3),147
INITIAL	MH110(4,3),157
INITIAL	MH110(5-6,3),158
INITIAL	MH110(3-6,4),6
INITIAL	MH110(4,1),2
INITIAL	MH110(4,2),50
INITIAL	MH110(5,1),3

(continued)

INITIAL	MH110(5,2),140
INITIAL	MH110(6,2),320
INITIAL	MH110(6,1),4
INITIAL	MX006(1-3,1),700100
INITIAL	MX006(1-2,2-4),780100
INITIAL	MX006(3,2-4),780150
INITIAL	MX006(4,1),700125
INITIAL	MX006(4,2-4),780200
INITIAL	MX006(5-6,1),780100
INITIAL	MX006(5-7,2),760100
INITIAL	MX006(5-6,3-4),780100
INITIAL	MX006(7,1),780150
INITIAL	MX006(7,3-4),780125
INITIAL	MX006(8,1),780200
INITIAL	MX006(8,2),760125
INITIAL	MX006(8,3-4),780200
INITIAL	MH158(1,1),1
INITIAL	MH158(1,2),3
INITIAL	MH158(2,1),13
INITIAL	MH158(2,2),28
INITIAL	MH157(1,1),1
INITIAL	MH157(1,2),3
INITIAL	MH157(2,1),13
INITIAL	MH157(2,2),28
INITIAL	MH157(2,8),41
INITIAL	MH147(1,1),1
INITIAL	MH147(1,2),3
INITIAL	MH147(1,8),41
INITIAL	MH147(2,1),13
INITIAL	MH147(2,2),28
* MANSFIELD	
INITIAL	MH111(1-2,1),4
INITIAL	MH111(1,2),8
INITIAL	MH111(1,3),18
INITIAL	MH111(1,4),124
INITIAL	MH111(2,3),24
INITIAL	MH111(2,4),2
INITIAL	MH111(3,1),1
INITIAL	MH111(3,2),140
INITIAL	MH111(3-4,3),148
INITIAL	MH111(3-4,4),7
INITIAL	MH111(4,2),320
INITIAL	MH111(4,1),2
INITIAL	MX007(1-2,1-2),860100
INITIAL	MX007(3,1-2),860150
INITIAL	MX007(4,1-2),860200
INITIAL	MX007(5-6,1-2),780100
INITIAL	MX007(7,1-2),780150
INITIAL	MX007(8,1-2),800200
INITIAL	MH148(1-2,1),2
INITIAL	MH148(2,2),5
* MARSHFIELD	
INITIAL	MH112(1-2,1),4
INITIAL	MH112(1,2),8
INITIAL	MH112(1,3),18
INITIAL	MH112(1,4),9
INITIAL	MH112(2,3),24
INITIAL	MH112(2,4),1
INITIAL	MH112(3,1),1
INITIAL	MH112(3,2),60
INITIAL	MH112(3-4,3),149
INITIAL	MH112(3-4,4),8
INITIAL	MH112(4,1),2
INITIAL	MH112(4,2),240
INITIAL	MX008(1-2,1-2),600100
INITIAL	MX008(3,1-2),600150
INITIAL	MX008(4,1-2),640200
INITIAL	MH149(1,1),2
INITIAL	MH149(1,2),5
* NEW BURYPORT	
INITIAL	MH113(1-2,1),4
INITIAL	MH113(1,2),8
INITIAL	MH113(1,3),18
INITIAL	MH113(1,4),11
INITIAL	MH113(2,3),24
INITIAL	MH113(2,4),1
INITIAL	MH113(3,1),1
INITIAL	MH113(3,2),100
INITIAL	MH113(3-4,3),150
INITIAL	MH113(3-4,4),9
INITIAL	MH113(4,1),2
INITIAL	MH113(4,2),280
INITIAL	MX009(1,1-2),740100
INITIAL	MX009(2-4,1-2),1500500
INITIAL	MH150(1,1),13
INITIAL	MH150(1,2),17

(continued)

* NORWOOD

INITIAL	MH114(1-2,1),6
INITIAL	MH114(1,2),7
INITIAL	MH114(1,3),23
INITIAL	MH114(1,4),49
INITIAL	MH114(2,3),24
INITIAL	MH114(2,4),4
INITIAL	MH114(3,1),1
INITIAL	MH114(3,2),350
INITIAL	MH114(3-6,3),151
INITIAL	MH114(3-6,4),10
INITIAL	MH114(4,1),2
INITIAL	MH114(4,2),170
INITIAL	MH114(5,1),3
INITIAL	MH114(5,2),100
INITIAL	MH114(6,1),4
INITIAL	MH114(6,2),280
INITIAL	MX010(1-3,1-4),640100
INITIAL	MX010(3,2-4),640150
INITIAL	MX010(4,1),640125
INITIAL	MX010(4,2-4),740200
INITIAL	MX010(5-7,1),580100
INITIAL	MX010(5-6,2-4),640100
INITIAL	MX010(7,2-4),640150
INITIAL	MX010(8,1),580125
INITIAL	MX010(8,2-4),740200
INITIAL	MX010(9,1-4),840100
INITIAL	MX010(10,1-4),840125
INITIAL	MX010(11,1-4),840150
INITIAL	MX010(12,1-4),840175
INITIAL	MX010(13-15,1),580100
INITIAL	MX010(16,1),580125
INITIAL	MH151(1-2,1),31
INITIAL	MH151(2,2),34
INITIAL	MH151(2,4),52
INITIAL	MH151(3-4,1),2
INITIAL	MH151(4,2),5

* PLYMOUTH

INITIAL	MH115(1-2,1),6
INITIAL	MH115(1,2),8
INITIAL	MH115(1,3),18
INITIAL	MH115(1,4),149
INITIAL	MH115(2,3),24
INITIAL	MH115(2,4),1
INITIAL	MH115(3,1),1
INITIAL	MH115(3,2),60
INITIAL	MH115(3-6,3),152
INITIAL	MH115(3-6,4),11
INITIAL	MH115(4,1),2
INITIAL	MH115(4,2),330
INITIAL	MH115(5,1),3
INITIAL	MH115(5,2),240
INITIAL	MH115(6,1),4
INITIAL	MH115(6,2),150
INITIAL	MH152(1,1),30
INITIAL	MX011(1-3,1-4),600100
INITIAL	MX011(3,2-4),600150
INITIAL	MX011(4,1-4),1500500

* S. WEYMOUTH

INITIAL	MH116(1-2,1),6
INITIAL	MH116(1-2,3),24
INITIAL	MH116(1,4),161
INITIAL	MH116(2,4),3
INITIAL	MH116(3,1),1
INITIAL	MH116(3,2),350
INITIAL	MH116(3,3),153
INITIAL	MH116(3-6,4),12
INITIAL	MH116(4,1),2
INITIAL	MH116(4,2),80
INITIAL	MH116(5,1),3
INITIAL	MH116(5,2),260
INITIAL	MH116(6,1),4
INITIAL	MH116(6,2),170
INITIAL	MH116(6,3),159
INITIAL	MH116(6,3),160
INITIAL	MH116(6,3),161
INITIAL	MX012(1-4,1),620100
INITIAL	MX012(1-2,2-4),640100
INITIAL	MX012(3,2-4),640150
INITIAL	MX012(4,2-4),720200
INITIAL	MX012(5-6,1-4),640100
INITIAL	MX012(7,1-4),640150
INITIAL	MX012(8,1-4),720200
INITIAL	MX012(9-12,1),520100
INITIAL	MX012(9-12,2),540100
INITIAL	MX012(9-12,3),560100

(continued)

INITIAL	MX012(9-10,4),640100
INITIAL	MX012(11,4),640150
INITIAL	MX012(12,4),720200
INITIAL	MH153(1-2,1),2
INITIAL	MH153(1-2,2),5
INITIAL	MH153(1,3),36
INITIAL	MH153(3,1),27
INITIAL	MH153(1,1),27
INITIAL	MH153(3,1),2
INITIAL	MH153(3,2),5
INITIAL	MH153(3,3),36
INITIAL	MH153(3,8),61
INITIAL	MH153(1,2-3),0
INITIAL	MH159(1,1),27
INITIAL	MH159(2-3,1),2
INITIAL	MH159(2-3,2),5
INITIAL	MH159(3,3),36
INITIAL	MH159(3,8),58
INITIAL	MH160(1,1),27
INITIAL	MH160(2-3,1),2
INITIAL	MH160(2-3,2),5
INITIAL	MH160(3,3),36
INITIAL	MH160(3,7),62
INITIAL	MH160(3,8),59
INITIAL	MH161(1,1),27
INITIAL	MH161(2-3,1),2
INITIAL	MH161(2-3,2),5
INITIAL	MH161(3,3),36
* TAUNTON	
INITIAL	MH117(1-2,1),4
INITIAL	MH117(1,2),8
INITIAL	MH117(1,3),18
INITIAL	MH117(1,4),92
INITIAL	MH117(2,3),24
INITIAL	MH117(2,4),3
INITIAL	MH117(3,1),1
INITIAL	MH117(3,2),300
INITIAL	MH117(3-4,3),154
INITIAL	MH117(3-4,4),13
INITIAL	MH117(4,1),2
INITIAL	MH117(4,2),120
INITIAL	MH154(1,1),29
INITIAL	MH154(2-3,1),2
INITIAL	MH154(3,2),5
INITIAL	MX013(1-3,1-2),660100
INITIAL	MX013(3,2),660150
INITIAL	MX013(4,1),660125
INITIAL	MX013(4,2),660200
INITIAL	MX013(5-7,1-2),760150
INITIAL	MX013(8,1-2),760200
INITIAL	MX013(9,1-2),580150
INITIAL	MX013(10-11,1-2),620150
INITIAL	MX013(12,1-2),620200
* TEW-MAL	
INITIAL	MH118(1-2,1),6
INITIAL	MH118(1,2),8
INITIAL	MH118(1,3),18
INITIAL	MH118(1,4),92
INITIAL	MH118(2,3),24
INITIAL	MH118(2,4),2
INITIAL	MH118(3,1),1
INITIAL	MH118(3,2),210
INITIAL	MH118(3-6,3),155
INITIAL	MH118(3-6,4),14
INITIAL	MH118(4,1),2
INITIAL	MH118(4,2),30
INITIAL	MH118(5,1),3
INITIAL	MH118(5,2),180
INITIAL	MH118(6,1),4
INITIAL	MH118(6,2),360
INITIAL	MH155(1,1),1
INITIAL	MH155(1,2),3
INITIAL	MH155(2,1),28
INITIAL	MX014(1-3,1-4),640100
INITIAL	MX014(3,2-4),640150
INITIAL	MX014(4,2-4),920200
INITIAL	MX014(4,1),640175
INITIAL	MX014(5-6,1-4),760100
INITIAL	MX014(7,1-4),760150
INITIAL	MX014(8,1-4),920200
INITIAL	XH1,63
INITIAL	XH2,1
INITIAL	XH3,180
INITIAL	XH4,15
INITIAL	XH5,8
INITIAL	XH6,18

(continued)

