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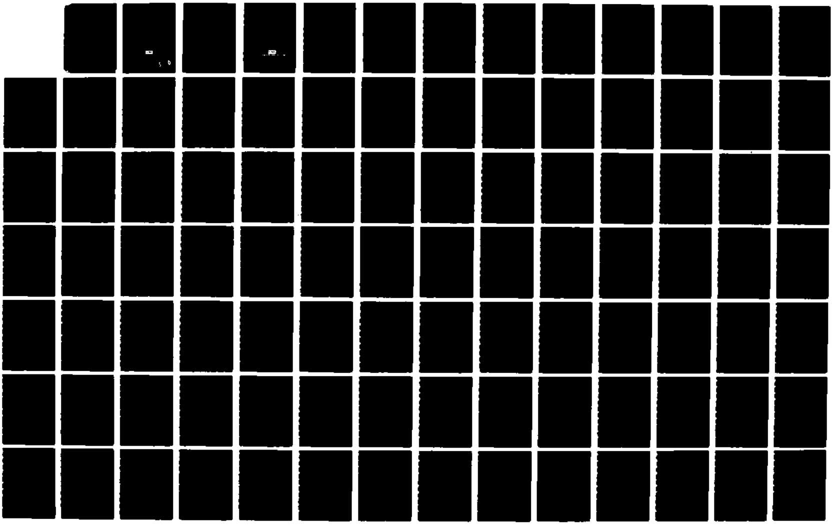

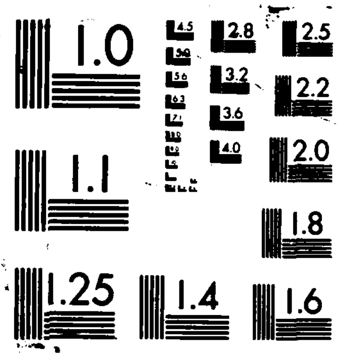

MICROCOPY RESOLUTION TEST CHART

2

Professional Paper 456 / June 1987

Simulation And Analysis Of Flight Deck Operations On An LHA

by

Stephen M. Gates

A Division of CNA Hudson Institute

CENTER·FOR·NAVAL·ANALYSES

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Chapter 1

INTRODUCTION

1.1 PURPOSE

The objective of this thesis was to develop a model that simulates the interactions between a number of close air support aircraft and helicopters on a flight deck during an amphibious assault. Application of this model permits a quantitative investigation into the operations of various mixes of current aircraft on a specific flight deck, and with minor modification, the effects of future aircraft and future flight decks can be examined.

The model is currently configured for operations aboard an LHA flight deck with two types of transport helicopters and the AV-8 Harrier attack aircraft. The model application presented here considers the maximum number of AV-8 Harriers that could operate effectively with a composite helicopter squadron during the amphibious assault of a Marine Amphibious Unit.

1.2 BACKGROUND

The principal mission for the United States Marine Corps is the amphibious assault. An amphibious assault is characterized by the ship-to-shore movement of troops and equipment by surface craft and aircraft to establish a beachhead and attain an operational objective. The success or failure of the assault may be determined by the initial rate of force buildup, when the landing force must rapidly be concentrated to overwelm opposition to the landing.

Marine amphibious task forces come in a variety of sizes, ranging from a Marine Amphibious Unit (MAU) of approximately 2500 personnel to a

Marine Amphibious Force (MAF) of nearly 50,000 personnel. During peacetime, Amphibious task forces are normally deployed as MAUs embarked on 3-7 Naval amphibious ships. Usually, one of these ships will be a general purpose amphibious assault ship of the Tarawa LHA-class.

An LHA has a flight deck configured for helicopter operations, a floodable well deck for landing craft operations, a hangar deck for storing and maintaining aircraft, a 300-bed hospital, living spaces for a crew of 900 and 1900 Marines, and cargo spaces for the weapons, equipment, and supplies to support these Marines for several weeks. In addition to the composite helicopter squadron that the LHA usually operates with, a detachment of AV-8 Harriers may also be carried. AV-8s have a vertical/short takeoff and landing (V/STOL) capability, and are embarked to assist in the beach preparation prior to the assault and to provide close air support during the assault.

The AV-8s are a valuable asset to the MAU, but LHAs were not designed to support fixed wing aircraft, and helicopter operations must be temporarily suspended when AV-8s launch or recover. The competition between AV-8s and helicopters for limited flight deck assets necessarily slows the offload of troops and equipment, the delay increasing with the number of AV-8s. As mentioned earlier, speed is of the essence in the buildup ashore, but the capability afforded by the AV-8 presence can offset some reduction in the buildup rate.

In July 1982, a test was conducted in the Indian Ocean with a composite squadron of helicopters and 6 AV-8s. Among the conclusions was the finding that a composite helicopter squadron and 6 AV-8s are capable of integrated flight deck operations. Further tests have been postponed pending the introduction of a new version of the AV-8.

1.3 APPROACH

The goal of this model is to simulate the flight deck operations during an actual assault rather than an assault exercise. This approach was chosen because interest would obviously be the greatest in results obtained in a more realistic setting. For simulation purposes, the transition from an exercise to an actual assault requires the removal of the effect of training being conducted concurrently, and relaxation of the many safety requirements of peacetime operations. Exercise data must therfore be massaged with the guidance of experts from this operational area.

Two aspects of reality have not been included in the model: they are combat attrition and aircraft reliability. The intended effect of their absence is to stress the aircraft interactions throughout the simulated assault by not allowing the finite source population to decrease.

The model is a stochastic, discrete event system. The events of interest include all types of service or activity where helicopters and AV-8s might interact, both on and off the flight deck, during an assault landing.

The model verification and validation were both accomplished by stepping event by event through simulation output for many cases. A sample of this output appears in appendix B. Both efforts concluded that the model performs basically as desired.

Chapter 2

SYSTEM DESCRIPTION

The system consists of a number of aircraft (CH-46s, CH-53s, and AV-8s) that move between three major locations with a variable amount of activity and movement occurring at one of these locations.

The first major location is the Landing Zone (LZ). The LZ is the destination of the heliborne force during the assault landing. The helicopters arrive at the LZ in waves, and depart as soon as their load of troops and/or cargo has been unloaded. Their destination from the LZ is the delta pattern.

The delta pattern is a holding pattern established in the vicinity of the ship. Normally the delta pattern is a racetrack pattern around the ship, oriented on the ship's heading. Aircraft arrive to the delta pattern individually and join any other aircraft waiting there until the ship is able to recover them. The order of recovery depends on many factors, including fuel status, flying time remaining, time of next launch, and aircraft type.

The last major location is the ship; this is where the majority of the aircraft interactions occur. Relevant features of the ship include locations where aircraft may be positioned, and service activities that are not necessarily location dependent. Figure 1 displays the features of the flight deck on an LHA. The sytem description continues with the ship designated as of the LHA class. Locations aboard the ship are described as follows:

1. Deck Spots - There are six deck spots normally used for the launch and recovery of aircraft. These spots are located on the port side of the ship running from bow to stern. In figure 1, these spots are numbered 2,4,5,6,7,8. Spot 1 is not capable of recovering any of the aircraft listed above because of the limited amount of deck forward of the spot. Spots 3 and 9 could be

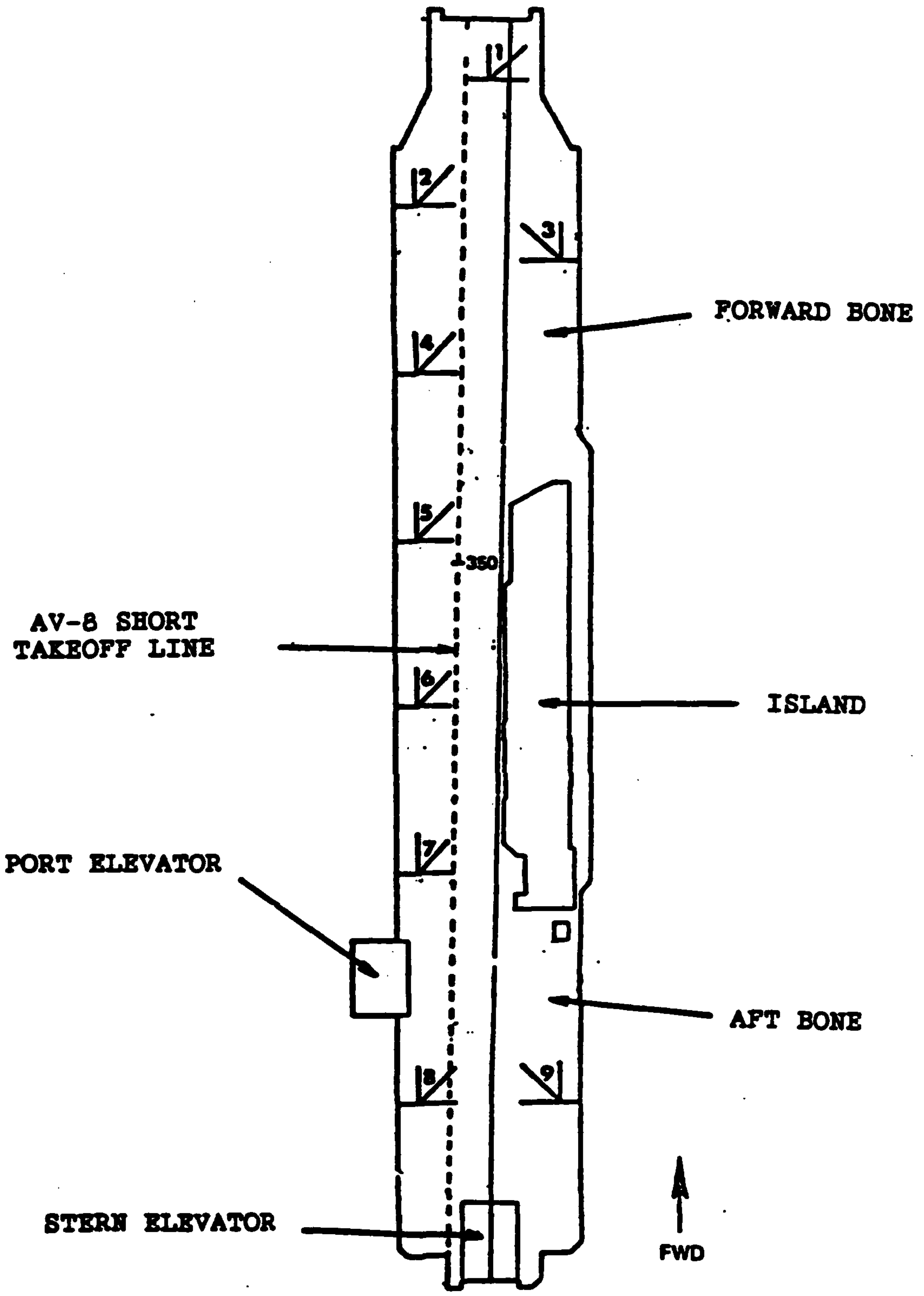


FIGURE 1. LHA FLIGHT DECK

used for launch and recovery, but they have other uses, and are called the forward and aft bones, respectively.

2. Forward Bone - The forward bone is the area forward of the island on the ship's starboard side. It is normally used as a parking area for aircraft waiting to respot to a deck spot for launching, and minor maintenance and refueling can be performed there. In the 1982 test, the forward bone was designated for use by the CH-46s.

3. Aft bone - The aft bone is the area aft of the island on the ship's starboard side. It has the same uses as the forward bone, and in the 1982 test, it was designated for use by CH-53s and AV-8s.

4. Elevator - There are two elevators on an LHA: one between spots 7 and 8 on the port side and the other centerline on the stern. The elevators connect the flight deck with the hangar deck and are capable of moving only one of the listed aircraft at a time. Normally, only one of the two elevators will be in use during an operation.

5. Hangar - The hangar is located directly below the flight deck. It is used to store aircraft and perform all levels of maintenance.

The service activities that the aircraft on the ship are affected by include:

1. Refueling - There are six refueling stations on the flight deck, each with two hoses. The stations are distributed on the deck so that an aircraft located anywhere on the deck is within the reach of at least one station's hoses. The stations are manned by four refueling crews that move between stations as necessary. The maximum number of aircraft that can refuel simultaneously is, therefore, four.

2. Loading - Helicopters are loaded on any of the six deck spots immediately prior to launching. Each spot has a combat cargo representative to oversee the loading process, so all six spots may load simultaneously. AV-8s are loaded with ordnance in the aft bone. Two ordnance teams are normally embarked, so only two AV-8s may be loaded at the same time. Ordnance can be assembled in advance and staged to the loading area, so it is assumed that ordnance is always available when requested.

3. Respotting - Respotting occurs for all aircraft to and from the deck spots, the bones, the elevator, and the hangar. Helicopters always require the assistance of a tug (tractor) when respotting. AV-8s may respot to the takeoff line from the bone, and from their recovery spot to the bone under their own power. In all other cases, AV-8s also require a tug for respotting. There are four tugs located on the flight deck and one located on the hangar

deck.

4. Launching - Helicopters launch from the six deck spots previously mentioned. AV-8s launch with with a deck run along the short takeoff line. The length of the deck run depends on the aircraft weight, the wind speed, and the temperature, but at the very least, spots 1,2, and 4 must be cleared of aircraft prior to an AV-8 launch. Aircraft launch one at a time with a small interval between launches of aircraft in a wave.

5. Recovery - All aircraft use the six deck spots previously mentioned for recovery. Generally, the smaller aircraft (CH-46s) are recovered on the forward spots and the larger aircraft (CH-53s) are recovered on the aft spots. During an emergency, all aircraft may be recovered on any of the port spots. Aircraft recover one at a time with a small interval between recoveries. Recoveries normally follow the launching of a wave.

6. Elevator service - Described above

Distributions for these service activities are presented in the discussion of Chapter 4.

The normal flow of helicopters and AV-8s through the system is shown in figures 2 and 3.

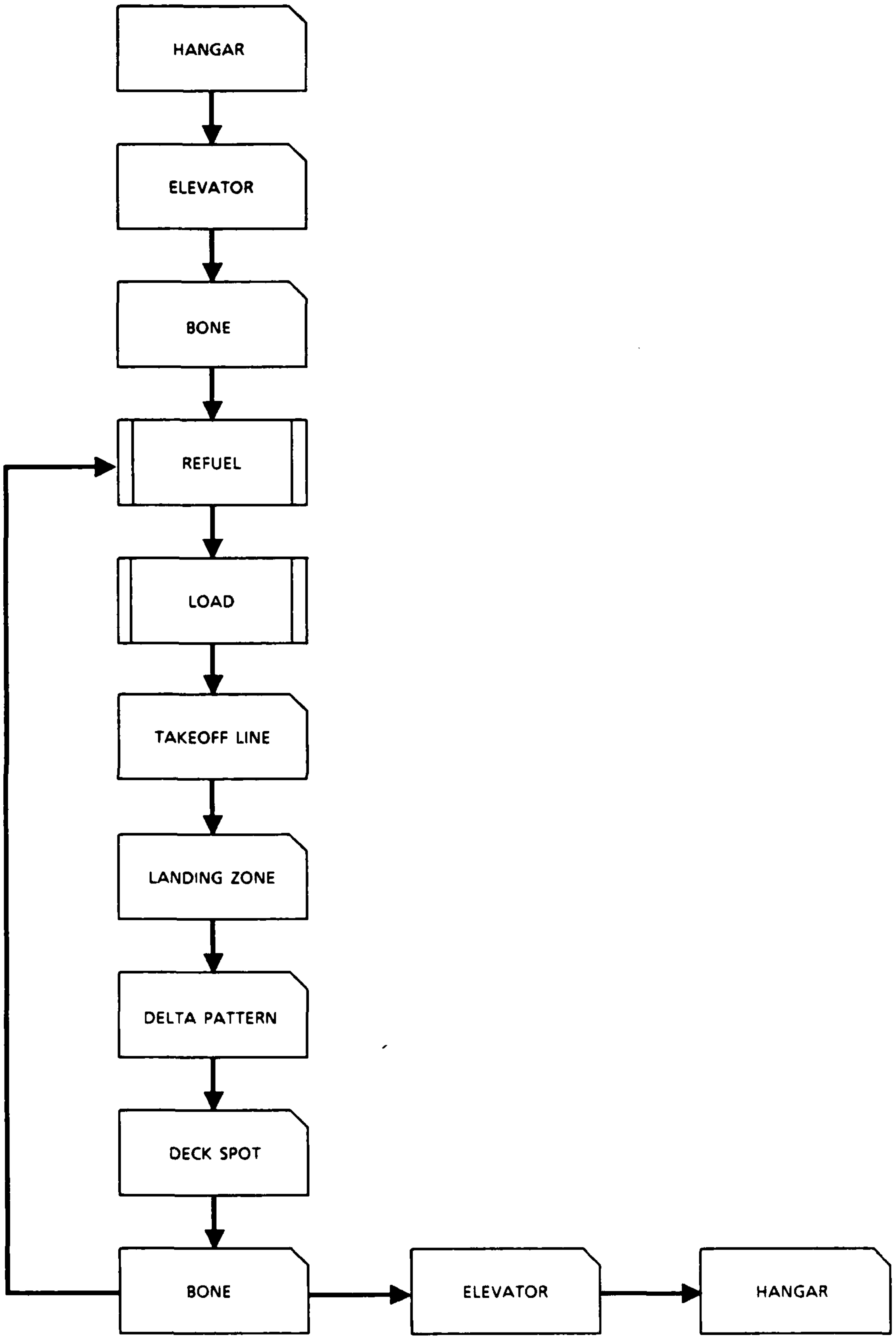


FIGURE 2. AV-8 FLOW THROUGH SYSTEM

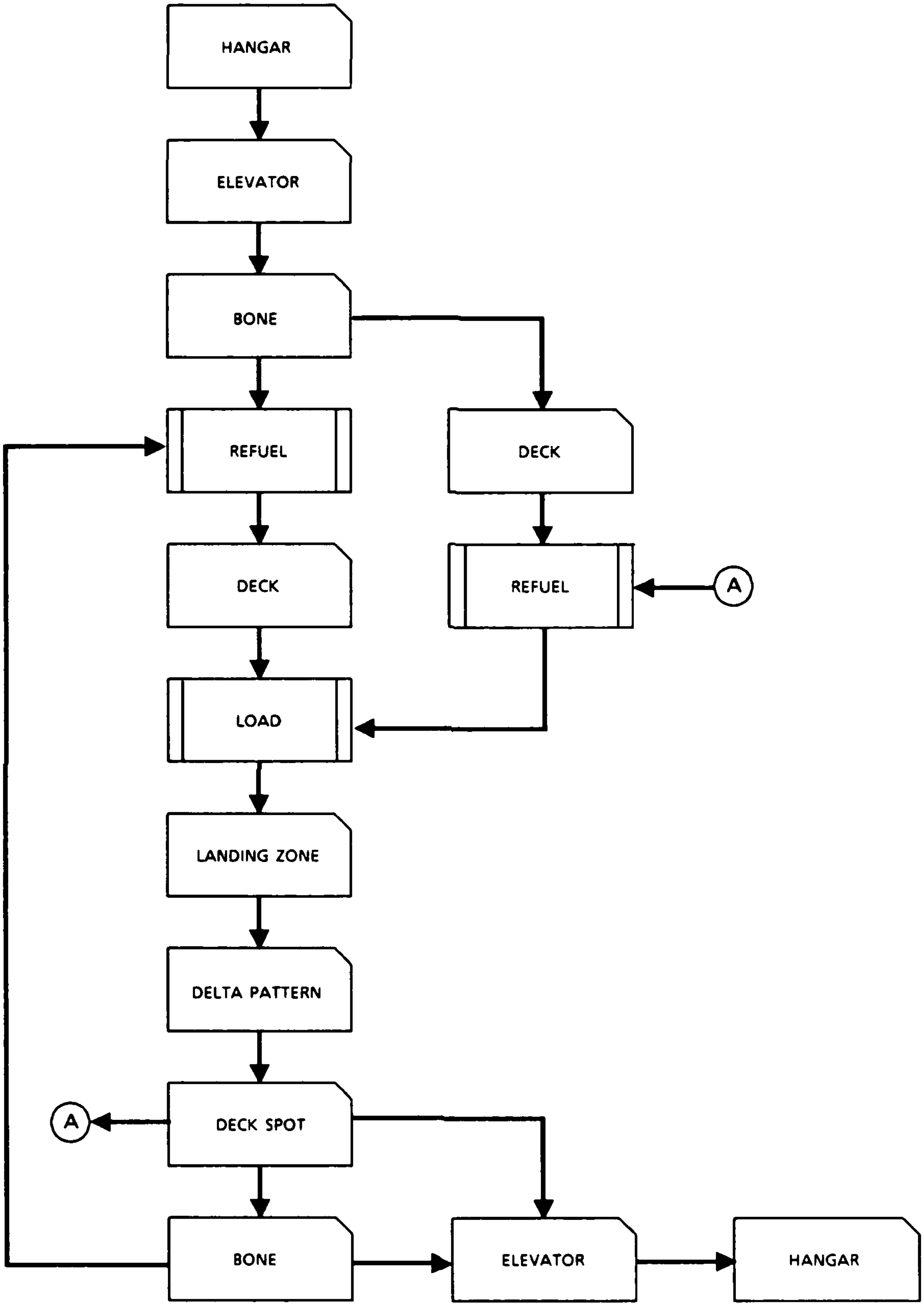


FIGURE 3. HELICOPTER FLOW THROUGH SYSTEM

Chapter 3

MODEL DESCRIPTION

The model was coded in Simscript II.5 and run on a VAX 11/785. A model listing appears in appendix A. This chapter describes how the model works with a section that details the model events, a section that defines the model entities and their attributes, and a section that presents potential measures of effectiveness that are currently in the model.

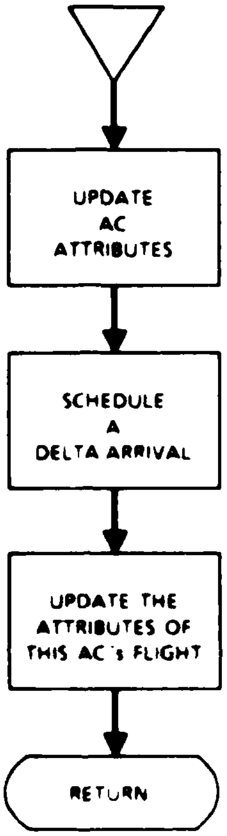
3.1 EVENT DESCRIPTIONS

In this section, the model events are described. Each subsection addresses one event with a text description followed by a flowchart. The order in which the events appear is alphabetical.

Several comments concerning conventions and symbols in the flowcharts may be helpful to the reader. There is a distinction between AC and A/C; AC refers to the aircraft that has been passed to the event, whereas A/C refers to all other aircraft that are treated during the event process. The triangular node indicates the beginning of an event. The rectangular node represents a positive action that occurs at that point in the model, whereas the rectangular node with extra vertical lines represents a comment concerning a state or a set of actions. There are two symbols that transfer the flow to different areas of the event, signified by a node with a single letter. The first symbol is a circle, and in this case, the flow is transferred to another area on the same page. The other symbol has five sides, and transfers the flow to another page of this event. The return node indicates a state in the simulation where control is returned to the Simscript scheduler, and marks the end of activity in the current event.

3.1.1 EVENT AC.LAUNCHED GIVEN AC

The occurrence of this event signals the departure of AC from the ship. The event DELTA.ARRIVAL is scheduled by computing the time required to make the round trip to the landing zone and adding the time (random) necessary to accomplish its mission (time to unload). A deck spot becomes available, and a SPOT.OPEN event is scheduled.



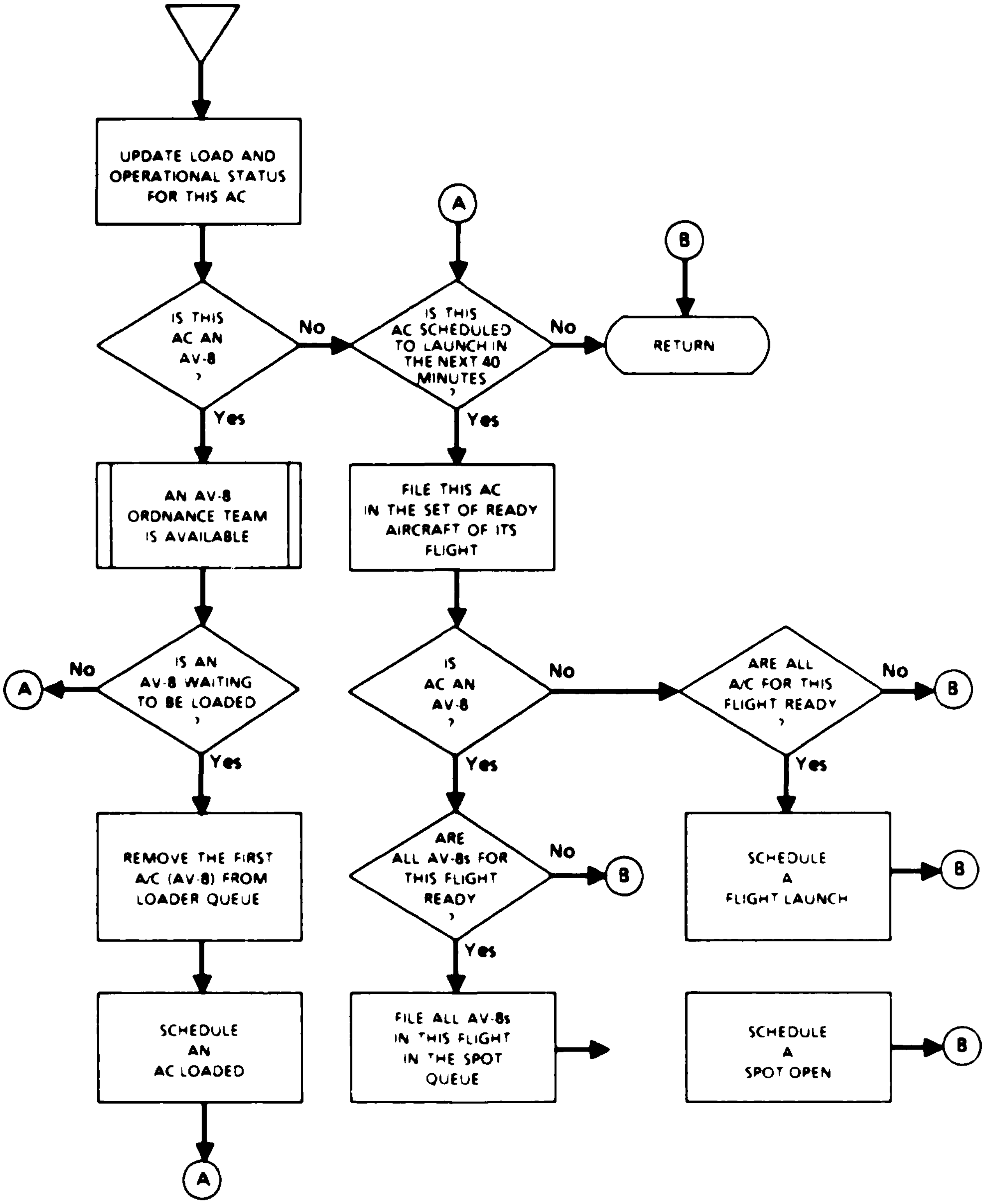
EVENT AC.LAUNCHED GIVEN AC

3.1.2 EVENT AC.LOADED GIVEN AC

The occurrence of this event signals the completion of the loading process for the aircraft AC. The action that occurs next depends on the type of aircraft that AC is and its launch time.

If AC is an AV-8, an ordnance team becomes available, and if another AV-8 is waiting for an ordnance team, _ AC.LOADED is scheduled. If AC has a launch time in the next 40 minutes, and both AV-8s in this flight have now been loaded, they are ready to be respotted to the takeoff line prior to launch. This is accomplished by filing them in the spot queue and scheduling a SPOT.OPEN event.

If AC is a helicopter, has a launch time in the next 40 minutes, and all aircraft of this flight have been loaded (launch time should be less than 10 minutes away if all aircraft are loaded), then a FLIGHT.LAUNCH event is scheduled.


UPDATE LOAD AND OPERATIONAL STATUS FOR THIS AC
IS THIS AC AN AV-8 ?
No
Yes
AN AV-8 ORDNANCE TEAM IS AVAILABLE
IS AN AV-8 WAITING TO BE LOADED ?
No
A
Yes
REMOVE THE FIRST A/C (AV-8) FROM LOADER QUEUE
SCHEDULE AN AC LOADED
A
A
IS THIS AC SCHEDULED TO LAUNCH IN THE NEXT 40 MINUTES ?
No
Yes
FILE THIS AC IN THE SET OF READY AIRCRAFT OF ITS FLIGHT
IS AC AN AV-8 ?
No
Yes
ARE ALL AV-8s FOR THIS FLIGHT READY ?
No
B
Yes
FILE ALL AV-8s IN THIS FLIGHT IN THE SPOT QUEUE
B
RETURN
ARE ALL A/C FOR THIS FLIGHT READY ?
No
B
Yes
SCHEDULE A FLIGHT LAUNCH
B
SCHEDULE A SPOT OPEN
B

EVENT AC.LOADED GIVEN AC

3.1.3 EVENT AC.RECOVERED GIVEN AC

This event occurs when the aircraft AC has returned to the ship and landed on one of the six deck spots. AC will remain on this deck spot only if all of the following conditions are satisfied:

: AC must have a launch time scheduled to occur in the next 40 minutes

: AC's presence on this deck spot must not interfere with the next AV-8 launch

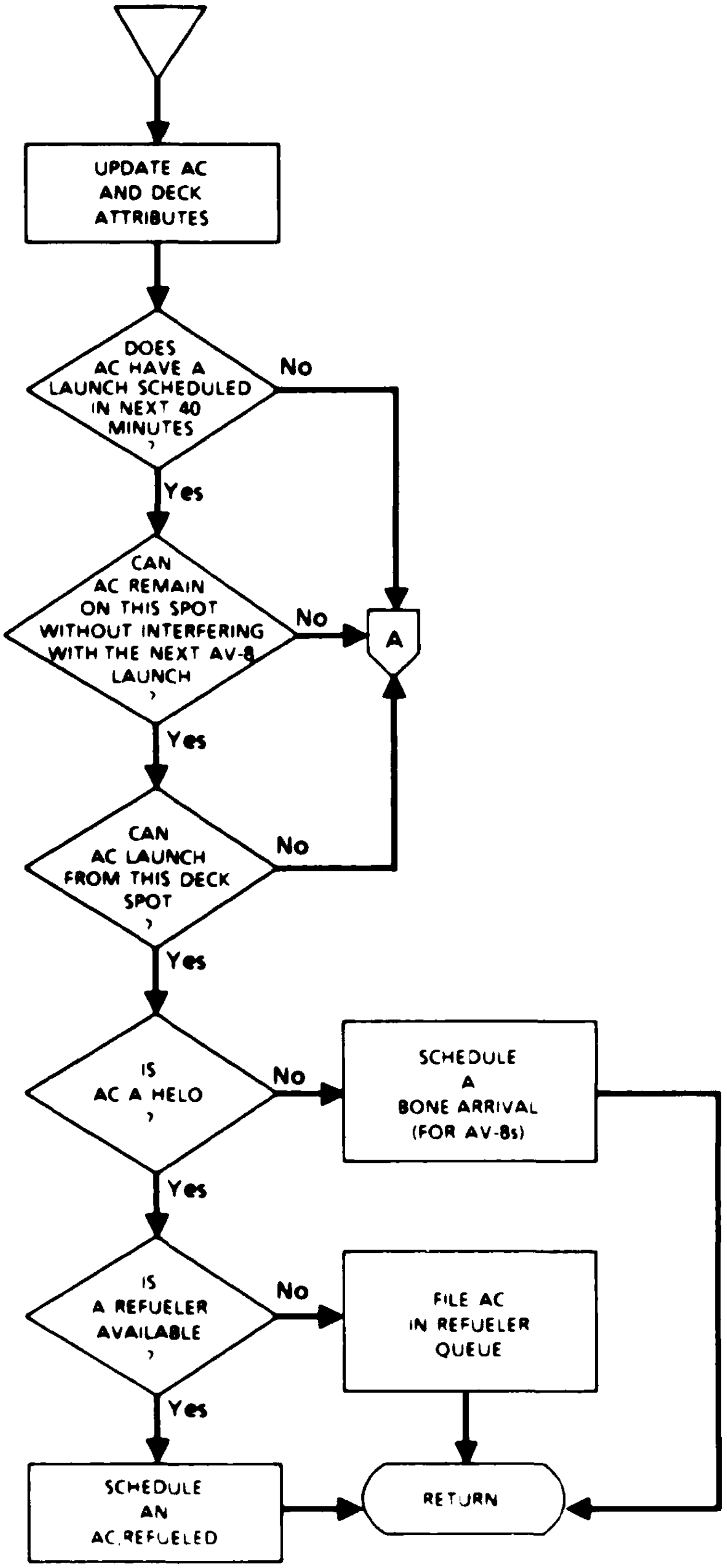
: AC must be compatible to launch from this deck spot

: AC must be a helicopter

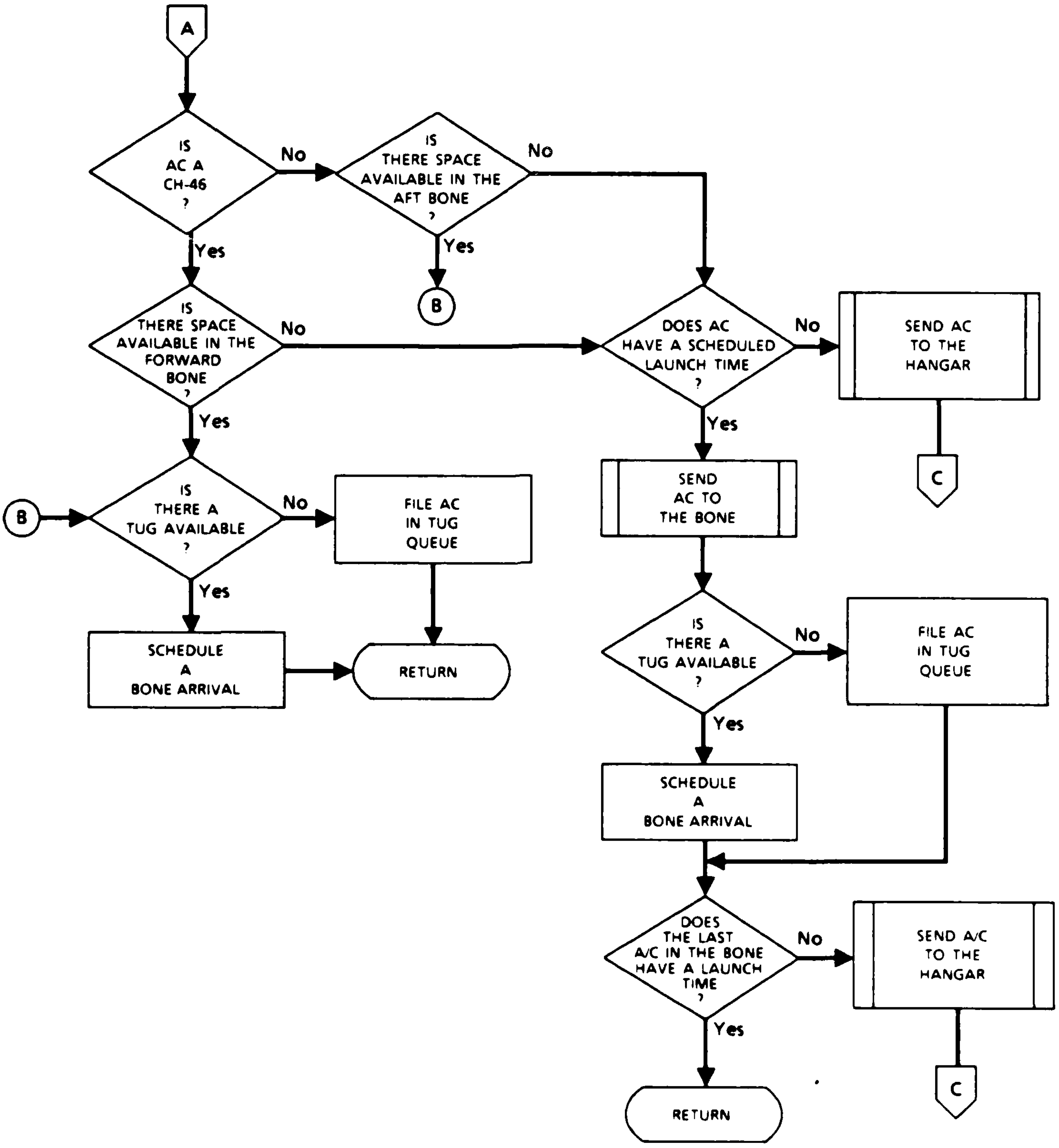
If all of these conditions are satisfied, the next step for this helicopter is to schedule an AC.REFUELED event.

If any of these conditions are not met, AC is sent to the appropriate bone if there is space in that bone. If the bone is full, AC is still sent to the bone if AC has a scheduled launch time; otherwise, AC is sent to the hangar. Helicopters require a tug in all cases for deck movement. AV-8s can respot to the bone under their own power, but require a tug when going to the hangar (elevator).

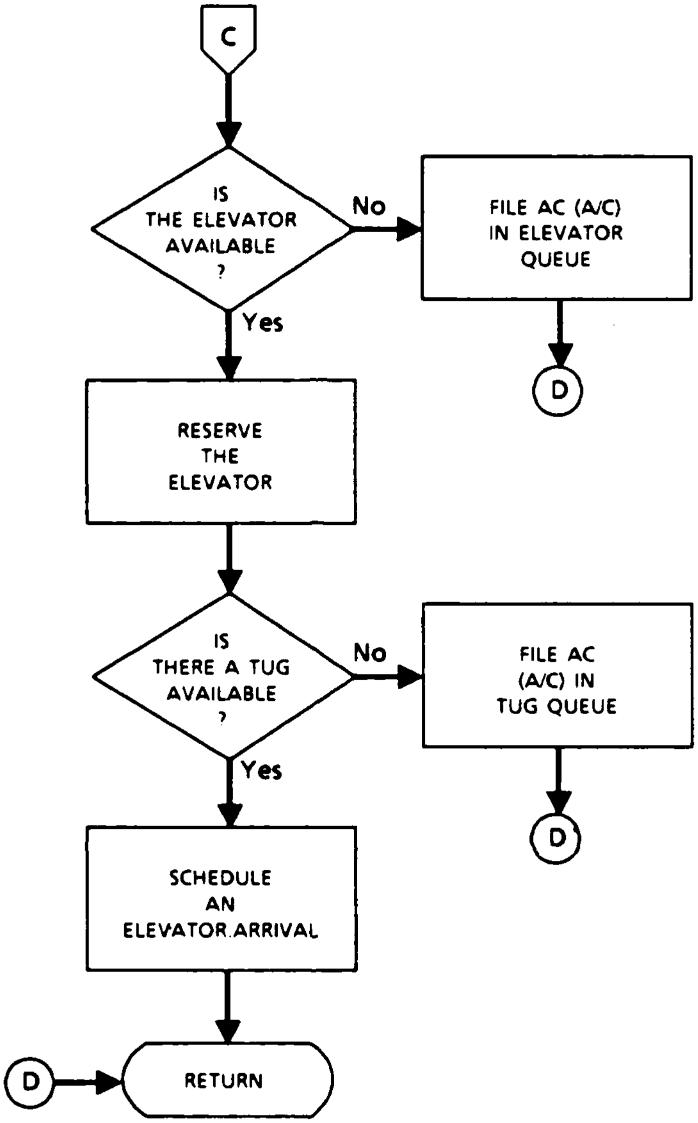
If the bone was full and AC has scheduled a BONE.ARRIVAL, the aircraft in that bone are checked for any that do not have a future launch time. If one is found, this aircraft is sent to the hangar (elevator).


UPDATE AC AND DECK ATTRIBUTES
DOES AC HAVE A LAUNCH SCHEDULED IN NEXT 40 MINUTES ?
No
Yes
CAN AC REMAIN ON THIS SPOT WITHOUT INTERFERING WITH THE NEXT AV-8 LAUNCH ?
No
A
Yes
CAN AC LAUNCH FROM THIS DECK SPOT ?
No
Yes
IS AC A HELO ?
No
SCHEDULE A BONE ARRIVAL (FOR AV-8s)
Yes
IS A REFUELER AVAILABLE ?
No
FILE AC IN REFUELER QUEUE
Yes
SCHEDULE AN AC.REFUELED
RETURN

EVENT AC.RECOVERED GIVEN AC


A
IS AC A CH-46 ?
No
IS THERE SPACE AVAILABLE IN THE AFT BONE ?
No
Yes
Yes
B
IS THERE SPACE AVAILABLE IN THE FORWARD BONE ?
No
DOES AC HAVE A SCHEDULED LAUNCH TIME ?
No
SEND AC TO THE HANGAR
Yes
Yes
C
SEND AC TO THE BONE
B
IS THERE A TUG AVAILABLE ?
No
FILE AC IN TUG QUEUE
Yes
SCHEDULE A BONE ARRIVAL
RETURN
IS THERE A TUG AVAILABLE ?
No
FILE AC IN TUG QUEUE
Yes
SCHEDULE A BONE ARRIVAL
DOES THE LAST A/C IN THE BONE HAVE A LAUNCH TIME ?
No
SEND A/C TO THE HANGAR
Yes
C
RETURN

CONTINUED: EVENT AC.RECOVERED


C
IS THE ELEVATOR AVAILABLE ?
No
FILE AC (A/C) IN ELEVATOR QUEUE
D
Yes
RESERVE THE ELEVATOR
IS THERE A TUG AVAILABLE ?
No
FILE AC (A/C) IN TUG QUEUE
D
Yes
SCHEDULE AN ELEVATOR.ARRIVAL
D
RETURN

CONTINUED: EVENT AC.RECOVERED

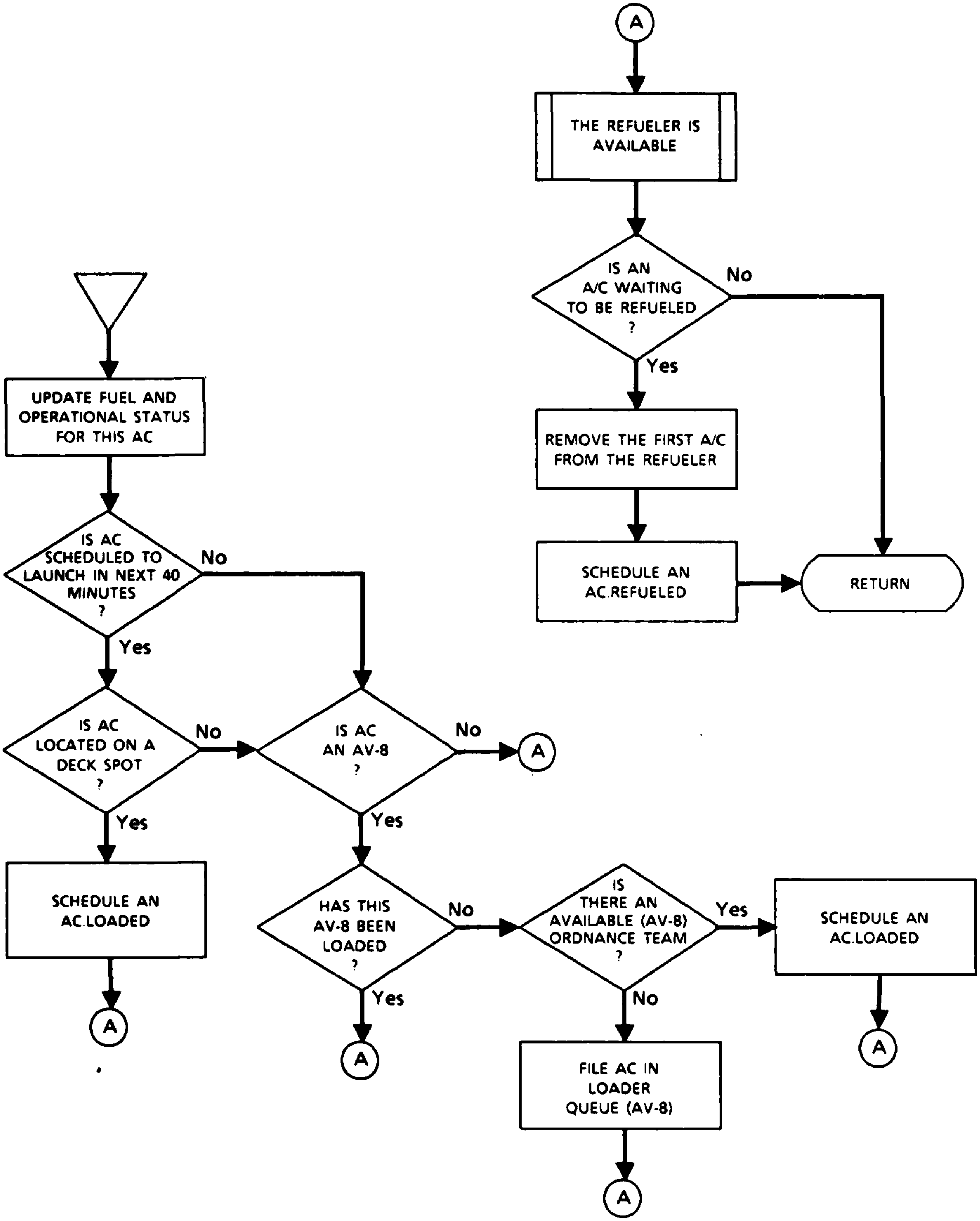
3.1.4 EVENT AC.REFUELED GIVEN AC

The occurrence of this event signals the completion of the refueling process for the aircraft AC. The action that occurs next depends on the type of aircraft that AC is and the launch time of AC.

If AC is an AV-8 and the loading of ordnance has not started, regardless of the next launch time for AC, the next step is to schedule an AC.LOADED event. Although not currently played in the model, these aircraft without launch times can be thought of as aircraft that are being readied for on-call missions.

If AC has a launch time in the next 40 minutes and is located on a deck spot, then it must be a helicopter, because AV-8s are not refueled on deck spots. The next step for this helicopter is to schedule an AC.LOADED event. The loading event will be scheduled to occur no more than 10 minutes prior to the scheduled launch time.

In all cases, a refueler becomes available when an AC.REFUELED event occurs. If an aircraft is waiting to be refueled, it is removed from the refueler queue and an event AC.REFUELED is scheduled.


