

Summary Report

**CASE FILE
COPY**

TRANSLATION OF SHUTTLE
OPERATIONS SIMULATION MODEL
FROM GPSS II TO GPSS 1100

April 1972

CR-123537



TELEDYNE

BROWN ENGINEERING

SUMMARY REPORT
ASD-ASTN-1512

TRANSLATION OF SHUTTLE OPERATIONS SIMULATION MODEL
FROM GPSS II TO GPSS 1100

By

A. J. Marshall

April 1972

Prepared For

SYSTEMS OPERATIONS BRANCH
MECHANICAL AND CREW SYSTEMS INTEGRATION DIVISION
ASTRONAUTICS LABORATORY
GEORGE C. MARSHALL SPACE FLIGHT CENTER

Contract No. NAS8-21804

Prepared By

SYSTEMS DESIGN AND SIMULATION BRANCH
SYSTEMS ENGINEERING DEPARTMENT
AEROSPACE SUPPORT DIVISION
TELEDYNE BROWN ENGINEERING COMPANY
HUNTSVILLE, ALABAMA

ABSTRACT

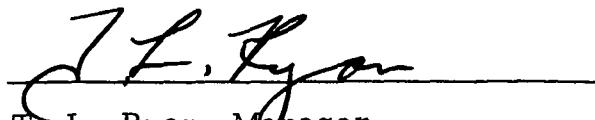
A method has been developed by the Sperry Rand Corporation which enables a programmer to convert the General Purpose Systems Simulator (GPSS) II simulation language into the GPSS 1100 language. To accomplish the conversion, a translator deck is used in addition to hand-changes made by the analyst after translation.

This report presents the conversion of a particular GPSS II program used at the Marshall Space Flight Center (MSFC) and summarizes the major changes required for compatibility of the two languages. Validation of the GPSS 1100 model was completed by comparing the results of the GPSS II statistics to the converted 1100 model.

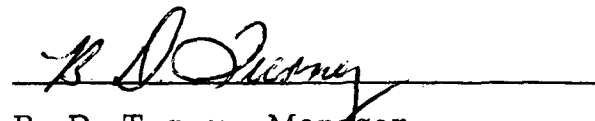
APPROVAL:



R. E. Talley, Chief
Operations Analysis Section



T. L. Ryan, Manager
Systems Design and Simulation Branch



B. D. Turney, Manager
Systems Engineering Department

TABLE OF CONTENTS

		Page
SECTION I.	INTRODUCTION	2
SECTION II.	GPSS II VERSION OF SOS MODEL	3
SECTION III.	GPSS 1100 TRANSLATED VERSION OF SOS MODEL	4
SECTION IV.	CORRECTED GPSS 1100 VERSION OF THE SOS MODEL	6
	A. Corrections Made to Model	6
	B. Major Differences between GPSS 1100 and GPSS II	7
	C. GPSS 1100 Run Stream	8
REFERENCES		10

LIST OF ILLUSTRATIONS

Figure	Title	Page
1.	Translator Deck Listing	5
2.	GPSS 1100 Run Stream Listing	9

DEFINITION OF SYMBOLS

GPSS	General Purpose Systems Simulator
LUT	Launch Umbilical Tower
SOS	Shuttle Operations Simulation

SUMMARY

This report illustrates the conversion of the General Purpose Systems Simulator (GPSS) II version of the Shuttle Operations Simulation (SOS) model to a GPSS 1100 SOS model. Conversion was accomplished by means of a translator deck and hand changes by the analyst. A working GPSS 1100 deck has been successfully used and compatibility between GPSS II and GPSS 1100 has been verified; however, there is a limit as to the number of transactions that can be successfully terminated by GPSS 1100.

Test results have shown (Appendices A and C--summary results and tables) that one can obtain identical results between the two models for 75 transactions. Attempts to run the GPSS 1100 SOS model beyond 75 transactions has caused the computer to use the maximum allotted run time even for run times as high as 8 min.

Although diligent efforts have been exerted to find the problem, no solution has been found as of this date; however, the cause of the maximum time problem is believed to be an internal error in the current version of the GPSS 1100 compiler program supplied by the Sperry Rand Corporation.

SECTION I. INTRODUCTION

The purpose of this report is to present an example General Purpose Systems Simulator (GPSS) II computer program, Shuttle Operations Simulation (SOS) model--Reference 1, and the methods used to obtain a compatible GPSS 1100 model. The conversion was carried out by the translator program, using the Univac 1108 computer, and various manual changes. Information presented herein is intended for other computer programmers who wish to minimize problems encountered during a translation.

SECTION II. GPSS II VERSION OF SOS MODEL

The SOS model, as presented in Appendix A, simulates operational facts about individual Shuttle processing facilities, Launch Umbilical Towers (LUT's), Orbiters, and Boosters. The model is composed of functional sections, with each section representing the abstraction of reality that reflects those functions that are most relevant. The model uses GPSS II and FORTRAN IV computer languages to simulate various operations and activities. (For a detailed description of the SOS model, see References 1 and 2.)

SECTION III. GPSS 1100 TRANSLATED VERSION OF SOS MODEL

The translated version of the SOS model is presented in Appendix B. To obtain this version, a deck, whose listing is shown in Figure 1, was used. The primary purpose of this deck is to translate the SOS model, which is permanently stored on a magnetic drum by the name of FILE2, and store the translation onto a tape by the name of TRANSFILE2.

Translation of the SOS model is accomplished by means of the @XQT FITOFR control card. This control card permits the execution of the GPSS II translator program. Following this card is a data card which contains the number of GPSS II facilities, storages, logic switches, queries, user chains, parameters, tables, savexes, functions, and variables.

```

%RUN, /T CONF2, 420025, MARSHLBIN225, 3, 150/5000 . FILE2 TRANSLATED AND ON TAPE
%ASG, I TRANSFILE2, 1, SAVE03
%ASG, I DUMMYP, F2
%ASG, I MODEL, F2
%DELETE IPFS.
%ASG, I IPFS., F/1/POS/12
%DATA 420223*FILE2, MODEL
-1125
      END
%END
%COPY, P GPSS*TRANSL., IPFS.
%BRKPT PUNCH$/DUMMYP
%XQT FITOFR
200      200      500      200      20      14      100      500      100      50
%ADD MODEL.
%BRKPT PUNCH$
%DATA, L DUMMYP, MODEL
%END
%COPY, GM MODEL., TRANSFILE2.
%FIN
%FIN

```

FIGURE 1. TRANSLATOR DECK LISTING

SECTION IV. CORRECTED GPSS 1100 VERSION OF THE SOS MODEL

A. Corrections Made to Model

The corrected GPSS 1100 version of the SOS model is presented in Appendix C. Corrections to the model were made by means of the file update insert method. Additionally, corrections were made to the GPSS II HELP and PRINT subroutines, which are written in FORTRAN IV, to make them conform to the GPSS 1100 requirements of the model.

One of the changes made to the HELP subroutine was to equate the K1, K2, K3, K4, and K5 values of the GPSS II HELP subroutine to JH(1), JH(2), JH(3), JH(4), and JH(5) values of the GPSS 1100 HELP subroutine. The other change made to the GPSS 1100 HELP subroutine was to equate the K2, K3, K4, and K5 (if necessary) to a positive zero before returning to the main program. This is necessary because a negative zero will be transferred to the main program as 131071.

Printout of the summary results is accomplished by means of the PRINT subroutine. Some of the information printed out, such as "Service Capacity of Safing Area" and "Service Capacity of Maintenance Facility", is dependent upon resident simulator data (Appendices A and C). This situation is true for both the GPSS II and the GPSS 1100 subroutines; however, to make the GPSS 1100 version perform the same function as the GPSS II version, one must gain access to the GPSS 1100 resident simulator data through the use of procedure tables. To gain access to the tables, one must use FORTRAN specification statements. The exact names that the procedures need to do this are given in Section 9.3 of Reference 4. In order to reference any of the tables, one must include the statement: INCLUDE TABLES in the PRINT subroutine. Additional INCLUDE statements are necessary for a particular procedure name.

Corrections made to the SOS model following translation are as follows:

- In certain areas of the GPSS II SOS model, time is advanced by means of a function, namely Function 1. Function 1 works in conjunction with the fifth location of the HELP block. GPSS II brings back the fifth location of the HELP block as X10 whereas GPSS 1100 designates the fifth location as

HA\$5; therefore, the numeric attribute X\$X(10) was changed to HA\$5. Function 2 was added to the GPSS 1100 version to compensate for times when X\$X(10) is used.

- The HELP subroutine is used to generate values to be inserted into certain savexes and parameters. These values are brought from the HELP subroutine as HA\$ (location number on card) instead of the numeric attribute for a savex or parameter; hence, the GPSS II numeric attributes for a savex or parameter were changed to the correct HA\$ (location number or card) numeric attribute.
- The GPSS 1100 translator did not translate the proper value for selection modes. For a 50 percent selection, the number should be 500 instead of the 50 which was translated. Also, for a 25 percent selection mode, the number should be 250, etc.
- The mark parameters' number attribute should be modulated by 131072 due to a translator error.
- Corrected numeric attributes are: ST\$(n), QX\$(n), SR\$(n), and FR\$(n) (n designates an integer).

B. Major Differences between GPSS 1100 and GPSS II

One of the major differences between the execution of GPSS 1100 and GPSS II is the operation of the ADVANCE block when time is advanced by means of a function and a selection mode. GPSS II advances time based on the present value of the function and then selects a block for entry. On the other hand, GPSS 1100 selects a block for entry and then advances time. As a result of this difference, an extra random number is used by GPSS II, thereby generating different selection mode routes. A remedy for this discrepancy is to use an additional ADVANCE block in GPSS II whereas advancing occurs only as a result of the function. An additional ADVANCE block is used for the purpose of the selection mode only.

Another difference is the inability of GPSS 1100 to transfer a negative zero from the HELP subroutine to the main program. As previously stated, this problem can be circumvented by setting the value to be transferred to a positive zero inside the HELP subroutine.

There is also a difference in the execution time for each language. The total time for 75 transactions is 00:02:43 for GPSS 1100 and 00:00:30 for GPSS II. The compile time is subtracted from the total

time to obtain the execution time. It has previously been determined by a test run that the compile time for GPSS 1100 is 00:02:07 and 00:00:16 for GPSS II; therefore, after subtraction, the execution time for GPSS 1100 is 36 sec and 14 sec for GPSS II. Even if one allows 5 sec for insertion procedures in GPSS 1100, there is still a difference of approximately 17 sec in execution time between the two languages for 75 transactions.

C. GPSS 1100 Run Stream

Execution of the GPSS 1100 version of the SOS model is accomplished by utilizing the run stream shown in Figure 2. Comments are inserted intermittently throughout the run stream to aid the user in interpreting the run stream.

```

%RUN, /T GPFL2,123456,MAKSHLBIN225,3,150
%ASG,T TAPE,T,REEL NUMBER
%ASG,T MODEL1,F2
%ASG,T MODEL,F2
%ASG,T MODELA,F2
%ASG,T GPSSE8,F2
%ASG,T PFILE,F2
%COPY,RS MASTER*GPSSE8.,GPSSE8.
* COPIES ALL INFORMATION STORED IN MASTER*GPSSE8 FILE AND PUTS IT INTO GPSSE8.
%DELETE TPF$.
%ASG,T TPF$.,F/1POS/12
%REWIND TAPE.
%COPY,G TAPE.,MODEL.
* COPIES ALL INFORMATION ON TAPE,PUTS IT INTO MODEL AND SAVES IT
%FREE TAPE.
%COPY,I MODEL.,PFILE.MODEL.A
* COPIES SDF MODEL AND ADDS IT TO PFILE.MODEL.A AS SOURCE LANGUAGE
%ELT GPSSE8.HELP,MODEL1.HELP
* CHANGES ARE MADE TO THE HELP ROUTINE AT THIS POINT SO THAT IT WILL INTERFACE
  WITH THE GPSS 1100 HELP ROUTINE.
%ERS TPF$.
%COPY,RS GPSSE8.,TPF$.
* COPIES SYMBOLIC AND RELOCATEABLES OF GPSSE8 ONTO TPF$.
%COPY,P GPSS*SYMREL.,TPF$.
%FOR,US PRINT,PRINT
* MODIFICATIONS HAD TO BE MADE TO A PRINT SUBROUTINE WHICH WAS CALLED BY THE
  HELP ROUTINE. THE PRINT SUBROUTINE WAS IN FORTRAN IV AND WAS WRITTEN BY
  THE USER FOR HIS OWN USE. THE FOLLOWING CARDS HAD TO BE INCLUDED IN ADDITION
  TO MODIFICATIONS OF PRINT:
  COMPLIER (FLD=R)
  INCLUDE TABLES
  INCLUDE DEFS
  INCLUDE STORES
  INCLUDE QUEUES
  INCLUDE FACS
  INCLUDE SAVEXS
%FOR,US HELP,HELP
-16,16
%ADD MODEL1.HELP
* THE PRECEDING THREE CARDS ARE USED FOR INSERTION OF THE USER'S HELP ROUTINE
  INTO THE GPSS 100 HELP ROUTINE.
%SSG GPSKEL
SSG
NAME GPSS SIZE,30000
* THE PRECEDING THREE CARDS WERE USED TO INCREASE THE AMOUNT OF CORE FOR THE
  PROGRAM. THE CORE SIZE WAS INCREASED TO APPROXIMATELY 60K.
%EOF
%GPSS,UA PFILE.MODEL.A
* THIS IS A GPSS 1100 CALL STATEMENT WHICH ALLOWS ONE TO UPDATE THE TRANSLATED
  VERSION OF THE MODEL. UPDATING IS ACCOMPLISHED BY THE INSERT METHOD.
  MODIFICATIONS TO THE MODEL FOLLOW THIS CARD
* GPSS 1100 BUFFER CARD FOLLOWS THE MODIFICATIONS. A BUFFER CARD HAS AN
  ASTERICK IN COLUMN 1.
* DATA CARD

```

FIGURE 2. GPSS 1100 RUN STREAM LISTING

REFERENCES

1. Shuttle Operation's Simulation Model Description. S&E-012-001-2H, Rev. A, February 15, 1971.
2. Shuttle Operations Simulation Model Programmers/Users Manual. July 30, 1971.
3. Univac General Purpose Systems Simulator II. Reference Manual UP-4129.
4. Univac General Purpose Systems Simulator (GPSS 1100). Reference Manual UP-7883.

APPENDIX A. GPSS II SOS MODEL PRINTOUT

JOB

SHUTTLE OPERATIONS SIMULATION MODEL MSFC VERSION III-C JAN. 7, 1972	IIIA 20
	IIIA 30
	IIIC 10
	IIIA 50
	IIIA 60
	IIIA 70
	IIIA 80
	IIIA 90
	IIIA 100
ALL TIMES EXPRESSED IN THIS PROGRAM ARE IN TERMS OF MILLI WORKING DAYS (1/1000 OF A WORKING DAY) (WORKING DAY = 16 HOURS)	IIIA 110
	IIIB 10
	IIIA 120
	IIIA 130
	IIIA 140
	IIIA 150
	IIIA 160
PERFORMANCE TIME DISTRIBUTION CODES	IIIA 170
	IIIA 180
	IIIA 190
	IIIA 200
	IIIA 210
	IIIC 11
	IIIC 12
	IIIA 220
	IIIA 230
	IIIA 240
	IIIA 250
	IIIB 20
	IIIB 30
	IIIB 40
	IIIB 50
	IIIB 60
	IIIB 70
	IIIB 80
	IIIB 90
	IIIA 100
	IIIA 110
	IIIB 120
	IIIB 130
	IIIB 140
	IIIB 150
	IIIB 160
	IIIB 170
	IIIB 180
	IIIB 190
	IIIA 260
	IIIA 270
	IIIA 280
	IIIA 290
	IIIA 300
	IIIA 310
CURRENT MAXIMUM PROGRAM LIMITS	
BLOCKS - 400	
FACILITIES - 15	
STORAGES - 50	
QUEUES - 50	
LOGIC SWITCHES - 25	
SAVEX LOCATIONS - 50	
FUNCTIONS - 10	
TABLES AND QTABLES - 30 (COMBINED TOTAL)	
VARIABLE STATEMENT - 25	
PARAMETERS - 20	
TRANSACTION NUMBERS - 100	
STORAGE CAPACITIES	
1 CAPACITY 1	
2 CAPACITY 2	
3 CAPACITY 2	

4	CAPACITY	9	111A 320
•5			111A 330
•6			111A 340
•7			111A 350
•8			111A 360
•9			111A 370
10	CAPACITY	1	111A 380
11	CAPACITY	2	111A 390
12	CAPACITY	2	111A 400
13	CAPACITY	9	111A 410
14	CAPACITY	9	111A 420
•15			111A 430
16	CAPACITY	10	111A 440
17	CAPACITY	2	111A 450
18	CAPACITY	2	111A 460
19	CAPACITY	1	111A 470
20	CAPACITY	1	111A 480
•21			111A 490
22	CAPACITY	2	111A 500
23	CAPACITY	2	111A 510
•24			111A 520
25	CAPACITY	2	111A 530
•26			111A 540
27	CAPACITY	2	111A 550
28	CAPACITY	2	111A 560
29	CAPACITY	1	111A 570
30	CAPACITY	1	111A 580
31	CAPACITY	1	111A 590
•			111A 600
•			111A 610
•			111A 620
•			111A 630
•			111A 640
•			111B 200
•			111A 660
•			111B 210
•			111B 220
•			111B 230
•			111B 240
•			111B 250
•			111B 260
•			111B 270
•			111A 700
•			111A 710
•			111A 720
•			111A 730
•			111A 740
•			111A 750
•			111B 280
•			111B 290
•			111B 300
•			111A 790
•			111A 800
•			111A 810
•			111B 310
•			111A 830

STORAGE AND QUEUE DEFINITIONS

NOTE - THE DEFINITIONS WHICH ARE FOLLOWED BY THE NOTATION (Q)

ALSO REFER TO A QUEUE WHICH IMMEDIATELY PRECEDES THE

STORAGE. THE DEFINITIONS WHICH ARE NOT FOLLOWED BY THE

NOTATION (Q) HAVE NO QUEUE ASSOCIATED WITH THEM.

1 - BOOSTER SAFING (Q)

2 - BOOSTER MAINTENANCE (Q)

3 - TRANSPORT BOOSTER TO SYSTEMS TEST, TEST, TRANSPORT TO STORAGE (Q)

4 - BOOSTER STORAGE

5

6

7

8

9

10 - ORBITER SAFING (Q)

11 - ORBITER MAINTENANCE (Q)

12 - TRANSPORT ORBITER TO SYSTEMS TEST, TEST, TRANSPORT TO STORAGE (Q)

13 - ORBITER STORAGE

14 - ORBITER BOOST TO ORBIT, PERFORM MISSION, RETURN

15

16 - LAUNCH UMBILICAL TOWER (LUTS) STORAGE

17 - REMOVE POST LAUNCH LUT FROM PAD

18 - TRANSPORT LOT TO MAINT. REFURBISH/TEST, TRANSPORT TO STORAGE (W) 111B 320
 19 - SEPARATE BOOSTER FROM LOT, TRANSPORT BOOSTER TO MAINTENANCE 111A 850
 20 - MATE AND HOOKUP BOOSTER, ORBITER AND LOT (W) 111B 330
 21 - QUEUE IMMEDIATELY PRECEEDING THE PAD FACILITIES (NOTE- THERE IS 111B 340
 NO ASSOCIATED STORAGE) 111B 350
 22 - COUNTDOWN PREPARATION 111A 880
 23 - COUNTDOWN 111A 890
 24 111A 900
 25 - REMOVE BOOSTER, ORBITER AND LOT FROM PAD 111A 910
 26 111A 920
 27 - REFURBISH LAUNCH PAD 111A 930
 28 - LIFTOFF THROUGH SEPARATION 111A 940
 29 - READY STORAGE FOR NEXT BOOSTER, ORBITER AND LOT (W) 111B 360
 30 - (IMMEDIATELY PRIOR TO THE BEGINNING OF THE MATE OPERATION) 111A 960
 31 - TRANSPORT VEHICLE, SEPARATE ORBITER, TRANSPORT ORBITER TO MAINT. 111A 970
 32 - RESTRICTS THE REQUEST FOR VEHICLE ELEMENTS TO ONE MISSION 111B 370
 33 - AT A TIME, SUCCEEDING MISSIONS MUST WAIT UNTIL THE MISSION 111B 380
 34 - IMMEDIATELY IN FRONT OF THEM HAS EITHER SUCCESSFULLY MET ITS 111B 390
 35 - REQUEST OR HAS BEEN CANCELLED DUE TO AN EXCESSIVE WAIT FOR 111B 400
 36 - VEHICLE ELEMENTS. (W) 111B 410
 37 111A 990
 38 111A1000
 39 111A1010
 40 111A1020
 41 111A1030
 42 111A1040
 43 111A1050
 44 111C 20
 45 111B 420
 46 111B 430
 47 111B 440
 48 111B 450
 49 111B 460
 50 111B 470
 51 111A1080
 52 111A1100
 53 111A1110
 54 111A1120
 55 111A1130
 56 111A1140
 57 111A1150
 58 111A1160
 59 111B 480
 60 111B 490
 61 111B 500
 62 111B 510
 63 111B 520
 64 111B 530
 65 111B 540
 66 111B 550
 67 111B 560
 68 111B 570
 69 111B 580
 70 111B 590
 71 111B 600

1 - IS A CONTINUOUS LINEAR FUNCTION WITH A SLOPE OF 1. ITS END
 POINTS ARE LOCATED AT (0,0) AND (999999,999999). IT IS USED
 TO CONVERT THE INPUT SYSTEM VARIABLE SAVEAX 10 (X10) INTO
 FUNCTION 1 (FMI), WHICH CAN BE USED AS A MODIFIER IN AN ADVANCE
 BLOCK. THE FUNCTION IS DESCRIBED SUCH THAT THE CONVERSION
 IS ONE TO ONE (FMI=X10).
 1 FUNCTION X10 C2
 0 0 999999999999

FUNCTION DEFINITIONS
 1 - IS A CONTINUOUS LINEAR FUNCTION WITH A SLOPE OF 1. ITS END
 POINTS ARE LOCATED AT (0,0) AND (999999,999999). IT IS USED
 TO CONVERT THE INPUT SYSTEM VARIABLE SAVEAX 10 (X10) INTO
 FUNCTION 1 (FMI), WHICH CAN BE USED AS A MODIFIER IN AN ADVANCE
 BLOCK. THE FUNCTION IS DESCRIBED SUCH THAT THE CONVERSION
 IS ONE TO ONE (FMI=X10).
 1 FUNCTION X10 C2
 0 0 999999999999

SAVEAX DEFINITIONS
 1 - BOOSTER AND ORBITER ARE AVAILABLE
 2 - BOOSTER AND ORBITER ARE NOT AVAILABLE
 3 - BOOSTER IS NOT AVAILABLE
 4 - ORBITER IS NOT AVAILABLE
 5 - BOOSTER AND/OR ORBITER AND/OR LOT NOT AVAILABLE

NOTE A - UNLESS OTHERWISE STATED THE FOLLOWING DEFINITIONS
 REPRESENT THE TOTAL COUNT OF THE TRANSACTIONS
 ENTERING THE STATEMENT.
 NOTE B - SAVEAX 10, 11, AND 12 ARE FIRST USED TO INITIALIZE
 THE NUMBER OF BOOSTERS, ORBITERS, AND LOTS RESPECTIVELY.
 THEY ARE THEN USED AS DEFINED BELOW.

• 6 - TOTAL GENERATED LAUNCH REQUESTS	111B 610
• 7 - ORBITER AND/OR LUT NOT AVAILABLE	111B 620
• 8 - LUT NOT AVAILABLE WHEN BOOSTER AND ORBITER ARE AVAILABLE	111B 630
• 9 -	111B 640
• 10 - THE INPUT VARIABLE TO FUNCTION 1 (SEE NOTE H ABOVE)	111B 650
• 11 - THE LENGTH OF THE NEXT ORBITER MISSION (SEE NOTE B ABOVE)	111B 660
• 12 - MISSION TYPE FOR NEXT MISSION (SEE NOTE B ABOVE)	111B 670
• 13 - TIME UNTIL NEXT LAUNCH	111B 680
• 14 -	111B 690
• 15 - TIME BETWEEN LAUNCH OPPORTUNITIES FOR NEXT MISSION	111B 700
• 16 - LENGTH OF ORBITER MISSION FOR NEXT MISSION	111C 30
• 17 - MISSION TYPE OF CURRENT MISSION	111B 710
• 18 - TIME UNTIL CURRENT LAUNCH	111B 720
• 19 -	111B 730
• 20 - TIME BETWEEN LAUNCH OPPORTUNITIES FOR CURRENT MISSION	111B 740
• 21 - TIME OF FIRST LAUNCH OPPORTUNITY FOR CURRENT MISSION	111B 750
• 22 - VEHICLES REMOVED FROM PAD (FAILURE ON PAD)	111B 760
• 23 - VEHICLES REMOVED FROM PAD (CONSTRAINS NEXT LAUNCH)	111B 770
• 24 - VEHICLES REMOVED FROM PAD (NO SECOND LAUNCH WINDOW)	111B 780
• 25 - LAUNCHES MISSED DUE TO PAD UNAVAILABILITY	111B 790
• 26 - THE NUMBER OF VEHICLES LAUNCHED AT AN ALTERNATE LAUNCH WINDOW	111B 800
• 27 - LAUNCH WINDOW INDICATOR	111C 40
• 28 - NUMBER OF LAUNCHES AT PRIMARY WINDOW	111C 50
• 29 - NUMBER OF TIMES A VEHICLE WAS REPAIRED ON THE PAD	111C 60
• 30 - TOTAL SUCCESSFULLY ACCOMPLISHED LAUNCHES	111B 840
• 31 -	111B 850
• 32 -	111C 61
• 33 -	111C 62
• 34 -	111C 63
• 35 - AMOUNT OF TIME AFTER PRIMARY WINDOW AT WHICH LAUNCH OCCURS	111C 64
•	111A1500
•	111A1510
•	111A1520
•	111A1530
•	111A1540
•	111A1550
•	111A1560
• 1 - GROUND PROCESSING TIME FOR EACH BOOSTER	111B 860
• (TIME OUT OF STORAGE)-(FLIGHT TIME)+(TIME IN STORAGE)	111B 870
• 2 - TIME LEFT BEFORE LAUNCH (USED TO DETERMINE IF SUFFICIENT TIME	111B 880
REMAINS BEFORE LAUNCH TO INITIATE AND COMPLETE COUNTDOWN)	111B 890
• (TIME TO LAUNCH FROM EARLIEST POSSIBLE STORAGE EXIT)-(ELAPSED	111B 900
TIME FROM EARLIEST POSSIBLE STORAGE EXIT)	111B 910
• NOTE- IF FIRST LAUNCH WINDOW IS MISSED V2 WILL BE NEGATIVE.	111B 920
THIS IS TAKEN INTO ACCOUNT IN LATER VARIABLES.	111C 70
•	111C 80
•	111B 930
• 3 - FLOATING HOLD TIME BETWEEN COMPLETION OF ALL PRECOUNTDOWN	111B 940
OPERATIONS AND THE INITIATION OF FINAL COUNTDOWN FOR THE	111B 950
FIRST LAUNCH OPPORTUNITY	111B 960
• (TIME LEFT BEFORE LAUNCH)-(COUNTDOWN TIME)	111B 970
•	111B 980
• 4 - TIME TO SECOND LAUNCH WINDOW	111C 90
(TIME FIRST WINDOW WAS MISSED BY)+(TIME BETWEEN FIRST AND	111C 100
SECOND WINDOW)	111C 110
•	111B1040

VARIABLE DEFINITIONS

• 5 - MAXIMUM TIME TO PROCESS VEHICLE FROM MATE AND HOOKUP INITIATION
 TO LAUNCH. THIS ALSO REPRESENTS THE EARLIEST POSSIBLE STORAGE
 EXIT FOR THE VEHICLE ELEMENTS.
 (ASSIGN CONSTANT = SUM OF MAXIMUM TIMES IN EACH
 PRELAUNCH OPERATION)
 • 6 - LENGTH OF COUNTDOWN
 (PREASSIGNED CONSTANT)
 • 7 - GROUND PROCESSING TIME FOR EACH ORBITER
 (TIME OUT OF STORAGE)-(FLIGHT TIME)+(TIME IN STORAGE)
 • 8 - MINIMUM TIME TO PROCESS VEHICLE FROM MATE AND HOOKUP INITIATION
 TO LAUNCH. THIS ALSO REPRESENTS THE LATEST POSSIBLE STORAGE
 EXIT FOR THE VEHICLE ELEMENTS IF THE FIRST LAUNCH WINDOW IS
 TO BE MET.
 (ASSIGN CONSTANT = SUM OF MINIMUM TIMES IN EACH
 PRELAUNCH OPERATION)
 • 9 - TIME VEHICLES ARE HELD IN READY STORAGE PRIOR TO EARLIEST
 POSSIBLE INITIATION OF MATE AND HOOKUP RELATIVE TO THEIR MISSION
 (LAUNCH TIME)-(CURRENT TIME)-(VARIABLE 5)
 • 10 - THE NUMBER OF SIMULATIONS FOR WHICH STATISTICS ARE COLLECTED
 (ASSIGN CONSTANT = ONE LESS THAN NUMBER OF SIMULATIONS
 SPECIFIED ON THE START CARD)
 • 11 - MAXIMUM TIME A REQUEST MAY WAIT FOR ANY VEHICLE ELEMENT
 AFTER THE EARLIEST POSSIBLE HALF AND HOOKUP INITIATION.
 (MAXIMUM TIME TO LAUNCH(V5))-(MINIMUM TIME TO LAUNCH(V8))
 • 12 - TIME TO BEGINNING OF FINAL COUNTDOWN FOR THE SECOND WINDOW
 (TIME TO SECOND LAUNCH WINDOW)-(LENGTH OF COUNT DOWN)
 • 13 - LENGTH OF TIME BETWEEN EVEN AND ODD WINDOWS
 (23.5 HOURS)-(TIME BETWEEN FIRST AND SECOND WINDOW)
 • 14 - TIME LEFT TO BEGINNING OF FINAL COUNTDOWN FOR LAUNCH AT THE
 CURRENT WINDOW.
 (LENGTH OF TIME BETWEEN FIRST WINDOW AND CURRENT WINDOW)+(TIME
 THE FIRST WINDOW WAS MISSED BY)-(LENGTH OF FINAL COUNTDOWN)
 • 15 - DIVIDE WINDOW NUMBER BY 2 DISCARD QUOTIENT AND RETAIN REMAINDER
 IF V15=0 THE WINDOW IS EVEN. IF V15=1 THE WINDOW IS ODD

 1 VARIABLE MP11-P1+P2
 2 VARIABLE V5-H1
 3 VARIABLE V2-V6
 4 VARIABLE P7+V2
 5 VARIABLE K5325
 6 VARIABLE K83
 7 VARIABLE MP11-P1+P4
 8 VARIABLE K3925
 9 VARIABLE X21-C1-V5
 10 VARIABLE K75
 11 VARIABLE V5-V8

11B105U
 11B106U
 11B107U
 11B108U
 11B109U
 11B110U
 11B111U
 11B112U
 11B113U
 11B114U
 11B115U
 11B116U
 11B117U
 11B118U
 11B119U
 11B120U
 11B121U
 11B122U
 11B123U
 11B124U
 11B125U
 11B126U
 11B129U
 11B130U
 11B131U
 11B132U
 11B133U
 11B134U
 11B135U
 11B136U
 11C 12U
 11C 13U
 11C 14U
 11C 15U
 11C 16U
 11C 17U
 11C 18U
 11C 19U
 11C 20U
 11C 21U
 11C 22U
 11C 23U
 11C 24U
 11A174U
 11A1361
 11A128U
 11A179U
 11C 25U
 11A181U
 11A182U
 11B1362
 11A184U
 11A185U
 11A187U

12	VARIABLE	V4-V6		111C 260
13	VARIABLE	K979-P7		111C 270
14	VARIABLE	X35+V2-V6		111C 280
15	VARIABLE	X271K2		111C 290

				111A1880
				111B1370
				111B1380

				111B1390
				111B1400
				111B1410
				111B1420

				111B1430
				111B1440

				111B1450
				111B1460
				111B1470
				111B1480
				111B1490
				111B1500
				111B1510
				111B1520
				111B1530
				111B1540
				111B1550
				111B1560
				111B1570

				111A1890
				111A1900
				111A1910
				111A1920
				111A1930
				111A1940
				111A1950
				111A1960
				111A1970
				111A1980
				111A1990
				111A2000
				111A2010
				111A2020
				111A2030
				111A2040
				111A2050
				111A2060
				111A2070
				111A2080
				111A2090
				111B1571
				111A2120
				111A2130
				111A2140
				111A2150
				111A2160
				111A2170
				111A2180
				111A2200

PARAMETER DEFINITIONS

1 - INDEPENDENT TOTAL FLIGHT TIME OF EACH BOOSTER AND ORBITER
 2 - TIME IN STORAGE FOR THE BOOSTER OF THE CURRENT MISSION
 3 - LENGTH OF CURRENT ORBITER MISSION
 4 - MISSION TYPE UNTIL REDEFINED AS TIME IN STORAGE FOR THE ORBITER
 5 - OF THE CURRENT MISSION
 6 - TIME TO THE CURRENT LAUNCH
 7 - TIME BETWEEN LAUNCH OPPORTUNITIES FOR CURRENT LAUNCH
 8 - TIME FROM LANDING TO STORAGE ENTRY
 9 - DEFINES PAD TO BE SEIZED FOR CURRENT MISSION
 10 - INITIALIZATION OF THE NUMBER OF BOOSTERS, ORBITERS AND LUTS
 11 - IS MARKED SUCH THAT THE LEAVE STORAGE TO LAUNCH TIME CAN BE
 TABULATED. THE AMOUNT OF TIME EACH BOOSTER AND ORBITER
 SPENDS OUT OF STORAGE IS ALSO TABULATED BY THIS PARAMETER.

START NEW PROBLEM AND READ IN FLEET SIZE

1 GENERATE 0 1 BOOSTER ORBITERS 2 LUT
 2 HELP K7 X11 X10 3 X12
 ENTER X10 NUMBER OF ORBITERS INTO STORAGE 13
 3 ASSIGN 10 X10 4
 4 ENTER 13 P10 5
 ENTER X11 NUMBER OF BOOSTERS INTO STORAGE 4
 5 ASSIGN 10 X11 6
 6 ENTER 4 P10 7
 ENTER X12 NUMBER OF LUTS IN STORAGE 16
 7 ASSIGN 10 X12 8
 8 ENTER 16 P10 15
 GENERATE SUFFICIENT TIME TO MEET THE FIRST MISSION REQUEST
 INITIALIZE SAVEX 16 THROUGH 21 WITH FIRST TRANSACTION START TIME

9	SAVEA	16	X11	10	11TA221J
10	SAVEA	17	X12	11	11TA222J
11	SAVEA	18	X13	12	11TA223J
12	SAVEA	20	X15	13	11TA224J
• INITIALIZE TIME TO LAUNCH CUMULATOR WITH SIMULATION START TIME					11TA225J
13	SAVEA	21	C1	15	11TA226J
• DETERMINE IF FIRST LAUNCH REQ. HAS ENOUGH TIME TO MEET ITS LAUNCH					11TA227J
14	COMPARE	A18	GE	V5	11TA228J
• CALL HELP & DETERMINE A MORE REALISTIC FIRST LAUNCH REQ.					11TA229J
15	HELP	K1	X11	X12	11TA230J
• RETURN AND REINITIALIZE SAVEA 16 THROUGH 21					11TA231J
16	LOGIC	K3		17	11TA232J
17	TERMINATE				11TA233J
• GENERATE LAUNCHES BASED ON PROJECTED TRAFFIC REQUIREMENT					11TA234J
• THE SIMULATION TRANSACTIONS ARE GENERATED FOLLOWING THIS POINT					11TA235J
• COUNT THE NUMBER OF LAUNCH REQUESTS					11TA236J
18	GENERATE			19	11TA237J
19	GATE	LR3		20	11TA238J
20	LOGIC	S3		21	11TA239J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA240J
21	SAVEA	6+	K1	22	11TA241J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA242J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA243J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA244J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA245J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA246J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA247J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA248J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA249J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA250J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA251J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA252J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA253J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA254J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA255J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA256J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA257J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA258J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA259J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA260J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA261J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA262J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA263J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA264J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA265J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA266J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA267J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA268J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA269J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA270J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA271J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA272J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA273J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA274J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA275J
• CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH					11TA276J

22	HELP	K1	X11	X12	23	X13	X15	111R1572
•								111A2780
•								111A2790
•								111A2800
•								111A2810
•								111A2820
•								111A2830
•								111A2840
•								111A2850
•								111A2860
•								111A2870
•								111A2880
•								111A2890
•								111A2900
•								111A2910
•								111A2920
•								111A2930
•								111A2940
•								111A2950
•								111A2960
•								111A2970
•								111A2980
•								111A2990
•								111A3000
•								111A3010
•								111A3020
•								111A3030
•								111A3040
•								111A3050
•								111A3060
•								111A3070
•								111A3080
•								111A3090
•								111A3100
•								111A3110
•								111A3120
•								111A3130
•								111A3140
•								111A3150
•								111A3160
•								111A3170
•								111A3180
•								111A3190
•								111A3200
•								111A3210
•								111A3220
•								111A3230
•								111A3240
•								111A3250
•								111A3260
•								111A3270
•								111A3280
•								111A3290
•								111M1580
•								111R1590
•								111R1600

23 ASSIGN 3 X16 24
 24 ASSIGN 4 X17 25
 25 ASSIGN 5 X18 26
 26 ASSIGN 7 X20 27
 27 SAVEX 16 X11 28
 28 SAVEX 17 X12 29
 29 SAVEX 18 X13 30
 30 SAVEX 20 X15 31
 31 SAVEX 21+ X18 32
 32 SPL11 33 37
 33 SAVEX 10 X13 34
 34 ADVANCE 35 1 FNI
 35 LOGIC R3 36
 36 TERMINATE

• READY STORAGE QUEUE TIME INCLUDED IN TABLE 2 AND TABLE 22
 37 QUEUE 29 38
 • ADVANCE UNTIL TIME TO MATE THE VEHICLES
 38 ENTER 29 39
 39 SAVEX 10 V9 40
 40 ADVANCE 41 1 FNI
 41 LEAVE 29 42
 42 QUEUE 31 43
 43 ENTER 31 44
 44 MARK BOTH 45 47

• CHECK IF TOO MUCH DELAY HAS OCCURRED TO MEET THE LAUNCH
 45 COMPARE M1 G V11 46
 46 LEAVE 31 250
 47 GATE SNE4 BOTH 45 48
 48 GATE SNE13 BOTH 45 49
 49 GATE SNE16 BOTH 51 50
 • CHECK TO SEE IF PAD IS AVAILABLE FOR THIS MISSION.
 • IF NOT GO TO MISSED LAUNCH STATISTICS SECTION

111A1610
 111A3300
 111A3310
 111C 300
 111C 310
 111A3330
 111A3340
 111A3350
 111A3360
 111A3370
 111B1620
 111B1630
 111A3380
 111A3390
 111A3400
 111A3410
 111A3420
 111A3430
 111A3440
 111A3450
 111A3460
 111A3470
 111A3480
 111A3490
 111A3500
 111A3510
 111A3520
 111A3530
 111A3540
 111A3550
 111A3560
 111A3570
 111A3580
 111A3590
 111A3600
 111C 311
 111A3620
 111A3630
 111A3640
 111A3650
 111A3660
 111A3680
 111A3690
 111A3700
 111A3710
 111A3720
 111A3730
 111A3740
 111A3750
 111A3760
 111A3770
 111A3780
 111A3790
 111A3800
 111A3810
 111A3820

50 LEAVE 31 259
 51 COMPARE W21 E K0 52
 52 LEAVE 31 53
 53 TABULATE 6 54

* COUNT THE NUMBER OF TIMES THE BOOSTER, ORBITER AND LUT ARE AVAILABLE
 * REMOVE ONE BOOSTER, ORBITER, AND LUT FROM THEIR RESPECTIVE STORAGES,
 * AND TABULATE THE TIME THESE VEHICLE ELEMENTS SPENT IN STORAGE.