INITIAL	XH7,5				
INITIAL	XH8,500				
INITIAL	XH9,18				
INITIAL	XH10,5				
INITIAL	XH11,15				
INITIAL	XH12,16				
INITIAL	XH13,10				
INITIAL	XH14,15				
INITIAL	XH15,30				
INITIAL	XH16,3				
INITIAL	XH17,5				
INITIAL	XH18,-1				
INITIAL	XH19,2				
INITIAL	XH20,100				
INITIAL	XH21,375				
INITIAL	XH22,5				
5	FUNCTION	RN2	C2		
0	50	.999		150	
6	FUNCTION	P1	D10		
4	3	5		3	6
7	7	8		12	9
10	22	11		22	12
13	30				30
7	FUNCTION	P3	D7		
1	1000	2		750	3
4	400	5		300	6
7	50				200
8	FUNCTION	P1	D7		
1	25	2		50	3
4	100	5		150	6
7	300				200
9	FUNCTION	RN2	C2		
0	150	.999		450	
10	FUNCTION	P1	D4		
1	1005	2		18060	3
4	24060				2015
11	FUNCTION	P1	C13		
0	100	1		7	10
100	2.3	200		1.61	300
400	.92	500		.69	600
700	.36	800		.22	900
999	.001				.11
1	FUNCTION	FN1	C2		
0	71	1		92	
2	FUNCTION	RN1	C2		
0	91	1		122	
3	FUNCTION	PN1	C2		
0	121	1		142	
4	FUNCTION	PN1	C2		
0	141	1		167	
1	VARIABLE	(C1/60)*24+1			
2	FVARIABLE	FN7+FN9-300			
3	FVARIABLE	FN11*P3			
4	FVARIABLE	FN11*P4			
5	FVARIABLE	FN8+(FN5-100)/2			
6	FVARIABLE	FN11*XH4			
7	FVARIABLE	FN7+FN5-100			
8	FVARIABLE	FN11*XH3			
9	FVARIABLE	XH23*MH41(P2,XH24)+V10			
10	FVARIABLE	XH25*MH42(P2,XH24)			
11	FVARIABLE	XH23*MH36(V1,XH24)+V12			
12	FVARIABLE	XH25*MH39(V1,XH24)			
13	FVARIABLE	60*V14			
14	FVARIABLE	FN11/(XH23*MH38(V1,18)+V15)			
15	FVARIABLE	XH25*MH39(V1,18)			
16	FVARIABLE	(600*(MH36(P15,P2)/P3)+5)/10			
17	FVARIABLE	(600*(MH37(P15,P2)/P3)+5)/10			
18	VARIABLE	M1-1			
19	VARIABLE	M1-P7			
20	VARIABLE	XH26*XH26			
21	FVARIABLE	FN10/100+RN7*V22/1000			
22	VARIABLE	FN10*100			
23	FVARIABLE	(10*(X1*XH27/60)+5)/10			
1	BVARIABLE	X2*L*P6			
2	BVARIABLE	X2*L*P6			
3	BVARIABLE	X2*GE*P6			
24	FVARIABLE	(600*P1/P3+5)/10			
25	FVARIABLE	(600*P1/XH28+5)/10			
26	FVARIABLE	XH18*XH26			
4	BVARIABLE	XH29*GE*V27*XH30*GE*V28			
29	FVARIABLE	4*(P16-1)+P14			
27	VARIABLE	X3/1000			
28	VARIABLE	X3*1000			

* WEATHER MODULE
* WEATHER PARAMETERS

(continued)

* P1-COUNTER
 * P2-RANDOM NUMBER COUNTER
 * P3-COUNTER
 * P4-CELLING MATRIX NUMBER
 * P5/VISABILITY MATRIX NUMBER
 * P6-DAY/NIGHT COUNTER

1	GENERATE				
2	SPLIT	1	59		
3	SPLIT	1	69		
4	ASSIGN	1	2		
5	ASSIGN	6	0		
6	ASSIGN	3	0		
7	TEST GE	V1	XH5	11	
8	TEST L	V1	XH6	11	
9	ASSIGN	1	3		
10	ASSIGN	6	1		
11	ASSIGN	2	RN2		
12	ASSIGN	3+	1		
13	TEST LE	P2,MH1(P3,P1),12			
14	SAVEVALUE	31,MH1(P3,1),H			
15	ASSIGN	2	RN2		
16	ASSIGN	1+	2		
17	TEST LE	P1	11	19	
18	TEST LE	P2,MH1(P3,P1),16			
19	SAVEVALUE	32	FN6	H	
20	ASSIGN	1-	3		
21	ASSIGN	2	RN2		
22	ASSIGN	4,MH1(P3,12)			
23	ASSIGN	5,MH1(P3,13)			
24	ASSIGN	3	0		
25	ASSIGN	3+	1		
26	TEST LE	P3	6	28	
27	TEST LE	P2,MH*4(P3,P1),25			
28	SAVEVALUE	33	P3	H	
29	TEST E	P3	1	32	
30	SAVEVALUE	34	FN7	H	
31	TRANSFER		36		
32	TEST NE	P3	2	35	
33	SAVEVALUE	34	V7	H	
34	TRANSFER		36		
35	SAVEVALUE	34	V2	H	
36	ASSIGN	3+	P3		
37	ASSIGN	3+	P6		
38	ASSIGN	3-	1		
39	ASSIGN	1	0		
40	ASSIGN	2	RN2		
41	ASSIGN	1+	1		
42	TEST LE	P1	6	44	
43	TEST LE	P2,MH*5(P1,P3),41			
44	SAVEVALUE	35	P1	H	
45	TEST E	P1	7	48	
46	SAVEVALUE	36	FN8	H	
47	TRANSFER		49		
48	SAVEVALUE	36	V5	H	
49	SAVEVALUE	25	1	H	
50	SAVEVALUE	23	0	H	
51	TEST E	XH35	7	55	
52	TEST E	XH33	1	55	
53	SAVEVALUE	25	0	H	
54	SAVEVALUE	23	1	H	
55	ASSIGN	1	RN2		
56	LOGICS	1			
57	ADVANCE	V8			
58	TRANSFER		4		
59	ASSIGN	3	XH33		
60	TEST NE	P3	1	66	
61	TEST NE	P3	2	64	
62	SAVEVALUE	34	V7	H	
63	TRANSFER		65		
64	SAVEVALUE	34	V2	H	
65	LOGICS	1			
66	ASSIGN	1	RN2		
67	ADVANCE	V6			
68	TRANSFER		59		
69	ASSIGN	1	XH35		
70	TEST NE	P1	7	72	
71	SAVEVALUE	36	V5	H	
72	ASSIGN	1	RN2		
73	LOGICS	1			
74	ADVANCE	V6			
75	TRANSFER		69		

* CONTROL A/C'S LEAVING HOLD AREA ENTERING AIR CONTROLLED APPROACH

* 76 GENERATE

1 1
 (continued)

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77 SPLIT 1 206
78 GATE LS 2
79 LOGICR 3
80 GATE LS 3
81 GATE LR 4
* AIR CONTROLLER TAKES CONTROL OF A/C
82 UNLINK 3 200 1 13 0 79
83 GATE LS 5
84 LOGICR 5
85 TRANSFER 81
*
* CREATE A/C AND LOAD INTO HOLD AREAS
*
86 GENERATE
87 GATE LR 6 16
88 LOGICS 6
89 ASSIGN 1 RN1
90 ADVANCE V13
91 LOGICR 6
* ASSIGN A/C TAIL NUMBER
92 SAVEVALUE 37+ 1 H
93 ASSIGN 5 XH37
* ASSIGN A/C DESTINATION
94 ASSIGN 1 RN1
95 SAVEVALUE 24 0 H
96 SAVEVALUE 24+ 1 H
97 TEST NE XH24 XH9 100
98 TEST G P1 V11 100
99 TRANSFER 96
100 ASSIGN 2 XH24
* ASSIGN A/C TYPE
101 SAVEVALUE 24 0 H
102 ASSIGN 1 RN1
103 SAVEVALUE 24+ 1 H
104 TEST G P1 V9 107
105 TEST E XH24 3 103
106 SAVEVALUE 24 4 H
107 ASSIGN 4 XH24
* ASSIGN A/C WEIGHT CLASS AND CATAGORY
108 ASSIGN 1 RN1
109 ASSIGN 8 0
110 ASSIGN 8+ 1
111 TEST LE P1,MH40(P4,P8),110
112 ASSIGN 14 P8
113 ASSIGN 8 4
114 ASSIGN 1 RN1
115 ASSIGN 8+ 1
116 TEST LE P1,MH40(P4,P8),115
117 ASSIGN 9 P8
118 ASSIGN 9- 4
* ASSIGN A/C SPEED
119 ASSIGN 3 FN*14
* LOAD DISPLAY MATRIX
120 MSAVEVALUE 44+ 1 P4 1 H
121 TEST LE P2 XH10 210
122 SAVEVALUE 38+ 1 H
123 MSAVEVALUE 44+ 2 P4 1 H
124 ASSIGN 15 1
125 ASSIGN 10 P5
126 ASSIGN 5 XH38
127 ASSIGN 8 0
128 ASSIGN 1 0
129 LOGICS 3
130 MARK
131 LINK 3 P10
*
* UNLOAD HOLD AREAS AND LAND A/C
*
132 ADVANCE P7
133 GATE LR 7
134 UNLINK P11 198 1 5 P5 199
135 TEST NE V19 0 138
136 MSAVEVALUE 44+ 5 P4 1 H
137 MSAVEVALUE 44+ 6 P4 V19 H
138 SAVEVALUE 39- 1 H
139 TEST L XH39,MH43(XH2,11),141
140 LOGICR 4
141 ASSIGN 1 P4
142 MSAVEVALUE 44+ 9 P4 1 H
143 SPLIT 1 150 3
144 LOGICS 8
145 ADVANCE 1
146 TEST GE XH2 XH11 148
147 ADVANCE 2
148 LOGICR 8
149 TERMINATE

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(continued)

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* TAKE OFF A/C
*
150 ADVANCE V21
151 PRIORITY 0
152 MSAVEVALUE 44+ 13 P1 1 H
153 MARK
154 ASSIGN 2 C1
155 SAVEVALUE 40+ 1 H
156 ASSIGN 3 XH40
157 SPLIT 1 159
158 LINK 4 P2
159 GATE LR 9
160 LOGICS 9
161 GATE LR 7
162 LOGICS 7
163 SAVEVALUE 2 P2
164 UNLINK 1 176 1 BV1 180
165 GATE LS 10
166 LOGICR 7
167 LOGICR 10
168 SAVEVALUE 1- C1
169 TEST G XH32 XH14 171
170 GATE LR 8
171 TEST NE V23 0 185
172 TEST L V23 XH19 185
173 MSAVEVALUE 44+ 12 P1 X1 H
174 ADVANCE X1
175 TRANSFER 161
176 SAVEVALUE 1 P6
177 SAVEVALUE 27 P3 H
178 LOGICS 10
179 LINK P11 P6
180 LOGICR 7
181 LOGICR 10
182 SAVEVALUE 1 0
183 SAVEVALUE 27 0 H
184 TRANSFER 169
185 TEST LE XH20 XH36 196
186 TEST LE XH21 XH34 196
187 UNLINK 4 198 1 3 199
188 ADVANCE 1
189 TEST GE XH2 XH11 191
190 ADVANCE 2
191 LOGICR 9
192 TEST NE V18 0 195
193 MSAVEVALUE 44+ 10 P1 1 H
194 MSAVEVALUE 44+ 11 P1 V18 H
195 TERMINATE
196 GATE LS 1
197 TRANSFER 161
198 TERMINATE
199 ASSIGN XH41 101
*
* TEST AND LOAD LANDING SCHEDULE
*
200 LOGICS 5
201 TEST LE M1 XH15 263
202 SAVEVALUE 39+ 1 H
203 TEST GE XH39,MH43(XH2,11),210
204 LOGICS 4
205 TRANSFER 210
206 GATE LS 1
207 LOGICR 1
208 UNLINK 3 210 ALL 13 1
209 TRANSFER 206
* DETERMINE LANDING RUNWAY
210 ASSIGN 1 XH7
211 PRIORITY 0
212 ASSIGN 8 0
213 ASSIGN 1+ 1
214 ASSIGN 1,MH36(P1,P2)
215 TEST NE P15 0 220
216 TEST G P2 XH10 220
217 ASSIGN 1 XH7
218 ASSIGN 1+ 1
219 ASSIGN 1,MH36(P1,1)
220 TEST GE V1,MH*1(1,2),242
221 TEST LE V1,MH*1(1,3),242
222 ASSIGN 6 3
223 ASSIGN 7,MH*1(2,1)
224 TEST GE V1,MH*1(2,2),226
225 TEST G V1,MH*1(2,3),229
226 ASSIGN 6,MH*1(2,1)
227 ASSIGN 7,MH*1(1,1)
228 ASSIGN 7+ 1
229 TEST G XH32 XH22 267

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(continued)