A
THE REFUELER IS AVAILABLE
IS AN A/C WAITING TO BE REFUELED ?
No
Yes
REMOVE THE FIRST A/C FROM THE REFUELER
SCHEDULE AN AC.REFUELED
RETURN
UPDATE FUEL AND OPERATIONAL STATUS FOR THIS AC
IS AC SCHEDULED TO LAUNCH IN NEXT 40 MINUTES ?
No
Yes
IS AC LOCATED ON A DECK SPOT ?
No
Yes
IS AC AN AV-8 ?
No
A
Yes
SCHEDULE AN AC.LOADED
A
HAS THIS AV-8 BEEN LOADED ?
No
Yes
A
IS THERE AN AVAILABLE (AV-8) ORDNANCE TEAM ?
Yes
No
SCHEDULE AN AC.LOADED
A
FILE AC IN LOADER QUEUE (AV-8)
A

EVENT AC.REFUELED GIVEN AC

3.1.5 EVENT AC.RESPOTTED GIVEN AC

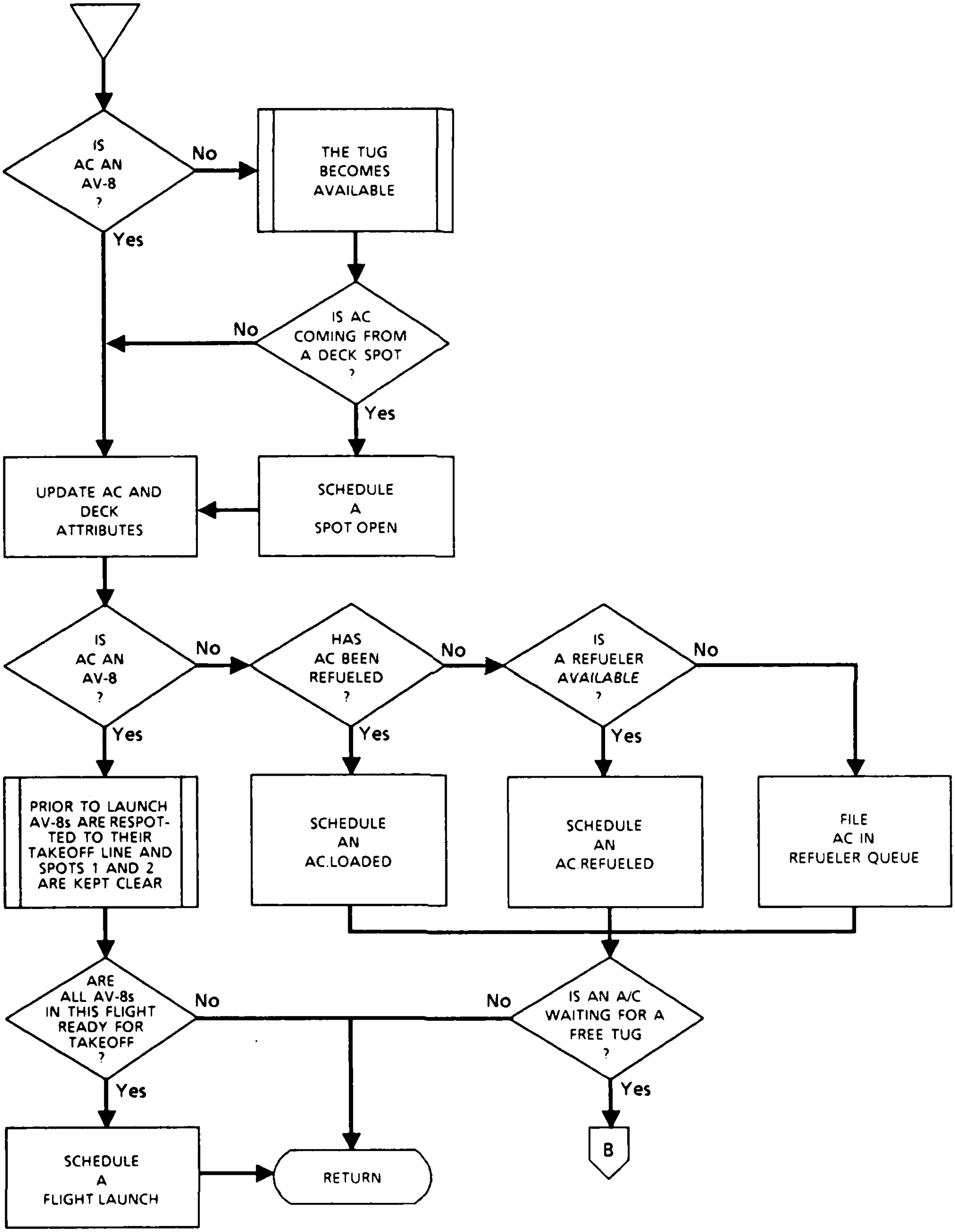
The occurrence of this event signals that AC has arrived at one of the six deck spots from which an aircraft may launch.

If AC is an AV-8, the movement has been made under its own power to the short takeoff line without a tug. The respotted AV-8 has been fueled and loaded, and is ready for takeoff. If both AV-8s in this flight are ready to launch, a FLIGHT.LAUNCH event is scheduled.

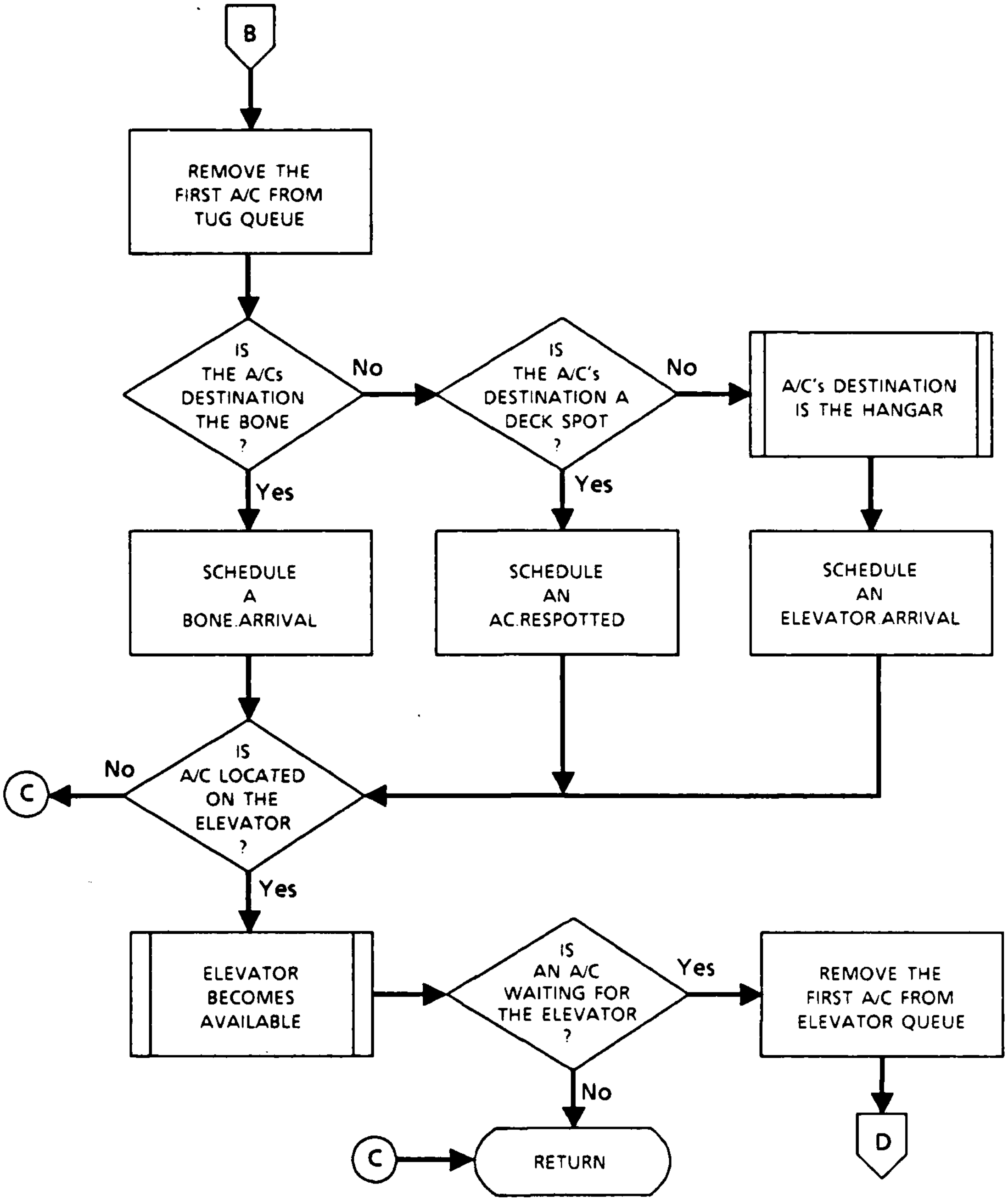
If AC is a helicopter, the movement has been made with a tug, and this tug becomes available to move another aircraft. If the helicopter has not been refueled, then the next event for this helicopter is an AC.REFUELED. If the helicopter has been refueled, the the next event scheduled will be an AC.LOADED. The loading event will be scheduled to occur no more that 10 minutes prior to the helicopter's scheduled launch time.

If there are aircraft waiting for a tug, and a tug is now free, the first aircraft in tug queue is removed from the queue and the appropriate event is scheduled to move it to its destination. If this aircraft was located on the elevator, the elevator becomes available.

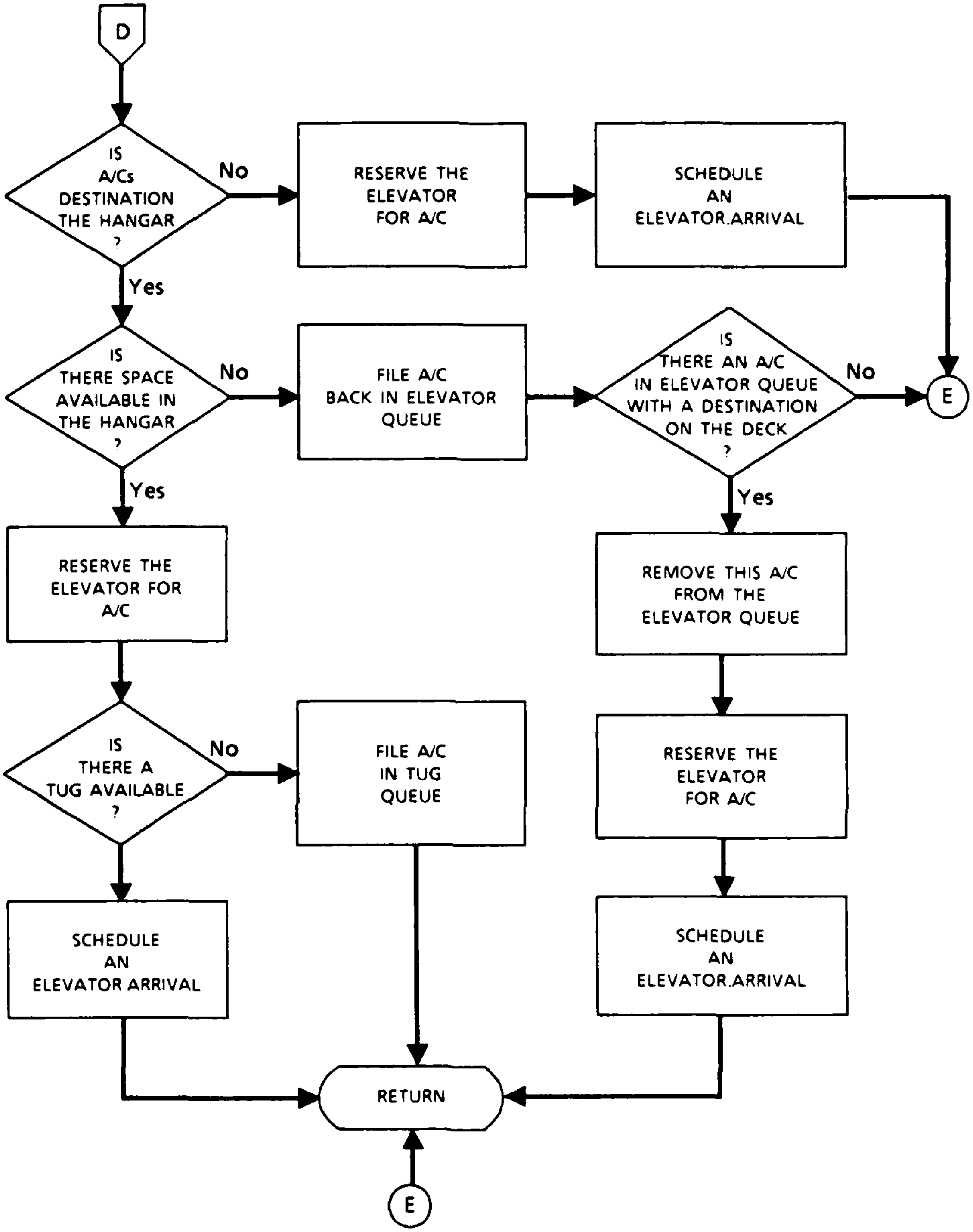
If the elevator is available and there are aircraft waiting in the elevator queue, the first aircraft in the queue whose destination is able to receive it is removed from queue, and an ELEVATOR.ARRIVAL event is scheduled.


IS AC AN AV-8 ?
No
Yes
THE TUG BECOMES AVAILABLE
IS AC COMING FROM A DECK SPOT ?
No
Yes
UPDATE AC AND DECK ATTRIBUTES
SCHEDULE A SPOT OPEN
IS AC AN AV-8 ?
No
Yes
HAS AC BEEN REFUELED ?
No
Yes
IS A REFUELER AVAILABLE ?
No
Yes
PRIOR TO LAUNCH AV-8s ARE RESPOTTED TO THEIR TAKEOFF LINE AND SPOTS 1 AND 2 ARE KEPT CLEAR
SCHEDULE AN AC.LOADED
SCHEDULE AN AC.REFUELED
FILE AC IN REFUELER QUEUE
ARE ALL AV-8s IN THIS FLIGHT READY FOR TAKEOFF ?
No
Yes
IS AN A/C WAITING FOR A FREE TUG ?
No
Yes
SCHEDULE A FLIGHT LAUNCH
RETURN
B

EVENT AC.RESPOTTED GIVEN AC


B
REMOVE THE FIRST A/C FROM TUG QUEUE
IS THE A/Cs DESTINATION THE BONE ?
No
Yes
IS THE A/C's DESTINATION A DECK SPOT ?
No
Yes
A/C's DESTINATION IS THE HANGAR
SCHEDULE A BONE.ARRIVAL
SCHEDULE AN AC.RESPOTTED
SCHEDULE AN ELEVATOR.ARRIVAL
IS A/C LOCATED ON THE ELEVATOR ?
No
C
Yes
ELEVATOR BECOMES AVAILABLE
IS AN A/C WAITING FOR THE ELEVATOR ?
Yes
REMOVE THE FIRST A/C FROM ELEVATOR QUEUE
No
C
RETURN
D

CONTINUED: EVENT AC.RESPOTTED


D
IS A/Cs DESTINATION THE HANGAR ?
No
RESERVE THE ELEVATOR FOR A/C
SCHEDULE AN ELEVATOR.ARRIVAL
Yes
IS THERE SPACE AVAILABLE IN THE HANGAR ?
No
FILE A/C BACK IN ELEVATOR QUEUE
IS THERE AN A/C IN ELEVATOR QUEUE WITH A DESTINATION ON THE DECK ?
No
E
Yes
RESERVE THE ELEVATOR FOR A/C
Yes
REMOVE THIS A/C FROM THE ELEVATOR QUEUE
IS THERE A TUG AVAILABLE ?
No
FILE A/C IN TUG QUEUE
RESERVE THE ELEVATOR FOR A/C
SCHEDULE AN ELEVATOR ARRIVAL
SCHEDULE AN ELEVATOR.ARRIVAL
RETURN
E

CONTINUED: EVENT AC.RESPOTTED

3.1.6 EVENT BONE.ARRIVAL GIVEN AC

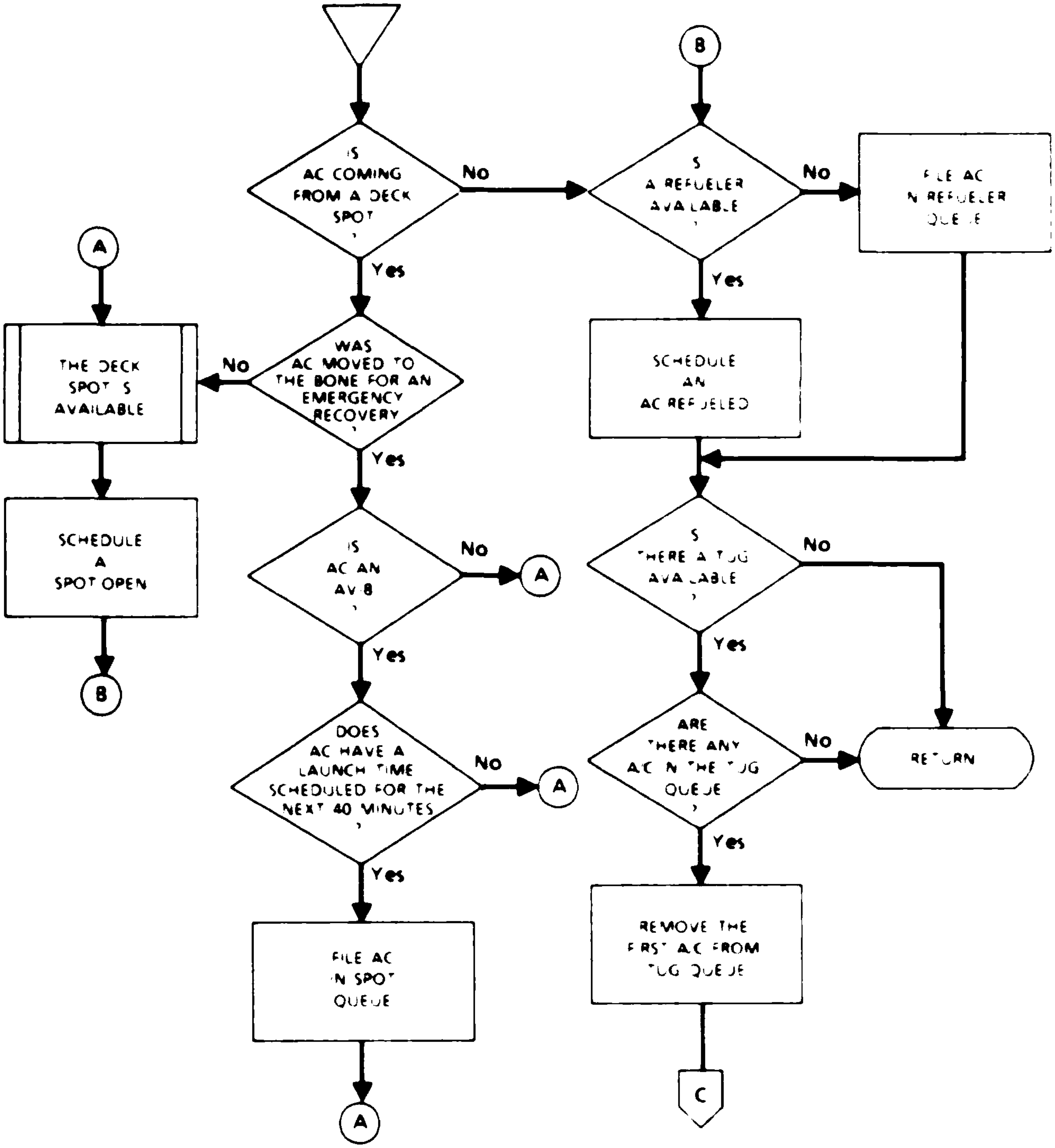
The occurrence of this event signals that AC has respotted to either the forward or aft bone.

If ACs last location was a deck spot, the spot is now available and a SPOT.OPEN event is scheduled.

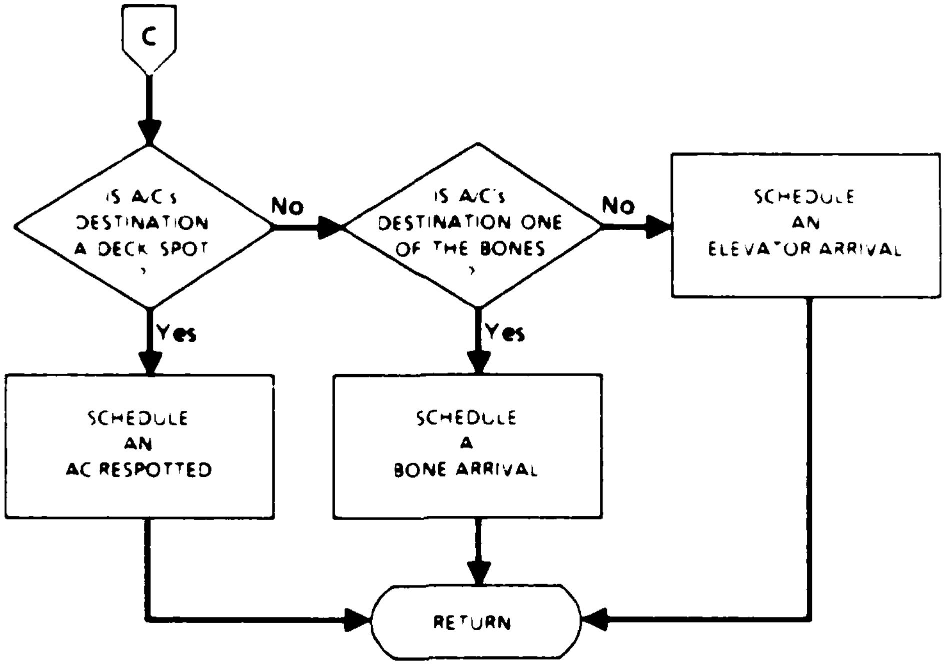
If AC requires fuel and a refueler is available, an event AC.REFUELED is scheduled. Otherwise, AC is filed in the queue to await the next available refueler.

If there are aircraft waiting for a tug, and a tug is now free, the first aircraft in tug queue is removed from the queue and the appropriate event is scheduled to move it to its destination. If this aircraft was located on the elevator, the elevator becomes available.

If the elevator is available and there are aircraft waiting in the elevator queue, the first aircraft in the queue whose destination is able to receive it is removed from queue, and an ELEVATOR.ARRIVAL event is scheduled.


IS AC COMING FROM A DECK SPOT ?
No
IS A REFUELER AVAILABLE ?
No
FILE AC IN REFUELER QUEUE
Yes
SCHEDULE AN AC REFUELED
A
WAS AC MOVED TO THE BONE FOR AN EMERGENCY RECOVERY ?
No
THE DECK SPOT IS AVAILABLE
Yes
SCHEDULE A SPOT OPEN
IS AC AN AV-8 ?
No
A
IS THERE A TUG AVAILABLE ?
No
Yes
B
Yes
DOES AC HAVE A LAUNCH TIME SCHEDULED FOR THE NEXT 40 MINUTES ?
No
A
ARE THERE ANY AC IN THE TUG QUEUE ?
No
RETURN
Yes
Yes
FILE AC IN SPOT QUEUE
REMOVE THE FIRST AC FROM TUG QUEUE
A
C
B

EVENT BONE.ARRIVAL GIVEN AC


C
IS A/C's DESTINATION A DECK SPOT ?
No
IS A/C's DESTINATION ONE OF THE BONES ?
No
SCHEDULE AN ELEVATOR ARRIVAL
Yes
SCHEDULE AN AC RESPOTTED
Yes
SCHEDULE A BONE ARRIVAL
RETURN

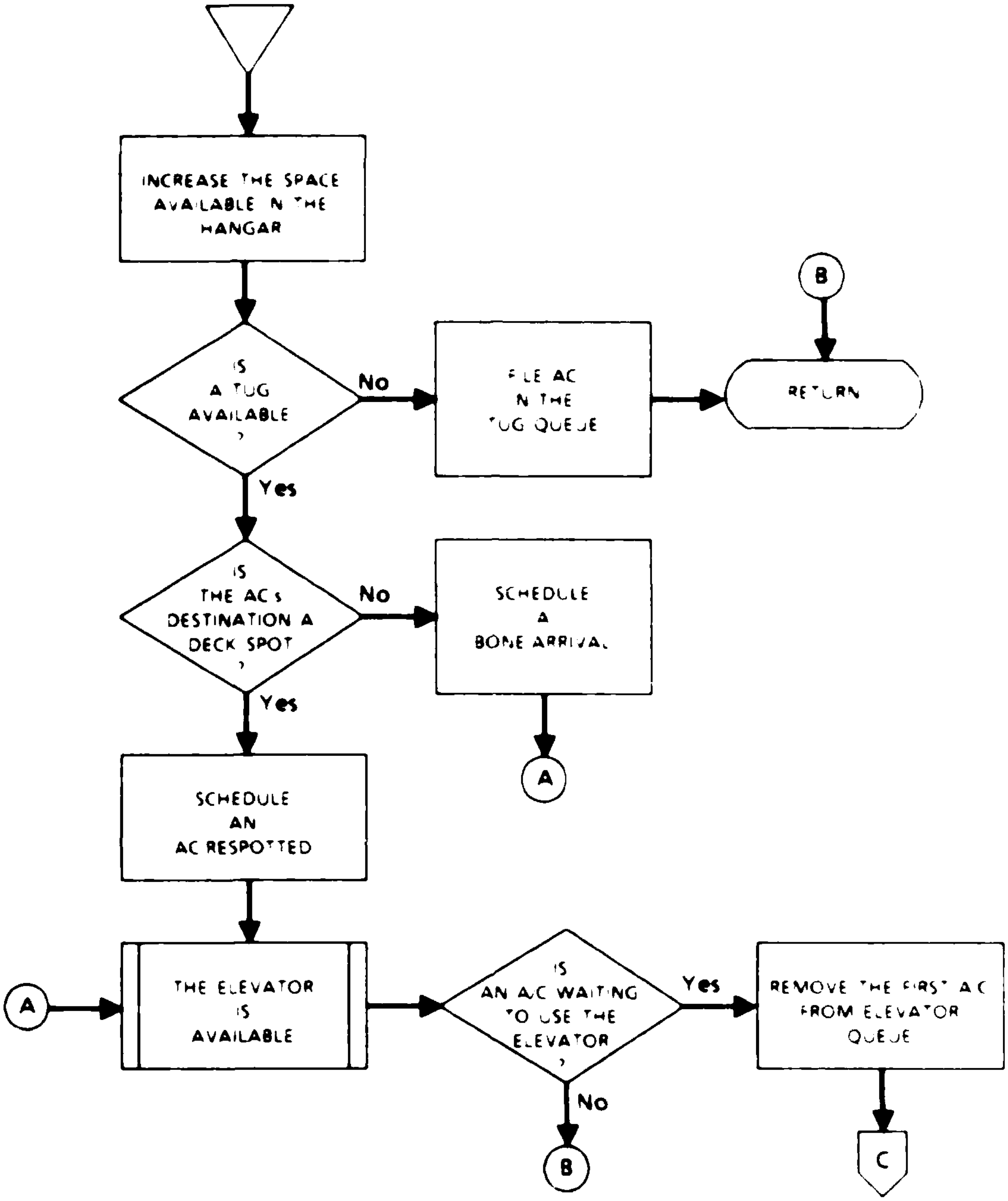
CONTINUED: EVENT BONE.ARRIVAL

3.1.7 EVENT DECK.ARRIVAL GIVEN AC

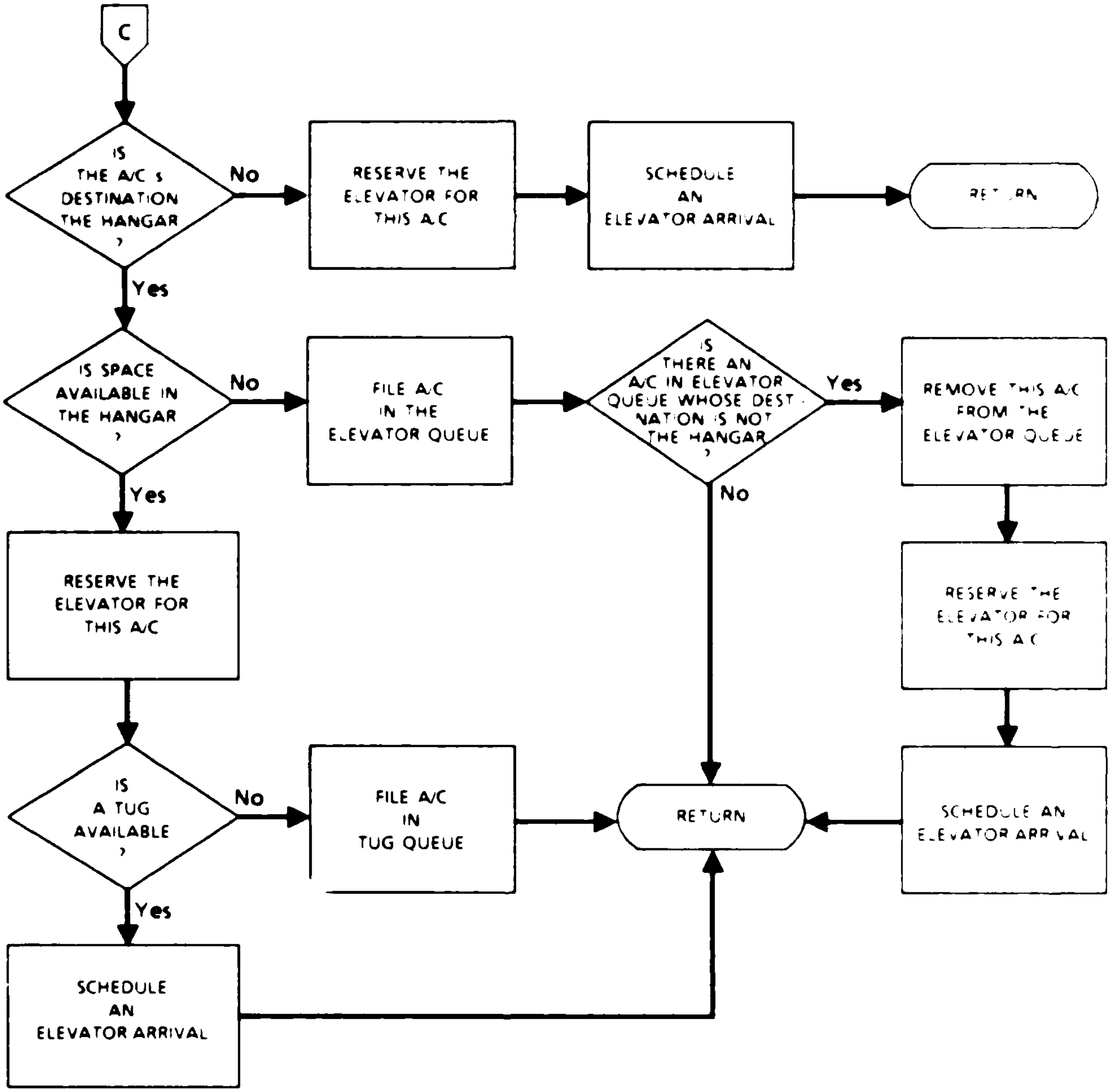
This event occurs when AC has arrived by elevator to the flight deck. In all cases, a tug is required to move AC to and from the elevator. If a tug is available, the event BONE.ARRIVAL or AC.RESPOTTED is scheduled depending on the destination of AC. Also, if a tug is available, the elevator will soon be available, and the elevator queue is checked for waiting aircraft.

If an aircraft is waiting for the elevator, and its destination is the hangar, there must be space available in the hangar. If these conditions are met, the elevator is reserved. If a tug is available, an ELEVATOR.ARRIVAL event is scheduled.

If an aircraft is waiting for the elevator, and its destination is the flight deck, the elevator is reserved and an ELEVATOR.ARRIVAL event is scheduled. (The tug on the hangar deck is assumed to be available whenever the elevator is.)


INCREASE THE SPACE AVAILABLE IN THE HANGAR
IS A TUG AVAILABLE ?
No
FILE AC IN THE TUG QUEUE
RETURN
B
Yes
IS THE AC's DESTINATION A DECK SPOT ?
No
SCHEDULE A BONE ARRIVAL
A
Yes
SCHEDULE AN AC RESPOTTED
A
THE ELEVATOR IS AVAILABLE
IS AN A/C WAITING TO USE THE ELEVATOR ?
Yes
REMOVE THE FIRST A/C FROM ELEVATOR QUEUE
No
B
C

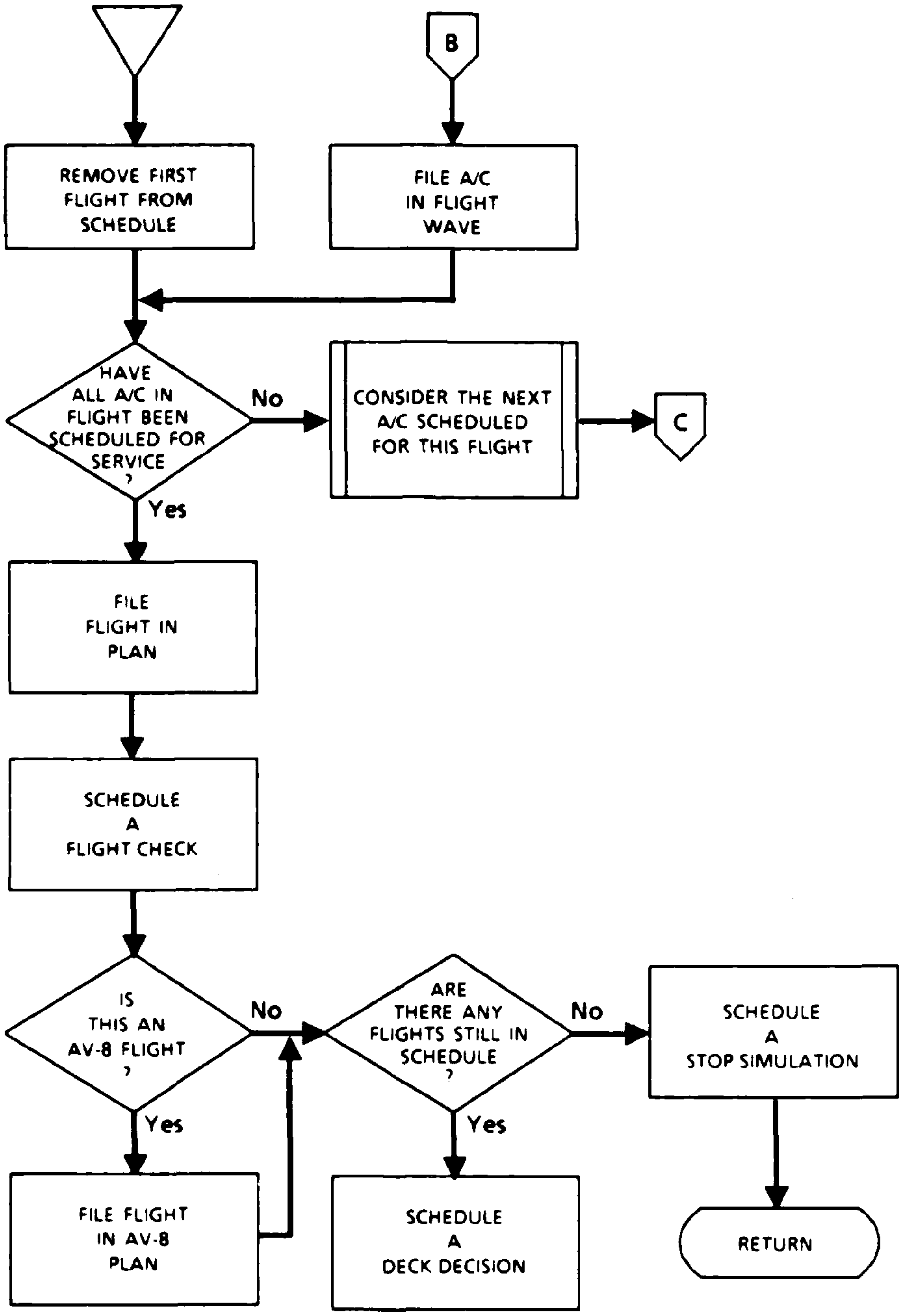
EVENT DECK.ARRIVAL GIVEN AC


C
IS THE A/C's DESTINATION THE HANGAR ?
No
RESERVE THE ELEVATOR FOR THIS A/C
SCHEDULE AN ELEVATOR ARRIVAL
RETURN
Yes
IS SPACE AVAILABLE IN THE HANGAR ?
No
FILE A/C IN THE ELEVATOR QUEUE
IS THERE AN A/C IN ELEVATOR QUEUE WHOSE DESTINATION IS NOT THE HANGAR ?
Yes
REMOVE THIS A/C FROM THE ELEVATOR QUEUE
No
Yes
RESERVE THE ELEVATOR FOR THIS A/C
RESERVE THE ELEVATOR FOR THIS A/C
IS A TUG AVAILABLE ?
No
FILE A/C IN TUG QUEUE
RETURN
SCHEDULE AN ELEVATOR ARRIVAL
Yes
SCHEDULE AN ELEVATOR ARRIVAL

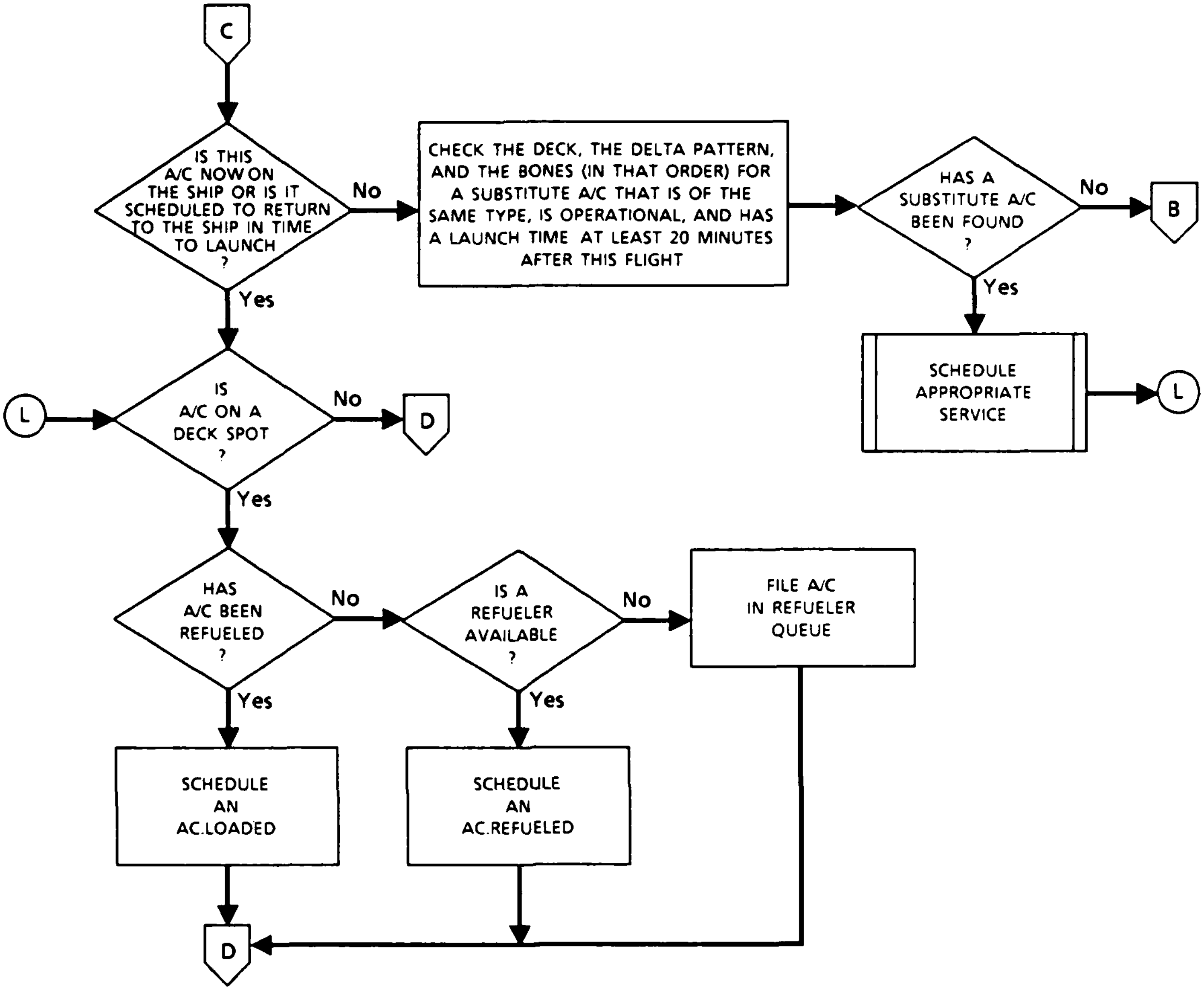
CONTINUED: EVENT DECK.ARRIVAL

3.1.8 EVENT DECK.DECISION GIVEN FLIGHT

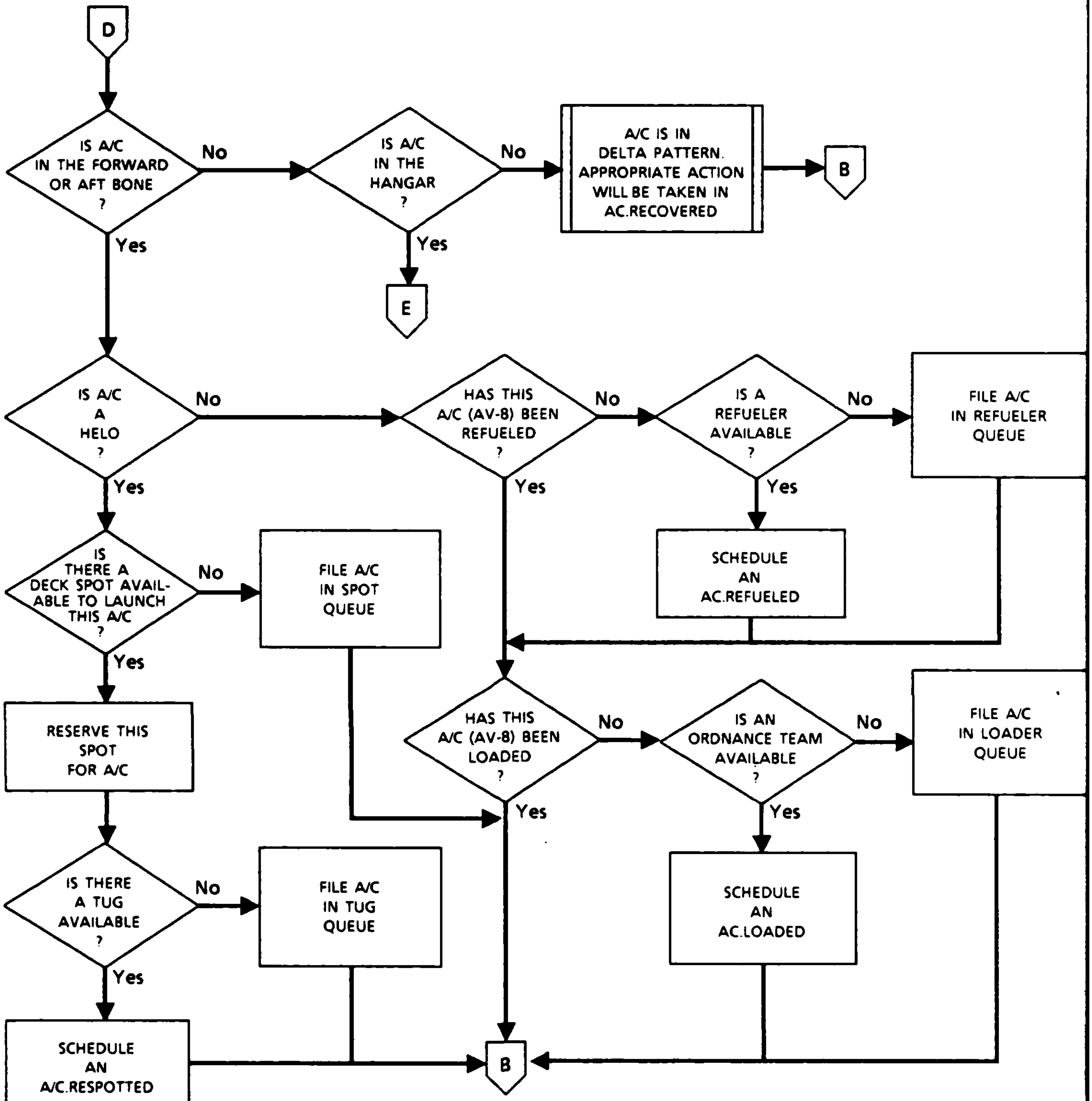
The primary function of this event is to ensure that aircraft with approaching launch times are preparing to launch. If an aircraft is not likely to be ready, it is replaced with another aircraft if one is available. The checking of aircraft statuses takes place 40 minutes prior to the scheduled launch time. If an aircraft has not begun making the necessary preparations, the appropriate event(s) are scheduled.