54 SAVEX 1+ K1 55
 55 LEAVE 4 56
 56 HELP K6 K1 C1 57 x10
 57 TABULATE 2 58
 58 ASSIGN 2 X10 59
 59 LEAVE 13 60
 60 HELP K6 K2 C1 61 x10
 61 TABULATE 22 62
 62 ASSIGN 4 X10 63
 63 LEAVE 16 64

* PARAMETER 11 MEASURES LEAVE STORAGE TO LAUNCH TIME
 64 MARK 11 65

* ENTER WAITING LINE FOR MATE AND HOOKUP FACILITY

65 QUEUE 20 66
 * MATE BOOSTER, ORBITER AND LUT
 66 ENTER 20 67
 * TRIANGULAR MIN MODE
 67 HELP K3 K1800 K2000 68
 68 ADVANCE 69
 69 LEAVE 20 70

JUST
 MAX
 K2200 X10
 1
 FNI

* WAITING LINE FOR PAD

70 QUEUE 21 71 72
 71 COMPARE F1 E K0 74
 72 COMPARE F2 E K0 75
 73 COMPARE F3 E K0 76
 74 ASSIGN 9 K1 77
 75 ASSIGN 9 K2 77
 76 ASSIGN 9 K3 77

* SEIZE THE FIRST AVAILABLE PAD FOR THIS MISSION AND

87	TABULATE	4	88	111C 710
	SET FIRST LAUNCH WINDOW INDICATOR			111C 720
88	SAVE	27 K1	89	111C 730
	ESTABLISH A BASE POINT OF ZERO FOR CALCULATING TIME BETWEEN			111C 740
	FIRST AND SUBSEQUENT WINDOWS IN CASE THIS VEHICLE HAS A FINAL			111C 750
	COUNTDOWN FAILURE AND CAN BE REPAIRED ON THE PAD.			111C 760
89	SAVE	35 K0	90	111C 770
	ADVANCE TO BEGINNING OF FINAL COUNTDOWN			111C 780
90	ADVANCE	91	1	111C 790
	-----			111C 800
	-----			111C 810
	-----			111C 820
	-----			111C 830
	-----			111C 840
	-----			111C 850
	-----			111C 860
	-----			111C 870
	-----			111C 880
	-----			111C 890
91	ENTER	23	92	111C 900
	ESTABLISH LENGTH OF FINAL COUNTDOWN			111C 910
92	HELP	A11 K83	93	111C 920
	ADVANCE TO END OF FINAL COUNTDOWN			111C 930
93	ADVANCE	94	1	111C 940
	LEAVE FINAL COUNTDOWN			111C 950
94	LEAVE	23	.05	111C 960
	-----			111C 970
	-----			111C 980
	-----			111C 990
	-----			111C 995
	-----			111C 1000
	-----			111C 1010
	-----			111C 1020
95	TABULATE	9	BOTH 96	111C 1030
	DID LAUNCH OCCUR AT PRIMARY WINDOW			111C 1040
96	COMPARE	A27 E K1	97	111C 1050
	COUNT NUMBER OF LAUNCHES AT THE PRIMARY WINDOW			111C 1060
97	SAVE	28+ K1	118	111C 1070
	LAUNCH DID NOT OCCUR AT THE PRIMARY WINDOW			111C 1080
	TABULATE AMOUNT OF TIME AFTER PRIMARY WINDOW LAUNCH OCCURRED			111C 1090
98	TABULATE	8	99	111C 1100
	COUNT NUMBER OF LAUNCHES AT A SUBSEQUENT WINDOW			111C 1110
99	SAVE	26+ K1	118	111C 1120
	-----			111C 1130
	-----			111C 1140
	-----			111C 1150
	-----			111C 1160
	-----			111C 1170
	-----			111C 1180
	-----			111C 1190
100	ADVANCE	.50	101	111C 1200
	COUNT NUMBER OF VEHICLES REMOVED FROM PAD DUE TO A FINAL			111C 1210
	COUNTDOWN FAILURE.			111C 1220
101	SAVE	22+ K1	210	111C 1230
	COUNT NUMBER OF TIMES A VEHICLE WAS REPAIRED ON THE PAD			111C 1240
102	SAVE	29+ K1	BOTH 103	111C 1250

•	103	COMPARE	P7	G	K3	112	111C126J
•		THERE IS NOT ANOTHER LAUNCH OPPORTUNITY					111C127D
•		COUNT NUMBER OF VEHICLES REMOVED DUE TO NO FURTHER					111C128U
•		LAUNCH WINDOW. THEN GO TO VEHICLE REMOVAL PATH.					111C129J
•	104	SAVEA	24+	K1	21D		111C130J
•		THERE IS ANOTHER LAUNCH OPPORTUNITY					111C131J
•		SET SECOND LAUNCH WINDOW INDICATOR					111C132U
•		-----					111C133D
•		-----					111C134U
•		-----					111C135U
•		-----					111C136U
•		-----					111C137U
•		THIS THE SECONDARY PATH THROUGH THE LAUNCH LOGIC. ONLY VEHICLES					111C138U
•		WHICH CANNOT LAUNCH ON THE PRIMARY WINDOW FLOW THROUGH THIS					111C139U
•		SECTION					111C140U
•		-----					111C140S
•	105	SAVEA	27	K2	106		111C141U
•		TABULATE AMOUNT OF TIME LEFT TO FIRST WINDOW (MAY BE NEGATIVE)					111C142U
•	106	TABULATE	7		BOTH 107	111	111C143D
•		IS THERE TIME TO LAUNCH AT THE SECOND WINDOW					111C144U
•	107	COMPARE	V4	GE	V6	108	111C145J
•		THERE IS TIME TO LAUNCH AT THE SECOND WINDOW					111C146J
•		ESTABLISH LENGTH OF HOLD TO BEGINNING OF FINAL COUNTDOWN					111C147U
•		FOR THE SECOND WINDOW.					111C148U
•	108	SAVEA	10	V12	109		111C149U
•		ESTABLISH LENGTH OF TIME BETWEEN FIRST AND SECOND WINDOW					111C150U
•	109	SAVEA	35	P7	110		111C151U
•		TABULATE HOLD TO BEGINNING OF FINAL COUNTDOWN FOR THE					111C152U
•		SECOND WINDOW					111C153U
•	110	TABULATE	5		9D		111C154U
•		-----					111C155U
•		-----					111C156U
•		-----					111C157U
•		THERE IS NOT TIME TO LAUNCH AT THE SECOND WINDOW					111C158U
•		ESTABLISH LENGTH OF TIME BETWEEN FIRST AND SECOND WINDOW					111C159D
•	111	SAVEA	35	P7	112		111C160U
•		INCREMENT WINDOW INDICATOR TO NEXT WINDOW					111C161D
•	112	SAVEA	27+	K1	BOTH 113	115	111C162U
•		DETERMINE IF THE WINDOW BEING TRIED IS EVEN OR ODD					111C163U
•	113	COMPARE	V15	G	K0	114	111C164U
•		THE WINDOW IS ODD.					111C165U
•		ESTABLISH LENGTH OF TIME BETWEEN FIRST AND SUBSEQUENT					111C166U
•		ODD WINDOWS					111C167J
•	114	SAVEA	35+	V13	BOTH 116	112	111C168U
•		-----					111C169U
•		-----					111C170U
•		THE WINDOW IS EVEN					111C171J
•		ESTABLISH LENGTH OF TIME BETWEEN FIRST AND SUBSEQUENT					111C172J
•		EVEN WINDOWS					111C173D
•	115	SAVEA	35+	P7	BOTH 116	112	111C174U
•		IS THERE TIME TO LAUNCH AT THIS WINDOW. IF NOT TRY NEXT WINDOW.					111C175J
•	116	COMPARE	V14	GE	K0	117	111C176U
•		THERE IS TIME TO LAUNCH					111C177J
•		ESTABLISH LENGTH OF HOLD TO BEGINNING OF FINAL COUNTDOWN					111C178J
•	117	SAVEA	10	V14	110		111C179J
•		-----					111C180U

[illegible]

71	QUEUE	3	
72	ENTER	3	
73	HELP	K3	K1900 K2000
74	ADVANCE		
75	LEAVE	3	

1111A6370
1111A6380
1111A6390
1111C1913
1111A6410
1111A6420
1111A6430
1111A6440
1111A6450
1111A6460
1111A6470
1111A6480
1111A6490
1111A6500
1111A6510
1111A6520
1111A6530
1111A6540
1111A6550

MAX
K2750 A10
FBI

10-1-1

K2100 410
1 FNI

176 ENTER	4	K1		177	111A6550
177 HELP	K5	K1	C1	178	111A6560
178 TABULATE	3			179	111A6570
179 TABULATE	1			260	111A6580
-----					111A6590
-----					111A6600
-----					111A6610
-----					111A6620
-----					111A6630
-----					111A6640
-----					111A6650
-----					111A6660
-----					111A6670
180 ENTER	14			181	111A6680
181 SAVEX	10	P3		182	111A6690
182 ASSIGN	1+	FNI		183	111A6700
183 ADVANCE			1	184	111A6710
184 LEAVE	14			185	111A6720
-----					111A6730
-----					111A6740
-----					111A6750
-----					111A6760
-----					111A6770
-----					111A6780
-----					111A6790
-----					111A6800
-----					111A6810
-----					111A6820
-----					111A6830
-----					111A6840
-----					111C1914
188 HELP	K3	K900	K1000	189	111A6860
189 ADVANCE				190	111A6870
190 LEAVE	10			191	111A6880
-----					111A6890
-----					111A6900
-----					111A6910
-----					111A6920
-----					111A6930
-----					111A6940
-----					111A6950
191 HELP	K3	K50	K100	192	111A6960
192 ADVANCE				193	111A6970
-----					111A6980
-----					111A6990
-----					111A7000
-----					111A7010
-----					111A7020
-----					111A7030
-----					111A7040
-----					111A7050
-----					111C1915
-----					111A7070
-----					111A7090

ROCKET STORAGE WHEN WAITING FOR ORBITER ON LAUNCH REQUIREMENT

ORBITER BOOST INTO ORBIT, PERFORM MISSION AND RETURN

PARAMETER 8 COLLECTS THE TIME FROM LANDING UNTIL ENTRY INTO STORAGE

ORBITER SAFING

TRANSPORT ORBITER TO MAINTENANCE

ORBITER MAINTENANCE

• ORBITER ADDITIONAL MAINTENANCE					IDST
• EXPONENTIAL	MIN	MEAN			111A7100
197 HELP	K8	K500	K1000	198	111A7110
198 ADVANCE				199	111C1916
199 LEAVE	11			200	111A7130
					111A7140
					111A7150
					111A7160
					111A7170
					111A7180
• TRANSPORT ORBITER TO SYSTEMS TEST, TEST, TRANSPORT TO STORAGE					111A7190
• ORBITER VEHICLE SYSTEM TEST FACILITY					111A7200
200 QUEUE	12			201	111A7210
201 ENTER	12			202	111A7220
202 HELP	K3	K1900	K2000	203	111A7230
203 ADVANCE				204	111A7240
204 LEAVE	12			205	111A7250
					111A7260
• ORBITER STORAGE WHEN WAITING FOR BOOSTER OR LAUNCH REQUIREMENT					111A7270
205 ENTER	13	K1		206	111A7280
206 HELP	K5	K2	C1	207	111A7290
207 TABULATE	21			208	111A7300
208 TABULATE	23			209	111A7310
209 TERMINATE					111A7320
					111A7330
					111A7340
					111A7350
					111A7360
					111A7370
					111A7380
• VEHICLE REMOVAL PATH					111C1920
ONLY VEHICLES WHICH ARE TO BE REMOVED FROM THE PAD FLOW					111C1930
THROUGH THIS SECTION.					111C1940
					111C1950
					111C1960
• REMOVE BOOSTER, ORBITER AND LUT FROM THE PAD					111C1970
210 ENTER	25			211	111C1980
TRIANGULAR		MIN	MODE		111C1990
211 HELP	K3	K1800	K2000	212	111C2000
212 ADVANCE				213	111C2010
213 LEAVE	25			214	111C2020
214 RELEASE	*9			215	111C2030
					111C2040
					111C2050
					111C2060
					111C2070
					111C2080
• TRANSPORT VEHICLE, SEPARATE ORBITER, TRANSPORT ORBITER TO MAINT					111C2090
215 ENTER	30			216	111C2100
TRIANGULAR		MIN	MODE		111C2110
216 HELP	K3	K550	K750	217	111C2120
217 ADVANCE				218	111C2130
218 LEAVE	30			219	111C2140
					111C2150
					111C2160
					111C2170
					111C2180

	NIN	NOM	MAX	
244	HELP	K3	K1900 K2000	245
245	ADVANCE			246
246	LEAVE	12		247
247	ENTER	13		248
248	HELP	K5	K2 C1	249
249	TERMINATE			

250	SAVEX	5+	K1	BOTH 251 255
251	GATE	SE4		BOTH 252 254
252	GATE	SE13		253

• NO BOOSTER OR ORBITER AVAILABLE				
253	SAVEX	2+	K1	260

• NO BOOSTER AVAILABLE				
254	SAVEX	3+	K1	260

• EITHER NO ORBITER OR NO LUT OR BOTH				
255	SAVEX	7+	K1	BOTH 256 258
256	GATE	SE13		257

• NO ORBITER AVAILABLE				
257	SAVEX	4+	K1	260

• NO LUT AVAILABLE WHEN HARDWARE IS AVAILABLE				
258	SAVEX	8+	K1	260

• COUNT NUMBER OF MISSED LAUNCHES PAO(S) UNAVAILABLE				
259	SAVEX	25+	K1	260
260	COMPARE	N271 LE	V10	BOTH 261 271
261	COMPARE	V10 E	N271	262

• PRINT OUT SUMMARY TABLE				
262	HELP	K10		263
263	HELP	K10	TB21	264
264	HELP	K10	QX1	265
265	HELP	K10	QX3	266
266	HELP	K10	QX21	267
267	HELP	K10	SR10	268
268	HELP	K10	SR3	269
269	HELP	K10	SR20	270
270	HELP	K10	FR1	271

271 TERMINATE * 11A8330

TABLE DEFINITIONS

1 - TIME FROM LANDING TO STORAGE ENTRY (BOOSTER)

2 - STORAGE TIME (BOOSTER)

3 - GROUND PROCESSING TIME (BOOSTER)

4 - FLOATING HOLD TIME BETWEEN COMPLETION OF ALL PRECOUNTDOWN OPERATIONS AND THE INITIATION OF FINAL COUNTDOWN FOR THE FIRST WINDOW

5 - FLOATING HOLD TIME BETWEEN COMPLETION OF ALL PRECOUNTDOWN OPERATIONS AND THE INITIATION OF FINAL COUNTDOWN FOR ALL WINDOWS SUBSEQUENT TO THE FIRST

6 - THE AMOUNT OF TIME A SUCCESSFUL REQUEST SPENT WAITING FOR VEHICLE ELEMENTS.

7 - THE AMOUNT OF TIME LEFT TO THE FIRST LAUNCH WINDOW • NEGATIVE VALUES IN THE TABLE INDICATE THE AMOUNT OF TIME PAST THE WINDOW THE PROGRAM IS AT.

8 - AMOUNT OF TIME AFTER PRIMARY WINDOW LAUNCH OCCURRED AT

9 - INDICATES THE NUMBER OF LAUNCHES AT EACH WINDOW

10 - ELAPSED TIME OF VEHICLE ELEMENTS FROM THEIR STORAGE EXIT TO THEIR LIFTOFF

11 -

12 -

13 -

14 -

15 -

16 -

17 -

18 -

19 -

20 -

21 - TIME FROM LANDING TO STORAGE ENTRY (ORBITER)

22 - STORAGE TIME (ORBITER)

23 - GROUND PROCESSING TIME (ORBITER)

1 TABLE MP8 5000 500 20

2 TABLE X10 000 500 30

3 TABLE V1 9000 500 30

4 TABLE X10 000 100 30

5 TABLE X10 000 100 30

6 TABLE M1 000 100 70

7 TABLE X10 -5000 100 55

8 TABLE X35 000 100 50

9 TABLE X27 000 1 15

10 TABLE MP11 0000 500 30

11

12

13

14

15

16

17

18

19

•20						111C264J
•21	TABLE	MPR	5000	500	20	111A839J
•22	TABLE	X10	600	500	33	111A840J
•23	TABLE	V7	9000	500	33	111A841C
•	-----					111B1940
•						111B1950
•		NUMBER OF SIMULATIONS TO BE PERFORMED				111B1960
•						111B1970
•	NOTE- SEE VARIABLE 10					111B1980
•	-----					111B1990
	START		76			

TABLE II. SUMMARY RESULTS

CASE STUDY: * GPSS 2 TEST WITH 75 TRANSACTIONS FOR GPSS 1100 COMPARISON

INITIAL CONDITIONS:

	BOOSTER	ORBITER
NUMBER OF VEHICLE STAGES	4	5
SERVICE CAPACITY OF SAFING AREA	1	1
SERVICE CAPACITY OF MAINTENANCE FACILITY	2	2
SERVICE CAPACITY OF CHECKOUT & TEST FACILITY	2	2
SERVICE CAPACITY OF MATE & HOOK-UP FACILITY	1	1
SERVICE CAPACITY OF LUT REFURBISHMENT FACILITY	2	2
NUMBER OF LUTS-	4	
NUMBER OF LAUNCH PADS-	2	

TRAFFIC MODEL STATISTICS:

MISSION MODEL LAUNCH RATE (FLIGHTS/YEAR)-	76
DISTRIBUTION OF TIME BETWEEN LAUNCH REQUESTS-	
19.8% OF LAUNCHES ARE SCHEDULED 1 DAY APART	
32.1% OF LAUNCHES ARE SCHEDULED 2 DAYS APART	
29.6% OF LAUNCHES ARE SCHEDULED 3 DAYS TO 1 WEEK APART	
18.5% OF LAUNCHES ARE SCHEDULED 1 WEEK TO 2 WEEKS APART	
.0% OF LAUNCHES ARE SCHEDULED 2 WEEKS TO 1 MONTH APART	

OPERATIONAL EVALUATION PARAMETERS FOR 79 SIMULATIONS:

THE NUMBER OF SUCCESSFUL LAUNCH REQUESTS ARE	73 OR 92.4 PERCENT
THE NUMBER OF UNSUCCESSFUL REQUESTS ARE	6 OR 7.6 PERCENT
THE NUMBER OF VEHICLES LAUNCHES AT A SUBSEQUENT WINDOW IS	5 OR 0.8PERCENT
REASONS FOR REQUEST FAILURES-	
BOOSTER UNAVAILABILITY	1 TIMES OR 1.3 PERCENT
ORBITER UNAVAILABILITY	3 TIMES OR 3.8 PERCENT
BOTH STAGES UNAVAILABLE	0 TIMES OR .0 PERCENT
LUT UNAVAILABILITY	0 TIMES OR .0 PERCENT
PAD UNAVAILABILITY	1 TIMES OR 1.3 PERCENT
FAILURES AND REMOVAL FROM PAD	1 TIMES OR 1.3 PERCENT

AVERAGE PHASE TIMES PER VEHICLE ELEMENT:

	BOOSTER	ORBITER
LANDING TO STORAGE(DAYS)	5.83	5.88
STORAGE(DAYS)	3.18	3.41
LEAVE STORAGE TO LAUNCH(DAYS)	5.30	5.30
MEAN ON-ORBIT MISSION TIME(DAYS)		3.53
TURNAROUND- LAUNCH TO LAUNCH(DAYS)	14.32	18.12

WAITING STATISTICS:	BOOSTER	ORBITER
PERCENT OF VEHICLES DELAYED FOR SAFING	.00	6.94
AVERAGE QUEUE TIME FOR SAFING(DAYS)	.00	.56
PERCENT OF VEHICLES DELAYED FOR MAINT.	.00	1.41
AVERAGE QUEUE TIME FOR MAINTENANCE(DAYS)	.00	1.14
PERCENT OF VEHICLES DELAYED FOR CHECKOUT&TEST	.00	.00
AVERAGE QUEUE TIME FOR CHECKOUT & TEST(DAYS)	.00	.00
PERCENT OF VEHICLES DELAYED FOR M & H	12.00	
AVERAGE QUEUE TIME FOR MATE & HOOKUP(DAYS)	.36	
PERCENT OF LOTS DELAYED FOR REFURBISHMENT	.00	
AVERAGE QUEUE TIME FOR LUT REFURBISH FACILITY	.00	
PERCENT OF VEHICLES DELAYED FOR PAD ACCESS	6.67	
AVERAGE QUEUE TIME FOR PAD(DAYS)	.61	

FACILITY UTILIZATION:	BOOSTER	ORBITER
SAFING AREA(PERCENT)	27.20	26.40
MAINTENANCE(PERCENT)	37.80	37.50
CHECKOUT & TEST(PERCENT)	26.80	26.40
MATE & HOOK-UP(PERCENT)	55.70	
LUT REFURBISHMENT(PERCENT)	40.90	
PAD UTILIZATION:		
LAUNCH PAD 1 (PERCENT)	74.10	
LAUNCH PAD 2 (PERCENT)	57.10	

***** GPSS 2 TEST WITH 75 TRANSACTIONS FOR GPSS 1100 COMPARISON *****

THE FLEET SIZE IS 4 BOOSTERS & 5 ORBITERS
 RANDOM NUMBER SEED FOR TRAFFIC MODEL SIMULATOR = 3154267131
 RANDOM NUMBER SEED FOR DISTRIBUTION FUNCTIONS = 4339968911

CLOCK TIME REL 267793 ABS 267793

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

216	0.	1	217	0.	1	218	0.	1	219	0.	1	220	0.	1
221	0.	1	222	0.	1	223	0.	1	224	0.	1	225	0.	1
226	0.	1	227	0.	1	228	0.	1	229	0.	1	230	0.	1
231	0.	1	232	0.	1	233	0.	1	234	0.	1	235	0.	1
236	0.	1	237	0.	1	238	0.	1	239	0.	1	240	0.	1
241	0.	1	242	0.	1	243	0.	1	244	0.	1	245	0.	1
246	0.	1	247	0.	1	248	0.	1	249	0.	1	250	0.	4
251	0.	1	252	0.	1	253	0.	1	254	0.	1	255	0.	3
256	0.	3	257	0.	3	258	0.	0	259	0.	1	260	0.	76
261	0.	1	262	0.	1	263	0.	1	264	0.	1	265	0.	1
266	0.	1	267	0.	1	268	0.	1	269	0.	1	270	0.	1
271	0.	76	272	0.	0	273	0.	0	274	0.	0	275	0.	0
296	0.	0	297	0.	0	298	0.	0	299	0.	0	300	0.	72
301	0.	70	302	0.	0	303	0.	0	304	0.	0	305	0.	0

SAVE	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1	75	2	0	3	1	4	3	5	4					
6	80	7	3	8	0	9	0	10	1999					
11	2969	12	1	13	3177	14	0	15	347					
16	2969	17	1	18	3177	19	0	20	347					
21	269542	22	1	23	0	24	0	25	1					
26	5	27	1	28	68	29	0	30	73					

FACILITY	AVERAGE	NUMBER	TRANS	TRANS	TRANS	TRANS	TRANS	TRANS	TRANS	TRANS	TRANS	TRANS	TRANS	TRANS
NR	UTILIZATION	ENTRIES	ENTRIES	ENTRIES	ENTRIES	ENTRIES	ENTRIES	ENTRIES	ENTRIES	ENTRIES	ENTRIES	ENTRIES	ENTRIES	ENTRIES
1	7414	42	4727.50	4727.50	4727.50	4727.50	4727.50	4727.50	4727.50	4727.50	4727.50	4727.50	4727.50	4727.50
2	5720	33	4641.73	4641.73	4641.73	4641.73	4641.73	4641.73	4641.73	4641.73	4641.73	4641.73	4641.73	4641.73

STORAGE	MAXIMUM	CAPACITY	AVERAGE	AVERAGE	AVERAGE	AVERAGE	AVERAGE	AVERAGE	AVERAGE	AVERAGE	AVERAGE	AVERAGE	AVERAGE	AVERAGE
NR	CONTENTS	CONTENTS	CONTENTS	CONTENTS	CONTENTS	CONTENTS	CONTENTS	CONTENTS	CONTENTS	CONTENTS	CONTENTS	CONTENTS	CONTENTS	CONTENTS
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11	2	2	2	2	2	2	2	2	2	2	2	2	2	2
12	2	2	2	2	2	2	2	2	2	2	2	2	2	2
13	5	5	5	5	5	5	5	5	5	5	5	5	5	5
14	3	3	3	3	3	3	3	3	3	3	3	3	3	3
16	4	4	4	4	4	4	4	4	4	4	4	4	4	4
17	2	2	2	2	2	2	2	2	2	2	2	2	2	2
18	2	2	2	2	2	2	2	2	2	2	2	2	2	2
19	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22	2	2	2	2	2	2	2	2	2	2	2	2	2	2
23	1	1	1	1	1	1	1	1	1	1	1	1	1	1
25	1	1	1	1	1	1	1	1	1	1	1	1	1	1
27	1	1	1	1	1	1	1	1	1	1	1	1	1	1
28	1	1	1	1	1	1	1	1	1	1	1	1	1	1
29	1	1	1	1	1	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1	1	1	1	1	1
31	1	1	1	1	1	1	1	1	1	1	1	1	1	1

2	1	.03	73	73	100.00	.00	.00	0
3	1	.00	73	73	100.00	.00	.00	0
10	1	.01	72	67	93.06	39.04	562.20	1
11	1	.00	71	70	98.59	16.04	1139.00	0
12	1	.00	71	71	100.00	.00	.00	0
16	1	.00	73	73	100.00	.00	.00	0
20	1	.01	75	66	88.00	43.17	359.78	0
21	1	.01	75	70	93.33	40.92	613.80	0
29	1	.00	80	80	100.00	.00	.00	0
31	1	.00	80	80	100.00	.00	.00	0

TABLE NUMBER 1

ENTRIES IN TABLE

70

MEAN ARGUMENT

5832.343

STANDARD DEVIATION

507.509

NON-WEIGHTED

UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLY OF MEAN	DEVIATION FROM MEAN
5000	0	.00	.0	100.0	.857	-1.640
5500	12	17.14	17.1	82.9	.943	-.655
6000	44	62.86	80.0	20.0	1.029	.330
6500	6	8.57	88.6	11.4	1.114	1.316
7000	5	7.14	95.7	4.3	1.200	2.301
7500	2	2.86	98.6	1.4	1.284	3.286
8000	1	1.43	100.0	.0	1.372	4.271

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NUMBER 2

ENTRIES IN TABLE

75

MEAN ARGUMENT

3182.000

STANDARD DEVIATION

2278.549

NON-WEIGHTED

UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLY OF MEAN	DEVIATION FROM MEAN
0	6	8.00	8.0	92.0	.000	-1.397
500	4	5.33	13.3	86.7	.157	-1.177
1000	8	10.67	24.0	74.0	.314	-.958
1500	6	8.00	32.0	68.0	.471	-.738
2000	3	4.00	36.0	64.0	.628	-.519
2500	4	5.33	41.3	58.7	.784	-.300
3000	5	6.67	48.0	52.0	.943	-.080
3500	9	12.00	60.0	40.0	1.100	.139
4000	5	6.67	66.7	33.3	1.257	.359
4500	4	5.33	72.0	28.0	1.414	.578
5000	4	5.33	77.3	22.7	1.571	.798
5500	6	8.00	85.3	14.7	1.728	1.017
6000	2	2.67	88.0	12.0	1.885	1.236
6500	2	2.67	90.7	9.3	2.042	1.456
7000	2	2.67	93.3	6.7	2.199	1.675
7500	2	2.67	96.0	4.0	2.357	1.895
8000	1	1.33	97.3	2.7	2.514	2.114
8500	1	1.33	98.7	1.3	2.671	2.334

9000 0 00 98.7 1.3 2.828 2.553
 9500 0 00 98.7 1.3 2.985 2.773
 10000 1 1.33 100.0 0 3.142 2.992
 REMAINING FREQUENCIES ARE ALL ZERO

TABLE NUMBER 3

ENTRIES IN TABLE		MEAN ARGUMENT		STANDARD DEVIATION		NON-WEIGHTED	
70		14295.957		2279.746			
UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN	
9000	0	.00	.0	100.0	.630	-2.323	
9500	0	.00	.0	100.0	.665	-2.104	
10000	0	.00	.0	100.0	.699	-1.884	
10500	1	1.43	1.4	98.6	.734	-1.665	
11000	4	5.71	7.1	92.9	.769	-1.446	
11500	3	4.29	11.4	88.6	.804	-1.226	
12000	4	5.71	17.1	82.9	.839	-1.007	
12500	4	5.71	22.9	77.1	.874	-.788	
13000	5	7.14	30.0	70.0	.909	-.568	
13500	7	10.00	40.0	60.0	.944	-.349	
14000	6	8.57	48.6	51.4	.979	-.130	
14500	6	8.57	57.1	42.9	1.014	.090	
15000	6	8.57	65.7	34.3	1.049	.309	
15500	6	8.57	74.3	25.7	1.084	.528	
16000	1	1.43	75.7	24.3	1.119	.747	
16500	5	7.14	82.9	17.1	1.154	.967	
17000	1	1.43	84.3	15.7	1.189	1.186	
17500	3	4.29	88.6	11.4	1.224	1.405	
18000	5	7.14	95.7	4.3	1.259	1.625	
18500	0	.00	95.7	4.3	1.294	1.844	
19000	1	1.43	97.1	2.9	1.329	2.063	
19500	1	1.43	98.6	1.4	1.364	2.283	
20000	0	.00	98.6	1.4	1.399	2.502	
20500	0	.00	98.6	1.4	1.434	2.721	
21000	1	1.43	100.0	.0	1.469	2.941	

REMAINING FREQUENCIES ARE ALL ZERO

A-28

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NUMBER 4

ENTRIES IN TABLE		MEAN ARGUMENT		STANDARD DEVIATION		NON-WEIGHTED	
69		682.594		269.853			
UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN	
0	0	.00	.0	100.0	.000	-2.530	
100	2	2.90	2.9	97.1	.144	-2.159	
200	4	5.80	8.7	91.3	.293	-1.788	
300	3	4.35	13.0	87.0	.439	-1.418	
400	2	2.90	15.9	84.1	.584	-1.047	
500	2	2.90	18.8	81.2	.732	-.677	

UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN
600	9	13.04	31.9	68.1	.879	-.306
700	12	17.39	49.3	50.7	1.025	.065
800	13	18.84	68.1	31.9	1.172	.435
900	8	11.59	79.7	20.3	1.318	.806
1000	6	8.70	88.4	11.6	1.465	1.176
1100	5	7.25	95.7	4.3	1.611	1.547
1200	3	4.35	100.0	.0	1.758	1.917

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NUMBER 5

ENTRIES IN TABLE		MEAN ARGUMENT	STANDARD DEVIATION		NON-WEIGHTED	
5		315.000	212.024			
UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN
0	0	.00	.0	100.0	.000	-1.486
100	1	20.00	20.0	80.0	.317	-1.014
200	1	20.00	40.0	60.0	.635	-.542
300	0	.00	40.0	60.0	.952	-.071
400	1	20.00	60.0	40.0	1.270	.401
500	1	20.00	80.0	20.0	1.587	.873
600	1	20.00	100.0	.0	1.905	1.344

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NUMBER 6

ENTRIES IN TABLE		MEAN ARGUMENT	STANDARD DEVIATION		NON-WEIGHTED	
75		67.267	224.322			
UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN
0	66	88.00	88.0	12.0	.000	-.300
100	1	1.33	89.3	10.7	1.487	.146
200	0	.00	89.3	10.7	2.973	.592
300	2	2.67	92.0	8.0	4.460	1.037
400	1	1.33	93.3	6.7	5.944	1.483
500	2	2.67	96.0	4.0	7.433	1.929
600	0	.00	96.0	4.0	8.920	2.375
700	0	.00	96.0	4.0	10.404	2.821
800	0	.00	96.0	4.0	11.893	3.266
900	0	.00	96.0	4.0	13.380	3.712
1000	0	.00	96.0	4.0	14.864	4.158
1100	2	2.67	98.7	1.3	16.353	4.604
1200	1	1.33	100.0	.0	17.839	5.050

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NUMBER 7

ENTRIES IN TABLE		MEAN ARGUMENT	STANDARD DEVIATION	
------------------	--	---------------	--------------------	--

288.112

307.403

5

5

5

5

5

UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN
-5000	0	.00	.0	100.0	16.265	-16.287
-4900	0	.00	.0	100.0	15.940	-15.940
-4800	0	.00	.0	100.0	15.615	-15.593
-4700	0	.00	.0	100.0	15.290	-15.246
-4600	0	.00	.0	100.0	14.964	-14.899
-4500	0	.00	.0	100.0	14.639	-14.552
-4400	0	.00	.0	100.0	14.314	-14.205
-4300	0	.00	.0	100.0	13.988	-13.858
-4200	0	.00	.0	100.0	13.663	-13.511
-4100	0	.00	.0	100.0	13.338	-13.164
-4000	0	.00	.0	100.0	13.012	-12.817
-3900	0	.00	.0	100.0	12.687	-12.469
-3800	0	.00	.0	100.0	12.362	-12.122
-3700	0	.00	.0	100.0	12.036	-11.775
-3600	0	.00	.0	100.0	11.711	-11.428
-3500	0	.00	.0	100.0	11.386	-11.081
-3400	0	.00	.0	100.0	11.061	-10.734
-3300	0	.00	.0	100.0	10.735	-10.387
-3200	0	.00	.0	100.0	10.410	-10.040
-3100	0	.00	.0	100.0	10.085	-9.693
-3000	0	.00	.0	100.0	9.759	-9.346
-2900	0	.00	.0	100.0	9.434	-8.999
-2800	0	.00	.0	100.0	9.109	-8.651
-2700	0	.00	.0	100.0	8.783	-8.304
-2600	0	.00	.0	100.0	8.458	-7.957
-2500	0	.00	.0	100.0	8.133	-7.610
-2400	0	.00	.0	100.0	7.807	-7.263
-2300	0	.00	.0	100.0	7.482	-6.916
-2200	0	.00	.0	100.0	7.157	-6.569
-2100	0	.00	.0	100.0	6.831	-6.222
-2000	0	.00	.0	100.0	6.504	-5.875
-1900	0	.00	.0	100.0	6.181	-5.528
-1800	0	.00	.0	100.0	5.854	-5.181
-1700	0	.00	.0	100.0	5.530	-4.834
-1600	0	.00	.0	100.0	5.205	-4.486
-1500	0	.00	.0	100.0	4.880	-4.139
-1400	0	.00	.0	100.0	4.554	-3.792
-1300	0	.00	.0	100.0	4.229	-3.445
-1200	0	.00	.0	100.0	3.904	-3.098
-1100	0	.00	.0	100.0	3.578	-2.751
-1000	0	.00	.0	100.0	3.253	-2.404
-900	0	.00	.0	100.0	2.928	-2.057
-800	0	.00	.0	100.0	2.602	-1.710
-700	1	20.00	20.0	80.0	2.277	-1.363
-600	0	.00	20.0	80.0	1.952	-1.016
-500	0	.00	20.0	80.0	1.627	-.668
-400	1	20.00	40.0	60.0	1.301	-.321
-300	0	.00	40.0	60.0	.974	.026
-200	1	20.00	60.0	40.0	.651	.373
-100	1	20.00	80.0	20.0	.325	.720
0	0	.00	80.0	20.0	.000	1.067
100	1	20.00	100.0	.0	-.325	1.414

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NUMBER 8

ENTRIES IN TABLE		MEAN ARGUMENT		STANDARD DEVIATION		NON-WEIGHTED	
5		705.400		256.384			
UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN	
0	0	.00	.0	100.0	.000	-2.751	
100	0	.00	.0	100.0	.142	-2.361	
200	0	.00	.0	100.0	.284	-1.971	
300	0	.00	.0	100.0	.425	-1.581	
400	1	20.00	.0	80.0	.567	-1.191	
500	0	.00	20.0	80.0	.709	-.801	
600	2	40.00	60.0	40.0	.851	-.411	
700	0	.00	60.0	40.0	.992	-.021	
800	0	.00	60.0	40.0	1.134	.369	
900	0	.00	60.0	40.0	1.276	.759	
1000	2	40.00	100.0	.0	1.418	1.149	

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NUMBER 9

ENTRIES IN TABLE		MEAN ARGUMENT		STANDARD DEVIATION		NON-WEIGHTED	
73		1.068		.253			
UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN	
0	0	.00	.0	100.0	.000	-4.230	
1	68	93.15	93.2	6.8	.936	-.271	
2	5	6.85	100.0	.0	1.872	3.688	

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NUMBER 10

ENTRIES IN TABLE		MEAN ARGUMENT		STANDARD DEVIATION		NON-WEIGHTED	
73		5304.205		204.833			
UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN	
0	0	.00	.0	100.0	.000	-25.895	
500	0	.00	.0	100.0	.094	-23.454	
1000	0	.00	.0	100.0	.189	-21.013	
1500	0	.00	.0	100.0	.283	-18.572	
2000	0	.00	.0	100.0	.377	-16.131	
2500	0	.00	.0	100.0	.471	-13.690	
3000	0	.00	.0	100.0	.564	-11.249	
3500	0	.00	.0	100.0	.660	-8.808	
4000	0	.00	.0	100.0	.754	-6.367	

4500 1 1.37 98.6 .848 -3.926
5000 3 4.11 94.5 .943 -1.485
5500 67 91.78 2.7 1.037 .956
6000 1 1.37 98.6 1.4 3.397
6500 1 1.37 100.0 .0 5.838

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NUMBER 21

ENTRIES IN TABLE 70 MEAN ARGUMENT 5882.471 STANDARD DEVIATION 478.170 NON-WEIGHTED

UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN
5000	0	.00	.0	100.0	.850	-1.846
5500	12	17.14	17.1	82.9	.935	-.800
6000	36	51.43	68.6	31.4	1.020	.246
6500	11	15.71	84.3	15.7	1.105	1.291
7000	10	14.29	98.6	1.4	1.190	2.337
7500	1	1.43	100.0	.0	1.275	3.383

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NUMBER 22

ENTRIES IN TABLE 75 MEAN ARGUMENT 3407.763 STANDARD DEVIATION 2554.081 NON-WEIGHTED

UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN
0	5	6.67	6.7	93.3	.000	-1.334
500	3	4.00	10.7	89.3	.147	-1.138
1000	7	9.33	20.0	80.0	.293	-.943
1500	6	8.00	28.0	72.0	.440	-.747
2000	4	5.33	33.3	66.7	.587	-.551
2500	5	6.67	40.0	60.0	.734	-.355
3000	6	8.00	48.0	52.0	.880	-.160
3500	6	8.00	56.0	44.0	1.027	.036
4000	5	6.67	62.7	37.3	1.174	.232
4500	6	8.00	70.7	29.3	1.321	.428
5000	6	8.00	78.7	21.3	1.467	.623
5500	3	4.00	82.7	17.3	1.614	.819
6000	0	.00	82.7	17.3	1.761	1.015
6500	3	4.00	86.7	13.3	1.907	1.211
7000	5	6.67	93.3	6.7	2.054	1.406
7500	2	2.67	96.0	4.0	2.201	1.602
8000	0	.00	96.0	4.0	2.348	1.798
8500	0	.00	96.0	4.0	2.494	1.994
9000	0	.00	96.0	4.0	2.641	2.190
9500	0	.00	96.0	4.0	2.788	2.385
10000	1	1.33	97.3	2.7	2.934	2.581
10500	1	1.33	98.7	1.3	3.081	2.777
11000	0	.00	98.7	1.3	3.228	2.973

11500	0	.00	98.7	1.3	3.375	3.168
12000	0	.00	98.7	1.3	3.521	3.364
12500	1	1.33	100.0	.0	3.668	3.560

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NUMBER 23

ENTRIES IN TABLE		MEAN ARGUMENT		STANDARD DEVIATION		NON-WEIGHTED	
70		14474.614		2603.447			
UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN	
9500	0	.00	.0	100.0	.622	-2.103	
9500	0	.00	.0	100.0	.654	-1.911	
10000	0	.00	.0	100.0	.691	-1.719	
10500	1	1.43	1.4	98.6	.725	-1.527	
11000	1	1.43	2.9	97.1	.760	-1.335	
11500	6	8.57	11.4	88.6	.794	-1.143	
12000	5	7.14	18.6	81.4	.829	-.951	
12500	6	8.57	27.1	72.9	.864	-.758	
13000	6	8.57	35.7	64.3	.898	-.566	
13500	1	1.43	37.1	62.9	.933	-.374	
14000	6	8.57	45.7	54.3	.967	-.182	
14500	6	8.57	54.3	45.7	1.002	.010	
15000	6	8.57	62.9	37.1	1.034	.202	
15500	5	7.14	70.0	30.0	1.071	.394	
16000	4	5.71	75.7	24.3	1.105	.586	
16500	4	5.71	81.4	18.6	1.140	.778	
17000	2	2.86	84.3	15.7	1.174	.970	
17500	1	1.43	85.7	14.3	1.209	1.162	
18000	5	7.14	92.9	7.1	1.244	1.354	
18500	1	1.43	94.3	5.7	1.278	1.546	
19000	1	1.43	95.7	4.3	1.313	1.738	
19500	1	1.43	97.1	2.9	1.347	1.930	
20000	0	.00	97.1	2.9	1.382	2.122	
20500	0	.00	97.1	2.9	1.414	2.314	
21000	0	.00	97.1	2.9	1.451	2.506	
21500	0	.00	97.1	2.9	1.485	2.698	
22000	1	1.43	98.6	1.4	1.520	2.891	
22500	0	.00	98.6	1.4	1.554	3.083	
23000	0	.00	98.6	1.4	1.589	3.275	
OVERFLOW	1	1.43	100.0	.0			

A-33

FUTURE RANDOM NUMBER SEED IS (OCTAL) 251037614731

LOC	NAME	X	Y	Z	SEL	NBA	NBH	MEAN	MOD	REMARKS	F
-----	------	---	---	---	-----	-----	-----	------	-----	---------	---

NORMAL EXIT. EXECUTION TIME: 27987 MILLISECONDS.