230	SAVEVALUE	26	XH31	H		
231	SAVEVALUE	26-	MH*1(P6,2),H			
232	TEST L	XH26	0	234		
233	SAVEVALUE	26	V26	H		
234	TEST GE	XH26	180	236		
235	SAVEVALUE	26-	360	H		
236	TEST G	V20	6400	267		
237	ASSIGN	6+	1			
238	TEST GE	P6	P7	230		
239	TEST NE	P8	0	242		
240	ASSIGN	15,MH*1(P8,1)				
241	TRANSFER		324			
242	TEST E	P15	0	249		
243	PRIORITY	2				
244	ASSIGN	15	RN5			
245	TEST LE	P15	XH8	247		
246	TERMINATE					
247	MSAVEVALUE	44+	3	P4	1	H
248	TRANSFER		122			
249	TEST E	P13	0	258		
250	SAVEVALUE	39-	1	H		
251	TEST LE	XH39,MH43(XH2,11),253				
252	LOGICR	4				
253	GATE LR	7				
254	UNLINK	1	198	1	10	
255	UNLINK	2	198	1	10	
256	SPLIT	1	259			
257	ASSIGN	13	1			
258	LINK	3	P10			
259	ADVANCE	XH15				
260	UNLINK	3	198	1	10	
261	MSAVEVALUE	44+	8	P4	1	H
262	TERMINATE					
263	PRIORITY	0	BUFFER			
264	UNLINK	3	198	1	10	
265	MSAVEVALUE	44+	8	P4	1	H
266	TERMINATE					
267	TEST NE	P8	0	277		
268	SAVEVALUE	3	V20			
269	SAVEVALUE	26	XH31	H		
270	SAVEVALUE	26-	MH*1(P8,2),H			
271	TEST L	XH26	0	273		
272	SAVEVALUE	26	V26	H		
273	TEST GE	XH26	180	275		
274	SAVEVALUE	26-	360	H		
275	SAVEVALUE	3-	V20			
276	TEST L	X3	0	237		
277	TEST NE	XH23	1	317		
278	ASSIGN	16	0			
279	ASSIGN	12,MH*1(P6,3)				
280	ASSIGN	16+	1			
281	TEST LE	P16,MH*1(2,4),237				
282	ASSIGN	11	0			
283	ASSIGN	11+	1			
284	TEST LE	P11	4	289		
285	TEST NE	MH*12(P16,P11),0,283				
286	SAVEVALUE	42,MH*12(P16,P11),H				
287	TEST NE	MX15(XH42,1),1,283				
288	TRANSFER		280			
289	SAVEVALUE	29	XH34	H		
290	SAVEVALUE	30	XH36	H		
291	SAVEVALUE	29-,MH*1(1,4),H				
292	TEST NE	MH*12(P16,5),0,297				
293	SAVEVALUE	42,MH*12(P16,5),H				
294	TEST NE	MX15(XH42,1),1,297				
295	SAVEVALUE	30-	25	H		
296	SAVEVALUE	29-	50	H		
297	TEST NE	MH*12(P16,6),0,302				
298	SAVEVALUE	42,MH*12(P16,6),H				
299	TEST NE	MX15(XH42,1),1,302				
300	SAVEVALUE	30-	25	H		
301	SAVEVALUE	29-	50	H		
302	TEST NE	MH*12(P16,7),0,307				
303	SAVEVALUE	42,MH*12(P16,7),H				
304	TEST NE	MX15(XH42,1),1,307				
305	SAVEVALUE	29-	50	H		
306	SAVEVALUE	30-	50	H		
307	TEST NE	MH*12(P16,8),0,311				
308	SAVEVALUE	42,MH*12(P16,8),H				
309	TEST NE	MX15(XH42,1),1,311				
310	SAVEVALUE	30-	50	H		
311	ASSIGN	12,MH*1(P6,4)				
312	SAVEVALUE	42,MH*1(P6,1),H				
313	SAVEVALUE	3,MX*12(V29,XH42)				
314	TEST NE	BV4	1	317		
315	ASSIGN	12,MH*1(P6,3)				

(continued)

316	TRANSFER		280				
317	ASSIGN	12	0				
318	TEST E	P15	0	320			
319	TERMINATE						
320	ASSIGN	15,MH*1(P6,1)					
321	TEST G	XH32	XH14	324			
322	ASSIGN	8	P6				
323	TRANSFER		237				
324	ASSIGN	1	0				
325	TEST E	P13	1	330			
326	ASSIGN	13	0				
327	PRIORITY	2					
328	LOGICS	3					
329	LINK	3	P10				
330	TEST E	P9	1	335			
331	TEST E	XH23	1	335			
332	ASSIGN	11	2				
333	ASSIGN	7	XH13				
334	TRANSFER		341				
335	ASSIGN	11	1				
336	MSAVEVALUE	38	V1	19	P15	H	
337	TEST GE	XH2	XH11	340			
338	ASSIGN	7	V17				
339	TRANSFER		341				
340	ASSIGN	7	V16				
* CALCULATE ETA AND CONFLICTS							
341	ASSIGN	6	P7				
342	ASSIGN	8	0				
343	TEST G	P2	XH10	345			
344	MSAVEVALUE	44+	4	P4	P7	H	
345	ASSIGN	6+	C1				
346	GATE LR	7					
347	LOGICS	7					
348	UNLINK	1	198	1	10		
349	UNLINK	2	198	1	10		
350	SAVEVALUE	2	P6				
351	UNLINK	P11	411	ALL	8V3		416
352	GATE LS	11					
353	LOGICR	11					
354	UNLINK	P11	401	1	8V2		406
355	GATE LS	12					
356	LOGICR	12					
357	LOGICR	7					
358	TEST E	X4	0	419			
* TRAILING A/C DOES NOT EXIST							
359	TEST NE	X5	0	384			
* LEAD A/C EXISTS							
360	ASSIGN	1	0				
361	TEST LE	P9	XH43	373			
362	TEST E	XH43	3	368			
363	ASSIGN	1	6				
364	ASSIGN	1+	XH43				
365	ASSIGN	1-	P9				
366	ASSIGN	1,MH43(XH2,P1)					
367	TRANSFER		373				
368	TEST E	XH43	2	373			
369	ASSIGN	1	9				
370	ASSIGN	1+	XH43				
371	ASSIGN	1-	P9				
372	ASSIGN	1,MH43(XH2,P1)					
373	ASSIGN	1+,MH43(XH2,5)					
374	TEST L	P1	XH17	377			
375	TEST G	CH4	XH16	377			
376	ASSIGN	1	XH17				
377	ASSIGN	1	V24				
378	ASSIGN	1+	X5				
379	TEST NE	P12	1	447			
380	TEST G	P1	P6	384			
* CALCULATE WAIT TIME							
381	ASSIGN	1-	P6				
382	ASSIGN	6+	P1				
383	ASSIGN	8+	P1				
384	SPLIT	1	386				
385	LINK	P11	P6				
386	TEST G	P8	0	132			
387	TEST G	P8	XH15	392			
388	GATE LR	7					
389	UNLINK	P11	198	1	5		199
390	SAVEVALUE	39-	1	H			
391	TRANSFER		263				
392	ADVANCE	P8					
393	MSAVEVALUE	44+	7	P4	P8	H	
394	PRIORITY	2					
395	ASSIGN	8	0				
396	TEST G	XH39,MH43(XH2,11),210					
397	SAVEVALUE	39-	1	H			

(continued)

398	GATE LR	7			
399	UNLINK	P11	198	1	5
400	LINK	3	P10		
401	SAVEVALUE	4	P6		
402	SAVEVALUE	44	P9	H	
403	SAVEVALUE	28	P3	H	
404	LOGICS	12			
405	LINK	P11	P6		
406	SAVEVALUE	4	0		
407	SAVEVALUE	44	0	H	
408	SAVEVALUE	28	0	H	
409	LOGICS	12			
410	TRANSFER		355		
411	SAVEVALUE	5	P6		
412	SAVEVALUE	43	P9	H	
413	TEST E	W351	1	415	
414	LOGICS	11			
415	LINK	P11	P6		
416	SAVEVALUE	5	0		
417	SAVEVALUE	43	0	H	
418	TRANSFER		353		
* TRAILING A/C EXISTS					
419	TEST E	X5	0	445	
* TEST TRAILING A/C					
420	ASSIGN	1	0		
421	TEST L	P6	X4	346	
422	TEST LE	XH44	P9	434	
423	TEST E	P9	3	429	
424	ASSIGN	1	6		
425	ASSIGN	1+	P9		
426	ASSIGN	1-	XH44		
427	ASSIGN	1,MH43(XH2,P1)			
428	TRANSFER		434		
429	TEST E	P9	2	434	
430	ASSIGN	1	9		
431	ASSIGN	1+	P9		
432	ASSIGN	1-	XH44		
433	ASSIGN	1,MH43(XH2,P1)			
434	ASSIGN	1+,MH43(XH2,5)			
435	TEST L	P1	XH17	438	
436	TEST G	CH4	XH16	438	
437	ASSIGN	1	XH17		
438	ASSIGN	1	V25		
439	ASSIGN	1+	P6		
440	TEST G	P1	X4	384	
* CALCULATE WAIT TIME					
441	ASSIGN	8+	X4		
442	ASSIGN	8-	P6		
443	ASSIGN	6	X4		
444	TRANSFER		346		
* LEAD A/C EXISTS					
445	ASSIGN	12	1		
446	TRANSFER		360		
447	ASSIGN	12	0		
448	SAVEVALUE	43	0	H	
449	SAVEVALUE	5	0		
450	TEST G	P1	P6	420	
* CALCULATE WAIT TIME					
451	ASSIGN	1-	P6		
452	ASSIGN	6+	P1		
453	ASSIGN	8+	P1		
454	TRANSFER		420		
* FACILITIES OUTAGE MODULE					
455	GENERATE				
456	ASSIGN	2+	1		
457	TEST G	P2	XH1	472	
458	LOGICS	2			
459	SAVEVALUE	2	1	H	
460	GATE LS	13			
461	LOGICR	13			
462	SAVEVALUE	2	0	H	
463	SAVEVALUE	2+	1	H	
464	TEST L	XH2	XH12	460	
465	ASSIGN	1	0		
466	ASSIGN	1+	1		
467	TEST LE	P1	4	460	
468	ASSIGN	2,MH43(XH2,P1)			
469	TEST NE	P2	0	466	
470	TEST E	MX15(P2,1),0	466		
471	TRANSFER		463		
472	SPLIT	1	456		
473	ASSIGN	3,MX15(P2,2)			

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474	ASSIGN	4, MX15(P2,3)			
475	MSAVEVALUE	15	P2	1	1
476	ASSIGN	1	RN4		
477	ADVANCE	V3			
478	LOGICS	13			
479	MSAVEVALUE	15	P2	1	0
480	ASSIGN	1	RN4		
481	ADVANCE	V4			
482	LOGICS	1			
483	LOGICS	13			
484	TRANSFER		475		
* MODEL RUN CONSTRAINTS					
485	GENERATE	1440			1
486	TERMINATE	1			
	START	1		1	

Core Requirements
Exceeded

ERROR NO. 595

TRANS 16 FROM

BLOCK COUNTS

BLOCK CURRENT

1 0

2 0

3 0

4 0

5 0

6 0

7 0

8 0

9 0

10 0

51 0

52 0

53 0

54 0

55 0

56 0

57 1

58 0

59 0

60 0

101 0

102 0

103 0

104 0

105 0

106 0

107 0

108 0

109 0

110 0

151 0

152 0

153 0

154 0

155 0

156 0

157 0

158 0

159 0

160 0

Block printout prints, for each CPSS statement number, the number of transactions currently at each block, and the total number of transactions passing through that block.

457 TO 472 CLOCK 1 TERMINATIONS TO GO 1

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
1	0	1	11	0	1	21	0	1	31	0	1	41	0	1
2	0	2	12	0	2	22	0	1	32	0	2	42	0	2
3	0	2	13	0	6	23	0	1	33	0	0	43	0	6
4	0	1	14	0	1	24	0	1	34	0	0	44	0	1
5	0	1	15	0	1	25	0	1	35	0	0	45	0	1
6	0	1	16	0	2	26	0	1	36	0	1	46	0	1
7	0	1	17	0	2	27	0	1	37	0	1	47	0	1
8	0	0	18	0	2	28	0	1	38	0	1	48	0	0
9	0	0	19	0	1	29	0	1	39	0	1	49	0	1
10	0	0	20	0	1	30	0	1	40	0	1	50	0	1
51	0	1	61	0	0	71	0	0	81	0	0	91	0	0
52	0	1	62	0	0	72	0	1	82	0	0	92	0	0
53	0	1	63	0	0	73	0	1	83	0	0	93	0	0
54	0	1	64	0	0	74	1	1	84	0	0	94	0	0
55	0	1	65	0	0	75	0	0	85	1	2	95	0	0
56	0	1	66	0	1	76	0	1	86	0	1	96	0	0
57	1	1	67	1	1	77	0	2	87	1	1	97	0	0
58	0	0	68	0	0	78	1	1	88	0	0	98	0	0
59	0	1	69	0	1	79	0	0	89	0	0	99	0	0
60	0	1	70	0	1	80	0	0	90	0	0	100	0	0
101	0	0	111	0	0	121	0	0	131	0	0	141	0	0
102	0	0	112	0	0	122	0	0	132	0	0	142	0	0
103	0	0	113	0	0	123	0	0	133	0	0	143	0	0
104	0	0	114	0	0	124	0	0	134	0	0	144	0	0
105	0	0	115	0	0	125	0	0	135	0	0	145	0	0
106	0	0	116	0	0	126	0	0	136	0	0	146	0	0
107	0	0	117	0	0	127	0	0	137	0	0	147	0	0
108	0	0	118	0	0	128	0	0	138	0	0	148	0	0
109	0	0	119	0	0	129	0	0	139	0	0	149	0	0
110	0	0	120	0	0	130	0	0	140	0	0	150	0	0
151	0	0	161	0	0	171	0	0	181	0	0	191	0	0
152	0	0	162	0	0	172	0	0	182	0	0	192	0	0
153	0	0	163	0	0	173	0	0	183	0	0	193	0	0
154	0	0	164	0	0	174	0	0	184	0	0	194	0	0
155	0	0	165	0	0	175	0	0	185	0	0	195	0	0
156	0	0	166	0	0	176	0	0	186	0	0	196	0	0
157	0	0	167	0	0	177	0	0	187	0	0	197	0	0
158	0	0	168	0	0	178	0	0	188	0	0	198	0	0
159	0	0	169	0	0	179	0	0	189	0	0	199	0	0
160	0	0	170	0	0	180	0	0	190	0	0	200	0	0

