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AN EVALUATION OF AIM-7F MISSILE READINESS INITIATIVES
(U) AIR FORCE LOGISTICS COMMAND WRIGHT-PATTERSON AFB OH
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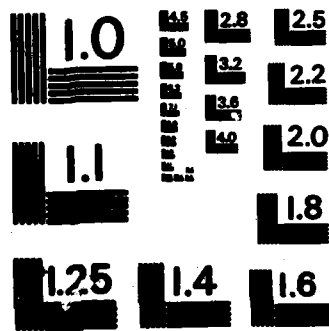
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AN EVALUATION OF AIM-7F MISSILE
READINESS INITIATIVES

MICHAEL R. NIKLAS

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The repair process for Guidance and Control Sections (G&C) of the AIM-7F missile is constrained at present by a lack of any shipping containers for individual items. Rather, the entire G&C must be delivered to depot repair when either of its two major components fails. Objective of this study is to provide an automated method of assessing missile availability, and use this model to evaluate the tradeoff between G&C spare stock and specialized shipping containers.		

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INTRODUCTION AND PURPOSE

The AIM-7F sparrow is an air intercept missile which is currently maintained in both US Air Force and Navy inventories.

This paper presents the results of a study of AIM-7F readiness initiatives. There are approximately 4,450 of these missiles in Air Force inventory today, but no spare Guidance and Control Sections (G&Cs) were ever procured. As a result, some missiles are unserviceable while they await the return of serviceable G&Cs through the resupply pipelines. HQ AFLC/LORIS came to HQ AFLC/XRS in August 1981, and requested help in determining the best quantities of spare G&Cs to be procured.

The second half of this working paper describes the computer program Missile Facility Simulator (MFS), which can be used to predict future states of the AIM-7F resupply system, and ask some "what if..." questions while varying any of several parameters.

This allows one to see the impact today's actions will have at a later point in time, and can be especially helpful in the planning stages by indicating potential problem areas.

BACKGROUND

The items on the missile which are subject to time related failure and subsequently require repair are the Target Seeker (TS) and the Flight Control (FC), which collectively are called a Guidance and Control Section. The USAF missile inventory has increased from 4,437 in 1981 to 4,915 in early 1982 and will decrease from that level to around 4,350 by the year 1986. On the average, there will be about 4,450 AIM-7Fs (Figure 1).

<u>AIM-7F MISSILE INVENTORY (22 JULY 1981)</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>
FY 81				4437
FY 82	4915	4646	4616	4586
FY 83	4562	4538	4514	4490
FY 84	4475	4460	4445	4430
FY 85	4415	4400	4385	4370
FY 86	4355	4340	4325	4310

FIGURE 1

The above quantities are the net result of on-hand, due-in, and due-out missiles. Those which are due-out include scheduled test firings, training, and Foreign Military Sales (FMS). In each of these cases, the missiles are not replaced with AIM-7Fs on a one-for-one basis; Rather, AIM-7Ms will be procured to replace AIM-7Fs depleted through FMS. Also, several AIM-7Fs will be converted to AIM-7Ms by removal and replacement of the -7F G&C with a -7M G&C. This is because it has been decided that the

AIM-7F G&C spares requirement will be satisfied with -7M G&Cs, which enhance capability at a lower overall cost. While this study is not concerned with the AIM-7M, which be funded by BP26, initial spares, this increase in the number of AIM-7Ms will need to be supported, and must be considered when determining AIM-7M spares requirements.

The decision to buy -7M G&Cs mentioned above was made at the AIM-7 Readiness Initiatives Meeting, July 1981, at Warner Robins Air Logistics Center. There it was also stated that the buyout of spare G&Cs should not include safety stock since there is no guideline (10%, 20%, 50%). Only 80% funding of the pipeline; the expected number in repair, in transit, or awaiting repair or transportation would be procured. But even this low level was decreased in December 1981, when it was discovered that rising production costs and limited funds would reduce the funding to roughly 40% of the pipeline. It was at this time that the main thrust of this study shifted--how to increase missile availability, given a dollar constraint, by possibly spending some of the available funds to reduce the size of the pipeline, and thus bring up more missiles. This is discussed further in the next section, Maintenance Policies.

MAINTENANCE POLICIES

The present AIM-7F maintenance system (Figure 2) has a problem. There are no individual shipping containers for Target Seekers (TS) and Flight Controls (FCs) respectively. This means that if a FC is found to be failed, maintenance must wait for a mate to fail (a TS in this case) before shipping the pair to the depot for repair. The empty space cannot be filled with foam in this particular situation because of physical constraints and sensitivity of the equipment, but there is an alternative. A serviceable mate can be sent along for the ride (44 days) and either bring down another missile or reduce the ready rate and expected availability. A further complication is that the TS fails about twice as often as the FC. Now it may have been the extremely low rates of .0043 and .0021 G&C removals per quarter that prompted the designers of this system to not be concerned about the dual containers and lack of spares, but as a simulation program written for this study points out, there is reason for concern.

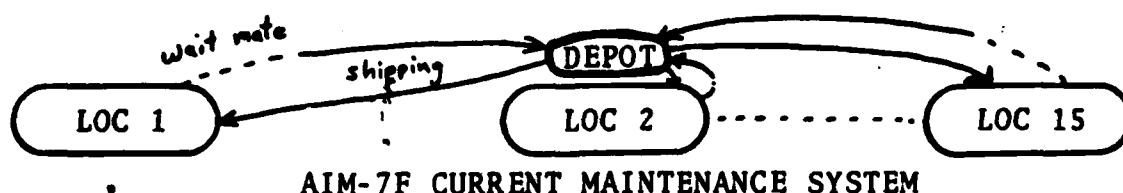


FIGURE 2

Another problem with the present containers is that they inhibit lateral resupply of TSs and FCs between missile locations. Lateral resupply isn't practical with the dual containers since operational spare sections would be made unavailable and possibly

cause a serviceable missile to be taken down while they fill space during shipment. Lateral resupply would be most helpful in the event of war, since long repair cycles could otherwise make many missiles useless throughout the first 141 days of war, well beyond the surge.

MISSILE FACILITY SIMULATOR PROGRAM

The Missile Facility Simulator (MFS) is a computer program which simulates the AIM-7F resupply system. The effect of changes to the maintenance policy, spares stock levels, missile inventory levels, pipeline times, etc., can be seen in missile availability measures. Potential problem areas such as constraints on transportation can also be seen in the output.

The program is written in GPSS (General Purpose Simulator System), an event oriented simulation language. It also contains some FORTRAN subroutines which format and summarize data before tables are printed.

The resupply system was modeled as explicitly as possible given the available data. The total number of missiles was input as data, and since actual missile inventory levels at specific locations are classified (and therefore could not be run on the CREATE computer at Wright-Patterson AFB). The total number of missiles, spare G&Cs, and individual item containers are distributed among the number of operating locations. By selecting a somewhat wide range of levels, from location-to-location, one gets a good idea of how the system behaves as a whole, and also how the different levels affect backorders at individual locations. This last point is mentioned because the more missiles there are at a facility, the greater the likelihood of simultaneous failure of a Target Seeker and a Flight Control, and consequently a dual container can be used for shipping to depot repair without a "waiting-mate" delay.

Failures are generated by a Poisson frequency distribution function, and repair times are assumed to be uniform around the mean.

The quantities of missiles, Target Seekers, Flight Controls, and individual containers are entered into the program by means of FUNCTION statements. A description can be found at the right of each FUNCTION statement which tells what the records directly below the statement refer to. For example:

```
17  FUNCTION  PH1  D15  TS  CANS 1,10/2,10/3,10/4,  
10/5,10/6,20/7,20/8,20/9,20/10,20/11,30/12,30/13,30/14,30/15,30/  
tells us that bases 1-5 have 10 Target Seeker single containers,  
6-10 have 20, and 11-15 have 30. These FUNCTION statements are  
located at the end of the program.
```

RECOMMENDATIONS

As mentioned in the introduction, by the time this study was nearly completed, the available funding dropped to such a level that only 50 Guidance and Control sections could be afforded. Note also that for the cost of one of these G&Cs,--enough TS and FC individual containers could be procured to reduce the "waiting mate" time to essentially zero.

The following options are presented with their impact on missile availability so that you can see the benefit of having separate containers for individual TSs, FCs. Also included are assessments of a pipeline buy (90 spares) and the current state of the system (0 spares).

<u>G&C SECTIONS PROCURED</u>	<u>TS, FC SEPARATE CONTAINERS PROCURED</u>	<u>AVAILABLE MISSILES</u>	<u>IMPROVEMENT FROM NO SPARES/CANS</u>	<u>IMPROVEMENT FROM 49 SPARES NO CANS</u>
49	0	4439.2	45.6	.0
50	0	4439.8	46.2	.6
49	400	4445.5	51.9	6.3
90	400	4476.2	62.6	17.0
0	0	4393.6		

It is clear that it's better to spend the last \$161,000 on individual containers rather than on another G&C since the containers bring up more than 10 times as many missiles. The containers also make lateral resupply between the bases feasible.