WFIN

RUNID: GPSS2 ACCOUNT: 420223 PROJECT: MARSHLBIN225

TIME: 00:00:29.889 IN: 1152 OUT: 0 PAGES: 46

INITIATION TIME: 23:27:39-APR 7, 1972

TERMINATION TIME: 23:29:41-APR 7, 1972

420223*GPSSER*HELP

```

1  SUBROUTINE HELP(K1,K2,K3,K4,K5)
2  COMMON /HELP/PARAM(7,3),LL,ISEED,ISEED1,ISTORE(2,10),IS(2)
3  COMMON /HLPRT/NBOUS,NORBI,NLUTS,TITLE(20),NSEED,NSEED1
4  25 GO TO (1,2,3,4,5,6,7,8,9,10,11,12,13),K1
5  C
6  C*****GENERATE REQUIREMENTS FOR NEXT LAUNCH
7  C
8  1 CONTINUE
9  CALL MISSION(NP1,NP2,NP3,NP4,NP5,MODEL1)
10 K2=NP1
11 K3=NP2
12 K4=NP3
13 K5=NP5
14 RETURN
15 2 CONTINUE
16 C*****NOT USED*****
17 RETURN
18 C
19 C*****GENERATE DEVIATE FOR TRIANGULAR DISTRIBUTION
20 C
21 3 PARAM(1,1)=K2
22 PARAM(1,2)=K3
23 PARAM(1,3)=K4
24 K5=TRIANG(1)
25 RETURN
26 C
27 C*****GENERATE DEVIATE FOR NORMAL DISTRIBUTION
28 C
29 4 PARAM(1,1)=K2
30 PARAM(1,2)=K3
31 K4=RNORM(1)
32 K5=K4
33 RETURN
34 C
35 C*****STORE THE TIME THAT THE BOOSTER (K2=1) OR ORBITER (K2=2) WAS
36 C*****PUT IN STORAGE.
37 C
38 5 IS(K2)=IS(K2)+1
39 K=IS(K2)
40 ISTORE(K2,K)=K3
41 RETURN
42 C
43 C*****COMPUTE THE TIME THAT THE BOOSTER OR ORBITER WAS PUT IN STORAGE
44 C*****BASED ON FIRST-IN-FIRST-OUT.
45 6 K4=K3-ISTORE(K2,1)
46 IS(K2)=IS(K2)-1
47 K=IS(K2)
48 IF(K.EQ.0)RETURN
49 DO 20 I=1,K
50 20 ISTORE(K2,I)=ISTORE(K2,I+1)
51 RETURN
52 7 CONTINUE
53 C
54 C*****INITIALIZE MISSION SUBROUTINE AND PREPARE FOR NEW CASE
55 C

```

HELP 10
HELP 20

HELP 110
HELP 120
HELP 130
HELP 140

HELP 160
HELP 170
HELP 180

HELP 200
HELP 210

HELP 230
HELP 240
HELP 250

HELP 260
HELP 270
HELP 280

HELP 290
HELP 300
HELP 310

HELP 320
HELP 330
HELP 340

HELP 350
HELP 360
HELP 370

HELP 380
HELP 390
HELP 400

HELP 410
HELP 420
HELP 430

HELP 440
HELP 450
HELP 460

HELP 470
HELP 480
HELP 490

HELP 500
HELP 510
HELP 520

HELP 530
HELP 540
HELP 550

HELP 560
HELP 570
HELP 580

HELP 590
HELP 600
HELP 610

```

56      LL=0
57      C
58      C****READ CASE STUDY COMMENT CARD
59      C
60      READ(5,101)(TITLE(I),I=1,20)
61      101 FORMAT(20A4)
62      C
63      C****READ THE VERSION CODE OF THE TRAFFIC MODEL TO BE SIMULATED
64      C****READ IN THE NUMBER OF BOOSTERS, ORBITERS & LUTS
65      C****READ IN THE RANDOM NUMBER SEED FOR MISSION MODEL PROGRAM(ISEED)
66      C****READ IN THE RANDOM NUMBER SEED FOR DISTRIBUTION GENERATORS(ISEED)
67      C
68      READ(5,103)MODEL,NBOUS,NORBI,NLUTS, ISEED,ISEED1
69      103 FORMAT(I1,I4,2I5,45X,2I10)
70      IS(1)=NBOUS
71      IS(2)=NORBI
72      K2=NBOUS
73      K3=NORBI
74      K4=NLUTS
75      NSEED=ISEED
76      NSEED1=ISEED1
77      RETURN
78      8 CONTINUE
79      C
80      C****GENERATE DEViate FOR A TWO PARAMETER EXPONENTIAL DISTRIBUTION
81      C
82      PARAM(1,1)=K2
83      NBETA=K3-K2
84      PARAM(1,2)=NBETA
85      K5=EXP0(1)
86      RETURN
87      9 CONTINUE
88      C
89      C****GENERATE DEViate FOR THE LOG NORMAL DISTRIBUTION
90      C
91      F2=FLOAT(K2)/1000.
92      F3=FLOAT(K3)/1000.
93      PARAM(1,2)=SQRT(ALOG(F3**2/F2**2+1.))
94      PARAM(1,1)=ALOG(F2)-.5*(PARAM(1,2))**2
95      K5=RLONGN(1)*1000
96      RETURN
97      10 CONTINUE
98      C
99      C****PRINT OUT OF SUMMARY TABLE
100      C
101      NCALL=NCALL+1
102      CALL PRINT(NCALL,K2,K3,K4,K5)
103      RETURN
104      11 CONTINUE
105      C
106      C****THIS FUNCTION PERMITS THE ADVANCE BLOCK TO BE INCREMENTED BY A
107      C****CONSTANT
108      C****TRANSFER THE VALUE OF ARGUMENT K2 TO ARGUMENT K5
109      C
110      C      GPSS OUTPUT CAN BE OBTAINED FROM EITHER THE K4 OR K5 FIELDS.
111      K5=K2

```

HELP 620
 HELP 650
 HELP 670
 HELP 700
 HELP 710
 HELP 720
 HELP 740
 HELP 770
 HELP 780
 HELP 790
 HELP 800
 HELP 810
 HELP 820
 HELP 830
 HELP 840
 HELP 850
 HELP 860
 HELP 880
 HELP 890
 HELP 900
 HELP 910
 HELP 920
 HELP 930
 HELP 940
 HELP 950
 HELP 960
 HELP 970
 HELP 980
 HELP 990
 HELP1000
 HELP1010
 HELP1020
 HELP1030
 HELP1040
 HELP1060

```

112      K4=K2
113      RETURN
114      12 CONTINUE
115      C
116      C*****GENERATE DEViate FOR UNIFORM DISTRIBUTION
117      C
118      A = K2
119      B = K3
120      C      GPSS OUTPUT CAN BE OBTAINED FROM EITHER THE K4 OR K5 FIELDS
121      K4 = UNFRM1(A,B)
122      K5=K4
123      RETURN
124      13 CONTINUE
125      C
126      C*****GENERATE DEViate FOR BETA DISTRIBUTION
127      C
128      PARAM(1,1) = K3
129      PARAM(1,2) = K2
130      PARAM(1,3) = K4
131      CALL PERTXF(1,SMEAN,SVAR)
132      K5 = BETADP(1,SMEAN,SVAR)
133      RETURN
134      END

```

HELP1070

GPRT GPSS8.PRINT

```

SUBROUTINE PRINT(NCALL,K2,K3,K4,K5)
1
2 C
3 C.....THIS ROUTINE PRINTS OUT THE SUMMARY RESULTS TABLE.....
4 C
5 REAL MAHUF,LUTREF
6 INTEGER P
7 INTEGER GLOB
8 COMMON /HLPRT/NBOOS,NORBI,NLUTS,TITLE(20),NSEED,NSEED1
9 COMMON /MISPT/NETA1,NETA2,NETA3,NETA4,NETA5
10 COMMON/EQ2/JF2(1)
11 COMMON/STOR1/JS1(1)
12 COMMON/STOR2/JS2(1)
13 COMMON/QUES/JQ5(1)
14 COMMON/QUE6/JQ6(1)
15 COMMON/EKSES/JEKS(1)
16 P=6
17 GO TO (10,20,30,40,50,60,70,80,90),NCALL
18
19 10 CONTINUE
20 WRITE(P,100)
21 100 FORMAT(1H1,30X,'**TABLE 11: SUMMARY RESULTS**')
22 WRITE(P,102)TITLE(1),I=1,20)
23 102 FORMAT(//10X,'CASE STUDY: ',20A4)
24 WRITE(P,103)
25 103 FORMAT(//10X,'INITIAL CONDITIONS:',T60,'BOOSTER',T70,'ORBITER',)
26 WRITE(P,104)NBOOS,NORBI
27 104 FORMAT(15X,'NUMBER OF VEHICLE STAGES ',T63,12,T73,12)
28 MSAB=MGTHIU(JS2(1))+MGTH2U(JS1(1))
29 MSAU=MGTHIU(JS2(10))+MGTH2U(JS1(10))
30 WRITE(P,170)MSAB,MSAU
31 170 FORMAT(15X,'SERVICE CAPACITY OF SAFING AREA',T63,12,T73,12)
32 MFB=MGTHIU(JS2(2))+MGTH2U(JS1(2))
33 MFO=MGTHIU(JS2(11))+MGTH2U(JS1(11))
34 WRITE(P,105)MFB,MFO
35 105 FORMAT(15X,'SERVICE CAPACITY OF MAINTENANCE FACILITY' ,T63,12,
36 1 T73,12)
37 MCOTB=MGTHIU(JS2(3))+MGTH2U(JS1(3))
38 MCOTO=MGTHIU(JS2(12))+MGTH2U(JS1(12))
39 WRITE(P,176)MCOTB,MCOTO
40 176 FORMAT(15X,'SERVICE CAPACITY OF CHECKOUT & TEST FACILITY' ,T63,
41 1 12,T73,12)
42 MHF=MGTHIU(JS2(20))+MGTH2U(JS1(20))
43 WRITE(P,171)MHF
44 171 FORMAT(15X,'SERVICE CAPACITY OF MATE & HOOK-UP FACILITY',T68,12)
45 LUTRF=MGTHIU(JS2(18))+MGTH2U(JS1(18))
46 WRITE(P,172)LUTRF
47 172 FORMAT(15X,'SERVICE CAPACITY OF LUT REFURBISHMENT FACILITY',T68,
48 1 12)
49 WRITE(P,173)NLUTS
50 173 FORMAT(15X,'NUMBER OF LUTS-',T40,12)
51 C.....
52 NPADS=1
53 IF(JF2(12).GT.0)NPADS=2
54 IF(JF2(3).GT.0)NPADS=3
55 13 WRITE(P,106)NPADS
56 106 FORMAT(15X,'NUMBER OF LAUNCH PAUS-',T40,12)

```

```

56 K2=JEKS(30)+JEKS(2)+JEKS(3)+JEKS(4)+JEKS(22)+JEKS(23)+JEKS(24)+
57 1 JEKS(25)+JEKS(8)
58 WRITE(P,174)
59 174 FORMAT(//10X,'TRAFFIC MODEL STATISTICS:')
60 NFR=260000./FLOAT(JEKS(21))*FLOAT(K2)
61 WRITE(P,157)NFR
62 157 FORMAT(15X,'MISSION MODEL LAUNCH RATE (FLIGHTS/YEAR)=',16)
63 NLR=NELT1+NELT2+NELT3+NELT4+NELT5
64 PELT1=FLOAT(NELT1)*100/NLR
65 PELT2=FLOAT(NELT2)*100/NLR
66 PELT3=FLOAT(NELT3)*100/NLR
67 PELT4=FLOAT(NELT4)*100/NLR
68 PELT5=FLOAT(NELT5)*100/NLR
69 WRITE(P,158)PELT1,PELT2,PELT3,PELT4,PELT5
70 158 FORMAT(15X,'DISTRIBUTION OF TIME BETWEEN LAUNCH REQUESTS=',
71 16X,F5.1,'% OF LAUNCHES ARE SCHEDULED 1 DAY APART',
72 16X,F5.1,'% OF LAUNCHES ARE SCHEDULED 2 DAYS APART',
73 16X,F5.1,'% OF LAUNCHES ARE SCHEDULED 3 DAYS TO 1 WEEK APART',
74 16X,F5.1,'% OF LAUNCHES ARE SCHEDULED 1 WEEK TO 2 WEEKS APART',
75 16X,F5.1,'% OF LAUNCHES ARE SCHEDULED 2 WEEKS TO 1 MONTH APART')
76 WRITE(P,107)K2
77 107 FORMAT(//10X,'OPERATIONAL EVALUATION PARAMETERS FOR ',14,' SIMULA
78 TIONS:')
79 PLR=FLOAT(JEKS(30))*100./K2
80 WRITE(P,152)JEKS(30),PLR
81 152 FORMAT(15X,'THE NUMBER OF SUCCESSFUL LAUNCH REQUESTS ARE',14,
82 1,' OR',F5.1,' PERCENT')
83 NMLR=K2-JEKS(30)
84 PNMLR=FLOAT(NMLR)*100./K2
85 WRITE(P,108)NMLR,PNMLR
86 108 FORMAT(15X,'THE NUMBER OF UNSUCCESSFUL REQUESTS ARE',14,
87 1,' OR',F5.1,' PERCENT')
88 GLOBP=(FLOAT(JEKS(26))/FLOAT(JEKS(30)))*100.
89 GLOB=JEKS(26)
90 WRITE(P,373)GLOB,GLOBP
91 373 FORMAT(15X,'THE NUMBER OF VEHICLES LAUNCHES AT A SUBSEQUENT WINDOW
92 1 IS',13,' OR',F5.1,' PERCENT')
93 WRITE(P,596)
94 596 FORMAT(
95 16X,'REASONS FOR REQUEST FAILURES=')
96 NBUNA=JEKS(3)
97 PBUNA=FLOAT(NBUNA)*100./K2
98 WRITE(P,109)NBUNA,PBUNA
99 109 FORMAT(17X,'BOOSTER UNAVAILABILITY',T50.14,' TIMES OR',F5.1,' PERC
100 ENT')
100 NBUNA=JEKS(4)
101 POBUNA=FLOAT(NOBUNA)*100./K2
102 WRITE(P,110)NOBUNA,POBUNA
103 110 FORMAT(17X,'ORBITER UNAVAILABILITY',T50.14,' TIMES OR',F5.1,' PERC
104 ENT')
105 PUNA=FLOAT(JEKS(21))*100./K2
106 WRITE(P,156)JEKS(2),PUNA
107 156 FORMAT(17X,'BOTH STAGES UNAVAILABLE',T50.14,' TIMES OR',F5.1,' PE
108 RCENT')
109 LFAIL=JEKS(8)
110 PLFAIL=FLOAT(LFAIL)*100./K2
111 WRITE(P,175)LFAIL,PLFAIL

```

```

112 175 FORMAT(17X,'LUT UNAVAILABILITY',T50.14,' TIMES OR',F5.1,' PERCENT
113 1 ' )
114 NPUAU=JEKS(25)
115 PPUAU=FLOAT(NPUAU)*100./K2
116 WRITE(P,150)NPUAU,PPUAU
117 150 FORMAT(17X,'PAD UNAVAILABILITY',T50.14,' TIMES OR',F5.1,' PERCENT
118 1 ' )
119 NFAIL=JEKS(22)+JEKS(24)+JEKS(23)
120 PFAIL=FLOAT(NFAIL)*100./K2
121 WRITE(P,151)NFAIL,PFAIL
122 151 FORMAT(17X,'FAILURES AND REMOVAL FROM PAD',T50.14,' TIMES OR',
123 1 ,F5.1,' PERCENT' )
124 WRITE(P,111)
125 111 FORMAT(///10X,'AVERAGE PHASE TIMES PER VEHICLE ELEMENT:',T60,
126 1 ,BOOSTER',T70,'ORBITER')
127 TLSL=K4/1000.
128 TIMEIO=K5/1000.
129 RETURN
130 C .....
131 20 CONTINUE
132 TLT8=K2/1000.
133 TLT50=K3/1000.
134 WRITE(P,113)TLT8,TLT50
135 113 FORMAT(15X,'LANDING TO STORAGE(DAYS) ' ,T61,F5.2,T71,F5.2)
136 STOR8=K4/1000.
137 STOR5=K5/1000.
138 WRITE(P,114)STOR8,STOR5
139 114 FORMAT(15X,'STORAGE(DAYS) ' ,T61,F5.2,T71,F5.2)
140 WRITE(P,161)TLSTL,TLSTL
141 161 FORMAT(15X,'LEAVE STORAGE TO LAUNCH(DAYS)',T61,F5.2,T71,F5.2)
142 WRITE(P,160)TIMEIO
143 160 FORMAT(15X,'MEAN ON-ORBIT MISSION TIME(DAYS)',T71,F5.2)
144 TOTAL8=TLT8+STOR8+TLSTL
145 TOTAL5=TLT50+STOR5+TLSTL+TIMEIO
146 WRITE(P,112)TOTAL8,TOTAL5
147 112 FORMAT(15X,'TURNAROUND- LAUNCH TO LAUNCH(DAYS)',T61,F5.2,T71,F5.2)
148 RETURN
149 C .....
150 30 CONTINUE
151 WRITE(P,180)
152 180 FORMAT(1H1)
153 WRITE(P,115)
154 115 FORMAT(///10X,'WAITING STATISTICS:
155 1 T60,'BOOSTER',T70,'ORBITER')
156 SAF8 = K2/1000.
157 SAF5 = K3/1000.
158 PDES8 = FLOAT(JQ5(1)-JQ6(1))*100./JQ5(1)
159 PDES5 = FLOAT(JQ5(10)-JQ6(10))*100./JQ5(10)
160 WRITE(P,300)PDES8,PDES5,SAF8,SAF5
161 300 FORMAT(15X,'PERCENT OF VEHICLES DELAYED FOR SAFING',T62,F5.2,T72,F
162 15.2,'15X,'AVERAGE QUEUE TIME FOR SAFING(DAYS)',T62,F5.2,T72,F5.2 )
163 PQM8=FLOAT(JQ5(2)-JQ6(2))*100./JQ5(2)
164 PQM5=FLOAT(JQ5(11)-JQ6(11))*100./JQ5(11)
165 WRITE(P,154)PQM8,PQM5
166 154 FORMAT(15X,'PERCENT OF VEHICLES DELAYED FOR MAINT.',T64,F5.2,T72,
167 1 F5.2)

```

```

168 TMUB=K4/1000.
169 TMUO=K5/1000.
170 WRITE(P,116)TMQB,TMUO
171 116 FORMAT(15X,'AVERAGE QUEUE TIME FOR MAINTENANCE(DAYS)',T61,F5.2,T71
172 1,F5.2)
173 RETURN
174 C.....
175 40 CONTINUE
176 PCHEK8 = FLOAT(J05(3)-J06(3))*100./J05(3)
177 PCHEKO = FLOAT(J05(12)-J06(12))*100./J05(12)
178 CHECK8 = K2/1000.
179 CHECKO = K3/1000.
180 WRITE(P,330)PCHEK8,PCHEKO,CHECK8,CHECKO
181 330 FORMAT(
182 215X,'PERCENT OF VEHICLES DELAYED FOR CHECKOUT&TEST',T62,F5.2,T72,
183 3 F5.2,/15X,'AVERAGE QUEUE TIME FOR CHECKOUT & TEST(DAYS)',T62,F5.2
184 42,T72,F5.2)
185 C WRITE(P,117) DUMMY WRITE STATEMENT
186 C 117 FORMAT(15X,'AVERAGE QUEUE TIME FOR
187 C 1 F5.2)
188 MAHUF = K4/1000.
189 LUTREF = K5/1000.
190 PMAHU = FLOAT(J05(20)-J06(20))*100./J05(20)
191 PLUT = FLOAT(J05(18)-J06(18))*100./J05(18)
192 WRITE(P,301)PMAHU,MAHUF,PLUT,LUTREF
193 301 FORMAT(15X,'PERCENT OF VEHICLES DELAYED FOR M & H',T65,F5.2,/15X,
194 1 AVERAGE QUEUE TIME FOR MATE & HOOKUP(DAYS)',T45,F5.2,/15X,'PERCENT
195 2 OF LUTS DELAYED FOR REFURBISHMENT',T45,F5.2,/15X,'AVERAGE QUEUE T
196 3IME FOR LUT REFURBISH FACILITY',T45,F5.2)
197 RETURN
198 C.....
199 50 CONTINUE
200 PWP=FLOAT(J05(21)-J06(21))*100./J05(21)
201 WRITE(P,155)PWP
202 155 FORMAT(15X,'PERCENT OF VEHICLES DFLAYED FOR PAD ACCESS',T45,F5.2)
203 TWP=K2/1000.
204 WRITE(P,118)TWP
205 118 FORMAT(15X,'AVERAGE QUEUE TIME FOR PAD(DAYS)
206 RETURN
207 C.....
208 60 CONTINUE
209 SAUB=K2/10.
210 SAUO=K3/10.
211 WRITE(P,119)SAUB,SAUO
212 119 FORMAT(//10X,'FACILITY UTILIZATION:',T60,'BOOSTER',T70,'ORBITER',
213 1 /15X,'SAFING AREA(PERCENT)',T61,F5.2,T71,F5.2)
214 SMUB=K4/10.
215 SMUO=K5/10.
216 WRITE(P,120)SMUB,SMUO
217 120 FORMAT(15X,'MAINTENANCE(PERCENT)
218 RETURN
219 C.....
220 70 CONTINUE
221 COTUB=K2/10.
222 COTUO=K3/10.
223 WRITE(P,177)COTUB,COTUO

```

```

224      177 FORMAT(15X,'CHECKOUT & TEST(PERCENT)',T61,F5.2,T71,F5.2)
225      RETURN
226      C.....
227      80 CONTINUE
228      PMHU=K2/10.
229      WRITE(P,121)PMHU
230      121 FORMAT(15X,'MATE & HOOK-UP(PERCENT)',T45,F5.2)
231      PLRU=K3/10.
232      WRITE(P,122)PLRU
233      122 FORMAT(15X,'LUT REFURBISHMENT(PERCENT)',T45,F5.2)
234      RETURN
235      C.....
236      90 CONTINUE
237      PDUI=K2/10.
238      WRITE(P,123)PDUI
239      123 FORMAT(/10X,'PAD UTILIZATION:',//
240      1 15X,'LAUNCH PAD 1 (PERCENT)',T45,F5.2)
241      IF (NPADS-2) 61,62,62
242      62 PDUI=K3/10.
243      WRITE(P,124)PDUI
244      124 FORMAT(15X,'LAUNCH PAD 2 (PERCENT)',T45,F5.2)
245      IF (NPADS-3) 61,1003,1003
246      1003 PDUI=K4/10.
247      WRITE(P,1004) PDUI
248      1004 FORMAT (15X,'LAUNCH PAD 3 (PERCENT)',T45,F5.2)
249      61 CONTINUE
250      C.....WRITE OUT CASE STUDY COMMENT CARD
251      WRITE(P,199)(TITLE(I),I=1,20)
252      199 FORMAT(1H1,///'.....20A4,'.....')
253      WRITE(P,200)NB0US,NORB1
254      200 FORMAT(///10X,'THE FLEET SIZE IS',12,' BOOSTERS 6'12,' ORBITERS
255      1')
256      WRITE(P,201)NSEED1
257      201 FORMAT(10X,'RANDOM NUMBER SEED FOR TRAFFIC MODEL SIMULATOR = ',110
258      1 10X,'RANDOM NUMBER SEED FOR DISTRIBUTION FUNCTIONS = ',110)
259      RETURN
260      C.....
261      END

```

APPENDIX B. GPSS 1100 TRANSLATED PRINTOUT

B DATA, L DUMMYP, MODEL		
DATA PROCESSOR LEVEL	3	
000001	JOB	
000002	ORDER, F 200	
000003	ORDER, S 200	
000004	ORDER, L 500	
000005	ORDER, Q 200	
000006	ORDER, UC 20	
000007	ORDER, P P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14	
000008	ORDER, T 100	
000009	ORDER, X 500	
000010	ORDER, FN FN1, FN2, FN3, FN4, FN5, FN6, FN7, FN8, FN9, FN10, FN11, FN12, FN13, FN14,	
000011	+ FN15, FN16, FN17, FN18, FN19, FN20, FN21, FN22, FN23, FN24, FN25, FN26, FN27, FN28,	
000012	+ FN29, FN30, FN31, FN32, FN33, FN34, FN35, FN36, FN37, FN38, FN39, FN40, FN41, FN42,	
000013	+ FN43, FN44, FN45, FN46, FN47, FN48, FN49, FN50, FN51, FN52, FN53, FN54, FN55, FN56,	
000014	+ FN57, FN58, FN59, FN60, FN61, FN62, FN63, FN64, FN65, FN66, FN67, FN68, FN69, FN70,	
000015	+ FN71, FN72, FN73, FN74, FN75, FN76, FN77, FN78, FN79, FN80, FN81, FN82, FN83, FN84,	
000016	+ FN85, FN86, FN87, FN88, FN89, FN90, FN91, FN92, FN93, FN94, FN95, FN96, FN97, FN98,	
000017	+ FN99, FN100	
000018	ORDER, V 50	
000019		
000020		
000021		
000022	SHUTTLE OPERATIONS SIMULATION MODEL MSFC VERSION 111-C JAN. 7, 1972	111A 20
000023		111A 30
000024		111C 10
000025		111A 50
000026		111A 60
000027		111A 70
000028		111A 80
000029		111A 90
000030		111A 100
000031		111A 110
000032		111B 10
000033		111A 120
000034		111A 130
000035		111A 140
000036		111A 150
000037		111A 160
000038		111A 170
000039		111A 180
000040		111A 190
000041		111A 200
000042		111A 210
000043		111C 11
000044		111C 12
000045		111A 220
000046		111A 230
000047		111A 240
000048		111A 250
000049		111B 20
000050		111B 30
000051		111B 40
000052		111B 50
000053		111B 60
000054		111B 70
		111B 80
		111B 90
		111B 100

ALL TIMES EXPRESSED IN THIS PROGRAM ARE IN TERMS OF MILLI WORKING DAYS (1/1000 OF A WORKING DAY) (WORKING DAY = 16 HOURS)	
PERFORMANCE TIME DISTRIBUTION CODES	
K3	TRIANGULAR
K4	NORMAL
K8	EXPONENTIAL
K9	LOGNORMAL
K11	CONSTANT
K12	UNIFORM
K13	BETA

CURRENT MAXIMUM PROGRAM LIMITS	
BLOCKS	- 400
FACILITIES	- 15
STORAGES	- 50
QUEUES	- 50
LOGIC SWITCHES	- 25
SAVEX LOCATIONS	- 50

000055	FUNCTIONS	- 10	1118 110
000056	TABLES AND QTABLES	- 30	1118 120
000057	VARIABLE STATEMENT	- 25	1118 130
000058	PARAMETERS	- 20	1118 140
000059	TRANSACTION NUMBERS	- 100	1118 150
000060			1118 160
000061			1118 170
000062			1118 180
000063			1118 190
000064			111A 260
000065			111A 270
000066			111A 280
000067	S(1) CAPACITY 1 @		111A 29
000068	• 0		
000069	S(2) CAPACITY 2 @		111A 30
000070	• 0		
000071	S(3) CAPACITY 2 @		111A 31
000072	• 0		
000073	S(4) CAPACITY 9 @		111A 32
000074	• 0		
000075	• 5		
000076	• 6		111A 330
000077	• 7		111A 340
000078	• 8		111A 350
000079	• 9		111A 360
000080	S(10) CAPACITY 1 @		111A 370
000081	• 80		111A 3
000082	S(11) CAPACITY 2 @		111A 3
000083	• 90		
000084	S(12) CAPACITY 2 @		111A 4
000085	• 00		
000086	S(13) CAPACITY 9 @		111A 4
000087	• 10		
000088	S(14) CAPACITY 9 @		111A 4
000089	• 20		
000090	• 15		111A 430
000091	S(16) CAPACITY 10 @		111A
000092	• 440		
000093	S(17) CAPACITY 2 @		111A 4
000094	• 50		
000095	S(18) CAPACITY 2 @		111A 4
000096	• 60		
000097	S(19) CAPACITY 1 @		111A 4
000098	• 70		
000099	S(20) CAPACITY 1 @		111A 4
000100	• 80		
000101	• 21		111A 490
000102	S(22) CAPACITY 2 @		111A 5
000103	• 00		
000104	S(23) CAPACITY 2 @		111A 5
000105	• 10		
000106	• 24		111A 520
000107	S(25) CAPACITY 2 @		111A 5
000108	• 30		
000109	• 26		111A 540
000110	S(27) CAPACITY 2 @		111A 5

STORAGE CAPACITIES

000167	VEHICLE ELEMENTS, (Q)	111B 410
000168	-----	111A 990
000169	-----	111A1000
000170	-----	111A1010
000171	-----	111A1020
000172	-----	111A1030
000173	-----	111A1040
000174	-----	111A1050
000175	FUNCTION DEFINITIONS	111C 20
000176	1 - IS A CONTINUOUS LINEAR FUNCTION WITH A SLOPE OF 1, ITS END	111B 420
000177	POINTS ARE LOCATED AT (0,0) AND (99999,99999). IT IS USED	111B 430
000178	TO CONVERT THE INPUT SYSTEM VARIABLE SAVEX 10 (X10) INTO	111B 440
000179	FUNCTION 1 (FN1), WHICH CAN BE USED AS A MODIFIER IN AN ADVANCE	111B 450
000180	BLOCK. THE FUNCTION IS DESCRIBED SUCH THAT THE CONVERSION	111B 460
000181	IS ONE TO ONE (FN1=X10).	111B 470
000182	-----	
000183	FN1 FUNCTION ,C XSX(10),0,0 999999,999999	111A1100
000184	-----	111A1110
000185	-----	111A1120
000186	-----	111A1130
000187	-----	111A1140
000188	-----	111A1150
000189	-----	111A1160
000190	-----	111B 480
000191	-----	111B 490
000192	-----	111B 500
000193	NOTE A - UNLESS OTHERWISE STATED THE FOLLOWING DEFINITIONS	111B 510
000194	REPRESENT THE TOTAL COUNT OF THE TRANSACTIONS	111B 520
000195	ENTERING THE STATEMENT.	111B 530
000196	NOTE B - SAVEXES 10,11, AND 12 ARE FIRST USED TO INITIALIZE	111B 540
000197	THE NUMBER OF BOOSTERS, ORBITERS, AND LUTS RESPECTIVELY.	111B 550
000198	THEY ARE THEN USED AS DEFINED BELOW.	111B 560
000199	-----	111B 570
000200	1 - BOOSTER AND ORBITER ARE AVAILABLE	111B 580
000201	2 - BOOSTER AND ORBITER ARE NOT AVAILABLE	111B 590
000202	3 - BOOSTER IS NOT AVAILABLE	111B 600
000203	4 - ORBITER IS NOT AVAILABLE	111B 610
000204	5 - BOOSTER AND/OR ORBITER AND/OR LUT NOT AVAILABLE	111B 620
000205	6 - TOTAL GENERATED LAUNCH REQUESTS	111B 630
000206	7 - ORBITER AND/OR LUT NOT AVAILABLE	111B 640
000207	8 - LUT NOT AVAILABLE WHEN BOOSTER AND ORBITER ARE AVAILABLE	111B 650
000208	9 -	111B 660
000209	10 - THE INPUT VARIABLE TO FUNCTION 1 (SEE NOTE B ABOVE)	111B 670
000210	11 - THE LENGTH OF THE NEXT ORBITER MISSION (SEE NOTE B ABOVE)	111B 680
000211	12 - MISSION TYPE FOR NEXT MISSION (SEE NOTE B ABOVE)	111B 690
000212	13 - TIME UNTIL NEXT LAUNCH	111B 700
000213	14 -	111C 30
000214	15 - TIME BETWEEN LAUNCH OPPORTUNITIES FOR NEXT MISSION	111B 710
000215	16 - LENGTH OF ORBITER MISSION FOR NEXT MISSION	111B 720
000216	17 - MISSION TYPE OF CURRENT MISSION	111B 730
000217	18 - TIME UNTIL CURRENT LAUNCH	111B 740
000218	19 -	111B 750
000219	20 - TIME BETWEEN LAUNCH OPPORTUNITIES FOR CURRENT MISSION	111B 760
000220	21 - TIME OF FIRST LAUNCH OPPORTUNITY FOR CURRENT MISSION	111B 770
000221	22 - VEHICLES REMOVED FROM PAD (FAILURE ON PAD)	111B 780
000222	23 - VEHICLES REMOVED FROM PAD (CONSTRAINS NEXT LAUNCH)	111B 790
	24 - VEHICLES REMOVED FROM PAD (NO SECOND LAUNCH WINDOW)	
	25 - LAUNCHES MISSED DUE TO PAD UNAVAILABILITY	

000223	• 26 - THE NUMBER OF VEHICLES LAUNCHED AT AN ALTERNATE LAUNCH WINDOW	111B 800
000224	• 27 - LAUNCH WINDOW INDICATOR	111C 40
000225	• 28 - NUMBER OF LAUNCHES AT PRIMARY WINDOW	111C 50
000226	• 29 - NUMBER OF TIMES A VEHICLE WAS REPAIRED ON THE PAD	111C 60
000227	• 30 - TOTAL SUCCESSFULLY ACCOMPLISHED LAUNCHES	111B 840
000228	• 31 -	111B 850
000229	• 32 -	111C 61
000230	• 33 -	111C 62
000231	• 34 -	111C 63
000232	• 35 - AMOUNT OF TIME AFTER PRIMARY WINDOW AT WHICH LAUNCH OCCURS	111C 64
000233	-----	111A1500
000234	•	111A1510
000235	•	111A1520
000236	•	111A1530
000237	•	111A1540
000238	•	111A1550
000239	•	111A1560
000240	•	111B 860
000241	•	111B 870
000242	•	111B 880
000243	•	111B 890
000244	•	111B 900
000245	•	111B 910
000246	•	111B 920
000247	•	111C 70
000248	•	111C 80
000249	•	111B 930
000250	•	111B 940
000251	•	111B 950
000252	•	111B 960
000253	•	111B 970
000254	•	111B 980
000255	•	111C 90
000256	•	111C 100
000257	•	111C 110
000258	•	111B1040
000259	•	111B1050
000260	•	111B1060
000261	•	111B1070
000262	•	111B1080
000263	•	111B1090
000264	•	111B1100
000265	•	111B1110
000266	•	111B1120
000267	•	111B1130
000268	•	111B1140
000269	•	111B1150
000270	•	111B1160
000271	•	111B1170
000272	•	111B1180
000273	•	111B1190
000274	•	111B1200
000275	•	111B1210
000276	•	111B1220
000277	•	111B1230
000278	•	111B1240