(continued)

BLOCK CURRENT		TOTAL	BLOCK CURRENT		TOTAL	BLOCK CURRENT		TOTAL	BLOCK CURRENT		TOTAL
451	0	0	461	0	0	471	0	0	481	0	0
452	0	0	462	0	0	472	0	14	482	0	0
453	0	0	463	0	0	473	0	0	483	0	0
454	0	0	464	0	0	474	0	0	484	0	0
455	0	1	465	0	0	475	0	7	485	0	0
456	0	8	466	0	0	476	0	7	486	0	0
457	0	8	467	0	0	477	7	7			
458	0	0	468	0	0	478	0	0			
459	0	0	469	0	0	479	0	0			
460	0	0	470	0	0	480	0	0			

CURRENT EVENTS CHAIN

TRANS	BDI	BLOCK	PR	SF	NBA	SET	MARK-TIME	P1	P2	P3	P4	SI	TI	DI	CI	MC	PC	PF
2	1	77			78	8	1	0				1	1	2				
8		209			206	2	1	0				1	1	2				
9	1	86			87	5	-2	0		0	0	0	1	1	2			
16		472			456	4	1	0		8	0	0	0	0	2			

A-82

Lists the transactions that are to be processed at the time the printout was presented.
Detailed explanation of this printout is presented in the GPSS user's manual.

FUTURE EVENTS CHAIN

TRANS	BDI	BLOCK	PR	SF	NBA	SET	MARK-TIME	P1	P2	P3	P4	SI	TI	DI	CI	MC	PC	PF
7	9	74			75	6	1	585				0	0	4				
6	10	67			68	1	1	537				0	1	4				
3	14	90			91	3	1	219				0	0	4				
1	796	57			58	7	1	0				0	0					
5	1440				485	5		17	436	1	12	0	0	4				
15	13211	477			478	16	1	13	0			0						
14	15336	477			478	15	1	585				0		4				
10	34335	477			478	11	1	537				7	24600	4				
11	41390	477			478	12	1	567				6	24600	4				
12	50484	477			478	13	1	502				2	60300	4				
4	92386	477			478	10	1	436				3	60300	4				
13	319847	477			478	14	1	219				4	60300	4				
								17				1	72300	4				

Lists the transactions that are to be processed at a future time.
Details of this printout are presented in the GPSS user's manual.

(continued)

NR	NR	NR
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Lists of logic switches that are in the set position at present time.

CONTENTS OF HALFWORD SAVEVALUES (NON-ZERO)

SAVE	VALUE	NR.	VALUE	NR.	VALUE	NR.	VALUE	NR.	VALUE	NR.	VALUE	NR.	VALUE	NR.	VALUE	NR.	VALUE
FACIL	63	1	WTCHG	180	15	WTVAR	15	8	DAYST	18	18	RUNNY	30	5	DIVRT	500	
AIRPT	18	5	NORAD	15	16	RADDW	16	10	TDF	15	30	MAXM	30	3	TAKQU	3	
LNOST	5	-1	LNOSP	2	100	TAKVS	100	375	TAKCL	5	5	VFRWT	1	1	WMDIR	90	
WNVLE	7	1	CEIL	1000	7	VISAP	7	300	VISAB	300							

List of savevalues that are not zero and their values.

MATRIX HALFWORD SAVEVALUECIRVL

MATRIX HALFWORD SAVEVALUECIRVL										Ceiling Matrix visibility Matrix										Default = 30 Knots
COL. 1		NT		DY		NT		DY		NT		DY		NT		DY				
		3		4		5		6		7		8		9		10				
				Wind Direction in Degrees																
				1000		1000		1000		1000		1000		1000		1000				
Calm	1	360	7	1	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	2	3	
N	2	0	96	58	61	7	576	448	839	777	777	777	777	777	777	777	777	4	5	
NNE	3	22	128	85	152	76	704	510	891	753	956	956	956	956	956	956	956	6	7	
NE	4	45	163	118	113	29	510	324	755	639	981	979	981	979	981	979	981	8	9	
NNE	5	67	198	169	82	441	494	0	724	770	981	992	981	992	981	992	981	10	11	
E	6	90	232	263	167	49	642	437	776	820	976	986	976	986	976	986	976	12	13	
ESE	7	112	256	348	207	47	671	0	866	804	994	1000	994	1000	994	1000	994	14	15	
SE	8	135	272	398	237	66	777	680	935	962	993	995	993	995	993	995	993	16	17	
SSE	9	157	296	425	153	101	736	641	939	924	1000	995	1000	995	1000	995	1000	18	19	
S	10	180	365	489	109	53	757	456	949	803	1000	985	1000	985	1000	985	1000	20	21	
SSW	11	202	424	550	58	20	569	211	845	602	1000	998	1000	998	1000	998	1000	22	23	
SW	12	225	496	591	48	17	479	195	779	510	998	1000	998	1000	998	1000	998	24	25	
WSW	13	247	616	663	19	15	439	302	827	645	996	992	996	992	996	992	996	26	27	
W	14	270	776	777	69	14	312	211	651	498	990	966	990	966	990	966	990	28	29	
WNW	15	292	836	874	33	101	295	184	649	439	974	977	974	977	974	977	974	30	31	
NW	16	315	937	958	26	20	396	225	734	554	986	993	986	993	986	993	986	32	33	
NWN	17	337	1000	1000	30	13	413	835	835	658	1000	1000	1000	1000	1000	1000	1000	34	35	
N	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Wind direction in degrees

Wind

Number of cumulative occurrences, out of 1000, of wind direction in Day/Night

3 Knots

7 Knots

12 Knots

22 Knots

Wind Velocity

(continued)

MATRIX HALFWORD SAVEVALUE 2											
	NT	DY	NT	DY	NT	DY	NT	DY	NT	DY	
Ceiling	COL. 1	2	3	4	5	6	7	8	9	10	
1000'	1	857	857	0	0	0	0	0	0	0	
750'	2	877	877	0	0	0	0	0	0	0	
500'	3	918	918	0	0	0	0	0	0	0	
400'	4	938	938	0	0	0	0	0	0	0	
300'	5	979	979	0	0	0	0	0	0	0	
200'	6	979	979	0	0	0	0	0	0	0	
Default = 50'											
Wind	3		2		12		22		30		
Velocity	Knots		Knots		Knots		Knots		Knots		

Ceiling Matrix for Wind Calm

MATRIX HALFWORD SAVEVALUE 3														
Visibility in Miles	NT COL. 1	DY 2	NT 3	DY 4	NT 5	DY 6	NT 7	DY 8	NT 9	DY 10	NT 11	DY 12	NT 13	DY 14
.25 1	24	24	0	0	0	0	0	0	500	500	0	0	1000	1000
.50 2	48	48	0	0	0	0	0	0	500	500	0	0	1000	1000
.80 3	48	48	0	0	0	0	0	0	500	500	0	0	1000	1000
1.00 4	72	72	0	0	0	0	1000	1000	1000	1000	0	0	1000	1000
1.50 5	119	119	0	0	0	0	1000	1000	1000	1000	0	0	1000	1000
2.00 6	143	143	0	0	1000	1000	1000	1000	1000	1000	0	0	1000	1000
Default = 3.00														
Ceiling	1000'		750'		500'		400'		300'		200'		50'	

Visibility Matrix for Wind Calm

MATRIX HALFWORD SAVEVALUE 4										
	NT	DY	NT	DY	NT	DY	NT	DY	NT	DY
Ceiling	COL. 1	2	3	4	5	6	7	8	9	10
1000' 1	825	733	798	841	762	752	714	640	1000	0
750' 2	850	800	857	911	878	883	876	820	1000	750
500' 3	850	833	881	943	901	905	933	910	1000	750
400' 4	850	866	914	956	948	956	962	944	1000	1000
300' 5	875	900	950	981	977	992	991	989	1000	1000
200' 6	950	967	977	981	994	1000	1000	989	1000	1000
Default = 50'										
Wind	3		7		12		22		30	
Velocity	Knots		Knots		Knots		Knots		Knots	

Ceiling matrix for wind N

MATRIX HALFWORD SAVEVALUE 5															
		NT	DY	NT	DY	NT	DY	NT	DY	NT	DY	NT	DY	NT	DY
Visibility in Miles	COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	
.25 1	0	0	0	0	0	0	0	71	0	0	63	0	455	400	
.50 2	2	0	0	60	0	59	0	143	0	0	313	333	728	600	
.80 3	2	0	17	80	56	118	91	143	48	71	501	333	819	800	
1.00 4	6	6	51	120	111	176	136	143	238	286	564	333	910	1000	
1.50 5	6	13	85	200	222	294	227	214	381	500	814	667	910	1000	
2.00 6	12	16	171	260	389	412	485	429	810	500	877	1000	1000	1000	
Default = 3.00															
Ceiling	1000'		750'		500'		400'		300'		200'		50'		

Visibility matrix for wind N

(continued)

MATRIX HALFWORD SAVEVALUE 6

	COL. 1	2	3	4	5	6	7	8	9	10
ROW 1	771	867	638	744	628	553	625	813	1000	1000
2	771	933	732	849	857	766	750	983	1000	1000
3	800	933	764	860	884	809	72	938	1000	1000
4	800	1000	795	884	907	894	875	979	1000	1000
5	829	1000	874	953	977	979	958	1000	1000	1000
6	914	1000	939	977	1000	1000	1000	1000	1000	1000

Same as matrix 2

Ceiling matrix for wind NNE

MATRIX HALFWORD SAVEVALUE 7

	COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14
ROW 1	0	0	0	0	0	0	0	250	0	0	231	0	545	500
2	0	7	0	0	0	0	0	375	0	0	385	333	818	1000
3	0	7	0	0	0	167	0	500	63	0	462	667	818	1000
4	0	7	0	0	0	167	0	500	63	273	462	1000	909	1000
5	13	7	40	37	125	167	0	625	188	273	846	1000	909	1000
6	20	14	120	74	500	500	0	750	688	909	1000	1000	1000	1000

Same as matrix 3

Visibility matrix for wind NNE

MATRIX HALFWORD SAVEVALUE 8

	COL. 1	2	3	4	5	6	7	8	9	10
ROW 1	793	857	549	629	492	547	586	593	200	200
2	862	857	637	743	651	693	776	765	800	800
3	862	857	725	757	762	747	810	852	800	1000
4	897	857	775	814	794	800	879	963	800	1000
5	931	1000	804	857	873	893	914	975	800	1000
6	931	1000	902	943	1000	960	966	1000	1000	1000

Same as matrix 2

Ceiling matrix for wind NE

MATRIX HALFWORD SAVEVALUE 9

	COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14
ROW 1	0	7	0	0	56	0	0	0	91	0	182	0	357	714
2	0	7	57	0	56	0	0	59	91	0	273	154	643	857
3	7	7	57	0	56	0	0	59	91	83	409	385	714	857
4	7	7	57	54	56	83	167	176	91	167	500	538	929	857
5	7	29	57	81	56	250	250	294	91	417	545	769	929	857
6	21	36	200	270	222	583	333	647	455	750	773	846	929	1000

Same as matrix 3

Visibility matrix for wind NE

(continued)

MATRIX HALFWORD SAVEVALUE 10

	COL. 1	2	3	4	5	6	7	8	9	10
ROW	1	2	3	4	5	6	7	8	9	10
1	762	800	575	764	644	844	576	695	200	333
2	857	613	0	831	763	877	833	829	800	667
3	905	933	689	872	780	902	879	878	1000	1000
4	905	933	755	905	831	918	924	951	1000	1000
5	905	933	783	939	898	959	959	988	1000	1000
6	952	1000	906	986	949	984	985	1000	1000	1000