B
REMOVE FIRST FLIGHT FROM SCHEDULE
FILE A/C IN FLIGHT WAVE
HAVE ALL A/C IN FLIGHT BEEN SCHEDULED FOR SERVICE ?
No
CONSIDER THE NEXT A/C SCHEDULED FOR THIS FLIGHT
C
Yes
FILE FLIGHT IN PLAN
SCHEDULE A FLIGHT CHECK
IS THIS AN AV-8 FLIGHT ?
No
ARE THERE ANY FLIGHTS STILL IN SCHEDULE ?
No
SCHEDULE A STOP SIMULATION
Yes
FILE FLIGHT IN AV-8 PLAN
Yes
SCHEDULE A DECK DECISION
RETURN

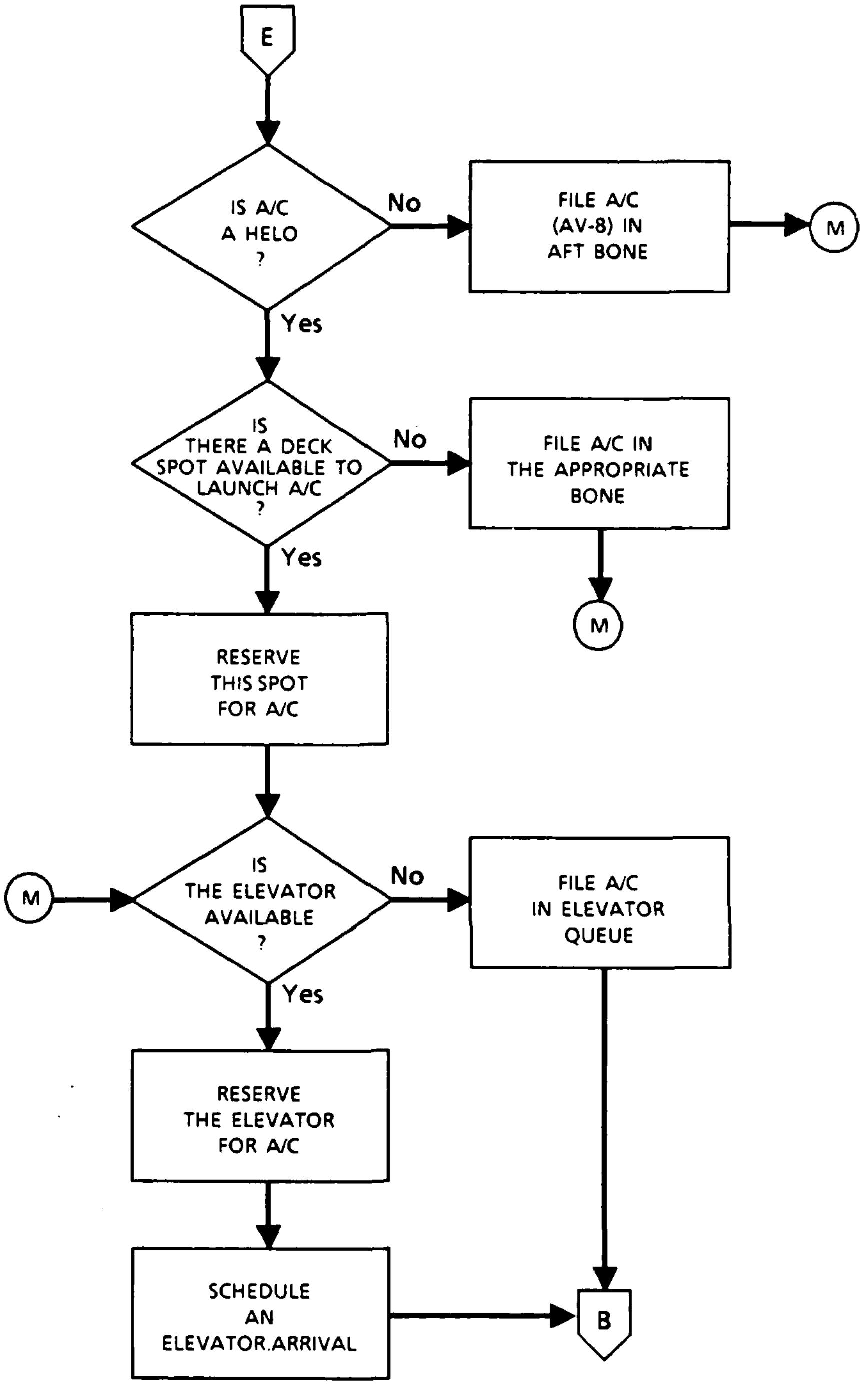
EVENT DECK.DECISION GIVEN FLIGHT


C
IS THIS A/C NOW ON THE SHIP OR IS IT SCHEDULED TO RETURN TO THE SHIP IN TIME TO LAUNCH ?
No
CHECK THE DECK, THE DELTA PATTERN, AND THE BONES (IN THAT ORDER) FOR A SUBSTITUTE A/C THAT IS OF THE SAME TYPE, IS OPERATIONAL, AND HAS A LAUNCH TIME AT LEAST 20 MINUTES AFTER THIS FLIGHT
HAS A SUBSTITUTE A/C BEEN FOUND ?
No
B
Yes
SCHEDULE APPROPRIATE SERVICE
L
Yes
L
IS A/C ON A DECK SPOT ?
No
D
Yes
HAS A/C BEEN REFUELED ?
No
IS A REFUELER AVAILABLE ?
No
FILE A/C IN REFUELER QUEUE
Yes
SCHEDULE AN AC.LOADED
Yes
SCHEDULE AN AC.REFUELED
D

CONTINUED: EVENT DECK.DECISION


D
IS A/C IN THE FORWARD OR AFT BONE ?
No
IS A/C IN THE HANGAR ?
No
A/C IS IN DELTA PATTERN. APPROPRIATE ACTION WILL BE TAKEN IN AC.RECOVERED
B
Yes
Yes
E
IS A/C A HELO ?
No
HAS THIS A/C (AV-8) BEEN REFUELED ?
No
IS A REFUELER AVAILABLE ?
No
FILE A/C IN REFUELER QUEUE
Yes
Yes
Yes
IS THERE A DECK SPOT AVAIL-ABLE TO LAUNCH THIS A/C ?
No
FILE A/C IN SPOT QUEUE
SCHEDULE AN AC.REFUELED
Yes
RESERVE THIS SPOT FOR A/C
HAS THIS A/C (AV-8) BEEN LOADED ?
No
IS AN ORDNANCE TEAM AVAILABLE ?
No
FILE A/C IN LOADER QUEUE
Yes
Yes
IS THERE A TUG AVAILABLE ?
No
FILE A/C IN TUG QUEUE
SCHEDULE AN AC.LOADED
Yes
SCHEDULE AN A/C.RESPOTTED
B

CONTINUED: EVENT DECK.DECISION


E
IS A/C A HELO ?
No
FILE A/C (AV-8) IN AFT BONE
M
Yes
IS THERE A DECK SPOT AVAILABLE TO LAUNCH A/C ?
No
FILE A/C IN THE APPROPRIATE BONE
M
Yes
RESERVE THIS SPOT FOR A/C
M
IS THE ELEVATOR AVAILABLE ?
No
FILE A/C IN ELEVATOR QUEUE
Yes
RESERVE THE ELEVATOR FOR A/C
SCHEDULE AN ELEVATOR.ARRIVAL
B

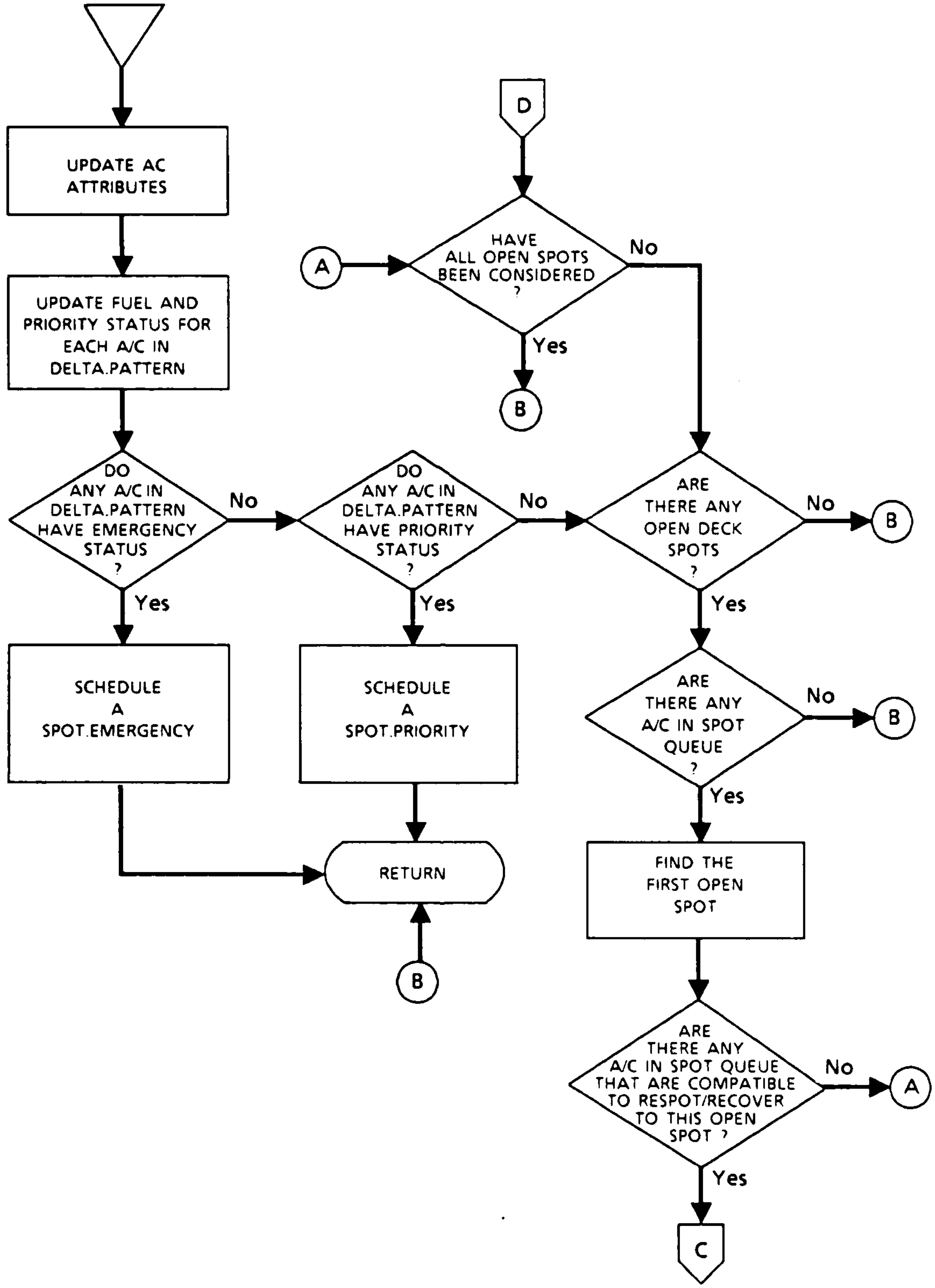
CONTINUED: EVENT DECK.DECISION

3.1.9 EVENT DELTA.ARRIVAL GIVEN AC

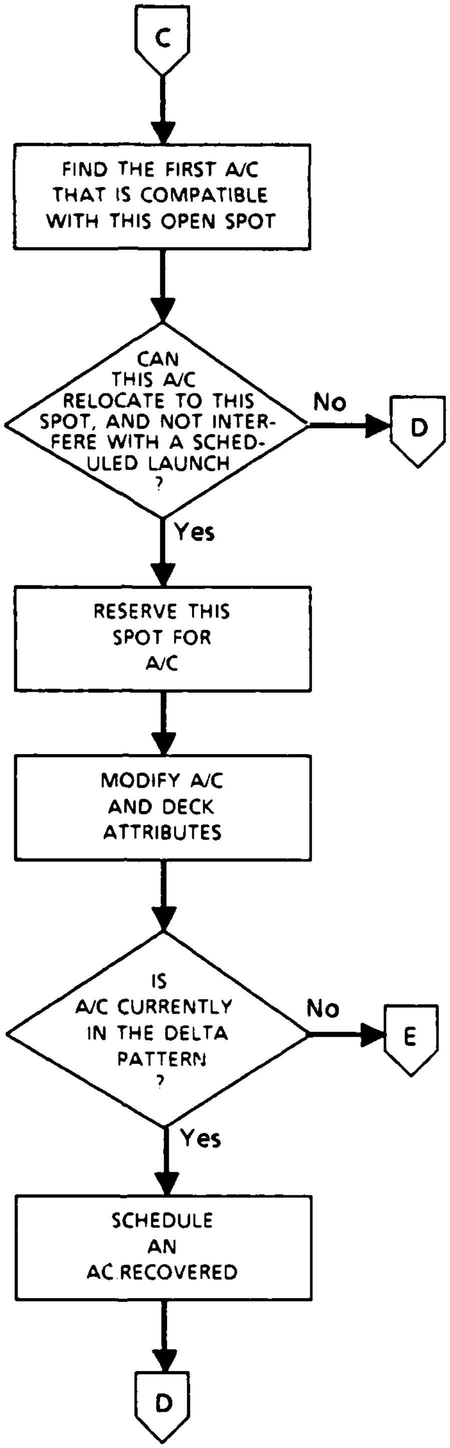
This event occurs when AC has completed its mission and returned to the ship's vicinity for recovery. AC enters the holding (delta) pattern to await clearance to land. The fuel status of each aircraft in the delta pattern is updated and checked to see if it entitles the aircraft for priority or emergency treatment.

If an aircraft is qualified for special treatment, either event SPOT.EMERGENCY or SPOT.PRIORITY , as appropriate, is scheduled.

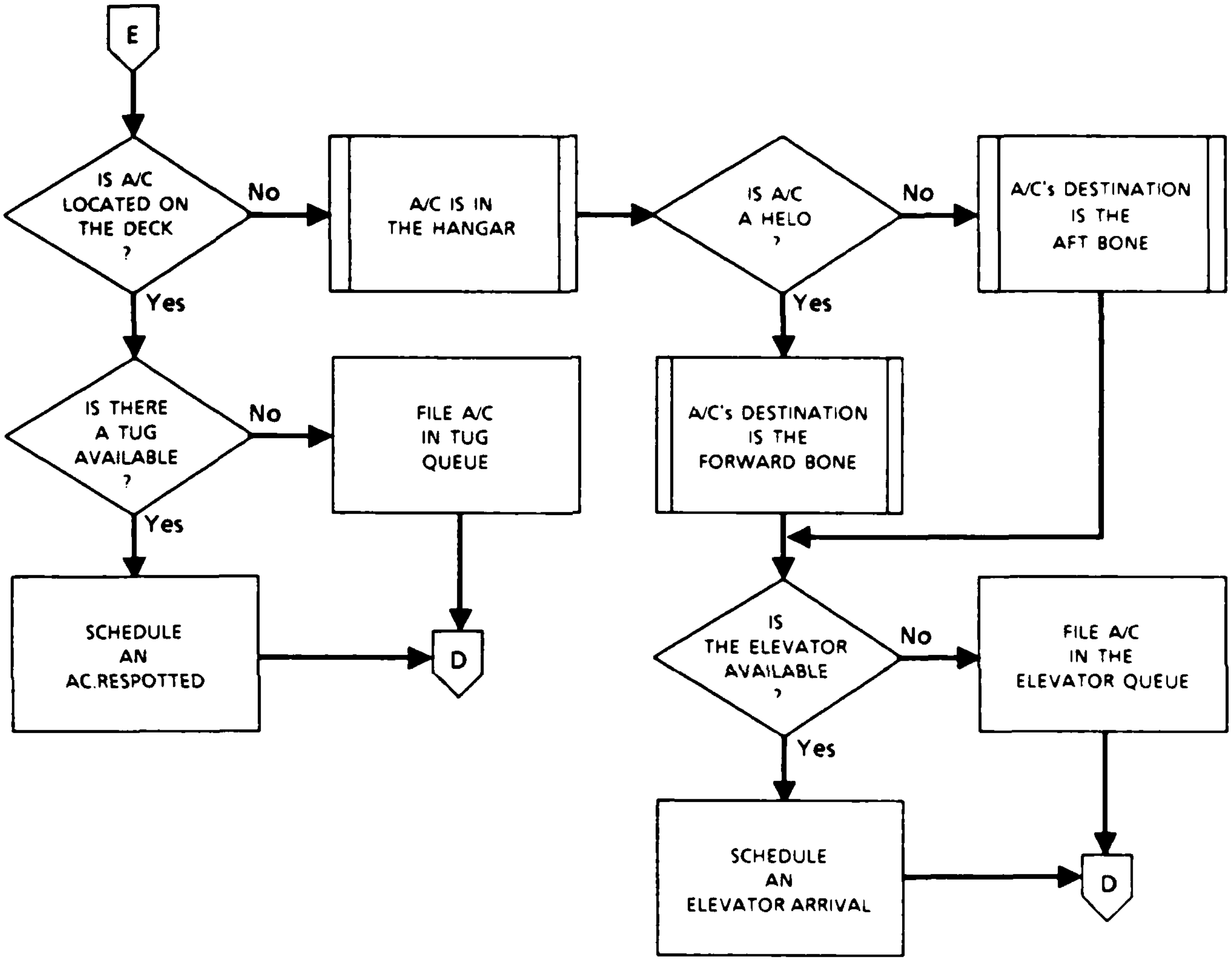
If no aircraft qualifies for special treatment, aircraft in the spot queue are considered for recovery or respotting to any open spots. Any aircraft that are compatible with an open spot, and will not interfere with another aircraft's launch are scheduled for an AC.RECOVERED or AC.RESPOTTED event.


UPDATE AC ATTRIBUTES
UPDATE FUEL AND PRIORITY STATUS FOR EACH A/C IN DELTA.PATTERN
DO ANY A/C IN DELTA.PATTERN HAVE EMERGENCY STATUS ?
No
Yes
SCHEDULE A SPOT.EMERGENCY
DO ANY A/C IN DELTA.PATTERN HAVE PRIORITY STATUS ?
No
Yes
SCHEDULE A SPOT.PRIORITY
RETURN
B
D
A
HAVE ALL OPEN SPOTS BEEN CONSIDERED ?
No
Yes
B
ARE THERE ANY OPEN DECK SPOTS ?
No
B
Yes
ARE THERE ANY A/C IN SPOT QUEUE ?
No
B
Yes
FIND THE FIRST OPEN SPOT
ARE THERE ANY A/C IN SPOT QUEUE THAT ARE COMPATIBLE TO RESPOT/RECOVER TO THIS OPEN SPOT ?
No
A
Yes
C

EVENT DELTA.ARRIVAL GIVEN AC


C
FIND THE FIRST A/C THAT IS COMPATIBLE WITH THIS OPEN SPOT
CAN THIS A/C RELOCATE TO THIS SPOT, AND NOT INTERFERE WITH A SCHEDULED LAUNCH ?
No
D
Yes
RESERVE THIS SPOT FOR A/C
MODIFY A/C AND DECK ATTRIBUTES
IS A/C CURRENTLY IN THE DELTA PATTERN ?
No
E
Yes
SCHEDULE AN AC.RECOVERED
D

(CONTINUED)
EVENT DELTA.ARRIVAL GIVEN AC

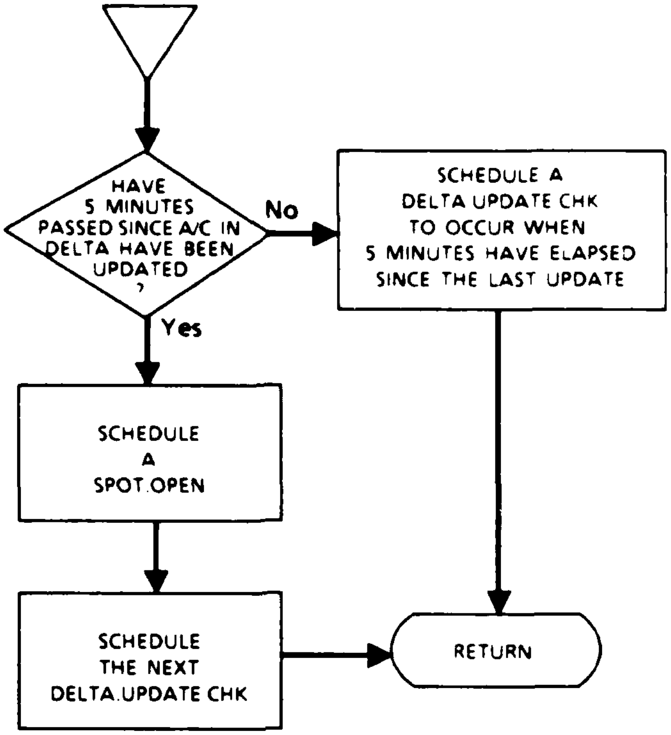

E
IS A/C LOCATED ON THE DECK ?
No
Yes
A/C IS IN THE HANGAR
IS A/C A HELO ?
No
Yes
A/C's DESTINATION IS THE AFT BONE
IS THERE A TUG AVAILABLE ?
No
Yes
FILE A/C IN TUG QUEUE
A/C's DESTINATION IS THE FORWARD BONE
SCHEDULE AN AC.RESPOTTED
D
IS THE ELEVATOR AVAILABLE ?
No
Yes
FILE A/C IN THE ELEVATOR QUEUE
SCHEDULE AN ELEVATOR ARRIVAL
D

(CONTINUED) EVENT DELTA.ARRIVAL

3.1.10 EVENT DELTA.UPDATE.CHK

This event occurs at least once every five minutes. Its purpose is to ensure that the fuel levels of aircraft in the delta pattern are remaining at safe levels. It accomplishes this by ensuring that the delta update algorithm in the DELTA.ARRIVAL and SPOT.OPEN events is activated at least once every five minutes.

If five minutes have passed since the last update, a SPOT.OPEN event is scheduled.


HAVE 5 MINUTES PASSED SINCE A/C IN DELTA HAVE BEEN UPDATED ?
No
SCHEDULE A DELTA UPDATE CHK TO OCCUR WHEN 5 MINUTES HAVE ELAPSED SINCE THE LAST UPDATE
Yes
SCHEDULE A SPOT.OPEN
SCHEDULE THE NEXT DELTA.UPDATE CHK
RETURN

EVENT DELTA.UPDATE.CHK

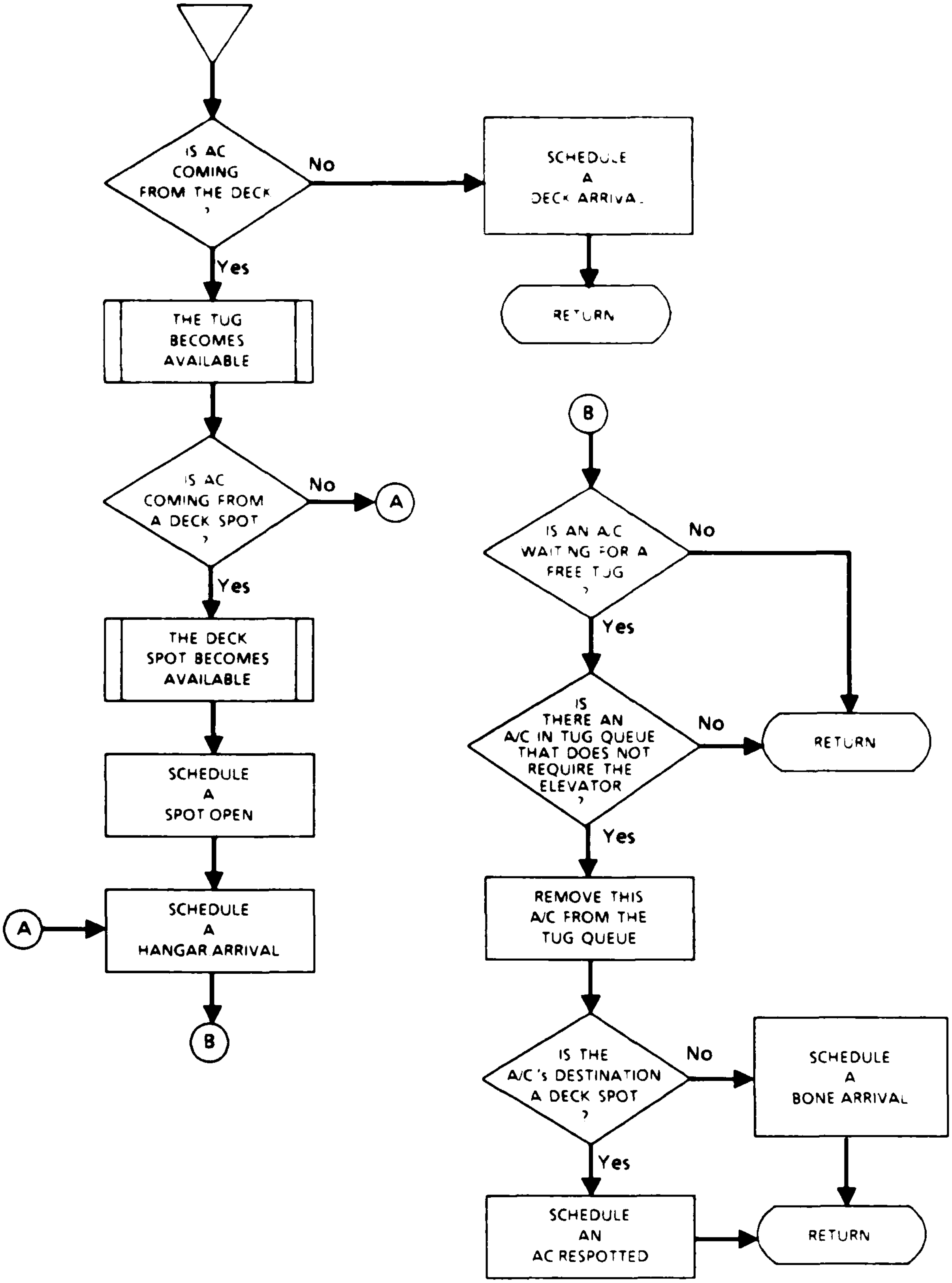
3.1.11 EVENT ELEVATOR.ARRIVAL GIVEN AC

This event occurs when the aircraft AC has been respotted to the elevator and tied down before the movement between the hangar and flight decks.

If AC is going to the hangar deck, a tug becomes available, and a HANGAR.ARRIVAL event is scheduled. If AC is coming from a deck spot, the deck spot becomes available and a SPOT.OPEN event is scheduled.

If AC is going to the flight deck, a DECK.ARRIVAL event is scheduled.

If there are aircraft waiting for a tug, and a tug is now free, the first aircraft in tug queue is removed from the queue and the appropriate event is scheduled to move it to its destination.


IS AC COMING FROM THE DECK ?
No
SCHEDULE A DECK ARRIVAL
RETURN
Yes
THE TUG BECOMES AVAILABLE
IS AC COMING FROM A DECK SPOT ?
No
A
Yes
THE DECK SPOT BECOMES AVAILABLE
SCHEDULE A SPOT OPEN
A
SCHEDULE A HANGAR ARRIVAL
B
B
IS AN A/C WAITING FOR A FREE TUG ?
No
Yes
IS THERE AN A/C IN TUG QUEUE THAT DOES NOT REQUIRE THE ELEVATOR ?
No
RETURN
Yes
REMOVE THIS A/C FROM THE TUG QUEUE
IS THE A/C's DESTINATION A DECK SPOT ?
No
SCHEDULE A BONE ARRIVAL
Yes
SCHEDULE AN AC RESPOTTED
RETURN

EVENT ELEVATOR.ARRIVAL GIVEN AC

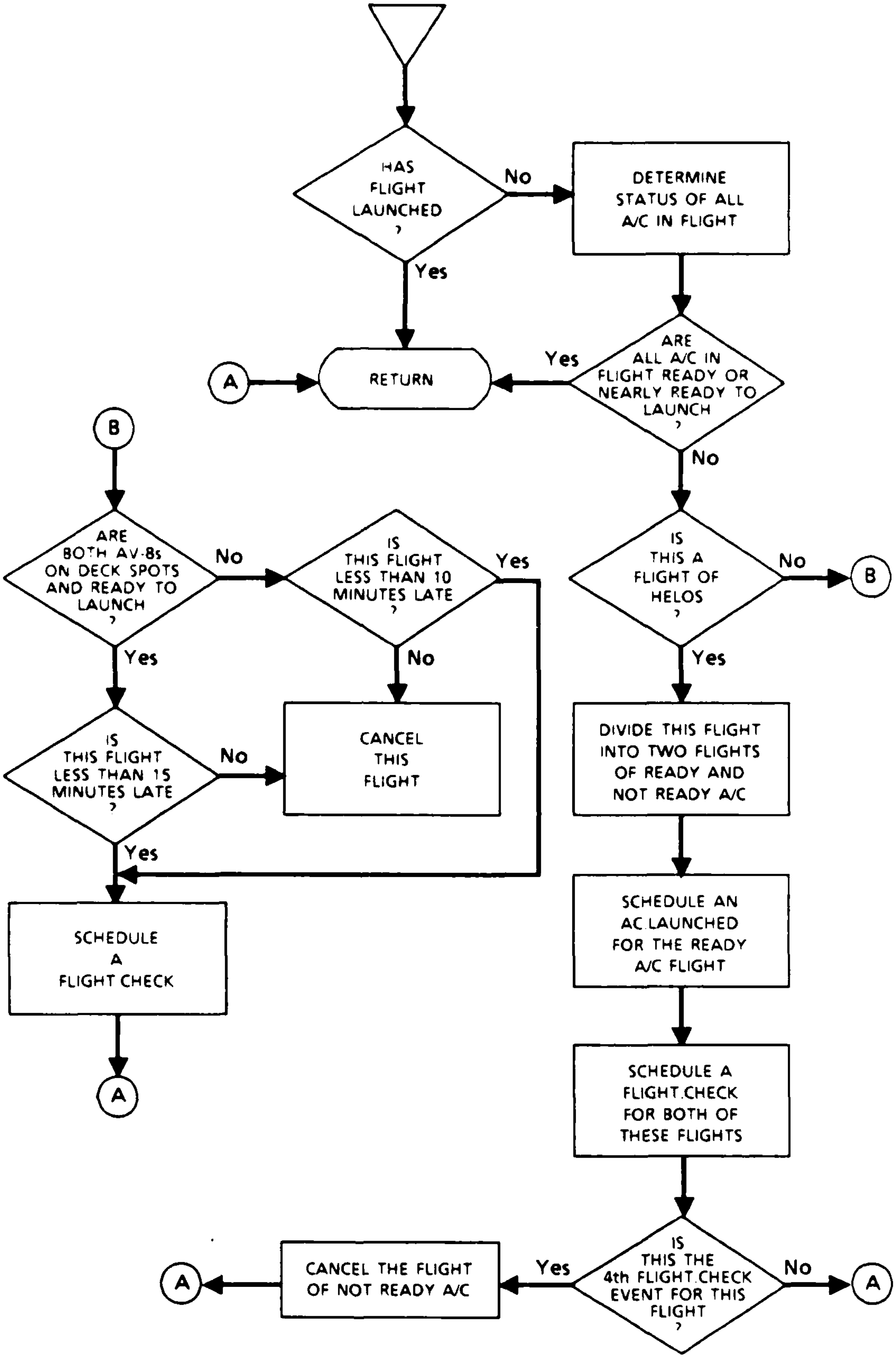
3.1.12 EVENT FLIGHT.CHECK GIVEN FLIGHT

The function of this event is to check whether or not a flight has launched, and if it has not, determine whether or not it should be cancelled. This event is scheduled in event DECK.DECISION, and occurs shortly after the scheduled launch time of FLIGHT.

If this is a flight of helicopters, the aircraft ready for takeoff will be launched at this point. If this is the fourth time that a FLIGHT.CHECK event has occurred for this FLIGHT, the aircraft that are not on deck in the final stages of preparation will have their launch times cancelled.

If this is a flight of AV-8s, both aircraft in the flight must be ready prior to launching the flight, because AV-8s always fly in groups of two. After a certain amount of time past the scheduled launch time, the flight will be cancelled.

If the flight has not been cancelled, another event FLIGHT.CHECK is scheduled.

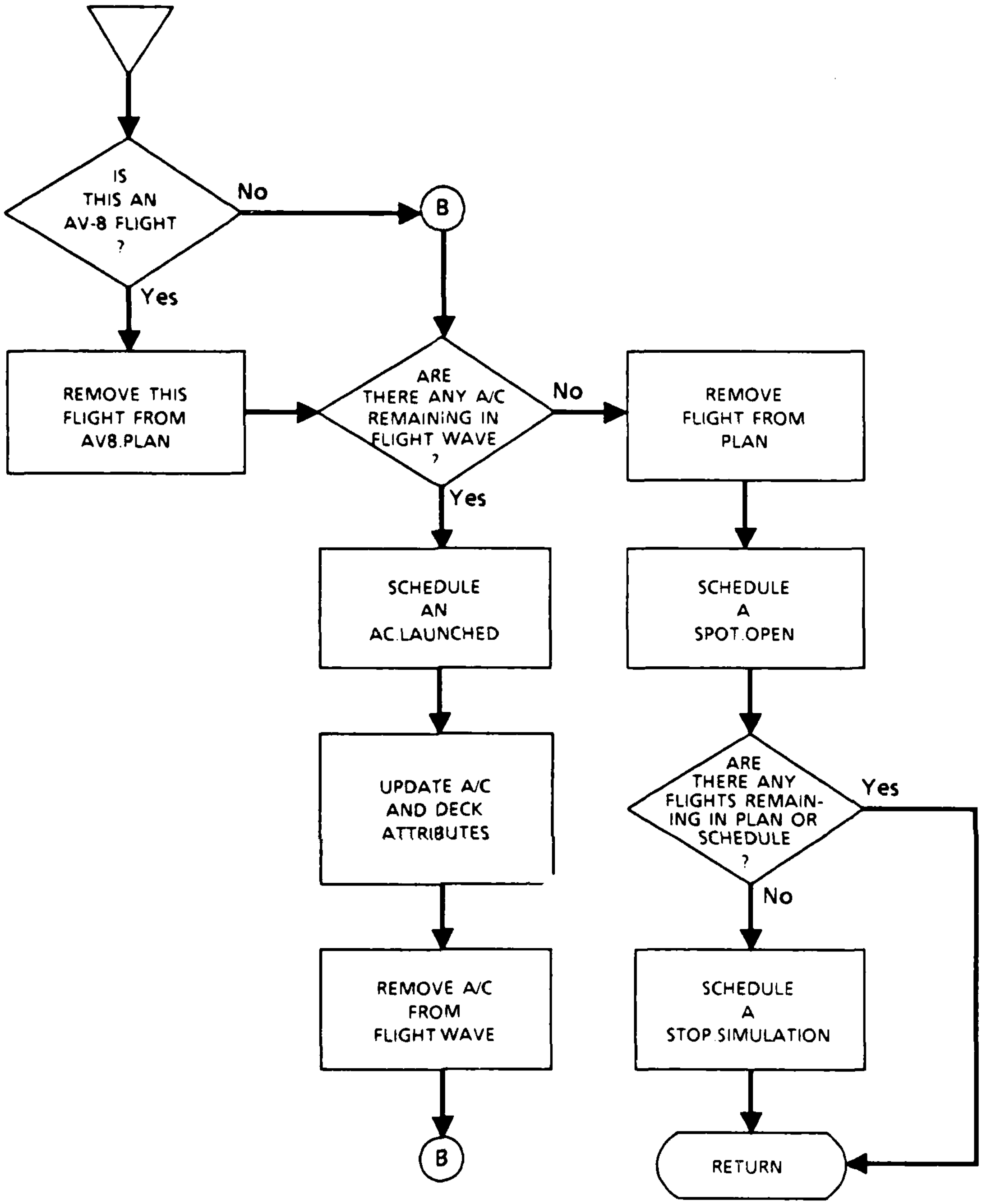

HAS FLIGHT LAUNCHED ?
No
DETERMINE STATUS OF ALL A/C IN FLIGHT
Yes
A
RETURN
Yes
ARE ALL A/C IN FLIGHT READY OR NEARLY READY TO LAUNCH ?
B
No
ARE BOTH AV-8s ON DECK SPOTS AND READY TO LAUNCH ?
No
IS THIS FLIGHT LESS THAN 10 MINUTES LATE ?
Yes
IS THIS A FLIGHT OF HELOS ?
No
B
Yes
No
Yes
IS THIS FLIGHT LESS THAN 15 MINUTES LATE ?
No
CANCEL THIS FLIGHT
DIVIDE THIS FLIGHT INTO TWO FLIGHTS OF READY AND NOT READY A/C
Yes
SCHEDULE A FLIGHT CHECK
SCHEDULE AN AC.LAUNCHED FOR THE READY A/C FLIGHT
A
SCHEDULE A FLIGHT.CHECK FOR BOTH OF THESE FLIGHTS
A
CANCEL THE FLIGHT OF NOT READY A/C
Yes
IS THIS THE 4th FLIGHT.CHECK EVENT FOR THIS FLIGHT ?
No
A

EVENT FLIGHT.CHECK GIVEN FLIGHT

3.1.13 EVENT FLIGHT.LAUNCH GIVEN FLIGHT

This event occurs when all aircraft scheduled to launch in this flight have completed refueling and loading, and are ready on deck spots to launch. Each aircraft in the flight has an event AC.LAUNCHED scheduled, and an event SPOT.OPEN is scheduled to follow the launch of the last aircraft in this flight.

If this was the last flight in the PLAN or SCHEDULE, an event STOP.SIMULATION is scheduled.


IS THIS AN AV-8 FLIGHT ?
No
B
Yes
REMOVE THIS FLIGHT FROM AV8.PLAN
ARE THERE ANY A/C REMAINING IN FLIGHT WAVE ?
No
REMOVE FLIGHT FROM PLAN
Yes
SCHEDULE AN AC.LAUNCHED
SCHEDULE A SPOT.OPEN
UPDATE A/C AND DECK ATTRIBUTES
ARE THERE ANY FLIGHTS REMAINING IN PLAN OR SCHEDULE ?
Yes
No
REMOVE A/C FROM FLIGHT WAVE
SCHEDULE A STOP.SIMULATION
B
RETURN

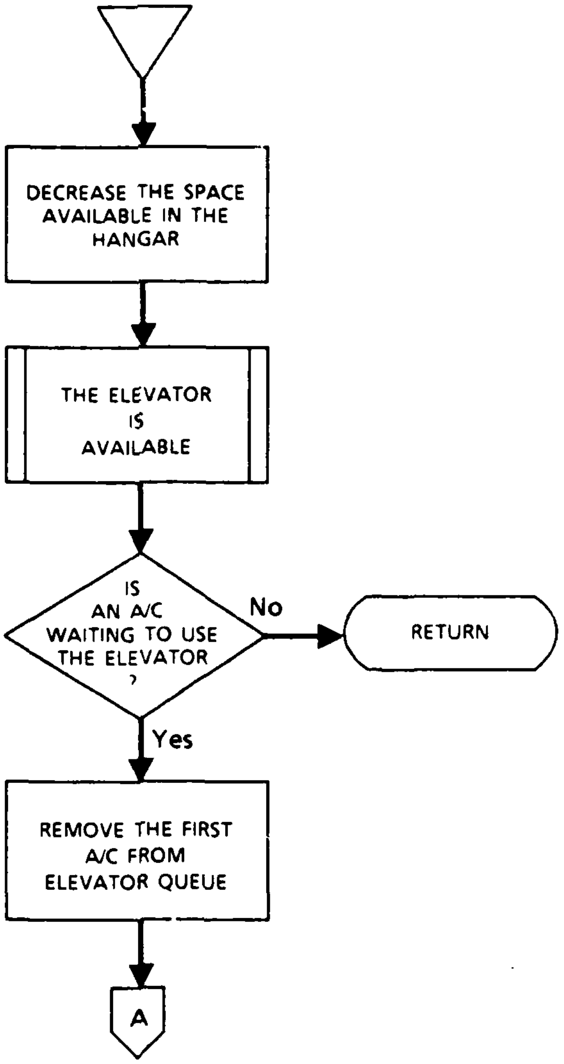
EVENT FLIGHT.LAUNCH GIVEN FLIGHT

3.1.14 EVENT HANGAR.ARRIVAL GIVEN AC

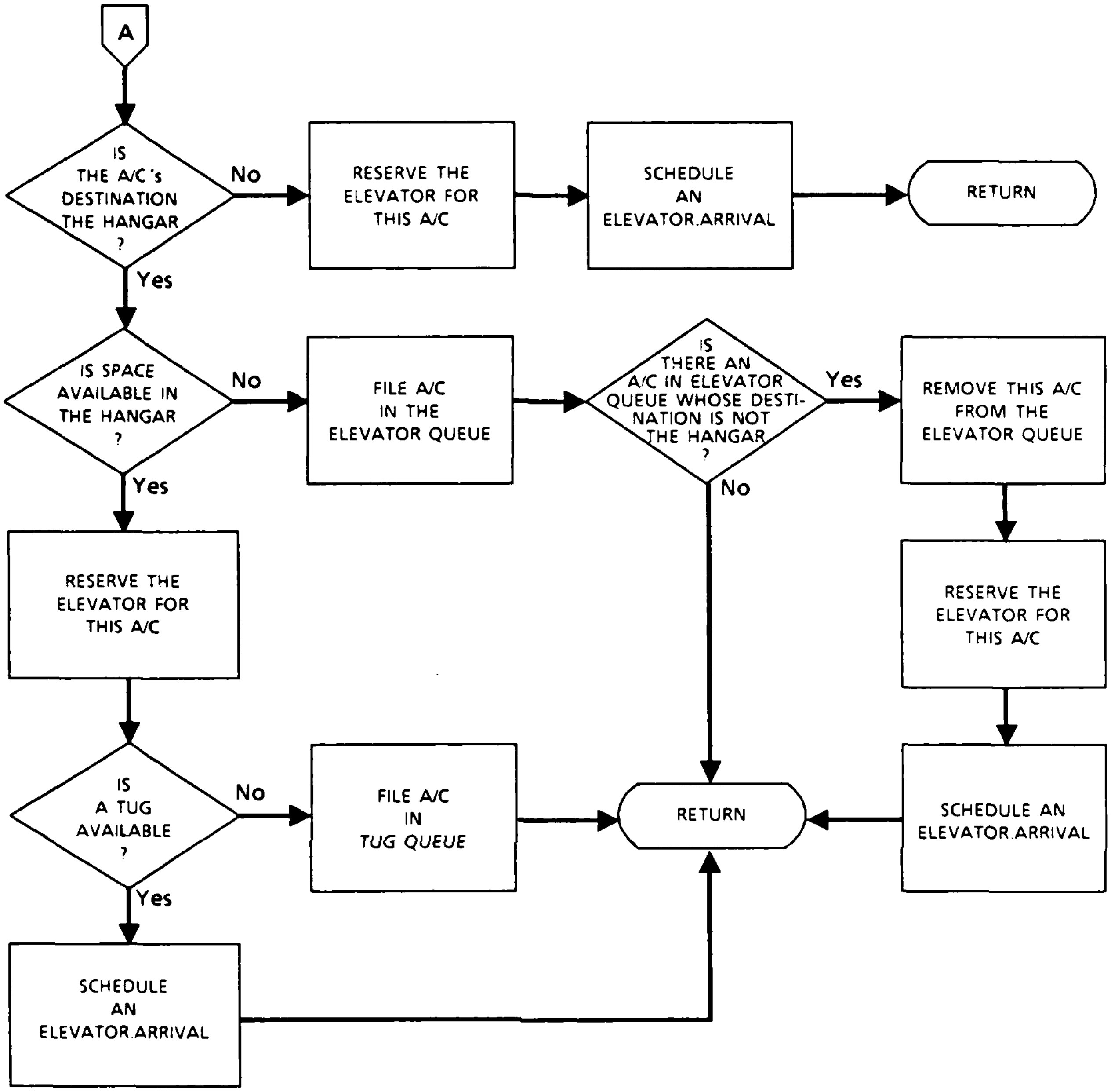
This event occurs when AC has arrived by elevator to the hangar deck. The hangar deck's tug is always available to remove aircraft from the elevator, so the elevator will soon become available, and the elevator queue is checked for waiting aircraft.

If an aircraft is waiting for the elevator, and its destination is the hangar, the hangar is checked to determine if there is space available. If these conditions are met, the elevator is reserved. If a tug is available, an ELEVATOR.ARRIVAL event is scheduled.

If an aircraft is waiting for the elevator, and its destination is the flight deck, the elevator is reserved and an ELEVATOR.ARRIVAL event is scheduled. (The tug on the hangar deck is assumed to be available whenever the elevator is.)


DECREASE THE SPACE AVAILABLE IN THE HANGAR
THE ELEVATOR IS AVAILABLE
IS AN A/C WAITING TO USE THE ELEVATOR ?
No
RETURN
Yes
REMOVE THE FIRST A/C FROM ELEVATOR QUEUE
A

EVENT HANGAR.ARRIVAL GIVEN AC


A
IS THE A/C's DESTINATION THE HANGAR ?
No
RESERVE THE ELEVATOR FOR THIS A/C
SCHEDULE AN ELEVATOR.ARRIVAL
RETURN
Yes
IS SPACE AVAILABLE IN THE HANGAR ?
No
FILE A/C IN THE ELEVATOR QUEUE
IS THERE AN A/C IN ELEVATOR QUEUE WHOSE DESTINATION IS NOT THE HANGAR ?
Yes
REMOVE THIS A/C FROM THE ELEVATOR QUEUE
No
Yes
RESERVE THE ELEVATOR FOR THIS A/C
RESERVE THE ELEVATOR FOR THIS A/C
IS A TUG AVAILABLE ?
No
FILE A/C IN *TUG QUEUE*
RETURN
SCHEDULE AN ELEVATOR.ARRIVAL
Yes
SCHEDULE AN ELEVATOR.ARRIVAL

CONTINUED: EVENT HANGAR.ARRIVAL

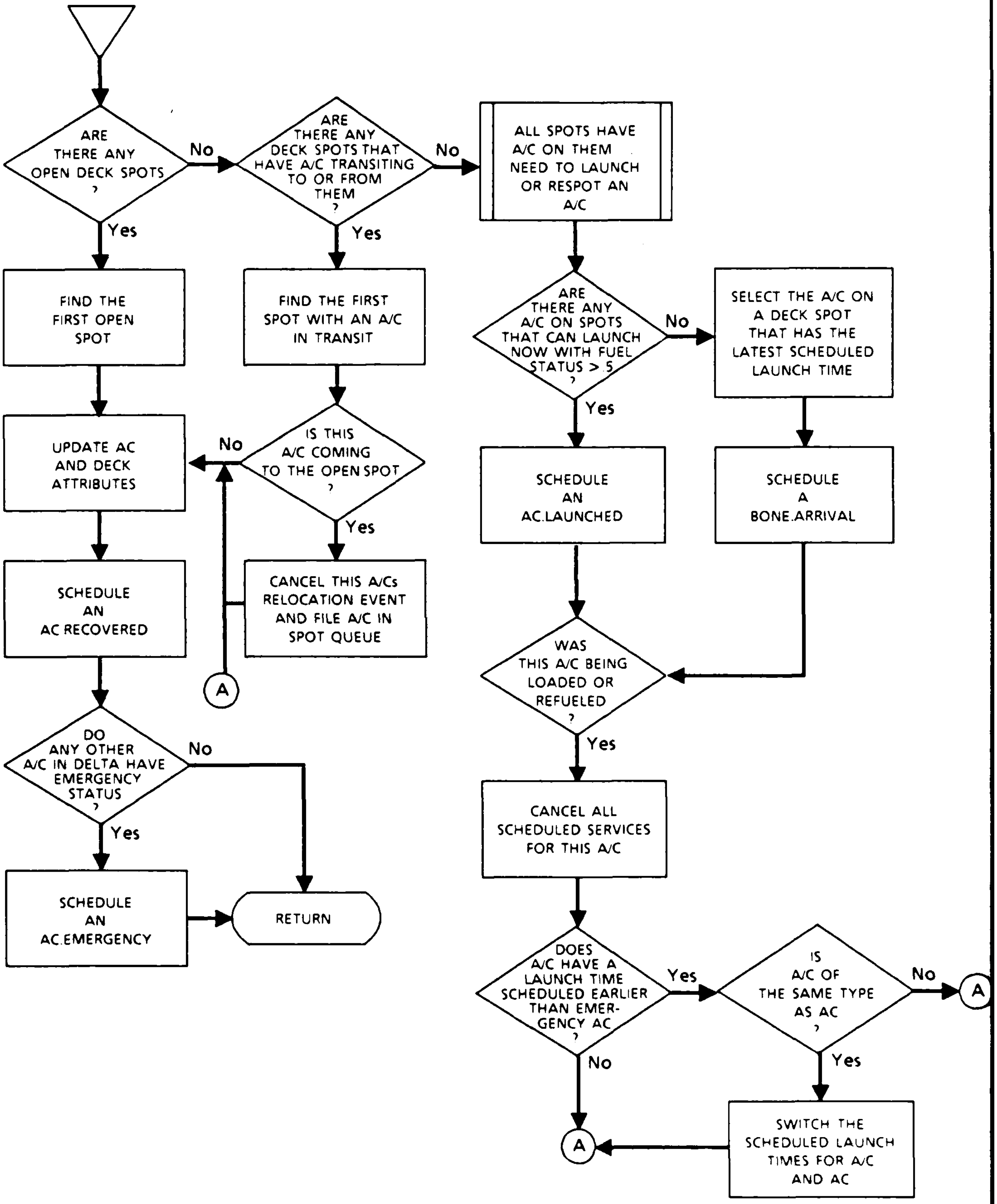
3.1.15 EVENT SPOT.EMERGENCY GIVEN AC

This event occurs when aircraft AC has entered a fuel emergency situation while waiting in the delta pattern to be assigned a deck spot for recovery to the ship.

If there are any deck spots open, the first open spot is reserved for AC and an AC.RECOVERED event is scheduled.

If there are no open spots, but there is a deck spot with an aircraft transiting to or from it, then this spot is reserved for AC, and an AC.RECOVERED event is scheduled. If the aircraft in transit was not leaving the spot, the relocation event for this aircraft is cancelled and the aircraft is filed in the spot queue to be considered for another spot.

If there are no open spots and no aircraft in transit to or from a spot, it is necessary to displace an aircraft to recover AC. The fuel status and launch time of each aircraft currently on a deck spot is checked to find an aircraft that has at least half a tank of fuel and is capable of launching immediately. If an aircraft is found meeting these requirements, an AC.LAUNCHED event is scheduled to clear a spot for AC to recover. If an aircraft cannot be found to launch, the aircraft on a deck spot with the latest launch time will schedule a BONE.ARRIVAL event. If the displaced aircraft was being refueled or loaded, the scheduled completion of these events is cancelled. If the emergency aircraft and the displaced aircraft are of the same type, and the displaced aircraft has an earlier scheduled launch time, these aircraft exchange launch times to minimize the potential for launch delay caused by the emergency recovery.