MFS PROGRAM DOCUMENTATION

A listing of the Missile Facility Simulator is given below. Three FORTRAN subroutines which the GPSS program uses are also included. Anyone who has permission to use the CREATE computer system can access and run this program by typing `€ARD OLD MEAN/MFS, R` at the `SYSTEM_level`, making the necessary routing and data changes, and then typing `RUN`.

```

108NS : ,8,16,30; : ,8,19
200:IDENT:
300:LIMITS: , , , 10K
400:SELECT:AF.LIB/GPSS4A
500:OPTION:FORTAN,HAP
600:SELECT:MEAN/MSUBS.0
700:SELECT:AF.LIB/GPSS4B
800:SELECT:AF.LIB/GPSS4C
900:PRNFL:PF,R,S,AF.LIB/GPSS.PF
1000:LIMITS:15,40K,-1K,10K
1100:FILE:H*,XIR,20R
120:SIMULATE; , , , PL
130:CONTROL;XAC,500,BLO,300,STO,150,CHA,50,VAR,35,HSV,200
140:UNLIST;ABS
150:INITIAL;XF18,-1
160 :INITIAL;XF17,1
170*
180* THIS ROUTINE GENERATES THE EXPECTED NUMBER OF REMOVALS BY BASE
190* EVERY QUARTER (90 DAYS). A TEST IS THEN MADE TO DETERMINE
200* IF BOTH THE TARGET SEEKER (TS) AND FLIGHT CONTROL (FC) HAVE FAILED.
210* IF YES, THE PROCESS SPLITS INTO TWO BRANCHES. THE FIRST, BMSLE,
220* REPRESENTS THE MISSILE NEEDING BOTH COMPONENTS. A DEPOT UNFILLED
230* DEMAND IS CREATED. A CHAIN (V10) CONTAINING MISSILES WAITING FOR
240* BOTH COMPONENTS IS INCREMENTED. IF BOTH SPARES EXIST, THE CHAIN IS
250* DECREMENTED AND THE UNLINKED MISSILE DEMAND IS SENT TO SPARE WHERE
260* THE SPARE COUNTERS ARE DECREMENTED AND A MISSILE IS BROUGHT UP.
270*
280:GENERATE;0,0,0,1, ,4PH EVERY THREE MONTHS
290:SPLIT;14,INIT1,1PH FOR 15 BASES
300 INIT1:SAVEVALUE;PH1,FN16,XH INITIALIZE TS SPARES
310 :SAVEVALUE;V2,FN16,XH INITIALIZE FC SPARES
320 :ENTER;V19,FN17 INITIALIZE TS CANS
330 :ENTER;V20,FN18 INITIALIZE FC CANS
340 :TRANSFER;,INIT
350*
360 :GENERATE;90,0, , ,0,4PH
370 :SPLIT;14,INIT1,1PH
380 INIT:SAVEVALUE;PH1,V23 INITIALIZE UP MISSILES
390 :SAVEVALUE;V28,FN*PH1,XH
400 REMO:SAVEVALUE;V8,V9,XH EXPECTED NO. OF REMOVALS
405 :HELPA;3,PH1,XH*V8
410:SPLIT;XH*V33,SPRED SPLIT OFF REMOVALS
420 NIX:TERMINATE
430 SPRED:ADVANCE;45,44 SPREAD REMOVALS THRU OUT QUARTER

```

```

440*
450:TRANSFER;.185,LEFT,BOTH   DID BOTH TS AND FC FAIL?
460 BOTH:HELPA;2,PH1,1,6      FAILURE BY COMPONENT COUNTER
470 :SPLIT;1,MARK
480 :ASSIGN;4,1      CODE AS DOUBLE
490 BMSLE:SPLIT;1,BDMND
500 BDOWN:SAVEVALUE;PH1-,1      TAKE MISSILE DOWN
510:SPLIT;1,BTEST  Awaiting BOTH COMPONENTS
520:LINK;V10,FIFO  CH4-20 NEEDS BOTH COMP
530*
540 BTEST:TEST 6;CH=V10,0,NIX
550 :TEST G;V3,0,NIX  ARE SPARES AVAILABLE?
560:UNLINK;V10,NIX,1
570 BPARE:SAVEVALUE;PH1-,1,XH  REDUCE TS SPARES
580:SAVEVALUE;V2-,1,XH  REDUCE FC SPARES
590:SAVEVALUE;PH1+,1  BRING MISSILE UP
600:TERMINATE
610*
620 BUFDN:LINK;V10,FIFO  WAITING FOR BOTH COMPONENTS
630 BDMND:LINK;1,FIFO  BASE UNFILLED DEMAND
640*
650*  THE SECOND BRANCH, BCOMP, REPRESENTS THE TWO COMPONENTS RE-
660* MOVED FROM THE MISSILE AND SENT TO THE DEPOT. THE COMPONENTS ARE
670* FIRST DELAYED FOR TRANSPORTATION TIME. THEY ARE TAGGED AS 1 (TS)
680* OR 2 (FC) IN PARAMETER 3. THEY ARE REPAIRED AND ADDED TO DEPOT
690* STOCK. A DEPOT UNFILLED DEMAND IS UNLINKED AND SENT TO TEST4. THE
700* GATE ALLOWS ONLY ONE DEMAND TO BE PROCESSED AT A TIME. AT TEST4, PH4
710* IS TESTED TO SEE WHAT TYPE OF DEMAND IT IS - 1 (DOUBLE CAN), 2 (SINGLE
720* TS) OR 3 (SINGLE FC). A TEST IS MADE TO SEE IF THE DEMAND CAN BE
730* FILLED. IF YES, APPROPRIATE DEPOT SPARE COUNTERS ARE DECREMENTED, THE
740* GATE IS OPENED TO ALLOW ANOTHER DEMAND TO BE PROCESSED. IT IS THEN
750* DELAYED FOR DTOD TRANSPORTATION AND THEN THE SPARE(S) ARE ADDED TO
760* BASE STOCK. CONTROL IS TRANSFERED TO CHECK TO SEE IF ANY MISSILES
770* CAN BE BROUGHT UP. IF THE DEMAND CAN NOT BE PROCESSED, IT IS RELINKED
780* TO THE DEMAND CHAIN AND THE GATE IS OPENED.
790*
800 MARK:ENTER;V29      TS BASE PIPELINE BY BASE
810 :ENTER;V30      TS TOTAL PIPELINE BY BASE
820 :ENTER;V31      FC BASE PIPELINE
830 :ENTER;V32      FC TOTAL PIPELINE BY BASE
840 :ENTER;3      TOTAL PIPELINE
850 BCOMP:HELPA;2,PH1,1,1
860 :LEAVE;V29      TS READY TO SHIP
870 :LEAVE;V31      FC READY TO SHIP
880 :ADVANCE;V14      DTOD TRANS
890 :HELPA;2,PH1,XF18,1
900 :SPLIT;1,BRITE
910 BLEFT:ASSIGN;3,1  POSITION CODE
920:TRANSFER;,INURK
930 BRITE:ASSIGN;3,2  POSITION CODE
940 INURK:HELPA;2,PH1,1,3