Same as matrix 2

Ceiling matrix for wind ENE

MATRIX HALFWORD SAVEVALUE 11

	COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14
ROW	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	0	3	0	0	0	0	77	0	0	154	105	83	667	0
2	0	10	30	77	0	0	154	0	111	308	263	250	733	0
3	0	17	30	115	0	0	231	0	111	385	526	417	733	0
4	0	24	61	115	0	63	308	77	111	538	632	500	1000	0
5	19	31	182	115	0	125	385	77	444	769	789	750	1000	0
6	39	49	303	221	71	500	462	692	667	846	947	833	1000	0

Same as matrix 3

Visibility matrix for wind ENE

MATRIX HALFWORD SAVEVALUE 12

	COL. 1	2	3	4	5	6	7	8	9	10
ROW	1	2	3	4	5	6	7	8	9	10
1	756	676	650	885	394	891	531	826	1000	333
2	829	824	744	916	606	925	796	926	167	333
3	854	882	786	916	667	944	837	942	1000	333
4	854	882	829	939	758	959	918	975	1000	667
5	878	941	880	943	788	959	1000	1000	1000	1000
6	976	971	949	966	909	993	1000	1000	1000	1000

Same as matrix 2

Ceiling matrix for wind E

MATRIX HALFWORD SAVEVALUE 13

	COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14
ROW	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	0	0	0	0	67	0	0	0	0	0	438	188	400	583
2	7	2	57	29	133	0	0	133	250	143	688	563	900	750
3	14	2	57	29	133	0	0	133	250	286	750	688	900	750
4	27	5	57	59	133	0	0	267	333	286	813	813	0	833
5	34	13	143	118	333	222	83	400	333	429	875	875	0	833
6	55	37	314	324	667	778	333	800	582	714	938	938	1000	1000

Same as matrix 3

Visibility matrix for wind E

(continued)

MATRIX HALFWORD SAVEVALUE 14

	COL. 1	2	3	4	5	6	7	8	9	10
ROW 1	758	724	675	896	813	930	286	902	1000	1000
2	788	793	727	922	875	961	571	959	1000	1000
3	788	828	805	942	906	969	619	975	1000	1000
4	818	897	844	971	938	987	762	984	1000	1000
5	848	931	883	979	938	991	857	1000	1000	1000
6	909	931	961	996	969	996	905	1000	1000	1000

Same as matrix 2

Ceiling matrix for wind ESE

MATRIX HALFWORD SAVEVALUE 15

	COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14
ROW 1	0	0	0	0	0	0	0	71	0	0	200	200	1000	250
2	0	2	0	91	0	0	0	71	167	167	600	600	1000	750
3	0	5	0	91	0	0	0	214	333	167	800	800	1000	750
4	0	12	231	91	0	0	250	286	500	167	900	1000	1000	1000
5	0	18	231	182	125	0	500	643	667	333	1000	1000	1000	1000
6	18	29	308	500	250	0	750	929	1000	1000	1000	1000	1000	1000

Same as matrix 3

Visibility matrix for wind ESE

MATRIX HALFWORD SAVEVALUE 16

	COL. 1	2	3	4	5	6	7	8	9	10
ROW 1	879	956	720	964	773	942	875	667	1000	0
2	879	956	853	996	909	981	875	917	1000	0
3	909	1000	893	996	1000	981	875	1000	1000	0
4	970	1000	907	996	1000	990	1000	1000	1000	500
5	1000	1000	933	996	1000	990	1000	1000	1000	1000
6	1000	1000	973	1000	1000	990	1000	1000	1000	1000

Same as matrix 2

Ceiling matrix for wind SE

MATRIX HALFWORD SAVEVALUE 17

	COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14
ROW 1	9	0	0	0	167	0	0	0	333	0	333	1000	1000	1000
2	9	0	0	0	333	0	0	0	333	0	333	1000	1000	1000
3	9	6	0	0	500	0	0	0	333	0	333	1000	1000	1000
4	18	6	0	71	667	0	0	0	333	0	1000	1000	1000	1000
5	27	6	0	143	667	0	250	0	333	0	1000	1000	1000	1000
6	106	35	143	214	667	500	250	500	1000	0	1000	1000	1000	1000

Same as matrix 3

Visibility matrix for wind SE

(continued)

MATRIX HALFWORD SAVEVALUE 18

	COL. 1	2	3	4	5	6	7	8	9	10
ROW 1	0	1000	817	935	781	893	800	643	1000	1000
2	750	1000	946	981	938	964	900	929	1000	1000
3	857	1000	957	981	938	964	900	1000	1000	1000
4	893	1000	968	991	969	1000	900	1000	1000	1000
5	929	1000	978	991	969	1000	900	1000	1000	1000
6	1000	989	1000	1000	1000	1000	1000	1000	1000	1000

Same as matrix 2

Ceiling matrix for wind SSE

MATRIX HALFWORD SAVEVALUE 19

	COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14
ROW 1	0	0	56	0	0	0	0	0	0	1000	0	1000	1000	1000
2	0	0	56	0	0	0	0	0	0	1000	400	1000	1000	1000
3	0	6	111	0	0	0	0	0	0	1000	600	1000	1000	1000
4	0	11	111	385	0	0	333	667	0	1000	800	1000	1000	1000
5	0	11	111	692	0	0	333	1000	1000	1000	1000	1000	1000	1000
6	1000	28	278	1000	250	0	667	1000	1000	1000	1000	1000	1000	1000

Same as matrix 3

Visibility matrix for wind SSE

MATRIX HALFWORD SAVEVALUE 20

	COL. 1	2	3	4	5	6	7	8	9	10
ROW 1	800	828	987	947	825	957	1000	965	1000	1000
2	891	862	948	979	918	981	1000	1000	1000	1000
3	927	1000	960	984	959	981	1000	1000	1000	1000
4	945	1000	979	989	990	994	1000	1000	1000	1000
5	964	1000	988	995	1000	1000	1000	1000	1000	1000
6	1000	1000	1000	995	1000	1000	1000	1000	1000	1000

Same as matrix 2

Ceiling matrix for wind S

MATRIX HALFWORD SAVEVALUE 21

	COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14
ROW 1	0	0	0	0	0	0	0	0	0	0	0	1000	1000	1000
2	2	0	0	0	0	0	0	0	0	0	167	1000	1000	1000
3	5	0	0	0	0	0	0	333	0	0	333	1000	1000	1000
4	7	0	0	0	0	0	0	667	0	500	500	1000	1000	1000
5	11	0	29	727	0	0	0	667	200	500	500	1000	1000	1000
6	20	11	88	909	100	600	500	1000	600	1000	667	1000	1000	1000

Same as matrix 3

Visibility matrix for wind S

(continued)

MATRIX HALFWORD SAVEVALUE 22

	COL. 1	2	3	4	5	6	7	8	9	10
ROW 1	960	889	891	940	866	959	955	971	1000	1000
2	960	1000	950	952	975	994	985	989	1000	1000
3	960	1000	968	976	983	1000	985	1000	1000	1000
4	960	1000	982	1000	983	1000	1000	1000	1000	1000
5	960	1000	991	1000	992	1000	1000	1000	1000	1000
6	1000	1000	995	1000	1000	1000	1000	1000	1000	1000

Same as matrix 2.

Ceiling matrix for wind SSW

MATRIX HALFWORD SAVEVALUE 23

	COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14
ROW 1	0	0	0	0	0	0	0	0	0	1000	333	1000	0	1000
2	3	0	0	0	0	0	0	0	0	1000	333	1000	0	1000
3	3	0	0	0	0	0	0	0	0	1000	333	1000	0	1000
4	3	0	0	0	0	0	0	0	0	1000	333	1000	1000	1000
5	3	0	71	0	200	0	0	0	333	1000	333	1000	1000	1000
6	5	7	107	1000	400	200	250	0	667	1000	1000	1000	1000	1000

Same as matrix 3

Visibility matrix for wind SSW

MATRIX HALFWORD SAVEVALUE 24

	COL. 1	2	3	4	5	6	7	8	9	10
ROW 1	1000	1000	930	981	930	958	965	986	1000	1000
2	1000	1000	965	1000	975	989	983	986	1000	1000
3	1000	1000	974	1000	981	989	991	1000	1000	1000
4	1000	1000	982	1000	994	1000	991	1000	1000	1000
5	1000	1000	987	1000	994	1000	1000	1000	1000	1000
6	1000	1000	991	1000	994	1000	1000	1000	1000	1000

Same as matrix 2

Ceiling matrix for wind SW

MATRIX HALFWORD SAVEVALUE 25

	COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14
ROW 1	2	0	0	0	0	1000	0	1000	0	1000	667	1000	1000	1000
2	2	0	0	0	0	1000	0	1000	0	1000	1000	1000	1000	1000
3	2	0	0	0	0	1000	0	1000	0	1000	1000	1000	1000	1000
4	2	0	0	0	0	1000	0	1000	0	1000	1000	1000	1000	1000
5	2	0	0	0	250	1000	1000	1000	1000	1000	1000	1000	1000	1000
6	14	0	118	167	250	1000	1000	1000	1000	1000	1000	1000	1000	1000

Same as matrix 3

Visibility matrix for wind SW

(continued)

MATRIX HALFWORD SAVEVALUE 26

	COL. 1	2	3	4	5	6	7	8	9	10
ROW 1	944	1000	935	947	953	967	980	995	1000	1000
2	944	1000	973	980	974	1000	993	995	1000	1000
3	944	1000	976	987	985	1000	1000	995	1000	1000
4	944	1000	984	987	988	1000	1000	1000	1000	1000
5	944	1000	995	993	997	1000	1000	1000	1000	1000
6	944	1000	995	993	1000	1000	1000	1000	1000	1000

Same as matrix 2

Ceiling matrix for wind WSW

MATRIX HALFWORD SAVEVALUE 27

	COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14
ROW 1	0	0	0	0	0	0	0	0	0	0	0	1000	0	0
2	0	0	0	0	0	0	0	1000	0	1000	1000	1000	1000	1000
3	0	2	43	0	0	0	0	1000	0	1000	1000	1000	1000	1000
4	0	2	43	0	0	0	286	1000	0	1000	1000	1000	1000	1000
5	1	2	130	0	500	0	286	1000	1000	1000	1000	1000	1000	1000
6	5	8	174	182	500	0	857	1000	1000	1000	1000	1000	1000	1000

Same as matrix 3

Visibility matrix for wind WSW

MATRIX HALFWORD SAVEVALUE 28

	COL. 1	2	3	4	5	6	7	8	9	10
ROW 1	892	1000	964	982	989	996	997	995	875	996
2	973	1000	985	994	1000	996	1000	997	1000	996
3	946	1000	985	994	1000	996	1000	997	1000	1000
4	1000	1000	990	994	1000	1000	1000	1000	1000	1000
5	1000	1000	995	1000	1000	1000	1000	1000	1000	1000
6	1000	1000	995	1000	1000	1000	1000	1000	1000	1000

Same as matrix 2

Ceiling matrix for wind W

MATRIX HALFWORD SAVEVALUE 29

	COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14
ROW 1	0	0	0	0	0	0	0	0	0	0	1000	1000	0	1000
2	0	0	0	0	0	0	0	0	0	0	1000	1000	1000	1000
3	0	0	0	0	0	0	0	0	0	0	1000	1000	1000	1000
4	1	0	91	0	0	0	0	0	0	0	1000	1000	1000	1000
5	1	2	91	333	1000	0	0	1000	0	0	1000	1000	1000	1000
6	5	7	182	333	1000	0	500	1000	0	0	1000	1000	1000	1000

Same as matrix 3

Visibility matrix for wind W

(continued)

MATRIX HALFWORD SAVEVALUE 30

	COL.	1	2	3	4	5	6	7	8	9	10
ROW	1	626	963	953	968	976	967	996	995	1000	1000
	2	1000	1000	967	968	986	978	1000	1000	1000	1000
	3	1000	1000	972	976	986	983	1000	1000	1000	1000
	4	1000	1000	981	984	990	989	1000	1000	1000	1000
	5	1000	1000	991	992	993	1000	1000	1000	1000	1000
	6	1000	1000	1000	992	997	1000	1000	1000	1000	1000

Same as matrix 2

Ceiling matrix for wind WNW

MATRIX HALFWORD SAVEVALUE 31

	COL.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
ROW	1	0	0	0	0	0	0	0	0	0	0	333	1000	1000	1000
	2	0	0	0	0	0	0	0	0	0	0	333	1000	1000	1000
	3	0	1	0	0	0	0	333	500	333	333	333	1000	1000	1000
	4	0	1	111	0	0	0	333	500	333	333	667	1000	1000	1000
	5	0	1	222	250	0	0	667	1000	667	667	1000	1000	1000	1000
	6	5	7	222	500	500	1000	1000	1000	1000	667	1000	1000	1000	1000