ARE THERE ANY OPEN DECK SPOTS ?
No
ARE THERE ANY DECK SPOTS THAT HAVE A/C TRANSITING TO OR FROM THEM ?
No
ALL SPOTS HAVE A/C ON THEM NEED TO LAUNCH OR RESPOT AN A/C
Yes
Yes
FIND THE FIRST OPEN SPOT
FIND THE FIRST SPOT WITH AN A/C IN TRANSIT
ARE THERE ANY A/C ON SPOTS THAT CAN LAUNCH NOW WITH FUEL STATUS > .5 ?
No
SELECT THE A/C ON A DECK SPOT THAT HAS THE LATEST SCHEDULED LAUNCH TIME
Yes
UPDATE AC AND DECK ATTRIBUTES
No
IS THIS A/C COMING TO THE OPEN SPOT ?
Yes
SCHEDULE AN AC.LAUNCHED
SCHEDULE A BONE.ARRIVAL
SCHEDULE AN AC.RECOVERED
CANCEL THIS A/Cs RELOCATION EVENT AND FILE A/C IN SPOT QUEUE
A
WAS THIS A/C BEING LOADED OR REFUELED ?
Yes
DO ANY OTHER A/C IN DELTA HAVE EMERGENCY STATUS ?
No
Yes
CANCEL ALL SCHEDULED SERVICES FOR THIS A/C
SCHEDULE AN AC.EMERGENCY
RETURN
DOES A/C HAVE A LAUNCH TIME SCHEDULED EARLIER THAN EMERGENCY AC ?
Yes
IS A/C OF THE SAME TYPE AS AC ?
No
A
No
Yes
SWITCH THE SCHEDULED LAUNCH TIMES FOR A/C AND AC
A

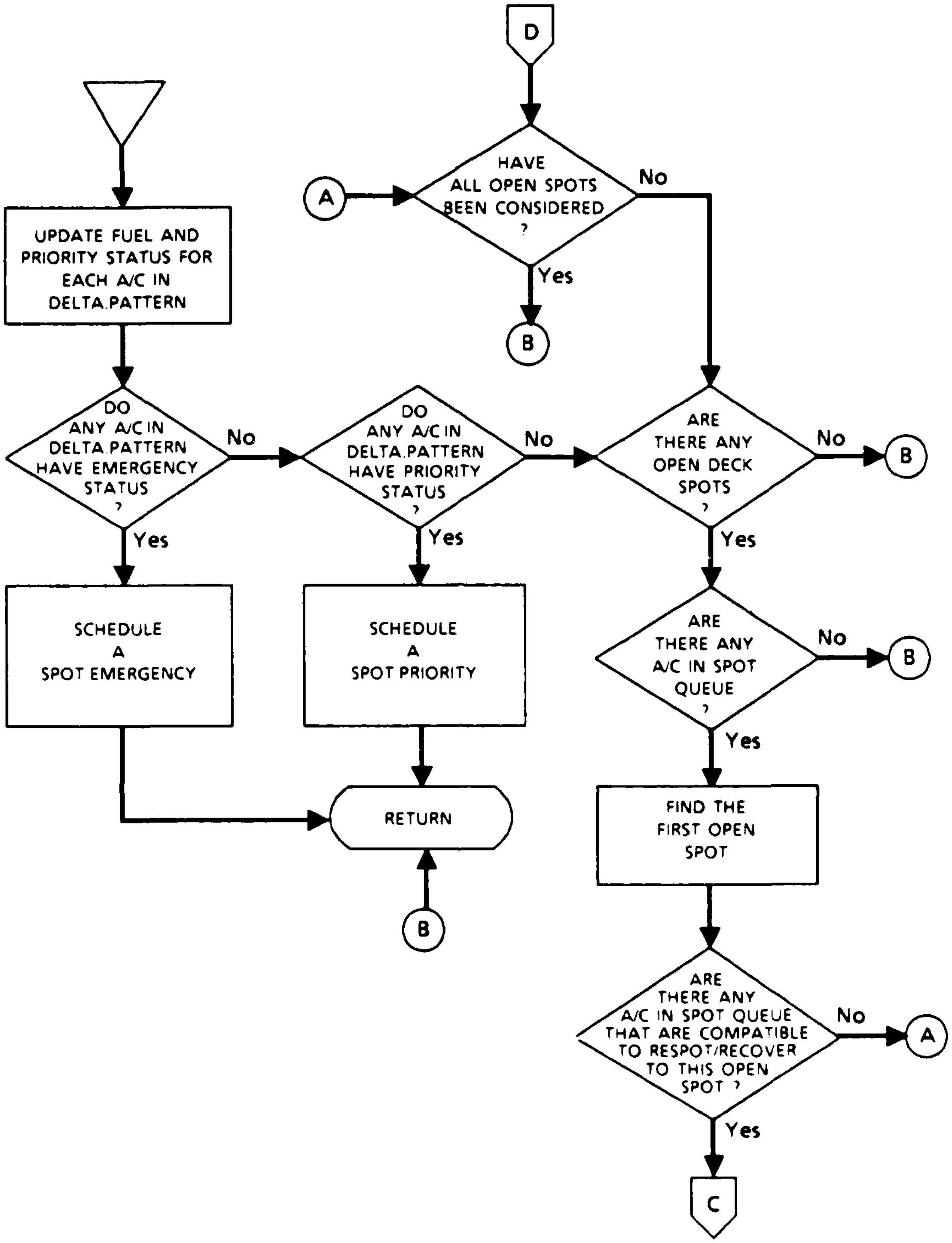
EVENT SPOT.EMERGENCY GIVEN AC

3.1.16 EVENT SPOT.OPEN

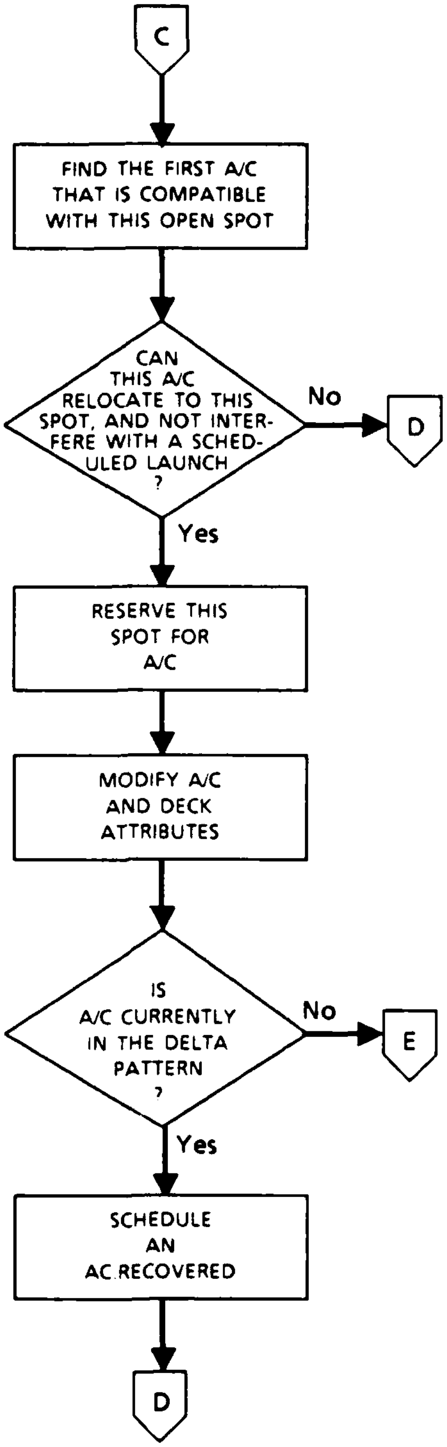
This event occurs at regular intervals (see event DELTA.UPDATE.CHK), and whenever a deck spot has been vacated by another aircraft. The fuel status of each aircraft in the delta pattern is updated and checked to see if it entitles the aircraft for priority or emergency treatment.

If an aircraft is qualified for special treatment, either event SPOT.EMERGENCY or SPOT.PRIORITY , as appropriate, is scheduled.

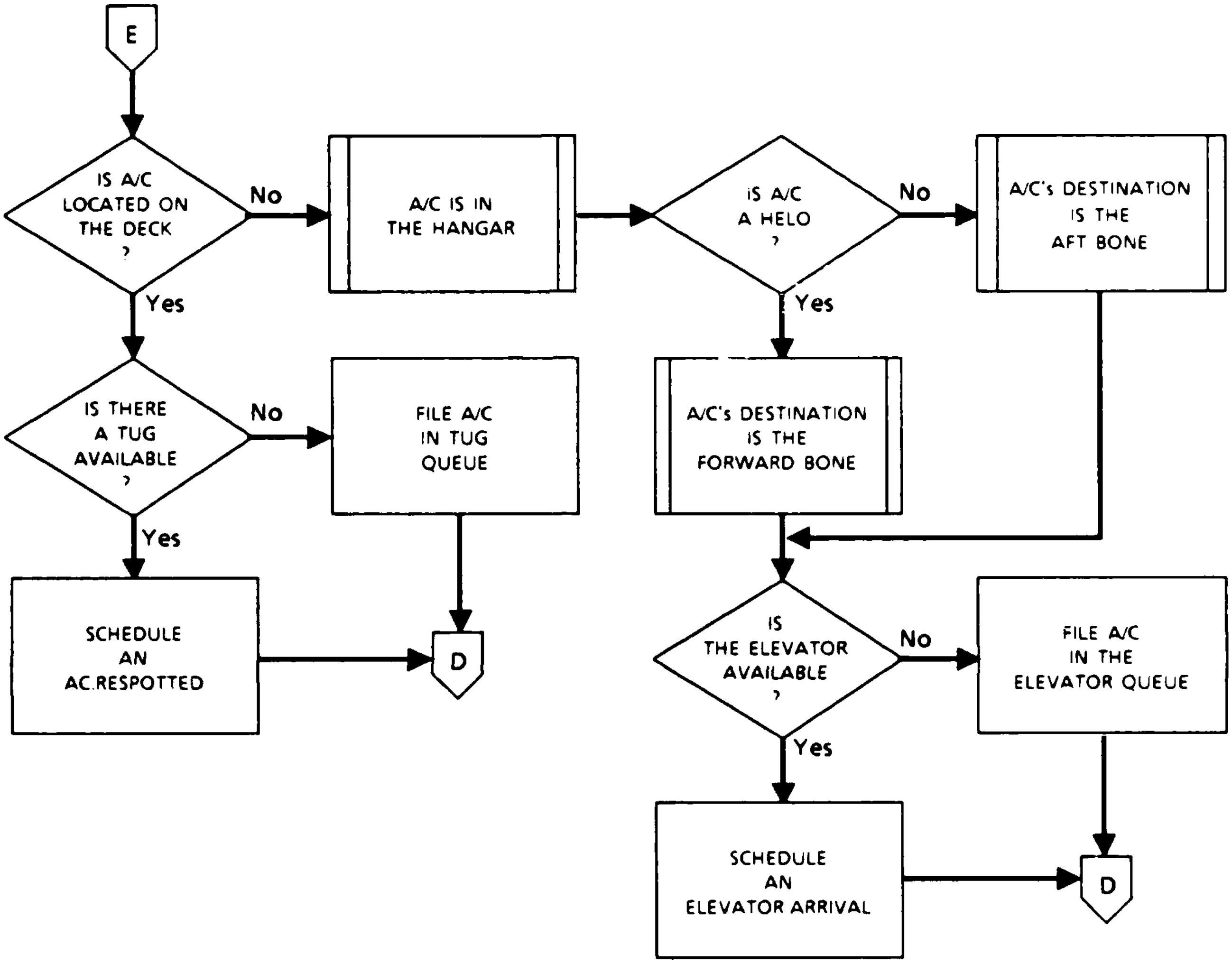
If no aircraft qualifies for special treatment, aircraft in the spot queue are considered for recovery or respotting to any open spots. Any aircraft that are compatible with an open spot, and will not interfere with another aircraft's launch are scheduled for an AC.RECOVERED or AC.RESPOTTED event.


D
HAVE ALL OPEN SPOTS BEEN CONSIDERED ?
A
No
Yes
B
UPDATE FUEL AND PRIORITY STATUS FOR EACH A/C IN DELTA.PATTERN
DO ANY A/C IN DELTA.PATTERN HAVE EMERGENCY STATUS ?
No
Yes
DO ANY A/C IN DELTA.PATTERN HAVE PRIORITY STATUS ?
No
Yes
ARE THERE ANY OPEN DECK SPOTS ?
No
B
Yes
SCHEDULE A SPOT EMERGENCY
SCHEDULE A SPOT PRIORITY
ARE THERE ANY A/C IN SPOT QUEUE ?
No
B
Yes
RETURN
B
FIND THE FIRST OPEN SPOT
ARE THERE ANY A/C IN SPOT QUEUE THAT ARE COMPATIBLE TO RESPOT/RECOVER TO THIS OPEN SPOT ?
No
A
Yes
C

EVENT SPOT.OPEN


C
FIND THE FIRST A/C THAT IS COMPATIBLE WITH THIS OPEN SPOT
CAN THIS A/C RELOCATE TO THIS SPOT, AND NOT INTERFERE WITH A SCHEDULED LAUNCH ?
No
D
Yes
RESERVE THIS SPOT FOR A/C
MODIFY A/C AND DECK ATTRIBUTES
IS A/C CURRENTLY IN THE DELTA PATTERN ?
No
E
Yes
SCHEDULE AN AC.RECOVERED
D

(CONTINUED) EVENT SPOT.OPEN


E
IS A/C LOCATED ON THE DECK ?
No
A/C IS IN THE HANGAR
IS A/C A HELO ?
No
A/C's DESTINATION IS THE AFT BONE
Yes
IS THERE A TUG AVAILABLE ?
No
FILE A/C IN TUG QUEUE
Yes
A/C's DESTINATION IS THE FORWARD BONE
Yes
SCHEDULE AN AC.RESPOTTED
D
IS THE ELEVATOR AVAILABLE ?
No
FILE A/C IN THE ELEVATOR QUEUE
Yes
SCHEDULE AN ELEVATOR ARRIVAL
D

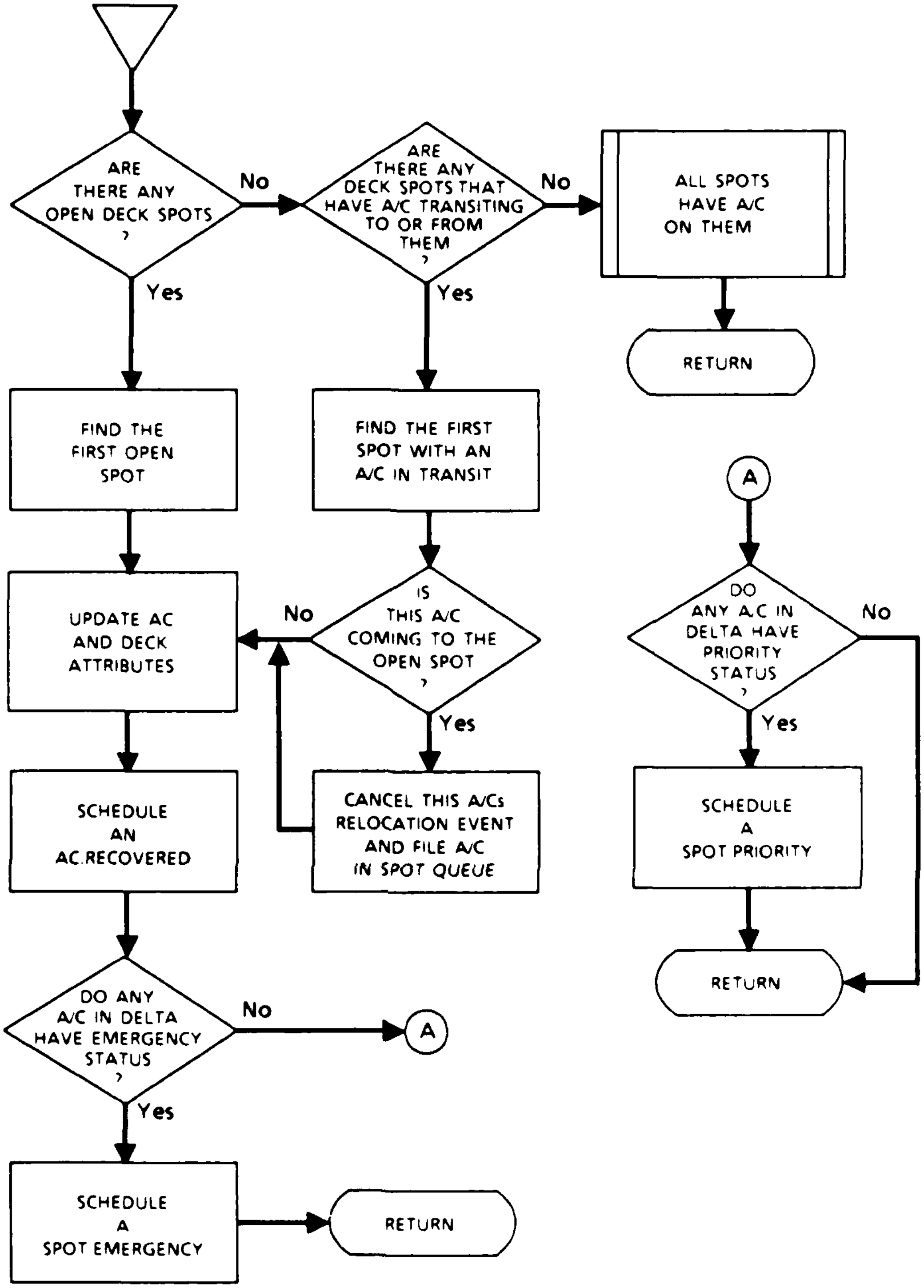
(CONTINUED) EVENT SPOT.OPEN

3.1.17 EVENT SPOT.PRIORITY GIVEN AC

This event occurs when aircraft AC has entered a fuel priority situation while waiting in the delta pattern to be assigned a deck spot for recovery to the ship.

If there are any deck spots open, the first open spot is reserved for AC and an AC.RECOVERED event is scheduled.

If there are no open spots, but there is a deck spot with an aircraft transiting to or from it, then this spot is reserved for AC, and an AC.RECOVERED event is scheduled. If the aircraft in transit was not leaving the spot, the relocation event for this aircraft is cancelled and the aircraft is filed in the spot queue to be considered for another spot.


ARE THERE ANY OPEN DECK SPOTS ?
No
ARE THERE ANY DECK SPOTS THAT HAVE A/C TRANSITING TO OR FROM THEM ?
No
ALL SPOTS HAVE A/C ON THEM
RETURN
Yes
Yes
FIND THE FIRST OPEN SPOT
FIND THE FIRST SPOT WITH AN A/C IN TRANSIT
A
UPDATE AC AND DECK ATTRIBUTES
No
IS THIS A/C COMING TO THE OPEN SPOT ?
DO ANY A/C IN DELTA HAVE PRIORITY STATUS ?
No
Yes
Yes
SCHEDULE AN AC.RECOVERED
CANCEL THIS A/Cs RELOCATION EVENT AND FILE A/C IN SPOT QUEUE
SCHEDULE A SPOT PRIORITY
RETURN
DO ANY A/C IN DELTA HAVE EMERGENCY STATUS ?
No
A
Yes
SCHEDULE A SPOT EMERGENCY
RETURN

EVENT SPOT.PRIORITY GIVEN AC

3.2 DESCRIPTION OF ENTITIES AND THEIR ATTRIBUTES

The model utilizes two entity structures: the permanent entity ACE and the temporary entity FLIGHTE. A copy of ACE is created for each aircraft that participates in the simulation. The attributes of ACE are defined as follows:

:AC.DELTA.ARRIVAL.TIME - The time at which ACE arrived to the delta pattern

:AC.DESTINATION - The next location planned for ACE

:AC.FLYING.TIME - The amount of time that ACE can/could remain airborne with the fuel it currently has on board

:AC.FUEL.STAT - The percent of a full fuel tank that ACE has on board

:AC.ID - An identification number assigned to ACE

:AC.LAUNCH.TIME - ACE's next scheduled launch time

:AC.LOAD.STAT - The percent of a full load that ACE has on board

:AC.LOCATION - The present location of ACE

:AC.OP.STAT - The operational status of ACE

:AC.PRIORITY - The priority assigned to ACE for recovery when in the delta pattern

:AC.RECOVERY.TIME - The time at which ACE was recovered to the flight deck

:AC.SERVICE.FLAG - Equals 1 if ACE is being loaded or refueled, 0 otherwise

:AC.TAKEOFF.TIME - The time at which ACE launched from the ship

:AC.TYPE - Equals 1 if ACE is a CH-46, 2 if a CH-53, and 3 if an AV-8

A FLIGHTE entity is created for each flight that is to be scheduled during the simulation. The attributes of FLIGHTE are defined as follows:

:FLT.AC.NUM - The number of aircraft assigned to FLIGHTE

:FLT.AC.RDY - The number of aircraft assigned to FLIGHTE that are ready to launch

:FLT.AC.TYPE - The type of aircraft in this flight; corresponds with AC.TYPE

:FLT.DELAY - The amount of time that FLIGHTE is late for takeoff

:FLT.NUM - An identification number assigned to FLIGHTE

:FLT.TIME - The time that FLIGHTE is scheduled to launch
:FLT.WAVE - The set that contains the aircraft assigned to FLIGHTE

3.3 MEASURES OF EFFECTIVENESS

The model currently has a number of bookkeeping routines built in that generate a number of potential measures of effectiveness. Tables 1-3 list portions of the summary file that displays this output for a sample run.

The first table compares the planned flight schedule with the actual launches as they occurred. This information allows the user to investigate delays and cancelled missions by aircraft and flight. The second table displays in chronological order the times at which launches occurred by aircraft type. This information can be used to create histograms and compare launch rates. The third table lists a number of measures that track utilization, average queue size, and completion times for a number of service related activities and structures.

TABLE 1

COMPARISON OF THE PLANNED AND ACTUAL LAUNCH TIMES
(OUTPUT FOR 10 AV-8 CASE)

```
FLIGHT   1   SCHEDULED  AT   20   LAUNCHED  A/C   1   AT   14.3
FLIGHT   1   SCHEDULED  AT   20   LAUNCHED  A/C   2   AT   14.8
FLIGHT   1   SCHEDULED  AT   20   LAUNCHED  A/C   3   AT   15.2
FLIGHT   1   SCHEDULED  AT   20   LAUNCHED  A/C   4   AT   15.5
FLIGHT   2   SCHEDULED  AT   21   LAUNCHED  A/C  11   AT   16.8
FLIGHT   2   SCHEDULED  AT   21   LAUNCHED  A/C  12   AT   17.5
FLIGHT   3   SCHEDULED  AT   35   LAUNCHED  A/C   5   AT   31.1
FLIGHT   3   SCHEDULED  AT   35   LAUNCHED  A/C   6   AT   31.4
FLIGHT   3   SCHEDULED  AT   35   LAUNCHED  A/C   7   AT   31.9
FLIGHT   3   SCHEDULED  AT   35   LAUNCHED  A/C   8   AT   32.3
FLIGHT   4   SCHEDULED  AT   36   LAUNCHED  A/C  13   AT   29.5
FLIGHT   4   SCHEDULED  AT   36   LAUNCHED  A/C  14   AT   30.1
FLIGHT   5   SCHEDULED  AT   45   LAUNCHED  A/C  17   AT   43.9
FLIGHT   5   SCHEDULED  AT   45   LAUNCHED  A/C  18   AT   44.6
FLIGHT   6   SCHEDULED  AT   50   LAUNCHED  A/C  19   AT   50.0
FLIGHT   6   SCHEDULED  AT   50   LAUNCHED  A/C  20   AT   50.6
FLIGHT   7   SCHEDULED  AT   65   LAUNCHED  A/C   9   AT   60.7
FLIGHT   7   SCHEDULED  AT   65   LAUNCHED  A/C  10   AT   60.1
FLIGHT   8   SCHEDULED  AT   66   LAUNCHED  A/C  15   AT   63.8
FLIGHT   8   SCHEDULED  AT   66   LAUNCHED  A/C  16   AT   63.1
FLIGHT   9   SCHEDULED  AT   75   LAUNCHED  A/C  21   AT   71.7
FLIGHT   9   SCHEDULED  AT   75   LAUNCHED  A/C  22   AT   72.2

FLIGHT  26   SCHEDULED  AT  216   LAUNCHED  A/C  13   AT  233.1
FLIGHT  26   SCHEDULED  AT  216   LAUNCHED  A/C  14   AT  232.6
FLIGHT  27   SCHEDULED  AT  225   LAUNCHED  A/C  17   AT  225.5
FLIGHT  27   SCHEDULED  AT  225   LAUNCHED  A/C  18   AT  226.1
FLIGHT  28   SCHEDULED  AT  230   LAUNCHED  A/C  19   AT    0
FLIGHT  28   SCHEDULED  AT  230   LAUNCHED  A/C  20   AT    0
FLIGHT  29   SCHEDULED  AT  245   LAUNCHED  A/C   9   AT  253.1
FLIGHT  29   SCHEDULED  AT  245   LAUNCHED  A/C  10   AT  253.5
FLIGHT  30   SCHEDULED  AT  246   LAUNCHED  A/C  15   AT  264.7
FLIGHT  30   SCHEDULED  AT  246   LAUNCHED  A/C  16   AT  277.1
FLIGHT  31   SCHEDULED  AT  255   LAUNCHED  A/C  21   AT  259.9
FLIGHT  31   SCHEDULED  AT  255   LAUNCHED  A/C  22   AT  260.5
FLIGHT  32   SCHEDULED  AT  260   LAUNCHED  A/C  23   AT    0
FLIGHT  32   SCHEDULED  AT  260   LAUNCHED  A/C  24   AT    0

FLIGHT  42   SCHEDULED  AT  345   LAUNCHED  A/C  21   AT  345.9
FLIGHT  42   SCHEDULED  AT  345   LAUNCHED  A/C  22   AT  346.3
FLIGHT  43   SCHEDULED  AT  350   LAUNCHED  A/C  23   AT  351.0
FLIGHT  43   SCHEDULED  AT  350   LAUNCHED  A/C  24   AT  351.3
```

TABLE 2

HISTOGRAM DATA

AC.TYPE	=	1	LAUNCH NO.	1	LAUNCH.TIME	=	14.3
AC.TYPE	=	1	LAUNCH NO.	2	LAUNCH.TIME	=	14.8
AC.TYPE	=	1	LAUNCH NO.	3	LAUNCH.TIME	=	15.2
AC.TYPE	=	1	LAUNCH NO.	4	LAUNCH.TIME	=	15.5
AC.TYPE	=	1	LAUNCH NO.	5	LAUNCH.TIME	=	31.1
AC.TYPE	=	1	LAUNCH NO.	6	LAUNCH.TIME	=	31.4
AC.TYPE	=	1	LAUNCH NO.	7	LAUNCH.TIME	=	31.9
AC.TYPE	=	1	LAUNCH NO.	8	LAUNCH.TIME	=	32.3
AC.TYPE	=	1	LAUNCH NO.	9	LAUNCH.TIME	=	60.1
AC.TYPE	=	1	LAUNCH NO.	10	LAUNCH.TIME	=	60.7
AC.TYPE	=	2	LAUNCH NO.	1	LAUNCH.TIME	=	16.8
AC.TYPE	=	2	LAUNCH NO.	2	LAUNCH.TIME	=	17.5
AC.TYPE	=	2	LAUNCH NO.	3	LAUNCH.TIME	=	29.5
AC.TYPE	=	2	LAUNCH NO.	4	LAUNCH.TIME	=	30.1
AC.TYPE	=	2	LAUNCH NO.	5	LAUNCH.TIME	=	63.1
AC.TYPE	=	2	LAUNCH NO.	6	LAUNCH.TIME	=	63.8
AC.TYPE	=	2	LAUNCH NO.	7	LAUNCH.TIME	=	95.6
AC.TYPE	=	2	LAUNCH NO.	8	LAUNCH.TIME	=	96.1
AC.TYPE	=	2	LAUNCH NO.	9	LAUNCH.TIME	=	121.8
AC.TYPE	=	2	LAUNCH NO.	10	LAUNCH.TIME	=	122.1
AC.TYPE	=	3	LAUNCH NO.	1	LAUNCH.TIME	=	43.9
AC.TYPE	=	3	LAUNCH NO.	2	LAUNCH.TIME	=	44.6
AC.TYPE	=	3	LAUNCH NO.	3	LAUNCH.TIME	=	50.0
AC.TYPE	=	3	LAUNCH NO.	4	LAUNCH.TIME	=	50.6
AC.TYPE	=	3	LAUNCH NO.	5	LAUNCH.TIME	=	71.7
AC.TYPE	=	3	LAUNCH NO.	6	LAUNCH.TIME	=	72.2
AC.TYPE	=	3	LAUNCH NO.	7	LAUNCH.TIME	=	77.2
AC.TYPE	=	3	LAUNCH NO.	8	LAUNCH.TIME	=	77.7
AC.TYPE	=	3	LAUNCH NO.	9	LAUNCH.TIME	=	108.0
AC.TYPE	=	3	LAUNCH NO.	10	LAUNCH.TIME	=	108.4
AC.TYPE	=	3	LAUNCH NO.	27	LAUNCH.TIME	=	329.6
AC.TYPE	=	3	LAUNCH NO.	28	LAUNCH.TIME	=	330.2
AC.TYPE	=	3	LAUNCH NO.	29	LAUNCH.TIME	=	345.9
AC.TYPE	=	3	LAUNCH NO.	30	LAUNCH.TIME	=	346.9
AC.TYPE	=	3	LAUNCH NO.	31	LAUNCH.TIME	=	351.0
AC.TYPE	=	3	LAUNCH NO.	32	LAUNCH.TIME	=	351.3

TABLE 3

MEASURES OF EFFECTIVENESS

	Average	Variant	Minimum	Maximum
SPOT.Q	4.21	7.97		11.00
REFUEL.Q	0.01	0.01		2.00
REFUELER	0.82	1.19		4.00
N.DELTA.PATTERN	4.07	8.17		10.00
N.BONE.FWD	1.68	4.86		6.00
N.BONE.AFT	6.10	3.44		10.00
BONE.TOTAL	8.37	8.57		12.00
N.HANGAR	2.27	15.37		13.00
TUG	0.39	0.59		4.00
N.TUG.Q	0.01	0.01		2.00
LOADER	1.33	0.74		2.00
N.LOADER.Q	0.69	0.84		3.00
LAUNCH.DELAY	6.04	80.95		31.11
HELO.MISSION.LENGTH	57.78	11.73	51.22	67.13
AV8.MISSION.LENGTH	29.86	20.87	23.70	40.48
HELO.FLYING.TIME	79.71	136.27	55.61	117.09
AV8.FLYING.TIME	45.42	39.60	29.38	55.61
HELO.RECOVER.TIME	21.93	144.35	3.38	56.94
AV8.RECOVER.TIME	15.55	49.68	3.69	30.49
TTLOAD	9.01	69.72	1.23	28.36
TTRESPOT	3.43	1.36	0.47	5.83
TIRECOVER	3.49	0.75	1.82	6.45
TTARRIV.ELEVATOR	6.56	2.33	3.59	8.94
TTARR1V.DECK	1.52	0.47	0.80	2.85
TTARRIV.HANGAR	1.32	0.32	0.62	2.81
TTUNLOAD	16.68	14.79	10.20	27.14

NO. EMERG.RECOVERIES = 0   NO. PRIORITY.RECOVERIES = 14

NO. STD.RECOVERIES = 102   NO. LAUNCHES = 96

NO. REPLACED.AC = 0

NO. CANCELLED.MISSIONS = 6

NO. FLIGHTS STILL IN SCHEDULE = 0   STILL IN PLAN = 0

Chapter 4

ANALYSIS OF THE AV-8/HELO MIX PROBLEM

The inputs that were used to run the model for this problem are listed in table 4. The distribution inputs are based on exercise results, however, all have been modified to account for expedients that would be taken during the conduct of an actual assault. These modifications ruled out using distributions which fit the exercise data, but provided approximations for the minimum, maximum, mean, and mode. In several cases, a shifted Beta distribution was chosen, and the parameters were determined by these approximations. Table 5 presents the distributions with associated parameters used for the event scheduling in model runs, and the random number stream assignments. In the absence of actual assault data, goodness-of-fit tests were not conducted.

The simulation begins with the aircraft at locations and statuses as shown in table 6. Helicopters of the second wave are in the delta pattern with full fuel tanks to minimize the interval between the first and second wave; it takes less time to recover-load-launch than it does to respot-start-load-launch. The first flight of AV-8s launches after the second wave. Thereafter, an AV-8 flight follows every wave if an AV-8 flight is available. The schedule of launches for each case is shown in table 7.

The primary MOE for this problem is the force buildup rate ashore for each of the aircraft mixes. The model tracks the buildup rate by recording the time that each aircraft launches; this removes from consideration any

TABLE 4

MODEL INPUTS FOR AIRCRAFT TYPES

	CH-46	CH-53	AV-8
AVERAGE FLYING SPEED (m/s)	65	65	200
AVERAGE FLYING TIME	120	150	75
FUEL CAPACITY (lb)	15,000	25,000	15,000
AVERAGE TIME TO REFUEL	5	6	5
AVERAGE TIME TO LOAD	5	10	16
STD DEV OF TIME TO LOAD	--	--	2
AVERAGE TIME TO RECOVER	4	4	3
STD DEV OF TIME TO RECOVER	.5	.5	.5
AVERAGE TIME TO RESPOT	4	4	3
STD DEV OF TIME TO RESPOT	1	1	1
AVERAGE TIME TO MOVE TO ELEVATOR	6	6	6
STD DEV OF TIME TO MOVE TO ELEVATOR	1.5	1.5	1.5
AVERAGE TIME TO COMPLETE MISSION	16	16	16
EMERGENCY FUEL LEVEL (%)	17	15	25
PRIORITY FUEL LEVEL (%)	25	20	35
PREFERRED LAUNCH SPOTS	1,2,3,4	5,6	1,2
PREFERRED RECOVERY SPOTS	1,2,3,4	5,6	1,2,5,6

NOTE: All times are in minutes.

TABLE 5

DISTRIBUTION AND RANDOM NUMBER STREAM ASSIGNMENTS

Event	Distribution	Stream
AC.LAUNCHED	UNIFORM (.5, 1) + INTERVAL FOR OTHER LAUNCHES	5
AC.LOADED	NORMAL... SEE TABLE 4 FOR PARAMETERS SPECIFIC TO AIRCRAFT TYPE	3
AC.RECOVERED	NORMAL... SEE TABLE 4	1
AC.REFUELED	FUNCTION OF FUEL STATUS AND TIME TO REFUEL PLUS DELAY NORMAL (1., .25)	4
AC.RESPOTTED	NORMAL... SEE TABLE 4	2
BONE.ARRIVAL	NORMAL... SAME AS AC.RESPOTTED	2
DECK.ARRIVAL	BETA (1.5, 5) MIN = .5 MAX = 4.5 MEAN = 1.4 MODE = .9	7
DELTA.ARRIVAL	FUNCTION OF DISTANCE TO SHORE AND A/C SPEED PLUS TIME TO UNLOAD BETA (1.5, 3)	6
ELEVATOR.ARRIVAL	NORMAL (6, 1.5)	8
FLIGHT.LAUNCH	UNIFORM (.1, .5)	9
FLIGHT.CHECK	BETA (1.5, 3) MIN = 1 MAX = 3 MEAN = 1.7 MODE = 1.4	9
HANGAR.ARRIVAL	BETA (1.5, 5) MIN = .5 MAX = 4.5 MEAN = 1.4 MODE = .9	7

TABLE 6

INITIAL AIRCRAFT LOCATIONS AND STATUSES

Aircraft number	Aircraft type	Location	Fuel status	Load status
1	CH-46	FWD BONE	1.0	.0
2	CH-46	FWD BONE	1.0	.0
3	CH-46	FWD BONE	1.0	.0
4	CH-46	FWD BONE	1.0	.0
5	CH-46	DELTA	1.0	.0
6	CH-46	DELTA	1.0	.0
7	CH-46	DELTA	1.0	.0
8	CH-46	DELTA	1.0	.0
9	CH-46	FWD BONE	1.0	.0
10	CH-53	FWD BONE	1.0	.0
11	CH-53	AFT BONE	1.0	.0
12	CH-53	AFT BONE	1.0	.0
13	CH-53	DELTA	1.0	.0
14	CH-53	DELTA	1.0	.0
15	CH-53	AFT BONE	1.0	.0
16	CH-53	AFT BONE	1.0	.0
17	AV-8	AFT BONE	1.0	1.0
18	AV-8	AFT BONE	1.0	1.0
19	AV-8	AFT BONE	1.0	1.0
20	AV-8	AFT BONE	1.0	1.0
21	AV-8	HANGAR	.0	.0
22	AV-8	HANGAR	.0	.0
23	AV-8	HANGAR	.0	.0
24	AV-8	HANGAR	.0	.0
25	AV-8	HANGAR	.0	.0
26	AV-8	HANGAR	.0	.0
27	AV-8	HANGAR	.0	.0
28	AV-8	HANGAR	.0	.0

TABLE 7

FLIGHT SCHEDULE FOR 6, 8, 10, AND 12 AV-8 CASES

WAVE NUMBER	LAUNCH TIME	AIRCRAFT TYPE	NUMBER OF AIRCRAFT	NUMBER OF AV-8's			
				12	10	8	6
1	20	CH-46	4				
1	21	CH-53	2				
2	35	CH-46	4				
2	36	CH-53	2				
	45	AV-8	2	X	X	X	X
	50	AV-8	2	X	X	X	
3	65	CH-46	2				
3	66	CH-53	2				
	75	AV-8	2	X	X	X	X
	80	AV-8	2	X	X		
4	95	CH-46	4				
4	96	CH-53	2				
	105	AV-8	2	X	X	X	X
	110	AV-8	2	X			
5	125	CH-46	4				
5	126	CH-53	2				
	135	AV-8	2	X	X	X	X
	140	AV-8	2	X	X	X	
6	155	CH-46	2				
6	156	CH-53	2				
	165	AV-8	2	X	X	X	X
	170	AV-8	2	X	X		
7	185	CH-46	4				
7	186	CH-53	2				
	195	AV-8	2	X	X	X	X
	200	AV-8	2	X			
8	215	CH-46	4				
8	216	CH-53	2				
	225	AV-8	2	X	X	X	X
	230	AV-8	2	X	X	X	
9	245	CH-46	2				
9	246	CH-53	2				
	255	AV-8	2	X	X	X	X
	260	AV-8	2	X	X		
10	275	CH-46	4				
10	276	CH-53	2				
	285	AV-8	2	X	X	X	X
	290	AV-8	2	X			
11	305	CH-46	4				
11	306	CH-53	2				
	315	AV-8	2	X	X	X	X
	320	AV-8	2	X	X	X	
12	335	CH-46	2				
12	336	CH-53	2				
	345	AV-8	2	X	X	X	X
	350	AV-8	2	X	X		
		NUMBER OF AV-8 FLIGHTS:		22	19	15	11

NOTE: X signifies that the AV-8 flight is scheduled for that AV-8 case.

factors that might affect the transit from ship to shore that are not resident in the flight deck operations. In other words, the best case is the case that is able to launch the most aircraft in the shortest time. Three other MOEs that are related to buildup are the average launch delay, the number of cancelled launches, and the number of AV-8 launches. Table 8 presents summary statistics for each case after ten replicates.

In order to introduce positive correlation between the cases, the method of common random numbers was employed as a variance reduction technique. The ten replicates for the twelve AV-8 case were run and the initial seeds for each random number stream were saved for each replicate. The ten replicates were then run for the other cases using the same initial seeds for each replicate.

The addition of two AV-8s from six to eight provides potentially eight more AV-8 sorties, with an average of 7.8 more sorties realized. The penalty paid for this increase is a reduction in the amount of time the average launch precedes its scheduled time by approximately 80 seconds. As the average launch is still ahead of schedule, a subjective judgement is made that the gain in AV-8 sorties outweighs the loss in timeliness, and the discussion continues with the eight AV-8 case designated as more effective than the case with six AV-8s.

For the cases of ten and twelve AV-8s, adding additional AV-8s appears to actually reduce the expected number of AV-8 launches. The increase in the number of possible AV-8 launches is almost identical to the increase in the number of missions cancelled between the eight, ten, and twelve AV-8 cases. Table 9 shows the results of a closer look at the cases of eight and ten AV-8s using paired differences and paired-t confidence intervals.

The results support the earlier observations: with 95 percent confidence, the expected number of additional missions cancelled lies in the interval (7.3,11.3), and the expected number of additional AV-8 sorties lies in the interval (-2.8,0.8). Also, the increase in launch delay is significant, and with 95 percent confidence the average launch will occur more that 5 minutes late for the 10 AV-8 case. Applying the Bonferroni inequality, the overall confidence that these three intervals simultaneously contain their respective true measures is at least 85 percent.

Figures 4-6 present graphical representations of the differences in buildup rate for the 6, 8, and 10 AV-8 cases. As can be seen, there is essentially no change in the buildup rate between the 6 and 8 AV-8 cases for helicopters, but there is a marked and consistent increase in the buildup rate for AV-8s. Between the 8 and 10 AV-8 cases, some decrease in the helicopter buildup

TABLE 8

SELECTED RESULTS AFTER TEN REPLICATES

NUMBER OF AV-8's	AVERAGE NUMBER MISSIONS CANCELLED	AVERAGE TAKEOFF DELAY	AVERAGE NUMBER AV-8 LAUNCHES	POSSIBLE NUMBER AV-8 LAUNCHES
6	0.0	-3.15	22.0	22
8	0.2	-1.73	29.8	30
10	9.5	4.67	28.8	38
12	16.1	6.38	28.6	44

TABLE 9

PAIRED-DIFFERENCE ANALYSIS FOR THE 8 AND 10 AV-8 CASES

	Number of missions cancelled			Average takeoff delay			Number of AV-8 launches		
Replicate	10 AV-8s	8 AV-8s	10 - 8	10 AV-8s	8 AV-8s	10 - 8	10 AV-8s	8 AV-8s	10 - 8
1	6	0	6	6.0	-1.4	7.4	32	30	2
2	13	2	11	4.4	-1.5	5.9	26	28	-2
3	12	0	12	5.4	-2.4	7.8	26	30	-2
4	10	0	10	4.4	-1.1	5.5	28	30	-2
5	4	0	4	4.5	-3.4	7.9	34	30	4
6	10	0	10	5.4	-1.6	7.0	28	30	-2
7	12	0	12	5.9	-1.6	7.5	28	30	-2
8	8	0	8	5.5	-0.6	6.1	30	30	0
9	12	0	12	2.1	-0.8	2.9	26	30	-4
10	8	0	8	3.1	-2.9	6.0	30	30	0
		$\bar{X}$ =	9.3			6.4			-1.0
		S =	2.75			1.50			2.54
		d =	1.97			1.08			1.82
		r =	0.21			0.17			1.82
		CI =	(7.3, 11.3)			(5.3, 7.5)			(-2.8, 0.8)

d = absolute precision (α = .05)
r = relative precision
CI = 95 percent confidence interval

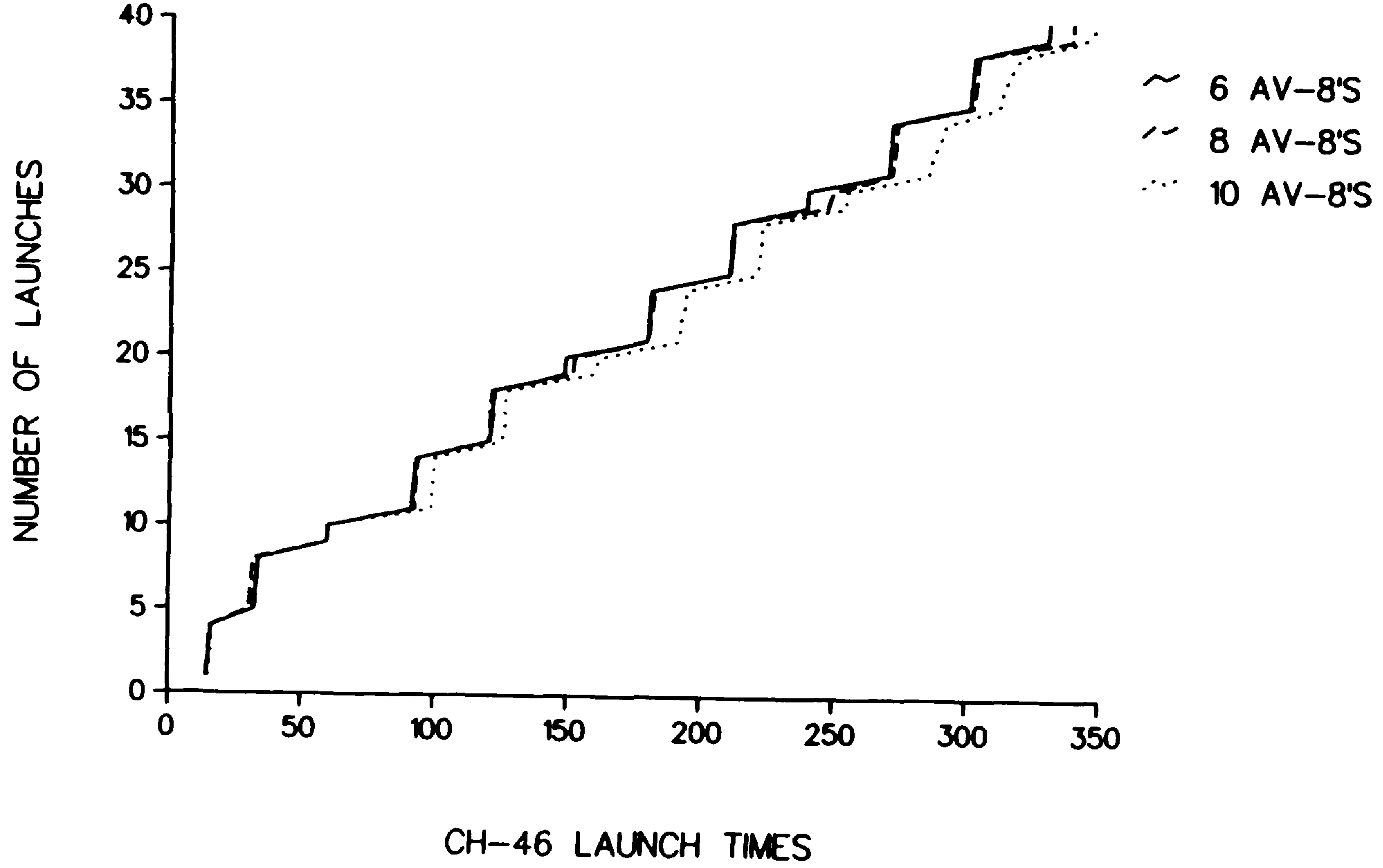


FIG. 4: BUILDUP RATE DURING A SIX-HOUR ASSAULT
(CH-46)

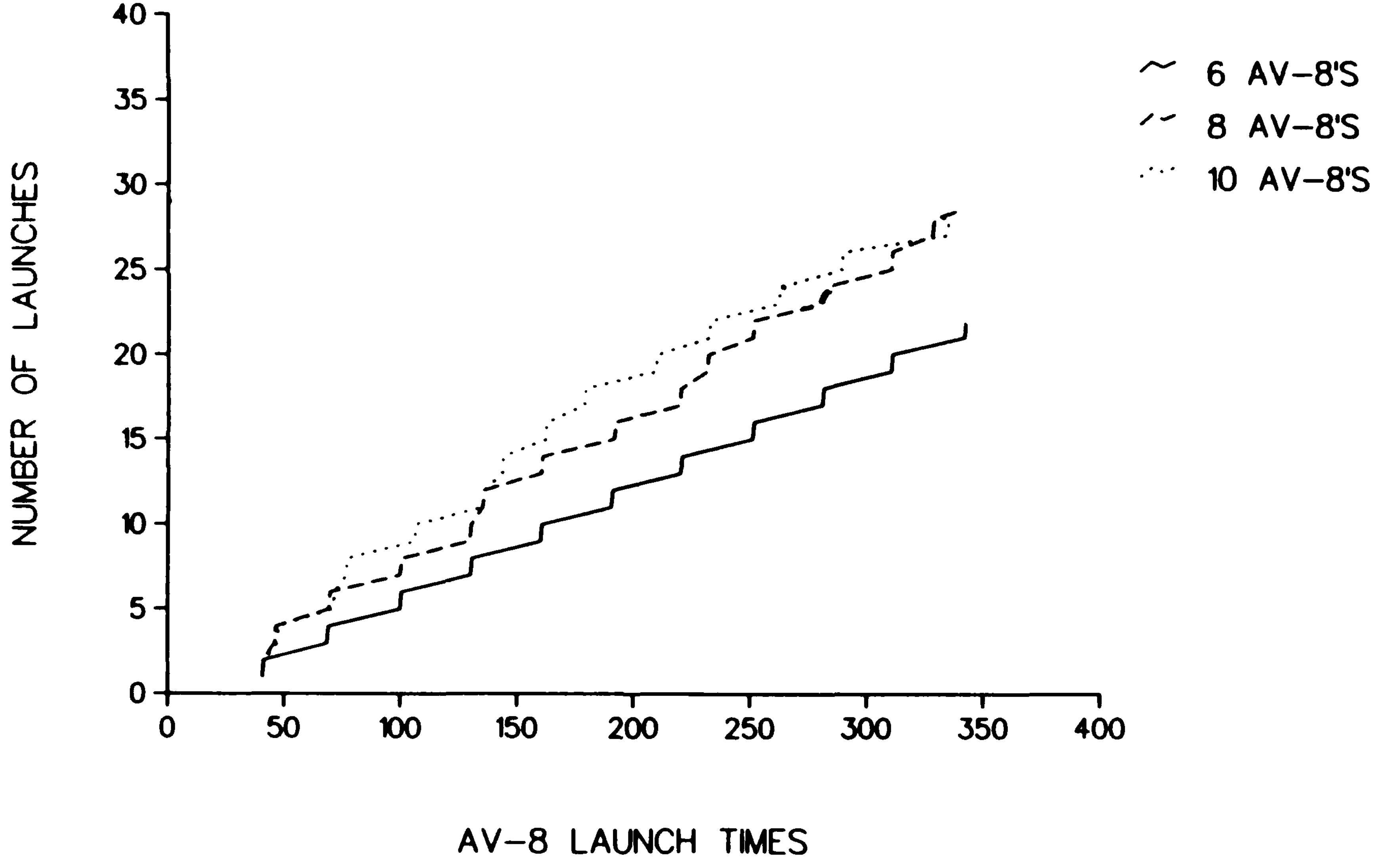


FIG. 5: BUILDUP RATE DURING A SIX-HOUR ASSAULT
(AV-8)

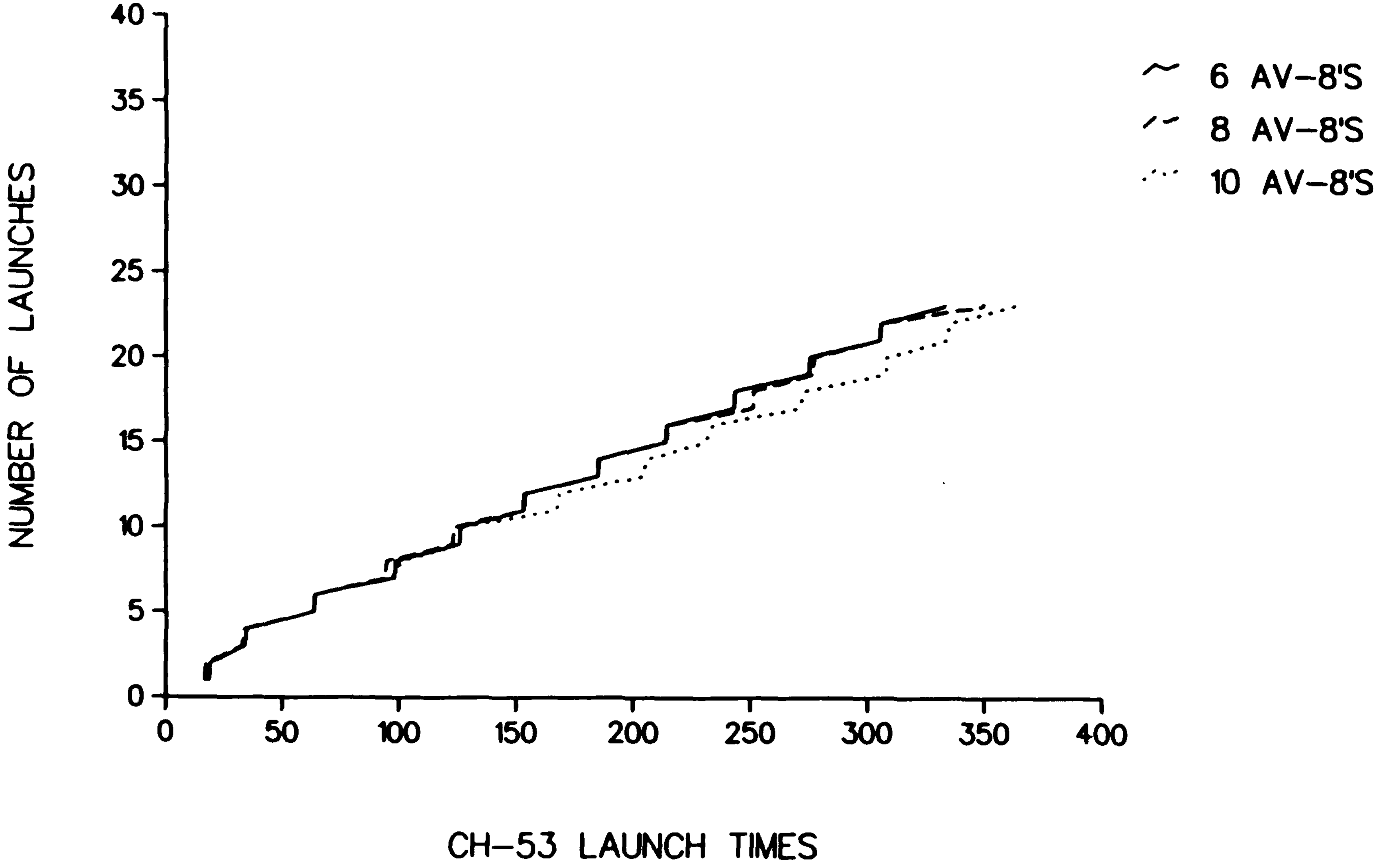


FIG. 6: BUILDUP RATE DURING A SIX-HOUR ASSAULT (CH-53)

rate is seen, and while the AV-8 buildup rate for the 10 AV-8 case appears to be generally above that of the 8 AV-8 case, the frequent intersections of the two buildup lines imply that there is no real improvement offered by 10 AV-8s in the long run.