VARIABLE DEFINITIONS

- 1 - GROUND PROCESSING TIME FOR EACH BOOSTER
(TIME OUT OF STORAGE)-(FLIGHT TIME)+(TIME IN STORAGE)
- 2 - TIME LEFT BEFORE LAUNCH (USED TO DETERMINE IF SUFFICIENT TIME REMAINS BEFORE LAUNCH TO INITIATE AND COMPLETE COUNTDOWN)
(TIME TO LAUNCH FROM EARLIEST POSSIBLE STORAGE EXIT)-(ELAPSED TIME FROM EARLIEST POSSIBLE STORAGE EXIT)
NOTE- IF FIRST LAUNCH WINDOW IS MISSED V2 WILL BE NEGATIVE, THIS IS TAKEN INTO ACCOUNT IN LATER VARIABLES.
- 3 - FLOATING HOLD TIME BETWEEN COMPLETION OF ALL PRECOUNTDOWN OPERATIONS AND THE INITIATION OF FINAL COUNTDOWN FOR THE FIRST LAUNCH OPPORTUNITY
(TIME LEFT BEFORE LAUNCH)-(COUNTDOWN TIME)
- 4 - TIME TO SECOND LAUNCH WINDOW
(TIME FIRST WINDOW WAS MISSED BY)+(TIME BETWEEN FIRST AND SECOND WINDOW)
- 5 - MAXIMUM TIME TO PROCESS VEHICLE FROM MATE AND HOOKUP INITIATION TO LAUNCH, THIS ALSO REPRESENTS THE EARLIEST POSSIBLE STORAGE EXIT FOR THE VEHICLE ELEMENTS.
(ASSIGN CONSTANT = SUM OF MAXIMUM TIMES IN EACH PRELAUNCH OPERATION)
- 6 - LENGTH OF COUNTDOWN
(PREASSIGNED CONSTANT)
- 7 - GROUND PROCESSING TIME FOR EACH ORBITER
(TIME OUT OF STORAGE)-(FLIGHT TIME)+(TIME IN STORAGE)
- 8 - MINIMUM TIME TO PROCESS VEHICLE FROM MATE AND HOOKUP INITIATION TO LAUNCH, THIS ALSO REPRESENTS THE LATEST POSSIBLE STORAGE EXIT FOR THE VEHICLE ELEMENTS IF THE FIRST LAUNCH WINDOW IS TO BE MET.
(ASSIGN CONSTANT = SUM OF MINIMUM TIMES IN EACH PRELAUNCH OPERATION)
- 9 - TIME VEHICLES ARE HELD IN READY STORAGE PRIOR TO EARLIEST

000279	•	POSSIBLE INITIATION OF MATE AND HOOKUP RELATIVE TO THEIR MISSION	111B1250
000280	•	(LAUNCH TIME)-(CURRENT TIME)-(VARIABLE 5)	111B1260
000281	•		111B1290
000282	•	10 - THE NUMBER OF SIMULATIONS FOR WHICH STATISTICS ARE COLLECTED	111B1300
000283	•	(ASSIGN CONSTANT = ONE LESS THAN NUMBER OF SIMULATIONS	111B1310
000284	•	SPECIFIED ON THE START CARD)	111B1320
000285	•		111B1330
000286	•	11 - MAXIMUM TIME A REQUEST MAY WAIT FOR ANY VEHICLE ELEMENT	111B1340
000287	•	AFTER THE EARLIEST POSSIBLE MATE AND HOOKUP INITIATION.	111B1350
000288	•	(MAXIMUM TIME TO LAUNCH(V5))-(MINIMUM TIME TO LAUNCH(V8))	111B1360
000289	•		
000290	•	12 - TIME TO BEGINNING OF FINAL COUNTDOWN FOR THE SECOND WINDOW	111C 120
000291	•	(TIME TO SECOND LAUNCH WINDOW)-(LENGTH OF COUNT DOWN)	111C 130
000292	•		111C 140
000293	•	13 - LENGTH OF TIME BETWEEN EVEN AND ODD WINDOWS	111C 150
000294	•	(23.5 HOURS)-(TIME BETWEEN FIRST AND SECOND WINDOW)	111C 160
000295	•		111C 170
000296	•	14 - TIME LEFT TO BEGINNING OF FINAL COUNTDOWN FOR LAUNCH AT THE	111C 180
000297	•	CURRENT WINDOW.	111C 190
000298	•	(LENGTH OF TIME BETWEEN FIRST WINDOW AND CURRENT WINDOW)+(TIME	111C 200
000299	•	THE FIRST WINDOW WAS MISSED BY)-(LENGTH OF FINAL COUNTDOWN)	111C 210
000300	•		111C 220
000301	•	15 - DIVIDE WINDOW NUMBER BY 2 DISCARD QUOTIENT AND RETAIN REMAINDER	111C 230
000302	•	IF V15=0 THE WINDOW IS EVEN. IF V15=1 THE WINDOW IS ODD	111C 240
000303	•	-----	111A1760
000304	•	V(1) VARIABLE , I MPSP11-PSP1+PSP2	
000305	•	V(2) VARIABLE , I VSV(5)-M\$1	
000306	•	V(3) VARIABLE , I VSV(2)-VSV(6)	
000307	•	V(4) VARIABLE , I PSP7+VSV(2)	
000308	•	V(5) VARIABLE , I 5325	
000309	•	V(6) VARIABLE , I 83	
000310	•	V(7) VARIABLE , I MPSP11-PSP1+PSP4	
000311	•	V(8) VARIABLE , I 3925	
000312	•	V(9) VARIABLE , I X\$X(21)-CS1-VSV(5)	
000313	•	V(10) VARIABLE , I 500	
000314	•	V(11) VARIABLE , I VSV(5)-VSV(8)	
000315	•	V(12) VARIABLE , I VSV(4)-VSV(6)	
000316	•	V(13) VARIABLE , I 979-PSP7	
000317	•	V(14) VARIABLE , I X\$X(35)+VSV(2)-VSV(6)	
000318	•	V(15) VARIABLE , I X\$X(27)/2	
000319	•	-----	111A1880
000320	•		111B1370
000321	•		111B1380
000322	•	-----	111B1390
000323	•		111B1400
000324	•	PARAMETER DEFINITIONS	111B1410
000325	•		111B1420
000326	•	1 - INDEPENDENT TOTAL FLIGHT TIME OF EACH BOOSTER AND ORBITER	111B1430
000327	•	2 - TIME IN STORAGE FOR THE BOOSTER OF THE CURRENT MISSION	111B1440
000328	•	3 - LENGTH OF CURRENT ORBITER MISSION	111B1450
000329	•	4 - MISSION TYPE UNTIL REDEFINED AS TIME IN STORAGE FOR THE ORBITER	111B1460
000330	•	OF THE CURRENT MISSION	111B1470
000331	•	5 - TIME TO THE CURRENT LAUNCH	111B1480
000332	•	6 -	111B1490
000333	•	7 - TIME BETWEEN LAUNCH OPPORTUNITIES FOR CURRENT LAUNCH	111B1500
000334	•	8 - TIME FROM LANDING TO STORAGE ENTRY	111B1510

```

000335      9 - DEFINES PAD TO BE SEIZED FOR CURRENT MISSION
000336      10 - INITIALIZATION OF THE NUMBER OF BOOSTERS, ORBITERS AND LUTS
000337      11 - IS MARKED SUCH THAT THE LEAVE STORAGE TO LAUNCH TIME CAN BE
000338      TABULATED. THE AMOUNT OF TIME EACH BOOSTER AND ORBITER
000339      SPENDS OUT OF STORAGE IS ALSO TABULATED BY THIS PARAMETER.
000340
000341
000342
000343
000344
000345
000346
000347
000348
000349
000350
000351
000352
000353
000354
000355
000356
000357
000358
000359
000360
000361
000362
000363
000364
000365
000366
000367
000368
000369
000370
000371
000372
000373
000374
000375
000376
000377
000378
000379
000380
000381
000382
000383
000384
000385
000386
000387
000388
000389
000390

      9 - DEFINES PAD TO BE SEIZED FOR CURRENT MISSION
      10 - INITIALIZATION OF THE NUMBER OF BOOSTERS, ORBITERS AND LUTS
      11 - IS MARKED SUCH THAT THE LEAVE STORAGE TO LAUNCH TIME CAN BE
      TABULATED. THE AMOUNT OF TIME EACH BOOSTER AND ORBITER
      SPENDS OUT OF STORAGE IS ALSO TABULATED BY THIS PARAMETER.
      -----
      START NEW PROBLEM AND READ IN FLEET SIZE
      -----
      LABEL.1 GENERATE 0,1 GOTO(LABEL.2)@ I1A1940 LUT I1A1960
      LABEL.2 HELP 7,XXS(11),XXS(10),XXS(12) GOTO(LABEL.3)@
      LABEL.3 ASSIGN P10,XXS(10) GOTO(LABEL.4)@ I1A2000
      LABEL.4 ENTER S(13),PSP10 GOTO(LABEL.5)@ I1A2010
      LABEL.5 ASSIGN P10,XXS(11) GOTO(LABEL.6)@ I1A2040
      LABEL.6 ENTER S(4),PSP10 GOTO(LABEL.7)@ I1A2050
      LABEL.7 ASSIGN P10,XXS(12) GOTO(LABEL.8)@ I1A2090
      LABEL.8 ENTER S(16),PSP10 GOTO(LABEL.15)@ I1B1571
      -----
      -----
      GENERATE SUFFICIENT TIME TO MEET THE FIRST MISSION REQUEST
      INITIALIZE SAVEX 16 THROUGH 21 WITH FIRST TRANSACTION START TIME
      -----
      LABEL.9 SAVEX X(16),XXS(11) GOTO(LABEL.10)@ I1A2230
      LABEL.10 SAVEX X(17),XXS(12) GOTO(LABEL.11)@ I1A2240
      LABEL.11 SAVEX X(18),XXS(13) GOTO(LABEL.12)@ I1A2250
      LABEL.12 SAVEX X(20),XXS(15) GOTO(LABEL.13)@ I1A2260
      INITIALIZE TIME TO LAUNCH CUMULATOR WITH SIMULATION START TIME
      LABEL.13 SAVEX X(21),CS1 GOTO(LABEL.14,LABEL.15)@ I1A2280
      DETERMINE IF FIRST LAUNCH REQ. HAS ENOUGH TIME TO MEET ITS LAUNCH
      LABEL.14 COMPARE XXS(18) GE VSV(5) GOTO(LABEL.16)@ I1A2320
      CALL HELP 6 DETERMINE A MORE REALISTIC FIRST LAUNCH REQ.
      LABEL.15 HELP 1,XXS(11),XXS(12),XXS(13),XXS(15) GOTO(LABEL.9)@ I1A
      2360
      RETURN AND REINITIALIZE SAVEX 16 THROUGH 21
  
```

```

000391 LABEL.16 LOGIC R,L(3) GOTO(LABEL.17)@ IIIA2400
000392 LABEL.17 TERMINATE @ IIIA2410
000393 ----- IIIA2420
000394 IIIA2430
000395 IIIA2440
000396 IIIA2450
000397 IIIA2460
000398 IIIA2470
000399 IIIA2480
000400 IIIA2490
000401 IIIA2500
000402 IIIA2510
000403 ----- IIIA2520
000404 * THE SIMULATION TRANSACTIONS ARE GENERATED FOLLOWING THIS POINT
000405 ----- IIIA2530
000406 IIIA2540
000407 IIIA2550
000408 IIIA2560
000409 IIIA2570
000410 IIIA2580
000411 IIIA2590
000412 IIIA2600
000413 IIIA2610
000414 IIIA2620
000415 IIIA2630
000416 IIIA2640
000417 IIIA2650
000418 IIIA2660
000419
000420
000421
000422 * COUNT THE NUMBER OF LAUNCH REQUESTS
000423
000424 LABEL.21 SAVEX X(6),X$(6)+1 GOTO(LABEL.22)@ IIIA2730
000425
000426 * CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH
000427
000428 LABEL.22 HELP 1,X$(11),X$(12),X$(13),X$(15) GOTO(LABEL.23)@
000429 * 81572
000430
000431 -----
000432
000433
000434
000435 * ASSIGN ATTRIBUTES OF CURRENT LAUNCH TO TRANSACTION
000436 * 3 - LENGTH OF THE ORBITER MISSION
000437 * 4 - MISSION TYPE
000438 * 5 - TIME UNTIL NEXT LAUNCH
000439 * 7 - TIME BETWEEN LAUNCH OPPORTUNITIES
000440
000441 LABEL.23 ASSIGN P3,X$(16) GOTO(LABEL.24)@ IIIA2890
000442 LABEL.24 ASSIGN P4,X$(17) GOTO(LABEL.25)@ IIIA2900
000443 LABEL.25 ASSIGN P5,X$(18) GOTO(LABEL.26)@ IIIA2910
000444 LABEL.26 ASSIGN P7,X$(20) GOTO(LABEL.27)@ IIIA2920
000445 LABEL.27 SAVEX X(16),X$(11) GOTO(LABEL.28)@ IIIA2930
000446 LABEL.28 SAVEX X(17),X$(12) GOTO(LABEL.29)@ IIIA2940

```



```

000503 LABEL.59 LEAVE S(13) GOTO(LABEL.60)@ IIIA3440
000504 LABEL.60 HELP 6,2,C$1,X$X(10) GOTO(LABEL.61)@ IIIA3450
000505 LABEL.61 TABULATE T(22) GOTO(LABEL.62)@ IIIA3460
000506 LABEL.62 ASSIGN P4,X$X(10) GOTO(LABEL.63)@ IIIA3470
000507 LABEL.63 LEAVE S(16) GOTO(LABEL.64)@ IIIA3480
000508 -----
000509 * PARAMETER 11 MEASURES LEAVE STORAGE TO LAUNCH TIME
000510 LABEL.64 MARK P11 GOTO(LABEL.65)@ IIIA3510
000511 -----
000512 -----
000513 -----
000514 * ENTER WAITING LINE FOR MATE AND HOOKUP FACILITY
000515 -----
000516 LABEL.65 QUEUE Q(20) GOTO(LABEL.66)@ IIIA3570
000517 * MATE BOOSTER, ORBITER AND LUT
000518 LABEL.66 ENTER S(20) GOTO(LABEL.67)@ IIIA3590
000519 * TRIANGULAR MIN MODE MAX
000520 LABEL.67 HELP 3,1800,2000,2200,X$X(10) GOTO(LABEL.68)@ IIIA3620
000521 LABEL.68 ADVANCE TIME(1*FNSFN) GOTO(LABEL.69)@ IIIA3630
000522 LABEL.69 LEAVE S(20) GOTO(LABEL.70)@ IIIA3640
000523 -----
000524 -----
000525 -----
000526 -----
000527 * WAITING LINE FOR PAD
000528 -----
000529 LABEL.70 QUEUE Q(21) GOTO(LABEL.71 THRU LABEL.72)@ IIIA3710
000530 LABEL.71 COMPARE F$F(1) E 0 GOTO(LABEL.74)@ IIIA3720
000531 LABEL.72 COMPARE F$F(2) E 0 GOTO(LABEL.75)@ IIIA3730
000532 LABEL.73 COMPARE F$F(3) E 0 GOTO(LABEL.76)@ IIIA3740
000533 LABEL.74 ASSIGN P9,1 GOTO(LABEL.77)@ IIIA3750
000534 LABEL.75 ASSIGN P9,2 GOTO(LABEL.77)@ IIIA3760
000535 LABEL.76 ASSIGN P9,3 GOTO(LABEL.77)@ IIIA3770
000536 -----
000537 -----
000538 -----
000539 -----
000540 * SEIZE THE FIRST AVAILABLE PAD FOR THIS MISSION AND
000541 * REMOVE THIS PAD FROM THE PAD AVAILABLE LIST
000542 -----
000543 LABEL.77 SEIZE *P9 GOTO(LABEL.78)@ IIIA3850
000544 -----
000545 -----
000546 -----
000547 -----
000548 * COUNTDOWN PREPARATION
000549 * TRANSFER LUT AND VEHICLE, INSTALL INTO PAD, AND COUNTDOWN PREPS
000550 -----
000551 LABEL.78 ENTER S(22) GOTO(LABEL.79)@ IIIA3940
000552 * TRIANGULAR MIN MODE MAX
000553 LABEL.79 HELP 3,2000,2500,3000,X$X(10) GOTO(LABEL.80)@ IIIA3970
000554 LABEL.80 ADVANCE TIME(1*FNSFN) GOTO(LABEL.81)@ IIIA3970
000555 LABEL.81 LEAVE S(22) GOTO(LABEL.82)@ IIIA3970
000556 -----
000557 -----
000558 -----

```

```

000559 -----IIIC 330
000560 * DETERMINE WHICH PATH THROUGH THE LAUNCH LOGIC IS TO BE TAKEN IIIC 340
000561 * ESTABLISH TIME LEFT TO FIRST LAUNCH WINDOW IIIC 350
000562 LABEL.82 SAVEX X(10),VSV(2) GOTO(LABEL.83 THRU LABEL.85) @ IIIC 36
000563 * 0
000564 * IIIC 370
000565 * IIIC 380
000566 * IIIC 390
000567 * IS TIME TO LAUNCH GE LENGTH OF FINAL COUNTDOWN. IF SO GO TO
000568 * PRIMARY PATH
000569 * IIIC 400
000570 * IIIC 410
000571 * IIIC 420
000572 * IIIC 430
000573 * PATH ONE
000574 LABEL.83 COMPARE VSV(2) GE VSV(6) GOTO(LABEL.86)@ IIIC 440
000575 *
000576 * TIME TO LAUNCH IS NOT GE LENGTH OF FINAL COUNTDOWN, IS THERE
000577 * ANOTHER LAUNCH WINDOW. IF SO GO TO SECONDARY PATH
000578 * IIIC 450
000579 * IIIC 460
000580 * IIIC 470
000581 * IIIC 480
000582 * IIIC 490
000583 * PATH TWO
000584 LABEL.84 COMPARE PSP7 G 0 GOTO(LABEL.105)@ IIIC 500
000585 *
000586 * TIME TO LAUNCH IS NOT GE LENGTH OF FINAL COUNTDOWN, AND THERE
000587 * IS NOT ANOTHER LAUNCH WINDOW. COUNT NUMBER OF VEHICLES REMOVED
000588 * FROM THE PAD FOR LACK OF ANOTHER LAUNCH WINDOW AND GO TO THE
000589 * VEHICLE REMOVAL PATH.
000590 * IIIC 510
000591 * IIIC 520
000592 * IIIC 530
000593 * IIIC 540
000594 * IIIC 550
000595 * IIIC 560
000596 * IIIC 570
000597 * PATH THREE
000598 LABEL.85 SAVEX X(24),X5X(24)+1 GOTO(LABEL.210)@ IIIC 580
000599 *
000600 * IIIC 590
000601 * IIIC 600
000602 * IIIC 610
000603 * IIIC 620
000604 * IIIC 630
000605 * THIS IS THE PRIMARY PATH THROUGH THE LAUNCH LOGIC.
000606 * IIIC 640
000607 * IIIC 650
000608 * IIIC 660
000609 * IIIC 670
000610 * IIIC 680
000611 * ESTABLISH LENGTH OF HOLD TO BEGINNING OF FINAL COUNTDOWN
000612 * LABEL.86 SAVEX X(10),VSV(3) GOTO(LABEL.87)@ IIIC 690
000613 * TABULATE LENGTH OF HOLD TO BEGINNING OF FINAL COUNTDOWN
000614 * LABEL.87 TABULATE T(4) GOTO(LABEL.88)@ IIIC 710
000615 * SET FIRST LAUNCH WINDOW INDICATOR
000616 * LABEL.88 SAVEX X(27),1 GOTO(LABEL.89)@ IIIC 730
000617 * ESTABLISH A BASE POINT OF ZERO FOR CALCULATING TIME BETWEEN
000618 * FIRST AND SUBSEQUENT WINDOWS IN CASE THIS VEHICLE HAS A FINAL
000619 * COUNTDOWN FAILURE AND CAN BE REPAIRED ON THE PAD.
000620 * LABEL.89 SAVEX X(35),0 GOTO(LABEL.90)@ IIIC 770
000621 * ADVANCE TO BEGINNING OF FINAL COUNTDOWN
000622 * LABEL.90 ADVANCE TIME(1,FNSFN) GOTO(LABEL.91)@ IIIC 790
000623 *
000624 * IIIC 800
000625 * IIIC 810
000626 * IIIC 820
000627 * IIIC 830
000628 * IIIC 840
000629 * IIIC 850
000630 * IIIC 860
000631 * IIIC 870
000632 *
000633 *
000634 *
000635 *
000636 *
000637 *
000638 *
000639 *
000640 *
000641 *
000642 *
000643 *
000644 *
000645 *
000646 *
000647 *
000648 *
000649 *
000650 *
000651 *
000652 *
000653 *
000654 *
000655 *
000656 *
000657 *
000658 *
000659 *
000660 *
000661 *
000662 *
000663 *
000664 *
000665 *
000666 *
000667 *
000668 *
000669 *
000670 *
000671 *
000672 *
000673 *
000674 *
000675 *
000676 *
000677 *
000678 *
000679 *
000680 *
000681 *
000682 *
000683 *
000684 *
000685 *
000686 *
000687 *
000688 *
000689 *
000690 *
000691 *
000692 *
000693 *
000694 *
000695 *
000696 *
000697 *
000698 *
000699 *
000700 *
000701 *
000702 *
000703 *
000704 *
000705 *
000706 *
000707 *
000708 *
000709 *
000710 *
000711 *
000712 *
000713 *
000714 *
000715 *
000716 *
000717 *
000718 *
000719 *
000720 *
000721 *
000722 *
000723 *
000724 *
000725 *
000726 *
000727 *
000728 *
000729 *
000730 *
000731 *
000732 *
000733 *
000734 *
000735 *
000736 *
000737 *
000738 *
000739 *
000740 *
000741 *
000742 *
000743 *
000744 *
000745 *
000746 *
000747 *
000748 *
000749 *
000750 *
000751 *
000752 *
000753 *
000754 *
000755 *
000756 *
000757 *
000758 *
000759 *
000760 *
000761 *
000762 *
000763 *
000764 *
000765 *
000766 *
000767 *
000768 *
000769 *
000770 *
000771 *
000772 *
000773 *
000774 *
000775 *
000776 *
000777 *
000778 *
000779 *
000780 *
000781 *
000782 *
000783 *
000784 *
000785 *
000786 *
000787 *
000788 *
000789 *
000790 *
000791 *
000792 *
000793 *
000794 *
000795 *
000796 *
000797 *
000798 *
000799 *
000800 *
000801 *
000802 *
000803 *
000804 *
000805 *
000806 *
000807 *
000808 *
000809 *
000810 *
000811 *
000812 *
000813 *
000814 *
000815 *
000816 *
000817 *
000818 *
000819 *
000820 *
000821 *
000822 *
000823 *
000824 *
000825 *
000826 *
000827 *
000828 *
000829 *
000830 *
000831 *
000832 *
000833 *
000834 *
000835 *
000836 *
000837 *
000838 *
000839 *
000840 *
000841 *
000842 *
000843 *
000844 *
000845 *
000846 *
000847 *
000848 *
000849 *
000850 *
000851 *
000852 *
000853 *
000854 *
000855 *
000856 *
000857 *
000858 *
000859 *
000860 *
000861 *
000862 *
000863 *
000864 *
000865 *
000866 *
000867 *
000868 *
000869 *
000870 *
000871 *
000872 *
000873 *
000874 *
000875 *
000876 *
000877 *
000878 *
000879 *
000880 *
000881 *
000882 *
000883 *
000884 *
000885 *
000886 *
000887 *
000888 *
000889 *
000890 *
000891 *
000892 *
000893 *
000894 *
000895 *
000896 *
000897 *
000898 *
000899 *
000900 *
000901 *
000902 *
000903 *
000904 *
000905 *
000906 *
000907 *
000908 *
000909 *
000910 *
000911 *
000912 *
000913 *
000914 *
000915 *
000916 *
000917 *
000918 *
000919 *
000920 *
000921 *
000922 *
000923 *
000924 *
000925 *
000926 *
000927 *
000928 *
000929 *
000930 *
000931 *
000932 *
000933 *
000934 *
000935 *
000936 *
000937 *
000938 *
000939 *
000940 *
000941 *
000942 *
000943 *
000944 *
000945 *
000946 *
000947 *
000948 *
000949 *
000950 *
000951 *
000952 *
000953 *
000954 *
000955 *
000956 *
000957 *
000958 *
000959 *
000960 *
000961 *
000962 *
000963 *
000964 *
000965 *
000966 *
000967 *
000968 *
000969 *
000970 *
000971 *
000972 *
000973 *
000974 *
000975 *
000976 *
000977 *
000978 *
000979 *
000980 *
000981 *
000982 *
000983 *
000984 *
000985 *
000986 *
000987 *
000988 *
000989 *
000990 *
000991 *
000992 *
000993 *
000994 *
000995 *
000996 *
000997 *
000998 *
000999 *
001000 *

```

```

000615 LABEL.91 ENTER S(23) GOTO(LABEL.92)@ I11C 880
000616 * ESTABLISH LENGTH OF FINAL COUNTDOWN I11C 890
000617 LABEL.92 HELP 11,83,,X$X(10) GOTO(LABEL.93)@ I11C 900
000618 * ADVANCE TO END OF FINAL COUNTDOWN
000619 LABEL.93 ADVANCE TIME(1+FN$FN1) GOTO(LABEL.94)@ I11C 920
000620 * LEAVE FINAL COUNTDOWN
000621 LABEL.94 LEAVE S(23) GOTO(105;LABEL.95,LABEL.100) @ I11C 940
000622 *-----
000623 *
000624 *
000625 *-----
000626 * FAILURE HAS NOT OCCURED DURING FINAL COUNTDOWN. COLLECT
000627 * APPROPRIATE STATISTICS AND INITIATE LAUNCH OF VEHICLE.
000628 * (95 PERCENT PROBABILITY)
000629 *
000630 * TABULATE WHICH WINDOW LAUNCH OCCURS AT
000631 LABEL.95 TABULATE T(9) GOTO(LABEL.96,LABEL.98) @ I11C1030
000632 * DID LAUNCH OCCUR AT PRIMARY WINDOW
000633 LABEL.96 COMPARE X$X(27) E 1 GOTO(LABEL.97)@ I11C1050
000634 * COUNT NUMBER OF LAUNCHES AT THE PRIMARY WINDOW
000635 LABEL.97 SAVEX X(28),X$X(28)+1 GOTO(LABEL.118)@ I11C1070
000636 * LAUNCH DID NOT OCCUR AT THE PRIMARY WINDOW
000637 * TABULATE AMOUNT OF TIME AFTER PRIMARY WINDOW LAUNCH OCCURED
000638 LABEL.98 TABULATE T(8) GOTO(LABEL.99)@ I11C1100
000639 * COUNT NUMBER OF LAUNCHES AT A SUBSEQUENT WINDOW
000640 LABEL.99 SAVEX X(26),X$X(26)+1 GOTO(LABEL.118)@ I11C1120
000641 *-----
000642 *
000643 *
000644 *-----
000645 * FAILURE HAS OCCURED DURING FINAL COUNTDOWN (5 PERCENT PROB.)
000646 * REMOVE 50 PERCENT OF THESE VEHICLES FROM PAD. ATTEMPT TO LAUNCH
000647 * 50 PERCENT AT A LATER WINDOW.
000648 LABEL.100 ADVANCE GOTO(50;LABEL.101,LABEL.102) @ I11C1200
000649 * COUNT NUMBER OF VEHICLES REMOVED FROM PAD DUE TO A FINAL
000650 * COUNTDOWN FAILURE.
000651 LABEL.101 SAVEX X(22),X$X(22)+1 GOTO(LABEL.210)@ I11C1230
000652 * COUNT NUMBER OF TIMES A VEHICLE WAS REPAIRED ON THE PAD
000653 LABEL.102 SAVEX X(29),X$X(29)+1 GOTO(LABEL.103,LABEL.104) @ I11C1240
000654 * 50
000655 * IS THERE ANOTHER LAUNCH OPPORTUNITY
000656 LABEL.103 COMPARE PSP7 G 0 GOTO(LABEL.112)@ I11C1270
000657 * THERE IS NOT ANOTHER LAUNCH OPPORTUNITY
000658 * COUNT NUMBER OF VEHICLES REMOVED DUE TO NO FURTHER
000659 * LAUNCH WINDOW. THEN GO TO VEHICLE REMOVAL PATH. I11C1310
000660 LABEL.104 SAVEX X(24),X$X(24)+1 GOTO(LABEL.210)@
000661 * THERE IS ANOTHER LAUNCH OPPORTUNITY
000662 * SET SECOND LAUNCH WINDOW INDICATOR
000663 *-----
000664 *
000665 *
000666 *-----
000667 *
000668 * THIS THE SECONDARY PATH THROUGH THE LAUNCH LOGIC. ONLY VEHICLES
000669 * WHICH CANNOT LAUNCH ON THE PRIMARY WINDOW FLOW THROUGH THIS
000670 * SECTION
000670 *

```

```

000671 LABEL.105 SAVEX X(27),2 GOTO(LABEL.106)@ I11C1410
000672 TABULATE AMOUNT OF TIME LEFT TO FIRST WINDOW (MAY BE NEGATIVE) I11C1430
000673 LABEL.106 TABULATE T(7) GOTO(LABEL.107,LABEL.111)@ I11C1440
000674 IS THERE TIME TO LAUNCH AT THE SECOND WINDOW I11C1450
000675 LABEL.107 COMPARE VSV(4) GE VSV(6) GOTO(LABEL.108)@ I11C1460
000676 THERE IS TIME TO LAUNCH AT THE SECOND WINDOW
000677 ESTABLISH LENGTH OF HOLD TO BEGINNING OF FINAL COUNTDOWN
000678 FOR THE SECOND WINDOW.
000679 LABEL.108 SAVEX X(10),VSV(12) GOTO(LABEL.109)@ I11C1500
000680 ESTABLISH LENGTH OF TIME BETWEEN FIRST AND SECOND WINDOW
000681 LABEL.109 SAVEX X(35),PSP7 GOTO(LABEL.110)@ I11C1520
000682 TABULATE HOLD TO BEGINNING OF FINAL COUNTDOWN FOR THE
000683 SECOND WINDOW
000684 LABEL.110 TABULATE T(5) GOTO(LABEL.90)@ I11C1550
000685
000686
000687
000688 THERE IS NOT TIME TO LAUNCH AT THE SECOND WINDOW
000689 ESTABLISH LENGTH OF TIME BETWEEN FIRST AND SECOND WINDOW
000690 LABEL.111 SAVEX X(35),PSP7 GOTO(LABEL.112)@ I11C1600
000691 INCREMENT WINDOW INDICATOR TO NEXT WINDOW
000692 LABEL.112 SAVEX X(27),Xsx(27)+1 GOTO(LABEL.113,LABEL.115) @ I11C1610
000693 20
000694
000695 DETERMINE IF THE WINDOW BEING TRIED IS EVEN OR ODD
000696 LABEL.113 COMPARE VSV(15) G O GOTO(LABEL.114)@ I11C1640
000697 THE WINDOW IS ODD.
000698 ESTABLISH LENGTH OF TIME BETWEEN FIRST AND SUBSEQUENT
000699 ODD WINDOWS
000700 LABEL.114 SAVEX X(35),Xsx(35)+VSV(13) GOTO(LABEL.116,LABEL.112) @
000701 I11C1680
000702
000703 THE WINDOW IS EVEN
000704 ESTABLISH LENGTH OF TIME BETWEEN FIRST AND SUBSEQUENT
000705 EVEN WINDOWS
000706 LABEL.115 SAVEX X(35),Xsx(35)+PSP7 GOTO(LABEL.116,LABEL.112) @ I11
000707 C1740
000708 IS THERE TIME TO LAUNCH AT THIS WINDOW. IF NOT TRY NEXT WINDOW. I11C1750
000709 LABEL.116 COMPARE VSV(14) GE O GOTO(LABEL.117)@ I11C1760
000710 THERE IS TIME TO LAUNCH
000711 ESTABLISH LENGTH OF HOLD TO BEGINNING OF FINAL COUNTDOWN
000712 LABEL.117 SAVEX X(10),VSV(14) GOTO(LABEL.110)@ I11C1790
000713
000714
000715
000716
000717
000718
000719
000720
000721
000722
000723
000724
000725
000726
-----
FAILURE HAS NOT OCCURED DURING TIME ON PAD. INITIATE LAUNCH OF SHUTTLE I11A4920
I11A4930
I11A4940
I11A4950
I11A4960
I11A4970
I11A4980
I11A4990
I11A5000
I11A5010
I11A5020
I11A5030
I11A5040
I11A5050
I11A5060
I11A5070
I11A5080
I11A5090
I11A5100
I11A5110
I11A5120
I11A5130
I11A5140
I11A5150
I11A5160
I11A5170
I11A5180
I11A5190
I11A5200
I11A5210
I11A5220
I11A5230
I11A5240
I11A5250
I11A5260
I11A5270
I11A5280
I11A5290
I11A5300
I11A5310
I11A5320
I11A5330
I11A5340
I11A5350
I11A5360
I11A5370
I11A5380
I11A5390
I11A5400
I11A5410
I11A5420
I11A5430
I11A5440
I11A5450
I11A5460
I11A5470
I11A5480
I11A5490
I11A5500
I11A5510
I11A5520
I11A5530
I11A5540
I11A5550
I11A5560
I11A5570
I11A5580
I11A5590
I11A5600
I11A5610
I11A5620
I11A5630
I11A5640
I11A5650
I11A5660
I11A5670
I11A5680
I11A5690
I11A5700
I11A5710
I11A5720
I11A5730
I11A5740
I11A5750
I11A5760
I11A5770
I11A5780
I11A5790
I11A5800
I11A5810
I11A5820
I11A5830
I11A5840
I11A5850
I11A5860
I11A5870
I11A5880
I11A5890
I11A5900
I11A5910
I11A5920
I11A5930
I11A5940
I11A5950
I11A5960
I11A5970
I11A5980
I11A5990
I11A6000
I11A6010
I11A6020
I11A6030
I11A6040
I11A6050
I11A6060
I11A6070
I11A6080
I11A6090
I11A6100
I11A6110
I11A6120
I11A6130
I11A6140
I11A6150
I11A6160
I11A6170
I11A6180
I11A6190
I11A6200
I11A6210
I11A6220
I11A6230
I11A6240
I11A6250
I11A6260

```

```

000727 LABEL.120 SPLIT 1,LABEL.142 GOTO(LABEL.121)@      IIIA4970
000728 LABEL.121 SPLIT 1,LABEL.122 GOTO(LABEL.136)@      IIIA4980
000729 -----
000730
000731
000732 -----
000733 LUT REMOVAL AND PAD REFURBISHMENT PATH
000734 THIS PATH IS SIMULTANEOUS WITH THE FLIGHT AND REFURBISH PATH
000735 -----
000736
000737
000738 *REMOVE POST LAUNCH LUT FROM PAD
000739 LABEL.122 ENTER S(17) GOTO(LABEL.123)@      IIIA5040
000740 LABEL.123 HELP 3,1250,1500,1750,XXS(10) GOTO(LABEL.124)@      IIIA5050
000741 LABEL.124 ADVANCE TIME(1*FNSFNI) GOTO(LABEL.125)@      IIIA5060
000742 LABEL.125 LEAVE S(17) GOTO(LABEL.126)@      IIIA5070
000743 LABEL.126 SPLIT 1,LABEL.130 GOTO(LABEL.127)@      IIIA5080
000744 LABEL.127 ASSEMBLE 2 GOTO(LABEL.128)@      IIIA5090
000745 LABEL.128 MATCH LABEL.119 GOTO(LABEL.129)@      IIIA5100
000746 LABEL.129 TERMINATE @      IIIA5110
000747 -----
000748
000749
000750 *TRANSPORT LUT TO MAINT.,REFURBISH/TEST,TRANSPORT TO STORAGE
000751 LABEL.130 QUEUE Q(18) GOTO(LABEL.131)@      IIIA5170
000752 LABEL.131 ENTER S(18) GOTO(LABEL.132)@      IIIA5181
000753 LABEL.132 HELP 3,2700,3000,3300,XXS(10) GOTO(LABEL.133)@      IIIA5190
000754 LABEL.133 ADVANCE TIME(1*FNSFNI) GOTO(LABEL.134)@      IIIA5200
000755 LABEL.134 LEAVE S(18) GOTO(LABEL.135)@      IIIA5210
000756 LABEL.135 ENTER S(16),1 GOTO(LABEL.129)@      IIIA5220
000757 -----
000758
000759
000760
000761
000762 *REFURBISH LAUNCH PAD
000763 LABEL.136 ENTER S(27) GOTO(LABEL.137)@      IIIA5390
000764 *TRIANGULAR MIN MODE
000765 LABEL.137 HELP 3,950,1000,1050,XXS(10) GOTO(LABEL.138)@      IIIA5410
000766 LABEL.138 ADVANCE TIME(1*FNSFNI) GOTO(LABEL.139)@      IIIA5420
000767 LABEL.139 LEAVE S(27) GOTO(LABEL.127)@      IIIA5430
000768 LABEL.140 RELEASE *P9 GOTO(LABEL.141)@      IIIA5440
000769 LABEL.141 TERMINATE @      IIIA5450
000770 -----
000771
000772 *FLIGHT AND REFURBISH PATH
000773
000774
000775 LABEL.142 TABULATE T(10) GOTO(LABEL.143)@      IIIA5490
000776 -----
000777
000778 *LIFTOFF THROUGH SEPARATION
000779
000780 LABEL.143 ENTER S(28) GOTO(LABEL.144)@      IIIA5540
000781 LABEL.144 HELP 11,2,,XXS(10) GOTO(LABEL.145)@      IIIA5550
000782 LABEL.145 ADVANCE TIME(1*FNSFNI) GOTO(LABEL.146)@      IIIA5560

```

```

000783 LABEL,146 LEAVE S(28) GOTO(LABEL,147)@ IIIA5570
000784 -----
000785 -----
000786 -----
000787 -----
000788 -----
000789 *PARAMETER 1 IS USED TO CUMULATE THE TOTAL INFLIGHT TIME FOR
000790 *COLLECTING STATISTICS ON GROUND PROCESSING TIME
000791 -----
000792 LABEL,147 ASSIGN P1,PSPI+2 GOTO(LABEL,148)@ IIIA5660
000793 -----
000794 *SEPARATION IN FLIGHT OF BOOSTER AND ORBITER
000795 *COUNT THE NUMBER OF SUCCESSFUL LAUNCHES
000796 -----
000797 LABEL,148 SAVEX X(30),XSX(30)+1 GOTO(LABEL,149)@ IIIA5710
000798 LABEL,149 SPLIT 1,LABEL,180 GOTO(LABEL,150)@ IIIA5720
000799 -----
000800 -----
000801 -----
000802 -----
000803 -----
000804 *BOOSTER COAST,REENTRY,FLYBACK AND LANDING IDST
000805 -----
000806 LABEL,150 HELP 3,64,70,76,XSX(10) GOTO(LABEL,151)@ IIIA5800
000807 LABEL,151 ASSIGN P1,PSPI+FN$FNI GOTO(LABEL,152)@ IIIA5810
000808 LABEL,152 ADVANCE TIME(1*FN$FNI) GOTO(LABEL,153)@ IIIA5820
000809 -----
000810 -----
000811 -----
000812 *PARAMETER 8 COLLECTS THE TIME FROM LANDING UNTIL ENTRY INTO STORAGE
000813 LABEL,153 MARK P8 GOTO(LABEL,154)@ IIIA5870
000814 -----
000815 -----
000816 -----
000817 -----
000818 -----
000819 -----
000820 *DELAY FOR TRANSPORTING FROM DOWNRANGE LANDING
000821 -----
000822 MIN NOM MAX
000823 LABEL,154 HELP 3,1000,1500,2000,XSX(10) GOTO(LABEL,155)@ IIIA5970
000824 LABEL,155 SAVEX X(10),0 GOTO(LABEL,156)@ IIIA5980
000825 LABEL,156 ADVANCE TIME(1*FN$FNI) GOTO(LABEL,157)@ IIIA5990
000826 -----
000827 -----
000828 -----
000829 -----
000830 *WAITING LINE FOR BOOSTERS GOING INTO SAFING FACILITY
000831 -----
000832 LABEL,157 QUEUE Q(1) GOTO(LABEL,158)@ IIIA6060
000833 -----
000834 -----
000835 -----
000836 -----
000837 *BOOSTER SAFING IDST
000838 -----