```

```

950 :ADVANCE;V13    STANDARD INJORK TIME
960 :HELPA;2,PH1,XF18,3
970 SPARE:ENTER;PH3    ADD TO DEPOT STOCK
980 :GATE LR;1    ONLY ALLOW ONE IN AT A TIME
990 :UNLINK;1,TEST4,1    UNLINK NEXT DEMAND
1000 :LOGIC S;1    CLOSE THE-GATE...
1010 :TERMINATE
1020*
1030 TEST4:TEST NE;PH4,1,DBLE    DOUBLE CONTAINER?
1040 :TEST E;PH4,2,ONEFC    SINGLE TS?
1050 :TEST G;S1,0,RLINK    DEPOT SPARES?
1060 :LEAVE;1    REDUCE TS SPARES
1070 :LOGIC R;1    OPEN THE GATE
1080 :HELPA;2,PH1,1,2
1090 :ADVANCE;V15    DTOB TRANS
1100 :HELPA;2,PH1,XF18,2
1110 :SAVEVALUE;PH1+,1,XH    ADD TO BASE STOCK
1120 :LEAVE;3    RETURN FROM DEPOT
1130 :LEAVE;V30    TS RETURN FROM DEPOT
1140 :ENTER;V19    ADD CAN TO STOCK
1150 :TRANSFER;;CHECK
1160*
1170 ONEFC:TEST G;S2,0,RLINK    DEPOT SPARES?
1180 :LEAVE;2    REDUCE FC SPARES
1190 :LOGIC R;1    OPEN THE GATE
1200 :HELPA;2,PH1,1,2
1210 :ADVANCE;V15    DTOB TRANS
1220 :HELPA;2,PH1,XF18,2
1230 :SAVEVALUE;V2+,1,XH    ADD TO BASE STOCK
1240 :LEAVE;3    RETURN FROM DEPOT - TOTAL
1250 :LEAVE;V32    FC RETURN FROM DEPOT
1260 :ENTER;V20    ADD CAN TO STOCK
1270 :TRANSFER;;CHECK
1280*
1290 DBLE:TEST G;V1,0,RLINK    DEPOT SPARES?
1300 :TRANSFER;;PARE
1310*
1320 RLINK:LOGIC R;1    OPEN THE GATE
1330 :LINK;1,LIFO    PUT BACK ON CHAIN - NO SPARES
1340*
1350 PARE:LEAVE;1    REDUCE TS STOCK
1360:LEAVE;2    REDUCE FC STOCK
1370 :LOGIC R;1    OPEN THE GATE
1380 :HELPA;2,PH1,1,2
1390:ADVANCE;V15    DTOB TRANS
1400 :HELPA;2,PH1,XF18,2
1410:SAVEVALUE;PH1+,1,XH    ADD TO BASE STOCK
1420:SAVEVALUE;V2+,1,XH    ADD TO BASE STOCK
1430 :LEAVE;3    RETURN FROM DEPOT - TOTAL
1440 :LEAVE;V30    TS RETURN FROM DEPOT
1450 :LEAVE;V32    FC RETURN FROM DEPOT

```

1460:TRANSFER;CHECK

1470*

1480* IF BOTH THE TS & FC HAVE NOT FAILED, A TEST IS MADE TO SEE IF
1490* JUST THE TS HAS FAILED GIVEN THAT THERE WAS A FAILURE AND BOTH
1500* COMPONENTS DID NOT FAIL. IF YES, A DEPOT UNFILLED DEMAND IS
1510* CREATED. THE PROCESS THEN SPLITS INTO TWO BRANCHES. THE FIRST,
1520* LMSLE, REPRESENTS THE MISSILE NEEDING A TS. A CHAIN (V11) CON-
1530* TAINING MISSILES AWAITING A TS IS INCREMENTED. IF A TS SPARE
1540* EXISTS, THE CHAIN IS DECREMENTED AND THE UNLINKED MISSILE DEMAND
1550* IS SENT TO LPARE WHERE THE TS SPARE COUNTER IS DECREMENTED AND A
1560* MISSILE IS BROUGHT UP.

1570*

1580 LEFT:TRANSFER;.750,RIGHT,LSPLT

1590 LSPLT:HELPA;2,PH1,1,4 - FAILURE BY COMPONENT COUNTER

1600 :SAVEVALUE;PH1-,1 TAKE MISSILE DOWN

1610:SPLIT;1,LCOMP

1620 LMSLE:SPLIT;1,LDOWN

1630 :LINK;V11,FIFO FC AWAITING MATE

1640 LDOWN:TEST 6;CH+V11,0,NIX

1650 :TEST 6;XH+PH1,0,NIX ANY SPARE TS'S

1660:UNLINK;V11,NIX,1

1670 LPARE:SAVEVALUE;PH1-,1,XH REDUCE TS SPARES

1680:SAVEVALUE;PH1+,1 BRING MISSILE UP

1690:TERMINATE

1700*

1710* SINCE THE BASE HAS JUST RECEIVED RESUPPLY FROM THE DEPOT, THIS
1720* ROUTINE CHECKS TO SEE IF THERE ARE ANY MISSILES AWAITING SPARES.
1730* EACH TEST CHECKS TO SEE IF AN UNFILLED DEMAND AND SPARE ARE
1740* AVAILABLE. MISSILES NEEDING ONLY ONE COMPONENT ARE FILLED FIRST.
1750* THIS ROUTINE WILL ALSO CANNIBALIZE ON COMPONENTS IF A MISSILE IS
1760* DOWN NEEDING A TS AND ANOTHER IS DOWN NEEDING A FC.

1770*

1780 CHECK:TEST 6;V16,0,TRITE ANY AWAITING TS & SPARE AVAILABLE?

1790:UNLINK;V11,NIX,1 REDUCE AWAITING TS

1800 CONT1:SAVEVALUE;PH1-,1,XH REDUCE TS SPARES

1810:SAVEVALUE;PH1+,1 BRING MISSILE UP

1820*

1830 TRITE:TEST 6;V17,0,TBOTH ANY AWAITING FC & SPARE AVAIL?

1840:UNLINK;V12,NIX,1 REDUCE AWAITING FC

1850 CONT2:SAVEVALUE;V2-,1,XH REDUCE FC SPARES

1860:SAVEVALUE;PH1+,1 BRING MISSILE UP

1870*

1880 TBOTH:TEST 6;V18,0,CHAIN AWAITING BOTH & SPARES?

1890:UNLINK;V10,NIX,1 REDUCE AWAITING BOTH

1900 CONT3:SAVEVALUE;V2-,1,XH REDUCE FC SPARES

1910:SAVEVALUE;PH1-,1,XH REDUCE TS SPARES

1920:SAVEVALUE;PH1+,1 BRING MISSILE UP

1930*

1940 CHAIN:TEST 6;V21,0,NIX CANNIBALIZE?

1950 :UNLINK;V11,NIX,1

1960 :UNLINK;V12,NIX,1

1970 :SAVEVALUE;PH1,1 BRING MISSILE UP
 1980 :LINK;V10,FIFO STRIPPED MISSILE DEMAND
 1990*
 2000* THE SECOND BRANCH REPRESENTS THE FAILED TS LOOKING FOR A MATE.
 2010* THE TS ENTERS A TS AWAITING MATE STORAGE. IF THERE IS NO FC AWAITING
 2020* MATE TO THE DEPOT, A TEST IS MADE TO SEE IF THERE ARE ANY SINGLE
 2030* CANS. IF NOT, THE TS WILL WAIT A MAX OF 10 DAYS FOR EITHER A FAILED
 2040* FC OR A SINGLE CAN. AFTER THE MAX DELAY, TESTS ARE MADE TO SEE IF
 2050* EITHER A SPARE FC EXISTS OR A SINGLE CAN. IF NOT, A MISSILE IS TAKEN
 2060* DOWN. THE REMOVED FC PROCEEDS WITH THE TS TO THE DEPOT WHILE THE
 2070* TAKEN DOWN MISSILE NEEDING A FC IS PUT ON A CHAIN AND CONTROL IS
 2080* TRANSFERRED TO CHECK TO CHECK FOR CANNIBALIZATION.
 2090*
 2100 LCOMP:ASSIGN;3,10 MAX # OF DAYS TO WAIT FOR MATE
 2110 :ENTER;V29 TS FAILED
 2120 :ENTER;V30 TS TOTAL PIPELINE BY BASE
 2130 :ENTER;3 TOTAL PIPELINE
 2140:ENTER;V4 TS AWAITING MATE
 2150 TEST:TEST 8;S+V4,0,NIX
 2160 :TEST 8;S+V5,0,WAIT IS THERE FC AWAITING MATE?
 2170:LEAVE;V5 REDUCE FC AWAITING MATE
 2180:LEAVE;V4 REDUCE TS AWAITING MATE
 2182 :SPLIT;1,LINKB
 2190:TRANSFER;BCOMP SEND TO DEPOT
 2192 LINKB:ASSIGN;4,1 CODE AS A DOUBLE
 2194 :LINK;1,FIFO
 2200*
 2210 WAIT:TEST 8;S+V19,0,REDUC1 ANY SINGLE CANS?
 2220:ADVANCE;1 WAIT ONE DAY
 2230:LOOP;3PN,TEST LOOP FOR 10 DAY MAX
 2240*
 2242 :TEST WE;S+V4,0,NIX
 2250 :TEST 8;S+V19,0,TSTFC ANY TS SINGLE CANS?
 2260*
 2270 REDUC1:LEAVE;V19 REDUCE SINGLE TS CANS
 2280 :LEAVE;V4
 2290 :ASSIGN;4,2 CODE AS A SINGLE TS
 2300 :SPLIT;1,DLEFT
 2310 :LINK;1,FIFO
 2320*
 2330 TSTFC:ASSIGN;4,1
 2340 :LEAVE;V4
 2350 :SPLIT;1,BDMND BASE UNFILLED DEMAND
 2360 :TEST 8;XN+V2,0,NOFC ANY SPARE FC'S?
 2370:SAVEVALUE;V2-,1,XN REDUCE FC STOCK
 2380 CODE:SPLIT;1,DRITE 2 COMPONENTS
 2390*
 2400 DLEFT:ASSIGN;3,1 CODE AS TS
 2410:ASSIGN;2,1 CODE AS FAILED
 2420 :LEAVE;V29 TS READY TO SHIP
 2430 BT08:HELPA;2,PH1,1,1