Given the inputs, initial conditions, and launch schedule presented in this section, the optimum number of AV-8s for simultaneous flight deck operations with a composite helicopter squadron during an assault from an LHA is eight. It should be noted again that the unavailability of AV-8s due to combat attrition and reliability failure has not been modelled. If these are relevant factors, then the MAU should deploy with additional AV-8s in order to sustain operations at the level of eight.

APPENDIX A

```
''      AV-8/HELO MIX SIMULATION

PREAMBLE
  EVENT NOTICES INCLUDE AC.LAUNCHED, AC.RECOVERED, AC.RESPOTTED, AC.LOADED,
                AC.REFUELED, BONE.ARRIVAL, DELTA.ARRIVAL, DECK.DECISION,
                SPOT.OPEN, FLIGHT.LAUNCH, STOP.SIMULATION, DELTA.UPDATE.CHK,
                SPOT.EMERGENCY, SPOT.PRIORITY, HANGER.ARRIVAL,
                ELEVATOR.ARRIVAL, DECK.ARRIVAL, FLIGHT.CHECK

  EVERY AC.LAUNCHED HAS AN AC1 AND AN F1
  EVERY AC.RECOVERED HAS AN AC2
  EVERY AC.RESPOTTED HAS AN AC3
  EVERY AC.LOADED HAS AN AC4
  EVERY AC.REFUELED HAS AN AC5
  EVERY BONE.ARRIVAL HAS AN AC6
  EVERY DELTA.ARRIVAL HAS AN AC7
  EVERY DECK.DECISION HAS A FLIGHT1
  EVERY FLIGHT.LAUNCH HAS A FLIGHT2
  EVERY SPOT.EMERGENCY HAS AN AC8
  EVERY SPOT.PRIORITY HAS AN AC9
  EVERY HANGER.ARRIVAL HAS AN AC10
  EVERY ELEVATOR.ARRIVAL HAS AN AC11
  EVERY DECK.ARRIVAL HAS AN AC12
  EVERY FLIGHT.CHECK HAS A FLIGHT3

  PERMANENT ENTITIES
    EVERY ACE HAS AN AC.ID, AN AC.TYPE, AN AC.LOCATION, AN AC.FUEL.STAT,
                AN AC.LOAD.STAT, AN AC.OP.STAT, AN AC.LAUNCH.TIME,
                AN AC.DELTA.ARRIVAL.TIME, AN AC.PRIORITY, AN AC.DESTINATION,
                AN AC.FLYING.TIME, AN AC.SERVICE.FLAG, AN AC.TAKEOFF.TIME,
                AND AN AC.RECOVERY.TIME
        AND MAY BELONG TO THE SHIP
        AND MAY BELONG TO THE HANGER.DECK
        AND MAY BELONG TO THE BONE.FWD
        AND MAY BELONG TO THE BONE.AFT
        AND MAY BELONG TO THE DELTA.PATTERN
        AND MAY BELONG TO THE SET.TEMP
        AND MAY BELONG TO THE REFUELER.Q
        AND MAY BELONG TO THE LOADER.Q     ''AV-8'S ONLY
        AND MAY BELONG TO THE LOAD.SET     ''AV-8'S ONLY
        AND MAY BELONG TO THE TUG.Q
        AND MAY BELONG TO THE FLT.WAVE
        AND MAY BELONG TO THE SPOT.Q
        AND MAY BELONG TO THE ELEVATOR.Q
        AND MAY BELONG TO THE AC.RDY.SET
        AND MAY BELONG TO THE AC.PRE.RDY.SET
        AND MAY BELONG TO THE AC.NOT.RDY.SET
''      AND MAY BELONG TO THE ARRAY SPOT (THIS IS NOT A FUNCTIONAL LINE)

  TEMPORARY ENTITIES
    EVERY FLIGHTE HAS A FLT.TIME, A FLT.AC.TYPE, A FLT.AC.NUM, A FLT.NUM,
        A FLT.AC.RDY, AND A FLT.DELAY
        AND OWNS A FLT.WAVE
        AND MAY BELONG TO THE SCHEDULE
        AND MAY BELONG TO THE PLAN
        AND MAY BELONG TO THE AV8.PLAN

''  AFTER FILING IN FLT.WAVE CALL CHECK2
''  BEFORE FILING IN SCHEDULE CALL CHECK1
''  AFTER FILING IN SCHEDULE CALL CHECK1
```

```
DEFINE MINUTES TO MEAN UNITS
DEFINE MINUTE  TO MEAN UNITS


DEFINE HANGER.DECK AS A SET RANKED BY AC.OP.STAT
DEFINE BONE.FWD AS A SET RANKED BY AC.LAUNCH.TIME
DEFINE BONE.AFT AS A SET RANKED BY AC.LAUNCH.TIME
DEFINE REFUELER.Q AS A SET RANKED BY LOW AC.LAUNCH.TIME, THEN BY AC.LOCATION
DEFINE LOADER.Q AS A SET RANKED BY LOW AC.LAUNCH.TIME ''AV8'S
DEFINE LOAD.SET AS A SET ''AV8'S
DEFINE TUG.Q AS A SET RANKED BY LOW AC.LAUNCH.TIME
DEFINE DELTA.PATTERN AS A SET RANKED BY LOW AC.FLYING.TIME
DEFINE SET.TEMP AS A SET
DEFINE ELEVATOR.Q AS A SET RANKED BY LOW AC.LOCATION,
                                         THEN BY LOW AC.LAUNCH.TIME
DEFINE FLT.WAVE AS A SET RANKED BY LOW AC.LOCATION WITHOUT M ATTRIBUTE
DEFINE SPOT.Q AS A SET RANKED BY LOW AC.LAUNCH.TIME,
                                     THEN BY LOW AC.FLYING.TIME
DEFINE AC.RDY.SET AS A SET RANKED BY LOW AC.LOCATION ''?WITHOUT M ATTRIBUTE
DEFINE AC.PRE.RDY.SET AS A SET RANKED BY LOW AC.LOCATION ''?WITHOUT M ATTRIB
DEFINE AC.NOT.RDY.SET AS A SET RANKED BY LOW AC.LOCATION ''?WITHOUT M ATTRIB

NORMALLY MODE IS INTEGER

DEFINE F AS A 1-DIMENSIONAL ARRAY
DEFINE ETA AS A REAL 1-DIMENSIONAL ARRAY
DEFINE INDEX AS A 1-DIMENSIONAL ARRAY
DEFINE TYPE.AC AS A 1-DIMENSIONAL ARRAY
DEFINE SPEED.AC AS A 1-DIMENSIONAL REAL ARRAY
DEFINE FUELCAP.AC AS A 1-DIMENSIONAL ARRAY
DEFINE FUELUSE.AC AS A 1-DIMENSIONAL REAL ARRAY
DEFINE TTREFUEL.AC AS A 1-DIMENSIONAL REAL ARRAY
DEFINE TTLOAD.AC AS A 1-DIMENSIONAL REAL ARRAY
DEFINE TTRESPOT.AC AS A 1-DIMENSIONAL REAL ARRAY
DEFINE TTRECOVER.AC AS A 1-DIMENSIONAL REAL ARRAY
DEFINE TTARRIV.E.AC AS A 1-DIMENSIONAL REAL ARRAY
DEFINE S.TTLOAD.AC AS A 1-DIMENSIONAL REAL ARRAY
DEFINE S.TTRESPOT.AC AS A 1-DIMENSIONAL REAL ARRAY
DEFINE S.TTRECOVER.AC AS A 1-DIMENSIONAL REAL ARRAY
DEFINE S.TTARRIV.E.AC AS A 1-DIMENSIONAL REAL ARRAY
DEFINE EMERGENCY.STAT.AC AS A 1-DIMENSIONAL REAL ARRAY
DEFINE PRIORITY.STAT.AC AS A 1-DIMENSIONAL REAL ARRAY
DEFINE TTUNLOAD.AC AS A 1-DIMENSIONAL REAL ARRAY
DEFINE NUM.LAUNCHES.AC AS A 1-DIMENSIONAL ARRAY
DEFINE SPOT AS A 1-DIMENSIONAL ARRAY
DEFINE SPOT.AC AS A 2-DIMENSIONAL ARRAY
DEFINE FLTARRAY AS A 2-DIMENSIONAL ARRAY
DEFINE HISTO.LAUNCHES AS A 2-DIMENSIONAL REAL ARRAY
DEFINE FLT.RECORD AS A 3-DIMENSIONAL REAL ARRAY


THE SYSTEM OWNS A HANGER.DECK, A BONE.FWD,
                A BONE.AFT, A SET.TEMP, A DELTA.PATTERN, A PLAN,
                A SCHEDULE, A REFUELER.Q, A TUG.Q, A SHIP, AN AV8.PLAN,
                A LOADER.Q, A LOAD.SET, AN ELEVATOR.Q, A SPOT.Q,
                AN AC.RDY.SET, AN AC.PRE.RDY.SET, AND AN AC.NOT.RDY.SET

DEFINE SCHEDULE AS A SET RANKED BY LOW FLT.TIME
DEFINE PLAN AS A SET RANKED BY LOW FLT.TIME
DEFINE AV8.PLAN AS A SET RANKED BY LOW FLT.TIME

DEFINE AC.ID, AC.TYPE, AC.LOCATION, DIST.TO.SHORE, NUM.FLTS,
       TUG, AC.LAUNCH.TIME,SPOTT, AC.DESTINATION, TYPES.AC, CYCLE.NUM,
       SPLIT.FLTS,  AC1, AC2, AC3, AC4, AC5, AC6, AC7, AC8, F1,
       AC9, AC10, AC11, AC12, FLIGHT1, FLIGHT2, FLIGHT3, SPOT1, SPOT2,
       REFUELER, NUM.AV8.RDY, NUM.EMERGENCY.RECOVERIES, BONE.TOTAL,
       NUM.PRIORITY.RECOVERIES, NUM.RECOVERIES, NUM.LAUNCHES,
       NUM.REPLACED.AC, NUM.CANCELLED.MISSIONS,
       NUM.OPEN.SPOTS, AC.SERVICE.FLAG AS INTEGER VARIABLES
DEFINE AC.FUEL.STAT, AC.LOAD.STAT, AC.PRIORITY, AC.OP.STAT, XBAR, SDEV,
       DELTA.UPDATE.TIME, HANGER.EQUIV, MAX.HANGER.EQUIV, AC.FLYING.TIME,
       LAST.LAUNCH.TIME, LAUNCH.DELAY, AC.DELTA.ARRIVAL.TIME, DELAY,
       NUM.AV8S.LOADED, TTARRIV.E, TTARRIV.H, TTARRIV.D, TTRECOVER,
       TTRESPOT, TTLOAD, TTFLY, TTUNLOAD, FLT.DELAY,
       LAST.RECOVERY.TIME, FLT.NUM, AC.TAKEOFF.TIME,
       HELO.MISSION.LENGTH, HELO.FLYING.TIME, HELO.RECOVER.TIME,
       AV8.MISSION.LENGTH, AV8.FLYING.TIME, AV8.RECOVER.TIME,
       AND DELTA AS REAL VARIABLES

DEFINE FILLER AS A TEXT VARIABLE

ACCUMULATE AVG.SPOT.Q AS THE MEAN, VAR.SPOT.Q AS THE VARIANCE,
           AND MAX.SPOT.Q AS THE MAXIMUM OF N.SPOT.Q
ACCUMULATE AVG.REFUELER.Q AS THE MEAN, VAR.REFUELER.Q AS THE VARIANCE,
           AND MAX.REFUELER.Q AS THE MAXIMUM OF N.REFUELER.Q
ACCUMULATE AVG.REFUELER AS THE MEAN, VAR.REFUELER AS THE VARIANCE,
           AND MAX.REFUELER AS THE MAXIMUM OF REFUELER
ACCUMULATE AVG.DELTA AS THE MEAN, VAR.DELTA AS THE VARIANCE,
           AND MAX.DELTA AS THE MAXIMUM OF N.DELTA.PATTERN
ACCUMULATE AVG.BONE.FWD AS THE MEAN, VAR.BONE.FWD AS THE VARIANCE,
           AND MAX.BONE.FWD AS THE MAXIMUM OF N.BONE.FWD
ACCUMULATE AVG.BONE.AFT AS THE MEAN, VAR.BONE.AFT AS THE VARIANCE,
           AND MAX.BONE.AFT AS THE MAXIMUM OF N.BONE.AFT
ACCUMULATE AVG.BONE.TOT AS THE MEAN, VAR.BONE.TOT AS THE VARIANCE,
           AND MAX.BONE.TOT AS THE MAXIMUM OF BONE.TOTAL
ACCUMULATE AVG.HANGER AS THE MEAN, VAR.HANGER AS THE VARIANCE,
           AND MAX.HANGER AS THE MAXIMUM OF N.HANGER.DECK
ACCUMULATE AVG.TUG.Q AS THE MEAN, VAR.TUG.Q AS THE VARIANCE,
           AND MAX.TUG.Q AS THE MAXIMUM OF N.TUG.Q
ACCUMULATE AVG.TUG AS THE MEAN, VAR.TUG AS THE VARIANCE,
           AND MAX.TUG AS THE MAXIMUM OF TUG
ACCUMULATE AVG.LOADER.Q AS THE MEAN, VAR.LOADER.Q AS THE VARIANCE,
           AND MAX.LOADER.Q AS THE MAXIMUM OF N.LOADER.Q
ACCUMULATE AVG.LOADER AS THE MEAN, VAR.LOADER AS THE VARIANCE,
           AND MAX.LOADER AS THE MAXIMUM OF N.LOAD.SET
ACCUMULATE AVG.ELEVATOR.Q AS THE MEAN, VAR.ELEVATOR.Q AS THE VARIANCE,
           AND MAX.ELEVATOR.Q AS THE MAXIMUM OF N.ELEVATOR.Q
TALLY      AVG.LAUNCH.DELAY AS THE MEAN, VAR.LAUNCH.DELAY AS THE
           VARIANCE, AND MAX.LAUNCH.DELAY AS THE MAXIMUM OF
           LAUNCH.DELAY
TALLY      AVG.HELO.FLYING.TIME AS THE MEAN, VAR.HELO.FLYING.TIME AS THE
           VARIANCE, MIN.HELO.FLYING.TIME AS THE MINIMUM, AND
           MAX.HELO.FLYING.TIME AS THE MAXIMUM OF HELO.FLYING.TIME
TALLY      AVG.AV8.FLYING.TIME AS THE MEAN, VAR.AV8.FLYING.TIME AS THE
           VARIANCE, MIN.AV8.FLYING.TIME AS THE MINIMUM, AND
           MAX.AV8.FLYING.TIME AS THE MAXIMUM OF AV8.FLYING.TIME
TALLY      AVG.HELO.MISSION.LENGTH AS THE MEAN, VAR.HELO.MISSION.LENGTH
           AS THE VARIANCE, MIN.HELO.MISSION.LENGTH AS THE
           MINIMUM, AND MAX.HELO.MISSION.LENGTH AS THE
```

```
             MAXIMUM OF HELO.MISSION.LENGTH
  TALLY      AVG.AV8.MISSION.LENGTH AS THE MEAN, VAR.AV8.MISSION.LENGTH
             AS THE VARIANCE, MIN.AV8.MISSION.LENGTH AS THE
             MINIMUM, AND MAX.AV8.MISSION.LENGTH AS THE
             MAXIMUM OF AV8.MISSION.LENGTH
  TALLY      AVG.HELO.RECOVER.TIME AS THE MEAN, VAR.HELO.RECOVER.TIME
             AS THE VARIANCE, MIN.HELO.RECOVER.TIME AS THE
             MINIMUM, AND MAX.HELO.RECOVER.TIME AS THE
             MAXIMUM OF HELO.RECOVER.TIME
  TALLY      AVG.AV8.RECOVER.TIME AS THE MEAN, VAR.AV8.RECOVER.TIME
             AS THE VARIANCE, MIN.AV8.RECOVER.TIME AS THE
             MINIMUM, AND MAX.AV8.RECOVER.TIME AS THE
             MAXIMUM OF AV8.RECOVER.TIME
  TALLY      AVG.TTLOAD AS THE MEAN, VAR.TTLOAD AS THE
             VARIANCE, MIN.TTLOAD AS THE MINIMUM, AND
             MAX.TTLOAD AS THE MAXIMUM OF TTLOAD
  TALLY      AVG.TTRESPOT AS THE MEAN, VAR.TTRESPOT AS THE
             VARIANCE, MIN.TTRESPOT AS THE MINIMUM, AND
             MAX.TTRESPOT AS THE MAXIMUM OF TTRESPOT
  TALLY      AVG.TTRECOVER AS THE MEAN, VAR.TTRECOVER AS THE
             VARIANCE, MIN.TTRECOVER AS THE MINIMUM, AND
             MAX.TTRECOVER AS THE MAXIMUM OF TTRECOVER
  TALLY      AVG.TTARRIV.E AS THE MEAN, VAR.TTARRIV.E AS THE
             VARIANCE, MIN.TTARRIV.E AS THE MINIMUM, AND
             MAX.TTARRIV.E AS THE MAXIMUM OF TTARRIV.E
  TALLY      AVG.TTARRIV.D AS THE MEAN, VAR.TTARRIV.D AS THE
             VARIANCE, MIN.TTARRIV.D AS THE MINIMUM, AND
             MAX.TTARRIV.D AS THE MAXIMUM OF TTARRIV.D
  TALLY      AVG.TTARRIV.H AS THE MEAN, VAR.TTARRIV.H AS THE
             VARIANCE, MIN.TTARRIV.H AS THE MINIMUM, AND
             MAX.TTARRIV.H AS THE MAXIMUM OF TTARRIV.H
  TALLY      AVG.TTUNLOAD AS THE MEAN, VAR.TTUNLOAD AS THE
             VARIANCE, MIN.TTUNLOAD AS THE MINIMUM, AND
             MAX.TTUNLOAD AS THE MAXIMUM OF TTUNLOAD
END
```

```
MAIN

  LET BETWEEN.V = 'TRACE'
  RESERVE SPOT AS 12
  USE 3 FOR INPUT

  READ CYCLE.NUM
  FOR I = 1 TO 9, DO
      READ FILLER,SEED.V(I)
  LOOP

  USE 1 FOR INPUT

  OPEN 2 FOR OUTPUT
  USE 2 FOR OUTPUT

  PRINT 1 LINE WITH CYCLE.NUM THUS
 **
  FOR I = 1 TO 9, DO
      PRINT 1 LINE WITH I,SEED.V(I) THUS
SEED * = **************
  LOOP

  ADD 1 TO CYCLE.NUM

  READ MAX.HANGER.EQUIV
  PRINT 1 LINE WITH MAX.HANGER.EQUIV THUS
    HANGER IS CAPABLE OF SLASHING ** CH-46 EQUIVALENTS
  READ DIST.TO.SHORE
  PRINT 1 LINE WITH DIST.TO.SHORE THUS
    DISTANCE TO SHORE:  ***** METERS

  READ TYPES.AC
  PRINT 1 LINE WITH TYPES.AC THUS
    TYPES.AC = **
  RESERVE TYPE.AC AS TYPES.AC
  RESERVE SPEED.AC AS TYPES.AC
  RESERVE FUELCAP.AC AS TYPES.AC
  RESERVE FUELUSE.AC AS TYPES.AC
  RESERVE TTREFUEL.AC AS TYPES.AC
  RESERVE TTLOAD.AC AS TYPES.AC
  RESERVE S.TTLOAD.AC AS TYPES.AC
  RESERVE TTRESPOT.AC AS TYPES.AC
  RESERVE S.TTRESPOT.AC AS TYPES.AC
  RESERVE TTRECOVER.AC AS TYPES.AC
  RESERVE S.TTRECOVER.AC AS TYPES.AC
  RESERVE TTARRIV.E.AC AS TYPES.AC
  RESERVE S.TTARRIV.E.AC AS TYPES.AC
  RESERVE EMERGENCY.STAT.AC AS TYPES.AC
  RESERVE PRIORITY.STAT.AC AS TYPES.AC
  RESERVE TTUNLOAD.AC AS TYPES.AC
  RESERVE SPOT.AC AS TYPES.AC BY 8
  RESERVE NUM.LAUNCHES.AC AS TYPES.AC
  RESERVE HISTO.LAUNCHES AS TYPES.AC BY 50
  FOR I = 1 TO TYPES.AC, DO
     READ TYPE.AC(I), SPEED.AC(I), FUELCAP.AC(I), FUELUSE.AC(I),
          TTREFUEL.AC(I), TTLOAD.AC(I), S.TTLOAD.AC(I), TTRECOVER.AC(I),
          S.TTRECOVER.AC(I), TTRESPOT.AC(I), S.TTRESPOT.AC(I),
          TTARRIV.E.AC(I), S.TTARRIV.E.AC(I), EMERGENCY.STAT.AC(I),
          PRIORITY.STAT.AC(I), TTUNLOAD.AC(I), SPOT.AC(I,1),
          SPOT.AC(I,2), SPOT.AC(I,3), SPOT.AC(I,4), SPOT.AC(I,5),
          SPOT.AC(I,6), SPOT.AC(I,7), SPOT.AC(I,8)
..     PRINT 1 LINE WITH
..          TYPE.AC(I), SPEED.AC(I), FUELCAP.AC(I), FUELUSE.AC(I),
..          TTREFUEL.AC(I), TTLOAD.AC(I), S.TTLOAD.AC(I), TTRECOVER.AC(I),
..          S.TTRECOVER.AC(I), TTRESPOT.AC(I), S.TTRESPOT.AC(I),
..          TTARRIV.E.AC(I), S.TTARRIV.E.AC(I), EMERGENCY.STAT.AC(I),
..          PRIORITY.STAT.AC(I), TTUNLOAD.AC(I), SPOT.AC(I,1),
..          SPOT.AC(I,2), SPOT.AC(I,3), SPOT.AC(I,4), SPOT.AC(I,5),
..          SPOT.AC(I,6), SPOT.AC(I,7), SPOT.AC(I,8)
..          **  *.*  **  *.*  *.*  **.*  * * * * * * * *
  LOOP

  READ N.ACE
  PRINT 1 LINE WITH N.ACE THUS
       NUM AC :  **
  RESERVE ETA AS N.ACE
  RESERVE INDEX AS N.ACE
  CREATE EVERY ACE
  FOR EACH ACE, DO
     READ AC.ID(ACE), AC.LOCATION(ACE), AC.FUEL.STAT(ACE),
          AC.LOAD.STAT(ACE), AC.OP.STAT(ACE), AND AC.TYPE(ACE)
     PRINT I LINE WITH AC.ID(ACE), AC.LOCATION(ACE), AC.FUEL.STAT(ACE),
           AC.LOAD.STAT(ACE), AC.OP.STAT(ACE), AND AC.TYPE(ACE) THUS
       ID: **  LOC: *  FUEL: *.**  LOAD: *.**  OP: *.**  TYPE: **
     LET AC.FLYING.TIME(ACE) = (AC.FUEL.STAT(ACE)/FUELUSE.AC(AC.TYPE(ACE)))
                             * 60.
     IF AC.LOCATION(ACE) <= 6
           SPOT(AC.LOCATION(ACE)) = AC.ID(ACE)
     ELSE
        IF AC.LOCATION(ACE) = 7
           FILE ACE IN BONE.FWD
        ALWAYS
        IF AC.LOCATION(ACE) = 8
           FILE ACE IN BONE.AFT
        ALWAYS
        IF AC.LOCATION(ACE) = 9
           LET AC.DESTINATION(ACE) = 9
           LET AC.PRIORITY(ACE) = 1 - (AC.FUEL.STAT(ACE) * .2)
           FILE ACE IN DELTA.PATTERN
           FILE THIS ACE IN SPOT.Q
        ALWAYS
        IF AC.LOCATION(ACE) = 12
           FILE ACE IN HANGER.DECK
           IF AC.TYPE(ACE) = 2
              ADD 1.5 TO HANGER.EQUIV
           ELSE
              ADD 1 TO HANGER.EQUIV
           ALWAYS
        ALWAYS
     ALWAYS
     LET AC.LAUNCH.TIME(ACE) = 9999
     LET AC.SERVICE.FLAG(ACE) = 0
     FILE THIS ACE IN THE SHIP
  LOOP
  READ NUM.FLTS
  LET SPLIT.FLTS = 0
  RESERVE F AS (NUM.FLTS + 100)
  RESERVE FLTARRAY AS (NUM.FLTS + 100) BY 6
  RESERVE FLT.RECORD AS NUM.FLTS BY 10 BY 2
  PRINT 1 LINE WITH NUM.FLTS THUS
    # SCHEDULED FLIGHTS = **
  FOR I = 1 TO NUM.FLTS, DO
     CREATE A FLIGHTE CALLED F(I)
     LET FLT.NUM(F(I)) = I
     READ FLT.TIME(F(I)), FLT.AC.TYPE(F(I)), FLT.AC.NUM(F(I))
       PRINT 1 LINE WITH I,FLT.TIME(F(I)),FLT.AC.TYPE(F(I)),
                             FLT.AC.NUM(F(I))
       THUS
         I : ** FLIGHT.TIME : ****   AC.TYPE : **  #AC : **
     LET FLT.RECORD(I,1,1) = FLT.TIME(F(I))
     LET FLT.RECORD(I,1,2) = FLT.AC.NUM(F(I)) + 1
     FOR J = 1 TO FLT.AC.NUM(F(I)), DO
        READ SPOTT
        FOR EACH ACE IN THE SHIP,
           WITH AC.ID(ACE) = SPOTT
        FIND THE FIRST CASE
        LET FLT.RECORD(I,J+1,1) = SPOTT
        IF AC.LAUNCH.TIME(ACE) = 9999
           LET AC.LAUNCH.TIME(ACE) = FLT.TIME(F(I))
           IF ((AC.TYPE(ACE) = 3) AND (AC.LOCATION(ACE) = 12))
              FILE ACE IN ELEVATOR.Q
              LET AC.DESTINATION(ACE) = 8
           ALWAYS
        ALWAYS
        LET FLTARRAY(I,J) = SPOTT
     LOOP
     FILE F(I) IN SCHEDULE
  LOOP

  LET NUM.OPEN.SPOTS = 0
  FOR I = 1 TO 6, DO
     IF SPOT(I) = 0
        ADD 1 TO NUM.OPEN.SPOTS
     ALWAYS
  LOOP
  PRINT 1 LINE WITH NUM.OPEN.SPOTS THUS
NUM.OPEN.SPOTS = **

  REMOVE FIRST FLIGHTE FROM SCHEDULE
  IF (FLT.TIME(FLIGHTE) - TIME.V) > 40
     SCHEDULE A DECK.DECISION GIVING FLIGHTE IN
                                (FLT.TIME(FLIGHTE)-TIME.V-40) MINUTES
  ELSE
     SCHEDULE A DECK.DECISION GIVING FLIGHTE NOW
  ALWAYS
  FILE FLIGHTE IN SCHEDULE
  READ STOP.SIM.TIME
  SCHEDULE A STOP.SIMULATION IN STOP.SIM.TIME MINUTES

  LET LAST.RECOVERY.TIME = 0
  LET LAST.LAUNCH.TIME = 0

IF N.DELTA.PATTERN > 0
   SCHEDULE A DELTA.UPDATE.CHK IN 5 MINUTES
ALWAYS

  START SIMULATION
END
```

```
''************************************************************************
EVENT AC.LAUNCHED GIVEN AC, T.FLT.NUM
''************************************************************************

  DEFINE AC, T.FLT.NUM AS INTEGER VARIABLES

  PRINT 1 LINE WITH AC.ID(AC),AC.FUEL.STAT(AC),AC.LOAD.STAT(AC),
                    AC.OP.STAT(AC) THUS
AC ** WITH FUEL *.**    AND LOAD *.**  HAS OP.STAT *.**


''    SET THE AC.LAUNCHED VARIABLES AND SCHEDULE A DELTA ARRIVAL.


IF AC.LOCATION(AC) < 9

  IF T.FLT.NUM = 0
     FOR EACH FLIGHTE IN PLAN
         FOR EACH ACE IN FLT.WAVE(FLIGHTE)
             WITH ACE = AC
     FIND THE FIRST CASE
     IF FOUND
        LET T.FLT.NUM = INT.F(FLT.NUM(FLIGHTE))
     ELSE
        PRINT 1 LINE THUS
        **ERROR** FLIGHT NOT FOUND
     ALWAYS
  ALWAYS

  IF SPOT(AC.LOCATION(AC)) = AC.ID(AC)
     LET SPOT(AC.LOCATION(AC)) = 0
     ADD 1 TO NUM.OPEN.SPOTS
  ELSE
     PRINT 1 LINE THUS
THIS SPOT WAS CLEARED FOR AN EMERGENCY RECOVERY
  ALWAYS
  PRINT 1 LINE WITH NUM.OPEN.SPOTS THUS
#OPEN SPOTS = ***
  LET AC.TAKEOFF.TIME(AC) = TIME.V
  IF TIME.V > LAST.LAUNCH.TIME
     LET LAST.LAUNCH.TIME = TIME.V
  ALWAYS
  ADD 1 TO NUM.LAUNCHES
  LET LAUNCH.DELAY = TIME.V - AC.LAUNCH.TIME(AC)
PRINT 1 LINE WITH AC.ID(AC),AC.LOCATION(AC),LAUNCH.DELAY THUS
      AC ** LAUNCHES FROM **  WITH DELAY ***.**
  LET AC.LOAD.STAT(AC) = 0
  LET AC.RECOVERY.TIME(AC) = 0
  LET AC.LOCATION(AC) = 10 '' AC IS IN FLIGHT
  LET AC.DESTINATION(AC) = 9

  LET TTFLY= (((DIST.TO.SHORE / SPEED.AC(AC.TYPE(AC))) / 60) * 2)
  LET TTUNLOAD = (((BETA.F(1.5,3.0,6)) * ((TTUNLOAD.AC(AC.TYPE(AC)))*2.))
                + (TTUNLOAD.AC(AC.TYPE(AC)))) / 3.
  LET ETA(AC.ID(AC)) = TIME.V + TTFLY + TTUNLOAD

   IF AC.TYPE(AC) <> 3
      LET HELO.MISSION.LENGTH = TTFLY + TTUNLOAD
   ELSE ''AC IS AV8
      LET AV8.MISSION.LENGTH = TTFLY + TTUNLOAD
  ALWAYS

  LET AC.FUEL.STAT(AC) = (AC.FUEL.STAT(AC) - ((1.15) *       ''FUEL CONSUMPTION
                       (FUELUSE.AC(AC.TYPE(AC))*(ETA(AC.ID(AC))-TIME.V)/60))) '
  LET AC.FLYING.TIME(AC) =(AC.FUEL.STAT(AC) / FUELUSE.AC(AC.TYPE(AC))) * 60.
  LET AC.PRIORITY(AC) = 1 - AC.FUEL.STAT(AC) * .2
PRINT 1 LINE WITH AC.ID(AC),ETA(AC.ID(AC)),AC.PRIORITY(AC),
                  AC.FLYING.TIME(AC) THUS
AC ** WILL ARRIVE TO DELTA AT ** WITH PRIORITY *.** AND FLYING.TIME ***.*
  SCHEDULE A DELTA.ARRIVAL  GIVING AC IN (ETA(AC.ID(AC))-TIME.V) MINUTES

  ADD 1 TO NUM.LAUNCHES.AC(AC.TYPE(AC))
  LET HISTO.LAUNCHES(AC.TYPE(AC),NUM.LAUNCHES.AC(AC.TYPE(AC))) = TIME.V
  FOR I = 1 TO FLT.RECORD(T.FLT.NUM,1,2)
      WITH FLT.RECORD(T.FLT.NUM,I,1) = AC.ID(AC)
  FIND THE FIRST CASE
  IF NONE
     ADD 1 TO FLT.RECORD(T.FLT.NUM,1,2)
  '' I IS ALREADY INCREMENTED FROM THE FOR LOOP..
     LET FLT.RECORD(T.FLT.NUM,I,1) = AC.ID(AC)
  ALWAYS
  LET FLT.RECORD(T.FLT.NUM,I,2) = TIME.V
  PRINT 1 LINE WITH FLT.RECORD(T.FLT.NUM,1,1),FLT.RECORD(T.FLT.NUM,1,2),
               FLT.RECORD(T.FLT.NUM,I,1),FLT.RECORD(T.FLT.NUM,I,2) THUS
FLIGHT AT **** WITH ** AC LAUNCHES AC ** AT ****.*

  FOR EACH FLIGHTE IN THE SCHEDULE
     FOR I = 1 TO FLT.AC.NUM(FLIGHTE)
       WITH AC.ID(AC) = FLTARRAY(FLT.NUM(FLIGHTE),I)
  FIND THE FIRST CASE
  IF FOUND
     LET AC.LAUNCH.TIME(AC) = FLT.TIME(FLIGHTE)
  ELSE
     LET AC.LAUNCH.TIME(AC) = 9999
  ALWAYS
ELSE
   PRINT 1 LINE WITH AC.ID(AC) THUS
   AC ** HAS ALREADY LAUNCHED
ALWAYS
RETURN
END
```

```
''**********************************************************************
EVENT AC.LOADED GIVEN AC
''**********************************************************************

  DEFINE AC,L.TIME AS INTEGER VARIABLES

  PRINT 1 LINE WITH AC.ID(AC),AC.FUEL.STAT(AC),AC.LOAD.STAT(AC),
                      AC.OP.STAT(AC) THUS
AC ** WITH FUEL *.**   AND LOAD *.**  HAS OP.STAT *.***

 LET AC.SERVICE.FLAG(AC) = 0

 IF AC.LOAD.STAT(AC) < 1
  LET AC.OP.STAT(AC) = AC.OP.STAT(AC) + .2*(1.0 - AC.LOAD.STAT(AC))
  LET AC.LOAD.STAT(AC) = 1.0
  IF AC.TYPE(AC) = 3
     REMOVE AC FROM LOAD.SET
     IF N.LOAD.SET < 2
        IF N.LOADER.Q > 0
           REMOVE FIRST ACE FROM LOADER.Q
           LET XBAR = TTLOAD.AC(AC.TYPE(ACE))
           LET SDEV = S.TTLOAD.AC(AC.TYPE(ACE))
           LET TTLOAD = NORMAL.F(XBAR,SDEV,3)
               + (NUM.AV8S.LOADED / 4.)
           ADD 1 TO NUM.AV8S.LOADED
           SCHEDULE AN AC.LOADED GIVING ACE
              IN TTLOAD MINUTES
           LET AC.SERVICE.FLAG(ACE) = 1
           FILE ACE IN LOAD.SET
           PRINT 1 LINE WITH N.LOAD.SET THUS
   N.LOAD.SET= **
        ALWAYS
     ALWAYS
  ALWAYS
 ELSE
  PRINT 1 LINE THUS
THIS AC LOADED PREVIOUSLY
 ALWAYS

IF (AC.OP.STAT(AC) < 1.01) AND (AC.OP.STAT(AC) > .99)
   LET AC.OP.STAT(AC) = 1.00
ALWAYS

  IF AC.OP.STAT(AC) > 1
     PRINT 1 LINE THUS
**ERROR**  AC.OP.STAT > 1
  ALWAYS
  IF AC.OP.STAT(AC) < 1
     PRINT 1 LINE THUS
**ERROR**  AC.OP.STAT < 1
  ALWAYS
  PRINT 1 LINE WITH AC.OP.STAT(AC) THUS
  AC.OP.STAT(AC) : *.***

  PRINT 1 LINE WITH TIME.V,N.PLAN THUS
  AT ****.**  THERE ARE ** FLIGHTS IN THE PLAN

 IF AC.LAUNCH.TIME(AC) <= (TIME.V + 40)
    FOR EACH FLIGHTE IN THE PLAN,
       FOR EACH ACE IN FLT.WAVE(FLIGHTE)
           WITH AC.ID(AC) = AC.ID(ACE)
    FIND THE FIRST CASE
    IF FOUND
       PRINT 1 LINE WITH AC.ID(AC),AC.ID(ACE) THUS
       AC.ID(AC) :  **   AC.ID(ACE) :  **
       ADD 1 TO FLT.AC.RDY(FLIGHTE)
       PRINT 1 LINE WITH FLT.AC.RDY(FLIGHTE) THUS
       #RDY AC IN FLIGHT = **
       IF AC.TYPE(ACE) <= 2  ''  HELO READY TO LAUNCH...CHECK LAUNCH TIME
          IF FLT.AC.RDY(FLIGHTE) = N.FLT.WAVE(FLIGHTE)
             SCHEDULE A FLIGHT.LAUNCH GIVING FLIGHTE IN .5 MINUTES
             PRINT 1 LINE THUS
             FLIGHT.LAUNCH HAS BEEN SCHEDULED
          ALWAYS
       ELSE  ''  AVB READY TO LAUNCH/RESPOT.....
             ''  IN BOTH CASES, MUST ALSO CHECK OP.STAT, LOCATION,WAVE?
          IF (FLT.TIME(FLIGHTE) - TIME.V) <= 40
             IF FLT.AC.RDY(FLIGHTE) = N.FLT.WAVE(FLIGHTE)
                FOR EACH ACE IN FLT.WAVE(FLIGHTE), DO
                     FILE ACE IN SPOT.Q
                     PRINT 1 LINE WITH ACE THUS
                     AC ** FILED IN SPOT.Q
                LOOP
                SCHEDULE A SPOT.OPEN NOW   ''THIS CAUSES THESE AVBS TO BE CONS
             ALWAYS
          ALWAYS
       ALWAYS
    ELSE
       PRINT 1 LINE WITH TIME.V,EVENT.V,AC.ID(AC) THUS
**ERROR** 1:: TIME = ****.**  EVENT = **  AC.ID(AC) = **
    ALWAYS
 ALWAYS
 RETURN
 END
```

```
''*********************************************************************
EVENT AC.REFUELED GIVEN AC
''*********************************************************************

  DEFINE AC AS AN INTEGER VARIABLE

  PRINT 1 LINE WITH AC.ID(AC),AC.FUEL.STAT(AC),AC.LOAD.STAT(AC),
                    AC.OP.STAT(AC) THUS
AC ** WITH FUEL *.**   AND LOAD *.**  HAS OP.STAT *.**

 LET AC.SERVICE.FLAG(AC) = 0

 IF ((AC.FUEL.STAT(AC) < 1) AND (AC.LOCATION(AC) < 9))
    LET AC.OP.STAT(AC) = AC.OP.STAT(AC) + (.2)*(1.0 - AC.FUEL.STAT(AC))
    LET AC.FUEL.STAT(AC) = 1.0
    LET AC.FLYING.TIME(AC) = (AC.FUEL.STAT(AC) / FUELUSE.AC(AC.TYPE(AC)))
                             * 60.
    IF AC.OP.STAT(AC) > 1
       PRINT 1 LINE THUS
**ERROR**  AC.OP.STAT > 1
    ALWAYS
PRINT 1 LINE WITH AC.OP.STAT(AC),AC.FLYING.TIME(AC) THUS
  AC.OP.STAT(AC) : *.**  FLYING.TIME = ***.*
  IF AC.LAUNCH.TIME(AC) < (TIME.V + 40)
    IF AC.LOCATION(AC) < 7
       LET TTLOAD = 1.+ BETA.F(1.5,3.0,3)
                 * TTLOAD.AC(AC.TYPE(AC))
       IF (AC.LAUNCH.TIME(AC) - TIME.V) < 10
          SCHEDULE AN AC.LOADED GIVING AC
              IN TTLOAD MINUTES
       ELSE
          SCHEDULE AN AC.LOADED GIVING AC AT
            (AC.LAUNCH.TIME(AC) - 10. + TTLOAD)
       ALWAYS
       LET AC.SERVICE.FLAG(AC) = 1
    ELSE
       IF AC.TYPE(AC) = 1
          REMOVE THIS AC FROM BONE.FWD
          FILE THIS AC IN BONE.FWD
       ELSE
          REMOVE THIS AC FROM BONE.AFT
          FILE THIS AC IN BONE.AFT
          IF AC.TYPE(AC) = 3
            IF M.LOAD.SET(AC) <> 1
             IF N.LOAD.SET < 2
                FILE AC IN LOAD.SET
                PRINT 1 LINE WITH N.LOAD.SET THUS
   N.LOAD.SET= **
                LET XBAR = TTLOAD.AC(AC.TYPE(AC))
                LET SDEV = S.TTLOAD.AC(AC.TYPE(AC))
                LET TTLOAD = NORMAL.F(XBAR,SDEV,3)
                      + (NUM.AV8S.LOADED / 4.)
                ADD 1 TO NUM.AV8S.LOADED
                SCHEDULE AN AC.LOADED GIVING AC
                     IN TTLOAD MINUTES
                LET AC.SERVICE.FLAG(AC) = 1
             ELSE
                IF M.LOADER.Q(AC) <> 1
                   FILE AC IN LOADER.Q
                ALWAYS
             ALWAYS
            ELSE
               PRINT 1 LINE THUS
AV8 IS ALREADY BEING LOADED
               LET AC.SERVICE.FLAG(AC) = 1
            ALWAYS
          ALWAYS
       ALWAYS
    ALWAYS
    IF (AC.TYPE(AC) < 3) AND (AC.DESTINATION(AC) < 7)
       IF TUG < 4
          LET TUG = TUG + 1
          LET XBAR = TTRESPOT.AC(AC.TYPE(AC))
          LET SDEV = S.TTRESPOT.AC(AC.TYPE(AC))
          LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
          SCHEDULE AN AC.RESPOTTED GIVING AC IN TTRESPOT MINUTES
       ELSE
          FILE AC IN TUG.Q
PRINT 1 LINE WITH AC THUS
AC ** FILED IN TUG.Q
       ALWAYS
    ALWAYS
  ELSE
    IF AC.TYPE(AC) = 3
      IF M.LOAD.SET(AC) <> 1
         IF N.LOAD.SET < 2
            FILE AC IN LOAD.SET
            PRINT 1 LINE WITH N.LOAD.SET THUS
    N.LOAD.SET= **
            LET XBAR = TTLOAD.AC(AC.TYPE(AC))
            LET SDEV = S.TTLOAD.AC(AC.TYPE(AC))
            LET TTLOAD = NORMAL.F(XBAR,SDEV,3)
                + (NUM.AV8S.LOADED / 4.)
            ADD 1 TO NUM.AV8S.LOADED
            SCHEDULE AN AC.LOADED GIVING AC
                IN TTLOAD MINUTES
            LET AC.SERVICE.FLAG(AC) = 1
         ELSE
            IF M.LOADER.Q(AC) <> 1
               FILE AC IN LOADER.Q
            ALWAYS
         ALWAYS
      ELSE
         PRINT 1 LINE THUS
AV8 IS ALREADY BEING LOADED
         LET AC.SERVICE.FLAG(AC) = 1
      ALWAYS
    ALWAYS
  ALWAYS
 ELSE
    PRINT 1 LINE THUS
THIS AC HAS ALREADY BEEN REFUELED
 ALWAYS
  SUSTRACT 1 FROM REFUELER
  IF N.REFUELER.Q. > 0
     REMOVE FIRST ACE FROM REFUELER.Q
     ADD 1 TO REFUELER
     LET DELAY = NORMAL.F(1.,.25,4)
     SCHEDULE AN AC.REFUELED GIVING ACE
         IN ((1. - AC.FUEL.STAT(ACE)) *
         TTREFUEL.AC(AC.TYPE(ACE))) + DELAY MINUTES
     LET AC.SERVICE.FLAG(ACE) = 1
     IF AC.TYPE(ACE) = 3
        IF M.LOAD.SET(ACE) <> 1
           IF N.LOAD.SET < 2
              FILE ACE IN LOAD.SET
              PRINT 1 LINE WITH N.LOAD.SET THUS
    N.LOAD.SET= **
              LET XBAR = TTLOAD.AC(AC.TYPE(ACE))
              LET SDEV = S.TTLOAD.AC(AC.TYPE(ACE))
              LET TTLOAD = NORMAL.F(XBAR,SDEV,3)
                 + (NUM.AV8S.LOADED / 4.)
              ADD 1 TO NUM.AV8S.LOADED
              SCHEDULE AN AC.LOADED GIVING ACE
                IN TTLOAD MINUTES
              LET AC.SERVICE.FLAG(ACE) = 1
           ELSE
              IF M.LOADER.Q(ACE) <> 1
                 FILE ACE IN LOADER.Q
              ALWAYS
           ALWAYS
        ELSE
           PRINT 1 LINE THUS
AV8 IS ALREADY BEING LOADED
           LET AC.SERVICE.FLAG(ACE) = 1
        ALWAYS
     ALWAYS
  ALWAYS
  RETURN
  END
```

```
''********************************************************************
EVENT AC.RECOVERED GIVEN AC
''********************************************************************

  DEFINE AC, FLAG AS INTEGER VARIABLES

  PRINT 1 LINE WITH AC.ID(AC),AC.FUEL.STAT(AC),AC.LOAD.STAT(AC),
                    AC.OP.STAT(AC) THUS
AC ** WITH FUEL *.**   AND LOAD *.**  HAS OP.STAT *.**

  REMOVE THIS AC FROM DELTA.PATTERN
  ADD 1 TO NUM.RECOVERIES
  LET AC.RECOVERY.TIME(AC) = TIME.V
  IF AC.TAKEOFF.TIME(AC) > 0
     IF AC.TYPE(AC) <> 3
        LET HELO.FLYING.TIME = AC.RECOVERY.TIME(AC) - AC.TAKEOFF.TIME(AC)
        LET HELO.RECOVER.TIME = AC.RECOVERY.TIME(AC)
                              - AC.DELTA.ARRIVAL.TIME(AC)
     ELSE
        LET AV8.FLYING.TIME = AC.RECOVERY.TIME(AC) - AC.TAKEOFF.TIME(AC)
        LET AV8.RECOVER.TIME = AC.RECOVERY.TIME(AC)
                             - AC.DELTA.ARRIVAL.TIME(AC)
     ALWAYS
  ALWAYS
  LET AC.LOCATION(AC) = AC.DESTINATION(AC)
  LET SPOT(AC.DESTINATION(AC)) = AC.ID(AC)
  LET AC.PRIORITY(AC) = 0
  LET AC.OP.STAT(AC) = AC.OP.STAT(AC) - (.2)*(1. - AC.LOAD.STAT(AC))
                                      - (.2)*(1. - AC.FUEL.STAT(AC))

  LET FLAG = 0
  FOR I = 1 TO SPOT.AC(AC.TYPE(AC),7),
     WITH SPOT.AC(AC.TYPE(AC),I) = AC.LOCATION(AC)
  FIND THE FIRST CASE
  IF NONE
     LET FLAG = 1
  ALWAYS

  IF N.AV8.PLAN > 0
     REMOVE THE FIRST FLIGHTE FROM AV8.PLAN
     LET AV8.LAUNCH.TIME = FLT.TIME(FLIGHTE)
     FILE THIS FLIGHTE IN AV8.PLAN
  ELSE
     LET AV8.LAUNCH.TIME = 9999
  ALWAYS

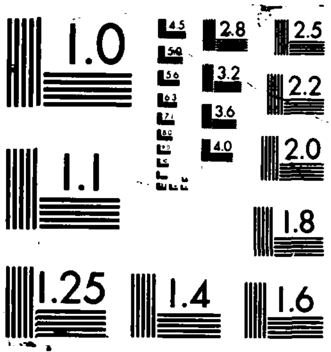
  PRINT 1 LINE WITH AC.LAUNCH.TIME(AC), AC.LOCATION(AC), N.SPOT.Q,
                    NUM.OPEN.SPOTS, AV8.LAUNCH.TIME THUS
TO TIME= ****    LOC= **    N.SPOT.Q= **    NUM.OPEN.SPOTS= **  AV8 TO TIME= **

  IF (AC.LAUNCH.TIME(AC) > (40+TIME.V))
        OR ((AV8.LAUNCH.TIME < AC.LAUNCH.TIME(AC))
            AND (AC.LOCATION(AC) <= 2)) OR (FLAG = 1)
    IF AC.TYPE(AC) = 1
       IF N.BONE.FWD < 5
          LET AC.DESTINATION(AC) = 7
          IF TUG < 4
             LET TUG = TUG + 1
             LET XBAR = TTRESPOT.AC(AC.TYPE(AC))
             LET SDEV = S.TTRESPOT.AC(AC.TYPE(AC))
```