```

```

000839 LABEL.158 ENTER S(1) GOTO(LABEL.159)@ IIIA6130 IIIA6191
000840 * TRIANGULAR MIN MODE MAX
000841 LABEL.159 HELP 3,900,1000,1100,XX(10) GOTO(LABEL.160)@ IIIA6150
000842 LABEL.160 ADVANCE TIME(1*FNSFNI) GOTO(LABEL.161)@ IIIA6160
000843 LABEL.161 LEAVE S(1) GOTO(LABEL.162)@ IIIA6170
000844 *-----*
000845 *
000846 *
000847 * TRANSPORT BOOSTER TO MAINTENANCE IDST
000848 *
000849 * TRIANGULAR MIN MODE MAX IIIA6240
000850 LABEL.162 HELP 3,50,100,150,XX(10) GOTO(LABEL.163)@ IIIA6250
000851 LABEL.163 ADVANCE TIME(1*FNSFNI) GOTO(LABEL.164)@
000852 *-----*
000853 *
000854 *
000855 *
000856 * BOOSTER MAINTENANCE IDST IIIA6300
000857 *
000858 LABEL.164 QUEUE Q(2) GOTO(LABEL.165)@ IIIA6320
000859 LABEL.165 ENTER S(2) GOTO(LABEL.166)@ IIIA6330
000860 * TRIANGULAR MIN MODE MAX
000861 LABEL.166 HELP 3,2250,2500,2750,XX(10) GOTO(LABEL.167)@ IIIA6350
000862 LABEL.167 ADVANCE TIME(1*FNSFNI) GOTO(25:LABEL.170,LABEL.168) @ III
000863 * A6360
000864 *
000865 * BOOSTER ADDITIONAL MAINTENANCE IDST
000866 *
000867 * EXPONENTIAL MIN MEAN
000868 LABEL.168 HELP 8,500,1000,XX(10) GOTO(LABEL.169)@ IIIA6410
000869 LABEL.169 ADVANCE TIME(1*FNSFNI) GOTO(LABEL.170)@ IIIA6420
000870 LABEL.170 LEAVE S(2) GOTO(LABEL.171)@ IIIA6430
000871 *-----*
000872 *
000873 *
000874 *
000875 * TRANSPORT BOOSTER TO SYSTEMS TEST, TEST, TRANSPORT TO STORAGE IDST
000876 *
000877 LABEL.171 QUEUE Q(3) GOTO(LABEL.172)@ IIIA6500
000878 LABEL.172 ENTER S(3) GOTO(LABEL.173)@ IIIA6510
000879 LABEL.173 HELP 3,1900,2000,2100,XX(10) GOTO(LABEL.174)@ IIIA6520
000880 LABEL.174 ADVANCE TIME(1*FNSFNI) GOTO(LABEL.175)@ IIIA6530
000881 LABEL.175 LEAVE S(3) GOTO(LABEL.176)@ IIIA6540
000882 *-----*
000883 * BOOSTER STORAGE WHEN WAITING FOR ORBITER OR LAUNCH REQUIREMENT
000884 *
000885 LABEL.176 ENTER S(4),1 GOTO(LABEL.177)@ IIIA6580
000886 LABEL.177 HELP 5,1,CS1 GOTO(LABEL.178)@ IIIA6590
000887 LABEL.178 TABULATE T(3) GOTO(LABEL.179)@ IIIA6600
000888 LABEL.179 TABULATE T(1) GOTO(LABEL.260)@ IIIA6610
000889 *-----*
000890 *
000891 *
000892 * ORBITER BOOST INTO ORBIT,PERFORM MISSION AND RETURN
000893 *
000894 LABEL.180 ENTER S(14) GOTO(LABEL.181)@ IIIA6670

```



```

000951 LABEL.200 QUEUE Q(12) GOTO(LABEL.201)@ IIIA7230
000952 LABEL.201 ENTER S(12) GOTO(LABEL.202)@ IIIA7240
000953 LABEL.202 HELP 3,1900,2000,2100,XX(10) GOTO(LABEL.203)@ IIIA7250
000954 LABEL.203 ADVANCE TIME(1,FNSFN1) GOTO(LABEL.204)@ IIIA7260
000955 LABEL.204 LEAVE S(12) GOTO(LABEL.205)@ IIIA7270
000956 *
000957 * ORBITER STORAGE WHEN WAITING FOR BOOSTER OR LAUNCH REQUIREMENT
000958 *
000959 LABEL.205 ENTER S(13),1 GOTO(LABEL.206)@ IIIA7310
000960 LABEL.206 HELP 5,2,CS1 GOTO(LABEL.207)@ IIIA7320
000961 LABEL.207 TABULATE T(21) GOTO(LABEL.208)@ IIIA7330
000962 LABEL.208 TABULATE T(23) GOTO(LABEL.209)@ IIIA7340
000963 LABEL.209 TERMINATE @ IIIA7350
000964 *
000965 *
000966 *
000967 *
000968 * VEHICLE REMOVAL PATH
000969 * ONLY VEHICLES WHICH ARE TO BE REMOVED FROM THE PAD FLOW
000970 * THROUGH THIS SECTION.
000971 *
000972 *
000973 * REMOVE BOOSTER, ORBITER AND LUT FROM THE PAD IDST
000974 *
000975 LABEL.210 ENTER S(25) GOTO(LABEL.211)@ IIIC2000
000976 * TRIANGULAR MIN MODE MAX IIIC2010
000977 LABEL.211 HELP 3,1800,2000,2200,XX(10) GOTO(LABEL.212)@ IIIC2020
000978 LABEL.212 ADVANCE TIME(1,FNSFN1) GOTO(LABEL.213)@ IIIC2030
000979 LABEL.213 LEAVE S(25) GOTO(LABEL.214)@ IIIC2040
000980 LABEL.214 RELEASE *P9 GOTO(LABEL.215)@ IIIC2050
000981 *
000982 *
000983 *
000984 *
000985 * TRANSPORT VEHICLE, SEPARATE ORBITER, TRANSPORT ORBITER TO MAINT IDST
000986 *
000987 LABEL.215 ENTER S(30) GOTO(LABEL.216)@ IIIC2120
000988 * TRIANGULAR MIN MODE MAX IIIC2130
000989 LABEL.216 HELP 3,550,750,950,XX(10) GOTO(LABEL.217)@ IIIC2140
000990 LABEL.217 ADVANCE TIME(1,FNSFN1) GOTO(LABEL.218)@ IIIC2150
000991 LABEL.218 LEAVE S(30) GOTO(LABEL.219)@ IIIC2160
000992 *
000993 *
000994 *
000995 *
000996 *
000997 * SEPARATE ORBITER FROM BOOSTER/LUT AND SEND ORBITER TO MAINTENANCE
000998 *
000999 LABEL.219 SPLIT 1,LABEL.237 GOTO(LABEL.220)@ IIIC2240
001000 *
001001 *
001002 *
001003 *
001004 *
001005 * SEPARATE BOOSTER FROM LUT, TRANSPORT BOOSTER TO MAINTENANCE IDST
001006 LABEL.220 ENTER S(19) GOTO(LABEL.221)@ IIIC2310

```

```

001007 LABEL.221 HELP 3,550,750,950,X$X(10) GOTO(LABEL.222)@ 111C2320
001008 LABEL.222 ADVANCE TIME(1*FNSFN1) GOTO(LABEL.223)@ 111C2330
001009 LABEL.223 LEAVE S(19) GOTO(LABEL.224)@ 111C2340
001010 LABEL.224 SPLIT 1,LABEL.130 GOTO(LABEL.225)@ 111C2350
001011 -----
001012 *BOOSTER MAINTENANCE ON RETURN FROM PAD 1DST 111A7400
001013 LABEL.225 QUEUE Q(2) GOTO(LABEL.226)@ 111A7410
001014 LABEL.226 ENTER S(2) GOTO(LABEL.227)@ 111A7420
001015 * EXPONENTIAL MIN MEAN
001016 LABEL.227 HELP 8,500,7500,X$X(10) GOTO(LABEL.228)@ 111A7440
001017 LABEL.228 ADVANCE TIME(1*FNSFN1) GOTO(LABEL.229)@ 111A7450
001018 LABEL.229 LEAVE S(2) GOTO(LABEL.230)@ 111A7460
001019 -----
001020 *
001021 *
001022 -----
001023 * BOOSTER VEHICLE SYSTEM TEST FACILITY ON RETURN FROM PAD 1DST 111A7510
001024 LABEL.230 QUEUE Q(3) GOTO(LABEL.231)@ 111A7520
001025 LABEL.231 ENTER S(3) GOTO(LABEL.232)@ 111A7530
001026 * MIN NOM MAX
001027 LABEL.232 HELP 3,1900,2000,2100,X$X(10) GOTO(LABEL.233)@ 111A7550
001028 LABEL.233 ADVANCE TIME(1*FNSFN1) GOTO(LABEL.234)@ 111A7560
001029 LABEL.234 LEAVE S(3) GOTO(LABEL.235)@ 111A7570
001030 LABEL.235 ENTER S(4),1 GOTO(LABEL.236)@ 111A7580
001031 LABEL.236 HELP 5,1,C$1 GOTO(LABEL.260)@ 111A7590
001032 -----
001033 *
001034 *
001035 -----
001036 * ORBITER MAINTENANCE ON RETURN FROM PAD 1DST 111A7600
001037 LABEL.237 QUEUE Q(11) GOTO(LABEL.238)@ 111A7650
001038 LABEL.238 ENTER S(11) GOTO(LABEL.239)@ 111A7660
001039 * EXPONENTIAL MIN MEAN
001040 LABEL.239 HELP 8,500,7500,X$X(10) GOTO(LABEL.240)@ 111A7680
001041 LABEL.240 ADVANCE TIME(1*FNSFN1) GOTO(LABEL.241)@ 111A7690
001042 LABEL.241 LEAVE S(11) GOTO(LABEL.242)@ 111A7700
001043 -----
001044 *
001045 *
001046 -----
001047 * ORBITER VEHICLE SYS TEST FACILITY ON RETURN FROM PAD 1DST 111A7750
001048 LABEL.242 QUEUE Q(12) GOTO(LABEL.243)@ 111A7760
001049 LABEL.243 ENTER S(12) GOTO(LABEL.244)@ 111A7770
001050 * MIN NOM MAX
001051 LABEL.244 HELP 3,1900,2000,2100,X$X(10) GOTO(LABEL.245)@ 111A7790
001052 LABEL.245 ADVANCE TIME(1*FNSFN1) GOTO(LABEL.246)@ 111A7800
001053 LABEL.246 LEAVE S(12) GOTO(LABEL.247)@ 111A7810
001054 LABEL.247 ENTER S(13) GOTO(LABEL.248)@ 111A7820
001055 LABEL.248 HELP 5,2,C$1 GOTO(LABEL.249)@ 111A7830
001056 LABEL.249 TERMINATE @ 111A7840
001057 -----
001058 *
001059 *
001060 *
001061 * COUNT NUMBER OF LAUNCHES MISSED BECAUSE OF UNAVAILABILITY
001062 * OF A BOOSTER AND/OR ORBITER AND/OR LUT

```

```

001063
001064 LABEL.250 SAVEX X(5),X5X(5)+1 GOTO(LABEL.251,LABEL.255) @ IIIA7910
001065 LABEL.251 GATE SE,S(4) GOTO(LABEL.252,LABEL.254) @ IIIA7920
001066 LABEL.252 GATE SE,S(13) GOTO(LABEL.253) @ IIIA7930
001067
001068 *NO BOOSTER OR ORBITER AVAILABLE IIIA7950
001069
001070 LABEL.253 SAVEX X(2),X5X(2)+1 GOTO(LABEL.260) @ IIIA7960
001071
001072 *NO BOOSTER AVAILABLE IIIA7970
001073
001074 LABEL.254 SAVEX X(3),X5X(3)+1 GOTO(LABEL.260) @ IIIA7990
001075
001076 * EITHER NO ORBITER OR NO LUT OR BOTH IIIA8000
001077
001078
001079 LABEL.255 SAVEX X(7),X5X(7)+1 GOTO(LABEL.256,LABEL.258) @ IIIA8010
001080 LABEL.256 GATE SE,S(13) GOTO(LABEL.257) @ IIIA8030
001081
001082 * NO ORBITER AVAILABLE IIIA8040
001083
001084 LABEL.257 SAVEX X(4),X5X(4)+1 GOTO(LABEL.260) @ IIIA8050
001085
001086 * NO LUT AVAILABLE WHEN HARDWARE IS AVAILABLE IIIA8060
001087
001088 LABEL.258 SAVEX X(8),X5X(8)+1 GOTO(LABEL.260) @ IIIA8070
001089
001090 * COUNT NUMBER OF MISSED LAUNCHES PAD(S) UNAVAILABLE IIIA8090
001091 LABEL.259 SAVEX X(25),X5X(25)+1 GOTO(LABEL.260) @ IIIA8100
001092 LABEL.260 COMPARE NSLABEL.271 LE V5V(10) GOTO(LABEL.261,LABEL.271) @ IIIA8110
001093
001094 LABEL.261 COMPARE V5V(10) E NSLABEL.271 GOTO(LABEL.262) @ IIIA8130
001095
001096 * PRINT OUT SUMMARY TABLE IIIA8140
001097
001098 LABEL.262 HELP 10,,TBST(10),SSS(114) GOTO(LABEL.263) @ IIIA8150
001099 LABEL.263 HELP 10,TBST(1),TBST(21),TBST(2),TBST(22) GOTO(LABEL.264) @ IIIA8170
001100
001101 LABEL.264 HELP 10,QSQ(X1),QSQ(X10),QSQ(X2),QSQ(X11) GOTO(LABEL.265) @ IIIA8180
001102
001103 LABEL.265 HELP 10,QSQ(X3),QSQ(X12),QSQ(X20),QSQ(X18) GOTO(LABEL.266) @ IIIA8220
001104
001105 LABEL.266 HELP 10,QSQ(X21) GOTO(LABEL.267) @ IIIA8230
001106 LABEL.267 HELP 10,SSS(R1),SSS(R10),SSS(R2),SSS(R11) GOTO(LABEL.268) @ IIIA8240
001107
001108 LABEL.268 HELP 10,SSS(R3),SSS(R12) GOTO(LABEL.269) @ IIIA8300
001109 LABEL.269 HELP 10,SSS(R20),SSS(R18) GOTO(LABEL.270) @ IIIA8310
001110 LABEL.270 HELP 10,FSF(R1),FSF(R2),FSF(R3) GOTO(LABEL.271) @ IIIA8320
001111 LABEL.271 TERMINATE ,R @ IIIA8330
001112
001113
001114
001115
001116
001117
001118

```

TABLE DEFINITIONS

1 - TIME FROM LANDING TO STORAGE ENTRY (BOOSTER)

2 - STORAGE TIME (BOOSTER)

3 - GROUND PROCESSING TIME (BOOSTER)

001119	• 4 - FLOATING HOLD TIME BETWEEN COMPLETION OF ALL PRECOUNTDOWN	111B1710
001120	• OPERATIONS AND THE INITIATION OF FINAL COUNTDOWN FOR THE FIRST	111C2380
001121	• WINDOW	111C2390
001122	• 5 - FLOATING HOLD TIME BETWEEN COMPLETION OF ALL PRECOUNTDOWN	111C2400
001123	• OPERATIONS AND THE INITIATION OF FINAL COUNTDOWN, FOR ALL WINDOWS	111C2410
001124	• SUBSEQUENT TO THE FIRST	111C2420
001125	• 6 - THE AMOUNT OF TIME A SUCCESSFUL REQUEST SPENT WAITING FOR	111C2430
001126	• VEHICLE ELEMENTS.	111C2440
001127	• 7 - THE AMOUNT OF TIME LEFT TO THE FIRST LAUNCH WINDOW - NEGATIVE	111C2450
001128	• VALUES IN THE TABLE INDICATE THE AMOUNT OF TIME PAST THE WINDOW	111C2460
001129	• THE PROGRAM IS AT.	111C2470
001130	• 8 - AMOUNT OF TIME AFTER PRIMARY WINDOW LAUNCH OCCURRED AT	111C2480
001131	• 9 - INDICATES THE NUMBER OF LAUNCHES AT EACH WINDOW	111C2490
001132	• 10 - ELAPSED TIME OF VEHICLE ELEMENTS FROM THEIR STORAGE EXIT TO	111B1780
001133	• THEIR LIFTOFF	111B1790
001134	• 11 -	111B1800
001135	• 12 -	111B1810
001136	• 13 -	111B1820
001137	• 14 -	111B1830
001138	• 15 -	111B1840
001139	• 16 -	111B1850
001140	• 17 -	111B1860
001141	• 18 -	111B1870
001142	• 19 -	111B1880
001143	• 20 -	111B1890
001144	• 21 - TIME FROM LANDING TO STORAGE ENTRY (ORBITER)	111B1900
001145	• 22 - STORAGE TIME (ORBITER)	111B1910
001146	• 23 - GROUND PROCESSING TIME (ORBITER)	111B1920
001147	• -----	111B1930
001148	T(1) TABLE MPSP8,5000,500,20@	111A8340
001149	T(2) TABLE XSV(10),000,500,30@	111A8350
001150	T(3) TABLE XSV(1),9000,500,30@	111A8360
001151	T(4) TABLE XSV(10),000,100,30@	111A8370
001152	T(5) TABLE XSV(10),000,100,30@	111C2500
001153	T(6) TABLE MS1,000,100,70@	111C2510
001154	T(7) TABLE XSV(10),-5000,100,55@	111C2520
001155	T(8) TABLE XSV(35),000,100,50@	111C2530
001156	T(9) TABLE XSV(27),000,1,15@	111C2540
001157	T(10) TABLE MPSP11,0000,500,30@	111A8380
001158	• 11	111C2550
001159	• 12	111C2560
001160	• 13	111C2570
001161	• 14	111C2580
001162	• 15	111C2590
001163	• 16	111C2600
001164	• 17	111C2610
001165	• 18	111C2620
001166	• 19	111C2630
001167	• 20	111C2640
001168	T(21) TABLE MPSP8,5000,500,20@	111A8390
001169	T(22) TABLE XSV(10),000,500,30@	111A8400
001170	T(23) TABLE XSV(7),9000,500,30@	111A8410
001171	• -----	111B1940
001172	•	111B1950
001173	•	111B1960
001174	•	111B1970

NUMBER OF SIMULATIONS TO BE PERFORMED

001175 * NOTE- SEE VARIABLE 10 11181980
 001176 * -----11181990
 001177 START 501
 001178 END

BCOPY,GM MODEL.,TRANSFILE2.
 FURPUR HA18-03/31-01:29
 10 BLOCKS COPIED

9FIN

RUNID: CONF2 ACCOUNT: 420025 PROJECT: MARSHLBIN225

2- SAVE BLANK 18/12 TRANSFILE2 -1 5006

2 3517

SERVICE 3517 19/12 5006
 SERVICE 3517 19/12 5006
 SERVICE 3517 19/12 5006
 SERVICE 3517 19/12 5006
 SERVICE 3517 19/12 5006

TIME: 00:00:44.119 IN: 1147 OUT: 1178 PAGES: 47

INITIATION TIME: 01:28:00-MAR 31,1972

TERMINATION TIME: 01:37:40-MAR 31,1972

APPENDIX C. CORRECTED GPSS 1100 PRINTOUT

1	JOB		IIIA	20
2	ORDER, F 200		IIIA	30
3	ORDER, S 200		IIIC	10
4	ORDER, L 500			
5	ORDER, Q 200		IIIA	50
6	ORDER, UC 20		IIIA	60
7	ORDER, P P1,P2,P3,P4,P5,P6,P7,P8,P9,P10,P11,P12,P13,P14		IIIA	70
8	ORDER, T 100		IIIA	80
9	ORDER, X 500		IIIA	90
10	ORDER, FN FN1, FN2, FN3, FN4, FN5, FN6, FN7, FN8, FN9, FN10, FN11, FN12, FN13, FN14,		IIIA	100
11	+ FN15, FN16, FN17, FN18, FN19, FN20, FN21, FN22, FN23, FN24, FN25, FN26, FN27, FN28,		IIIA	110
12	+ FN29, FN30, FN31, FN32, FN33, FN34, FN35, FN36, FN37, FN38, FN39, FN40, FN41, FN42,		IIIB	10
13	+ FN43, FN44, FN45, FN46, FN47, FN48, FN49, FN50, FN51, FN52, FN53, FN54, FN55, FN56,		IIIA	120
14	+ FN57, FN58, FN59, FN60, FN61, FN62, FN63, FN64, FN65, FN66, FN67, FN68, FN69, FN70,		IIIA	130
15	+ FN71, FN72, FN73, FN74, FN75, FN76, FN77, FN78, FN79, FN80, FN81, FN82, FN83, FN84,		IIIA	140
16	+ FN85, FN86, FN87, FN88, FN89, FN90, FN91, FN92, FN93, FN94, FN95, FN96, FN97, FN98,		IIIA	150
17	+ FN99, FN100		IIIA	160
18	ORDER, V 50		IIIA	170
19			IIIA	180
20			IIIA	190
21	SHUTTLE OPERATIONS SIMULATION MODEL MSFC VERSION III-C JAN. 7, 1972		IIIA	200
22			IIIC	11
23			IIIC	12
24			IIIA	220
25			IIIA	230
26			IIIA	240
27			IIIA	250
28			IIIB	20
29			IIIB	30
30			IIIB	40
31			IIIB	50
32			IIIB	60
33			IIIB	70
34			IIIB	80
35			IIIB	90
36				
37				
38				
39				
40				
41				
42				
43				
44				
45				
46				
47				
48				
49				
50				
51				
52				
53				

ALL TIMES EXPRESSED
IN THIS PROGRAM ARE IN
TERMS OF MILIT WORKING DAYS (1/1000 OF A WORKING DAY)
(WORKING DAY = 16 HOURS)

PERFORMANCE TIME DISTRIBUTION CODES

K3	TRIANGULAR
K4	NORMAL
K8	EXPONENTIAL
K9	LOGNORMAL
K11	CONSTANT
K12	UNIFORM
K13	BETA

CURRENT MAXIMUM PROGRAM LIMITS

BLOCKS	- 400
FACILITIES	- 15
STORAGES	- 50
QUEUES	- 50
LOGIC SWITCHES	- 25

54	•	SAVEX LOCATIONS	- 50	1118 100
55	•	FUNCTIONS	- 10	1118 110
56	•	TABLES AND TABLES	- 30 (COMBINED TOTAL)	1118 120
57	•	VARIABLE STATEMENT	- 25	1118 130
58	•	PARAMETERS	- 20	1118 140
59	•	TRANSACTION NUMBERS	- 100	1118 150
60	•			1118 160
61	•			1118 170
62	•			1118 180
63	•			1118 190
64	•			111A 260
65	•			111A 270
66	•			111A 280
67	•	S(1) CAPACITY 1 @		111A 29
68	•	0		
69	•	S(2) CAPACITY 2 @		111A 30
70	•	0		
71	•	S(3) CAPACITY 2 @		111A 31
72	•	0		
73	•	S(4) CAPACITY 9 @		111A 32
74	•	0		
75	•	5		111A 330
76	•	6		111A 340
77	•	7		111A 350
78	•	8		111A 360
79	•	9		111A 370
80	•	S(10) CAPACITY 1 @		111A 3
81	•	80		
82	•	S(11) CAPACITY 2 @		111A 3
83	•	90		
84	•	S(12) CAPACITY 2 @		111A 4
85	•	00		
86	•	S(13) CAPACITY 9 @		111A 4
87	•	10		
88	•	S(14) CAPACITY 9 @		111A 4
89	•	20		
90	•	15		111A 430
91	•	S(16) CAPACITY 10 @		111A
92	•	440		
93	•	S(17) CAPACITY 2 @		111A 4
94	•	50		
95	•	S(18) CAPACITY 2 @		111A 4
96	•	60		
97	•	S(19) CAPACITY 1 @		111A 4
98	•	70		
99	•	S(20) CAPACITY 1 @		111A 4
100	•	80		
101	•	21		111A 490
102	•	S(22) CAPACITY 2 @		111A 5
103	•	00		
104	•	S(23) CAPACITY 2 @		111A 5
105	•	10		
106	•	24		111A 520
107	•	S(25) CAPACITY 2 @		111A 5
108	•	30		
109	•	26		111A 540

110	S(27) CAPACITY 2 W	IIIA 5
111	• 50	
112	S(28) CAPACITY 2 W	IIIA 5
113	• 60	
114	S(29) CAPACITY 1 W	IIIA 5
115	• 70	
116	S(30) CAPACITY 1 W	IIIA 5
117	• 80	
118	S(31) CAPACITY 1 W	IIIA 5
119	• 90	
120	-----	IIIA 600
121	•	IIIA 610
122	•	IIIA 620
123	•	IIIA 630
124	•	IIIA 640
125	•	IIIB 200
126	•	IIIA 660
127	•	IIIB 210
128	•	IIIB 220
129	•	IIIB 230
130	•	IIIB 240
131	•	IIIB 250
132	•	IIIB 260
133	•	IIIB 270
134	•	IIIA 700
135	•	IIIA 710
136	•	IIIA 720
137	•	IIIA 730
138	•	IIIA 740
139	•	IIIA 750
140	•	IIIB 280
141	•	IIIB 290
142	•	IIIB 300
143	•	IIIA 790
144	•	IIIA 800
145	•	IIIA 810
146	•	IIIB 310
147	•	IIIA 830
148	•	IIIB 320
149	•	IIIA 850
150	•	IIIB 330
151	•	IIIB 340
152	•	IIIB 350
153	•	IIIA 880
154	•	IIIA 890
155	•	IIIA 900
156	•	IIIA 910
157	•	IIIA 920
158	•	IIIA 930
159	•	IIIA 940
160	•	IIIB 360
161	•	IIIA 960
162	•	IIIA 970
163	•	IIIB 370
164	•	IIIB 380
165	•	IIIB 390

STORAGE AND QUEUE DEFINITIONS

NOTE - THE DEFINITIONS WHICH ARE FOLLOWED BY THE NOTATION (Q) ALSO REFER TO A QUEUE WHICH IMMEDIATELY PRECEEDS THE STORAGE. THE DEFINITIONS WHICH ARE NOT FOLLOWED BY THE NOTATION (Q) HAVE NO QUEUE ASSOCIATED WITH THEM.

1 - BOOSTER SAFING (Q)
2 - BOOSTER MAINTENANCE (Q)
3 - TRANSPORT BOOSTER TO SYSTEMS TEST, TEST, TRANSPORT TO STORAGE (Q)
4 - BOOSTER STORAGE

10 - ORBITER SAFING (Q)
11 - ORBITER MAINTENANCE (Q)
12 - TRANSPORT ORBITER TO SYSTEMS TEST, TEST, TRANSPORT TO STORAGE (Q)
13 - ORBITER STORAGE
14 - ORBITER BOOST TO ORBIT, PERFORM MISSION, RETURN
15

16 - LAUNCH UMRILICAL TOWER (LUTS) STORAGE
17 - REMOVE POST LAUNCH LUT FROM PAD
18 - TRANSPORT LUT TO MAINT., REFURRISH/TEST, TRANSPORT TO STORAGE (Q)
19 - SEPARATE BOOSTER FROM LUT, TRANSPORT BOOSTER TO MAINTENANCE
20 - MATE AND HOOKUP BOOSTER, ORBITER AND LUT (Q)
21 - QUEUE IMMEDIATELY PRECEEDING THE PAD FACILITIES (NOTE- THERE IS NO ASSOCIATED STORAGE)
22 - COUNTDOWN PREPARATION
23 - COUNTDOWN
24
25 - REMOVE BOOSTER, ORBITER AND LUT FROM PAD
26
27 - REFURRISH LAUNCH PAD
28 - LIFTOFF THROUGH SEPARATION
29 - READY STORAGE FOR NEXT BOOSTER, ORBITER AND LUT (Q)
30 - TRANSPORT VEHICLE, SEPARATE ORBITER, TRANSPORT ORBITER TO MAINT. (IMMEDIATELY PRIOR TO THE BEGINNING OF THE MATE OPERATION)
31 - RESTRICTS THE REQUEST FOR VEHICLE ELEMENTS TO ONE MISSION AT A TIME. SUCCEEDING MISSIONS MUST WAIT UNTIL THE MISSION IMMEDIATELY IN FRONT OF THEM HAS EITHER SUCCESSFULLY MET ITS

```

166 * REQUEST OR HAS BEEN CANCELLED DUE TO AN EXCESSIVE WAIT FOR 111B 400
167 * VEHICLE ELEMENTS. (Q) 111B 410
168 ----- 111A 990
169 * 111A1000
170 * 111A1010
171 ----- 111A1020
172 * 111A1030
173 * 111A1040
174 * 111A1050
175 * 111C 20
176 * 111B 420
177 * 111B 430
178 * 111B 440
179 * 111B 450
180 * 111B 460
181 * 111B 470
182 *
183 *
184 *
185 *
186 *
187 *
188 *
189 *
190 *
191 *
192 *
193 *
194 *
195 *
196 *
197 *
198 *
199 *
200 *
201 *
202 *
203 *
204 *
205 *
206 *
207 *
208 *
209 *
210 *
211 *
212 *
213 *
214 *
215 *
216 *
217 *
218 *
219 *
220 *
221 *

```

FUNCTION DEFINITIONS

1 - IS A CONTINUOUS LINEAR FUNCTION WITH A SLOPE OF 1. ITS END
 POINTS ARE LOCATED AT (0,0) AND (999999,999999). IT IS USED
 TO CONVERT THE INPUT SYSTEM VARIABLE SAVEX 10 (X10) INTO
 FUNCTION 1 (FN1), WHICH CAN BE USED AS A MODIFIER IN AN ADVANCE
 BLOCK. THE FUNCTION IS DESCRIBED SUCH THAT THE CONVERSION
 IS ONE TO ONE (FN1=X10).

FN1 FUNCTION ,C HASS,0,0 999999,999999
 FN2 FUNCTION ,C XSX(10),0,0 999999,999999

SAVEX DEFINITIONS

NOTE A - UNLESS OTHERWISE STATED THE FOLLOWING DEFINITIONS
 REPRESENT THE TOTAL COUNT OF THE TRANSACTIONS
 ENTERING THE STATEMENT.

NOTE B - SAVEXES 10,11, AND 12 ARE FIRST USED TO INITIALIZE
 THE NUMBER OF BOOSTERS, ORBITERS, AND LUTS RESPECTIVELY.
 THEY ARE THEN USED AS DEFINED BELOW.

1 - BOOSTER AND ORBITER ARE AVAILABLE
 2 - BOOSTER AND ORBITER ARE NOT AVAILABLE
 3 - BOOSTER IS NOT AVAILABLE
 4 - ORBITER IS NOT AVAILABLE
 5 - BOOSTER AND/OR ORBITER AND/OR LUT NOT AVAILABLE
 6 - TOTAL GENERATED LAUNCH REQUESTS
 7 - ORBITER AND/OR LUT NOT AVAILABLE
 8 - LUT NOT AVAILABLE WHEN BOOSTER AND ORBITER ARE AVAILABLE
 9 -
 10 - THE INPUT VARIABLE TO FUNCTION 1 (SEE NOTE B ABOVE)
 11 - THE LENGTH OF THE NEXT ORBITER MISSION (SEE NOTE B ABOVE)
 12 - MISSION TYPE FOR NEXT MISSION (SEE NOTE B ABOVE)
 13 - TIME UNTIL NEXT LAUNCH
 14 -
 15 - TIME BETWEEN LAUNCH OPPORTUNITIES FOR NEXT MISSION
 16 - LENGTH OF ORBITER MISSION FOR NEXT MISSION
 17 - MISSION TYPE OF CURRENT MISSION
 18 - TIME UNTIL CURRENT LAUNCH
 19 -
 20 - TIME BETWEEN LAUNCH OPPORTUNITIES FOR CURRENT MISSION
 21 - TIME OF FIRST LAUNCH OPPORTUNITY FOR CURRENT MISSION
 22 - VEHICLES REMOVED FROM PAD (FAILURE ON PAD)
 23 - VEHICLES REMOVED FROM PAD (CONSTRAINS NEXT LAUNCH)
 24 - VEHICLES REMOVED FROM PAD (NO SECOND LAUNCH WINDOW)

222	• 25 - LAUNCHES MISSED DUE TO PAD UNAVAILABILITY	1118 790
223	• 26 - THE NUMBER OF VEHICLES LAUNCHED AT AN ALTERNATE LAUNCH WINDOW	1118 800
224	• 27 - LAUNCH WINDOW INDICATOR	111C 40
225	• 28 - NUMBER OF LAUNCHES AT PRIMARY WINDOW	111C 50
226	• 29 - NUMBER OF TIMES A VEHICLE WAS REPAIRED ON THE PAD	111C 60
227	• 30 - TOTAL SUCCESSFULLY ACCOMPLISHED LAUNCHES	1118 840
228	• 31 -	1118 850
229	• 32 -	111C 61
230	• 33 -	111C 62
231	• 34 -	111C 63
232	• 35 - AMOUNT OF TIME AFTER PRIMARY WINDOW AT WHICH LAUNCH OCCURS	111C 64
233		111A1500
234		111A1510
235		111A1520
236		111A1530
237		111A1540
238		111A1550
239		111A1560
240	• 1 - GROUND PROCESSING TIME FOR EACH BOOSTER	1118 860
241	(TIME OUT OF STORAGE)-(FLIGHT TIME)+(TIME IN STORAGE)	1118 870
242		1118 880
243	• 2 - TIME LEFT BEFORE LAUNCH (USED TO DETERMINE IF SUFFICIENT TIME	1118 890
244	REMAINS BEFORE LAUNCH TO INITIATE AND COMPLETE COUNTDOWN)	1118 900
245	(TIME TO LAUNCH FROM EARLIEST POSSIBLE STORAGE EXIT)-(ELAPSED	1118 910
246	TIME FROM EARLIEST POSSIBLE STORAGE EXIT)	1118 920
247	NOTE- IF FIRST LAUNCH WINDOW IS MISSED V2 WILL BE NEGATIVE.	111C 70
248	THIS IS TAKEN INTO ACCOUNT IN LATER VARIABLES.	111C 80
249		1118 930
250	• 3 - FLOATING HOLD TIME BETWEEN COMPLETION OF ALL PRECOUNTDOWN	1118 940
251	OPERATIONS AND THE INITIATION OF FINAL COUNTDOWN FOR THE	1118 950
252	FIRST LAUNCH OPPORTUNITY	1118 960
253	(TIME LEFT BEFORE LAUNCH)-(COUNTDOWN TIME)	1118 970
254		1118 980
255	• 4 - TIME TO SECOND LAUNCH WINDOW	111C 90
256	(TIME FIRST WINDOW WAS MISSED BY)+(TIME BETWEEN FIRST AND	111C 100
257	SECOND WINDOW)	111C 110
258		11181040
259	• 5 - MAXIMUM TIME TO PROCESS VEHICLE FROM MATE AND HOOKUP INITIATION	11181050
260	TO LAUNCH. THIS ALSO REPRESENTS THE EARLIEST POSSIBLE STORAGE	11181060
261	EXIT FOR THE VEHICLE ELEMENTS.	11181070
262	(ASSIGN CONSTANT = SUM OF MAXIMUM TIMES IN EACH	11181080
263	PRELAUNCH OPERATION)	11181090
264		11181100
265	• 6 - LENGTH OF COUNTDOWN	11181110
266	(PREASSIGNED CONSTANT)	11181120
267		11181130
268	• 7 - GROUND PROCESSING TIME FOR EACH ORBITER	11181140
269	(TIME OUT OF STORAGE)-(FLIGHT TIME)+(TIME IN STORAGE)	11181150
270		11181160
271	• 8 - MINIMUM TIME TO PROCESS VEHICLE FROM MATE AND HOOKUP INITIATION	11181170
272	TO LAUNCH. THIS ALSO REPRESENTS THE LATEST POSSIBLE STORAGE	11181180
273	EXIT FOR THE VEHICLE ELEMENTS IF THE FIRST LAUNCH WINDOW IS	11181190
274	TO BE MET.	11181200
275	(ASSIGN CONSTANT = SUM OF MINIMUM TIMES IN EACH	11181210
276	PRELAUNCH OPERATION)	11181220
277		11181230

```

278 9 - TIME VEHICLES ARE HELD IN READY STORAGE PRIOR TO EARLIEST 111B1240
279 POSSIBLE INITIATION OF MATE AND HOOKUP RELATIVE TO THEIR MISSION 111B1250
280 (LAUNCH TIME)-(CURRENT TIME)-(VARIABLE 5) 111B1260
281 111B1290
282 10 - THE NUMBER OF SIMULATIONS FOR WHICH STATISTICS ARE COLLECTED 111B1300
283 (ASSIGN CONSTANT = ONE LESS THAN NUMBER OF SIMULATIONS 111B1310
284 SPECIFIED ON THE START CARD) 111B1320
285 111B1330
286 11 - MAXIMUM TIME A REQUEST MAY WAIT FOR ANY VEHICLE ELEMENT 111B1340
287 AFTER THE EARLIEST POSSIBLE MATE AND HOOKUP INITIATION. 111B1350
288 (MAXIMUM TIME TO LAUNCH(V5))-(MINIMUM TIME TO LAUNCH(V8)) 111B1360
289
290 12 - TIME TO BEGINNING OF FINAL COUNTDOWN FOR THE SECOND WINDOW 111C 120
291 (TIME TO SECOND LAUNCH WINDOW)-(LENGTH OF COUNT DOWN) 111C 130
292 111C 140
293 13 - LENGTH OF TIME BETWEEN EVEN AND ODD WINDOWS 111C 150
294 (23.5 HOURS)-(TIME BETWEEN FIRST AND SECOND WINDOW) 111C 160
295 111C 170
296 14 - TIME LEFT TO BEGINNING OF FINAL COUNTDOWN FOR LAUNCH AT THE 111C 180
297 CURRENT WINDOW. 111C 190
298 (LENGTH OF TIME BETWEEN FIRST WINDOW AND CURRENT WINDOW)+(TIME 111C 200
299 THE FIRST WINDOW WAS MISSED BY)-(LENGTH OF FINAL COUNTDOWN) 111C 210
300 111C 220
301 15 - DIVIDE WINDOW NUMBER BY 2 DISCARD QUOTIENT AND RETAIN REMAINDER 111C 230
302 IF V15=0 THE WINDOW IS EVEN. IF V15=1 THE WINDOW IS ODD 111C 240
303 111A1760
304
305 V(1) VARIABLE ,I MSP11-PSP1+PSP2
306 V(2) VARIABLE ,I VSV(5)-MS1
307 V(3) VARIABLE ,I VSV(2)-VSV(6)
308 V(4) VARIABLE ,I PSP7+VSV(2)
309 V(5) VARIABLE ,I 5325
310 V(6) VARIABLE ,I R3
311 V(7) VARIABLE ,I MSP11-PSP1+PSP4
312 V(8) VARIABLE ,I 3925
313 V(9) VARIABLE ,I X$X(21)-C$1-VSV(5)
314 V(10) VARIABLE ,I 75
315 V(11) VARIABLE ,I VSV(5)-VSV(8)
316 V(12) VARIABLE ,I VSV(4)-VSV(6)
317 V(13) VARIABLE ,I 979-PSP7
318 V(14) VARIABLE ,I X$X(35)+VSV(2)-VSV(6)
319 V(15) VARIABLE ,I X$X(27)/2
320
321 -----111A1880
322 111B1370
323 111B1380
324 111B1390
325 111B1400
326 111B1410
327 111B1420
328 111B1430
329 111B1440
330 111B1450
331 111B1460
332 111B1470
333 111B1480
334 111B1490
335 111B1500