2440 :ADVANCE;V14 BTOD TRANS
 2450 :HELPA;2,PH1,XF10,1
 2460:TEST E;PH2,0,INWRK COMPONENT FAILED?
 2470:TRANSFER;SPARE GOOD COMPONENT - ADD TO DEPOT STOCK
 2480*
 2490 DRITE:ASSIGN;3,2 CODE AS FC
 2495 :ENTER;V32 FC TOTAL PIPELINE
 2500:ASSIGN;2,0 CODE AS 800B
 2510:TRANSFER;BTOD
 2520*
 2530 NOFC:SAVEVALUE;PH1-,1 TAKE MISSILE DOWN
 2540:SPLIT;1,CODE
 2550 SMSLE:SPLIT;1,CHECK
 2560*
 2570 LDAMB:LINK;V12,FIFO TS AWAITING MATE
 2580*
 2590* SINCE BOTH COMPONENTS DID NOT FAIL AND THE TS ALONE DID NOT FAIL,
 2600* THE FC FAILED. A DEPOT UNFILLED DEMAND IS CREATED. THE PROCESS THEN
 2610* SPLITS INTO TWO BRANCHES. THE FIRST, RNSLE, REPRESENTS THE MISSILE
 2620* NEEDING A FC. A CHAIN (V12) CONTAINING MISSILES AWAITING A FC IS
 2630* INCREMENTED. IF A FC SPARE EXISTS, THE CHAIN IS DECREMENTED AND THE
 2640* UNLINKED MISSILE DEMAND IS SENT TO RPARE WHERE THE FC SPARE COUNTER
 2650* IS DECREMENTED AND A MISSILE IS BROUGHT UP.
 2660*
 2670 RIGHT:HELPA;2,PH1,1,5 FAILED COMPONENTS COUNTER
 2680 :SAVEVALUE;PH1-,1 TAKE MISSILE DOWN
 2690:SPLIT;1,RCOMP
 2700 RNSLE:SPLIT;1,RDOWN AWAITING TS
 2710:LINK;V12,FIFO TS AWAITING MATE
 2720*
 2730 RDOWN:TEST G;CH=V12,0,NIX
 2740 :TEST G;XN=V2,0,NIX SPARE FC AVAILABLE?
 2750:UNLINK;V12,NIX,1 UNLINK UNFILLED DEMAND
 2760 RPARE:SAVEVALUE;V2-,1,XN REDUCE FC SPARES
 2770:SAVEVALUE;PH1+,1 BRING MISSILE UP
 2780:TERMINATE
 2790*
 2800* THE SECOND REPRESENTS THE FAILED FC LOOKING FOR A MATE. THE FC
 2810* ENTERS A FC AWAITING MATE STORAGE. IF THERE IS NO TS AWAITING MATE
 2820* TO THE DEPOT, A TEST IS MADE TO SEE IF THERE ARE ANY SINGLE CANS
 2830* IF NOT, THE FC WILL WAIT A MAX OF 10 DAYS FOR EITHER A FAILED TS
 2840* OR A SINGLE CAN. AFTER THE MAX DELAY, TESTS ARE MADE TO SEE IF
 2850* EITHER A SPARE TS EXISTS OR A SINGLE CAN. IF NOT, A MISSILE IS TAKEN
 2860* DOWN. THE REMOVED TS PROCEEDS WITH THE FC TO THE DEPOT WHILE THE
 2870* MISSILE TAKEN DOWN NEEDING A TS IS PUT ON A CHAIN AND CONTROL IS
 2880* TRANSFERED TO CHECK TO CHECK FOR CANNIBALIZATION.
 2890*
 2900*
 2910 RCOMP:ASSIGN;3,10 10 DAY MAX
 2920 :ENTER;V31 FC BASE PIPELINE
 2930 :ENTER;V32 FC DEPOT PIPELINE BY BASE

2940 :ENTER;3 TOTAL PIPELINE
 2950:ENTER;V5 FC AWAITING MATE
 2960 RTEST:TEST G;S=V5,0,NIX
 2970 :TEST G;S=V4,0,RWAIT TS AWAITING MATE?
 2980:LEAVE;V5 REDUCE FC AWAITING MATE
 2990:LEAVE;V4 REDUCE TS AWAITING MATE
 2992 :SPLIT;1,LINKB
 3000:TRANSFER;;,BCOMP SEND TO DEPOT
 3010*
 3020 RWAIT:TEST E;S=V20,0,RDUC2 --- ANY SINGLE CANS
 3030:ADVANCE;1 WAIT ONE DAY
 3040:LOOP;3PH,RTEST LOOP FOR 10 DAY MAX
 3050*
 3052 :TEST NE;S=V5,0,NIX
 3060 :TEST G;S=V20,0,TSITS ANY FC SINGLE CANS
 3070*
 3080 RDUC2:LEAVE;V20 REDUCE FC CANS
 3090 :LEAVE;V5
 3100 :ASSIGN;4,3 CODE AS SINGLE FC
 3110 :SPLIT;1,RRITE
 3120 :LINK;1,FIFO
 3130 TSITS:ASSIGN;4,1
 3140 :LEAVE;V5
 3150 :SPLIT;1,BONND BASE UNFILLED DEMAND
 3160 :TEST G;XH=PH1,0,NOTS ANY SPARE IS S?
 3170:SAVEVALUE;PH1-,1,XH REDUCE TS STOCK
 3180 RCODE:SPLIT;1,RRITE
 3190 RLEFT:ASSIGN;3,1 CODE AS TS
 3195 :ENTER;V30 TS TOTAL PIPELINE
 3200:ASSIGN;2,0 CODE AS GOOD
 3210:TRANSFER;;,BT0B
 3220*
 3230 RRITE:ASSIGN;3,2 CODE AS FC
 3240:ASSIGN;2,1 CODE AS FAILED
 3250 :LEAVE;V31 FC READY TO SHIP
 3260:TRANSFER;;,BT0B
 3270*
 3280 NOTS:SAVEVALUE;PH1-,1 TAKE MISSILE DOWN
 3290:SPLIT;1,RCODE
 3300 SMLE1:SPLIT;1,CHECK
 3310*
 3320 RDND:LINK;V11,FIFO FC AWAITING MATE
 3330*
 3340:GENERATE;90,0,,,1,2PH
 3350 :ASSIGN;2,15 MAX NO. OF BASES
 3360 OUT:ASSIGN;1,V22 REVERSE SEQUENCE
 3370 :SAVEVALUE;16,PH1 SAVE BASE NUMBER
 3380 :HELPA;1,FN=PH1,V21
 3390 :SAVEVALUE;V24,0,XH
 3400 :SAVEVALUE;V25,0,XH
 3410 :SAVEVALUE;V26,0,XH

3420 :LOOP;2PH,OUT
 3430 :SAVEVALUE;17+,1 QTR NUMBER
 3440:TERMINATE;1
 3450B1:VARIABLE;S1+S2
 3460B2:VARIABLE;15+PH1
 3470B3:VARIABLE;XH+PH1+XH+V2
 3480B4:VARIABLE;9+PH1
 3490B5:VARIABLE;25+PH1
 3500B8:VARIABLE;30+PH1
 3510B9:FUARIABLE;XF+PH1+.0054*300-EXPECTED NO. OF REMOVALS * 100
 3520B10:VARIABLE;5+PH1
 3530B11:VARIABLE;20+PH1
 3540B12:VARIABLE;35+PH1
 3550B13:VARIABLE;90
 3560B14:VARIABLE;30
 3570B15:VARIABLE;14
 3580B16:VARIABLE;CH+V11+XH+PH1
 3590B17:VARIABLE;CH+V12+XH+V2
 3600B18:VARIABLE;CH+V10+XH+V2+XH+PH1
 3610B19:VARIABLE;10+PH1
 3620B20:VARIABLE;35+PH1
 3630B21:VARIABLE;CH+V11+CH+V12
 3640B22:VARIABLE;14-PH2
 3650B23:VARIABLE;(FN+PH1-XH+V28)+XF+PH1 CURRENT UP MISSILES
 3660B24:VARIABLE;115+PH1
 3670B25:VARIABLE;130+PH1
 3680B26:VARIABLE;145+PH1
 3690B28:VARIABLE;185+PH1 PREVIOUS MONTHS POSS MISSILES
 3700B29:VARIABLE;70+PH1 TS BASE PIPELINE
 3710B30:VARIABLE;85+PH1 TS TOTAL PIPELINE BY BASE
 3720B31:VARIABLE;100+PH1 FC BASE PIPELINE
 3730B32:VARIABLE;115+PH1 FC TOTAL PIPELINE BY BASE
 3735B33:VARIABLE;160+PH1
 3750*
 3760B1:FUNCTION;XF17,D21 POSS MISSILES - BASE 1
 3770B5,59/6,66/7,62/8,62/9,61/10,61/11,61/12,60/13,60
 3780B14,60/15,59/16,59/17,59/18,57/19,59/20,58/21,58
 3790B22,58/23,58/24,58/25,57
 3800*
 3810B2:FUNCTION;XF17,D21 POSS MISSILES - BASE 2
 3820B5,89/6,98/7,93/8,92/9,92/10,91/11,91/12,90/13,90
 3830B14,89/15,89/16,89/17,89/18,88/19,88/20,88/21,87
 3840B22,87/23,87/24,86/25,86
 3850*
 3860B3:FUNCTION;XF17,D21 POSS MISSILES - BASE 3
 3870B5,118/6,131/7,124/8,123/9,122/10,122/11,121/12,120/13,120
 3880B14,119/15,119/16,119/17,118/18,118/19,117/20,117/21,117
 3890B22,116/23,116/24,115/25,115
 3900*
 3910B4:FUNCTION;XF17,D21 POSS MISSILES - BASE 4
 3920B5,148/6,164/7,155/8,154/9,153/10,152/11,151/12,150/13,150