AD-A182 192 SIMULATION AND ANALYSIS OF FLIGHT DECK OPERATIONS ON AN LHA(U) CENTER FOR NAVAL ANALYSES ALEXANDRIA VA MARINE CORPS OPERATIONS ANALYSIS GROUP S M GATES JUN 87 2/2

UNCLASSIFIED CNA-PP-456 N00014-87-C-0001 F/G 1/2 NL

END



CROCOPY RESOLUTION TEST CHART

```
             LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
             SCHEDULE A BONE.ARRIVAL GIVING AC IN TTRESPOT MINUTES
          ELSE
             FILE THIS AC IN TUG.Q
PRINT 1 LINE WITH AC THUS
AC ** FILED IN TUG.Q
          ALWAYS
          FILE AC IN BONE.FWD
PRINT 1 LINE WITH AC THUS
AC ** FILED IN BONE
       ELSE   ''N.BONE.FWD >= 5
          IF AC.LAUNCH.TIME(AC) < 9999
             LET AC.DESTINATION(AC) = 7
             IF TUG < 4
                LET TUG = TUG + 1
                LET XBAR = TTRESPOT.AC(AC.TYPE(AC))
                LET SDEV = S.TTRESPOT.AC(AC.TYPE(AC))
                LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
                SCHEDULE A BONE.ARRIVAL GIVING AC IN TTRESPOT MINUTES
             ELSE
                FILE THIS AC IN TUG.Q
PRINT 1 LINE WITH AC THUS
AC ** FILED IN TUG.Q
             ALWAYS
             FILE AC IN BONE.FWD
PRINT 1 LINE WITH AC THUS
AC ** FILED IN BONE
             REMOVE THE LAST ACE FROM BONE.FWD
             IF (AC.LAUNCH.TIME(ACE)=9999)
                LET AC.DESTINATION(ACE) = 12
                IF (SPOT(11) = 0) AND (HANGER.EQUIV < MAX.HANGER.EQUIV)
                   LET SPOT(11) = -AC.ID(ACE)
                   IF TUG < 4
                      ADD 1 TO TUG
                      LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
                      LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
                      LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
                      SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                                 IN  TTARRIV.E MINUTES
                   ELSE
                      FILE ACE IN TUG.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN TUG.Q
                   ALWAYS
                ELSE
                   IF N.ELEVATOR.Q(ACE) <> 1
                      FILE ACE IN ELEVATOR.Q
                   ALWAYS
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN ELEVATOR.Q
                ALWAYS
             ALWAYS
             FILE ACE IN BONE.FWD
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN BONE
          ELSE
             PRINT 1 LINE WITH AC.ID(AC),AC.LOCATION(AC) THUS
     AC ** AT LOCATION ** CANNOT RESPOT TO FWD.BONE...5 AC ALREADY THERE
             LET AC.DESTINATION(AC) = 12
             IF (SPOT(11) = 0) AND (HANGER.EQUIV < MAX.HANGER.EQUIV)
```

```
                LET SPOT(11) = -AC.ID(AC)
                IF TUG < 4
                   ADD 1 TO TUG
                   LET XBAR = TTARRIV.E.AC(AC.TYPE(AC))
                   LET SDEV = S.TTARRIV.E.AC(AC.TYPE(AC))
                   LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
                   SCHEDULE AN ELEVATOR.ARRIVAL GIVING AC
                            IN  TTARRIV.E MINUTES
                ELSE
                   FILE AC IN TUG.Q
PRINT 1 LINE WITH AC THUS
AC ** FILED IN TUG.Q
                ALWAYS
             ELSE
                IF M.ELEVATOR.Q(AC) <> 1
                   FILE THIS AC IN ELEVATOR.Q
                ALWAYS
PRINT 1 LINE WITH AC THUS
AC ** FILED IN ELEVATOR.Q
             ALWAYS
          ALWAYS
       ALWAYS
    ELSE
       IF N.BONE.AFT < 7
          LET AC.DESTINATION(AC) = 8
          IF AC.TYPE(AC) < 3
             IF TUG < 4
                LET TUG = TUG + 1
                LET XBAR = TTRESPOT.AC(AC.TYPE(AC))
                LET SDEV = S.TTRESPOT.AC(AC.TYPE(AC))
                LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
                SCHEDULE A BONE.ARRIVAL GIVING AC
                         IN TTRESPOT MINUTES
             ELSE
                FILE THIS AC IN TUG.Q
PRINT 1 LINE WITH AC THUS
AC ** FILED IN TUG.Q
             ALWAYS
          ELSE
             LET XBAR = TTRESPOT.AC(AC.TYPE(AC))
             LET SDEV = S.TTRESPOT.AC(AC.TYPE(AC))
             LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
             SCHEDULE A BONE.ARRIVAL GIVING AC IN TTRESPOT/2 MINUTES
          ALWAYS
          FILE AC IN BONE.AFT
PRINT 1 LINE WITH AC THUS
AC ** FILED IN BONE
       ELSE   ''N.BONE.AFT >=7
          IF AC.LAUNCH.TIME(AC) < 9999
             LET AC.DESTINATION(AC) = 8
             LET XBAR = TTRESPOT.AC(AE.TYPE(AC))
             LET SDEV = S.TTRESPOT.AC(AC.TYPE(AC))
             LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
             IF AC.TYPE(AC) < 3
                IF TUG < 4
                   LET TUG = TUG + 1
                   SCHEDULE A BONE.ARRIVAL GIVING AC
                            IN TTRESPOT MINUTES
                ELSE
                   FILE THIS AC IN TUG.Q
```

```
PRINT 1 LINE WITH AC THUS
AC ** FILED IN TUG.Q
                ALWAYS
             ELSE '' AC IS AV8
                SCHEDULE A BONE.ARRIVAL GIVING AC
                         IN TTRESPOT MINUTES
             ALWAYS
             FILE AC IN BONE.AFT
PRINT 1 LINE WITH AC THUS
AC ** FILED IN BONE
             REMOVE THE LAST ACE FROM BONE.AFT
             IF (AC.LAUNCH.TIME(ACE)=9999)
                LET AC.DESTINATION(ACE) = 12
                IF (SPOT(11) = 0) AND (HANGER.EQUIV < MAX.HANGER.EQUIV)
                   LET SPOT(11) = -AC.ID(ACE)
                   IF TUG < 4
                      ADD 1 TO TUG
                      LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
                      LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
                      LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
                      SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                                IN  TTARRIV.E MINUTES
                   ELSE
                      FILE ACE IN TUG.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN TUG.Q
                   ALWAYS
                ELSE
                   IF M.ELEVATOR.Q(ACE) <> 1
                      FILE ACE IN ELEVATOR.Q
                   ALWAYS
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN ELEVATOR.Q
                ALWAYS
             ALWAYS
             FILE ACE IN BONE.AFT
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN BONE
          ELSE
             PRINT 1 LINE WITH AC.ID(AC),AC.LOCATION(AC) THUS
     AC ** AT LOCATION ** CANNOT RESPOT TO AFT.BONE...7 AC ALREADY THERE
             LET AC.DESTINATION(AC) = 12
             IF (SPOT(11) = 0) AND (HANGER.EQUIV < MAX.HANGER.EQUIV)
                LET SPOT(11) = -AC.ID(AC)
                IF TUG < 4
                   ADD 1 TO TUG
                   LET XBAR = TTARRIV.E.AC(AC.TYPE(AC))
                   LET SDEV = S.TTARRIV.E.AC(AC.TYPE(AC))
                   LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
                   SCHEDULE AN ELEVATOR.ARRIVAL GIVING AC
                             IN  TTARRIV.E MINUTES
                ELSE
                   FILE AC IN TUG.Q
PRINT 1 LINE WITH AC THUS
AC ** FILED IN TUG.Q
                ALWAYS
             ELSE
                IF M.ELEVATOR.Q(AC) <> 1
                   FILE AC IN ELEVATOR.Q
                ALWAYS
```

```
PRINT 1 LINE WITH AC THUS
AC ** FILED IN ELEVATOR.Q
             ALWAYS
          ALWAYS
        ALWAYS
     ALWAYS
     PRINT 1 LINE WITH AC.ID(AC),AC.LOCATION(AC),AC.DESTINATION(AC),
                       TUG,N.TUG.Q,N.ELEVATOR.Q THUS
AC ** IS AT **  WITH DEST **  TUG= **  N.TUG.Q= **  N.ELEVATOR.Q= **
  ELSE
     PRINT 1 LINE WITH REFUELER,N.REFUELER.Q THUS
REFUELER= **    N.REFUELER.Q = **
     IF AC.TYPE(AC) < 3
        LET AC.DESTINATION(AC) = 10
        IF REFUELER < 4
           ADD 1 TO REFUELER
           LET DELAY = NORMAL.F(1.,.25,4)
           SCHEDULE AN AC.REFUELED GIVING AC ''FOR HELOS ONLY*******
            IN ((1. - AC.FUEL.STAT(AC)) *
            TTREFUEL.AC(AC.TYPE(AC))) + DELAY MINUTES
           LET AC.SERVICE.FLAG(AC) = 1
        ELSE
           FILE THIS AC IN REFUELER.Q
        ALWAYS
     ELSE
        LET AC.DESTINATION(AC) = 8
        LET XBAR = TTRESPOT.AC(AC.TYPE(AC))
        LET SDEV = S.TTRESPOT.AC(AC.TYPE(AC))
        LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
        SCHEDULE A BONE.ARRIVAL GIVING AC IN TTRESPOT/2 MINUTES ''AV8S
        FILE AC IN BONE.AFT
PRINT 1 LINE WITH AC THUS
AC ** FILED IN BONE
     ALWAYS
  ALWAYS
  RETURN
  END
```

```
''*********************************************************************
EVENT AC.RESPOTTED GIVEN AC
''*********************************************************************

  DEFINE AC, OPEN.SPOT, AND COUNTER AS INTEGER VARIABLES
  PRINT 1 LINE WITH AC.ID(AC),AC.FUEL.STAT(AC),AC.LOAD.STAT(AC),
                     AC.OP.STAT(AC) THUS
AC ** WITH FUEL *.**   AND LOAD *.**  HAS OP.STAT *.**

''  A TUG BECOMES AVAILABLE.

 IF AC.TYPE(AC) < 3
    LET TUG = TUG - 1
    IF AC.LOCATION(AC) < 7
       LET SPOT(AC.LOCATION(AC)) = 0
       SCHEDULE A SPOT.OPEN NOW
    ALWAYS
  ALWAYS


''    REMOVE THIS RESPOTTED AIRCRAFT FROM THE BONE IF IT WAS RESPOTTED FROM
''  THAT AREA.

  IF AC.LOCATION(AC) = 7
    REMOVE THIS AC FROM THE BONE.FWD
  ALWAYS
  IF AC.LOCATION(AC) = 8
    REMOVE THIS AC FROM THE BONE.AFT
  ALWAYS

     LET AC.LOCATION(AC) = AC.DESTINATION(AC)
     LET SPOT(AC.LOCATION(AC)) = AC.ID(AC)
     LET AC.DESTINATION(AC) = 10
     IF AC.TYPE(AC) < 3
        IF AC.FUEL.STAT(AC) = 1
           LET TTLOAD = 1.+ BETA.F(1.5,3.0,3)
                * TTLOAD.AC(AC.TYPE(AC))
           IF AC.LAUNCH.TIME(AC) - TIME.V < 10
              SCHEDULE AN AC.LOADED GIVING AC
                IN TTLOAD MINUTES
           ELSE
              SCHEDULE AN AC.LOADED GIVING AC AT
                ((AC.LAUNCH.TIME(AC) - 10. + TTLOAD))
           ALWAYS
           LET AC.SERVICE.FLAG(AC) = 1
        ELSE
           IF REFUELER < 4
              ADD 1 TO REFUELER
              LET DELAY = NORMAL.F(1.,.25,4)
              SCHEDULE AN AC.REFUELED GIVING AC IN
                ((1. - AC.FUEL.STAT(AC)) *
                TTREFUEL.AC(AC.TYPE(AC))) + DELAY MINUTES
              LET AC.SERVICE.FLAG(AC) = 1
           ELSE
              FILE THIS AC IN REFUELER.Q
           ALWAYS
        ALWAYS

''    DETERMINE IF THE NOW AVAILABLE TUG CAN BE USED BY WAITING AIRCRAFT IN
''  THE TUG QUEUE.
```

```
     IF N.TUG.Q > 0 AND TUG < 4
       REMOVE FIRST ACE FROM TUG.Q
       PRINT 1 LINE WITH ACE THUS
AC ** REMOVED FROM TUG.Q
       LET TUG = TUG + 1
       IF AC.DESTINATION(ACE) = 7 OR AC.DESTINATION(ACE) = 8
         LET XBAR = TTRESPOT.AC(AC.TYPE(ACE))
         LET SDEV = S.TTRESPOT.AC(AC.TYPE(ACE))
         LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
         SCHEDULE A BONE.ARRIVAL GIVING ACE IN TTRESPOT MINUTES
       ELSE
         IF AC.DESTINATION(ACE) < 7
           LET X5AR = TTRESPOT.AC(AC.TYPE(ACE))
           LET SDEV = S.TTRESPOT.AC(AC.TYPE(ACE))
           LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
           SCHEDULE AN AC.RESPOTTED GIVING ACE IN TTRESPOT MINUTES
         ELSE
           LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
           LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
           LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
           SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                  IN  TTARRIV.E MINUTES
         ALWAYS
       ALWAYS
       IF (AC.LOCATION(ACE) = 11)
         LET SPOT(11) = 0
       ALWAYS
     ALWAYS

     IF ((SPOT(11) = 0) AND (N.ELEVATOR.Q > 0))
       REMOVE THE FIRST ACE FROM ELEVATOR.Q
       IF AC.DESTINATION(ACE) > 0
         IF AC.DESTINATION(ACE) = 12
           IF (HANGER.EQUIV + 1) < (MAX.HANGER.EQUIV)
             LET SPOT(11) = -AC.ID(ACE)
             IF TUG < 4
               ADD 1 TO TUG
               LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
               LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
               LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
               SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                      IN  TTARRIV.E MINUTES
              ELSE
               FILE ACE IN TUG.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN TUG.Q
             ALWAYS
           ELSE
             IF N.ELEVATOR.Q(ACE) <> 1
               FILE ACE IN ELEVATOR.Q
             ALWAYS
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN ELEVATOR.Q
             FOR EACH ACE IN ELEVATOR.Q
                WITH AC.DESTINATION(ACE) < 12
             FIND THE FIRST CASE
             IF FOUND
               REMOVE THIS ACE FROM ELEVATOR.Q
               LET SPOT(11) = -AC.ID(ACE)
```

```
                   LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
                   LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
                   LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
                   SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                            IN  TTARRIV.E MINUTES
                ALWAYS
             ALWAYS
          ELSE
             LET SPOT(11) = -AC.ID(ACE)
             LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
             LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
             LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
             SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                        IN  TTARRIV.E MINUTES
          ALWAYS
       ELSE
          IF AC.TYPE(ACE) = 1
             IF N.BONE.FWD < 5
                FILE ACE IN BONE.FWD
                LET AC.DESTINATION(ACE) = 7
                LET SPOT(11) = -AC.ID(ACE)
                LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
                LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
                LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
                SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                          IN  TTARRIV.E MINUTES
             ALWAYS
          ELSE
             IF N.BONE.AFT < 7
                FILE ACE IN BONE.AFT
                LET AC.DESTINATION(ACE) = 8
                LET SPOT(11) = -AC.ID(ACE)
                LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
                LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
                LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
                SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                          IN  TTARRIV.E MINUTES
             ALWAYS
          ALWAYS
       ALWAYS
    ALWAYS

 ELSE ''CHECK IF AV8 FLIGHT RDY TO LAUNCH...SCHED LAUNCH IF RDY
    IF AC.LOCATION(AC) <= 2
       PRINT 1 LINE WITH AC.ID(AC),TIME.V,AC.LOCATION(AC) THUS
       AV8 ** RDY TO LAUNCH AT **** FROM SPOT **
       FOR EACH FLIGHTE IN AV8.PLAN
          WITH FLT.TIME(FLIGHTE) = AC.LAUNCH.TIME(AC)
       FIND THE FIRST CASE
       IF FOUND
          ADD 1 TO NUM.AV8.RDY
          PRINT 1 LINE WITH FLT.TIME(FLIGHTE),NUM.AV8.RDY THUS
AV8 FLIGHT SCHED TO LAUNCH AT **** HAS ** AV8'S RDY ON SPOTS
          IF NUM.AV8.RDY = 2
             LET NUM.AV8.RDY = 0
             SCHEDULE A FLIGHT.LAUNCH GIVING FLIGHTE IN
                      UNIFORM.F(.1,.5,9) MINUTES
             PRINT 1 LINE WITH FLT.TIME(FLIGHTE) THUS
    AV8 FLIGHT SCHE TO LAUNCH AT **** HAS BEEN SENT TO FLIGHT.LAUNCH
             FOR EACH ACE IN FLT.WAVE(FLIGHTE), DO
```

```
                  IF N.SPOT.Q(ACE) = 1
                     REMOVE THIS ACE FROM SPOT.Q
                  ALWAYS
               LOOP
            ALWAYS
         ELSE
            PRINT 1 LINE WITH AC.ID(AC) THUS
            #*ERROR IN AC.RESPOTTED WITH AC **
         ALWAYS
      ELSE ''NEED SOME OTHER ACTION FOR RESPOTTED AV8
         PRINT 1 LINE WITH AC.ID(AC),AC.LOCATION(AC) THUS
   #* ERROR AC ** (AV8) RESPOTTED TO **   ...NEED SOME ACTION#**
      ALWAYS
   ALWAYS

RETURN
END
```

```
''********************************************************************
EVENT BONE.ARRIVAL GIVEN AC
''********************************************************************

  DEFINE AC AS INTEGER VARIABLES

  PRINT 1 LINE WITH AC.ID(AC),AC.FUEL.STAT(AC),AC.LOAD.STAT(AC),
                    AC.OP.STAT(AC) THUS
AC ** WITH FUEL *.**   AND LOAD *.**  HAS OP.STAT *.**

  IF (AC.TYPE(AC) < 3) OR (AC.LOCATION(AC) = 11)
     LET TUG = TUG - 1
  ALWAYS

  IF AC.LOCATION(AC) < 7
     IF SPOT(AC.LOCATION(AC)) = AC.ID(AC)
        LET SPOT(AC.LOCATION(AC)) = 0
        ADD 1 TO NUM.OPEN.SPOTS
        SCHEDULE A SPOT.OPEN NOW
     ELSE ''AC MOVED TO BONE FOR EMERGENCY RECOVERY
     ALWAYS
  ELSE  ''AC IS COMING FROM THE HANGER DECK
  ALWAYS

  IF AC.LAUNCH.TIME(AC) = 0
    LET AC.LAUNCH.TIME(AC) = 9999
  ELSE
    IF (AC.LAUNCH.TIME(AC) <= (TIME.V + 40)) AND ((AC.TYPE(AC) < 3)
                                              OR (AC.OP.STAT(AC) = 1.0))
                                              AND (M.SPOT.Q(AC) <> 1)
       FILE AC IN SPOT.Q
    ALWAYS
  ALWAYS
  IF AC.TYPE(AC) = 1
     LET AC.LOCATION(AC) = 7
     IF M.BONE.FWD(AC) <> 1
        FILE THIS AC IN BONE.FWD
     ALWAYS
  ELSE
     LET AC.LOCATION(AC) = 8
     IF M.BONE.AFT(AC) <> 1
        FILE THIS AC IN BONE.AFT
     ALWAYS
  ALWAYS

  LET BONE.TOTAL = N.BONE.AFT + N.BONE.FWD

  PRINT 1 LINE WITH N.BONE.FWD, N.BONE.AFT, BONE.TOTAL,
                    NUM.OPEN.SPOTS THUS
N.BONE.FWD= **    N.BONE.AFT= **   BONE.TOTAL= **   NUM.OPEN.SPOTS= **

  IF AC.OP.STAT(AC) <> 0 AND AC.FUEL.STAT(AC) < 1.0
     IF REFUELER < 4
        ADD 1 TO REFUELER
        LET DELAY = NORMAL.F(1.,.25,4)
        SCHEDULE AN AC.REFUELED GIVING AC
            IN ((1. - AC.FUEL.STAT(AC)) *
            TTREFUEL.AC(AC.TYPE(AC))) + DELAY MINUTES
        LET AC.SERVICE.FLAG(AC) = 1
        IF AC.TYPE(AC) = 3  ''AV8S CAN LOAD WHILE REFUELING
           IF M.LOAD.SET(AC) <> 1
              IF N.LOAD.SET < 2
                 FILE AC IN LOAD.SET
                 PRINT 1 LINE WITH N.LOAD.SET THUS
   N.LOAD.SET= **
                 LET XBAR = TTLOAD.AC(AC.TYPE(AC))
                 LET SDEV = S.TTLOAD.AC(AC.TYPE(AC))
                 LET TTLOAD = NORMAL.F(XBAR,SDEV,3)
                     + (NUM.AV8S.LOADED / 4.)
                 ADD 1 TO NUM.AV8S.LOADED
                 SCHEDULE AN AC.LOADED GIVING AC
                     IN TTLOAD MINUTES
                 LET AC.SERVICE.FLAG(AC) = 1
              ELSE
                 IF M.LOADER.Q(AC) <> 1
                    FILE AC IN LOADER.Q
                 ALWAYS
              ALWAYS
           ELSE
              PRINT 1 LINE THUS
AV8 IS ALREADY BEING LOADED
              LET AC.SERVICE.FLAG(AC) = 1
           ALWAYS
        ALWAYS
     ELSE
        FILE AC IN REFUELER.Q
     ALWAYS
  ALWAYS

        IF (N.TUG.Q > 0) AND (TUG < 4)
           REMOVE FIRST ACE FROM TUG.Q
           PRINT 1 LINE WITH ACE THUS
AC ** REMOVED FROM TUG.Q
           LET TUG = TUG + 1
           IF AC.DESTINATION(ACE) = 7 OR AC.DESTINATION(ACE) = 8
              LET XBAR = TTRESPOT.AC(AC.TYPE(ACE))
              LET SDEV = S.TTRESPOT.AC(AC.TYPE(ACE))
              LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
              SCHEDULE A BONE.ARRIVAL GIVING ACE IN TTRESPOT MINUTES
           ELSE
              IF AC.DESTINATION(ACE) < 7
                 LET XBAR = TTRESPOT.AC(AC.TYPE(ACE))
                 LET SDEV = S.TTRESPOT.AC(AC.TYPE(ACE))
                 LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
                 SCHEDULE AN AC.RESPOTTED GIVING ACE IN TTRESPOT MINUTES
              ELSE  '' AC.DESTINATION(ACE) = 12
                 LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
                 LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
                 LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
                 SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                             IN  TTARRIV.E MINUTES
              ALWAYS
           ALWAYS
           IF (AC.LOCATION(ACE)=11) AND (N.ELEVATOR.Q > 0)
              REMOVE THE FIRST ACE FROM ELEVATOR.Q
              IF AC.DESTINATION(ACE) = 12
                 IF (HANGER.EQUIV + 1) < (MAX.HANGER.EQUIV)
                    LET SPOT(11) = -AC.ID(ACE)
                    IF TUG < 4
```

```
                       ADD 1 TO TUG
                       LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
                       LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
                       LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
                       SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                                IN  TTARRIV.E MINUTES
                    ELSE
                       FILE ACE IN TUG.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN TUG.Q
                    ALWAYS
                 ELSE
                    IF M.ELEVATOR.Q(ACE) <> 1
                       FILE ACE IN ELEVATOR.Q
                    ALWAYS
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN ELEVATOR.Q
                    FOR EACH ACE IN ELEVATOR.Q
                       WITH AC.DESTINATION(ACE) < 12
                    FIND THE FIRST CASE
                    IF FOUND
                       REMOVE THIS ACE FROM ELEVATOR.Q
                       LET SPOT(11) = -AC.ID(ACE)
                       LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
                       LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
                       LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
                       SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                                IN  TTARRIV.E MINUTES
                    ALWAYS
                 ALWAYS
              ELSE
                 LET SPOT(11) = -AC.ID(ACE)
                 LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
                 LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
                 LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
                 SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                            IN  TTARRIV.E MINUTES
              ALWAYS
           ALWAYS
        ALWAYS
     IF N.BONE.FWD > 7
        REMOVE LAST ACE FROM BONE.FWD
        IF (AC.LAUNCH.TIME(ACE)=9999)
           LET AC.DESTINATION(ACE) = 12
           IF (SPOT(11) = 0) AND (HANGER.EQUIV < MAX.HANGER.EQUIV)
              LET SPOT(11) = -AC.ID(ACE)
              IF TUG < 4
                 ADD 1 TO TUG
                 LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
                 LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
                 LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
                 SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                          IN  TTARRIV.E MINUTES
              ELSE
                 FILE ACE IN TUG.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN TUG.Q
              ALWAYS
           ELSE
              IF M.ELEVATOR.Q(ACE) <> 1
```

```
                 FILE ACE IN ELEVATOR.Q
              ALWAYS
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN ELEVATOR.Q
           ALWAYS
        ALWAYS
        FILE ACE IN BONE.FWD
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN BONE
     ALWAYS
     IF N.BONE.AFT > 9
        REMOVE LAST ACE FROM BONE.AFT
        IF (AC.LAUNCH.TIME(ACE)=9999)
           LET AC.DESTINATION(ACE) = 12
           IF (SPOT(11) = 0) AND (HANGER.EQUIV < MAX.HANGER.EQUIV)
              LET SPOT(11) = -AC.ID(ACE)
              IF TUG < 4
                 ADD 1 TO TUG
                 LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
                 LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
                 LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
                 SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                          IN  TTARRIV.E MINUTES
              ELSE
                 FILE ACE IN TUG.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN TUG.Q
              ALWAYS
           ELSE
              IF N.ELEVATOR.Q(ACE) <> 1
                 FILE ACE IN ELEVATOR.Q
              ALWAYS
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN ELEVATOR.Q
           ALWAYS
        ALWAYS
        FILE ACE IN BONE.AFT
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN BONE
     ALWAYS
  RETURN
  END
```

```
''************************************************************************
EVENT DECK.ARRIVAL GIVEN AC
''************************************************************************

  DEFINE AC AS AN INTEGER VARIABLE

  LET AC.LOCATION(AC) = 11
  LET SPOT(11) = AC.ID(AC)

  IF AC.TYPE(AC) = 2
     SUBTRACT 1.5 TO HANGER.EQUIV
  ELSE
     SUBTRACT 1.0 TO HANGER.EQUIV
  ALWAYS

  PRINT 1 LINE WITH HANGER.EQUIV THUS
HANGER.EQUIV = **.*



  IF TUG < 4
     ADD 1 TO TUG
     IF AC.DESTINATION(AC) < 7
        LET XBAR = TTRESPOT.AC(AC.TYPE(AC))
        LET SDEV = S.TTRESPOT.AC(AC.TYPE(AC))
        LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
        SCHEDULE AN AC.RESPOTTED GIVING AC IN TTRESPOT MINUTES
     ELSE
        LET XBAR = TTRESPOT.AC(AC.TYPE(AC))
        LET SDEV = S.TTRESPOT.AC(AC.TYPE(AC))
        LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
        SCHEDULE A BONE.ARRIVAL GIVING AC IN TTRESPOT MINUTES
     ALWAYS
     LET SPOT(11) = 0
     IF N.ELEVATOR.Q > 0
        REMOVE THE FIRST ACE FROM ELEVATOR.Q
        IF AC.DESTINATION(ACE) = 12
           IF (HANGER.EQUIV + 1) < (MAX.HANGER.EQUIV)
              LET SPOT(11) = -AC.ID(ACE)
              IF TUG < 4
                 ADD 1 TO TUG
                 LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
                 LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
                 LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
                 SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                          IN  TTARRIV.E MINUTES
              ELSE
                 FILE ACE IN TUG.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN TUG.Q
              ALWAYS
           ELSE
              IF M.ELEVATOR.Q(ACE) <> 1
                 FILE ACE IN ELEVATOR.Q
              ALWAYS
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN ELEVATOR.Q
              FOR EACH ACE IN ELEVATOR.Q
                 WITH AC.DESTINATION(ACE) < 12
```

```
            FIND THE FIRST CASE
            IF FOUND
               REMOVE THIS ACE FROM ELEVATOR.Q
               LET SPOT(11) = -AC.ID(ACE)
               LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
               LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
               LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
               SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                        IN  TTARRIV.E MINUTES
            ALWAYS
         ALWAYS
      ELSE
         LET SPOT(11) = -AC.ID(ACE)
         LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
         LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
         LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
         SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                  IN  TTARRIV.E MINUTES
      ALWAYS
   ALWAYS
  ELSE
     FILE AC IN TUG.Q
PRINT 1 LINE WITH AC THUS
AC ** FILED IN TUG.Q
  ALWAYS
  RETURN
  END
```

```
''*******************************************************************
EVENT DECK.DECISION GIVEN FLIGHT
''*******************************************************************

  DEFINE COUNTER,FLIGHT,AC,T.AC,SPOTT,LOSPOT,AV8.LAUNCH.TIME,
         TT.NUM.AC  AS INTEGER VARIABLES
  DEFINE INTERVAL AS A REAL VARIABLE

  REMOVE THIS FLIGHT FROM SCHEDULE

  IF N.AV8.PLAN > 0
     REMOVE THE FIRST FLIGHTE FROM AV8.PLAN
     LET AV8.LAUNCH.TIME = FLT.TIME(FLIGHTE)
     FILE THIS FLIGHTE IN AV8.PLAN
  ELSE
     LET AV8.LAUNCH.TIME = 9999
  ALWAYS

''CHECK THAT DESIGNATED AC ARE STILL AVAILABLE FOR THIS FLIGHT

  LET COUNTER = 0
  PRINT 1 LINE WITH FLT.AC.NUM(FLIGHT),FLT.AC.TYPE(FLIGHT) THUS
THERE ARE * AC OF TYPE * IN THIS FLIGHT

  FOR J = 1 TO FLT.AC.NUM(FLIGHT), DO
     FOR EACH ACE IN THE SHIP,
        WITH AC.ID(ACE) = FLTARRAY(FLT.NUM(FLIGHT),J)
     FIND THE FIRST CASE
     IF FOUND

     PRINT 1 LINE WITH AC.ID(ACE),AC.LOCATION(ACE),AC.LAUNCH.TIME(ACE),
                       ETA(AC.ID(ACE)) THUS
AC **   AT **   SCHED TO LAUNCH AT ****   AND RETURN AT ****
     IF ((ETA(AC.ID(ACE)) + 5 <= FLT.TIME(FLIGHT)) OR
             (AC.LOCATION(ACE) < 9)) AND (AC.LAUNCH.TIME(ACE) =
              FLT.TIME(FLIGHT))
        ADD 1 TO COUNTER
        FILE THIS ACE IN FLT.WAVE(FLIGHT)
        LET FLTARRAY(FLT.NUM(FLIGHT),J) = 0

        PRINT 1 LINE WITH AC.ID(ACE) AND COUNTER THUS
                AC :  **   COUNTER :  **

        IF ((AC.LOCATION(ACE) < 7) AND (AC.DESTINATION(ACE) = 10))''OTHERWISE
           IF AC.SERVICE.FLAG(ACE) = 0
              IF AC.FUEL.STAT(ACE) < 1.0
                 IF REFUELER < 4
                    ADD 1 TO REFUELER
                    PRINT 1 LINE WITH REFUELER THUS
         REFUELER = **
                    LET DELAY = NORMAL.F(1.,.25,4)
                    SCHEDULE AN AC.REFUELED GIVING ACE
                             IN ((1. - AC.FUEL.STAT(ACE)) *
                                 TTREFUEL.AC(AC.TYPE(ACE))) +
                                 DELAY MINUTES
                    LET AC.SERVICE.FLAG(ACE) = 1
                 ELSE
                    FILE ACE IN REFUELER.Q
                 ALWAYS
              ELSE
```

```
      LET TTLOAD = 1.+ BETA.F(1.5,3.0,3)
             * TTLOAD.AC(AC.TYPE(ACE))
      IF (AC.LAUNCH.TIME(ACE) - TIME.V) < 10
        SCHEDULE AN AC.LOADED GIVING ACE
              IN TTLOAD MINUTES
      ELSE
        SCHEDULE AN AC.LOADED GIVING ACE
              AT AC.LAUNCH.TIME(ACE)
              - 10. + TTLOAD
      ALWAYS
      LET AC.SERVICE.FLAG(ACE) = 1
    ALWAYS
  ALWAYS
ALWAYS


''            IF AC.LOCATION(ACE) = 9
''              IF AC.RECOVERY.TIME(ACE) = 0
''                REMOVE THIS ACE FROM THE DELTA.PATTERN
''                FILE THIS ACE IN DELTA.PATTERN
''                IF N.SPOT.Q(ACE) = 1
''                  REMOVE THIS ACE FROM SPOT.Q
''                  FILE THIS ACE IN SPOT.Q
''                ALWAYS
''              ALWAYS
''            ALWAYS


             IF (AC.LOCATION(ACE) = 7) OR (AC.LOCATION(ACE) = 8)
               IF AC.TYPE(ACE) < 3
                 IF NUM.OPEN.SPOTS > 0
                   IF AVG.LAUNCH.TIME < AC.LAUNCH.TIME(ACE)
                     LET LOSPOT = 3
                   ELSE
                     LET LOSPOT = 1
                   ALWAYS
                   FOR I = LOSPOT TO SPOT.AC(AC.TYPE(ACE),7),
                     WITH SPOT(SPOT.AC(AC.TYPE(ACE),I)) = 0
                   FIND THE FIRST CASE
                   IF FOUND
                     LET SPOTT = SPOT.AC(AC.TYPE(ACE),I)
                     LET AC.DESTINATION(ACE) = SPOTT
                     LET SPOT(SPOTT) = -AC.ID(ACE)
                     SUBTRACT 1 FROM NUM.OPEN.SPOTS
                     PRINT 1 LINE WITH NUM.OPEN.SPOTS THUS
                     NUM.OPEN.SPOTS = **
                     IF AC.SERVICE.FLAG(ACE) = 0
                       IF TUG < 4
                         LET TUG = TUG + 1
                         LET XBAR = TTRESPOT.AC(AC.TYPE(ACE))
                         LET SDEV = S.TTRESPOT.AC(AC.TYPE(ACE))
                         LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
                         SCHEDULE AN AC.RESPOTTED GIVING ACE
                               IN TTRESPOT MINUTES
                       ELSE
                         FILE ACE IN TUG.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN TUG.Q
                       ALWAYS
```

```
                                ELSE ''CHECK FOR FREE TUG AFTER SERVICE COMPL
                                ALWAYS
                             ELSE   ''(IF NOT FOUND)
                                FILE THIS ACE IN SPOT.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN SPOT.Q
                             ALWAYS
                          ELSE   ''(IF NUM.OPEN.SPOTS = 0)
                             FILE THIS ACE IN SPOT.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN SPOT.Q
                          ALWAYS
                       ELSE      ''ACE IS AV8
                         IF AC.SERVICE.FLAG(ACE) = 0
                          IF AC.FUEL.STAT(ACE) < 1
                             IF REFUELER < 4
                                ADD 1 TO REFUELER
                                LET DELAY = NORMAL.F(1.,.25,4)
                                SCHEDULE AN AC.REFUELED GIVING ACE
                                   IN ((1. - AC.FUEL.STAT(ACE)) *
                                   TTREFUEL.AC(AC.TYPE(ACE))) +
                                   DELAY MINUTES
                                LET AC.SERVICE.FLAG(ACE) = 1
                                IF AC.LOAD.STAT(ACE) < 1
                                   IF M.LOAD.SET(ACE) <> 1
                                      IF N.LOAD.SET < 2
                                         FILE THIS ACE IN LOAD.SET
                                      PRINT 1 LINE WITH N.LOAD.SET THUS
     N.LOAD.SET= **
                                      LET XBAR = TTLOAD.AC(AC.TYPE(ACE))
                                      LET SDEV = S.TTLOAD.AC(AC.TYPE(ACE))
                                      LET TTLOAD = NORMAL.F(XBAR,SDEV,3)
                                           + (NUM.AV8S.LOADED / 4.)
                                      ADD 1 TO NUM.AV8S.LOADED
                                      SCHEDULE AN AC.LOADED GIVING ACE
                                         IN TTLOAD MINUTES
                                         LET AC.SERVICE.FLAG(ACE) = 1
                                      ELSE
                                         IF M.LOADER.Q(ACE) <> 1
                                            FILE ACE IN LOADER.Q
                                         ALWAYS
                                      ALWAYS
                                   ALWAYS
                                ALWAYS
                             ELSE
                                FILE ACE IN REFUELER.Q
                             ALWAYS
                          ELSE
                             IF AC.LOAD.STAT(ACE) < 1
                                PRINT 1 LINE WITH AC.ID(ACE) THUS
            AV8 ** FUELED, BUT NOT LOADED
                                 IF M.LOAD.SET(ACE) <> 1
                                    IF N.LOAD.SET < 2
                                       FILE THIS ACE IN LOAD.SET
                                       PRINT 1 LINE WITH N.LOAD.SET THUS
     N.LOAD.SET= **
                                   LET XBAR = TTLOAD.AC(AC.TYPE(ACE))
                                   LET SDEV = S.TTLOAD.AC(AC.TYPE(ACE))
                                   LET TTLOAD = NORMAL.F(XBAR,SDEV,3)
                                           + (NUM.AV8S.LOADED / 4.)
```

```
                                  ADD 1 TO NUM.AVSS.LOADED
                                  SCHEDULE AN AC.LOADED GIVING ACE
                                    IN TTLOAD MINUTES
                                      LET AC.SERVICE.FLAG(ACE) = 1
                                   ELSE
                                      IF M.LOADER.Q(ACE) <> 1
                                         FILE ACE IN LOADER.Q
                                      ALWAYS
                                   ALWAYS
                                ALWAYS
                             ELSE
                                SCHEDULE AN AC.LOADED GIVING ACE NOW   ''AC AL
                                                                       ''CONTR

                                LET AC.SERVICE.FLAG(ACE) = 1
                             ALWAYS
                          ALWAYS
                         ALWAYS
                       ALWAYS
                    ALWAYS



                    IF (AC.LOCATION(ACE) = 12)
                       IF AC.TYPE(ACE) < 3
                          IF NUM.OPEN.SPOTS > 0
                             IF AVS.LAUNCH.TIME < AC.LAUNCH.TIME(ACE)
                                LET LOSPOT = 3
                             ELSE
                                LET LOSPOT = 1
                             ALWAYS
                             FOR I = LOSPOT TO SPOT.AC(AC.TYPE(ACE),7),
                                WITH SPOT(SPOT.AC(AC.TYPE(ACE),I)) = 0
                             FIND THE FIRST CASE
                             IF FOUND
                                LET SPOTT = SPOT.AC(AC.TYPE(ACE),I)
                                LET AC.DESTINATION(ACE) = SPOTT
                                LET SPOT(SPOTT) = -AC.ID(ACE)
                                SUBTRACT 1 FROM NUM.OPEN.SPOTS
                                PRINT 1 LINE WITH NUM.OPEN.SPOTS THUS
                                NUM.OPEN.SPOTS = **
                                IF SPOT(11) = 0
                                   LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
                                   LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
                                   LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
                                   SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                                                IN  TTARRIV.E MINUTES
                                   LET SPOT(11) = -AC.ID(ACE)
                                ELSE
                                   IF M.ELEVATOR.Q(ACE) <> 1
                                      FILE ACE IN ELEVATOR.Q
                                   ALWAYS
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN ELEVATOR.Q
                                ALWAYS
                             ELSE    ''(IF NOT FOUND)
                                FILE THIS ACE IN SPOT.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN SPOT.Q
                             ALWAYS
                          ELSE    ''(IF NUM.OPEN.SPOTS = 0)
```

```
                             IF AC.TYPE(ACE) = 1
                                   FILE ACE IN BONE.FWD
                                   LET AC.DESTINATION(ACE) = 7
                                   IF SPOT(11) = 0
                                    LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
                                    LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
                                    LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
                                    SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                                               IN  TTARRIV.E MINUTES
                                      LET SPOT(11) = -AC.ID(ACE)
                                   ELSE
                                      IF N.ELEVATOR.Q(ACE) <> 1
                                         FILE ACE IN ELEVATOR.Q
                                      ALWAYS
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN ELEVATOR.Q

                                   ALWAYS
                                   FILE ACE IN SPOT.Q
                             ELSE
                                   FILE ACE IN BONE.AFT
                                   LET AC.DESTINATION(ACE) = 8
                                   IF SPOT(11) = 0