```

PARAMETER DEFINITIONS

```

1 - INDEPENDENT TOTAL FLIGHT TIME OF EACH BOOSTER AND ORBITER
2 - TIME IN STORAGE FOR THE BOOSTER OF THE CURRENT MISSION
3 - LENGTH OF CURRENT ORBITER MISSION
4 - MISSION TYPE UNTIL REDEFINED AS TIME IN STORAGE FOR THE ORBITER
5 - OF THE CURRENT MISSION
6 - TIME TO THE CURRENT LAUNCH
7 - TIME BETWEEN LAUNCH OPPORTUNITIES FOR CURRENT LAUNCH

```

```

334 • 8 - TIME FROM LANDING TO STORAGE ENTRY
335 • 9 - DEFINES PAD TO BE SEIZED FOR CURRENT MISSION
336 • 10 - INITIALIZATION OF THE NUMBER OF BOOSTERS, ORBITERS AND LUTS
337 • 11 - IS MARKED SUCH THAT THE LEAVE STORAGE TO LAUNCH TIME CAN BE
338 • TABULATED, THE AMOUNT OF TIME EACH BOOSTER AND ORBITER
339 • SPENDS OUT OF STORAGE IS ALSO TABULATED BY THIS PARAMETER.
340 -----
341 •
342 •
343 •
344 • START NEW PROBLEM AND READ IN FLEET SIZE
345 •
346 •
347 • 1 LABEL.1 GENERATE 0,1 GOTO(LABEL.2)@
348 • 2 LABEL.2 HELP 7,XSX(11),XSX(10),XSX(12) GOTO(LABEL.3)@ LUT
349 • 3 LABEL.3 ASSIGN P10,MAS3 GOTO(LABEL.4)@
350 • 4 LABEL.4 ENTER S(13),PSP10 GOTO(LABEL.5)@
351 • 5 ENTER X11 NUMBER OF BOOSTERS INTO STORAGE 4
352 • 6 LABEL.5 ASSIGN P10,MAS2 GOTO(LABEL.6)@
353 • 7 LABEL.6 ENTER S(4),PSP10 GOTO(LABEL.7)@
354 • 8 ENTER X12 NUMBER OF LUTS IN STORAGE 16
355 • 9 LABEL.7 ASSIGN P10,MAS4 GOTO(LABEL.8)@
356 • 10 LABEL.8 ENTER S(16),PSP10 GOTO(LABEL.15)@
357 • -----
358 •
359 •
360 •
361 •
362 •
363 •
364 •
365 •
366 •
367 •
368 • GENERATE SUFFICIENT TIME TO MEET THE FIRST MISSION REQUEST
369 •
370 • INITIALIZE SAVEX 16 THROUGH 21 WITH FIRST TRANSACTION START TIME
371 •
372 •
373 • 9 LABEL.9 SAVEX X(16),MAS2 GOTO(LABEL.10)@
374 • 10 LABEL.10 SAVEX X(17),MAS3 GOTO(LABEL.11)@
375 • 11 LABEL.11 SAVEX X(18),MAS4 GOTO(LABEL.12)@
376 • 12 LABEL.12 SAVEX X(20),MAS5 GOTO(LABEL.13)@
377 • INITIALIZE TIME TO LAUNCH CUMULATOR WITH SIMULATION START TIME
378 • 13 LABEL.13 SAVEX X(21),CS1 GOTO(LABEL.14,LABEL.15) @
379 •
380 • DETERMINE IF FIRST LAUNCH REQ. HAS ENOUGH TIME TO MEET ITS LAUNCH
381 •
382 • 14 LABEL.14 COMPARE XSX(18) GE VSV(5) GOTO(LABEL.16)@
383 •
384 • CALL HELP & DETERMINE A MORE REALISTIC FIRST LAUNCH REQ.
385 •
386 • 15 LABEL.15 HELP 1,XSX(11),XSX(12),XSX(13),XSX(15) GOTO(LABEL.9)@
387 • 2360
388 •
389 • RETURN AND REINITIALIZE SAVEX 16 THROUGH 21

```

```

11181510
11181520
11181530
11181540
11181550
11181560
11181570
11181580
11181590
11181600
11181610
11181620
11181630
11181640
11181650
11181660
11181670
11181680
11181690
11181700
11181710
11181720
11181730
11181740
11181750
11181760
11181770
11181780
11181790
11181800
11181810
11181820
11181830
11181840
11181850
11181860
11181870
11181880
11181890
11181900
11181910
11181920
11181930
11181940
11181950
11181960
11181970
11181980
11181990
11192020
11192030
11192060
11192070
11192080
11192120
11192130
11192140
11192150
11192160
11192170
11192180
11192200
11192210
11192220
11192270
11192290
11192300
11192310
11192330
11192340
11192350
11192370
11192380

```

```

390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445

16 LABEL.16 LOGIC R,L(3) GOTO(LABEL.17)@
17 LABEL.17 TERMINATE @
18 LABEL.18 GENERATE 0 GOTO(LABEL.19)@
19 LABEL.19 GATE LR,L(3) GOTO(LABEL.20)@
20 LABEL.20 LOGIC S,L(3) GOTO(LABEL.21)@
21 LABEL.21 SAVE X(6),X$X(6)+1 GOTO(LABEL.22)@
22 LABEL.22 HELP 1,X$X(11),X$X(12),X$X(13),X$X(15) GOTO(LABEL.23)@
23 LABEL.23 ASSIGN P3,X$X(16) GOTO(LABEL.24)@
24 LABEL.24 ASSIGN P4,X$X(17) GOTO(LABEL.25)@
25 LABEL.25 ASSIGN P5,X$X(18) GOTO(LABEL.26)@
26 LABEL.26 ASSIGN P7,X$X(20) GOTO(LABEL.27)@
27 LABEL.27 SAVE X(16),M$S2 GOTO(LABEL.28)@

111A2390
111A2400
111A2410
111A2420
111A2430
111A2440
111A2450
111A2460
111A2470
111A2480
111A2490
111A2500
111A2510
111A2520
111A2530
111A2540
111A2550
111A2560
111A2570
111A2580
111A2590
111A2600
111A2610
111A2620
111A2630
111A2640
111A2650
111A2660
111A2700
111A2710
111A2720
111A2740
111A2750
111A2760
111A2780
111A2790
111A2800
111A2810
111A2820
111A2830
111A2840
111A2850
111A2860
111A2870
111A2880

THE SIMULATION TRANSACTIONS ARE GENERATED FOLLOWING THIS POINT

GENERATE LAUNCHES BASED ON PROJECTED TRAFFIC REQUIREMENT

COUNT THE NUMBER OF LAUNCH REQUESTS

CALL HELP TO GENERATE ATTRIBUTES OF NEXT LAUNCH

3 - LENGTH OF THE ORBITER MISSION
4 - MISSION TYPE
5 - TIME UNTIL NEXT LAUNCH
7 - TIME BETWEEN LAUNCH OPPORTUNITIES

ASSIGN ATTRIBUTES OF CURRENT LAUNCH TO TRANSACTION

```

```

446 28 LABEL.28 SAVEX X(17),MAS3 GOTO(LABEL.29)W
447 29 LABEL.29 SAVEX X(18),MAS4 GOTO(LABEL.30)W
448 30 LABEL.30 SAVEX X(20),MAS5 GOTO(LABEL.31)W
449 31 LABEL.31 SAVEX X(21),X$X(21)+X$X(18) GOTO(LABEL.32)@
450 32 LABEL.32 SPLIT 1,LABEL.37 GOTO(LABEL.33)@
451 33 LABEL.33 SAVEX X(10),MAS4 GOTO(LABEL.34)@
452 34 LABEL.34 ADVANCE TIME(1)*FNSFN2) GOTO(LABEL.35)@
453 35 LABEL.35 LOGIC R,L(3) GOTO(LABEL.36)@
454 36 LABEL.36 TERMINATE @
455 *****
456 .
457 .
458 .
459 * READY STORAGE QUEUE TIME INCLUDED IN TABLE 2 AND TABLE 22
460 37 LABEL.37 QUEUE Q(29) GOTO(LABEL.38)@
461 .
462 * ADVANCE UNTIL TIME TO MATE THE VEHICLES
463 .
464 38 LABEL.38 ENTER S(29) GOTO(LABEL.39)@
465 39 LABEL.39 SAVEX X(10),VSV(9) GOTO(LABEL.40)@
466 40 LABEL.40 ADVANCE TIME(1)*FNSFN2) GOTO(LABEL.41)@
467 41 LABEL.41 LEAVE S(29) GOTO(LABEL.42)@
468 42 LABEL.42 QUEUE Q(31) GOTO(LABEL.43)@
469 43 LABEL.43 ENTER S(31) GOTO(LABEL.44)@
470 .
471 44 LABEL.44 MARK GOTO(LABEL.45,LABEL.47) @
472 .
473 .
474 .
475 * CHECK IF TOO MUCH DELAY HAS OCCURRED TO MEET THE LAUNCH
476 .
477 45 LABEL.45 COMPARE M$1 G VSV(11) GOTO(LABEL.46)@
478 46 LABEL.46 LEAVE S(31) GOTO(LABEL.250)W
479 47 LABEL.47 GATE SNE,S(4) GOTO(LABEL.45,LABEL.48) @
480 48 LABEL.48 GATE SNE,S(13) GOTO(LABEL.45,LABEL.49) @
481 49 LABEL.49 GATE SNE,S(16) GOTO(LABEL.51,LABEL.50) @
482 .
483 * CHECK TO SEE IF PAD IS AVAILABLE FOR THIS MISSION.
484 * IF NOT GO TO MISSED LAUNCH STATISTICS SECTION
485 .
486 50 LABEL.50 LEAVE S(31) GOTO(LABEL.259)W
487 51 LABEL.51 COMPARE Q$Q(21) E O GOTO(LABEL.52)@
488 52 LABEL.52 LEAVE S(31) GOTO(LABEL.53)@
489 53 LABEL.53 TABULATE T(6) GOTO(LABEL.54)@
490 .
491 .
492 .
493 .
494 * COUNT THE NUMBER OF TIMES THE BOOSTER,ORBITER AND LUT ARE AVAILABLE
495 * REMOVE ONE BOOSTER, ORBITER, AND LUT FROM THEIR RESPECTIVE STORAGES,
496 * AND TABULATE THE TIME THESE VEHICLE ELEMENTS SPENT IN STORAGE.
497 .
498 54 LABEL.54 SAVEX X(1),X$X(11)+1 GOTO(LABEL.55)@
499 55 LABEL.55 LEAVE S(4) GOTO(LABEL.56)@
500 56 LABEL.56 HELP 6,1,C$1,X$X(10) GOTO(LABEL.57)@
501 57 LABEL.57 TABULATE T(2) GOTO(LABEL.58)@

```

111A3030
 111A3040
 111A3050
 111A3060
 111A3070

111A3090
 111A3100
 111A3110

111A3180
 111A3200
 111A3210
 111A3220
 111A3230
 111A3240

111B1580
 111B1590
 111B1600
 111B1610

111A3330
 111A3340
 111A3350
 111A3360
 111A3370
 111B1620
 111B1630
 111A3380

```

502 58 LABEL.58 ASSIGN P2,MA$4      GOTO(LABEL.59)@
503 59 LABEL.59 LEAVE S(13)  GOTO(LABEL.60)@      IIIA3440
504 60 LABEL.60 HELP 6,2,CS1,XX(10)  GOTO(LABEL.61)@      IIIA3450
505 61 LABEL.61 TABULATE T(22)  GOTO(LABEL.62)@      IIIA3460
506 62 LABEL.62 ASSIGN P4,MA$4      GOTO(LABEL.63)@      IIIA3480
507 63 LABEL.63 LEAVE S(16)  GOTO(LABEL.64)@
508 *****
509 PARAMETER 11 MEASURES LEAVE STORAGE TO LAUNCH TIME
510 64 LABEL.64 MARK P11  GOTO(LABEL.65)@      IIIA3510
511 *
512 *
513 *
514 *
515 *
516 65 LABEL.65 QUEUE Q(20)  GOTO(LABEL.66)@      IIIA3570
517 *MATE BOOSTER,ORBITER AND LUT
518 66 LABEL.66 ENTER S(20)  GOTO(LABEL.67)@      IIIA3590
519 *
520 *
521 *
522 *
523 *
524 *
525 *
526 *
527 *
528 *
529 70 LABEL.70 QUEUE Q(21)  GOTO(LABEL.71 THRU LABEL.72) @      IIIA3710
530 71 LABEL.71 COMPARE FSF(1) E Q  GOTO(LABEL.74)@      IIIA3720
531 72 LABEL.72 COMPARE FSF(2) E Q  GOTO(LABEL.75)@      IIIA3730
532 73 LABEL.73 COMPARE FSF(3) E Q  GOTO(LABEL.76)@      IIIA3740
533 74 LABEL.74 ASSIGN P9,1  GOTO(LABEL.77)@      IIIA3750
534 75 LABEL.75 ASSIGN P9,2  GOTO(LABEL.77)@      IIIA3760
535 76 LABEL.76 ASSIGN P9,3  GOTO(LABEL.77)@      IIIA3770
536 *****
537 *
538 *
539 *
540 *
541 *
542 *
543 77 LABEL.77 SEIZE *P9  GOTO(LABEL.78)@      IIIA3850
544 *****
545 *
546 *
547 *
548 *
549 *
550 *
551 78 LABEL.78 ENTER S(22)  GOTO(LABEL.79)@      IIIA3940
552 *
553 *
554 *
555 *
556 *
557 *
558 *
559 *
560 *
561 *
562 *
563 *
564 *
565 *
566 *
567 *
568 *
569 *
570 *
571 *
572 *
573 *
574 *
575 *
576 *
577 *
578 *
579 *
580 *
581 *
582 *
583 *
584 *
585 *
586 *
587 *
588 *
589 *
590 *
591 *
592 *
593 *
594 *
595 *
596 *
597 *
598 *
599 *
600 *
601 *
602 *
603 *
604 *
605 *
606 *
607 *
608 *
609 *
610 *
611 *
612 *
613 *
614 *
615 *
616 *
617 *
618 *
619 *
620 *
621 *
622 *
623 *
624 *
625 *
626 *
627 *
628 *
629 *
630 *
631 *
632 *
633 *
634 *
635 *
636 *
637 *
638 *
639 *
640 *
641 *
642 *
643 *
644 *
645 *
646 *
647 *
648 *
649 *
650 *
651 *
652 *
653 *
654 *
655 *
656 *
657 *
658 *
659 *
660 *
661 *
662 *
663 *
664 *
665 *
666 *
667 *
668 *
669 *
670 *
671 *
672 *
673 *
674 *
675 *
676 *
677 *
678 *
679 *
680 *
681 *
682 *
683 *
684 *
685 *
686 *
687 *
688 *
689 *
690 *
691 *
692 *
693 *
694 *
695 *
696 *
697 *
698 *
699 *
700 *
701 *
702 *
703 *
704 *
705 *
706 *
707 *
708 *
709 *
710 *
711 *
712 *
713 *
714 *
715 *
716 *
717 *
718 *
719 *
720 *
721 *
722 *
723 *
724 *
725 *
726 *
727 *
728 *
729 *
730 *
731 *
732 *
733 *
734 *
735 *
736 *
737 *
738 *
739 *
740 *
741 *
742 *
743 *
744 *
745 *
746 *
747 *
748 *
749 *
750 *
751 *
752 *
753 *
754 *
755 *
756 *
757 *
758 *
759 *
760 *
761 *
762 *
763 *
764 *
765 *
766 *
767 *
768 *
769 *
770 *
771 *
772 *
773 *
774 *
775 *
776 *
777 *
778 *
779 *
780 *
781 *
782 *
783 *
784 *
785 *
786 *
787 *
788 *
789 *
790 *
791 *
792 *
793 *
794 *
795 *
796 *
797 *
798 *
799 *
800 *
801 *
802 *
803 *
804 *
805 *
806 *
807 *
808 *
809 *
810 *
811 *
812 *
813 *
814 *
815 *
816 *
817 *
818 *
819 *
820 *
821 *
822 *
823 *
824 *
825 *
826 *
827 *
828 *
829 *
830 *
831 *
832 *
833 *
834 *
835 *
836 *
837 *
838 *
839 *
840 *
841 *
842 *
843 *
844 *
845 *
846 *
847 *
848 *
849 *
850 *
851 *
852 *
853 *
854 *
855 *
856 *
857 *
858 *
859 *
860 *
861 *
862 *
863 *
864 *
865 *
866 *
867 *
868 *
869 *
870 *
871 *
872 *
873 *
874 *
875 *
876 *
877 *
878 *
879 *
880 *
881 *
882 *
883 *
884 *
885 *
886 *
887 *
888 *
889 *
890 *
891 *
892 *
893 *
894 *
895 *
896 *
897 *
898 *
899 *
900 *
901 *
902 *
903 *
904 *
905 *
906 *
907 *
908 *
909 *
910 *
911 *
912 *
913 *
914 *
915 *
916 *
917 *
918 *
919 *
920 *
921 *
922 *
923 *
924 *
925 *
926 *
927 *
928 *
929 *
930 *
931 *
932 *
933 *
934 *
935 *
936 *
937 *
938 *
939 *
940 *
941 *
942 *
943 *
944 *
945 *
946 *
947 *
948 *
949 *
950 *
951 *
952 *
953 *
954 *
955 *
956 *
957 *
958 *
959 *
960 *
961 *
962 *
963 *
964 *
965 *
966 *
967 *
968 *
969 *
970 *
971 *
972 *
973 *
974 *
975 *
976 *
977 *
978 *
979 *
980 *
981 *
982 *
983 *
984 *
985 *
986 *
987 *
988 *
989 *
990 *
991 *
992 *
993 *
994 *
995 *
996 *
997 *
998 *
999 *

```

```

558 *-----IIIA4010
559 * DETERMINE WHICH PATH THROUGH THE LAUNCH LOGIC IS TO BE TAKEN-----IIIC 330
560 * ESTABLISH TIME LEFT TO FIRST LAUNCH WINDOW IIIC 340
561 82 LABEL.82 SAVEX X(10),VSV(2) GOTO(LABEL.83 THRU LABEL.85) @ IIIC 350
562 * 0 IIIC 36
563 *
564 * IIIC 370
565 * IIIC 380
566 * IIIC 390
567 * IS TIME TO LAUNCH GE LENGTH OF FINAL COUNTDOWN, IF SO GO TO IIIC 400
568 * PRIMARY PATH IIIC 410
569 * IIIC 420
570 * IIIC 430
571 * PATH ONE
572 83 LABEL.83 COMPARE VSV(2) GE VSV(6) GOTO(LABEL.86)@ IIIC 440
573 *
574 * TIME TO LAUNCH IS NOT GE LENGTH OF FINAL COUNTDOWN, IS THERE
575 * ANOTHER LAUNCH WINDOW, IF SO GO TO SECONDARY PATH
576 *
577 * PATH TWO
578 84 LABEL.84 COMPARE PSP7 G 0 GOTO(LABEL.105)@ IIIC 500
579 *
580 * TIME TO LAUNCH IS NOT GE LENGTH OF FINAL COUNTDOWN, AND THERE
581 * IS NOT ANOTHER LAUNCH WINDOW. COUNT NUMBER OF VEHICLES REMOVED
582 * FROM THE PAD FOR LACK OF ANOTHER LAUNCH WINDOW AND GO TO THE
583 * VEHICLE REMOVAL PATH.
584 *
585 * PATH THREE
586 85 LABEL.85 SAVEX X(24),X$X(24)+1 GOTO(LABEL.210)@ IIIC 580
587 *
588 *-----IIIC 590
589 * IIIC 600
590 * IIIC 610
591 * IIIC 620
592 * THIS IS THE PRIMARY PATH THROUGH THE LAUNCH LOGIC.
593 *
594 *
595 * ESTABLISH LENGTH OF HOLD TO BEGINING OF FINAL COUNTDOWN
596 86 LABEL.86 SAVEX X(10),VSV(3) GOTO(LABEL.87)@ IIIC 630
597 * IIIC 640
598 * TABULATE LENGTH OF HOLD TO BEGINING OF FINAL COUNTDOWN IIIC 650
599 87 LABEL.87 TABULATE T(4) GOTO(LABEL.88)@ IIIC 660
600 * IIIC 670
601 * SET FIRST LAUNCH WINDOW INDICATOR IIIC 680
602 88 LABEL.88 SAVEX X(27),1 GOTO(LABEL.89)@ IIIC 700
603 * IIIC 720
604 * ESTABLISH A BASE POINT OF ZERO FOR CALCULATING TIME BETWEEN IIIC 740
605 * FIRST AND SUBSEQUENT WINDOWS IN CASE THIS VEHICLE HAS A FINAL IIIC 750
606 * COUNTDOWN FAILURE AND CAN BE REPAIRED ON THE PAD. IIIC 760
607 89 LABEL.89 SAVEX X(35),0 GOTO(LABEL.90)@ IIIC 770
608 * IIIC 780
609 * ADVANCE TO BEGINING OF FINAL COUNTDOWN
610 90 LABEL.90 ADVANCE TIME(1*FNSFN2) GOTO(LABEL.91)@
611 *-----
612 * IIIC 800
613 * IIIC 810
614 * IIIC 820
615 * IIIC 830
616 * IIIC 840
617 * IIIC 850
618 * IIIC 860
619 *
620 * BEGIN FINAL COUNTDOWN
621 *
622 *
623 *
624 *
625 *
626 *
627 *
628 *
629 *
630 *
631 *
632 *
633 *
634 *
635 *
636 *
637 *
638 *
639 *
640 *
641 *
642 *
643 *
644 *
645 *
646 *
647 *
648 *
649 *
650 *
651 *
652 *
653 *
654 *
655 *
656 *
657 *
658 *
659 *
660 *
661 *
662 *
663 *
664 *
665 *
666 *
667 *
668 *
669 *
670 *
671 *
672 *
673 *
674 *
675 *
676 *
677 *
678 *
679 *
680 *
681 *
682 *
683 *
684 *
685 *
686 *
687 *
688 *
689 *
690 *
691 *
692 *
693 *
694 *
695 *
696 *
697 *
698 *
699 *
700 *
701 *
702 *
703 *
704 *
705 *
706 *
707 *
708 *
709 *
710 *
711 *
712 *
713 *
714 *
715 *
716 *
717 *
718 *
719 *
720 *
721 *
722 *
723 *
724 *
725 *
726 *
727 *
728 *
729 *
730 *
731 *
732 *
733 *
734 *
735 *
736 *
737 *
738 *
739 *
740 *
741 *
742 *
743 *
744 *
745 *
746 *
747 *
748 *
749 *
750 *
751 *
752 *
753 *
754 *
755 *
756 *
757 *
758 *
759 *
760 *
761 *
762 *
763 *
764 *
765 *
766 *
767 *
768 *
769 *
770 *
771 *
772 *
773 *
774 *
775 *
776 *
777 *
778 *
779 *
780 *
781 *
782 *
783 *
784 *
785 *
786 *
787 *
788 *
789 *
790 *
791 *
792 *
793 *
794 *
795 *
796 *
797 *
798 *
799 *
800 *
801 *
802 *
803 *
804 *
805 *
806 *
807 *
808 *
809 *
810 *
811 *
812 *
813 *
814 *
815 *
816 *
817 *
818 *
819 *
820 *
821 *
822 *
823 *
824 *
825 *
826 *
827 *
828 *
829 *
830 *
831 *
832 *
833 *
834 *
835 *
836 *
837 *
838 *
839 *
840 *
841 *
842 *
843 *
844 *
845 *
846 *
847 *
848 *
849 *
850 *
851 *
852 *
853 *
854 *
855 *
856 *
857 *
858 *
859 *
860 *
861 *
862 *
863 *
864 *
865 *
866 *
867 *
868 *
869 *
870 *
871 *
872 *
873 *
874 *
875 *
876 *
877 *
878 *
879 *
880 *
881 *
882 *
883 *
884 *
885 *
886 *
887 *
888 *
889 *
890 *
891 *
892 *
893 *
894 *
895 *
896 *
897 *
898 *
899 *
900 *
901 *
902 *
903 *
904 *
905 *
906 *
907 *
908 *
909 *
910 *
911 *
912 *
913 *
914 *
915 *
916 *
917 *
918 *
919 *
920 *
921 *
922 *
923 *
924 *
925 *
926 *
927 *
928 *
929 *
930 *
931 *
932 *
933 *
934 *
935 *
936 *
937 *
938 *
939 *
940 *
941 *
942 *
943 *
944 *
945 *
946 *
947 *
948 *
949 *
950 *
951 *
952 *
953 *
954 *
955 *
956 *
957 *
958 *
959 *
960 *
961 *
962 *
963 *
964 *
965 *
966 *
967 *
968 *
969 *
970 *
971 *
972 *
973 *
974 *
975 *
976 *
977 *
978 *
979 *
980 *
981 *
982 *
983 *
984 *
985 *
986 *
987 *
988 *
989 *
990 *
991 *
992 *
993 *
994 *
995 *
996 *
997 *
998 *
999 *

```

```

614 91 LABEL.91 ENTER S(23) GOTO(LABEL.92)@ I11C 880
615 * ESTABLISH LENGTH OF FINAL COUNTDOWN
616 *
617 92 LABEL.92 HELP 11,83,,X$X(10) GOTO(LABEL.93)@ I11C 900
618 * ADVANCE TO END OF FINAL COUNTDOWN
619 93 LABEL.93 ADVANCE TIME(11*FN$FN1) GOTO(LABEL.94)@ I11C 920
620 * LEAVE FINAL COUNTDOWN
621 94 LABEL.94 LEAVE S(23) GOTO(150) LABEL.95, LABEL.100)@
622 *-----*
623 *
624 *
625 *-----*
626 * FAILURE HAS NOT OCCURED DURING FINAL COUNTDOWN. COLLECT
627 * APPROPRIATE STATISTICS AND INITIATE LAUNCH OF VEHICLE.
628 * (95 PERCENT PROBABILITY)
629 *
630 * TABULATE WHICH WINDOW LAUNCH OCCURS AT
631 95 LABEL.95 TABULATE T(9) GOTO(LABEL.96, LABEL.98) @ I11C1030
632 * DID LAUNCH OCCUR AT PRIMARY WINDOW
633 96 LABEL.96 COMPARE X$X(27) E 1 GOTO(LABEL.97)@ I11C1050
634 * COUNT NUMBER OF LAUNCHES AT THE PRIMARY WINDOW
635 97 LABEL.97 SAVEX X(28), X$X(28)+1 GOTO(LABEL.118)@ I11C1070
636 * LAUNCH DID NOT OCCUR AT THE PRIMARY WINDOW
637 * TABULATE AMOUNT OF TIME AFTER PRIMARY WINDOW LAUNCH OCCURED
638 98 LABEL.98 TABULATE T(8) GOTO(LABEL.99)@ I11C1100
639 * COUNT NUMBER OF LAUNCHES AT A SUBSEQUENT WINDOW
640 99 LABEL.99 SAVEX X(26), X$X(26)+1 GOTO(LABEL.118)@ I11C1120
641 *-----*
642 *
643 *
644 *-----*
645 * FAILURE HAS OCCURED DURING FINAL COUNTDOWN (5 PERCENT PROB.)
646 * REMOVE 50 PERCENT OF THESE VEHICLES FROM PAD. ATTEMPT TO LAUNCH
647 * 50 PERCENT AT A LATER WINDOW.
648 100 LABEL.100 ADVANCE GOTO(500) LABEL.101, LABEL.102)@
649 * COUNT NUMBER OF VEHICLES REMOVED FROM PAD DUE TO A FINAL
650 * COUNTDOWN FAILURE.
651 101 LABEL.101 SAVEX X(22), X$X(22)+1 GOTO(LABEL.210)@ I11C1230
652 * COUNT NUMBER OF TIMES A VEHICLE WAS REPAIRED ON THE PAD
653 102 LABEL.102 SAVEX X(29), X$X(29)+1 GOTO(LABEL.103, LABEL.104) @ I11C12
654 * 50
655 * IS THERE ANOTHER LAUNCH OPPORTUNITY
656 103 LABEL.103 COMPARE PSP7 G 0 GOTO(LABEL.112)@ I11C1270
657 * THERE IS NOT ANOTHER LAUNCH OPPORTUNITY
658 * COUNT NUMBER OF VEHICLES REMOVED DUE TO NO FURTHER
659 * LAUNCH WINDOW. THEN GO TO VEHICLE REMOVAL PATH. I11C1310
660 104 LABEL.104 SAVEX X(24), X$X(24)+1 GOTO(LABEL.210)@
661 * THERE IS ANOTHER LAUNCH OPPORTUNITY
662 * SET SECOND LAUNCH WINDOW INDICATOR
663 *-----*
664 *
665 *-----*
666 *-----*
667 *-----*
668 * THIS THE SECONDARY PATH THROUGH THE LAUNCH LOGIC. ONLY VEHICLES
669 * WHICH CANNOT LAUNCH ON THE PRIMARY WINDOW FLOW THROUGH THIS

```

670	•	SECTION		111C1405
671	•			111C1410
672	105	LABEL.105	SAVE X(27),2 GOTO(LABEL.106)@	111C1420
673	•		TABULATE AMOUNT OF TIME LEFT TO FIRST WINDOW (MAY BE NEGATIVE)	111C1430
674	106	LABEL.106	TABULATE T(7) GOTO(LABEL.107,LABEL.111)@	111C1440
675	•		IS THERE TIME TO LAUNCH AT THE SECOND WINDOW	111C1450
676	107	LABEL.107	COMPARE VSV(4) GE VSV(6) GOTO(LABEL.108)@	111C1460
677	•		THERE IS TIME TO LAUNCH AT THE SECOND WINDOW	111C1470
678	•		ESTABLISH LENGTH OF HOLD TO BEGINNING OF FINAL COUNTDOWN	111C1480
679	•		FOR THE SECOND WINDOW.	111C1490
680	108	LABEL.108	SAVE X(10),VSV(12) GOTO(LABEL.109)@	111C1500
681	•		ESTABLISH LENGTH OF TIME BETWEEN FIRST AND SECOND WINDOW	111C1510
682	109	LABEL.109	SAVE X(35),PSP7 GOTO(LABEL.110)@	111C1520
683	•		TABULATE HOLD TO BEGINNING OF FINAL COUNTDOWN FOR THE	111C1530
684	•		SECOND WINDOW	111C1540
685	110	LABEL.110	TABULATE T(5) GOTO(LABEL.90)@	111C1550
686	•			111C1560
687	•			111C1570
688	•		THERE IS NOT TIME TO LAUNCH AT THE SECOND WINDOW	111C1580
689	•		ESTABLISH LENGTH OF TIME BETWEEN FIRST AND SECOND WINDOW	111C1590
690	111	LABEL.111	SAVE X(35),PSP7 GOTO(LABEL.112)@	111C1600
691	•		INCREMENT WINDOW INDICATOR TO NEXT WINDOW	111C1610
692	112	LABEL.112	SAVE X(27),XSX(27)+1 GOTO(LABEL.113,LABEL.115)@	111C16
693	•	20		
694	•		DETERMINE IF THE WINDOW BEING TRIED IS EVEN OR ODD	111C1630
695	113	LABEL.113	COMPARE VSV(15) G O GOTO(LABEL.114)@	111C1640
696	•		THE WINDOW IS ODD.	111C1650
697	•		ESTABLISH LENGTH OF TIME BETWEEN FIRST AND SUBSEQUENT	111C1660
698	•		ODD WINDOWS	111C1670
699	114	LABEL.114	SAVE X(35),XSX(35)+VSV(13) GOTO(LABEL.116,LABEL.112)@	
700	•	111C1680		
701	•			111C1690
702	•		THE WINDOW IS EVEN	111C1700
703	•		ESTABLISH LENGTH OF TIME BETWEEN FIRST AND SUBSEQUENT	111C1710
704	•		EVEN WINDOWS	111C1720
705	•			111C1730
706	115	LABEL.115	SAVE X(35),XSX(35)+PSP7 GOTO(LABEL.116,LABEL.112)@	111
707	•	C1740		
708	•		IS THERE TIME TO LAUNCH AT THIS WINDOW. IF NOT TRY NEXT WINDOW.	111C1750
709	116	LABEL.116	COMPARE VSV(14) GE O GOTO(LABEL.117)@	111C1760
710	•		THERE IS TIME TO LAUNCH	111C1770
711	•		ESTABLISH LENGTH OF HOLD TO BEGINNING OF FINAL COUNTDOWN	111C1780
712	117	LABEL.117	SAVE X(10),VSV(14) GOTO(LABEL.110)@	111C1790
713	•			111C1800
714	•			111C1810
715	•			111C1820
716	•			111C1830
717	•			111A4570
718	•			111A4580
719	•			111A4590
720	•			111A4900
721	•			111A4910
722	•			111A4920
723	•		FAILURE HAS NOT OCCURED DURING TIME ON PAD. INITIATE LAUNCH OF SHUTTLE	111A4930
724	•			111A4940
725	118	LABEL.118	SPLIT 1,LABEL.120 GOTO(LABEL.119)@	111A4950

```

726 119 LABEL.119 MATCH LABEL.128 GOTO(LABEL.140)@ 111A4960
727 120 LABEL.120 SPLIT 1,LABEL.142 GOTO(LABEL.121)@ 111A4970
728 121 LABEL.121 SPLIT 1,LABEL.122 GOTO(LABEL.136)@ 111A4980
729 -----
730 .
731 .
732 -----
733 .
734 . LUT REMOVAL AND PAD REFURBISHMENT PATH
735 . THIS PATH IS SIMULTANEOUS WITH THE FLIGHT AND REFURBISH PATH
736 .
737 *REMOVE POST LAUNCH LUT FROM PAD
738 122 LABEL.122 ENTER S(17) GOTO(LABEL.123)@ 111A5040
739 123 LABEL.123 HELP 3,1250,1500,1750,XX(10) GOTO(LABEL.124)@ 111A5050
740 124 LABEL.124 ADVANCE TIME(1*FN$FNI) GOTO(LABEL.125)@ 111A5060
741 125 LABEL.125 LEAVE S(17) GOTO(LABEL.126)@ 111A5070
742 126 LABEL.126 SPLIT 1,LABEL.130 GOTO(LABEL.127)@ 111A5080
743 127 LABEL.127 ASSEMBLE 2 GOTO(LABEL.128)@ 111A5090
744 128 LABEL.128 MATCH LABEL.119 GOTO(LABEL.129)@ 111A5100
745 129 LABEL.129 TERMINATE @ 111A5110
746 -----
747 .
748 .
749 -----
750 *TRANSPORT LUT TO MAINT.,REFURBISH/TEST,TRANSPORT TO STORAGE
751 130 LABEL.130 QUEUE Q(18) GOTO(LABEL.131)@ 111A5170
752 131 LABEL.131 ENTER S(18) GOTO(LABEL.132)@ 111C1881
753 132 LABEL.132 HELP 3,2700,3000,3300,XX(10) GOTO(LABEL.133)@ 111A5190
754 133 LABEL.133 ADVANCE TIME(1*FN$FNI) GOTO(LABEL.134)@ 111A5200
755 134 LABEL.134 LEAVE S(18) GOTO(LABEL.135)@ 111A5210
756 135 LABEL.135 ENTER S(16),1 GOTO(LABEL.129)@ 111A5220
757 -----
758 .
759 .
760 -----
761 *REFURBISH LAUNCH PAD
762 .
763 136 LABEL.136 ENTER S(27) GOTO(LABEL.137)@ 111A5390
764 . TRIANGULAR MIN MOOE -MAX
765 137 LABEL.137 HELP 3,950,1000,1050,XX(10) GOTO(LABEL.138)@ 111A5410
766 138 LABEL.138 ADVANCE TIME(1*FN$FNI) GOTO(LABEL.139)@ 111A5420
767 139 LABEL.139 LEAVE S(27) GOTO(LABEL.127)@ 111A5430
768 140 LABEL.140 RELEASE *P9 GOTO(LABEL.141)@ 111A5440
769 141 LABEL.141 TERMINATE @ 111A5450
770 -----
771 .
772 . FLIGHT AND REFURBISH PATH
773 .
774 .
775 142 LABEL.142 TABULATE T(10) GOTO(LABEL.143)@ 111A5490
776 .
777 -----
778 *LIFTOFF THROUGH SEPARATION
779 .
780 143 LABEL.143 ENTER S(28) GOTO(LABEL.144)@ 111A5540
781 144 LABEL.144 HELP 11,2,,XX(10) GOTO(LABEL.145)@ 111A5550

```

```

782 145 LABEL.145 ADVANCE TIME(1*FN$FN1) GOTO(LABEL.146)@      111A5560
783 146 LABEL.146 LEAVE S(2B) GOTO(LABEL.147)@      111A5570
784 -----
785 .
786 .
787 .
788 .
789 .PARAMETER 1 IS USED TO CUMULATE THE TOTAL INFLIGHT TIME FOR
790 .COLLECTING STATISTICS ON GROUND PROCESSING TIME
791 .
792 147 LABEL.147 ASSIGN P1,P$P1+2 GOTO(LABEL.148)@      111A5660
793 .
794 . SEPARATION IN FLIGHT OF BOOSTER AND ORBITER
795 . COUNT THE NUMBER OF SUCCESSFUL LAUNCHES
796 .
797 148 LABEL.148 SAVEX X(30),X$X(30)+1 GOTO(LABEL.149)@      111A5710
798 149 LABEL.149 SPLIT 1,LABEL.180 GOTO(LABEL.150)@      111A5720
799 .
800 -----
801 .
802 .
803 .
804 .BOOSTER COAST,REENTRY,FLYBACK AND LANDING
805 .
806 150 LABEL.150 HELP 3,64,70,76,X$X(10) GOTO(LABEL.151)W      111A5800
807 151 LABEL.151 ASSIGN P1,P$P1+FN$FN1 GOTO(LABEL.152)@      111A5810
808 152 LABEL.152 ADVANCE TIME(1*FN$FN1) GOTO(LABEL.153)@      111A5820
809 .
810 -----
811 .
812 .PARAMETER 8 COLLECTS THE TIME FROM LANDING UNTIL ENTRY INTO STORAGE
813 153 LABEL.153 MARK PA GOTO(LABEL.154)@      111A5870
814 .
815 .
816 .
817 .
818 .
819 .
820 .DELAY FOR TRANSPORTING FROM DOWNRANGE LANDING
821 .
822 . MIN NOM MAX
823 154 LABEL.154 HELP 3,1000,1500,2000,X$X(10) GOTO(LABEL.155)@      111A5970
824 155 LABEL.155 SAVEX X(10),0 GOTO(LABEL.156)W      111A5980
825 156 LABEL.156 ADVANCE TIME(1*FN$FN2) GOTO(LABEL.157)W
826 -----
827 .
828 .
829 .
830 . WAITING LINE FOR BOOSTERS GOING INTO SAFING FACILITY
831 .
832 157 LABEL.157 QUEUE Q(1) GOTO(LABEL.158)@      111A6060
833 .
834 -----
835 .
836 .
837 .BOOSTER SAFING