3930N14,149/15,149/16,148/17,148/18,147/19,147/20,146/21,146
 3940N22,145/23,145/24,144/25,144
 3950*
 3960N5:FUNCTION;XF17,D21 POSS MISSILES - BASE 5
 3970N5,177/6,197/7,186/8,185/9,183/10,182/11,182/12,131/13,180
 3980N14,179/15,178/16,178/17,177/18,177/19,176/20,175/21,175
 3990N22,174/23,174/24,173/25,172
 4000*
 4010N6:FUNCTION;XF17,D21 POSS MISSILES - BASE 6
 4020N5,207/6,229/7,217/8,215/9,214/10,213/11,212/12,211/13,210
 4030N14,209/15,208/16,207/17,207/18,206/19,205/20,205/21,204
 4040N22,203/23,203/24,202/25,201
 4050*
 4060N7:FUNCTION;XF17,D21 POSS MISSILES - BASE 7
 4070N5,237/6,262/7,248/8,246/9,245/10,243/11,242/12,241/13,239
 4080N14,239/15,238/16,237/17,236/18,235/19,235/20,234/21,233
 4090N22,232/23,231/24,231/25,230
 4100*
 4110N8:FUNCTION;XF17,D21 POSS MISSILES - BASE 8
 4120N5,266/6,295/7,279/8,277/9,275/10,274/11,272/12,271/13,269
 4130N14,268/15,268/16,267/17,266/18,265/19,264/20,263/21,262
 4140N22,261/23,260/24,259/25,259
 4150*
 4160N9:FUNCTION;XF17,D21 POSS MISSILES - BASE 9
 4170N5,296/6,328/7,310/8,308/9,306/10,304/11,303/12,301/13,299
 4180N14,298/15,297/16,296/17,295/18,294/19,293/20,292/21,291
 4190N22,290/23,289/24,288/25,287
 4200*
 4210N10:FUNCTION;XF17,D21 POSS MISSILES - BASE 10
 4220N5,296/6,328/7,310/8,308/9,306/10,304/11,303/12,301/13,299
 4230N14,298/15,297/16,296/17,295/18,294/19,293/20,292/21,291
 4240N22,290/23,289/24,288/25,287
 4250*
 4260N11:FUNCTION;XF17,D21 POSS MISSILES - BASE 11
 4270N5,296/6,328/7,310/8,308/9,306/10,304/11,303/12,301/13,299
 4280N14,298/15,297/16,296/17,295/18,294/19,293/20,292/21,291
 4290N22,290/23,289/24,288/25,287
 4300*
 4310N12:FUNCTION;XF17,D21 POSS MISSILES - BASE 12
 4320N5,325/6,360/7,341/8,339/9,336/10,335/11,333/12,331/13,329
 4330N14,328/15,327/16,326/17,325/18,324/19,323/20,322/21,320
 4340N22,319/23,318/24,317/25,316
 4350*
 4360N13:FUNCTION;XF17,D21 POSS MISSILES - BASE 13
 4370N5,444/6,492/7,465/8,462/9,459/10,456/11,454/12,451/13,449
 4380N14,447/15,446/16,444/17,443/18,441/19,440/20,438/21,437
 4390N22,435/23,434/24,432/25,431
 4400*
 4410N14:FUNCTION;XF17,D21 POSS MISSILES - BASE 14
 4420N5,592/6,653/7,619/8,615/9,611/10,608/11,605/12,602/13,599
 4430N14,597/15,595/16,593/17,591/18,589/19,587/20,585/21,583

4440N22,581/23,579/24,577/25,575

4450*

4460N15:FUNCTION;XF17,D21 POS3 MISSILES - BASE 15

4470N5,887/6,983/7,929/8,923/9,917/10,912/11,908/12,903/13,898

4480N14,895/15,892/16,889/17,886/18,883/19,880/20,877/21,874

4490N22,871/23,868/24,865/25,862

4500*

4510N16:FUNCTION;PH1,D15 49 SPARE G+C's

4520N1,1/2,2/3,2/4,3/5,4/6,4/7,5/8,5/9,6/10,6

4530N11,6/12,7/13,9/14,12/15,18

4531*

4532N17:FUNCTION;PH1,D15 TS CANS

4533N1,10/2,10/3,10/4,10/5,10/6,20/7,20/8,20/9,20/10,20

4534N11,30/12,30/13,30/14,30/15,30

4535*

4536N18:FUNCTION;PH1,D15 FC CANS

4537N1,10/2,10/3,10/4,10/5,10/6,20/7,20/8,20/9,20/10,20

4538N11,30/12,30/13,30/14,30/15,30

4539*

4550 :START;24,,1

4540 :END

45704:ENDJOB

ready

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100NS,R(AC) : ,8,16,30;;,8,19
200:IDENT:
300:LIMITS:,,,10N
400:FORTY:DECK
500:PRNF1C,U,S,NEAN/NSUBS.0
60   SUBROUTINE HELP1(IPOSS,NMCS)
70   CHARACTER TEXT1*40
80   CHARACTER TEXT2*40
90   CHARACTER TEXT3*40
100  CHARACTER TEXT4*40
110  TEXT1 = "      ** MISSILES ** ** FAILURES ** ** SPARES **"
120  TEXT2 = "      ** NSLES AVAIT ** * AVAIT RATE/CAN * DEPOT PIPELINE *
130  1*"
140  TEXT3 = "BASE POS   UP   Z UP   TS FC BOTH   TS CANS FC CANS
150  1"
160  TEXT4 = "      TS FC BOTH   TS FC   STOB INUK DTOD"
170  IBASE = LOADXF(16)
180  IQTR = LOADXF(17)
190  IF(IQTR.LT.5)RETURN
191  NQTR=IQTR-4
192  IF(NQTR.GT.1) GO TO 5
194  CALL STORXF(21,0)
195  CALL STORXF(22,0)
199 5  CONTINUE
200  IF(IBASE.NE. 1) GO TO 7
205  CALL STORXF(19,0)
207  CALL STORXF(20,0)
210  WRITE(6,100)TEXT1,TEXT2
220  WRITE(6,101)TEXT3,TEXT4
230  WRITE(6,102) NQTR
240 100 FORMAT(1H1,A60,A60)
250 101 FORMAT(1X,A60,A60)
260 102 FORMAT(1H0,10NQUARTER = ,12)
270 7  NATETS = ISTO2(IBASE*5)
280  NATEFC = ISTO2(IBASE*25)
290  NEEDBT = ICH2(IBASE*5)
300  NEEDTS = ICH2(IBASE*20)
310  NEEDFC = ICH2(IBASE*35)
320  NSLSUP = LOADXF(IBASE)
322  CALL STORXF(19,LOADXF(19)+IPOSS)
324  CALL STORXF(20,LOADXF(20)+NSLSUP)
330  UPPCT = FLOAT(NSLSUP)/FLOAT(IPOSS)*100.0
340  IBTOD = LOADXN(IBASE*70)
350  IDTOD = LOADXN(IBASE*85)
360  NTSCAN = ISTO2(IBASE*40)