                                    LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
                                    LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
                                    LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
                                    SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                                               IN  TTARRIV.E MINUTES
                                      LET SPOT(11) = -AC.ID(ACE)
                                   ELSE
                                      IF N.ELEVATOR.Q(ACE) <> 1
                                         FILE ACE IN ELEVATOR.Q
                                      ALWAYS
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN ELEVATOR.Q

                                   ALWAYS
                                   FILE ACE IN SPOT.Q
                             ALWAYS

PRINT 1 LINE WITH ACE THUS
AC ** FILED IN SPOT.Q
                          ALWAYS
                       ELSE      ''ACE IS AV8
                          LET AC.DESTINATION(ACE) = 8
                          FILE ACE IN BONE.AFT
                          IF SPOT(11) = 0
                             LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
                             LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
                             LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
                             SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                                         IN  TTARRIV.E MINUTES
                             LET SPOT(11) = -AC.ID(ACE)
                          ELSE
                             IF ((N.ELEVATOR.Q(ACE) <> 1)
                                     AND (SPOT(11) <> -AC.ID(ACE)))
                                FILE ACE IN ELEVATOR.Q
                             ALWAYS
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN ELEVATOR.Q
                          ALWAYS
                       ALWAYS
```

```
                    ALWAYS

     ELSE

        PRINT 1 LINE WITH COUNTER AND N.FLT.WAVE(FLIGHT) THUS
                COUNTER :  **     N.FLT.WAVE :  **

     ALWAYS
   ELSE ''ACE NOT FOUND IN SHIP...
      PRINT 1 LINE WITH J,FLTARRAY(FLT.NUM(FLIGHT),J),
                        FLT.TIME(FLIGHT) THUS
**ERROR**   THE *TH AC (***) OF THE FLIGHT TO LAUNCH AT **** IS NOT FOUND
   ALWAYS
  LOOP
  LET T.NUM.AC = FLT.AC.NUM(FLIGHT) - COUNTER
  LET TT.NUM.AC = T.NUM.AC
  PRINT 1 LINE WITH T.NUM.AC,FLT.AC.NUM(FLIGHT),COUNTER THUS
T.NUM.AC = **  FLT.AC.NUM = **   COUNTER = **
  IF T.NUM.AC > 0  ''CHECK DECK
     PRINT 1 LINE WITH T.NUM.AC THUS
   T.NUM.AC = ** 1  ...CHECKING DECK FOR AVAILABLE AC
     IF FLT.AC.TYPE(FLIGHT) <= 2  ''ONLY HELOS CAN BE PARKED ON SPOTS
        FOR I = 1 TO 6
          WHILE T.NUM.AC > 0, DO
             IF SPOT(I) <> 0
                LET T.AC = ABS.F(SPOT(I))
                FOR EACH ACE IN THE SHIP,
                   WITH AC.ID(ACE) = T.AC,
                FIND THE FIRST CASE
                IF AC.TYPE(ACE) = FLT.AC.TYPE(FLIGHT)
                   IF AC.LAUNCH.TIME(ACE) > (FLT.TIME(FLIGHT) + 20)
                      IF AC.OP.STAT(ACE) >= .6
                         IF AC.DESTINATION(ACE) = AC.LOCATION(ACE)
                            LET AC.LAUNCH.TIME(ACE) = FLT.TIME(FLIGHT)
                            IF AC.FUEL.STAT(ACE) < 1.0
                               IF REFUELER < 4
                                  ADD 1 TO REFUELER
                                  LET DELAY = NORMAL.F(1.,.25,4)
                                  SCHEDULE AN AC.REFUELED GIVING ACE
                                    IN ((1. - AC.FUEL.STAT(ACE)) *
                                    TTREFUEL.AC(AC.TYPE(ACE)))
                                    + DELAY MINUTES
                                  LET AC.SERVICE.FLAG(ACE) = 1
                               ELSE
                                  FILE ACE IN REFUELER.Q
                               ALWAYS
                            ELSE
                               LET TTLOAD = 1.+ BETA.F(1.5,3.0,3)
                                          * TTLOAD.AC(AC.TYPE(ACE))
                               IF (AC.LAUNCH.TIME(ACE) - TIME.V) < 10
                                  SCHEDULE AN AC.LOADED GIVING ACE
                                    IN TTLOAD MINUTES
                               ELSE
                                  SCHEDULE AN AC.LOADED GIVING ACE
                                     AT AC.LAUNCH.TIME(ACE)
                                     - 10. + TTLOAD
                               ALWAYS
                               LET AC.SERVICE.FLAG(ACE) = 1
                            ALWAYS
                            SUBTRACT 1 FROM T.NUM.AC
                            FILE THIS ACE IN FLT.WAVE(FLIGHT)
                            PRINT 1 LINE WITH AC.ID(ACE),AC.LOCATION(ACE),
                                  AC.FUEL.STAT(ACE),AC.LOAD.STAT(ACE),
                                  FLT.TIME(FLIGHT),T.NUM.AC THUS
AC ** AT ** WITH FUEL *.** AND LOAD *.** JOINS FLIGHT **** ... T.NUM.AC= *
                         ALWAYS
                      ALWAYS
                   ALWAYS
                ALWAYS
             ALWAYS
        LOOP
     ALWAYS
  ALWAYS
  IF T.NUM.AC > 0  ''CHECK DELTA
     PRINT 1 LINE WITH T.NUM.AC THUS
   T.NUM.AC = **  2   CHECKING DELTA FOR AVAILABLE AC
     FOR EACH ACE IN DELTA.PATTERN
        WHILE T.NUM.AC > 0, DO
           IF AC.OP.STAT(ACE) > .6
              IF AC.TYPE(ACE) = FLT.AC.TYPE(FLIGHT)
                 IF AC.LAUNCH.TIME(ACE) > (FLT.TIME(FLIGHT) + 20)
                    LET AC.LAUNCH.TIME(ACE) = FLT.TIME(FLIGHT)
                    SUBTRACT 1 FROM T.NUM.AC
                    FILE THIS ACE IN FLT.WAVE(FLIGHT)
                    PRINT 1 LINE WITH AC.ID(ACE),AC.LOCATION(ACE),
                                  AC.DESTINATION(ACE),AC.FUEL.STAT(ACE),
                                  AC.LOAD.STAT(ACE),
                                  FLT.TIME(FLIGHT),T.NUM.AC THUS
AC ** AT ** WITH DEST ** FUEL *.** LOAD *.** JOINS FLIGHT **** ... T.NUM.AC= :
                    IF M.SPOT.Q(ACE) = 1
                       REMOVE THIS ACE FROM SPOT.Q
                       FILE THIS ACE IN SPOT.Q
PRINT 1 LINE WITH ACE THUS
AC ** RE-FILED IN SPOT.Q
                    ALWAYS
                 ALWAYS
              ALWAYS
           ALWAYS
     LOOP
  ALWAYS
''NO AC AVAIL FOR FLIGHT...LOOK IN BONE
  IF T.NUM.AC > 0  ''CHECK BONES
     PRINT 1 LINE WITH T.NUM.AC THUS
   T.NUM.AC = **  3   CHECKING BONES FOR AVAILABLE AC
     IF FLT.AC.TYPE(FLIGHT) = 1
        FOR EACH ACE IN BONE.FWD
           WHILE T.NUM.AC > 0, DO
              IF AC.OP.STAT(ACE) >= .6
                 IF AC.TYPE(ACE) = FLT.AC.TYPE(FLIGHT)
                    IF AC.LAUNCH.TIME(ACE) > (FLT.TIME(FLIGHT) + 20)
                       LET AC.LAUNCH.TIME(ACE) = FLT.TIME(FLIGHT)
                       SUBTRACT 1 FROM T.NUM.AC
                       IF AC.TYPE(ACE) < 3
                          IF NUM.OPEN.SPOTS > 0
                             IF AVS.LAUNCH.TIME < AC.LAUNCH.TIME(ACE)
                                LET LOSPOT = 3
                             ELSE
                                LET LOSPOT = 1
                             ALWAYS
                             FOR I = LOSPOT TO SPOT.AC(AC.TYPE(ACE),7),
                                 WITH SPOT(SPOT.AC(AC.TYPE(ACE),I)) = 0
                              FIND THE FIRST CASE
                              IF FOUND
                                 LET SPOTT = SPOT.AC(AC.TYPE(ACE),I)
                                 LET AC.DESTINATION(ACE) = SPOTT
                                 LET SPOT(SPOTT) = -AC.ID(ACE)
                                 SUBTRACT 1 FROM NUM.OPEN.SPOTS
                                 IF TUG < 4
                                    LET TUG = TUG + 1
                                    LET XBAR = TTRESPOT.AC(AC.TYPE(ACE))
                                    LET SDEV = S.TTRESPOT.AC(AC.TYPE(ACE))
                                    LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
                                    SCHEDULE AN AC.RESPOTTED GIVING ACE
                                                IN TTRESPOT MINUTES
                                 ELSE
                                    FILE ACE IN TUG.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN TUG.Q

                                 ALWAYS
                              ELSE   ''(IF NOT FOUND)
                                 FILE THIS ACE IN SPOT.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN SPOT.Q
                              ALWAYS
                           ELSE   ''(IF NUM.OPEN.SPOTS = 0)
                              FILE THIS ACE IN SPOT.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN SPOT.Q
                           ALWAYS
                        ELSE      ''ACE IS AV8
                           IF AC.FUEL.STAT(ACE) < 1
                              IF REFUELER < 4
                                 ADD 1 TO REFUELER
                                 LET DELAY = NORMAL.F(1.,.25,4)
                                 SCHEDULE AN AC.REFUELED GIVING ACE
                                   IN ((1. - AC.FUEL.STAT(ACE)) *
                                   TTREFUEL.AC(AC.TYPE(ACE)))
                                   + DELAY MINUTES
                                 LET AC.SERVICE.FLAG(ACE) = 1
                                 IF N.LOAD.SET(ACE) <> 1
                                    IF AC.LOAD.STAT(ACE) < 1
                                       IF N.LOAD.SET < 2
                                          FILE ACE IN LOAD.SET
                                          PRINT 1 LINE WITH N.LOAD.SET THUS
       N.LOAD.SET = **

                                          LET XBAR = TTLOAD.AC(AC.TYPE(ACE))
                                          LET SDEV = S.TTLOAD.AC(AC.TYPE(ACE))
                                          LET TTLOAD = NORMAL.F(XBAR,SDEV,3)
                                                + (NUM.AV8S.LOADED / 4.)
                                          ADD 1 TO NUM.AV8S.LOADED
                                          SCHEDULE AN AC.LOADED GIVING ACE
                                            IN TTLOAD MINUTES
                                          LET AC.SERVICE.FLAG(ACE) = 1
                                       ELSE
                                          IF N.LOADER.Q(ACE) <> 1
                                             FILE ACE IN LOADER.Q
                                          ALWAYS
                                       ALWAYS
                                    ALWAYS
                                 ALWAYS
```

```
                             ELSE
                                FILE ACE IN REFUELER.Q
                             ALWAYS
                          ELSE
                            IF M.LOAD.SET(ACE) <> 1
                             IF AC.LOAD.STAT(ACE) < 1
                                IF N.LOAD.SET < 2
                                   FILE ACE IN LOAD.SET
                                   PRINT 1 LINE WITH N.LOAD.SET THUS
       N.LOAD.SET = **
                                   LET XBAR = TTLOAD.AC(AC.TYPE(ACE))
                                   LET SDEV = S.TTLOAD.AC(AC.TYPE(ACE))
                                   LET TTLOAD = NORMAL.F(XBAR,SDEV,3)
                                          + (NUM.AV8S.LOADED / 4.)
                                   ADD 1 TO NUM.AV8S.LOADED
                                   SCHEDULE AN AC.LOADED GIVING ACE
                                     IN TTLOAD MINUTES
                                   LET AC.SERVICE.FLAG(ACE) = 1
                                ELSE
                                   IF M.LOADER.Q(ACE) <> 1
                                      FILE ACE IN LOADER.Q
                                   ALWAYS
                                ALWAYS
                             ALWAYS
                            ALWAYS
                          ALWAYS
                       ALWAYS
                       FILE THIS ACE IN FLT.WAVE(FLIGHT)
                            PRINT 1 LINE WITH AC.ID(ACE),AC.LOCATION(ACE),
                                  AC.FUEL.STAT(ACE),AC.LOAD.STAT(ACE),
                                  FLT.TIME(FLIGHT),T.NUM.AC THUS
AC ** AT ** WITH FUEL *.** AND LOAD *.** JOINS FLIGHT **** ... T.NUM.AC= *
                    ALWAYS
                ALWAYS
             ALWAYS
        LOOP
     ELSE
        FOR EACH ACE IN BONE.AFT
           WHILE T.NUM.AC > 0, DO
              IF AC.OP.STAT(ACE) >= .6
                 IF AC.TYPE(ACE) = FLT.AC.TYPE(FLIGHT)
                    IF AC.LAUNCH.TIME(ACE) > (FLT.TIME(FLIGHT) + 20)
                       LET AC.LAUNCH.TIME(ACE) = FLT.TIME(FLIGHT)
                       SUBTRACT 1 FROM T.NUM.AC
                       IF NUM.OPEN.SPOTS > 0
                          IF AV8.LAUNCH.TIME < AC.LAUNCH.TIME(ACE)
                             LET LOSPOT = 3
                          ELSE
                             LET LOSPOT = 1
                          ALWAYS
                          FOR I = LOSPOT TO SPOT.AC(AC.TYPE(ACE),7),
                             WITH SPOT(SPOT.AC(AC.TYPE(ACE),I)) = 0
                          FIND THE FIRST CASE
                          IF FOUND
                             IF AC.TYPE(ACE) < 3
                                LET SPOTT = SPOT.AC(AC.TYPE(ACE),I)
                                LET AC.DESTINATION(ACE) = SPOTT
                                LET SPOT(SPOTT) = -AC.ID(ACE)
                                SUBTRACT 1 FROM NUM.OPEN.SPOTS
                                PRINT 1 LINE WITH NUM.OPEN.SPOTS THUS
                                NUM.OPEN.SPOTS = **
                                IF TUG < 4
                                   LET TUG = TUG + 1
                                   LET XBAR = TTRESPOT.AC(AC.TYPE(ACE))
                                   LET SDEV = S.TTRESPOT.AC(AC.TYPE(ACE))
                                   LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
                                   SCHEDULE AN AC.RESPOTTED GIVING ACE
                                               IN TTRESPOT MINUTES
                                ELSE
                                   FILE ACE IN TUG.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN TUG.Q
                                ALWAYS
                             ELSE      ''ACE IS AV8
                                IF AC.FUEL.STAT(ACE) < 1
                                   IF REFUELER < 4
                                      ADD 1 TO REFUELER
                                      LET DELAY = NORMAL.F(1.,.25,4)
                                      SCHEDULE AN AC.REFUELED GIVING ACE
                                       IN ((1. - AC.FUEL.STAT(ACE)) *
                                       TTREFUEL.AC(AC.TYPE(ACE)))
                                       + DELAY MINUTES
                                      LET AC.SERVICE.FLAG(ACE) = 1
                            IF M.LOAD.SET(ACE) <> 1
                               IF AC.LOAD.STAT(ACE) < 1
                                  IF N.LOAD.SET < 2
                                     FILE ACE IN LOAD.SET
                                      PRINT 1 LINE WITH N.LOAD.SET THUS
          N.LOAD.SET = **
                                      LET XBAR = TTLOAD.AC(AC.TYPE(ACE))
                                      LET SDEV = S.TTLOAD.AC(AC.TYPE(ACE))
                                      LET TTLOAD = NORMAL.F(XBAR,SDEV,3)
                                          + (NUM.AV8S.LOADED / 4.)
                                      ADD 1 TO NUM.AV8S.LOADED
                                      SCHEDULE AN AC.LOADED GIVING ACE
                                          IN TTLOAD MINUTES
                                      LET AC.SERVICE.FLAG(ACE) = 1
                                   ELSE
                                      IF M.LOADER.Q(ACE) <> 1
                                         FILE ACE IN LOADER.Q
                                      ALWAYS
                                   ALWAYS
                                ALWAYS
                             ALWAYS
                                   ELSE
                                      FILE ACE IN REFUELER.Q
                                   ALWAYS
                                ELSE
                                   IF AC.LOAD.STAT(ACE) < 1
                                    IF M.LOAD.SET(ACE) <> 1
                                     IF N.LOAD.SET < 2
                                        FILE ACE IN LOAD.SET
                                        PRINT 1 LINE WITH N.LOAD.SET THUS
      N.LOAD.SET= **
                                  LET XBAR = TTLOAD.AC(AC.TYPE(ACE))
                                  LET SDEV = S.TTLOAD.AC(AC.TYPE(ACE))
                                  LET TTLOAD = NORMAL.F(XBAR,SDEV,3)
                                          + (NUM.AV8S.LOADED / 4.)
                                  ADD 1 TO NUM.AV8S.LOADED
                                  SCHEDULE AN AC.LOADED GIVING ACE
```

```
                                     IN TTLOAD MINUTES
                                         LET AC.SERVICE.FLAG(ACE) = 1
                                      ELSE
                                         IF M.LOADER.Q(ACE) <> 1
                                            FILE ACE IN LOADER.Q
                                         ALWAYS
                                      ALWAYS
                                     ALWAYS
                                    ALWAYS
                                 ALWAYS
                              ALWAYS
                           ELSE   ''(IF NOT FOUND)
                              FILE THIS ACE IN SPOT.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN SPOT.Q
                           ALWAYS
                        ELSE   ''(IF NUM.OPEN.SPOTS = 0)
                           FILE THIS ACE IN SPOT.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN SPOT.Q
                        ALWAYS
                        FILE THIS ACE IN FLT.WAVE(FLIGHT)
                             PRINT 1 LINE WITH AC.ID(ACE),AC.LOCATION(ACE),
                                   AC.FUEL.STAT(ACE),AC.LOAD.STAT(ACE),
                                   FLT.TIME(FLIGHT),T.NUM.AC THUS
AC ** AT ** WITH FUEL *.** AND LOAD *.** JOINS FLIGHT **** ... T.NUM.AC= *
                     ALWAYS
                   ALWAYS
               ALWAYS
           LOOP
     ALWAYS
  ALWAYS

  IF TT.NUM.AC > 0
     LET TT.NUM.AC = TT.NUM.AC - T.NUM.AC
     ADD TT.NUM.AC TO NUM.REPLACED.AC
  ALWAYS

  IF T.NUM.AC > 0
     PRINT 1 LINE WITH T.NUM.AC THUS
   T.NUM.AC = **  4   ...UNABLE TO FIND AVAILABLE AC TO FILL THIS FLIGHT

     FOR I = 1 TO T.NUM.AC, DO
         FOR J = 1 TO FLT.AC.NUM(FLIGHT),
             WITH FLTARRAY(FLT.NUM(FLIGHT),J) <> 0
         FIND THE FIRST CASE
         IF FOUND
            FOR EACH ACE IN THE SHIP,
                WITH AC.ID(ACE) = FLTARRAY(FLT.NUM(FLIGHT),J)
            FIND THE FIRST CASE
            IF FOUND
               ADD 1 TO COUNTER
               FILE THIS ACE IN FLT.WAVE(FLIGHT)
               LET FLTARRAY(FLT.NUM(FLIGHT),J) = 0
               PRINT 1 LINE WITH AC.ID(ACE),FLT.TIME(FLIGHT) THUS
NO REPLACEMENT AC ARE AVAILABLE...AC ** IS STILL SCHEDULED TO LAUNCH AT ****
            ELSE
               PRINT 1 LINE THUS
                 ***ERROR*** AC NOT FOUND IN FLTARRAY
            ALWAYS
```

```
        ELSE
           PRINT 1 LINE THUS
                ###ERROR### AC NOT FOUND IN DECK.DECISION
        ALWAYS
    LOOP
 ALWAYS
 FILE FLIGHT IN PLAN
 SCHEDULE A FLIGHT.CHECK GIVING FLIGHT AT (FLT.TIME(FLIGHT)
               + (1. + BETA.F(1.5,3.0,9) * 2.))
 IF FLT.AC.TYPE(FLIGHT) = 3
     FILE FLIGHT IN AV8.PLAN
 ALWAYS

 IF N.SCHEDULE > 0
    REMOVE FIRST FLIGHTE FROM SCHEDULE
    IF (FLT.TIME(FLIGHTE) - TIME.V) >= 40
       SCHEDULE A DECK.DECISION GIVING FLIGHTE IN
                                 (FLT.TIME(FLIGHTE)-TIME.V-40) MINUTES
       FILE FLIGHTE IN SCHEDULE
    ELSE
       SCHEDULE A DECK.DECISION GIVING FLIGHTE IN 2 MINUTES
       FILE FLIGHTE IN SCHEDULE
    ALWAYS
 ELSE
    SCHEDULE A STOP.SIMULATION IN 200 MINUTES
    PRINT 1 LINE WITH TIME.V,(TIME.V+200) THUS
STOP.SIMULATION SCHEDULED AT ****.** TO OCCUR AT SIM.TIME = ****.**
 ALWAYS
RETURN
END
```

```
''*********************************************************************
EVENT DELTA.ARRIVAL GIVEN AC
''*********************************************************************

  DEFINE AC, ACE.T, FLAG, SPOTT AS INTEGER VARIABLES
  DEFINE INTERVAL AS  REAL VARIABLES

  PRINT 1 LINE WITH AC.ID(AC),AC.FUEL.STAT(AC),AC.LOAD.STAT(AC),
                    AC.OP.STAT(AC),AC.FLYING.TIME(AC) THUS
AC ** WITH FUEL *.**  AND LOAD *.**  HAS OP.STAT *.**  AND FLYING.TIME ***.*

  LET AC.DELTA.ARRIVAL.TIME(AC) = TIME.V
  LET AC.LOCATION(AC) = 9
  LET ETA(AC.ID(AC)) = 0

''   THIS SECTION OF CODE UPDATES THE FUEL AND PRIORITY STATUS VARIABLES OF
'' THE AIRCRAFT IN THE DELTA PATTERN

    FOR EACH ACE IN DELTA.PATTERN, DO
      LET DELTA = ((TIME.V - DELTA.UPDATE.TIME)/60) *
                             (FUELUSE.AC(AC.TYPE(ACE)))
      LET AC.FUEL.STAT(ACE) = AC.FUEL.STAT(ACE) - DELTA
      LET AC.FLYING.TIME(ACE) = (AC.FUEL.STAT(ACE)
                              / FUELUSE.AC(AC.TYPE(ACE))) * 60.
      LET AC.PRIORITY(ACE) = AC.PRIORITY(ACE) + DELTA * .2
PRINT 1 LINE WITH AC.ID(ACE),AC.DESTINATION(ACE),AC.PRIORITY(ACE),
              AC.FUEL.STAT(ACE), AC.FLYING.TIME(ACE)  THUS
AC ** WITH DEST ** HAS PRIORITY  *.***  FUEL.STAT  *.**  FLYING.TIME  ***.*
      REMOVE THIS ACE FROM THE DELTA.PATTERN
      FILE THIS ACE IN DELTA.PATTERN
    LOOP
    LET DELTA.UPDATE.TIME = TIME.V

''    FILE THE ARRIVING AIRCRAFT IN THE DELTA PATTERN.

    FILE THIS AC IN DELTA.PATTERN
    FILE THIS AC IN SPOT.Q
PRINT 1 LINE WITH AC THUS
AC ** FILED IN SPOT.Q

''    THIS SECTION OF CODE DETERMINES WHAT ACTION SHOULD BE TAKEN FOR THE
''  AIRCRAFT IN DELTA.  CHECK TO SEE
''  IF THERE EXIST AN EMERGENCY STATUS FOR ANY OF THE AIRCRAFT IN THE DELTA
''  PATTERN.  IF AN EMERGENCY EXIST, ALLOW THE EMERGENCY AIRCRAFT TO RECOVER

  LET FLAG = 0
  FOR EACH ACE IN DELTA.PATTERN,
      WITH ((AC.DESTINATION(ACE) = 9)
           AND (AC.PRIORITY(ACE) > PRIORITY.STAT.AC(AC.TYPE(ACE))))
  FIND THE FIRST CASE
  IF FOUND
     IF AC.PRIORITY(ACE) > EMERGENCY.STAT.AC(AC.TYPE(ACE))
        SCHEDULE A SPOT.EMERGENCY GIVING ACE IN .25 MINUTES
        PRINT 1 LINE WITH AC.ID(ACE),TIME.V THUS
AC ** DECLARES EMERGENCY AT ****.**
        LET FLAG = 1
     ELSE
        IF AC.PRIORITY(ACE) > PRIORITY.STAT.AC(AC.TYPE(ACE))
           SCHEDULE A SPOT.PRIORITY GIVING ACE IN 1 MINUTE
           PRINT 1 LINE WITH AC.ID(ACE),TIME.V THUS
```

```
AC ** DECLARES PRIORITY AT ****.**
           LET FLAG = 1
        ALWAYS
     ALWAYS
  ALWAYS
  IF FLAG = 0
     LET INTERVAL = 0
     LET I = 7

     PRINT 1 LINE THUS
THE FOLLOWING AC ARE IN SPOT.Q:

     FOR EACH ACE IN SPOT.Q, DO
         IF AC.LOCATION(ACE) = 9
            LET INDEX(AC.ID(ACE)) = 8
         ELSE
            LET INDEX(AC.ID(ACE)) = 7
         ALWAYS
         PRINT 1 LINE WITH AC.ID(ACE),AC.LOCATION(ACE),
                           AC.LAUNCH.TIME(ACE) THUS
         AC **  AT *  SCHED TO LAUNCH AT ****
     LOOP

     WHILE ((NUM.OPEN.SPOTS > 0) AND (N.SPOT.Q > 0) AND (I > 1)), DO
        SUBTRACT 1 FROM I

     PRINT 1 LINE WITH NUM.OPEN.SPOTS,N.SPOT.Q,I,SPOT(I) THUS
  #OPEN SPOTS= **   #SPOT.Q = **   I = *   SPOT(I) = **

        IF SPOT(I) = 0
           LET SPOTT = I
           IF N.AV8.PLAN > 0
              REMOVE THE FIRST FLIGHTE FROM AV8.PLAN
              LET AV8.LAUNCH.TIME = FLT.TIME(FLIGHTE)
              FILE THIS FLIGHTE IN AV8.PLAN
           ELSE
              LET AV8.LAUNCH.TIME = 9999
           ALWAYS

           FOR EACH FLIGHTE IN THE PLAN
               WITH ((FLT.AC.TYPE(FLIGHTE) <> 3)
                    AND (FLT.DELAY(FLIGHTE) = 0))
           FIND THE FIRST CASE
           IF FOUND
              LET HELO.LAUNCH.TIME = FLT.TIME(FLIGHTE)
           ELSE
              LET HELO.LAUNCH.TIME = 9999
           ALWAYS

              PRINT 1 LINE WITH AV8.LAUNCH.TIME, HELO.LAUNCH.TIME,
                                SPOTT THUS
AV8.LAUNCH.TIME= ****   HELO.LAUNCH.TIME= ****   OPEN SPOT IS **

           FOR EACH ACE IN SPOT.Q,
              FOR J = 1 TO SPOT.AC(AC.TYPE(ACE),INDEX(AC.ID(ACE))),
                 WITH ((SPOT.AC(AC.TYPE(ACE),J) = SPOTT)
                  AND (((AC.LOCATION(ACE) = 9)
                  AND ((AC.FLYING.TIME(ACE) < 33)
                    OR ((((AC.LAUNCH.TIME(ACE) - TIME.V)
                          > AC.FLYING.TIME(ACE))
```

```
                         OR ((AC.LAUNCH.TIME(ACE)-TIME.V) < 25))
                       AND (((AV8.LAUNCH.TIME
                              > AC.LAUNCH.TIME(ACE))
                           OR (AV8.LAUNCH.TIME > (TIME.V + 20)))
                       OR ((AC.TYPE(ACE) = 3)
                            AND (AV8.LAUNCH.TIME > (TIME.V + 10))))
                       AND ((HELO.LAUNCH.TIME > (TIME.V + 10))
                           OR ((HELO.LAUNCH.TIME + 1.)
                                > AC.LAUNCH.TIME(ACE))))))
                  OR ((AC.LOCATION(ACE) < 9)
                     AND ((SPOTT > 2)
                         OR (AV8.LAUNCH.TIME >= AC.LAUNCH.TIME(ACE)))
                     AND ((AC.LAUNCH.TIME(ACE) - TIME.V) < 25))))
           FIND THE FIRST CASE
           IF FOUND   '' AC COMPATIBLE WITH SPOT IDENTIFIED
              PRINT 1 LINE WITH AC.ID(ACE),SPOTT,AC.LAUNCH.TIME(ACE),
                                AC.FLYING.TIME(ACE)  THUS
    AC ** COMPATIBLE TO GO TO SPOT * HAS LAUNCH.TIME= **** AND FLYING.TIME = *





                 IF AC.LOCATION(ACE) = 9

                   IF FLAG = 0  ''DRAWS TTRECOVER ONLY ON FIRST PASS
                    LET XBAR = TTRECOVER.AC(AC.TYPE(ACE))
                    LET SDEV = S.TTRECOVER.AC(AC.TYPE(ACE))
                    LET TTRECOVER = NORMAL.F(XBAR,SDEV,1)
                    IF TTRECOVER < (LAST.RECOVERY.TIME + .5 - TIME.V)
                       LET TTRECOVER = LAST.RECOVERY.TIME + .5 - TIME.V
                    ALWAYS
                    IF TTRECOVER < (LAST.LAUNCH.TIME + 2 - TIME.V)
                       LET TTRECOVER = LAST.LAUNCH.TIME + 2 - TIME.V
                    ALWAYS
                    LET FLAG = 1
                   ALWAYS

                    LET AC.DESTINATION(ACE) = SPOTT
                    LET SPOT(SPOTT) = -AC.ID(ACE)
                    SUBTRACT 1 FROM NUM.OPEN.SPOTS
                    PRINT 1 LINE WITH NUM.OPEN.SPOTS THUS
                    NUM.OPEN.SPOTS = **
                    SCHEDULE AN AC.RECOVERED GIVING ACE
                             IN TTRECOVER + INTERVAL MINUTES
                    ADD UNIFORM.F(.5,.8,1) TO INTERVAL
                    LET LAST.RECOVERY.TIME = TTRECOVER + TIME.V
                                           + INTERVAL
                    PRINT 1 LINE WITH AC.ID(ACE),SPOTT,
                                 (TTRECOVER+INTERVAL) THUS
AC ** WILL RECOVER TO SPOT **  IN ***.* MINUTES
                    REMOVE THIS ACE FROM SPOT.Q
                 ELSE
                   IF AC.LOCATION(ACE) < 12
                    IF AC.TYPE(ACE) < 3
```

```
                       LET AC.DESTINATION(ACE) = SPOTT
                       LET SPOT(SPOTT) = -AC.ID(ACE)
                       IF AC.SERVICE.FLAG(ACE) = 0
                          IF TUG < 4
                             ADD 1 TO TUG
                             LET XBAR = TTRESPOT.AC(AC.TYPE(ACE))
                             LET SDEV = S.TTRESPOT.AC(AC.TYPE(ACE))
                             LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
                             SCHEDULE AN AC.RESPOTTED GIVING ACE
                                      IN TTRESPOT MINUTES
                          PRINT 1 LINE WITH AC.ID(ACE),SPOTT THUS
                        AC ** WILL RESPOT TO SPOT **
                          ELSE
                             FILE THIS ACE IN TUG.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN TUG.Q
                          ALWAYS
                       ALWAYS
                       IF AC.LOCATION(ACE) > 6
                          SUBTRACT 1 FROM NUM.OPEN.SPOTS
                          PRINT 1 LINE WITH NUM.OPEN.SPOTS THUS
                          NUM.OPEN.SPOTS = **
                       ALWAYS
                       REMOVE THIS ACE FROM SPOT.Q
                    ELSE
                       IF AC.LAUNCH.TIME(ACE) = AV8.LAUNCH.TIME
                          IF SPOTT <= 2  ''AV8'S CAN RECOVER ON 1,2,5,6 BUT LA
                             IF (AC.LAUNCH.TIME(ACE) - TIME.V) <= 10.
                                LET AC.DESTINATION(ACE) = SPOTT
                                LET SPOT(SPOTT) = -AC.ID(ACE)
                                LET XBAR = TTRESPOT.AC(AC.TYPE(ACE))
                                LET SDEV = S.TTRESPOT.AC(AC.TYPE(ACE))
                                LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
                                SCHEDULE AN AC.RESPOTTED GIVING ACE IN
                                      TTRESPOT MINUTES
                            PRINT 1 LINE WITH AC.ID(ACE),SPOTT THUS
           AC = **  WILL RESPOT TO **
                                SUBTRACT 1 FROM NUM.OPEN.SPOTS
                                PRINT 1 LINE WITH NUM.OPEN.SPOTS THUS
                                NUM.OPEN.SPOTS = **
                                REMOVE THIS ACE FROM SPOT.Q
                             ELSE
                                SCHEDULE A SPOT.OPEN IN (AC.LAUNCH.TIME(ACE)
                                   - 10. + UNIFORM.F(.1,2.,9)) MINUTES
                             ALWAYS
                          ALWAYS
                       ALWAYS
                    ALWAYS
                   ELSE
                      IF AC.TYPE(ACE) < 3
                         LET AC.DESTINATION(ACE) = SPOTT
                         LET SPOT(SPOTT) = - AC.ID(ACE)
                         SUBTRACT 1 FROM NUM.OPEN.SPOTS
                         PRINT 1 LINE WITH NUM.OPEN.SPOTS THUS
                         NUM.OPEN.SPOTS = **
                      ELSE
                         LET AC.DESTINATION(ACE) = 3
                         FILE ACE IN BONE.AFT
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN BONE
```

```
                      ALWAYS
                      IF (SPOT(11) = 0) AND
                               (HANGER.EQUIV < MAX.HANGER.EQUIV)
                          LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
                          LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
                          LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
                          SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                                      IN. TTARRIV.E MINUTES
                         LET SPOT(11) = -AC.ID(ACE)
                      ELSE
                         IF M.ELEVATOR.Q(ACE) <> 1
                            FILE ACE IN ELEVATOR.Q
                         ALWAYS
PRINT I LINE WITH ACE THUS
AC ** FILED IN ELEVATOR.Q
                      ALWAYS
                      REMOVE ACE FROM SPOT.Q
                   ALWAYS
                 ALWAYS
           PRINT 1 LINE WITH N.SPOT.Q,NUM.OPEN.SPOTS,I,SPOT(I),
                             AC.ID(ACE), AC.LOCATION(ACE) THUS
#IN SPOT.Q **  #OPEN SPOTS *  I *  SPOT(I) **  AC.ID **  AC.LOC **
           ALWAYS
        ALWAYS
     LOOP
  ALWAYS
  RETURN
  END
```

```
''***********************************************************************
EVENT DELTA.UPDATE.CHK
''***********************************************************************

  PRINT 1 LINE WITH DELTA.UPDATE.TIME,(TIME.V-DELTA.UPDATE.TIME) THUS
DELTA.UPDATE.TIME= ****.****    TIME-DELTA= ****.****
  IF (TIME.V - DELTA.UPDATE.TIME) >= 5
     SCHEDULE A SPOT.OPEN NOW
     SCHEDULE A DELTA.UPDATE.CHK IN 5 MINUTES
  ELSE
     SCHEDULE A DELTA.UPDATE.CHK IN
               MAX.F(5.-TIME.V+DELTA.UPDATE.TIME,1.0) MINUTES
  ALWAYS
  RETURN
  END
```

```
''*************************************************************
EVENT ELEVATOR.ARRIVAL GIVEN AC
''*************************************************************

  DEFINE AC AS AN INTEGER VARIABLE

  IF AC.LOCATION(AC) < 12
    LET TUG = TUG - 1  ''ALL AIRCRAFT ARE MOVED BY TUG TO AND FROM THE ELEVATC
    IF AC.LOCATION(AC) < 7
       LET SPOT(AC.LOCATION(AC)) = 0
       ADD 1 TO NUM.OPEN.SPOTS
       PRINT 1 LINE WITH NUM.OPEN.SPOTS THUS
       NUM.OPEN.SPOTS = **
       SCHEDULE A SPOT.OPEN NOW
    ELSE
       IF AC.LOCATION(AC) = 7
          REMOVE AC FROM BONE.FWD
       ELSE
          IF AC.LOCATION(AC) = 8
             REMOVE AC FROM BONE.AFT
          ALWAYS
       ALWAYS
    ALWAYS
    LET TTARRIV.H = .5 + ((BETA.F(1.5,5.0,7)) * 4.)
    SCHEDULE A HANGER.ARRIVAL GIVING AC IN TTARRIV.H MINUTES
    LET AC.LOCATION(AC) = 11
    LET SPOT(11) = AC.ID(AC)
    IF (N.TUG.Q > 0) AND (TUG < 4)
      FOR EACH ACE IN TUG.Q
         WITH (AC.DESTINATION(ACE) < 9) AND (AC.LOCATION(ACE) <> 12)
      FIND THE FIRST CASE
      IF FOUND
         REMOVE THIS ACE FROM TUG.Q
           PRINT 1 LINE WITH ACE THUS
AC ** REMOVED FROM TUG.Q
         LET TUG = TUG + 1
         IF AC.DESTINATION(ACE) = 7 OR AC.DESTINATION(ACE) = 8
            LET XBAR = TTRESPOT.AC(AC.TYPE(ACE))
            LET SDEV = S.TTRESPOT.AC(AC.TYPE(ACE))
            LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
            SCHEDULE A BONE.ARRIVAL GIVING ACE IN TTRESPOT MINUTES
         ELSE
            LET XBAR = TTRESPOT.AC(AC.TYPE(ACE))
            LET SDEV = S.TTRESPOT.AC(AC.TYPE(ACE))
            LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
            SCHEDULE AN AC.RESPOTTED GIVING ACE IN TTRESPOT MINUTES
         ALWAYS
      ALWAYS
    ALWAYS
  ELSE  ''AC IS GOING TO THE DECK
  PRINT 1 LINE THUS
AC GOING TO DECK HAS ARRIVED AT THE ELEVATOR
      REMOVE THIS AC FROM THE HANGER.DECK
      LET TTARRIV.D = .5 + ((BETA.F(1.5,5.0,7)) * 4.)
      SCHEDULE A DECK.ARRIVAL GIVING AC IN  TTARRIV.D MINUTES
  ALWAYS
  RETURN
  END
```

```
''**********************************************************************
EVENT FLIGHT.CHECK GIVEN FLIGHT
''**********************************************************************
  DEFINE FLIGHT AS AN INTEGER VARIABLE
  DEFINE DEL,T.CHK AS REAL VARIABLES

  IF N.PLAN(FLIGHT) = 1  ''FLIGHT HAS NOT LAUNCHED
   IF FLT.AC.NUM(FLIGHT) > 0
     FOR EACH ACE IN FLT.WAVE(FLIGHT), DO
         PRINT 1 LINE WITH AC.ID(ACE),AC.LOCATION(ACE),AC.FUEL.STAT(ACE),
                           AC.LOAD.STAT(ACE),AC.OP.STAT(ACE),
                           AC.LAUNCH.TIME(ACE), AC.DESTINATION(ACE) THUS
AC ** AT ** WITH FUEL *.** LOAD *.** HAS OP.STAT *.** TO.TIME **** DEST **

         IF ((AC.LOCATION(ACE) < 7) AND (AC.DESTINATION(ACE) = 10))
            IF AC.OP.STAT(ACE) = 1.0
               FILE ACE IN AC.RDY.SET
            ELSE
               FILE ACE IN AC.PRE.RDY.SET
            ALWAYS
         ELSE
            FILE ACE IN AC.NOT.RDY.SET
         ALWAYS
     LOOP
           PRINT 1 LINE WITH N.AC.RDY.SET,N.AC.PRE.RDY.SET,
                             N.AC.NOT.RDY.SET THUS
#RDY AC= **     #PRE.RDY AC= **     #NOT.RDY AC= **

              FOR EACH FLIGHTE IN THE PLAN, DO
                  PRINT 1 LINE WITH FLT.TIME(FLIGHTE),FLT.AC.TYPE(FLIGHTE),
                                    FLT.AC.RDY(FLIGHTE),FLT.AC.NUM(FLIGHTE),
                                    FLT.DELAY(FLIGHTE) THUS
FLT SCHED AT **** WITH AC.TYPE * HAS * OUT OF * READY...#DELAYS= *
              LOOP

     IF FLT.AC.TYPE(FLIGHT) <> 3  ''AV-8S ALWAYS FLY IN TWO'S
        IF N.AC.RDY.SET <> FLT.AC.NUM(FLIGHT)
           IF (N.AC.RDY.SET+N.AC.PRE.RDY.SET) <> FLT.AC.NUM(FLIGHT)
              ADD 1 TO SPLIT.FLTS
              LET T.FLT = SPLIT.FLTS + NUM.FLTS
              CREATE A FLIGHTE CALLED F(T.FLT)

              IF N.SET.TEMP > 0
                 FOR EACH ACE IN SET.TEMP, DO
                     REMOVE THIS ACE FROM SET.TEMP
                 LOOP
              ALWAYS

              FOR EACH ACE IN FLT.WAVE(FLIGHT),DO
                  FILE ACE IN SET.TEMP
                  REMOVE THIS ACE FROM FLT.WAVE(FLIGHT)
                  PRINT 1 LINE WITH AC.ID(ACE) THUS
                  AC ** FILES IN SET.TEMP
              LOOP


              FOR EACH ACE IN SET.TEMP, DO
                  IF AC.LOCATION(ACE) > 6
                     FILE THIS ACE IN FLT.WAVE(F(T.FLT))
                     PRINT 1 LINE WITH AC.ID(ACE),
                                       (FLT.TIME(FLIGHT)+5) THUS
                AC ** IS NOW SCHEDULED TO LAUNCH AT ****
                  ELSE
                     FILE THIS ACE IN FLT.WAVE(FLIGHT)
                     PRINT 1 LINE WITH AC.ID(ACE),
                                       (FLT.TIME(FLIGHT)) THUS
                AC **  SCHEDULED TO LAUNCH AT ****
                  ALWAYS
              LOOP

              LET FLT.NUM(F(T.FLT)) = FLT.NUM(FLIGHT) + .1
              LET FLT.DELAY(F(T.FLT)) = FLT.DELAY(FLIGHT) + 5
              LET FLT.TIME(F(T.FLT)) = FLT.TIME(FLIGHT) + 5
              WHILE FLT.TIME(F(T.FLT)) < TIME.V, DO
                    ADD 5 TO FLT.TIME(F(T.FLT))
                    ADD 5 TO FLT.DELAY(F(T.FLT))
                    ADD .1 TO FLT.NUM(F(T.FLT))
              LOOP
              LET FLT.AC.TYPE(F(T.FLT)) = FLT.AC.TYPE(FLIGHT)
              LET FLT.AC.NUM(F(T.FLT)) =  N.FLT.WAVE(F(T.FLT))
              LET FLT.AC.RDY(F(T.FLT)) = 0
              LET FLT.AC.NUM(FLIGHT) = N.FLT.WAVE(FLIGHT)
              PRINT 1 LINE WITH FLT.AC.NUM(FLIGHT),FLT.AC.RDY(FLIGHT) THUS
FLIGHT HAS ** AC, OF WHICH ** ARE READY TO LAUNCH
              IF ((FLT.AC.RDY(FLIGHT) = FLT.AC.NUM(FLIGHT))
                 AND (FLT.AC.NUM(FLIGHT) > 0))
                 SCHEDULE A FLIGHT.LAUNCH GIVING FLIGHT NOW
                 CALL CHECK1 GIVING FLIGHT
              ELSE
                 IF FLT.AC.NUM(FLIGHT) = 0
                    REMOVE FLIGHT FROM PLAN
                 ALWAYS
              ALWAYS

              LET DEL = (FLT.NUM(F(T.FLT)) - INT.F(FLT.NUM(F(T.FLT))))
              PRINT 1 LINE WITH FLT.NUM(F(T.FLT)),
                                INT.F(FLT.NUM(F(T.FLT))),DEL THUS
FLT.NUM = ***.*   INT(FLT.NUM) = ***.*  DEL = ***.**
              IF DEL < .4
                 FILE F(T.FLT) IN PLAN
                 LET T.CHK=(FLT.TIME(F(T.FLT))+(1.+BETA.F(1.5,3.0,9)*2.))
                 PRINT 1 LINE WITH T.CHK THUS
F(T.FLT) SCHEDULED FOR FLIGHT.CHECK AT ***.*
                 SCHEDULE A FLIGHT.CHECK GIVING F(T.FLT)) AT T.CHK
              ELSE ''AFTER 4 FLIGHT.CHECKS THERE ARE AC IN THIS FLIGHT STILL N
                 FOR EACH ACE IN FLT.WAVE(F(T.FLT)), DO
                     ADD 1 TO NUM.CANCELLED.MISSIONS
                     FOR EACH FLIGHTE IN THE SCHEDULE
                         FOR I = 1 TO FLT.AC.NUM(FLIGHTE)
                             WITH AC.ID(ACE) = FLTARRAY(FLT.NUM(FLIGHTE),I)
                     FIND THE FIRST CASE
                     IF FOUND
                        LET AC.LAUNCH.TIME(ACE) = FLT.TIME(FLIGHTE)
                     ELSE
                        LET AC.LAUNCH.TIME(ACE) = 9999
                     ALWAYS