```

1DST

```

838      158 LABEL.158 ENTER S(1) GOTO(LABEL.159)@      IIIA6130
839      * TRIANGULAR MIN MODE MAX
840      159 LABEL.159 HELP 3,900,1000,1100,XSX(10) GOTO(LABEL.160)@      IIIA6150
841      160 LABEL.160 ADVANCE TIME(1*FNSFN1) GOTO(LABEL.161)@      IIIA6160
842      161 LABEL.161 LEAVE S(1) GOTO(LABEL.162)@      IIIA6170
843      *-----*
844      *
845      *
846      *
847      * TRANSPORT BOOSTER TO MAINTENANCE
848      *
849      * TRIANGULAR MIN MODE MAX
850      162 LABEL.162 HELP 3,50,100,150,XSX(10) GOTO(LABEL.163)@      IIIA6240
851      163 LABEL.163 ADVANCE TIME(1*FNSFN1) GOTO(LABEL.164)@      IIIA6250
852      *-----*
853      *
854      *
855      *
856      * BOOSTER MAINTENANCE
857      *
858      164 LABEL.164 QUEUE Q(2) GOTO(LABEL.165)@      IIIA6320
859      165 LABEL.165 ENTER S(2) GOTO(LABEL.166)@      IIIA6330
860      * TRIANGULAR MIN MODE MAX
861      166 LABEL.166 HELP 3,2250,2500,2750,XSX(10) GOTO(LABEL.167)@      IIIA6350
862      167 LABEL.167 ADVANCE TIME(1*FNSFN1) GOTO(250:LABEL.170,LABEL.168)@
863      * A6360
864      *
865      * BOOSTER ADDITIONAL MAINTENANCE
866      *
867      * EXPONENTIAL MIN MEAN
868      168 LABEL.168 HELP 8,500,1000,XSX(10) GOTO(LABEL.169)@      IIIA6410
869      169 LABEL.169 ADVANCE TIME(1*FNSFN1) GOTO(LABEL.170)@      IIIA6420
870      170 LABEL.170 LEAVE S(2) GOTO(LABEL.171)@      IIIA6430
871      *-----*
872      *
873      *
874      *
875      * TRANSPORT BOOSTER TO SYSTEMS TEST, TEST, TRANSPORT TO STORAGE
876      *
877      171 LABEL.171 QUEUE Q(3) GOTO(LABEL.172)@      IIIA6500
878      172 LABEL.172 ENTER S(3) GOTO(LABEL.173)@      IIIA6510
879      173 LABEL.173 HELP 3,1900,2000,2100,XSX(10) GOTO(LABEL.174)@      IIIA6520
880      174 LABEL.174 ADVANCE TIME(1*FNSFN1) GOTO(LABEL.175)@      IIIA6530
881      175 LABEL.175 LEAVE S(3) GOTO(LABEL.176)@      IIIA6540
882      *
883      * BOOSTER STORAGE WHEN WAITING FOR ORBITER OR LAUNCH REQUIREMENT
884      *
885      176 LABEL.176 ENTER S(4),1 GOTO(LABEL.177)@      IIIA6580
886      177 LABEL.177 HELP 5,1,C$1 GOTO(LABEL.178)@      IIIA6590
887      178 LABEL.178 TABULATE T(3) GOTO(LABEL.179)@      IIIA6600
888      179 LABEL.179 TABULATE T(1) GOTO(LABEL.260)@      IIIA6610
889      *-----*
890      *
891      *
892      * ORBITER BOOST INTO ORBIT,PERFORM MISSION AND RETURN
893      *

```

```

894 180 LABEL.180 ENTER S(14) GOTO(LABEL.181)@ IIIA6670
895 181 LABEL.181 SAVE X(10),PSP3 GOTO(LABEL.182)@ IIIA6680
896 182 LABEL.182 ASSIGN P1,PSP1+FN$FN2 GOTO(LABEL.183)@
897 183 LABEL.183 ADVANCE TIME(1+FN$FN2) GOTO(LABEL.184)@
898 184 LABEL.184 LEAVE S(14) GOTO(LABEL.185)@ IIIA6710
899 -----
900 .
901 .
902 .
903 185 LABEL.185 MARK P8 GOTO(LABEL.186)@ IIIA6760
904 .
905 .
906 .
907 .
908 .
909 .
910 186 LABEL.186 QUEUE Q(10) GOTO(LABEL.187)@ IIIA6830
911 187 LABEL.187 ENTER S(10) GOTO(LABEL.188)@ IIIA6840
912 . TRIANGULAR MIN MODE MAX
913 188 LABEL.188 HELP 3,900,1000,1100,X$X(10) GOTO(LABEL.189)@ IIIA6860
914 189 LABEL.189 ADVANCE TIME(1+FN$FN1) GOTO(LABEL.190)@ IIIA6870
915 190 LABEL.190 LEAVE S(10) GOTO(LABEL.191)@ IIIA6880
916 -----
917 .
918 .
919 .
920 .
921 .
922 . LOGNORMAL MEAN STDEV
923 191 LABEL.191 HELP 3,50,100,150,X$X(10) GOTO(LABEL.192)@ IIIA6960
924 192 LABEL.192 ADVANCE TIME(1+FN$FN1) GOTO(LABEL.193)@ IIIA6970
925 -----
926 .
927 .
928 .
929 .
930 .
931 193 LABEL.193 QUEUE Q(11) GOTO(LABEL.194)@ IIIA7040
932 194 LABEL.194 ENTER S(11) GOTO(LABEL.195)@ IIIA7050
933 . TRIANGULAR MIN MODE MAX
934 195 LABEL.195 HELP 3,2250,2500,2750,X$X(10) GOTO(LABEL.196)@ IIIA7070
935 196 LABEL.196 ADVANCE TIME(1+FN$FN1) GOTO(250:LABEL.199,LABEL.197)@
936 . A7080
937 .
938 .
939 .
940 .
941 197 LABEL.197 HELP 8,500,1000,X$X(10) GOTO(LABEL.198)@ IIIA7130
942 198 LABEL.198 ADVANCE TIME(1+FN$FN1) GOTO(LABEL.199)@ IIIA7140
943 199 LABEL.199 LEAVE S(11) GOTO(LABEL.200)@ IIIA7150
944 -----
945 .
946 .
947 .
948 .
949 .
950 200 LABEL.200 ENTER S(11) GOTO(LABEL.201)@ IIIA7160
951 201 LABEL.201 SAVE X(10),PSP3 GOTO(LABEL.202)@ IIIA7170
952 202 LABEL.202 ASSIGN P1,PSP1+FN$FN2 GOTO(LABEL.203)@ IIIA7180
953 203 LABEL.203 ADVANCE TIME(1+FN$FN2) GOTO(LABEL.204)@ IIIA7190
954 204 LABEL.204 LEAVE S(11) GOTO(LABEL.205)@ IIIA7200
955 -----
956 .
957 .
958 .
959 .
960 .
961 . LOGNORMAL MEAN STDEV
962 205 LABEL.205 HELP 3,50,100,150,X$X(10) GOTO(LABEL.206)@ IIIA7210
963 206 LABEL.206 ADVANCE TIME(1+FN$FN1) GOTO(LABEL.207)@ IIIA7220
964 -----
965 .
966 .
967 .
968 .
969 .
970 207 LABEL.207 QUEUE Q(12) GOTO(LABEL.208)@ IIIA7230
971 208 LABEL.208 ENTER S(12) GOTO(LABEL.209)@ IIIA7240
972 . TRIANGULAR MIN MODE MAX
973 209 LABEL.209 HELP 3,900,1000,1100,X$X(10) GOTO(LABEL.210)@ IIIA7250
974 210 LABEL.210 ADVANCE TIME(1+FN$FN1) GOTO(LABEL.211)@ IIIA7260
975 211 LABEL.211 LEAVE S(12) GOTO(LABEL.212)@ IIIA7270
976 -----
977 .
978 .
979 .
980 .
981 .
982 212 LABEL.212 QUEUE Q(13) GOTO(LABEL.213)@ IIIA7280
983 213 LABEL.213 ENTER S(13) GOTO(LABEL.214)@ IIIA7290
984 . TRIANGULAR MIN MODE MAX
985 214 LABEL.214 HELP 3,900,1000,1100,X$X(10) GOTO(LABEL.215)@ IIIA7300
986 215 LABEL.215 ADVANCE TIME(1+FN$FN1) GOTO(LABEL.216)@ IIIA7310
987 216 LABEL.216 LEAVE S(13) GOTO(LABEL.217)@ IIIA7320
988 -----
989 .
990 .
991 .
992 .
993 .
994 217 LABEL.217 QUEUE Q(14) GOTO(LABEL.218)@ IIIA7330
995 218 LABEL.218 ENTER S(14) GOTO(LABEL.219)@ IIIA7340
996 . TRIANGULAR MIN MODE MAX
997 219 LABEL.219 HELP 3,900,1000,1100,X$X(10) GOTO(LABEL.220)@ IIIA7350
998 220 LABEL.220 ADVANCE TIME(1+FN$FN1) GOTO(LABEL.221)@ IIIA7360
999 221 LABEL.221 LEAVE S(14) GOTO(LABEL.222)@ IIIA7370

```



```

1006 220 LABEL.220 ENTER S(19) GOTO(LABEL.221)@ 111C2310
1007 221 LABEL.221 HELP 3,550,750,950,XX(10) GOTO(LABEL.222)@ 111C2320
1008 222 LABEL.222 ADVANCE TIME(1)*FNSFN1) GOTO(LABEL.223)@ 111C2330
1009 223 LABEL.223 LEAVE S(19) GOTO(LABEL.224)@ 111C2340
1010 224 LABEL.224 SPLIT 1,LABEL.130 GOTO(LABEL.225)@ 111C2350
1011 -----
1012 *HOOSTER MAINTENANCE ON RETURN FROM PAD IDST 111A7400
1013 LABEL.225 QUEUE Q(2) GOTO(LABEL.226)@ 111A7410
1014 LABEL.226 ENTER S(2) GOTO(LABEL.227)@ 111A7420
1015 * EXPONENTIAL MIN MEAN 111C2361
1016 227 LABEL.227 HELP 8,500,750,XX(10) GOTO(LABEL.228)@ 111A7440
1017 228 LABEL.228 ADVANCE TIME(1)*FNSFN1) GOTO(LABEL.229)@ 111A7450
1018 LABEL.229 LEAVE S(2) GOTO(LABEL.230)@ 111A7460
1019 -----
1020 *
1021 *
1022 -----
1023 * BOOSTER VEHICLE SYSTEM TEST FACILITY ON RETURN FROM PAD IDST 111A7510
1024 230 LABEL.230 QUEUE Q(3) GOTO(LABEL.231)@ 111A7520
1025 231 LABEL.231 ENTER S(3) GOTO(LABEL.232)@ 111A7530
1026 * MIN NOM MAX 111A7540
1027 232 LABEL.232 HELP 3,1900,2000,2100,XX(10) GOTO(LABEL.233)@ 111A7550
1028 233 LABEL.233 ADVANCE TIME(1)*FNSFN1) GOTO(LABEL.234)@ 111A7560
1029 234 LABEL.234 LEAVE S(3) GOTO(LABEL.235)@ 111A7570
1030 235 LABEL.235 ENTER S(4),1 GOTO(LABEL.236)@ 111A7580
1031 236 LABEL.236 HELP 5,1,CS1 GOTO(LABEL.260)@ 111A7590
1032 -----
1033 *
1034 *
1035 -----
1036 * ORBITER MAINTENANCE ON RETURN FROM PAD IDST 111A7600
1037 237 LABEL.237 QUEUE Q(11) GOTO(LABEL.238)@ 111A7610
1038 238 LABEL.238 ENTER S(11) GOTO(LABEL.239)@ 111A7620
1039 * EXPONENTIAL MIN MEAN 111A7630
1040 239 LABEL.239 HELP 8,500,750,XX(10) GOTO(LABEL.240)@ 111A7640
1041 240 LABEL.240 ADVANCE TIME(1)*FNSFN1) GOTO(LABEL.241)@ 111A7650
1042 241 LABEL.241 LEAVE S(11) GOTO(LABEL.242)@ 111A7660
1043 -----
1044 *
1045 *
1046 -----
1047 * ORBITER VEHICLE SYS TEST FACILITY ON RETURN FROM PAD IDST 111A7700
1048 242 LABEL.242 QUEUE Q(12) GOTO(LABEL.243)@ 111A7710
1049 243 LABEL.243 ENTER S(12) GOTO(LABEL.244)@ 111A7720
1050 * MIN NOM MAX 111A7730
1051 244 LABEL.244 HELP 3,1900,2000,2100,XX(10) GOTO(LABEL.245)@ 111A7740
1052 245 LABEL.245 ADVANCE TIME(1)*FNSFN1) GOTO(LABEL.246)@ 111A7750
1053 246 LABEL.246 LEAVE S(12) GOTO(LABEL.247)@ 111A7760
1054 247 LABEL.247 ENTER S(13) GOTO(LABEL.248)@ 111A7770
1055 248 LABEL.248 HELP 5,2,CS1 GOTO(LABEL.249)@ 111A7780
1056 249 LABEL.249 TERMINATE # 111A7790
1057 -----
1058 *
1059 *
1060 * COUNT NUMBER OF LAUNCHES MISSED BECAUSE OF UNAVAILABILITY
1061 -----

```

```

1062      *      OF A BOOSTER AND/OR ORBITER AND/OR LUT      IIIA7900
1063      *      IIIA7910
1064      250 LABEL.250 SAVEX X(5),X$X(5)+1 GOTO(LABEL.251,LABEL.255) @ IIIA7920
1065      251 LABEL.251 GATE SE,S(4) GOTO(LABEL.252,LABEL.254) @ IIIA7930
1066      252 LABEL.252 GATE SE,S(13) GOTO(LABEL.253)@ IIIA7940
1067      *      IIIA7950
1068      *      IIIA7960
1069      *      IIIA7970
1070      *      IIIA7990
1071      *      IIIA8000
1072      *      IIIA8010
1073      *      IIIA8030
1074      254 LABEL.254 SAVEX X(3),X$X(3)+1 GOTO(LABEL.260)@ IIIA8020
1075      *      IIIA8040
1076      *      IIIA8050
1077      *      IIIA8060
1078      *      IIIA8070
1079      255 LABEL.255 SAVEX X(7),X$X(7)+1 GOTO(LABEL.256,LABEL.258) @
1080      256 LABEL.256 GATE SE,S(13) GOTO(LABEL.257)@ IIIA8080
1081      *      IIIA8090
1082      *      IIIA8100
1083      *      IIIA8110
1084      257 LABEL.257 SAVEX X(4),X$X(4)+1 GOTO(LABEL.260)@ IIIA8120
1085      *      IIIA8130
1086      *      IIIA8140
1087      *      IIIA8150
1088      258 LABEL.258 SAVEX X(8),X$X(8)+1 GOTO(LABEL.260)@ IIIA8160
1089      *      IIIA8170
1090      *      IIIA8180
1091      *      COUNT NUMBER OF MISSED LAUNCHES PAD(S) UNAVAILABLE
1092      LABEL.259 SAVEX X(25),X$X(25)+1 GOTO(LABEL.260)@ IIIA8190
1093      260 LABEL.260 COMPARE N$LABEL.271 LE V$V(10) GOTO(LABEL.261,LABEL.271) @
1094      *      IIIA8200
1095      261 LABEL.261 COMPARE V$V(10) E N$LABEL.271 GOTO(LABEL.262)@ IIIA8210
1096      *      IIIA8220
1097      *      PRINT OUT SUMMARY TABLE      IIIA8230
1098      *      IIIA8240
1099      262 LABEL.262 HELP 10,,T$ST(10),ST$S(14) GOTO(LABEL.263)@
1100      263 LABEL.263 HELP 10,T$ST(1),T$ST(21),T$ST(2),T$ST(22) GOTO(LABEL.264)@
1101      264 LABEL.264 HELP 10,QX$Q(1),QX$Q(10),QX$Q(2),QX$Q(11) GOTO(LABEL.265)@
1102      265 LABEL.265 HELP 10,QX$Q(3),QX$Q(12),QX$Q(20),QX$Q(18) GOTO(LABEL.266)@
1103      266 LABEL.266 HELP 10,QX$Q(21) GOTO(LABEL.267)@
1104      267 LABEL.267 HELP 10,SR$S(1),SR$S(10),SR$S(2),SR$S(11) GOTO(LABEL.268)@
1105      268 LABEL.268 HELP 10,SR$S(3),SR$S(12) GOTO(LABEL.269)@
1106      269 LABEL.269 HELP 10,SR$S(20),SR$S(18) GOTO(LABEL.270)@
1107      270 LABEL.270 HELP 10,FR$F(1),FR$F(2),FR$F(3) GOTO(LABEL.271)@
1108      271 LABEL.271 TERMINATE ,R @ IIIA8330
1109      *      IIIB1640
1110      *      IIIB1650
1111      *      IIIB1660
1112      *      IIIB1670
1113      *      IIIB1680
1114      *      IIIB1690
1115      *      IIIB1700
1116      *      IIIB1710
1117      *      IIIC2380
1118      *      IIIC2390

```

TABLE DEFINITIONS

- 1 - TIME FROM LANDING TO STORAGE ENTRY (BOOSTER)
- 2 - STORAGE TIME (BOOSTER)
- 3 - GROUND PROCESSING TIME (BOOSTER)
- 4 - FLOATING HOLD TIME BETWEEN COMPLETION OF ALL PRECOUNTDOWN OPERATIONS AND THE INITIATION OF FINAL COUNTDOWN FOR THE FIRST WINDOW

```

1118 * 5 - FLOSTING HOLD TIME BETWEEN COMPLETION OF ALL PRECOUNTDOWN 111C2400
1119 * OPERATIONS AND THE INITIATION OF FINAL COUNTDOWN, FOR ALL WINDOWS 111C2410
1120 * SUBSEQUENT TO THE FIRST 111C2420
1121 * 6 - THE AMOUNT OF TIME A SUCCESSFUL REQUEST SPENT WAITING FOR 111C2430
1122 * VEHICLE ELEMENTS. 111C2440
1123 * 7 - THE AMOUNT OF TIME LEFT TO THE FIRST LAUNCH WINDOW - NEGATIVE 111C2450
1124 * VALUES IN THE TABLE INDICATE THE AMOUNT OF TIME PAST THE WINDOW 111C2460
1125 * THE PROGRAM IS AT. 111C2470
1126 * 8 - AMOUNT OF TIME AFTER PRIMARY WINDOW LAUNCH OCCURED AT 111C2480
1127 * 9 - INDICATES THE NUMBER OF LAUNCHES AT EACH WINDOW 111C2490
1128 * 10 - ELAPSED TIME OF VEHICLE ELEMENTS FROM THEIR STORAGE EXIT TO 111B1780
1129 * THEIR LIFTOFF 111B1790
1130 * 11 - 111B1800
1131 * 12 - 111B1810
1132 * 13 - 111B1820
1133 * 14 - 111B1830
1134 * 15 - 111B1840
1135 * 16 - 111B1850
1136 * 17 - 111B1860
1137 * 18 - 111B1870
1138 * 19 - 111B1880
1139 * 20 - 111B1890
1140 * 21 - TIME FROM LANDING TO STORAGE ENTRY (ORBITER) 111B1900
1141 * 22 - STORAGE TIME (ORBITER) 111B1910
1142 * 23 - GROUND PROCESSING TIME (ORBITER) 111B1920
1143 * ----- 111B1930
1144 * T(1) TABLE MPSP8//131072,5000,500,500,200 111A8360
1145 * T(2) TABLE HAS4,000,500,300 111A8370
1146 * T(3) TABLE VSV(1),9000,500,300 111C2500
1147 * T(4) TABLE X$X(10),000,100,300 111C2510
1148 * T(5) TABLE X$X(10),000,100,300 111C2520
1149 * T(6) TABLE M$1,000,100,700 111C2530
1150 * T(7) TABLE X$X(10),-5000,100,550 111C2540
1151 * T(8) TABLE X$X(35),000,100,500 111C2550
1152 * T(9) TABLE X$X(27),000,1,150 111C2560
1153 * T(10) TABLE MPSP11//131072,0000,500,500,300 111C2570
1154 * 11 111C2580
1155 * 12 111C2590
1156 * 13 111C2600
1157 * 14 111C2610
1158 * 15 111C2620
1159 * 16 111C2630
1160 * 17 111C2640
1161 * 18
1162 * 19
1163 * 20
1164 * T(21) TABLE MPSP8//131072,5000,500,500,200 111B1940
1165 * T(22) TABLE HAS4,000,500,300 111B1950
1166 * T(23) TABLE VSV(7),9000,500,300 111B1960
1167 * ----- 111B1970
1168 * 111B1980
1169 * 111B1990
1170 *
1171 * NUMBER OF SIMULATIONS TO BE PERFORMED
1172 *
1173 * NOTE- SEE VARIABLE 10
1174 *
1175 * START 76

```

BLOCKS:

LABEL.1	LABEL.2	LABEL.3	LABEL.4	LABEL.5
LABEL.6	LABEL.7	LABEL.8	LABEL.9	LABEL.10
LABEL.11	LABEL.12	LABEL.13	LABEL.14	LABEL.15
LABEL.16	LABEL.17	LABEL.18	LABEL.19	LABEL.20
LABEL.21	LABEL.22	LABEL.23	LABEL.24	LABEL.25
LABEL.26	LABEL.27	LABEL.28	LABEL.29	LABEL.30
LABEL.31	LABEL.32	LABEL.33	LABEL.34	LABEL.35
LABEL.36	LABEL.37	LABEL.38	LABEL.39	LABEL.40
LABEL.41	LABEL.42	LABEL.43	LABEL.44	LABEL.45
LABEL.46	LABEL.47	LABEL.48	LABEL.49	LABEL.50
LABEL.51	LABEL.52	LABEL.53	LABEL.54	LABEL.55
LABEL.56	LABEL.57	LABEL.58	LABEL.59	LABEL.60
LABEL.61	LABEL.62	LABEL.63	LABEL.64	LABEL.65
LABEL.66	LABEL.67	LABEL.68	LABEL.69	LABEL.70
LABEL.71	LABEL.72	LABEL.73	LABEL.74	LABEL.75
LABEL.76	LABEL.77	LABEL.78	LABEL.79	LABEL.80
LABEL.81	LABEL.82	LABEL.83	LABEL.84	LABEL.85
LABEL.86	LABEL.87	LABEL.88	LABEL.89	LABEL.90
LABEL.91	LABEL.92	LABEL.93	LABEL.94	LABEL.95
LABEL.96	LABEL.97	LABEL.98	LABEL.99	LABEL.100
LABEL.101	LABEL.102	LABEL.103	LABEL.104	LABEL.105
LABEL.106	LABEL.107	LABEL.108	LABEL.109	LABEL.110
LABEL.111	LABEL.112	LABEL.113	LABEL.114	LABEL.115
LABEL.116	LABEL.117	LABEL.118	LABEL.119	LABEL.120
LABEL.121	LABEL.122	LABEL.123	LABEL.124	LABEL.125
LABEL.126	LABEL.127	LABEL.128	LABEL.129	LABEL.130
LABEL.131	LABEL.132	LABEL.133	LABEL.134	LABEL.135
LABEL.136	LABEL.137	LABEL.138	LABEL.139	LABEL.140
LABEL.141	LABEL.142	LABEL.143	LABEL.144	LABEL.145
LABEL.146	LABEL.147	LABEL.148	LABEL.149	LABEL.150
LABEL.151	LABEL.152	LABEL.153	LABEL.154	LABEL.155
LABEL.156	LABEL.157	LABEL.158	LABEL.159	LABEL.160
LABEL.161	LABEL.162	LABEL.163	LABEL.164	LABEL.165
LABEL.166	LABEL.167	LABEL.168	LABEL.169	LABEL.170
LABEL.171	LABEL.172	LABEL.173	LABEL.174	LABEL.175
LABEL.176	LABEL.177	LABEL.178	LABEL.179	LABEL.180
LABEL.181	LABEL.182	LABEL.183	LABEL.184	LABEL.185
LABEL.186	LABEL.187	LABEL.188	LABEL.189	LABEL.190
LABEL.191	LABEL.192	LABEL.193	LABEL.194	LABEL.195
LABEL.196	LABEL.197	LABEL.198	LABEL.199	LABEL.200
LABEL.201	LABEL.202	LABEL.203	LABEL.204	LABEL.205
LABEL.206	LABEL.207	LABEL.208	LABEL.209	LABEL.210
LABEL.211	LABEL.212	LABEL.213	LABEL.214	LABEL.215
LABEL.216	LABEL.217	LABEL.218	LABEL.219	LABEL.220
LABEL.221	LABEL.222	LABEL.223	LABEL.224	LABEL.225
LABEL.226	LABEL.227	LABEL.228	LABEL.229	LABEL.230
LABEL.231	LABEL.232	LABEL.233	LABEL.234	LABEL.235
LABEL.236	LABEL.237	LABEL.238	LABEL.239	LABEL.240
LABEL.241	LABEL.242	LABEL.243	LABEL.244	LABEL.245
LABEL.246	LABEL.247	LABEL.248	LABEL.249	LABEL.250
LABEL.251	LABEL.252	LABEL.253	LABEL.254	LABEL.255

LABEL.256	LABEL.257	LABEL.258	LABEL.259	LABEL.260
LABEL.261	LABEL.262	LABEL.263	LABEL.264	LABEL.265
LABEL.266	LABEL.267	LABEL.268	LABEL.269	LABEL.270
LABEL.271				LABEL.270

PARAMETERS:

P1	P2	P3	P4	P5
P6	P7	P8	P9	P10
P11	P12	P13	P14	

FUNCTIONS:

FN1	FN2	FN3	FN4	FN5
FN6	FN7	FN8	FN9	FN10
FN11	FN12	FN13	FN14	FN15
FN16	FN17	FN18	FN19	FN20
FN21	FN22	FN23	FN24	FN25
FN26	FN27	FN28	FN29	FN30
FN31	FN32	FN33	FN34	FN35
FN36	FN37	FN38	FN39	FN40
FN41	FN42	FN43	FN44	FN45
FN46	FN47	FN48	FN49	FN50
FN51	FN52	FN53	FN54	FN55
FN56	FN57	FN58	FN59	FN60
FN61	FN62	FN63	FN64	FN65
FN66	FN67	FN68	FN69	FN70
FN71	FN72	FN73	FN74	FN75
FN76	FN77	FN78	FN79	FN80
FN81	FN82	FN83	FN84	FN85
FN86	FN87	FN88	FN89	FN90
FN91	FN92	FN93	FN94	FN95
FN96	FN97	FN98	FN99	FN100

NUMBER OF TRANSACTIONS ALLOWED: 1335

TABLE II. SUMMARY RESULTS

CASE STUDY: • GPSS 1100 75 TRANSACTIONS TEST CASE

INITIAL CONDITIONS:		
NUMBER OF VEHICLE STAGES		
SERVICE CAPACITY OF SAFING AREA	4	5
SERVICE CAPACITY OF MAINTENANCE FACILITY	1	1
SERVICE CAPACITY OF CHECKOUT & TEST FACILITY	2	2
SERVICE CAPACITY OF MATE & HOOK-UP FACILITY	2	2
SERVICE CAPACITY OF LUT REFURBISHMENT FACILITY		1
NUMBER OF LUTS-	4	2
NUMBER OF LAUNCH PADS-	2	
	BOOSTER	ORBITER

TRAFFIC MODEL STATISTICS:

MISSION MODEL LAUNCH RATE (FLIGHTS/YEAR)- 76
DISTRIBUTION OF TIME BETWEEN LAUNCH REQUESTS-
19.8% OF LAUNCHES ARE SCHEDULED 1 DAY APART
32.1% OF LAUNCHES ARE SCHEDULED 2 DAYS APART
29.6% OF LAUNCHES ARE SCHEDULED 3 DAYS TO 1 WEEK APART
18.5% OF LAUNCHES ARE SCHEDULED 1 WEEK TO 2 WEEKS APART
.0% OF LAUNCHES ARE SCHEDULED 2 WEEKS TO 1 MONTH APART

OPERATIONAL EVALUATION PARAMETERS FOR 79 SIMULATIONS:

THE NUMBER OF SUCCESSFUL LAUNCH REQUESTS ARE 73 OR 92.4 PERCENT
THE NUMBER OF UNSUCCESSFUL REQUESTS ARE 6 OR 7.6 PERCENT
THE NUMBER OF VEHICLES LAUNCHED AT A SUBSEQUENT WINDOW IS 5 OR 6.8 PERCENT
REASONS FOR REQUEST FAILURES-
BOOSTER UNAVAILABILITY 1 TIMES OR 1.3 PERCENT
ORBITER UNAVAILABILITY 3 TIMES OR 3.8 PERCENT
BOTH STAGES UNAVAILABLE 0 TIMES OR .0 PERCENT
LUT UNAVAILABILITY 0 TIMES OR .0 PERCENT
PAD UNAVAILABILITY 1 TIMES OR 1.3 PERCENT
FAILURES AND REMOVAL FROM PAD 1 TIMES OR 1.3 PERCENT

AVERAGE PHASE TIMES PER VEHICLE ELEMENT:

LANDING TO STORAGE(DAYS)	BOOSTER	ORBITER
STORAGE(DAYS)	5.83	5.88
LEAVE STORAGE TO LAUNCH(DAYS)	3.18	3.41
MEAN ON-ORBIT MISSION TIME(DAYS)	5.30	5.30
TURNAROUND- LAUNCH TO LAUNCH(DAYS)	14.32	18.12

WAITING STATISTICS:

PERCENT OF VEHICLES DELAYED FOR SAFING	BOOSTER	ORBITER
AVERAGE QUEUE TIME FOR SAFING(DAYS)	.00	6.94
PERCENT OF VEHICLES DELAYED FOR MAINT.	.00	.56
AVERAGE QUEUE TIME FOR MAINTENANCE(DAYS)	.00	1.41
PERCENT OF VEHICLES DELAYED FOR CHECKOUT&TEST	.00	1.14
AVERAGE QUEUE TIME FOR CHECKOUT & TEST(DAYS)	.00	.00
PERCENT OF VEHICLES DELAYED FOR M & H	.00	.00
AVERAGE QUEUE TIME FOR MATE & HOOKUP(DAYS)	12.00	
PERCENT OF LUTS DELAYED FOR REFURBISHMENT	.36	
AVERAGE QUEUE TIME FOR LUT REFURBISH FACILITY	.00	
PERCENT OF VEHICLES DELAYED FOR PAD ACCESS	6.67	
AVERAGE QUEUE TIME FOR PAD(DAYS)	.61	

FACILITY UTILIZATION:

SAFING AREA(PERCENT)	BOOSTER	ORBITER
MAINTENANCE(PERCENT)	27.20	26.40
CHECKOUT & TEST(PERCENT)	37.80	37.50
MATE & HOOK-UP(PERCENT)	26.80	26.40
LUT REFURBISHMENT(PERCENT)		
	55.70	
	40.90	

PAD UTILIZATION:

LAUNCH PAD 1 (PERCENT)	74.10
LAUNCH PAD 2 (PERCENT)	57.10

..... GPSS 1100 75 TRANSACTIONS TEST CASE

.....

THE FLEET SIZE IS 4 BOOSTERS & 5 ORBITERS
RANDOM NUMBER SEED FOR TRAFFIC MODEL SIMULATOR = 3154267131
RANDOM NUMBER SEED FOR DISTRIBUTION FUNCTIONS = 4339968911

TRANS COUNTS	BLOCK	TRAN	TOTAL	NAME	BLOCK	TRAN	TOTAL	NAME	BLOCK	TRAN	TOTAL
LABEL.1	1	0	1	LABEL.2	2	0	1	LABEL.3	3	0	1
LABEL.4	4	0	1	LABEL.5	5	0	1	LABEL.6	6	0	1
LABEL.7	7	0	1	LABEL.8	8	0	1	LABEL.9	9	0	1
LABEL.10	10	0	1	LABEL.11	11	0	1	LABEL.12	12	0	1
LABEL.13	13	0	1	LABEL.14	14	0	1	LABEL.15	15	0	1
LABEL.16	16	0	1	LABEL.17	17	0	1	LABEL.18	18	1	81
LABEL.19	19	0	80	LABEL.20	20	0	80	LABEL.21	21	0	80
LABEL.22	22	0	80	LABEL.23	23	0	80	LABEL.24	24	0	80
LABEL.25	25	0	80	LABEL.26	26	0	80	LABEL.27	27	0	80
LABEL.28	28	0	80	LABEL.29	29	0	80	LABEL.30	30	0	80
LABEL.31	31	0	80	LABEL.32	32	0	80	LABEL.33	33	0	80
LABEL.34	34	1	80	LABEL.35	35	0	79	LABEL.36	36	0	79
LABEL.37	37	0	80	LABEL.38	38	0	80	LABEL.39	39	0	80
LABEL.40	40	0	80	LABEL.41	41	0	80	LABEL.42	42	0	80
LABEL.43	43	0	80	LABEL.44	44	0	80	LABEL.45	45	0	4
LABEL.46	46	0	4	LABEL.47	47	0	79	LABEL.48	48	0	76
LABEL.49	49	0	76	LABEL.50	50	0	1	LABEL.51	51	0	75
LABEL.52	52	0	75	LABEL.53	53	0	75	LABEL.54	54	0	75
LABEL.55	55	0	75	LABEL.56	56	0	75	LABEL.57	57	0	75
LABEL.58	58	0	75	LABEL.59	59	0	75	LABEL.60	60	0	75
LABEL.61	61	0	75	LABEL.62	62	0	75	LABEL.63	63	0	75
LABEL.64	64	0	75	LABEL.65	65	0	75	LABEL.66	66	0	75
LABEL.67	67	0	75	LABEL.68	68	0	75	LABEL.69	69	0	75
LABEL.70	70	0	75	LABEL.71	71	0	42	LABEL.72	72	0	33
LABEL.73	73	0	0	LABEL.74	74	0	42	LABEL.75	75	0	33
LABEL.76	76	0	0	LABEL.77	77	0	75	LABEL.78	78	0	75
LABEL.79	79	0	75	LABEL.80	80	1	75	LABEL.81	81	0	74
LABEL.82	82	0	74	LABEL.83	83	0	69	LABEL.84	84	0	5
LABEL.85	85	0	0	LABEL.86	86	0	69	LABEL.87	87	0	69
LABEL.88	88	0	69	LABEL.89	89	0	69	LABEL.90	90	0	74
LABEL.91	91	0	74	LABEL.92	92	0	74	LABEL.93	93	0	74
LABEL.94	94	0	74	LABEL.95	95	0	73	LABEL.96	96	0	68
LABEL.97	97	0	68	LABEL.98	98	0	5	LABEL.99	99	0	5
LABEL.100	100	0	1	LABEL.101	101	0	1	LABEL.102	102	0	0
LABEL.103	103	0	0	LABEL.104	104	0	0	LABEL.105	105	0	5
LABEL.106	106	0	5	LABEL.107	107	0	5	LABEL.108	108	0	5
LABEL.109	109	0	5	LABEL.110	110	0	5	LABEL.111	111	0	0
LABEL.118	118	0	73	LABEL.119	119	1	73	LABEL.120	120	0	73
LABEL.121	121	0	73	LABEL.122	122	0	73	LABEL.123	123	0	73
LABEL.124	124	1	73	LABEL.125	125	0	72	LABEL.126	126	0	72
LABEL.127	127	1	145	LABEL.128	128	0	72	LABEL.129	129	0	144
LABEL.130	130	0	73	LABEL.131	131	0	73	LABEL.132	132	0	73
LABEL.133	133	1	73	LABEL.134	134	0	72	LABEL.135	135	0	72
LABEL.136	136	0	73	LABEL.137	137	0	73	LABEL.138	138	0	73
LABEL.139	139	0	73	LABEL.140	140	0	72	LABEL.141	141	0	72
LABEL.142	142	0	73	LABEL.143	143	0	73	LABEL.144	144	0	73
LABEL.145	145	0	73	LABEL.146	146	0	73	LABEL.147	147	0	73
LABEL.148	148	0	73	LABEL.149	149	0	73	LABEL.150	150	0	73
LABEL.151	151	0	73	LABEL.152	152	0	73	LABEL.153	153	0	73
LABEL.154	154	0	73	LABEL.155	155	0	73	LABEL.156	156	0	73
LABEL.157	157	0	73	LABEL.158	158	0	73	LABEL.159	159	0	73
LABEL.160	160	1	73	LABEL.161	161	0	72	LABEL.162	162	0	72

C-28

QUEUE NAME	MAXIMUM CONTENTS	AVERAGE CONTENTS	TOTAL ENTRIES	ZERO ENTRIES	PERCENT	ZEROS	ALL ENT	AVERAGE TIME/ENTRIES	TABLE NAME	CURRENT CONTENTS
S (2)	2	.76	2	2.00	.3787	73	73	1.00	2778.48	0
S (3)	2	.54	2	2.00	.2690	73	73	1.00	1973.48	2
S (4)	4	.89	9	9.00	.0990	75	72	1.04	3182.60	0
S (10)	1	.26	1	1.00	.2647	71	71	1.00	998.44	1
S (11)	2	.75	2	2.00	.3756	71	71	1.00	2832.97	0
S (12)	2	.53	2	2.00	.2648	71	71	1.00	1997.63	0
S (13)	5	.96	9	9.00	.1065	76	72	1.06	3378.33	1
S (14)	3	.96	9	9.00	.1069	73	73	1.00	3529.22	1
S (16)	4	1.28	10	10.00	.1280	76	73	1.04	4510.59	1
S (17)	2	.40	2	2.00	.2021	73	73	1.00	1483.04	1
S (18)	2	.82	2	2.00	.4100	73	73	1.00	3007.97	1
S (19)	1	.00	1	1.00	.0026	1	1	1.00	709.00	0
S (20)	1	.56	1	1.00	.5578	75	75	1.00	1991.80	0
S (22)	2	.70	2	2.00	.3486	75	75	1.00	2489.69	1
S (23)	1	.02	2	2.00	.0115	74	74	1.00	83.00	0
S (25)	1	.01	2	2.00	.0036	1	1	1.00	1927.00	0
S (27)	1	.27	2	2.00	.1357	73	73	1.00	995.82	0
S (28)	1	.00	2	2.00	.0003	73	73	1.00	2.00	0
S (29)	1	.05	1	1.00	.0544	80	80	1.00	182.22	0
S (30)	1	.00	1	1.00	.0024	1	1	1.00	652.00	0
S (31)	1	.04	1	1.00	.0416	80	80	1.00	139.39	0