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370  NFCCAN = IST02(IBASE+55)
380  NTSSPR = LOADXH(IBASE)
390  NFCSPR = LOADXH(IBASE+15)
400  INURK = LOADXH(IBASE+100)
410  ITSFL = LOADXH(IBASE+115)
420  IFCFL = LOADXH(IBASE+130)
430  IBOTHF = LOADXH(IBASE+145)
440  WRITE(6,20)IBASE,IPOSS,MSLSUP,UPPCT,ITSFL,IFCFL,IBOTHF,NTSSPR,
450  INTSCAN,NFCSPR,NFCCAN,NEEDTS,NEEDFC,NEEBBT,MATETS,MATEFC,IBTOD,
460  2INURK,IDTOD
470  20  FORMAT(1H0,I3,1X,2(I3,1X),F5.1,2X,3(I2,2X),2X,2(2X,I2,3X,I3),
480  18X,2(I2,2X),1X,I3,8X,2(I3,3X),5X,I3,1X,I4,2X,I3)
490  IF(IBASE.LT.15) RETURN
492  TOTNIS=LOADXF(19)
494  TOTUP=LOADXF(20)
495  CALL STORXF(21,LOADXF(21)+LOADXF(20))
496  TOTUPPCT=TOTUP/TOTNIS*100.
497  ITOT=TOTUPPCT
498  WRITE(6,30)TOTNIS,TOTUP,TOTUPPCT
499  CALL STORXF(22,LOADXF(22)+ITOT)
500  30  FORMAT(1H0,/,2X,F6.0,F7.0," TOTAL % AVAIL = ",F8.4)
501  IF(NQTR.LT.19)GO TO 200
502  AVUP=FLOAT(LOADXF(21))/FLOAT(NQTR)
504  AVPCTUP=FLOAT(LOADXF(22))/FLOAT(NQTR)
506  WRITE(6,300)AVUP,AVPCTUP
507  300  FORMAT(" ",/,"AVE NO UP = ",F10.3,"AVE PCT UP = ",F10.4)
508  200  RETURN
509  END
510  SUBROUTINE HELP2(IBASE,INOUT,K)
520  GO TO(1,2,3,4,5,6),K
530  1  IB = IBASE+70
540  IBTOD = LOADXH(IB)
550  CALL STORXH(IB,IBTOD+INOUT)
560  RETURN
570  2  IB = IBASE+85
580  IDTOD = LOADXH(IB)
590  CALL STORXH(IB,IDTOD+INOUT)
600  RETURN
610  3  IB = IBASE+100
620  INURK = LOADXH(IB)
630  CALL STORXH(IB,INURK+INOUT)
640  RETURN
650  4  IB = IBASE+115
660  ITSFL = LOADXH(IB)
670  CALL STORXH(IB,ITSFL+INOUT)
680  RETURN
690  5  IB = IBASE+130
700  IFCFL = LOADXH(IB)
710  CALL STORXH(IB,IFCFL+INOUT)
720  RETURN
730  6  IB = IBASE+145

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740      IBOTHF = LOADXH(IB)
750      CALL STORXH(IB,IBOTHF+INOÛT)
760      RETURN
770      END
780      SUBROUTINE HELP3(IBASE,MU)
782      XMU=FLOAT(MU)/100.
785      NBASE = 160 + IBASE
790      NPOIS=0
800      A=EXP(-XMU)
810      S=1.
820 4    CALL PTIME(RN1)
830      RN1=UNIFM1(RN1)
840      S=S+RN1
850      IF(S-A)9,7,7
860 7    NPOIS=NPOIS+1
870      GO TO 4
880 9    CALL STORXH(NBASE,NPOIS)
885      RETURN
890      END

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ready

This section may only be meaningful to GPSS programmers.
It describes the storages, chains, save values, and locations
of data initialization statements in the program.

AIM-7F NUMBERING SCHEME

STORAGES

1	Depot Stock - TS
2	Depot Stock - FC
3	Total Pipeline (turnaround time)
10-24	TS Awaiting Mate to Depot
26-40	FC Awaiting Mate to Depot
41-55	TS Single Cans
56-70	FC Single Cans
71-85	TS Base Time to Ship
86-100	TS Total Pipeline
101-115	FC Base Time to Ship
116-130	FC Total Pipeline

CHAINS

1	Base Unfilled Demands at Depot
6-20	Down Missiles Needing TS and FC
21-35	Down Missiles Needing TS
26-50	Down Missiles Needing FC

FULLWORD SAVEVALUES

1-15	Up Missiles
16	Base Number (used for subroutine)
17	Quarter Number
18	-1 (for subroutine)

19	Possessed Missiles
20	Up Missiles
21	Total Number Available Missiles
22	Average Percent Available Missiles

HALFWORD SAVEVALUES

1-15	TS Base Spares
16-30	FC Base Spares
31-45	Expected Number of Removals
71-85	Base to Depot Pipeline
86-100	Depot to Base Pipeline
101-115	Inwork Pipeline
116-130	Cause of Missile Failure - TS
131-145	Cause of Missile Failure - FC
146-160	Cause of Missile Failure - TS and FC
186-200	Previous Months Up Missiles

DATA REFERENCE SHEET

<u>LINE NO</u>	<u>DESCRIPTION</u>
320	Initial TS Cans
330	Initial FC Cans
450	P(TS FC Fail/Failure) (.185)
1580	P(TS Fail/Failure TS FC Failure) (.750)
2100	Maximum number of days awaiting mate to depot or single can (10)-TS
2910	Maximum number of days awaiting mate to depot or single can (10)-FC
3350	Maximum number of bases (15)
3510	Monthly failure rate (.0054)

3550	Depot inwork time (90 days)
3560	Base to depot transportation (30 days)
3570	Depot to base transportation (14 days)
3740	Defines depot pipeline interval breakdown (0-133, 134, 135,.....194)
3760-4490	Possessed missiles by base by quarter
4510-4530	Initial TS and FC spares by base
4550	Simulation length (24 qtrs)
4556	Frequency of GPSS output generation (1 every quarter)

OUTPUT STORAGES

DESCRIPTION

71-85	Base turnaround time - TS
101-115	Base turnaround time - FC
86-100	Pipeline time (resupply time) - TS
116-130	Pipeline time (resupply time) - FC
3	Total turnaround time (all bases)

SAMPLE OUTPUT

The output below is from the 10th quarter of a 20 quarter run. The first page will make the most sense to non-GPSS programmers. The other pages give detailed information about system usage, and statistics on various legs of the pipelines. The program and data which generated this report are given in Chapter V.

MISSILES		FAILURES		SPARES		MISSILES AVAILABLE		AVAILABLE MISSILES		PIPELINES	
BASE POS	UP % JP	TS	FC BOTH	TS	CANS	FC	CANS	TS	FC BOTH	TS	FC
QUARTER = 10											
1	59	59	100.0	0	0	0	0	0	0	0	0
2	89	89	100.0	0	0	0	0	0	0	0	0
3	117	117	93.3	0	2	0	0	0	0	2	2
4	149	149	97.3	0	0	0	0	0	0	4	4
5	178	178	98.3	1	0	0	0	1	0	2	2
6	204	206	99.0	0	0	0	0	0	0	2	2
7	233	233	97.9	0	0	0	0	0	0	5	5
8	268	267	99.6	1	0	0	0	0	0	1	1
9	297	293	98.7	2	0	1	0	0	0	4	4
10	297	293	98.7	2	1	1	0	0	0	2	2
11	297	295	99.3	1	1	0	0	0	0	2	2
12	327	326	99.7	1	1	1	0	0	0	0	0
13	446	444	99.6	0	3	0	0	0	0	2	2
14	595	592	99.5	0	0	2	0	0	0	3	3
15	892	885	99.2	0	1	5	0	0	0	7	7
Total Available = 39,129											