Same as matrix 3

Visibility matrix for wind WNW

MATRIX HALFWORD SAVEVALUE 32

	COL.	1	2	3	4	5	6	7	8	9	10
ROW	1	947	833	937	888	960	965	969	974	1000	1000
	2	947	917	952	944	988	980	990	989	1000	1000
	3	947	917	956	976	992	985	995	996	1000	1000
	4	947	1000	967	984	1000	985	1000	996	1000	1000
	5	947	1000	993	992	1000	995	1000	0	1000	1000
	6	947	1000	996	992	1000	1000	1000	1000	1000	1000

Same as matrix 2

Ceiling matrix for wind NW

MATRIX HALFWORD SAVEVALUE 33

	COL.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
ROW	1	0	2	0	0	0	0	167	0	0	0	0	0	500	1000
	2	0	3	0	67	0	0	167	500	125	0	0	0	500	1000
	3	1	3	0	67	0	0	333	500	125	250	0	0	1000	1000
	4	1	3	0	133	333	143	500	500	375	500	0	0	1000	1000
	5	6	5	67	200	333	286	500	500	500	500	1000	0	1000	1000
	6	10	12	200	267	333	571	500	1000	750	750	1000	1000	1000	1000

Same as matrix 3

Visibility matrix for wind NW

(continued)

MATRIX HALFWORD SAVEVALUE 34

ROW	COL. 1									
	1	2	3	4	5	6	7	8	9	10
1	786	1000	903	828	918	879	934	962	1000	1000
2	786	1000	938	892	964	935	974	1000	1000	1000
3	786	1000	955	946	969	972	987	1000	1000	1000
4	786	1000	983	968	974	991	1000	1000	1000	1000
5	786	1000	994	989	990	1000	1000	1000	1000	1000
6	1000	1000	1000	989	1000	1000	1000	1000	1000	1000

Same as matrix 2

Celling matrix for wind NNW

MATRIX HALFWORD SAVEVALUE 35

ROW	COL. 1													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	0	4	0	0	0	111	0	0	0	0	0	1000	1000	0
2	0	4	0	0	0	111	0	250	0	333	167	1000	1000	1000
3	0	4	0	0	0	222	0	250	0	667	333	1000	1000	1000
4	0	4	125	0	200	333	143	250	0	667	333	1000	1000	1000
5	10	14	125	0	400	333	143	500	200	667	500	1000	1000	1000
6	14	25	56	188	400	556	429	500	400	667	833	1000	1000	1000

Same as matrix 3

Visibility matrix for wind NNW

MATRIX HALFWORD SAVEVALUE DSTN

ROW	COL. 1																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	4	34	25	19	31	49	27	36	46	39	46	22	29	55	12	33	14	30
2	27	39	45	41	18	33	16	22	37	31	25	22	29	34	12	33	14	30
3	22	33	45	41	20	26	26	16	38	43	23	47	36	28	43	45	35	49
4	33	50	29	25	20	44	43	35	48	63	43	29	20	40	26	29	30	32
5	15	25	32	47	41	26	16	22	37	31	25	36	51	34	34	55	35	52
6	101	101	101	101	101	101	106	107	108	109	110	111	112	113	114	115	116	117

Airport definition matrix number (Row)

Column Headings

- Manjo
- Millis
- Bridgewater
- Skipper
- LWM
- Bedford
- Beverly
- Fitchbury
- Ft. Devens
- Lawrence
- Mansfield
- Marshfield
- Newburyport
- Norwood
- Plymouth
- S. Weymouth
- Taunton
- Tew-Mac

Distance from hold area/secondary airport to Logan in a radar environment

(continued)

MATRIX HALFWORD SAVEVALUEDESTNR

ROW	COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	26	49	39	55	26	15	14	38	49	27	34	31	27	28	31	28	45	24
2	38	39	39	38	36	38	21	62	55	38	45	31	35	38	42	28	45	35
3	26	38	46	26	43	28	14	49	45	27	55	41	27	48	52	38	55	24
4	19	18	29	25	39	45	35	66	62	51	34	21	48	28	31	17	34	45
5	27	38	29	44	27	15	24	38	48	28	42	55	38	28	58	38	52	17

Same as DSTN matrix

Distance from hold area/secondary airport to Logan in a non-radar environment

MATRIX HALFWORD SAVEVALUEVFRAC

ROW	Hold Areas					Secondary Airports													Default to Tew Mac
	COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1	297	597	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000	1000	7
2	299	598	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000	1000	6
3	299	598	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000	1000	6
4	299	598	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000	1000	8
5	299	598	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000	1000	11
6	299	598	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000	1000	17
7	299	598	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000	1000	25
8	260	522	740	784	871	871	871	871	954	955	955	955	955	955	955	955	955	955	30
9	251	502	710	752	836	836	836	836	948	954	955	955	955	955	955	955	955	955	41
10	251	502	710	752	836	836	836	836	948	954	955	955	955	955	955	955	955	955	40
11	251	502	710	752	836	836	836	836	948	954	955	955	955	955	955	955	955	955	39
12	251	502	710	752	836	836	836	836	948	954	955	955	955	955	955	955	955	955	40
13	251	502	710	752	836	836	836	836	948	954	955	955	955	955	955	955	955	955	40
14	251	502	710	752	836	836	836	836	948	954	955	955	955	955	955	955	955	955	46
15	251	502	710	752	836	836	836	836	948	954	955	955	955	955	955	955	955	955	46
16	251	502	710	752	836	836	836	836	948	954	955	955	955	955	955	955	955	955	40
17	251	502	710	752	836	836	836	836	948	954	955	955	955	955	955	955	955	955	53
18	251	502	710	752	836	836	836	836	948	954	955	955	955	955	955	955	955	955	60
19	258	516	731	774	860	860	860	860	948	954	955	955	955	955	955	955	955	955	43
20	258	516	731	774	860	860	860	860	948	954	955	955	955	955	955	955	955	955	53
21	258	516	731	774	860	860	860	860	948	954	955	955	955	955	955	955	955	955	46
22	258	516	731	774	860	860	860	860	948	954	955	955	955	955	955	955	955	955	46
23	258	516	731	774	860	860	860	860	948	954	955	955	955	955	955	955	955	955	26
24	269	538	763	807	897	997	997	997	998	998	998	998	998	998	998	1000	1000	1000	12

Time of Day
Number of aircraft created in VFR conditions

(continued)

MATRIX HALFWORD SAVEVALUEIFRAC

ROW	COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	297	597	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000	3
2	299	598	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000	5
3	299	598	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000	5
4	299	598	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000	7
5	299	598	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000	9
6	299	598	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000	14
7	299	598	847	897	996	996	996	996	997	997	997	997	997	997	997	1000	1000	20
8	260	522	740	784	871	871	871	954	955	955	955	955	955	955	998	1000	1000	24
9	251	502	711	752	836	836	836	946	947	948	954	954	955	955	997	998	999	33
10	251	502	710	752	836	836	836	946	947	948	954	954	955	955	997	998	999	33
11	251	502	710	752	836	836	836	946	947	948	954	954	955	955	997	998	999	30
12	251	502	710	752	836	836	836	946	947	948	954	954	955	955	997	998	999	32
13	251	502	710	752	836	836	836	946	947	948	954	954	955	955	997	998	999	30
14	251	502	710	752	836	836	836	946	947	948	954	954	955	955	997	998	999	37
15	251	502	710	752	836	836	836	946	947	948	954	954	955	955	997	998	999	31
16	251	502	710	752	836	836	836	946	947	948	954	954	955	955	997	998	999	43
17	251	502	710	752	836	836	836	946	947	948	954	954	955	955	997	998	999	48
18	251	502	710	752	836	836	836	946	947	948	954	954	955	955	997	998	999	35
19	258	516	731	774	860	860	860	955	955	955	956	956	956	956	998	1000	1000	43
20	258	516	731	774	860	860	860	955	955	955	956	956	956	956	998	1000	1000	37
21	258	516	731	774	860	860	860	955	955	955	956	956	956	956	998	1000	1000	27
22	258	516	731	774	860	860	860	955	955	955	956	956	956	956	998	1000	1000	20
23	258	516	731	774	860	860	860	955	955	955	956	956	956	956	998	1000	1000	6
24	269	538	763	807	897	897	897	997	997	998	998	998	998	998	998	1000	1000	10

Same as VFRAC matrix, but in IFR conditions

MATRIX HALFWORD SAVEVALUECATWT

ROW	COL. 1	2	3	4	5	6	7
1	0	0	787	1000	0	787	1000
2	0	1000	1000	1000	0	1000	1000
3	1000	1000	1000	1000	1000	1000	1000
4	300	500	1000	1000	500	1000	1000

Approach Category

Weight Class

Matrix is used to define aircraft category and weight, once type has been determined

(continued)

MATRIX HALFWORD SAVEVALUEVFRPT

	COL. 1	2	3
ROW	1	782	897 996
	2	782	897 996
	3	782	897 996
	4	782	897 996
	5	782	897 996
	6	30	111 947
	7	0	2 816
	8	0	0 1000
	9	0	0 38
	10	0	190 1000
	11	0	0 1000
	12	0	0 1000
	13	0	0 1000
	14	2	11 869
	15	0	0 1000
	16	0	0 174
	17	0	0 1000
	18	0	235 1000

A/C Type (Default = type 4)

Matrix is used to determine aircraft type once destination is known in VFR conditions
(Entries signify occurrences out of 1000)

MATRIX HALFWORD SAVEVALUEIFRPT

	COL. 1	2	3
ROW	1	782	897 996
	2	782	897 996
	3	782	897 996
	4	782	897 996
	5	782	897 996
	6	30	111 947
	7	0	2 816
	8	0	0 1000
	9	0	0 38
	10	0	190 1000
	11	0	0 1000
	12	0	0 1000
	13	0	0 1000
	14	2	11 869
	15	0	0 1000
	16	0	0 174
	17	0	0 1000
	18	0	235 1000

Same as VFRPT matrix, but in IFR conditions

MATRIX HALFWORD SAVEVALUEARSEP

		COL. 1	2	3	4	5	6	7	8	9	10	11	
R-Radar Conditions	ROW	1	37	39	40	38	3	1	2	3	0	1	20
		2	37	39	40	0	3	1	2	3	0	1	20
		3	37	39	0	38	3	1	2	3	0	1	16
		4	37	39	0	0	3	1	2	3	0	1	16
		5	37	0	40	38	4	0	1	2	0	0	10
		6	37	0	40	0	4	0	1	2	0	0	10
		7	37	0	0	38	4	0	1	2	0	0	12
		8	37	0	0	0	4	0	1	2	0	0	12
		9	0	39	40	38	3	1	2	3	0	1	20
		10	0	39	40	0	3	1	2	3	0	1	20
		11	0	39	0	38	5	0	0	1	0	0	16
		12	0	39	0	0	5	0	0	1	0	0	16
		13	0	0	40	38	5	0	0	1	0	0	10
		14	0	0	0	38	5	0	0	1	0	0	8
		15	0	0	40	0	12	0	0	1	0	0	10
		16	0	0	0	0	12	0	0	1	0	0	8

Equipment required
up to determine
which separation
criteria to use
(row number)

Required
separation
in miles

Additional separation
in miles for various
weights of aircraft

Number of aircraft air control
can handle at one time

(continued)

MATRIX HALFWORD SAVEVALUEDELAY

	COL. 1	2	3	4
ROW 1	515	64	160	12
2	514	56	87	8
3	0	0	21	4
4	0	0	462	83
5	356	33	60	4
6	7419	801	1418	91
7	4694	629	968	49
8	51	9	6	2
9	462	47	81	6
10	346	29	56	2
11	1252	80	153	2
12	39	2	4	0
13	461	44	81	2