TABLE NAME: T (1)

ENTRIES IN TABLE	MEAN ARGUMENT	STANDARD DEVIATION	NON-WEIGHTED	WEIGHTED
70	5832.343	507.509		
70	5832.343	507.509		

UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN
5000.0000	0	.00	.0	100.0	.857	-1.640
5500.0000	12	17.14	17.1	82.9	.943	-.655
6000.0000	44	62.86	80.0	20.0	1.029	.330
6500.0000	6	8.57	88.6	11.4	1.114	1.316
7000.0000	5	7.14	95.7	4.3	1.200	2.301
7500.0000	2	2.86	98.6	1.4	1.286	3.286

8000.0000 1 1.43 100.0 0.0 1.372 4.271
 REMAINING FREQUENCIES ARE ALL ZERO

TABLE NAME: T (2)

ENTRIES IN TABLE		MEAN ARGUMENT		STANDARD DEVIATION		NON-WEIGHTED	
75		3182.600		2278.549			
75		3182.600		2278.549		WEIGHTED	
UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN	
.0000	6	8.00	8.0	92.0	.000	-1.397	
5000.0000	4	5.33	13.3	86.7	.157	-1.177	
10000.0000	8	10.67	24.0	76.0	.314	-.958	
15000.0000	6	8.00	32.0	68.0	.471	-.738	
20000.0000	3	4.00	36.0	64.0	.628	-.519	
25000.0000	4	5.33	41.3	58.7	.786	-.300	
30000.0000	5	6.67	48.0	52.0	.943	-.080	
35000.0000	9	12.00	60.0	40.0	1.100	.139	
40000.0000	5	6.67	66.7	33.3	1.257	.359	
45000.0000	4	5.33	72.0	28.0	1.414	.578	
50000.0000	4	5.33	77.3	22.7	1.571	.798	
55000.0000	6	8.00	85.3	14.7	1.728	1.017	
60000.0000	2	2.67	88.0	12.0	1.885	1.236	
65000.0000	2	2.67	90.7	9.3	2.042	1.456	
70000.0000	2	2.67	93.3	6.7	2.199	1.675	
75000.0000	2	2.67	96.0	4.0	2.357	1.895	
80000.0000	1	1.33	97.3	2.7	2.514	2.114	
85000.0000	1	1.33	98.7	1.3	2.671	2.334	
90000.0000	0	.00	98.7	1.3	2.828	2.553	
95000.0000	0	.00	98.7	1.3	2.985	2.773	
100000.0000	1	1.33	100.0	.0	3.142	2.992	

REMAINING FREQUENCIES ARE ALL ZERO

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NAME: T (3)

ENTRIES IN TABLE		MEAN ARGUMENT		STANDARD DEVIATION		NON-WEIGHTED	
70		14295.957		2279.746			
70		14295.957		2279.746		WEIGHTED	
UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN	
9000.0000	0	.00	.0	100.0	.630	-2.323	
9500.0000	0	.00	.0	100.0	.665	-2.104	
10000.0000	0	.00	.0	100.0	.699	-1.884	
10500.0000	1	1.43	1.4	98.6	.734	-1.665	
11000.0000	4	5.71	7.1	92.9	.769	-1.446	
11500.0000	3	4.29	11.4	88.6	.804	-1.226	
12000.0000	4	5.71	17.1	82.9	.839	-1.007	
12500.0000	4	5.71	22.9	77.1	.874	-.788	

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NAME: T (6)

ENTRIES IN TABLE
75

MEAN ARGUMENT
67.267

STANDARD DEVIATION
224.322

NON-WEIGHTED

WEIGHTED

UPPER
LIMIT

OBSERVED
FREQUENCY

PERCENT
OF TOTAL

CUMULATIVE
PERCENTAGE

CUMULATIVE
REMAINDER

MULTIPLE
OF MEAN

DEVIATION
FROM MEAN

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NAME: T (7)

ENTRIES IN TABLE
5

MEAN ARGUMENT
-307.400

STANDARD DEVIATION
288.112

NON-WEIGHTED

WEIGHTED

UPPER
LIMIT

OBSERVED
FREQUENCY

PERCENT
OF TOTAL

CUMULATIVE
PERCENTAGE

CUMULATIVE
REMAINDER

MULTIPLE
OF MEAN

DEVIATION
FROM MEAN

REMAINING FREQUENCIES ARE ALL ZERO

-4000.0000	0	.00	.00	100.0	13.012	-12.817
-3900.0000	0	.00	.00	100.0	12.687	-12.469
-3800.0000	0	.00	.00	100.0	12.362	-12.122
-3700.0000	0	.00	.00	100.0	12.036	-11.775
-3600.0000	0	.00	.00	100.0	11.711	-11.428
-3500.0000	0	.00	.00	100.0	11.386	-11.081
-3400.0000	0	.00	.00	100.0	11.061	-10.734
-3300.0000	0	.00	.00	100.0	10.735	-10.387
-3200.0000	0	.00	.00	100.0	10.410	-10.040
-3100.0000	0	.00	.00	100.0	10.085	-9.693
-3000.0000	0	.00	.00	100.0	9.759	-9.346
-2900.0000	0	.00	.00	100.0	9.434	-8.999
-2800.0000	0	.00	.00	100.0	9.109	-8.651
-2700.0000	0	.00	.00	100.0	8.783	-8.304
-2600.0000	0	.00	.00	100.0	8.458	-7.957
-2500.0000	0	.00	.00	100.0	8.133	-7.610
-2400.0000	0	.00	.00	100.0	7.807	-7.263
-2300.0000	0	.00	.00	100.0	7.482	-6.916
-2200.0000	0	.00	.00	100.0	7.157	-6.569
-2100.0000	0	.00	.00	100.0	6.831	-6.222
-2000.0000	0	.00	.00	100.0	6.506	-5.875
-1900.0000	0	.00	.00	100.0	6.181	-5.528
-1800.0000	0	.00	.00	100.0	5.856	-5.181
-1700.0000	0	.00	.00	100.0	5.530	-4.834
-1600.0000	0	.00	.00	100.0	5.205	-4.486
-1500.0000	0	.00	.00	100.0	4.880	-4.139
-1400.0000	0	.00	.00	100.0	4.554	-3.792
-1300.0000	0	.00	.00	100.0	4.229	-3.445
-1200.0000	0	.00	.00	100.0	3.904	-3.098
-1100.0000	0	.00	.00	100.0	3.578	-2.751
-1000.0000	0	.00	.00	100.0	3.253	-2.404
-900.0000	0	.00	.00	100.0	2.928	-2.057
-800.0000	0	.00	.00	100.0	2.602	-1.710
-700.0000	1	20.00	20.00	80.0	2.277	-1.363
-600.0000	0	.00	20.0	80.0	1.952	-1.016
-500.0000	0	.00	20.0	80.0	1.627	-.668
-400.0000	1	20.00	40.0	60.0	1.301	-.321
-300.0000	0	.00	40.0	60.0	.976	.026
-200.0000	1	20.00	60.0	40.0	.651	.373
-100.0000	1	20.00	80.0	20.0	.325	.720
.0000	0	.00	80.0	20.0	.000	1.067
100.0000	1	20.00	100.0	.0	-.325	1.414

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NAME: T (8)

ENTRIES IN TABLE		MEAN ARGUMENT		STANDARD DEVIATION		NON-WEIGHTED	
S		705.400		256.384		256.384	
UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN	
.0000	0	.00	.0	100.0	.000	-2.751	

100.0000	0	.00	.0	100.0	.142	-2.361
200.0000	0	.00	.0	100.0	.284	-1.971
300.0000	0	.00	.0	100.0	.425	-1.581
400.0000	1	20.00	20.0	80.0	.567	-1.191
500.0000	0	.00	20.0	80.0	.709	-.801
600.0000	2	40.00	60.0	40.0	.851	-.411
700.0000	0	.00	60.0	40.0	.992	-.021
800.0000	0	.00	60.0	40.0	1.134	.369
900.0000	0	.00	60.0	40.0	1.276	.759
1000.0000	2	40.00	100.0	.0	1.418	1.149

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NAME: T (9)

ENTRIES IN TABLE		MEAN ARGUMENT	STANDARD DEVIATION		NON-WEIGHTED		DEVIATION FROM MEAN
UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN		
73		1.068		.253			
73		1.068		.253			
1.0000	0	.00	.0	100.0	.000	-4.230	
2.0000	68	93.15	93.2	6.8	.936	-.271	
	5	6.85	100.0	.0	1.872	3.688	

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NAME: T (10)

ENTRIES IN TABLE		MEAN ARGUMENT	STANDARD DEVIATION		NON-WEIGHTED		DEVIATION FROM MEAN
UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN		
73		5304.205		204.833			
73		5304.205		204.833			
500.0000	0	.00	.0	100.0	.000	-25.895	
1000.0000	0	.00	.0	100.0	.094	-23.454	
1500.0000	0	.00	.0	100.0	.189	-21.013	
2000.0000	0	.00	.0	100.0	.283	-18.572	
2500.0000	0	.00	.0	100.0	.377	-16.131	
3000.0000	0	.00	.0	100.0	.471	-13.690	
3500.0000	0	.00	.0	100.0	.566	-11.249	
4000.0000	0	.00	.0	100.0	.660	-8.808	
4500.0000	1	1.37	1.4	98.6	.754	-6.367	
5000.0000	3	4.11	5.5	94.5	.848	-3.926	
5500.0000	67	91.78	97.3	2.7	.943	-1.485	
6000.0000	1	1.37	98.6	1.4	1.037	.956	
6500.0000	1	1.37	100.0	.0	1.131	3.397	
					1.225	5.838	

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NAME: T (21)

ENTRIES IN TABLE		MEAN ARGUMENT		STANDARD DEVIATION	
70		5882.471		478.170	
70		5882.471		478.170	
UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN
5000.0000	0	.00	.0	100.0	.850
5500.0000	12	17.14	17.1	82.9	.935
6000.0000	36	51.43	68.6	31.4	1.020
6500.0000	11	15.71	84.3	15.7	1.105
7000.0000	10	14.29	98.6	1.4	1.190
7500.0000	1	1.43	100.0	.0	1.275

REMAINING FREQUENCIES ARE ALL ZERO

DEVIATION FROM MEAN
-1.846
-.800
.246
1.291
2.337
3.383

TABLE NAME: T (22)

ENTRIES IN TABLE		MEAN ARGUMENT		STANDARD DEVIATION	
75		3407.760		2554.081	
75		3407.760		2554.081	
UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN
.0000	5	6.67	6.7	93.3	.000
500.0000	3	4.00	10.7	89.3	.147
1000.0000	7	9.33	20.0	80.0	.293
1500.0000	6	8.00	28.0	72.0	.440
2000.0000	4	5.33	33.3	66.7	.587
2500.0000	5	6.67	40.0	60.0	.734
3000.0000	6	8.00	48.0	52.0	.880
3500.0000	6	8.00	56.0	44.0	1.027
4000.0000	5	6.67	62.7	37.3	1.174
4500.0000	6	8.00	70.7	29.3	1.321
5000.0000	6	8.00	78.7	21.3	1.467
5500.0000	3	4.00	82.7	17.3	1.614
6000.0000	0	.00	82.7	17.3	1.761
6500.0000	3	4.00	86.7	13.3	1.907
7000.0000	5	6.67	93.3	6.7	2.054
7500.0000	2	2.67	96.0	4.0	2.201
8000.0000	0	.00	96.0	4.0	2.348
8500.0000	0	.00	96.0	4.0	2.494
9000.0000	0	.00	96.0	4.0	2.641
9500.0000	0	.00	96.0	4.0	2.788
10000.0000	1	1.33	97.3	2.7	2.934
10500.0000	1	1.33	98.7	1.3	3.081
11000.0000	0	.00	98.7	1.3	3.228
11500.0000	0	.00	98.7	1.3	3.375
12000.0000	0	.00	98.7	1.3	3.521
12500.0000	1	1.33	100.0	.0	3.668

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NAME: T (23)

ENTRIES IN TABLE		MEAN ARGUMENT		STANDARD DEVIATION		NON-WEIGHTED	
70		14474.614		2603.447		NON-WEIGHTED	
70		14474.614		2603.447		WEIGHTED	
UPPER LIMIT	OBSERVED FREQUENCY	PERCENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN	
9000.0000	0	.00	.0	100.0	.622	-2.103	
9500.0000	0	.00	.0	100.0	.656	-1.911	
10000.0000	0	.00	.0	100.0	.691	-1.719	
10500.0000	1	1.43	1.4	98.6	.725	-1.527	
11000.0000	1	1.43	2.9	97.1	.760	-1.335	
11500.0000	6	8.57	11.4	88.6	.794	-1.143	
12000.0000	5	7.14	18.6	81.4	.829	-.951	
12500.0000	6	8.57	27.1	72.9	.864	-.758	
13000.0000	6	8.57	35.7	64.3	.898	-.566	
13500.0000	1	1.43	37.1	62.9	.933	-.374	
14000.0000	6	8.57	45.7	54.3	.967	-.182	
14500.0000	6	8.57	54.3	45.7	1.002	.010	
15000.0000	6	8.57	62.9	37.1	1.036	.202	
15500.0000	5	7.14	70.0	30.0	1.071	.394	
16000.0000	4	5.71	75.7	24.3	1.105	.586	
16500.0000	4	5.71	81.4	18.6	1.140	.778	
17000.0000	2	2.86	84.3	15.7	1.174	.970	
17500.0000	1	1.43	85.7	14.3	1.209	1.162	
18000.0000	5	7.14	92.9	7.1	1.244	1.354	
18500.0000	1	1.43	94.3	5.7	1.278	1.546	
19000.0000	1	1.43	95.7	4.3	1.313	1.738	
19500.0000	1	1.43	97.1	2.9	1.347	1.930	
20000.0000	0	.00	97.1	2.9	1.382	2.122	
20500.0000	0	.00	97.1	2.9	1.416	2.314	
21000.0000	0	.00	97.1	2.9	1.451	2.506	
21500.0000	0	.00	97.1	2.9	1.485	2.698	
22000.0000	1	1.43	98.6	1.4	1.520	2.891	
22500.0000	0	.00	98.6	1.4	1.554	3.083	
23000.0000	0	.00	98.6	1.4	1.589	3.275	
23500.0000	0	.00	98.6	1.4	1.624	3.467	
OVERFLOW	1	1.43	100.0	.0			

FUTURE SEEDS FOR RANDOM NUMBER GENERATORS:

GENERATOR	MULTIPLIER	INCREMENT	SEED
1	1220703125	0	22691126745
2	3141592653	2718281829	3141592653
3	2718281829	3141592653	2718281829
4	10604499373	7261067085	10604499373
5	17249876309	7261067085	17249876309
6	30517578125	7261067085	30517578125
7	2565727293	35981228	2565727293
8	107936437	4292354	107936437
9	22438762221	6891	22438762221
10	621444377	92111326	621444377

1174 * GPSS 1100 BUFFER CARD
1175 END

0FIN

MUNID: GPFL2 ACCOUNT: 420025 PROJECT: MARSHLBIN225

LOAD 3517 16/3 TAPE -1 5736

5736*MSG: NEW GPSS CALLED GPSS IS DONE

TIME: 00:02:43.228 IN: 332 OUT: 0 PAGES: 202

INITIATION TIME: 00:22:42-APR 8,1972

TERMINATION TIME: 00:40:01-APR 8,1972

420025*TPFS.HELP

```

1 C THIS IS A DUMMY ROUTINE THAT CAN BE CHANGED BY A USER TO GET FORTRAN
2 C INTERFACE DURING THE EXECUTION OF A SIMULATION. A USER DEFINED NUMBER OF
3 C GPSS SYSTEM VARIABLES (HASN) SERVE AS ARGUMENTS FOR THIS ROUTINE. THEY ARE
4 C SPECIFIED ON THE HELP CARD AND AVAILABLE HERE IN THE JH( )-ARRAY.
5 COMPILER (FLD=)
6 C .....
7 C .....
8 C .....
9 SUBROUTINE HELP
10 C .....
11 C .....
12 C .....
13 COMMON/HELPC/JH(1)
14 C .....
15 C .....
16 C .....
17 C .....
18 C .....
19 C .....
20 C .....
21 C .....
22 C .....
23 C .....
24 C .....
25 C .....
26 C .....
27 C .....
28 C .....
29 C .....
30 C .....
31 C .....
32 C .....
33 C .....
34 C .....
35 C .....
36 C .....
37 C .....
38 C .....
39 C .....
40 C .....
41 C .....
42 C .....
43 C .....
44 C .....
45 C .....
46 C .....
47 C .....
48 C .....
49 C .....
50 C .....
51 C .....
52 C .....
53 C .....
54 C .....
55 C .....

```

THE USER ROUTINE IS SUBSTITUTED FOR THE FOLLOWING STATEMENT

```

COMMON /HEPL/PARAM(7,3),LL,ISEED,ISEED1,ISTORE(2,10),IS(2)
COMMON /HLPRT/NBOOS,NORBI,NLUTS,TITLE(20),NSEED,NSEED1
EQUIVALENCE (K1,JH(1)),(K2,JH(2)),(K3,JH(3)),(K4,JH(4)),(K5,JH(5))
25 GO TO (1,2,3,4,5,6,7,8,9,10,11,12,13),K1

```

GENERATE REQUIREMENTS FOR NEXT LAUNCH

```

1 CONTINUE
CALL MISSION(NP1,NP2,NP3,NP4,NP5,MODEL)
K2=NP1
K3=NP2
K4=NP3
K5=NP5
GO TO 99
2 CONTINUE
C.....NOT USED.....
GO TO 99

```

GENERATE DEVIATE FOR TRIANGULAR DISTRIBUTION

```

3 PARAM(1,1)=K2
PARAM(1,2)=K3
PARAM(1,3)=K4
K5=TRIANG(1)
GO TO 99

```

GENERATE DEVIATE FOR NORMAL DISTRIBUTION

```

4 PARAM(1,1)=K2
PARAM(1,2)=K3
K4=RNORM(1)
K5=K4
GO TO 99

```

STORE THE TIME THAT THE BOOSTER (K2=1) OR ORBITER (K2=2) WAS

```

5 IS(K2)=IS(K2)+1
K=IS(K2)
ISTORE(K2,K)=K3

```

PUT IN STORAGE.

```

56      GO TO 99
57      C
58      C*****COMPUTE THE TIME THAT THE BOOSTER OR ORBITER WAS PUT IN STORAGE
59      C*****BASED ON FIRST-IN-FIRST-OUT.
60      6 K4=K3-ISTORE(K2,1)
61      IS(K2)=IS(K2)-1
62      K=IS(K2)
63      IF(K.EQ.0) GO TO 99
64      DO 20 I=1,K
65      20 ISTORE(K2,I)=ISTORE(K2,I+1)
66      GO TO 99
67      7 CONTINUE
68
69      C
70      C*****INITIALIZE MISSION SUBROUTINE AND PREPARE FOR NEW CASE
71      C
72      C
73      C*****READ CASE STUDY COMMENT CARD
74      C
75      READ(5,101) (TITLE(I), I=1,20)
76      101 FORMAT(20A4)
77
78      C
79      C*****READ THE VERSION CODE OF THE TRAFFIC MODEL TO BE SIMULATED
80      C*****READ IN THE NUMBER OF BOOSTERS, ORBITERS & LUTS
81      C*****READ IN THE RANDOM NUMBER SEED FOR MISSION MODEL PROGRAM(1SEED)
82      C*****READ IN THE RANDOM NUMBER SEED FOR DISTRIBUTION GENERATORS(1SEED1)
83      C
84      READ(5,103) MODEL,NBOOS,NORBI,NLUTS,      ISEED,1SEED1
85      103 FORMAT(11,14,215,45X,2110)
86      IS(1)=NBOOS
87      IS(2)=NORBI
88      K2=NBOOS
89      K3=NORBI
90      K4=NLUTS
91      NSEED=1SEED
92      GO TO 99
93      8 CONTINUE
94
95      C
96      C*****GENERATE DEViate FOR A TWO PARAMETER EXPONENTIAL DISTRIBUTION
97      C
98      C
99      PARAM(1,1)=K2
100      NBETA=K3-K2
101      PARAM(1,2)=NBETA
102      K5=EXPO(1)
103      GO TO 99
104      9 CONTINUE
105
106      C
107      C*****GENERATE DEViate FOR THE LOG NORMAL DISTRIBUTION
108      C
109      C
110      F2=FLOAT(K2)/1000.
111      F3=FLOAT(K3)/1000.
112      PARAM(1,2)=SQRT(ALOG(F3**2/F2**2+1.))
113      PARAM(1,1)=ALOG(F2)-.5*(PARAM(1,2))**2
114      K5=RLOGN(1)*1000
115      GO TO 99

```

HELP 480

HELP 490

HELP 500

HELP 510

HELP 520

HELP 530

HELP 550

HELP 560

HELP 580

HELP 590

HELP 600

HELP 610

HELP 620

HELP 650

HELP 670

HELP 700

HELP 710

HELP 720

HELP 740

HELP 770

HELP 780

HELP 790

HELP 800

HELP 820

HELP 830

HELP 840

HELP 850

HELP 860

HELP 880

HELP 900

HELP 910

HELP 920

HELP 930

HELP 940

HELP 950

HELP 960

HELP 970

HELP 980

```

112      10 CONTINUE
113      C
114      C*****PRINT OUT OF SUMMARY TABLE
115      C
116      NCALL=NCALL+1
117      CALL PRINT(NCALL,K2,K3,K4,K5)
118      GO TO 99
119      11 CONTINUE
120      C
121      C*****THIS FUNCTION PERMITS THE ADVANCE BLOCK TO BE INCREMENTED BY A
122      C*****CONSTANT
123      C*****TRANSFER THE VALUE OF ARGUMENT K2 TO ARGUMENT K5
124      C
125      C      GPSS OUTPUT CAN BE OBTAINED FROM EITHER THE K4 OR K5 FIELDS
126      K5=K2
127      K4=K2
128      GO TO 99
129      12 CONTINUE
130      C
131      C*****GENERATE DEVIATE FOR UNIFORM DISTRIBUTION
132      C
133      A = K2
134      B = K3
135      C      GPSS OUTPUT CAN BE OBTAINED FROM EITHER THE K4 OR K5 FIELDS
136      K4 = UNFRM1(A,B)
137      K5=K4
138      GO TO 99
139      13 CONTINUE
140      C
141      C*****GENERATE DEVIATE FOR BETA DISTRIBUTION
142      C
143      PARAM(1,1) = K3
144      PARAM(1,2) = K2
145      PARAM(1,3) = K4
146      CALL PERTXF(1,SMEAN,SVAR)
147      K5 = BETADP(1,SMEAN,SVAR)
148      99 CONTINUE
149      IF(K2.LE.0) K2=0
150      IF(K3.LE.0) K3=0
151      IF(K4.LE.0) K4=0
152      IF(K5.LE.0) K5=0
153      RETURN
154      C      . SE
155      END

```

HELP1000
 HELP1010
 HELP1020
 HELP1030
 HELP1040

HELP

```

1  COMPILER (FLD=K)
2  SUBROUTINE PRINT(NCALL,K2,K3,K4,K5)
3
4  C*****THIS ROUTINE PRINTS OUT THE SUMMARY RESULTS TABLE*****
5  C
6  REAL MANUF,LUTREF
7  INTEGER P
8  INTEGER GLOB
9  COMMON /HLPRT/NBOOS,NORBI,NLUTS,TITLE(20),NSEED,NSEED1
10 COMMON /MISPR/NELTA1,NELTA2,NELTA3,NELTA4,NELTAS
11 INCLUDE TABLES
12 INCLUDE DEFS
13 INCLUDE STORES
14 INCLUDE QUEUES
15 INCLUDE FACS
16 INCLUDE SAVESX
17 P=6
18 GO TO (10,20,30,40,50,60,70,80,90).NCALL
19 CONTINUE
20 WRITE(P,100)
21 100 FORMAT(1H1,30X,*****TABLE 11. SUMMARY RESULTS****)
22 WRITE(P,102)(TITLE(I),I=1,20)
23 102 FORMAT(//10X,'CASE STUDY: ',20A4)
24 WRITE(P,103)
25 103 FORMAT(//10X,'INITIAL CONDITIONS:',T60,'BOOSTER',T70,'ORBITER')
26 WRITE(P,104)NBOOS,NORBI
27 104 FORMAT(15X,'NUMBER OF VEHICLE STAGES ',T63.12,T73.12)
28 MSAB=YSVSX(1)
29 MSAB=YSVSX(10)
30 WRITE(P,170)MSAB,MSAO
31 170 FORMAT(15X,'SERVICE CAPACITY OF SAFING AREA',T63.12,T73.12)
32 MF8=YSVSX(2)
33 MFO=YSVSX(11)
34 WRITE(P,105)MF8,MFO
35 105 FORMAT(15X,'SERVICE CAPACITY OF MAINTENANCE FACILITY',T63.12,
36 1 T73.12)
37 MCOTB=YSVSX(3)
38 MCOTO=YSVSX(12)
39 WRITE(P,176)MCOTB,MCOTO
40 176 FORMAT(15X,'SERVICE CAPACITY OF CHECKOUT & TEST FACILITY',T63.
41 1 12,T73.12)
42 MHF=YSVSX(20)
43 WRITE(P,171)MHF
44 171 FORMAT(15X,'SERVICE CAPACITY OF MATE & HOOK-UP FACILITY',T68.12)
45 LUTRF=YSVSX(18)
46 WRITE(P,172)LUTRF
47 172 FORMAT(15X,'SERVICE CAPACITY OF LUT REFURBISHMENT FACILITY',T68.
48 1 12)
49 WRITE(P,173)NLUTS
50 173 FORMAT(15X,'NUMBER OF LUTS=',T40.12)
51 C*****
52 NPADS=1
53 IF(VXACCT(2).GT.0)NPADS=2
54 IF(VXACCT(3).GT.0)NPADS=3
55 13 WRITE(P,106)NPADS

```

```

56 106 FORMAT(15X,'NUMBER OF LAUNCH PADS=',I40,I2)
57 K2=JEKS(30)+JEKS(2)+JEKS(3)+JEKS(4)+JEKS(22)+JEKS(23)+JEKS(24)+
58 1 JEKS(25)+JEKS(8)
59 WRITE(P,174)
60 174 FORMAT(///10X,'TRAFFIC MODEL STATISTICS:')
61 NFR=260000./FLOAT(JEKS(21))*FLOAT(K2)
62 WRITE(P,157)NFR
63 157 FORMAT(15X,'MISSION MODEL LAUNCH RATE (FLIGHTS/YEAR)=',I6)
64 NLR=NELTA1+NELTA2+NELTA3+NELTA4+NELTAS
65 PELTA1=FLOAT(NELTA1)*100./NLR
66 PELTA2=FLOAT(NELTA2)*100./NLR
67 PELTA3=FLOAT(NELTA3)*100./NLR
68 PELTA4=FLOAT(NELTA4)*100./NLR
69 PELTAS=FLOAT(NELTAS)*100./NLR
70 WRITE(P,158)PELTA1,PELTA2,PELTA3,PELTA4,PELTAS
71 158 FORMAT(15X,'DISTRIBUTION OF TIME BETWEEN LAUNCH REQUESTS=')
72 A/16X,F5.1,'% OF LAUNCHES ARE SCHEDULED 1 DAY APART',
73 B/16X,F5.1,'% OF LAUNCHES ARE SCHEDULED 2 DAYS APART',
74 C/16X,F5.1,'% OF LAUNCHES ARE SCHEDULED 3 DAYS TO 1 WEEK APART',
75 D/16X,F5.1,'% OF LAUNCHES ARE SCHEDULED 1 WEEK TO 2 WEEKS APART',
76 E/16X,F5.1,'% OF LAUNCHES ARE SCHEDULED 2 WEEKS TO 1 MONTH APART')
77 WRITE(P,107)K2
78 107 FORMAT(///10X,'OPERATIONAL EVALUATION PARAMETERS FOR ',I4,' SIMULA
79 TIONS:')
80 PLR=FLOAT(JEKS(30))*100./K2
81 NJEK30=JEKS(30)
82 WRITE(P,152)NJEK30,PLR
83 152 FORMAT(15X,'THE NUMBER OF SUCCESSFUL LAUNCH REQUESTS ARE',I4,
84 1 ' OR',F5.1,' PERCENT')
85 NMLR=K2-JEKS(30)
86 PNMLR=FLOAT(NMLR)*100./K2
87 WRITE(P,108)NMLR,PNMLR
88 108 FORMAT(15X,'THE NUMBER OF UNSUCCESSFUL REQUESTS ARE',I4,
89 1 ' OR',F5.1,' PERCENT')
90 GLOBP =(FLOAT(JEKS(26))/FLOAT(JEKS(30)))*100.
91 GLOB = JEKS(26)
92 WRITE(P,373)GLOB,GLOBP
93 373 FORMAT(15X,'THE NUMBER OF VEHICLES LAUNCHES AT A SUBSEQUENT WINDOW
94 1 15',I3,' OR',F5.1,'PERCENT')
95 WRITE(P,596)
96 596 FORMAT(
97 16X,'REASONS FOR REQUEST FAILURES=')
97 NBUNA= JEKS(3)
98 PBUNA=FLOAT(NBUNA)*100./K2
99 WRITE(P,109)NBUNA,PBUNA
100 109 FORMAT(17X,'BOOSTER UNAVAILABILITY',T50,I4,' TIMES OR',F5.1,' PERC
101 ENT')
102 NOUNA= JEKS(4)
103 POUNA=FLOAT(NOUNA)*100./K2
104 WRITE(P,110)NOUNA,POUNA
105 110 FORMAT(17X,'ORBITER UNAVAILABILITY',T50,I4,' TIMES OR',F5.1,' PERC
106 ENT')
107 PUNA=FLOAT(JEKS(2))*100./K2
108 NJEK2=JEKS(2)
109 WRITE(P,156)NJEK2,PUNA
110 156 FORMAT(17X,'BOTH STAGES UNAVAILABLE',T50,I4,' TIMES OR',F5.1,' PE
111 RCENT')

```

```

112 LFAIL=JEKS(8)
113 PLFAIL=FLOAT(LFAIL)*100./K2
114 WRITE(P,175)PLFAIL
115 175 FORMAT(17X,'LUT UNAVAILABILITY',T50.14,' TIMES OR',F5.1,' PERCENT
116      ,
117      )
117 NPUAU=JEKS(25)
118 PPUAU=FLOAT(NPUAU)*100./K2
119 WRITE(P,150)PPUAU
120 150 FORMAT(17X,'PAD UNAVAILABILITY',T50.14,' TIMES OR',F5.1,' PERCENT
121      ,
122      )
122 NFAIL=JEKS(22)*JEKS(24)+JEKS(23)
123 PFAIL=FLOAT(NFAIL)*100./K2
124 WRITE(P,151)NFAIL,PFAIL
125 151 FORMAT(17X,'FAILURES AND REMOVAL FROM PAD',T50.14,' TIMES OR'
126      ,F5.1,' PERCENT')
127 WRITE(P,111)
128 111 FORMAT(17X,'AVERAGE PHASE TIMES PER VEHICLE ELEMENT',T60.
129      ,
130      )
130 TLSTL=K4/1000.
131 TIME10=K5/1000.
132 RETURN
133 C*****
134 20 CONTINUE
135 TLTSB=K2/1000.
136 TLTSO=K3/1000.
137 WRITE(P,113)TLTSB,TLTSO
138 113 FORMAT(15X,'LANDING TO STORAGE(DAYS)
139      ,T61.F5.2,T71.F5.2)
140 STORB=K4/1000.
141 STORO=K5/1000.
142 WRITE(P,114)STORB,STORO
143 114 FORMAT(15X,'STORAGE(DAYS)
144      ,T61.F5.2,T71.F5.2)
145 WRITE(P,161)TLSTL
146 161 FORMAT(15X,'LEAVE STORAGE TO LAUNCH(DAYS)',T61.F5.2,T71.F5.2)
147 WRITE(P,160)TIME10
148 160 FORMAT(15X,'MEAN ON-ORBIT MISSION TIME(DAYS)',T71.F5.2)
149 TOTALB=TLTSB+STORB+TLSTL
150 TOTALO=TLTSO+STORO+TLSTL+TIME10
151 WRITE(P,112)TOTALB,TOTALO
152 112 FORMAT(15X,'TURNAROUND= LAUNCH TO LAUNCH(DAYS)',T61.F5.2,T71.F5.2)
153 RETURN
154 C*****
155 30 CONTINUE
156 WRITE(P,180)
157 180 FORMAT(1H)
158 115 FORMAT(17X,'WAITING STATISTICS:
159      ,
160      )
160 1 T60,'BOOSTER',T70,'ORBITER'
161 SAFB = K2/1000.
162 SAFO = K3/1000.
163 PDESB=FLOAT(YSVQC(1))-YSVQZ(1)*100./YSVQC(1)
164 PDESO=FLOAT(YSVQC(10))-YSVQZ(10)*100./YSVQC(10)
165 WRITE(P,300)PDESB,PDESO,SAFB,SAFO
166 300 FORMAT(15X,'PERCENT OF VEHICLES DELAYED FOR SAFING',T62.F5.2,T72.F
167      ,
168      )
168 15.2./15X,'AVERAGE QUEUE TIME FOR SAFING(DAYS)',T62.F5.2,T72.F5.2)
169 PMB=FLOAT(YSVQC(2))-YSVQZ(2)*100./YSVQC(2)
170 PMO=FLOAT(YSVQC(11))-YSVQZ(11)*100./YSVQC(11)

```

```

168 WRITE(P,154)PQMB,PQMO
169 154 FORMAT(15X,'PERCENT OF VEHICLES DELAYED FOR MAINT.',T62,F5.2,T72,
170 1 F5.2)
171 TMQB=K4/1000.
172 TMQO=K5/1000.
173 WRITE(P,116)TMQB,TMQO
174 116 FORMAT(15X,'AVERAGE QUEUE TIME FOR MAINTENANCE(DAYS)',T61,F5.2,T71
175 1,F5.2)
176 RETURN
177 C.....
178 40 CONTINUE
179 PCHEKB=FLOAT(YSVQC(3)-YSVQZ(3))*100./YSVQC(3)
180 PCHEKO=FLOAT(YSVQC(12)-YSVQZ(12))*100./YSVQC(12)
181 CHECKB = K2/1000.
182 CHECKO = K3/1000.
183 WRITE(P,330)PCHEKB,PCHEKO,CHECKB,CHECKO
184 330 FORMAT(
185 215X,'PERCENT OF VEHICLES DELAYED FOR CHECKOUT&TEST',T62,F5.2,T72,
186 3 F5.2,/15X,'AVERAGE QUEUE TIME FOR CHECKOUT & TEST(DAYS)',T62,F5.2
187 42,T72,F5.2)
188 WRITE(P,117) DUMMY WRITE STATEMENT
189 C 117 FORMAT(15X,'AVERAGE QUEUE TIME FOR
190 1 F5.2)
191 MAHUF = K4/1000.
192 LUTREF = K5/1000.
193 PHAHU=FLOAT(YSVQC(20)-YSVQZ(20))*100./YSVQC(20)
194 PLUT =FLOAT(YSVQC(18)-YSVQZ(18))*100./YSVQC(18)
195 WRITE(P,301)PHAHU,MAHUF,PLUT,LUTREF
196 301 FORMAT(15X,'PERCENT OF VEHICLES DELAYED FOR M & H',T65,F5.2,/15X,'
197 1AVERAGE QUEUE TIME FOR MATE & HOOKUP(DAYS)',T65,F5.2,/15X,'PERCENT
198 2 OF LUTS DELAYED FOR REFURBISHMENT',T65,F5.2,/15X,'AVERAGE QUEUE T
199 3IME FOR LUT REFURBISH FACILITY',T65,F5.2)
200 RETURN
201 C.....
202 50 CONTINUE
203 POP=FLOAT(YSVQC(21)-YSVQZ(21))*100./YSVQC(21)
204 WRITE(P,155)POP
205 155 FORMAT(15X,'PERCENT OF VEHICLES DELAYED FOR PAD ACCESS',T65,F5.2)
206 TOP=K2/1000.
207 WRITE(P,118)TOP
208 118 FORMAT(15X,'AVERAGE QUEUE TIME FOR PAD(DAYS)
209 1,T65,F5.2)
210 RETURN
211 C.....
212 60 CONTINUE
213 SAUB=K2/10.
214 SAUO=K3/10.
215 WRITE(P,119)SAUB,SAUO
216 119 FORMAT(//10X,'FACILITY UTILIZATION:',T60,'BOOSTER',T70,'ORBITER',
217 1 /15X,'SAFING AREA(PERCENT)',T61,F5.2,T71,F5.2)
218 SMUB=K4/10.
219 SMUO=K5/10.
220 WRITE(P,120)SMUB,SMUO
221 120 FORMAT(15X,'MAINTENANCE(PERCENT)
222 1,T61,F5.2,T71,F5.2)
223 RETURN
224 C.....
225 70 CONTINUE

```

```

224 COTUB=K2/10.
225 COTUO=K3/10.
226 WRITE(P,177)COTUB,COTUO
227 177 FORMAT(15X,'CHECKOUT & TEST(PERCENT)',T61,F5.2,T71,F5.2)
228 RETURN
229 C.....
230 80 CONTINUE
231 PHU=K2/10.
232 WRITE(P,121)PMHU
233 121 FORMAT(15X,'MATE & HOOK-UP(PERCENT)',T45,F5.2)
234 PLRU=K3/10.
235 WRITE(P,122)PLRU
236 122 FORMAT(15X,'LUT REFURBISHMENT(PERCENT)',T45,F5.2)
237 RETURN
238 C.....
239 90 CONTINUE
240 POU=K2/10.
241 WRITE(P,123)POU
242 123 FORMAT(10X,'PAD UTILIZATION:',//
243 1 15X,'LAUNCH PAD 1 (PERCENT)',T45,F5.2)
244 IF (NPADS-2) 61,62,62
245 62 POU2=K3/10.
246 WRITE(P,124)POU2
247 124 FORMAT(15X,'LAUNCH PAD 2 (PERCENT)',T45,F5.2)
248 IF (NPADS-3) 61,1003,1003
249 1003 POU3=K4/10.
250 WRITE(P,1004) POU3
251 1004 FORMAT (15X,'LAUNCH PAD 3 (PERCENT) ',T45,F5.2)
252 61 CONTINUE
253 C.....WRITE OUT CASE STUDY COMMENT CARD
254 WRITE(P,199)(TITLE(I),I=1,20)
255 199 FORMAT(1H1,///'.....',20A4,'.....')
256 WRITE(P,200)NBOOS,NORBI
257 200 FORMAT(///,10X,'THE FLEET SIZE IS',12,' BOOSTERS &12,' ORBITERS
258 1')
259 WRITE(P,201)NSEED,NSEEDI
260 201 FORMAT(10X,'RANDOM NUMBER SEED FOR TRAFFIC MODEL SIMULATOR = ',110
261 1 ,/10X,'RANDOM NUMBER SEED FOR DISTRIBUTION FUNCTIONS = ',110)
262 NCALL=0
263 RETURN
264 C.....
265 END

```

BPRT TPF5.HELP