SNAP STATISTICS = ABSOLUTE CLOCK = 1350 RELATIVE CLOCK = 1350 TERMINATION TO GO = 9

BLOCK COUNTS

CURRENT TOTAL			CURRENT TOTAL			CURRENT TOTAL			CURRENT TOTAL			CURRENT TOTAL		
1# GENER	0	1	2# SPLIT	0	15	3# SAVED	0	15	4# SAVED	0	15	5# ENTER	0	0
6# ENTER	0	15	7# TRANSF	0	15	8# GENER	0	14	9# SPLIT	0	210	10# SAVED	0	0
11# SAVED	0	225	12# SAVED	0	225	13# HELPA	0	225	14# SPLIT	0	1229	15# TERM	0	0
16# ADVANC	0	1354	17# TRANSF	0	1354	18# HELPA	0	210	19# SPLIT	0	420	20# ASSIGN	0	0
21# SPLIT	0	420	22# SAVED	0	210	23# SPLIT	0	420	24# LINK	0	210	25# TEST	0	0
26# TEST	0	210	27# UNLINK	0	16	28# SAVED	0	16	29# SAVED	0	16	30# SAVED	0	0
31# TERM	0	16	32# LINK	0	343	33# ENTER	0	210	34# ENTER	0	210	35# ENTER	0	0
37# ENTER	0	210	38# ENTER	0	210	39# HELPA	0	313	40# LEAVE	0	313	41# LEAVE	0	0
42# ADVANC	2	313	43# HELPA	2	311	44# SPLIT	0	622	45# ASSIGN	0	311	46# TRANSF	0	0
47# ASSIGN	0	311	48# HELPA	0	1246	49# ADVANC	37	1246	50# HELPA	0	1159	51# ENTER	0	0
52# GATE	0	1783	53# UNLINK	0	1783	54# LOGIC	0	1783	55# TERM	0	1783	56# TEST	0	0
57# TEST	0	1783	58# TRANSF	0	372	59# LOGIC	0	911	60# LINK	0	911	61# LEAVE	0	0
62# LEAVE	0	372	63# LOGIC	2	372	64# HELPA	0	872	65# ADVANC	9	872	66# HELPA	0	0
67# SAVED	0	363	68# SAVED	0	363	69# LEAVE	0	863	70# LEAVE	0	863	71# LEAVE	0	0
72# TRANSF	0	363	73# TRANSF	2	864	74# HELPA	0	632	75# SAVED	0	632	76# SPLIT	0	0
77# SPLIT	0	1274	78# LINK	4	637	79# TEST	0	637	80# TEST	0	620	81# UNLINK	0	0
82# SAVED	0	73	83# SAVED	0	73	84# TERM	0	73	85# TEST	0	1222	86# UNLINK	0	0
87# SAVED	0	251	88# SAVED	0	251	89# TEST	0	1222	90# UNLINK	0	106	91# SAVED	0	0
92# SAVED	0	109	93# TEST	0	1222	94# UNLINK	0	524	95# SAVED	0	524	96# SAVED	0	0
97# SAVED	0	524	98# TEST	0	1222	99# UNLINK	0	364	100# UNLINK	0	364	101# SAVED	0	0
102# SAVED	0	394	103# ASSIGN	0	637	104# ENTER	0	637	105# ENTER	0	637	106# ENTER	0	0
107# LINK	24	637	108# TEST	0	5735	109# TEST	0	5691	110# LEAVE	0	51	111# LEAVE	0	0
112# ENTER	0	102	113# TRANSF	0	51	114# ASSIGN	0	103	115# LINK	0	133	116# TEST	0	0
117# SPLIT	0	102	118# LOOP	0	5637	119# TEST	0	539	120# TEST	0	531	121# ASSIGN	0	0
122# ADVANC	3	5640	123# SPLIT	0	1062	124# TEST	0	531	125# SAVED	0	227	126# SPLIT	0	0
127# LEAVE	0	531	128# ASSIGN	0	531	129# LEAVE	0	531	130# HELPA	0	1266	131# ADVANC	18	0
132# ASSIGN	0	531	133# ASSIGN	0	1246	134# TRANSF	0	624	135# ASSIGN	0	531	136# ENTER	0	0
137# HELPA	0	1246	138# TEST	0	531	139# SAVED	0	304	140# SPLIT	0	638	141# SPLIT	0	0
142# ASSIGN	0	531	143# TRANSF	0	207	144# HELPA	0	207	145# SPLIT	0	616	146# SPLIT	0	0
147# LINK	0	304	148# HELPA	0	207	149# SAVED	0	198	150# UNLINK	0	39	151# SAVED	0	0
152# LINK	2	207	153# TEST	0	207	154# TEST	0	207	155# ENTER	0	207	156# ENTER	0	0
157# SAVED	0	39	158# TERM	0	39	159# ASSIGN	0	1394	160# TEST	0	1348	161# LEAVE	0	0
162# ENTER	0	207	163# ENTER	0	207	164# TEST	0	52	165# TEST	0	1296	166# ADVANC	2	0
167# LEAVE	0	52	168# SPLIT	0	104	169# TRANSF	0	102	170# SAVED	0	102	171# LEAVE	0	0
172# LOOP	0	1294	173# TEST	0	107	174# TEST	0	67	175# SPLIT	0	206	176# ASSIGN	0	0
177# SPLIT	0	204	178# TEST	0	102	179# SAVED	0	102	180# SPLIT	0	102	181# ASSIGN	0	0
182# ENTER	0	102	183# ASSIGN	0	102	184# TRANSF	0	102	185# ASSIGN	0	110	186# SPLIT	0	0
187# LEAVE	0	102	188# TRANSF	0	102	189# SAVED	0	55	190# SPLIT	0	225	191# SPLIT	0	0
192# LINK	0	55	193# GENER	0	15	194# ASSIGN	0	15	195# ASSIGN	0	225	196# SAVED	0	0
197# HELPA	0	225	198# SAVED	0	225	199# SAVED	0	225	200# SAVED	0	225	201# LOOP	0	0
202# SAVED	0	15	203# TERM	0	15									

UNUSED BLOCKS ARE NOT SHOWN

STORAGES

- - AVERAGE UTILIZATION - -

REFERENCE	CAPACITY	AVERAGE CONTENTS	ENTRIES	AVERAGE TIME/UNIT	TOTAL TIME	AVAIL. TIME	UNAVAIL. TIME	CURRENT STATUS	PERCENT AVAILABILITY	CURRENT CONTENTS	MAX CONT
1#	2147433647	0.	372	0.	0.	0.	0.	A	100.00	0	0
2#	2147433647	22.16	211	43.22	3.000	0.000	0.	A	100.00	39	39
3#	2147433647	142.84	254	152.96	3.000	0.000	0.	A	100.00	191	191
17#	2147433647	0.00	8	13.00	0.000	0.000	0.	A	100.00	0	0
11#	2147433647	0.12	16	10.00	0.000	0.000	0.	A	100.00	0	0
12#	2147433647	0.13	14	10.00	0.000	0.000	0.	A	100.00	0	0
13#	2147433647	0.19	25	10.00	0.000	0.000	0.	A	100.00	0	0
14#	2147433647	0.18	26	8.35	0.000	0.000	0.	A	100.00	1	1
15#	2147433647	0.18	27	8.81	0.000	0.000	0.	A	100.00	0	0
16#	2147433647	0.24	36	5.17	0.000	0.000	0.	A	100.00	0	0
17#	2147433647	0.27	38	9.53	0.000	0.000	0.	A	100.00	0	0
18#	2147433647	0.30	45	7.13	0.000	0.000	0.	A	100.00	0	0
19#	2147433647	0.25	36	7.47	0.000	0.000	0.	A	100.00	0	0
20#	2147433647	0.28	45	3.29	0.000	0.000	0.	A	100.00	0	0
21#	2147433647	0.25	40	3.40	0.000	0.000	0.	A	100.00	0	0
22#	2147433647	0.43	71	4.11	0.000	0.000	0.	A	100.00	2	2
23#	2147433647	0.49	79	3.34	0.000	0.000	0.	A	100.00	0	0
24#	2147433647	0.74	122	8.11	0.000	0.000	0.	A	100.00	3	3
25#	2147433647	0.31	2	10.00	0.000	0.000	0.	A	100.00	0	0
27#	2147433647	0.36	5	10.00	0.000	0.000	0.	A	100.00	0	0
28#	2147433647	0.06	8	10.00	0.000	0.000	0.	A	100.00	0	0
29#	2147433647	0.35	7	10.00	0.000	0.000	0.	A	100.00	0	0
30#	2147433647	0.35	10	7.20	0.000	0.000	0.	A	100.00	0	0
31#	2147433647	0.35	15	2.10	0.000	0.000	0.	A	100.00	0	0
32#	2147433647	0.35	8	7.63	0.000	0.000	0.	A	100.00	0	0
33#	2147433647	0.33	6	2.50	0.000	0.000	0.	A	100.00	0	0
34#	2147433647	0.36	11	7.09	0.000	0.000	0.	A	100.00	0	0
35#	2147433647	0.23	10	4.50	0.000	0.000	0.	A	100.00	0	0
36#	2147433647	0.06	17	5.12	0.000	0.000	0.	A	100.00	1	1
37#	2147433647	0.06	12	4.32	0.000	0.000	0.	A	100.00	1	1
38#	2147433647	0.08	23	4.74	0.000	0.000	0.	A	100.00	0	0
39#	2147433647	0.10	30	4.62	0.000	0.000	0.	A	100.00	0	0
40#	2147433647	0.15	43	4.74	0.000	0.000	0.	A	100.00	0	0
71#	2147433647	0.06	10	8.00	0.000	0.000	0.	A	100.00	0	0
72#	2147433647	0.12	23	6.96	0.000	0.000	0.	A	100.00	0	0
73#	2147433647	0.13	23	7.83	0.000	0.000	0.	A	100.00	0	0
74#	2147433647	0.19	39	6.41	0.000	0.000	0.	A	100.00	0	0
75#	2147433647	0.16	36	6.38	0.000	0.000	0.	A	100.00	1	1
76#	2147433647	0.18	33	7.21	0.000	0.000	0.	A	100.00	0	0
77#	2147433647	0.26	46	7.17	0.000	0.000	0.	A	100.00	0	0
78#	2147433647	0.27	46	7.87	0.000	0.000	0.	A	100.00	0	0
79#	2147433647	0.30	58	7.09	0.000	0.000	0.	A	100.00	0	0
30#	2147433647	1.25	59	5.78	0.000	0.000	0.	A	100.00	0	0
31#	2147433647	1.28	60	6.22	0.000	0.000	0.	A	100.00	0	0
82#	2147433647	0.25	54	6.22	0.000	0.000	0.	A	100.00	0	0
43#	2147433647	0.43	92	6.26	0.000	0.000	0.	A	100.00	2	2