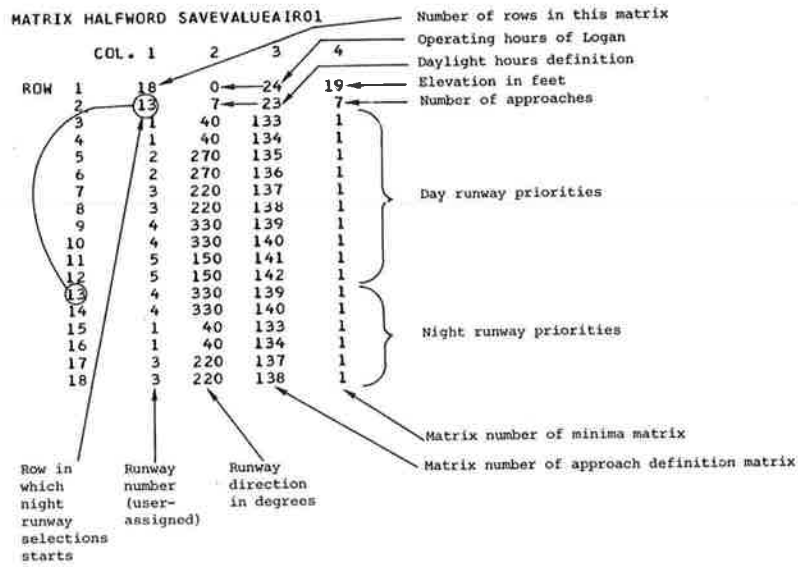
Aircraft Type

1. Number of aircraft created at holding fixes and secondary airports
2. Number of aircraft originally scheduled to the primary airport through the holding fixes
3. Number of aircraft diverted from secondary airport to primary airport
4. Time of flight accumulated by secondary-airport aircraft diverted to the primary airport
5. Number of aircraft landing at primary airport that experienced delay
6. Total delay of landing aircraft
7. Total delay accumulated, for both landing and diverting aircraft, due to separation criteria
8. Number of aircraft not able to land at primary airport and diverted
9. Number of aircraft that landed at primary airport
10. Number of aircraft that experienced takeoff delay at primary airport
11. Total takeoff delay time
12. Total takeoff delay time experienced by aircraft at head of takeoff queue waiting to achieve separation on aircraft taking off ahead
13. Number of aircraft entering the takeoff queue

Figure 3-6. OUTPUT DELAY MATRIX

(continued)

Logan Definition Matrix



Airport Definition Matrix (General Case)				
Column	1	2	3	4
Row				
1	Number of Rows (n)	Opening Time	Closing Time	Elevation (in feet)
2	Night Runways (M)	Day Start	Night Start	Number of Approaches
3	Runway Number (Consecutive)	Runway Direction (Degrees)	Approach Matrix Number	Minima Matrix Number
M-1				
M				
n				

Day matrix
Night matrix

(continued)

MATRIX HALFWORD SAVEVALUEAIRO2

	COL. 1	2	3	4
ROW 1	6	7	24	133
2	6	0	24	5
3	1	110	143	2
4	2	290	156	2
5	3	230	156	2
6	4	50	156	2

Same as matrix AIRO1

Bedford definition matrix

MATRIX HALFWORD SAVEVALUE 107

	COL. 1	2	3	4
ROW 1	6	8	18	108
2	6	0	24	4
3	1	160	144	3
4	2	340	144	3
5	3	90	144	3
6	4	270	144	3

Same as matrix AIRO1

Beverly definition matrix

MATRIX HALFWORD SAVEVALUE 108

	COL. 1	2	3	4
ROW 1	5	8	18	350
2	5	0	24	1
3	1	140	145	4
4	2	320	145	4
5	3	200	145	4

Same as matrix AIRO1

Fitchburg definition matrix

MATRIX HALFWORD SAVEVALUE 109

	COL. 1	2	3	4
ROW 1	6	0	24	268
2	6	0	24	1
3	1	140	146	5
4	2	320	146	5
5	3	20	146	5
6	4	200	146	5

Same as matrix AIRO1

Ft. Devens definition matrix

(continued)

MATRIX HALFWORD SAVEVALUE 110

	COL.	1	2	3	4
ROW	1	6	8	21	147
	2	6	0	24	2
	3	1	230	147	6
	4	2	50	157	6
	5	3	140	158	6
	6	4	320	158	6

Same as matrix AIRO1

Lawrence definition matrix

MATRIX HALFWORD SAVEVALUE 111

	COL.	1	2	3	4
ROW	1	4	8	18	124
	2	4	0	24	2
	3	1	140	148	7
	4	2	320	148	7

Same as matrix AIRO1

Mansfield definition matrix

MATRIX HALFWORD SAVEVALUE 112

	COL.	1	2	3	4
ROW	1	4	8	18	9
	2	4	0	24	1
	3	1	60	149	8
	4	2	240	149	8

Same as matrix AIRO1

Marshfield definition matrix

MATRIX HALFWORD SAVEVALUE 113

	COL.	1	2	3	4
ROW	1	4	8	18	11
	2	4	0	24	1
	3	1	100	150	9
	4	2	280	150	9

Same as matrix AIRO1

Newburyport definition matrix

(continued)

MATRIX HALFWORD SAVEVALUE 114

	COL. 1	2	3	4
ROW 1	6	7	23	49
2	6	0	24	4
3	1	350	151	10
4	2	170	151	10
5	3	100	151	10
6	4	280	151	10

Same as matrix AIRO1

Norwood definition matrix

MATRIX HALFWORD SAVEVALUE 115

	COL. 1	2	3	4
ROW 1	6	8	18	149
2	6	0	24	1
3	1	60	152	11
4	2	330	152	11
5	3	240	152	11
6	4	150	152	11

Same as matrix AIRO1

Plymouth definition matrix

MATRIX HALFWORD SAVEVALUE 116

	COL. 1	2	3	4
ROW 1	6	0	24	161
2	6	0	24	3
3	1	350	153	12
4	2	80	159	12
5	3	260	160	12
6	4	170	161	12

Same as matrix AIRO1

S. Weymouth definition matrix

MATRIX HALFWORD SAVEVALUE 117

	COL. 1	2	3	4
ROW 1	4	8	18	92
2	4	0	24	3
3	1	300	154	13
4	2	120	154	13

Same as matrix AIRO1

Taunton definition matrix

MATRIX HALFWORD SAVEVALUE 118

	COL. 1	2	3	4
ROW 1	6	8	18	92
2	6	0	24	2
3	1	210	155	14
4	2	30	155	14
5	3	180	155	14
6	4	360	155	14

Same as matrix AIRO1

Tew-Mac definition matrix

(continued)

MATRIX HALFWORD SAVEVALUEAIRO3

	COL. 1	2	3	4	5	6	7	8
ROW 1	2	4	0	0	0	0	0	0
2	4	7	0	0	0	0	0	0
3	15	10	7	0	19	23	56	43
4	15	7	0	0	0	0	56	43
5	35	0	0	0	15	0	56	0
6	15	7	35	0	0	0	0	0
7	37	0	0	0	0	0	0	0

Approaches { 1, 2, 3, 4, 5, 6, 7 }

Facility number required up for approach to be used

Outer marker facility number (if required by approach)

Middle marker facility number (if required by approach)

ALS facility number (if required by approach)

HRL facility number (if required by approach)

Approach Definition Matrixes
(matrix AIRO3 to matrix 161)

MATRIX HALFWORD SAVEVALUE 134

	COL. 1	2	3	4	5	6	7	8
ROW 1	2	4	0	0	0	0	0	0
2	4	7	0	0	0	0	0	0
3	15	2	3	0	19	23	56	43
4	15	2	3	10	0	0	56	43
5	35	0	0	0	19	0	56	0
6	15	2	3	0	0	0	0	0
7	37	0	0	0	0	0	0	0

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 135

	COL. 1	2	3	4	5	6	7	8
ROW 1	4	7	0	0	0	0	0	48
2	4	7	0	0	0	0	0	0
3	16	11	2	3	20	24	0	0
4	16	7	0	0	0	0	0	0
5	7	0	0	0	0	0	0	0
6	15	2	3	35	0	0	0	0
7	37	0	0	0	0	0	0	0

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 136

	COL. 1	2	3	4	5	6	7	8
ROW 1	4	2	0	0	0	0	0	48
2	4	7	0	0	0	0	0	0
3	16	11	2	3	20	24	0	0
4	16	7	0	0	0	0	0	0
5	7	0	0	0	20	0	0	0
6	15	7	35	0	0	0	0	0
7	37	0	0	0	0	0	0	0

Same as matrix AIRO3

(continued)

MATRIX HALFWORD SAVEVALUE 137

	COL. 1	2	3	4	5	6	7	8
ROW 1	2	4	0	0	0	0	0	0
2	2	4	7	0	0	0	0	44
3	15	10	7	0	19	23	0	0
4	15	7	0	0	0	0	0	0
5	35	0	0	0	19	0	0	0
6	35	15	7	0	0	0	0	44
7	37	0	0	0	0	0	0	0

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 138

	COL. 1	2	3	4	5	6	7	8
ROW 1	2	4	0	0	0	0	0	0
2	2	4	0	0	0	0	0	44
3	15	2	3	10	19	23	0	0
4	15	2	3	0	0	0	0	0
5	35	0	0	0	19	0	0	0
6	15	2	3	0	0	0	0	44
7	37	0	0	0	0	0	0	0

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 139

	COL. 1	2	3	4	5	6	7	8
ROW 1	4	7	0	0	0	0	57	46
2	4	7	0	0	0	0	0	0
3	16	11	2	3	20	24	57	0
4	16	7	0	0	0	0	0	0
5	7	0	0	0	20	0	57	0
6	15	2	3	35	0	0	0	0
7	37	0	0	0	0	0	0	0

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 140

	COL. 1	2	3	4	5	6	7	8
ROW 1	2	4	0	0	0	0	57	46
2	7	4	0	0	0	0	0	0
3	7	16	11	0	20	24	57	0
4	7	16	0	0	0	0	0	0
5	7	0	0	0	20	0	57	0
6	7	15	35	0	0	0	0	0
7	37	0	0	0	0	0	0	0

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 141

	COL. 1	2	3	4	5	6	7	8
ROW 1	4	7	0	0	0	0	0	0
2	4	7	0	0	0	0	0	45
3	14	7	9	0	18	22	0	0
4	14	7	0	0	0	0	0	45
5	0	0	0	0	0	0	0	0
6	15	7	35	0	0	0	0	0
7	37	0	0	0	0	0	0	0

Same as matrix AIRO3 (continued)

MATRIX HALFWORD SAVEVALUE 142

	COL. 1	2	3	4	5	6	7	8
ROW 1	4	2	0	0	0	0	0	0
2	4	7	0	0	0	0	0	45
3	14	2	1	9	18	22	0	0
4	14	2	1	0	0	0	0	45
5	0	0	0	0	0	0	0	0
6	15	2	1	35	0	0	0	0
7	37	0	0	0	0	0	0	0

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 143

	COL. 1	2	3	4	5	6	7	8
ROW 1	53	0	0	0	17	0	0	0
2	12	8	1	0	17	21	0	64
3	12	1	0	0	17	0	0	0
4	4	53	0	0	17	0	0	0
5	1	4	0	0	0	0	0	0

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 144

	COL. 1	2	3	4	5	6	7	8
ROW 1	25	0	0	0	0	0	0	0
2	4	3	6	0	0	0	0	0
3	4	33	1	0	0	0	0	0
4	4	33	1	1	0	0	0	0

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 145

	COL. 1	2	3	4	5	6	7	8
ROW 1	32	0	0	0	0	0	0	0

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 146

	COL. 1	2	3	4	5	6	7	8
ROW 1	26	0	0	0	0	0	0	0

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 147

	COL. 1	2	3	4	5	6	7	8
ROW 1	1	3	0	0	0	0	0	41
2	13	28	0	0	0	0	0	0

Same as matrix AIRO3

(continued)

MATRIX HALFWORD SAVEVALUE 148

	COL.	1	2	3	4	5	6	7	8
ROW	1	2	0	0	0	0	0	0	0
	2	2	5	0	0	0	0	0	0

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 149

	COL.	1	2	3	4	5	6	7	8
ROW	1	2	5	0	0	0	0	0	0

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 150

	COL.	1	2	3	4	5	6	7	8
ROW	1	13	17	0	0	0	0	0	0

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 151

	COL.	1	2	3	4	5	6	7	8
ROW	1	31	0	0	0	0	0	0	0
	2	31	34	0	52	0	0	0	0
	3	2	0	0	0	0	0	0	0
	4	2	5	0	0	0	0	0	0

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 152

	COL.	1	2	3	4	5	6	7	8
ROW	1	30	0	0	0	0	0	0	0

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 153

	COL.	1	2	3	4	5	6	7	8
ROW	1	27	0	0	0	0	0	0	0
	2	2	5	0	0	0	0	0	0
	3	2	5	36	0	0	0	0	61

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 154

	COL.	1	2	3	4	5	6	7	8
ROW	1	29	0	0	0	0	0	0	0
	2	2	0	0	0	0	0	0	0
	3	2	5	0	0	0	0	0	0

Same as matrix AIRO3

(continued)