- - AVERAGE UTILIZATION - -											
REFERENCE	CAPACITY	AVERAGE CONTENTS	ENTRIES	AVERAGE TIME/UNIT	TOTAL TIME	AVAIL. TIME	UNAVAIL. TIME	CURRENT STATUS	PERCENT AVAILABILITY	CURRENT CONTENTS	MAX. CONTENTS
340	2147483067	0.59	125	5.28	0.000	0.000	0.	A	100.00	0	0
350	2147483067	0.76	155	5.24	0.000	0.000	0.	A	100.00	0	0
360	2147483067	1.16	12	131.00	0.000	0.000	0.	A	100.00	1	1
370	2147483067	2.53	23	125.51	0.000	0.000	0.	A	100.00	1	1
380	2147483067	2.23	31	123.23	0.000	0.000	0.	A	100.00	5	5
390	2147483067	4.19	46	122.96	0.000	0.000	0.	A	100.00	6	6
400	2147483067	3.73	60	125.82	0.000	0.000	0.	A	100.00	5	5
410	2147483067	3.51	39	121.62	0.000	0.000	0.	A	100.00	4	4
420	2147483067	4.71	51	126.57	0.000	0.000	0.	A	100.00	8	8
430	2147483067	4.74	50	127.36	0.000	0.000	0.	A	100.00	6	6
440	2147483067	5.10	66	126.61	0.000	0.000	0.	A	100.00	7	7
450	2147483067	5.33	65	125.14	0.000	0.000	0.	A	100.00	6	6
460	2147483067	5.19	66	126.58	0.000	0.000	0.	A	100.00	6	6
470	2147483067	5.82	62	126.71	0.000	0.000	0.	A	100.00	6	6
480	2147483067	4.28	99	122.62	0.000	0.000	0.	A	100.00	7	7
490	2147483067	10.75	117	126.15	0.000	0.000	0.	A	100.00	10	10
500	2147483067	13.97	179	125.75	0.000	0.000	0.	A	100.00	16	16
510	2147483067	0.31	4	5.00	0.000	0.000	0.	A	100.00	0	0
520	2147483067	2.26	12	6.17	0.000	0.000	0.	A	100.00	0	0
530	2147483067	0.06	13	6.15	0.000	0.000	0.	A	100.00	0	0
540	2147483067	0.35	21	3.33	0.000	0.000	0.	A	100.00	0	0
550	2147483067	0.35	18	6.30	0.000	0.000	0.	A	100.00	0	0
560	2147483067	0.35	16	6.44	0.000	0.000	0.	A	100.00	0	0
570	2147483067	0.35	13	3.39	0.000	0.000	0.	A	100.00	0	0
580	2147483067	0.23	16	3.21	0.000	0.000	0.	A	100.00	0	0
590	2147483067	0.36	24	3.25	0.000	0.000	0.	A	100.00	0	0
600	2147483067	0.05	33	1.27	0.000	0.000	0.	A	100.00	0	0
610	2147483067	0.06	32	2.72	0.000	0.000	0.	A	100.00	1	1
620	2147483067	0.06	31	2.95	0.000	0.000	0.	A	100.00	1	1
630	2147483067	0.08	44	2.48	0.000	0.000	0.	A	100.00	0	0
640	2147483067	0.10	56	2.50	0.000	0.000	0.	A	100.00	0	0
650	2147483067	0.15	81	2.52	0.000	0.000	0.	A	100.00	0	0
660	2147483067	1.12	12	126.00	0.000	0.000	0.	A	100.00	1	1
670	2147483067	2.54	28	122.68	0.000	0.000	0.	A	100.00	1	1
680	2147483067	2.26	31	120.00	0.000	0.000	0.	A	100.00	3	3
690	2147483067	4.06	46	119.04	0.000	0.000	0.	A	100.00	6	6
700	2147483067	3.62	39	123.33	0.000	0.000	0.	A	100.00	6	6
710	2147483067	3.39	39	117.33	0.000	0.000	0.	A	100.00	6	6
720	2147483067	4.51	51	119.29	0.000	0.000	0.	A	100.00	8	8
730	2147483067	1.50	50	121.52	0.000	0.000	0.	A	100.00	4	4
740	2147483067	5.70	64	121.61	0.000	0.000	0.	A	100.00	7	7
750	2147483067	5.32	65	120.89	0.000	0.000	0.	A	100.00	6	6
760	2147483067	5.98	67	120.42	0.000	0.000	0.	A	100.00	5	5
770	2147483067	5.93	63	120.67	0.000	0.000	0.	A	100.00	5	5
780	2147483067	5.93	97	123.15	0.000	0.000	0.	A	100.00	5	5
790	2147483067	10.37	117	119.71	0.000	0.000	0.	A	100.00	10	10
800	2147483067	15.26	179	121.14	0.000	0.000	0.	A	100.00	16	16

USER CHANGES

REFERENCE	MAXIMUM CONTENTS	AVERAGE CONTENTS	TOTAL ENTRIES	AVERAGE TIME/TRAN	CURRENT CONTENTS
1#	29	24.33	1852	36.60	26
2#	2	3.53	8	64.75	0
3#	5	1.53	26	38.92	0
4#	5	1.31	25	37.60	2
5#	5	2.14	32	28.63	1
12#	7	1.87	23	119.52	2
11#	6	1.66	22	62.32	2
12#	6	1.63	32	62.67	5
13#	7	1.65	32	62.28	1
14#	5	2.92	40	99.70	4
15#	11	2.92	51	77.25	2
16#	7	2.94	40	79.15	2
17#	5	1.75	32	62.62	0
18#	9	3.75	50	101.28	3
19#	13	3.36	52	37.32	3
20#	20	7.36	92	107.96	7
21#	2	0.04	8	7.50	0
22#	2	0.10	20	6.60	0
23#	2	0.10	26	5.38	0
24#	2	0.16	29	7.45	0
25#	5	0.15	29	7.03	1
26#	2	0.23	28	10.89	0
27#	5	0.29	40	3.95	0
28#	3	0.23	39	7.97	0
29#	3	0.25	50	6.66	0
30#	3	0.23	41	7.54	1
31#	2	0.50	50	3.06	0
32#	2	0.26	45	7.91	0
33#	3	0.37	73	5.45	2
34#	4	0.39	30	6.52	0
35#	4	0.42	136	9.02	0
36#	1	0.	5	0.	0
37#	1	0.03	13	2.33	0
38#	1	0.06	20	4.00	0
39#	2	0.04	26	2.00	0
40#	1	0.08	22	4.95	0
41#	2	0.12	25	6.36	0
42#	2	0.16	26	8.23	0
43#	2	0.03	24	1.52	0
44#	2	0.05	33	2.58	0
45#	2	0.06	33	2.66	1
46#	2	0.16	37	5.73	0
47#	2	0.12	37	4.34	1
48#	3	0.12	49	3.18	0
49#	2	0.09	62	1.95	0
50#	4	0.20	86	3.15	0

FULL#083 SAVEVALUES

NUMBER --- CONTENTS	NUMBER --- CONTENTS	NUMBER --- CONTENTS	NUMBER --- CONTENTS	NUMBER --- CONTENTS	NUMBER --- CONTENTS	NUMBER --- CONTENTS	NUMBER --- CONTENTS
1#	5#	2#	8#	1#	11#	4#	14#
7#	233	8#	267	9#	293	10#	293
13#	445	14#	592	15#	885	16#	15
19#	4459	20#	4419	21#	45326	22#	984

HALF#082 SAVEVALUES

NUMBER - CONTENTS	NUMBER - CONTENTS	NUMBER - CONTENTS	NUMBER - CONTENTS	NUMBER - CONTENTS	NUMBER - CONTENTS	NUMBER - CONTENTS	NUMBER - CONTENTS
11#	1	31#	95	32#	144	33#	189
36#	330	37#	380	38#	427	39#	477
42#	522	43#	722	44#	959	45#	1425
76#	4	77#	2	80#	3	83#	4
92#	1	93#	1	94#	1	95#	3
133#	2	104#	6	105#	5	106#	2
138#	9	117#	4	118#	5	119#	6
115#	19	163#	2	164#	3	165#	1
163#	1	162#	3	170#	4	171#	2
174#	8	175#	9	136#	59	187#	89
132#	173	191#	228	192#	238	193#	268
196#	297	197#	327	198#	446	199#	595