MATRIX HALFWORD SAVEVALUE 155

	COL. 1	2	3	4	5	6	7	8
ROW 1	1	3	0	0	0	0	0	0
2	28	0	0	0	0	0	0	0

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 156

	COL. 1	2	3	4	5	6	7	8
ROW 1	53	0	0	0	17	0	0	0
2	1	12	8	0	17	0	0	0
3	1	12	0	0	17	0	0	0
4	4	53	0	0	17	0	0	0
5	4	1	0	0	0	0	0	0

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 157

	COL. 1	2	3	4	5	6	7	8
ROW 1	1	3	0	0	0	0	0	0
2	13	28	0	0	0	0	0	41

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 158

	COL. 1	2	3	4	5	6	7	8
ROW 1	1	3	0	0	0	0	0	0
2	13	28	0	0	0	0	0	0

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 159

	COL. 1	2	3	4	5	6	7	8
ROW 1	27	0	0	0	0	0	0	0
2	2	5	0	0	0	0	0	0
3	2	5	36	0	0	0	0	58

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 160

	COL. 1	2	3	4	5	6	7	8
ROW 1	27	0	0	0	0	0	0	0
2	2	5	0	0	0	0	0	0
3	2	5	36	0	0	0	62	59

Same as matrix AIRO3

MATRIX HALFWORD SAVEVALUE 161

	COL. 1	2	3	4	5	6	7	8
ROW 1	27	0	0	0	0	0	0	0
2	2	5	0	0	0	0	0	0
3	2	5	36	0	0	0	0	0

Same as matrix AIRO3 (continued)

MATRIX FULLWORD SAVEVALUE MINMA

		(4R)	(27)	(22L)	(33L)	(15R)
		COLUMN	1	2	3	4
				Runway Number		
ROW	1	1	680100	460100	680100	680100
VOR 1	2	2	680100	460100	680100	680100
	3	3	820150	460100	820150	820150
	4	4	820200	460100	820200	820200
	5	1	680100	680100	560100	780100
VOR DME 2	6	2	680100	680100	560100	780125
	7	3	820150	820150	560100	780150
	8	4	820200	820200	560125	780175
	9	1	216050	680100	680100	268075
ILS 3	10	2	216050	680100	680100	268075
	11	3	216050	820150	820150	268075
	12	4	216050	820200	820200	268075
	13	1	460075	680100	680100	580100
LOC 4	14	2	460075	680100	680100	580100
	15	3	460075	820150	820150	580100
	16	4	460075	820200	820200	580125
	17	1	680100	680100	680100	680100
NDB 5	18	2	680100	680100	680100	680100
	19	3	820150	820150	820150	820150
	20	4	820200	820200	820200	820200
	21	1	680100	680100	420100	680100
LOC BC 6	22	2	680100	680100	420100	680100
	23	3	820150	820150	420100	820150
	24	4	820200	820200	420100	820200
	25	1	620050	460100	540100	800100
ASR 7	26	2	620050	460100	540100	800175
	27	3	620050	460100	540100	800150
	28	4	620100	460100	540125	800175

Minimum visibility requirement
(in 100ths of a mile)

Minimum ceiling
requirement (in feet)

Approach
Type

A/C
Category

Logan Minima Matrix

MATRIX FULLWORD SAVEVALUE . 2

		COLUMN	1	2	3	4
ROW	1		700100	700100	700100	700100
	2		700100	700100	700100	700100
	3		700100	720150	720150	720150
	4		700125	760200	760200	760200
	5		383100	0	0	0
	6		383100	0	0	0
	7		383100	0	0	0
	8		383100	0	0	0
	9		660100	680100	680100	680100
	10		660100	680100	680100	680100
	11		660100	720150	720150	720150
	12		660125	760200	760200	760200
	13		800100	800100	800100	800100
	14		800100	800100	800100	800100
	15		800150	800125	800150	800150
	16		800200	800150	800200	800200
	17		680100	680100	680100	680100
	18		680100	680100	680100	680100
	19		720150	680100	680100	720150
	20		760200	760200	680125	760200

Same as matrix MINMA

Bedford Minima Matrix

(continued)

MATRIX FULLWORD SAVEVALUE 3

	COLUMN	1	2	3	4
ROW	1	600100	600100	600100	600100
	2	600100	600100	600100	600100
	3	600150	600150	600150	600150
	4	700200	700200	700200	700200
	5	640100	640100	640100	640100
	6	640100	640100	640100	640100
	7	640100	640150	640150	640150
	8	640125	700200	700200	700200
	9	580100	600100	600100	600100
	10	580100	600100	600100	600100
	11	580100	600150	600150	600150
	12	580100	700200	700200	700200
	13	500100	600100	600100	600100
	14	500100	600100	600100	600100
	15	500100	600150	600150	600150
	16	500100	700200	700200	700200

Same as matrix MINMA

Beverly Minima Matrix

MATRIX FULLWORD SAVEVALUE 4

	COLUMN	1	2	3	4
ROW	1	1140100	1140100	1140100	1140100
	2	1400175	1400175	1400175	1400175
	3	1420200	1420200	1420200	1420200
	4	1600200	1600200	1600200	1600200

Same as matrix MINMA

Fitchburg Minima Matrix

MATRIX FULLWORD SAVEVALUE 5

	COLUMN	1	2	3	4
ROW	1	940100	940100	940100	940100
	2	940100	940100	940100	940100
	3	940125	940150	940150	940150
	4	940150	940200	940200	940200

Same as matrix MINMA

Pt. Devens Minima Matrix

MATRIX FULLWORD SAVEVALUE 6

	COLUMN	1	2	3	4
ROW	1	700100	780100	780100	780100
	2	700100	780100	780100	780100
	3	700100	780150	780150	780150
	4	700125	780200	780200	780200
	5	780100	760100	780100	780100
	6	780100	760100	780100	780100
	7	780150	760100	780125	780125
	8	780200	760125	780200	780200

Same as matrix MINMA

Lawrence Minima Matrix

(continued)

MATRIX FULLWORD SAVEVALUE 7

	COLUMN	1	2
ROW 1		860100	860100
2		860100	860100
3		860150	860150
4		860200	860200
5		780100	780100
6		780100	780100
7		780150	780150
8		800200	800200

Same as matrix MINMA

Mansfield Minima Matrix

MATRIX FULLWORD SAVEVALUE 8

	COLUMN	1	2
ROW 1		600100	600100
2		600100	600100
3		600150	600150
4		640200	640200

Same as matrix MINMA

Marshfield Minima Matrix

MATRIX FULLWORD SAVEVALUE 9

	COLUMN	1	2
ROW 1		740100	740100
2		1500500	1500500
3		1500500	1500500
4		1500500	1500500

Same as matrix MINMA

Newburyport Minima Matrix

MATRIX FULLWORD SAVEVALUE 10

	COLUMN	1	2	3	4
ROW 1		640100	640100	640100	640100
2		640100	640100	640100	640100
3		640100	640150	640150	640150
4		640125	740200	740200	740200
5		580100	640100	640100	640100
6		580100	640100	640100	640100
7		580100	640150	640150	640150
8		580125	740200	740200	740200
9		840100	840100	840100	840100
10		840125	840125	840125	840125
11		840150	840150	840150	840150
12		840175	840175	840175	840175
13		580100	0	0	0
14		580100	0	0	0
15		580100	0	0	0
16		580125	0	0	0

Same as matrix MINMA

Norwood Minima Matrix

(continued)

MATRIX FULLWORD SAVEVALUE 11

	COLUMN	1	2	3	4
ROW	1	600100	600100	600100	600100
	2	600100	600100	600100	600100
	3	600100	600150	600150	600150
	4	1500500	1500500	1500500	1500500

Same as matrix MINMA

Plymouth Minima Matrix

MATRIX FULLWORD SAVEVALUE 12

	COLUMN	1	2	3	4
ROW	1	620100	640100	640100	640100
	2	620100	640100	640100	640100
	3	620100	640150	640150	640150
	4	620100	720200	720200	720200
	5	640100	640100	640100	640100
	6	640100	640100	640100	640100
	7	640150	640150	640150	640150
	8	720200	720200	720200	720200
	9	520100	540100	560100	640100
	10	520100	540100	560100	640100
	11	520100	540100	560100	640150
	12	520100	540100	560100	720200

Same as matrix MINMA

S. Weymouth Minima Matrix

MATRIX FULLWORD SAVEVALUE 13

	COLUMN	1	2
ROW	1	660100	660100
	2	660100	660100
	3	660100	660150
	4	660125	660200
	5	760150	760150
	6	760150	760150
	7	760150	760150
	8	760200	760200
	9	560150	580150
	10	620150	620150
	11	620150	620150
	12	620200	620200

Same as matrix MINMA

Taunton Minima Matrix

MATRIX FULLWORD SAVEVALUE 14

	COLUMN	1	2	3	4
ROW	1	640100	640100	640100	640100
	2	640100	640100	640100	640100
	3	640100	640150	640150	640150
	4	640175	920200	920200	920200
	5	760100	760100	760100	760100
	6	760100	760100	760100	760100
	7	760150	760150	760150	760150
	8	920200	920200	920200	920200

Same as matrix MINMA

Tew-Mac Minima Matrix

(continued)

MATRIX FULLWORD SAVEVALUE FACIL

ROW	CCLUMN	MTBP in minutes	
		1	2
Facility Number	1	0-facility down	MTTR in minutes
1	1	60300	318
2	1	60300	318
3	1	60300	318
4	1	60300	318
5	1	72300	402
6	1	24600	534
7	1	24600	534
8	0	28500	1260
9	0	28500	1260
10	0	28500	1260
11	0	28500	1260
12	0	23400	900
13	0	23400	900
14	0	23400	900
15	0	23400	900
16	0	23400	900
17	0	111900	1920
18	0	111900	1920
19	0	111900	1920
20	0	111900	1920
21	0	130500	2580
22	0	130500	2580
23	0	130500	2580
24	0	130500	2580
25	0	2100000	660
26	0	2100000	660
27	0	2100000	660
28	0	2100000	660
29	0	2100000	660
30	0	2100000	660
31	0	2100000	660
32	0	2100000	660
33	0	2100000	660
34	0	2100000	660
35	0	2100000	660
36	0	24600	534
37	0	36300	96
38	0	5160	180
39	0	29100	120
40	0	20100	114
41	0	25200	780
42	0	25200	780
43	0	25200	780
44	0	25200	780
45	0	25200	780
46	0	25200	780
47	0	25200	780
48	0	25200	780
49	0	2100000	616
50	0	2100000	616
51	0	2100000	660
52	0	2100000	660
53	0	2100000	660
54	0	25200	780
55	0	25200	780
56	0	25200	780
57	0	25200	780
58	0	25200	780
59	0	25200	780
60	0	25200	780
61	0	25200	780
62	0	25200	780
63	0	25200	780

Facility Status Matrix

***** TOTAL RUN TIME (INCLUDING ASSEMBLY) = 19.13 MINUTES *****

EQJ 1324

DATE 11/01/76, CLOCK 02/20/35, DURATION 00/19/19

APPENDIX B

LIST OF REFERENCES

1. "Special Ceiling-Visibility Wind Tabulation" for Boston, for the period January 1970 to December 1974, National Climatic Center, Asheville, North Carolina.
2. "Seasonal and Annual Persistence of Surface Wind Direction by Wind Speed" at Binghamton, New York, for the period January 1960 to December 1964, National Climatic Center, Asheville, North Carolina.
3. "Duration of High Surface Wind Speeds" at Oscoda, Michigan AFB, for the period November 1950 to December 1970, National Climatic Center, Asheville, North Carolina.
4. "FAA Air Traffic Activity, Calendar Year 1975", March 1976, U.S. Department of Transportation, FAA, Office of Management Systems, Information and Statistics Division, Washington, D.C. 20591.
5. *Air Traffic Control*, 7110.65, 1 January 1976, U.S. Department of Transportation, FAA, Air Traffic Service, Washington, D.C. 20591.
6. "Instrument Approach Procedures", National Ocean Survey.
7. "Standard Operating Procedures", March 15, 1976, (BOS TWR 7110.35), Boston Tower, Logan International Airport, East Boston, Massachusetts.
8. "60-Nautical-Mile Video Map", ASR-7, National Ocean Survey, revised 4 February 1976, Boston (Logan International), Massachusetts.
9. "Performance Measurement System for Major Airports", November 1975, U.S. Department of Transportation, FAA, Air Traffic Service, Operation Research Branch, Washington, D.C. 20591.
10. "Air Navigation and Air Traffic Control Facility Performance and Availability" (RIS: SM 6040-20), Calendar Year 1975, FAA, Airway Facilities Service, Washington, D.C. 20591.

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