                     IF ((AC.LOCATION(ACE) < 9) AND (N.SPOT.Q(ACE) = 1))
                        REMOVE THIS ACE FROM SPOT.Q
                     ALWAYS
                     IF M.BONE.FWD(ACE) = 1
                        REMOVE THIS ACE FROM BONE.FWD
                        FILE THIS ACE IN BONE.FWD
                     ALWAYS

                     IF M.BONE.AFT(ACE) = 1
                        REMOVE THIS ACE FROM BONE.AFT
                        FILE THIS ACE IN BONE.AFT
                     ALWAYS


                     IF ((AC.DESTINATION(ACE) < 7) ''NEED TO CANCEL RESPOT
                        AND (AC.LOCATION(ACE) < 9)) ''FOR AC ON DECK
                        FOR EACH AC.RESPOTTED IN EV.S(I.AC.RESPOTTED)
                            WITH AC3 = ACE, DO
                            CANCEL AC.RESPOTTED
                            PRINT 1 LINE WITH AC.ID(ACE), TIME.V THUS
         AC.RESPOTTED EVENT FOR AC ** WAS CANCELLED AT ****.*
                        LOOP
                        LET SPOT(AC.DESTINATION(ACE)) = 0
                        ADD 1 TO NUM.OPEN.SPOTS
                        SCHEDULE A SPOT.OPEN NOW
                     ALWAYS


                     PRINT 1 LINE WITH AC.ID(ACE), AC.LAUNCH.TIME(ACE) THUS
AC **'S STICK IN THIS FLIGHT IS CANCELLED...NEXT LAUNCH.TIME IS ****
                 LOOP
''                 FOR EACH FLIGHTE IN PLAN
''                     WITH (FLT.TIME(FLIGHT) = FLT.TIME(FLIGHTE))
''                         AND (FLT.NUM(FLIGHT) = FLT.NUM(FLIGHTE))
''                 FIND THE FIRST CASE
''                 IF FOUND
''                    REMOVE THIS FLIGHTE FROM PLAN
''                 ELSE
''                    PRINT 1 LINE THUS
''           **ERROR**  FLIGHT NOT FOUND IN PLAN
''                 ALWAYS
                 IF ((N.PLAN = 0) AND (N.SCHEDULE = 0))
                    SCHEDULE A STOP.SIMULATION IN 160 MINUTES
                    PRINT 1 LINE WITH TIME.V,(TIME.V+160) THUS
AT ****.** A STOP SIMULATION WAS SCHEDULED FOR TIME = ****.**
                 ALWAYS
              ALWAYS

              SCHEDULE A FLIGHT.CHECK GIVING FLIGHT
                       IN (1. + BETA.F(1.5,3.0,9) * 2.) MINUTES
           ELSE  ''ALL AC ARE IN FINAL SERVICE...WAIT
              PRINT 1 LINE THUS
ALL AC ARE IN FINAL SERVICE ON DECK SPOTS...WAIT FOR COMPLETION
              SCHEDULE A FLIGHT.CHECK GIVING FLIGHT
                       IN (1. + BETA.F(1.5,3.0,9) * 2.) MINUTES
           ALWAYS
        ELSE ''ALL AC ARE READY...LAUNCH IS IMMINENT
           PRINT 1 LINE THUS
ALL AC ARE READY...LAUNCH IS IMMINENT
           SCHEDULE A FLIGHT.CHECK GIVING FLIGHT
                    IN (1. + BETA.F(1.5,3.0,9) * 2.) MINUTES
        ALWAYS
     ELSE ''AV3 FLT IS LATE
```

```
        PRINT 1 LINE THUS
THIS AV8 FLIGHT IS LATE
        ADD 2 TO FLT.DELAY(FLIGHT)
       IF((N.AC.RDY.SET <> FLT.AC.NUM(FLIGHT))
            OR (FLT.DELAY(FLIGHT) > 14))
        IF FLT.DELAY(FLIGHT) >= 10 ''CANCEL THIS FLIGHT
           ADD 2 TO NUM.CANCELLED.MISSIONS
           FOR EACH ACE IN FLT.WAVE(FLIGHT), DO
               FOR EACH FLIGHTE IN THE SCHEDULE
                   FOR I = 1 TO FLT.AC.NUM(FLIGHTE)
                       WITH AC.ID(ACE) = FLTARRAY(FLT.NUM(FLIGHTE),I)
               FIND THE FIRST CASE
               IF FOUND
                  LET AC.LAUNCH.TIME(ACE) = FLT.TIME(FLIGHTE)
               ELSE
                  LET AC.LAUNCH.TIME(ACE) = 9999
               ALWAYS

               IF ((AC.LOCATION(ACE) < 9) AND (M.SPOT.Q(ACE) = 1))
                  REMOVE THIS ACE FROM SPOT.Q
               ALWAYS

               IF M.BONE.AFT(ACE) = 1
                  REMOVE THIS ACE FROM BONE.AFT
                  FILE THIS ACE IN BONE.AFT
               ALWAYS

               IF ((AC.DESTINATION(ACE) < 7) ''NEED TO CANCEL RESPOT
                  AND (AC.LOCATION(ACE) < 9)) ''FOR AC ON DECK
                  FOR EACH AC.RESPOTTED IN EV.S(I.AC.RESPOTTED)
                      WITH AC3 = ACE, DO
                      CANCEL AC.RESPOTTED
                      PRINT 1 LINE WITH AC.ID(ACE), TIME.V THUS
       AC.RESPOTTED EVENT FOR AC ** WAS CANCELLED AT ****.*
                  LOOP
                  LET SPOT(AC.DESTINATION(ACE)) = 0
                  ADD 1 TO NUM.OPEN.SPOTS
                  SCHEDULE A SPOT.OPEN NOW
               ALWAYS

               IF AC.LOCATION(ACE) < 7  ''NEED TO RESPOT AV8S BACK TO BONE
                  SUBTRACT 1 FROM NUM.AV8.RDY
                  LET AC.DESTINATION(ACE) = 8
                  LET XBAR = TTRESPOT.AC(AC.TYPE(ACE))
                  LET SDEV = S.TTRESPOT.AC(AC.TYPE(ACE))
                  LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
                  SCHEDULE A BONE.ARRIVAL GIVING ACE
                           IN TTRESPOT MINUTES
                  FILE ACE IN BONE.AFT
               ALWAYS

               PRINT 1 LINE WITH AC.ID(ACE), AC.LAUNCH.TIME(ACE) THUS
AC **'S STICK IN THIS FLIGHT IS CANCELLED...NEXT LAUNCH.TIME IS ****
           LOOP
           FOR EACH FLIGHTE IN PLAN
               WITH (FLT.TIME(FLIGHT) = FLT.TIME(FLIGHTE))
                     AND (FLT.NUM(FLIGHT) = FLT.NUM(FLIGHTE))
           FIND THE FIRST CASE
           IF FOUND
              REMOVE THIS FLIGHTE FROM PLAN
              REMOVE THIS FLIGHTE FROM AV8.PLAN
           ELSE
              PRINT 1 LINE THUS
              **ERROR**  FLIGHT NOT FOUND IN PLAN
           ALWAYS
           IF ((N.PLAN = 0) AND (N.SCHEDULE = 0))
              SCHEDULE A STOP.SIMULATION IN 160 MINUTES
              PRINT 1 LINE WITH TIME.V,(TIME.V+160) THUS
      AT ****.** A STOP SIMULATION WAS SCHEDULED FOR TIME = ****.**
           ALWAYS
        ELSE
           SCHEDULE A FLIGHT.CHECK GIVING FLIGHT IN 2 MINUTES
        ALWAYS
       ELSE
          SCHEDULE A FLIGHT.CHECK GIVING FLIGHT IN 2 MINUTES
          PRINT 1 LINE THUS
ALL AV8-'S ARE ON DECK AND READY TO LAUNCH...
       ALWAYS
     ALWAYS

     FOR EACH ACE IN AC.RDY.SET, DO
         REMOVE ACE FROM AC.RDY.SET
     LOOP
     FOR EACH ACE IN AC.PRE.RDY.SET, DO
         REMOVE ACE FROM AC.PRE.RDY.SET
     LOOP
     FOR EACH ACE IN AC.NOT.RDY.SET, DO
         REMOVE ACE FROM AC.NOT.RDY.SET
     LOOP
   ELSE
     IF N.PLAN(FLIGHT) = 1
        REMOVE THIS FLIGHT FROM PLAN
     ALWAYS
   ALWAYS
  ELSE ''FLIGHT HAS LAUNCHED
     PRINT 1 LINE THUS
THIS FLIGHT HAS LAUNCHED
  ALWAYS

RETURN
END
```

```
''*********************************************************************
EVENT FLIGHT.LAUNCH GIVEN FLIGHT
''*********************************************************************

  DEFINE INTERVAL, T.FLT.NUM AS REAL VARIABLES
  DEFINE FLIGHT AS INTEGER VARIABLES

  LET INTERVAL = UNIFORM.F(.5,1.,5)

  PRINT 1 LINE WITH INTERVAL,LAST.LAUNCH.TIME,LAST.RECOVERY.TIME THUS
INTERVAL= **.*   LAST.LAUNCH.TIME= ****.*   LAST.REC.TIME= ****.*

  IF TIME.V + INTERVAL < MAX.F((LAST.LAUNCH.TIME + 1.),
                                (LAST.RECOVERY.TIME + 1.))
     LET INTERVAL = MAX.F((LAST.LAUNCH.TIME - TIME.V + 1.),
                          (LAST.RECOVERY.TIME - TIME.V + 1.))
  ALWAYS
  LET T.FLT.NUM = INT.F(FLT.NUM(FLIGHT))
  IF FLT.AC.TYPE(FLIGHT) = 3
     FOR EACH ACE IN FLT.WAVE(FLIGHT), DO
        IF AC.LOCATION(ACE) < 7
           PRINT 1 LINE WITH TIME.V,AC.ID(ACE),INTERVAL THUS
           TIME: ****  AC ** WILL LAUNCH IN *.** MINUTES
           SCHEDULE AN AC.LAUNCHED GIVING ACE,T.FLT.NUM IN INTERVAL MINUTES
           LET LAST.LAUNCH.TIME = TIME.V + INTERVAL
           REMOVE THIS ACE FROM FLT.WAVE(FLIGHT)
           ADD UNIFORM.F(.3,.7,5) TO INTERVAL
        ELSE
           PRINT 1 LINE WITH AC.ID(ACE) THUS
AC ** WAS LAUNCHED EARLIER...DURING AN EMERGENCY RECOVERY...
        ALWAYS
     LOOP
     SCHEDULE A SPOT.OPEN IN INTERVAL MINUTES
     FOR EACH FLIGHTE IN AV8.PLAN
        WITH FLT.TIME(FLIGHT) = FLT.TIME(FLIGHTE)
     FIND THE FIRST CASE
     IF FOUND
        REMOVE THIS FLIGHTE FROM AV8.PLAN
     ELSE
        PRINT 1 LINE THUS
        ##ERROR##  FLIGHT NOT FOUND IN PLAN (AV8)
     ALWAYS
  ELSE

     IF N.SET.TEMP > 0
        FOR EACH ACE IN SET.TEMP, DO
            REMOVE THIS ACE FROM SET.TEMP
        LOOP
     ALWAYS

     FOR EACH ACE IN FLT.WAVE(FLIGHT),DO
         FILE ACE IN SET.TEMP
         REMOVE THIS ACE FROM FLT.WAVE(FLIGHT)
     LOOP


     FOR EACH ACE IN SET.TEMP, DO
        FILE ACE IN FLT.WAVE(FLIGHT)
     LOOP
     FOR EACH ACE IN FLT.WAVE(FLIGHT), DO
        IF AC.LOCATION(ACE) < 7
           PRINT 1 LINE WITH TIME.V,AC.ID(ACE),INTERVAL THUS
           TIME: ****  AC ** WILL LAUNCH IN *.** MINUTES
           SCHEDULE AN AC.LAUNCHED GIVING ACE,T.FLT.NUM IN INTERVAL MINUTES
           LET LAST.LAUNCH.TIME = TIME.V + INTERVAL
           REMOVE THIS ACE FROM FLT.WAVE(FLIGHT)
           ADD UNIFORM.F(.3,.7,5) TO INTERVAL

           IF INTERVAL > 10.0
              PRINT 1 LINE WITH INTERVAL THUS
     **ERROR**  INTERVAL = ***
              PRINT 1 LINE WITH N.SET.TEMP,N.FLT.WAVE(FLIGHT) THUS
              #IN SET.TEMP = *****     #IN FLT.WAVE = *****
              SCHEDULE A STOP.SIMULATION NOW
              RETURN
           ALWAYS

        ELSE
           PRINT 1 LINE WITH AC.ID(ACE) THUS
AC ** WAS LAUNCHED EARLIER...DURING AN EMERGENCY RECOVERY...
        ALWAYS
     LOOP
     SCHEDULE A SPOT.OPEN IN INTERVAL MINUTES
  ALWAYS

  FOR EACH FLIGHTE IN PLAN
     WITH (FLT.TIME(FLIGHT) = FLT.TIME(FLIGHTE))
        AND (FLT.NUM(FLIGHT) = FLT.NUM(FLIGHTE))
  FIND THE FIRST CASE
  IF FOUND
     REMOVE THIS FLIGHTE FROM PLAN
  ELSE
     PRINT 1 LINE THUS
     **ERROR**  FLIGHT NOT FOUND IN PLAN
  ALWAYS

  FOR EACH FLIGHTE IN THE PLAN, DO
      FOR EACH ACE IN FLT.WAVE(FLIGHTE), DO
          PRINT 1 LINE WITH FLT.TIME(FLIGHTE),AC.ID(ACE),
                AC.LOCATION(ACE),AC.DESTINATION(ACE) THUS
FLIGHT **** IS IN PLAN AND HAS  AC ** AT LOCATION **  WITH DEST **
      LOOP
  LOOP

  IF ((N.PLAN = 0) AND (N.SCHEDULE = 0))
     SCHEDULE A STOP.SIMULATION IN 160 MINUTES
     PRINT 1 LINE WITH TIME.V,(TIME.V+160) THUS
AT ****.** A STOP SIMULATION WAS SCHEDULED FOR TIME = ****.**
  ALWAYS
  RETURN
  END
```

```
''********************************************************************
EVENT HANGER.ARRIVAL GIVEN AC
''********************************************************************

  DEFINE AC AS INTEGER VARIABLES
  IF AC.TYPE(AC) = 2
     ADD 1.5 TO HANGER.EQUIV
  ELSE
     ADD 1.0 TO HANGER.EQUIV
  ALWAYS

  PRINT 1 LINE WITH HANGER.EQUIV THUS
HANGER.EQUIV = **.*

  FILE AC IN HANGER.DECK
PRINT 1 LINE WITH AC THUS
AC ** FILED IN HANGER
  LET AC.LOCATION(AC) = 12
  LET SPOT(11) = 0
  IF N.ELEVATOR.Q > 0
     REMOVE THE FIRST ACE FROM ELEVATOR.Q
     IF AC.DESTINATION(ACE) = 12
        IF (HANGER.EQUIV + 1) < (MAX.HANGER.EQUIV)
           LET SPOT(11) = -AC.ID(ACE)
           IF TUG < 4
              ADD 1 TO TUG
              LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
              LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
              LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
              SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                       IN  TTARRIV.E MINUTES
              PRINT 1 LINE WITH ACE,TTARRIV.E THUS
AC ** SCHEDULED TO ARRIVE AT THE ELEVATOR IN ***.* MINUTES
           ELSE
              FILE ACE IN TUG.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN TUG.Q
           ALWAYS
        ELSE
           IF M.ELEVATOR.Q(ACE) <> 1
              FILE ACE IN ELEVATOR.Q
           ALWAYS
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN ELEVATOR.Q
           FOR EACH ACE IN ELEVATOR.Q
              WITH AC.DESTINATION(ACE) < 12
           FIND THE FIRST CASE
           IF FOUND
              REMOVE THIS ACE FROM ELEVATOR.Q
              LET SPOT(11) = -AC.ID(ACE)
              LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
              LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
              LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
              SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                       IN  TTARRIV.E MINUTES
              PRINT 1 LINE WITH ACE,TTARRIV.E THUS
 ACE ** SCHEDULED TO ARRIVE AT THE ELEVATOR IN ***.* MINUTES
           ALWAYS
        ALWAYS
     ELSE
```

```
       LET SPOT(11) = -AC.ID(ACE)
       LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
       LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
       LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
       SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE IN  TTARRIV.E MINUTES
       PRINT 1 LINE WITH ACE,TTARRIV.E THUS
AC ** SCHEDULED TO ARRIVE AT THE ELEVATOR IN ***.* MINUTES
    ALWAYS
 ALWAYS
 RETURN
 END
```

```
''**********************************************************************
EVENT SPOT.EMERGENCY GIVEN AC
''**********************************************************************
  DEFINE SPOTT, AC,ACE,MAX.LAUNCH.TIME,MIN.LAUNCH.TIME,AC.MIN,AC.RDY,
         ACE.P, ACE.T, FLIGHTE.P, FLAG, AND AC.MAX AS INTEGER VARIABLES
  DEFINE INTERVAL, TTRECOVER, T.FLT.NUM AS REAL VARIABLES
  PRINT 1 LINE WITH TIME.V,EVENT.V,AC.ID(AC),AC.PRIORITY(AC),
                    AC.FUEL.STAT(AC) THUS
T ****.** E ** AC ** W PRI *.*** FUEL *.*** REQUESTED EMERGENCY LANDING

  IF M.SPOT.Q(AC) = 1  '' OTHERWISE AC ALREADY HAS A RECOVERY DESTINATION

     IF NUM.OPEN.SPOTS > 0
        FOR I BACK FROM 6 TO 1 BY 1
           WITH SPOT(I) = 0
        FIND THE FIRST CASE
        IF FOUND
           LET SPOTT = I
        ELSE
           LET SPOTT = 0
           PRINT 1 LINE THUS
**ERROR**    OPEN SPOT NOT FOUND
        ALWAYS
     ALWAYS
     IF I <> 0
        PRINT 1 LINE WITH EVENT.V,NUM.OPEN.SPOTS,SPOTT THUS
EVENT ** #OPEN SPOTS ** OPEN SPOT *     IF
        SUBTRACT 1 FROM NUM.OPEN.SPOTS



        PRINT 1 LINE WITH NUM.OPEN.SPOTS THUS
        NUM.OPEN.SPOTS = **
     ELSE
        LET FLAG = 0
        FOR I BACK FROM 6 TO 1 BY 1
           WHILE FLAG = 0, DO
           LET SPOTT = I
           IF SPOT(SPOTT) < 0
              FOR EACH ACE IN THE SHIP
                 WITH AC.ID(ACE) =  SPOT(SPOTT)
              FIND THE FIRST CASE
              IF FOUND
                 PRINT 1 LINE WITH AC.ID(ACE),AC.LOCATION(ACE),
                                   AC.FUEL.STAT(ACE),SPOTT THUS
   AC **  AT  **  WITH FUEL  **.**       SPOTT= **
                 IF ((AC.LOCATION(ACE) < 9) OR (AC.FUEL.STAT(ACE) > .5))
                    PRINT 1 LINE WITH ACE,SPOTT THUS
   AC ** WILL ABORT MOVEMENT TO SPOT **
                    LET FLAG = 1
                    PRINT 1 LINE WITH EVENT.V,NUM.OPEN.SPOTS,SPOTT THUS
                    EVENT ** #OPEN SPOTS ** OPEN SPOT *     ELSE
                    FOR EACH ACE IN THE SHIP,
                       WITH AC.ID(ACE) = ABS.F(SPOT(SPOTT))
                    FIND THE FIRST CASE
                    PRINT 1 LINE WITH AC.ID(ACE),AC.LOCATION(ACE),SPOTT THUS
                       AC ** IN TRANSIT FROM ** TO ** MUST BE DISPLACED
                    IF AC.LOCATION(ACE) = 9
                       FOR EACH AC.RECOVERED IN EV.S(I.AC.RECOVERED)
                          WITH AC2 = ACE, DO
                          CANCEL AC.RECOVERED
                       LOOP
                    ELSE
                       FOR EACH AC.RESPOTTED IN EV.S(I.AC.RESPOTTED)
                          WITH AC3 = ACE, DO
                          CANCEL AC.RESPOTTED
                       LOOP
                    ALWAYS
                    FILE ACE IN SPOT.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN SPOT.Q
                 ALWAYS
              ALWAYS
           ELSE
              FOR EACH ACE IN THE SHIP
                  WITH AC.ID(ACE) = ABS.F(SPOT(SPOTT))
              FIND THE FIRST CASE
              IF FOUND
                 IF (AC.DESTINATION(ACE) = 7) OR
                              (AC.DESTINATION(ACE) = 8)
                    LET FLAG = 2
                    PRINT 1 LINE WITH AC.ID(ACE) THUS
           AC ** IS IN TRANSIT TO THE BONE...WILL TAKE THIS SPOT FOR THE EMER(
                    IF M.TUG.Q(ACE) = 1
                       ADD 1 TO TUG
                       LET XBAR = TTRESPOT.AC(AC.TYPE(ACE))
                       LET SDEV = S.TTRESPOT.AC(AC.TYPE(ACE))
                       LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
                       SCHEDULE A BONE.ARRIVAL GIVING ACE
                                IN TTRESPOT MINUTES
                       REMOVE ACE FROM TUG.Q
           PRINT 1 LINE WITH ACE THUS
AC ** REMOVED FROM TUG.Q
                    ALWAYS
                 ALWAYS
              ALWAYS
           ALWAYS
         LOOP
         IF FLAG = 0
         ''ALL SPOTS CURRENTLY HAVE AN AC ON THEM..NEED TO LAUNCH OR RESPOT AC
           PRINT 1 LINE WITH AC.ID(AC) THUS
   MUST LAUNCH OR RESPOT AIRCRAFT TO ACCOMODATE AC ** EMERGENCY
           LET MIN.LAUNCH.TIME = 9999
           LET MAX.LAUNCH.TIME = 0
           LET AC.MIN = 0
           LET AC.MAX = 0
           LET AC.RDY = 0
           FOR I BACK FROM 6 TO 1 BY 1, DO
              FOR EACH ACE IN THE SHIP
                 WITH AC.ID(ACE) = SPOT(I)
              FIND THE FIRST CASE
              IF FOUND
                 IF ((AC.LAUNCH.TIME(ACE) > MAX.LAUNCH.TIME)
                    AND (AC.TYPE(ACE) <> 3))
                    LET AC.MAX = ACE
                    LET MAX.LAUNCH.TIME = AC.LAUNCH.TIME(ACE)
                 ALWAYS
                 IF ((AC.LAUNCH.TIME(ACE) < MIN.LAUNCH.TIME) AND
                          (AC.TYPE(ACE) <> 3) AND
                          (AC.OP.STAT(ACE) > .65) AND
                          ( AC.FUEL.STAT(ACE) > .5))
                    LET AC.MIN = ACE
                    LET MIN.LAUNCH.TIME = AC.LAUNCH.TIME(ACE)
                 ALWAYS
                 IF ((AC.FUEL.STAT(ACE)=1.)AND(AC.LOAD.STAT(ACE)= 1.)
                      AND (AC.RDY = 0) AND (AC.TYPE(ACE) <> 3))
                    LET AC.RDY = ACE
                 ALWAYS
                 PRINT 1 LINE WITH I,AC.ID(ACE),AC.MIN,AC.MAX THUS
I  **    AC  **    AC.MIN  ****     AC.MAX   ****
              ELSE
                 PRINT 1 LINE WITH I,SPOT(I),AC.MIN,AC.MAX THUS
    I  **   AC  **    AC.MIN  ****     AC.MAX   ****
              ALWAYS
           LOOP
            IF ((AC.RDY <> 0) AND (AC.LOAD.STAT(AC.MIN) < 1.))
               LET AC.MIN = AC.RDY
            ALWAYS
            IF (AC.MIN <> 0) AND (AC.TYPE(AC.MIN) < 3)
              LET SPOTT = AC.LOCATION(AC.MIN)
              PRINT 1 LINE WITH AC.ID(AC.MIN),SPOTT THUS
AC ** WILL LAUNCH IMMEDIATELY FROM SPOT * FOR THE EMERGENCY RECOVERY
              LET SPOT(SPOTT) = 0
              IF AC.LOAD.STAT(AC.MIN) = 1.0
                 FOR EACH FLIGHTE IN PLAN
                     FOR EACH ACE IN FLT.WAVE(FLIGHTE)
                         WITH ACE = AC.MIN
                 FIND THE FIRST CASE
                 IF FOUND
                    REMOVE AC.MIN FROM FLT.WAVE(FLIGHTE)
                    SUBTRACT 1 FROM FLT.AC.RDY(FLIGHTE)
                    SUBTRACT 1 FROM FLT.AC.NUM(FLIGHTE)
                    LET T.FLT.NUM = INT.F(FLT.NUM(FLIGHTE))
                    SCHEDULE AN AC.LAUNCHED GIVING AC.MIN,T.FLT.NUM
                             IN UNIFORM.F(.5,1.,5) MINUTES
                    PRINT 1 LINE WITH AC.ID(AC.MIN) THUS
AC ** SCHEDULED TO LAUNCH IN .5-1 MINUTES
                 ELSE
                    PRINT 1 LINE THUS
**ERROR** FLIGHT NOT FOUND IN PLAN
                 ALWAYS
              ELSE
                 LET AC.FUEL.STAT(AC.MIN) = AC.FUEL.STAT(AC.MIN) - .02 ''SINCE
                 LET AC.PRIORITY(AC.MIN) = 1 - AC.FUEL.STAT(AC.MIN) * .2  ''WI
                 LET AC.LOCATION(AC.MIN) = 10
                 LET AC.DESTINATION(AC.MIN) = 9
                 LET ETA(AC.ID(AC.MIN)) = 1 + TIME.V
                 LET AC.OP.STAT(AC.MIN) = AC.OP.STAT(AC.MIN) + .2  ''FOR LOAD
                 SCHEDULE A DELTA.ARRIVAL GIVING AC.MIN            ''WHEN AC.
                             IN UNIFORM.F(1.,2.,6) MINUTES
              ALWAYS
              LET ACE = AC.MIN
            ELSE
```

```
              LET SPOTT = AC.LOCATION(AC.MAX)
              PRINT 1 LINE WITH AC.ID(AC.MAX),SPOTT THUS
AC ** WILL RESPOT IMMEDIATELY FROM SPOT * FOR THE EMERGENCY RECOVERY
              LET SPOT(SPOTT) = 0
              IF AC.TYPE(AC.MAX) = 1
                 LET AC.DESTINATION(AC.MAX) = 7
                 FILE AC.MAX IN BONE.FWD
              ELSE
                 LET AC.DESTINATION(AC.MAX) = 8
                 FILE AC.MAX IN BONE.AFT
              ALWAYS
              PRINT 1 LINE WITH N.BONE.FWD,N.BONE.AFT THUS
N.BONE.FWD= **      N.BONE.AFT= **
              LET XBAR = TTRESPOT.AC(AC.TYPE(AC.MAX))
              LET SDEV = S.TTRESPOT.AC(AC.TYPE(AC.MAX))
              LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
              SCHEDULE A BONE.ARRIVAL GIVING AC.MAX IN TTRESPOT MINUTES
              LET ACE = AC.MAX
              ADD 1 TO TUG
            ALWAYS
            IF AC.SERVICE.FLAG(ACE) = 1
               IF AC.FUEL.STAT(ACE) < 1.  ''AV8S NEVER ENTER THIS SECTION
                  FOR EACH AC.REFUELED IN EV.S(I.AC.REFUELED)
                      WITH AC5 = ACE, DO
                      CANCEL AC.REFUELED
                      PRINT 1 LINE WITH ACE THUS
AC.REFUELED EVENT SCHEDULED FOR AC ** HAS BEEN CANCELLED
                      SUBTRACT 1 FROM REFUELER
                  LOOP
               ALWAYS
               IF AC.LOAD.STAT(ACE) < 1.
                  FOR EACH AC.LOADED IN EV.S(I.AC.LOADED)
                      WITH AC4 = ACE, DO
                      CANCEL AC.LOADED
                      PRINT 1 LINE WITH ACE THUS
AC.LOADED EVENT SCHEDULED FOR AC ** HAS BEEN CANCELLED
                  LOOP
               ALWAYS
               LET AC.SERVICE.FLAG(ACE) = 0
            ALWAYS
            IF M.TUG.Q(ACE) = 1
               REMOVE THIS ACE FROM TUG.Q
           PRINT 1 LINE WITH ACE THUS
AC ** REMOVED FROM TUG.Q
            ALWAYS
            IF M.SPOT.Q(ACE) = 1
               REMOVE THIS ACE FROM SPOT.Q
            ALWAYS
            IF M.ELEVATOR.Q(ACE) = 1
               REMOVE THIS ACE FROM ELEVATOR.Q
            ALWAYS
            IF M.REFUELER.Q(ACE) = 1
               REMOVE THIS ACE FROM REFUELER.Q
            ALWAYS

PRINT 1 LINE WITH AC.ID(AC),AC.ID(ACE) THUS
AC = **     ACE = **

            IF (AC.FUEL.STAT(AC) < .25) AND (AC.TYPE(AC) = AC.TYPE(ACE)) ''SW
                                        AND (AC.LOAD.STAT(ACE) <> 1.0)
               IF AC.LAUNCH.TIME(ACE) < AC.LAUNCH.TIME(AC)
                  FOR EACH FLIGHTE IN PLAN
                      WITH FLT.TIME(FLIGHTE) = AC.LAUNCH.TIME(ACE)
                  FIND THE FIRST CASE
                  IF FOUND

                     PRINT 1 LINE WITH FLT.TIME(FLIGHTE),
                                       N.FLT.WAVE(FLIGHTE) THUS
#AC IN FLIGHT SCHED FOR ****  IS **
                     FOR EACH ACE.P IN FLT.WAVE(FLIGHTE), DO
                     PRINT 1 LINE WITH AC.ID(ACE.P),AC.LAUNCH.TIME(ACE.P) THUS
AC ** IS SCHED TO LAUNCH AT ****
                     LOOP

PRINT 1 LINE WITH AC.ID(AC),AC.ID(ACE) THUS
AC = **    ACE = **




                     REMOVE ACE FROM FLT.WAVE(FLIGHTE)
                     LET AC.LAUNCH.TIME(ACE) = AC.LAUNCH.TIME(AC)
                     LET AC.LAUNCH.TIME(AC) = FLT.TIME(FLIGHTE)
PRINT 1 LINE WITH AC.ID(AC),AC.ID(ACE) THUS
AC = **    ACE = **

                     PRINT 1 LINE WITH FLT.TIME(FLIGHTE),
                                       N.FLT.WAVE(FLIGHTE) THUS
#AC IN FLIGHT SCHED FOR ****  IS **
                     FOR EACH ACE.P IN FLT.WAVE(FLIGHTE), DO
                     PRINT 1 LINE WITH AC.ID(ACE.P),AC.LAUNCH.TIME(ACE.P) THUS
AC ** IS SCHED TO LAUNCH AT ****
                     LOOP
PRINT 1 LINE WITH AC.ID(AC),AC.ID(ACE) THUS
AC = **    ACE = **

                  ALWAYS
                  IF AC.LAUNCH.TIME(ACE) < 9999
                     FOR EACH FLIGHTE.P IN PLAN
                         WITH FLT.TIME(FLIGHTE.P) = AC.LAUNCH.TIME(ACE)
                     FIND THE FIRST CASE
                     IF FOUND
PRINT 1 LINE WITH AC.ID(AC),AC.ID(ACE) THUS
AC = **    ACE = **
                     PRINT 1 LINE WITH FLT.TIME(FLIGHTE.P),
                                       N.FLT.WAVE(FLIGHTE.P) THUS
#AC IN FLIGHT SCHED FOR ****  IS **
                     FOR EACH ACE.P IN FLT.WAVE(FLIGHTE.P), DO
                     PRINT 1 LINE WITH AC.ID(ACE.P),AC.LAUNCH.TIME(ACE.P) THUS
AC ** IS SCHED TO LAUNCH AT ****
                     LOOP

PRINT 1 LINE WITH AC.ID(AC),AC.ID(ACE) THUS
AC = **    ACE = **
                        REMOVE AC FROM FLT.WAVE(FLIGHTE.P)
                        FILE ACE IN FLT.WAVE(FLIGHTE.P)
                     PRINT 1 LINE WITH FLT.TIME(FLIGHTE.P),
                                       N.FLT.WAVE(FLIGHTE.P) THUS
#AC IN FLIGHT SCHED FOR ****  IS **
```

```
PRINT 1 LINE WITH AC.ID(AC),AC.ID(ACE) THUS
AC = **    ACE = **
                     FOR EACH ACE.P IN FLT.WAVE(FLIGHTE.P), DO
                     PRINT 1 LINE WITH AC.ID(ACE.P),AC.LAUNCH.TIME(ACE.P) THUS
AC ** IS SCHED TO LAUNCH AT ****
                     LOOP

                     ALWAYS
                  ALWAYS
                  FILE AC IN FLT.WAVE(FLIGHTE)
                     PRINT 1 LINE WITH FLT.TIME(FLIGHTE),
                                       N.FLT.WAVE(FLIGHTE) THUS
#AC IN FLIGHT SCHED FOR ****  IS **
                     FOR EACH ACE.P IN FLT.WAVE(FLIGHTE), DO
                     PRINT 1 LINE WITH AC.ID(ACE.P),AC.LAUNCH.TIME(ACE.P) THU
AC ** IS SCHED TO LAUNCH AT ****
                     LOOP

PRINT 1 LINE WITH AC.ID(AC),AC.ID(ACE) THUS
AC = **    ACE = **
                ALWAYS
             ALWAYS
          ALWAYS
       ALWAYS
     LET AC.DESTINATION(AC) = SPOTT
     LET SPOT(SPOTT) = - AC.ID(AC)
     REMOVE THIS AC FROM DELTA.PATTERN
     REMOVE THIS AC FROM SPOT.Q


     LET XBAR = TTRECOVER.AC(AC.TYPE(AC))
     LET SDEV = S.TTRECOVER.AC(AC.TYPE(AC))
     LET TTRECOVER = NORMAL.F(XBAR,SDEV,1)
     IF TTRECOVER < (LAST.RECOVERY.TIME + .5 - TIME.V)
        LET TTRECOVER = LAST.RECOVERY.TIME + .5 - TIME.V
     ALWAYS
     IF TTRECOVER < (LAST.LAUNCH.TIME + 2 - TIME.V)
        LET TTRECOVER = LAST.LAUNCH.TIME + 2 - TIME.V
     ALWAYS
     LET LAST.RECOVERY.TIME = TTRECOVER + TIME.V

     SCHEDULE AN AC.RECOVERED GIVING AC IN TTRECOVER MINUTES
     ADD 1 TO NUM.EMERGENCY.RECOVERIES
     PRINT 1 LINE WITH AC.ID(AC),SPOTT,TTRECOVER THUS
 AC ** WILL RECOVER TO SPOT ** IN ***.* MINUTES
     FOR EACH ACE IN DELTA.PATTERN, DO
        PRINT 1 LINE WITH AC.ID(ACE),AC.PRIORITY(ACE),
                          AC.DESTINATION(ACE) THUS
 AC **  WITH PRIORITY **.***  HAS DEST **
     LOOP
     FOR EACH ACE IN DELTA.PATTERN
        WITH ((AC.PRIORITY(ACE) >  EMERGENCY.STAT.AC(AC.TYPE(ACE)))
             AND (AC.DESTINATION(ACE) = 9)),
     FIND THE FIRST CASE
     IF FOUND
        SCHEDULE A SPOT.EMERGENCY GIVING ACE IN .25 MINUTES
        PRINT 1 LINE WITH ACE,TIME.V THUS
 AC **  DECLARES EMERGENCY AT ****.**
     ALWAYS
     FILE AC IN DELTA.PATTERN
```

```
ELSE
   PRINT 1 LINE WITH AC.ID(AC) THUS
AC ** HAS ALREADY BEEN ASSIGNED A RECOVERY SPOT
ALWAYS
RETURN
END
```

```
''************************************************************************
EVENT SPOT.OPEN
''************************************************************************
  DEFINE SPOTT, FLAG, AC, ACE.T AS INTEGER VARIABLES
  DEFINE INTERVAL,TTRECOVER AS REAL VARIABLES

''   THIS SECTION OF CODE UPDATES THE FUEL AND PRIORITY STATUS VARIABLES OF
'' THE AIRCRAFT IN THE DELTA PATTERN IF THE LAST UPDATE TIME WAS MORE THAN
'' 10 MINUTES AGO.

  LET J = 0
  FOR I BACK FROM 6 TO 1 BY 1, DO
     IF SPOT(I) = 0
        ADD 1 TO J
     ALWAYS
  LOOP
  IF J <> NUM.OPEN.SPOTS
     PRINT 1 LINE WITH TIME.V,EVENT.V,J,NUM.OPEN.SPOTS THUS
**ERROR**  TIME: ****.**  EVENT **  J = **  NUM.OPEN.SPOTS = **
  ALWAYS

  LET FLAG = 0
  PRINT 1 LINE WITH NUM.OPEN.SPOTS,DELTA.UPDATE.TIME,
                    N.DELTA.PATTERN,N.SPOT.Q THUS
#OPEN SPOTS= * LAST DELTA UPDATE= **** #DELTA AC= ** N.SPOT.Q = **
  IF N.DELTA.PATTERN > 0
     FOR EACH ACE IN DELTA.PATTERN, DO
         LET DELTA = ((TIME.V - DELTA.UPDATE.TIME)/60) *
                                 (FUELUSE.AC(AC.TYPE(ACE)))
        LET AC.FUEL.STAT(ACE) = AC.FUEL.STAT(ACE) - DELTA
        LET AC.FLYING.TIME(ACE) = (AC.FUEL.STAT(ACE)
                              / FUELUSE.AC(AC.TYPE(ACE))) * 60.
        LET AC.PRIORITY(ACE) = AC.PRIORITY(ACE) + DELTA * .2
PRINT 1 LINE WITH AC.ID(ACE),AC.DESTINATION(ACE),AC.PRIORITY(ACE),
                  AC.FUEL.STAT(ACE),AC.FLYING.TIME(ACE)   THUS
AC ** WITH DEST ** HAS PRIORITY  *.**  FUEL.STAT  *.**  FLYING.TIME  ***.*
        REMOVE THIS ACE FROM THE DELTA.PATTERN
        FILE THIS ACE IN THE DELTA.PATTERN
     LOOP
     LET DELTA.UPDATE.TIME = TIME.V
     FOR EACH ACE IN DELTA.PATTERN,
         WITH (AC.PRIORITY(ACE) >  EMERGENCY.STAT.AC(AC.TYPE(ACE)))
              AND (AC.DESTINATION(ACE) = 9)
     FIND THE FIRST CASE
     IF FOUND
        SCHEDULE A SPOT.EMERGENCY GIVING ACE IN .25 MINUTES
        PRINT 1 LINE WITH AC.ID(ACE),TIME.V THUS
AC ** DECLARES EMERGENCY AT ****.**
        LET FLAG = 1
     ELSE
        FOR EACH ACE IN DELTA.PATTERN,
            WITH (AC.PRIORITY(ACE) >  PRIORITY.STAT.AC(AC.TYPE(ACE)))
                AND (AC.DESTINATION(ACE) = 9)
        FIND THE FIRST CASE
        IF FOUND
           SCHEDULE A SPOT.PRIORITY GIVING ACE IN 1 MINUTE
           PRINT 1 LINE WITH AC.ID(ACE),TIME.V THUS
AC ** DECLARES PRIORITY AT ****.**
           LET FLAG = 1
        ALWAYS
     ALWAYS
  ALWAYS
  IF FLAG = 0
     LET INTERVAL = 0
     LET I = 7

     FOR EACH ACE IN SPOT.Q, DO
         IF AC.LOCATION(ACE) = 9
            LET INDEX(AC.ID(ACE)) = 8
         ELSE
            LET INDEX(AC.ID(ACE)) = 7
         ALWAYS
         PRINT 1 LINE WITH AC.ID(ACE),AC.LOCATION(ACE),
                           AC.LAUNCH.TIME(ACE) THUS
AC **  AT *  SCHED TO LAUNCH AT ****
     LOOP


     WHILE ((NUM.OPEN.SPOTS > 0) AND (N.SPOT.Q > 0) AND (I > 1)), DO
        SUBSTRACT 1 FROM I

     PRINT 1 LINE WITH NUM.OPEN.SPOTS,N.SPOT.Q,I,SPOT(I) THUS
  #OPEN SPOTS= **    #SPOT.Q = **    I = *    SPOT(I) = **

        IF SPOT(I) = 0
           LET SPOTT = I

           IF N.AV8.PLAN > 0
              REMOVE THE FIRST FLIGHTE FROM AV8.PLAN
              LET AV8.LAUNCH.TIME = FLT.TIME(FLIGHTE)
              FILE THIS FLIGHTE IN AV8.PLAN
           ELSE
              LET AV8.LAUNCH.TIME = 9999
           ALWAYS

           FOR EACH FLIGHTE IN THE PLAN
               WITH ((FLT.AC.TYPE(FLIGHTE) <> 3)
                    AND (FLT.DELAY(FLIGHTE) = 0))
           FIND THE FIRST CASE
           IF FOUND
              LET HELO.LAUNCH.TIME = FLT.TIME(FLIGHTE)
           ELSE
              LET HELO.LAUNCH.TIME = 9999
           ALWAYS


              PRINT 1 LINE WITH AV8.LAUNCH.TIME, HELO.LAUNCH.TIME,
                                SPOTT THUS
AV8.LAUNCH.TIME= ****    HELO.LAUNCH.TIME= ****  OPEN SPOT IS **

           FOR EACH ACE IN SPOT.Q,
              FOR J = 1 TO SPOT.AC(AC.TYPE(ACE),INDEX(AC.ID(ACE))),
                 WITH ((SPOT.AC(AC.TYPE(ACE),J) = SPOTT)
                  AND (((AC.LOCATION(ACE) = 9)
                  AND ((AC.FLYING.TIME(ACE) < 33)
                    OR ((((AC.LAUNCH.TIME(ACE) - TIME.V)
                          > AC.FLYING.TIME(ACE))
                         OR ((AC.LAUNCH.TIME(ACE)-TIME.V) < 25))
                       AND (((AV8.LAUNCH.TIME
                              > AC.LAUNCH.TIME(ACE))
                           OR (AV8.LAUNCH.TIME > (TIME.V + 20)))
                       OR ((AC.TYPE(ACE) = 3)
                            AND (AV8.LAUNCH.TIME > (TIME.V + 10))))
                       AND ((HELO.LAUNCH.TIME > (TIME.V + 10))
                           OR ((HELO.LAUNCH.TIME + 1.)
                                > AC.LAUNCH.TIME(ACE))))))
                  OR ((AC.LOCATION(ACE) < 9)
                     AND ((SPOTT > 2)
                         OR (AV8.LAUNCH.TIME >= AC.LAUNCH.TIME(ACE)))
                     AND ((AC.LAUNCH.TIME(ACE) - TIME.V) < 25))))
           FIND THE FIRST CASE
           IF FOUND   '' AC COMPATIBLE WITH SPOT IDENTIFIED

              PRINT 1 LINE WITH AC.ID(ACE),SPOTT,AC.LAUNCH.TIME(ACE),
                                AC.FLYING.TIME(ACE)  THUS
    AC ** COMPATIBLE TO GO TO SPOT * HAS LAUNCH.TIME= **** AND FLYING.TIME= *:




                 IF AC.LOCATION(ACE) = 9

                   IF FLAG = 0
                    LET XBAR = TTRECOVER.AC(AC.TYPE(ACE))
                    LET SDEV = S.TTRECOVER.AC(AC.TYPE(ACE))
                    LET TTRECOVER = NORMAL.F(XBAR,SDEV,1)
                    IF TTRECOVER < (LAST.RECOVERY.TIME + .5 - TIME.V)
                       LET TTRECOVER = LAST.RECOVERY.TIME + .5 - TIME.V
                    ALWAYS
                    IF TTRECOVER < (LAST.LAUNCH.TIME + 2 - TIME.V)
                       LET TTRECOVER = LAST.LAUNCH.TIME + 2 - TIME.V
                    ALWAYS
                    LET FLAG = 1
                   ALWAYS

                    LET AC.DESTINATION(ACE) = SPOTT
                    LET SPOT(SPOTT) = -AC.ID(ACE)
                    SUBTRACT 1 FROM NUM.OPEN.SPOTS
                    PRINT 1 LINE WITH NUM.OPEN.SPOTS THUS
                    NUM.OPEN.SPOTS = **
                    SCHEDULE AN AC.RECOVERED GIVING ACE
                             IN TTRECOVER + INTERVAL MINUTES
                    ADD UNIFORM.F(.5,.8,1) TO INTERVAL
                    LET LAST.RECOVERY.TIME = TTRECOVER + TIME.V
                                           + INTERVAL
                    PRINT 1 LINE WITH AC.ID(ACE),SPOTT,
                                  (TTRECOVER+INTERVAL)  THUS
AC ** WILL RECOVER TO SPOT **  IN ***.* MINUTES
                    REMOVE THIS ACE FROM SPOT.Q
                 ELSE
                   IF AC.LOCATION(ACE) < 12
                    IF AC.TYPE(ACE) < 3
                       LET AC.DESTINATION(ACE) = SPOTT
```

```
               LET SPOT(SPOTT) = -AC.ID(ACE)
               IF AC.SERVICE.FLAG(ACE) = 0
                 IF TUG < 4
                   ADD 1 TO TUG
                   LET XBAR = TTRESPOT.AC(AC.TYPE(ACE))
                   LET SDEV = S.TTRESPOT.AC(AC.TYPE(ACE))
                   LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
                   SCHEDULE AN AC.RESPOTTED GIVING ACE
                         IN TTRESPOT MINUTES
                 PRINT 1 LINE WITH AC.ID(ACE),SPOTT THUS
               AC ** WILL RESPOT TO SPOT **
                 ELSE
                   FILE THIS ACE IN TUG.Q
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN TUG.Q
                 ALWAYS
               ALWAYS
               IF AC.LOCATION(ACE) > 6
                 SUBTRACT 1 FROM NUM.OPEN.SPOTS
                 PRINT 1 LINE WITH NUM.OPEN.SPOTS THUS
                 NUM.OPEN.SPOTS = **
               ALWAYS
               REMOVE THIS ACE FROM SPOT.Q
             ELSE
               IF AC.LAUNCH.TIME(ACE) = AV8.LAUNCH.TIME
                 IF SPOTT <= 2  ''AV8'S CAN RECOVER ON 1,2,5,6 BUT L
                   IF (AC.LAUNCH.TIME(ACE) - TIME.V) <= 10.
                     LET AC.DESTINATION(ACE) = SPOTT
                     LET SPOT(SPOTT) = -AC.ID(ACE)
                     LET XBAR = TTRESPOT.AC(AC.TYPE(ACE))
                     LET SDEV = S.TTRESPOT.AÇ(AC.TYPE(ACE))
                     LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
                     SCHEDULE AN AC.RESPOTTED GIVING ACE IN
                         TTRESPOT MINUTES
                   PRINT 1 LINE WITH AC.ID(ACE),SPOTT THUS
      AC = **  WILL RESPOT TO **
                     SUBTRACT I FROM NUM.OPEN.SPOTS
                     PRINT 1 LINE WITH NUM.OPEN.SPOTS THUS
                     NUM.OPEN.SPOTS = **
                     REMOVE THIS ACE FROM SPOT.Q
                   ELSE
                     SCHEDULE A SPOT.OPEN IN (AC.LAUNCH.TIME(ACE)
                       - 10. + UNIFORM.F(.1,2.,9)) MINUTES
                   ALWAYS
                 ALWAYS
               ALWAYS
             ALWAYS
             ELSE
               IF AC.TYPE(ACE) < 3
                 LET AC.DESTINATION(ACE) = SPOTT
                 LET SPOT(SPOTT) = - AC.ID(ACE)
                 SUBTRACT 1 FROM NUM.OPEN.SPOTS
                 PRINT 1 LINE WITH NUM.OPEN.SPOTS THUS
                 NUM.OPEN.SPOTS = **
               ELSE
                 LET AC.DESTINATION(ACE) = 8
                 FILE ACE IN BONE.AFT
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN BONE
               ALWAYS
```

```
                      IF (SPOT(11) = 0) AND
                            (HANGER.EQUIV < MAX.HANGER.EQUIV)
                         LET XBAR = TTARRIV.E.AC(AC.TYPE(ACE))
                         LET SDEV = S.TTARRIV.E.AC(AC.TYPE(ACE))
                         LET TTARRIV.E = NORMAL.F(XBAR,SDEV,8)
                         SCHEDULE AN ELEVATOR.ARRIVAL GIVING ACE
                                     IN  TTARRIV.E MINUTES
                         LET SPOT(11) = -AC.ID(ACE)
                      ELSE
                         IF N.ELEVATOR.Q(ACE) <> 1
                            FILE ACE IN ELEVATOR.Q
                         ALWAYS
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN ELEVATOR.Q
                      ALWAYS
                      REMOVE ACE FROM SPOT.Q
                   ALWAYS
                 ALWAYS
           PRINT 1 LINE WITH N.SPOT.Q,NUM.OPEN.SPOTS,I,SPOT(I),
                             AC.ID(ACE), AC.LOCATION(ACE) THUS
*IN SPOT.Q **  *OPEN SPOTS *  I *  SPOT(I) **  AC.ID **  AC.LOC **
           ALWAYS
        ALWAYS
     LOOP
  ALWAYS
  RETURN
  END
```

```
''**********************************************************************
EVENT SPOT.PRIORITY GIVEN AC
''**********************************************************************
  DEFINE SPOTT, AC, ACE, ACE.T, FLAG AS INTEGER VARIABLES
  DEFINE INTERVAL AS A REAL VARIABLE
  PRINT 1 LINE WITH TIME.V,EVENT.V,AC.ID(AC),AC.PRIORITY(AC),
                    AC.FUEL.STAT(AC) THUS
T ****.** E ** AC ** W PRI *.*** FUEL *.** REQUESTED PRIORITY LANDING

  IF M.SPOT.Q(AC) = 1  ''OTHERWISE AC ALREADY HAS A RECOVERY DESTINATION
     IF NUM.OPEN.SPOTS > 0
        FOR I BACK FROM 6 TO 1 BY 1
           WITH SPOT(I) = 0
        FIND THE FIRST CASE
        IF FOUND
           LET SPOTT = I
        ELSE
           LET SPOTT = 0
           PRINT 1 LINE THUS
**ERROR**   OPEN SPOT NOT FOUND
        ALWAYS
     ALWAYS
     IF I <> 0




        PRINT 1 LINE WITH EVENT.V,NUM.OPEN.SPOTS,SPOTT THUS
EVENT ** #OPEN SPOTS ** OPEN SPOT *     IF
        LET AC.DESTINATION(AC) = SPOTT
        LET SPOT(SPOTT) = - AC.ID(AC)
        SUBTRACT 1 FROM NUM.OPEN.SPOTS
        PRINT 1 LINE WITH NUM.OPEN.SPOTS THUS
        NUM.OPEN.SPOTS = **
        REMOVE THIS AC FROM DELTA.PATTERN
        REMOVE THIS AC FROM SPOT.Q


        LET XBAR = TTRECOVER.AC(AC.TYPE(AC))
        LET SDEV = S.TTRECOVER.AC(AC.TYPE(AC))
        LET TTRECOVER = NORMAL.F(XBAR,SDEV,1)
        IF TTRECOVER < (LAST.RECOVERY.TIME + .5 - TIME.V)
           LET TTRECOVER = LAST.RECOVERY.TIME + .5 - TIME.V
        ALWAYS
        IF TTRECOVER < (LAST.LAUNCH.TIME + 2 - TIME.V)
           LET TTRECOVER = LAST.LAUNCH.TIME + 2 - TIME.V
        ALWAYS
        LET LAST.RECOVERY.TIME = TTRECOVER + TIME.V

        SCHEDULE AN AC.RECOVERED GIVING AC IN TTRECOVER MINUTES
        ADD 1 TO NUM.PRIORITY.RECOVERIES
        PRINT 1 LINE WITH EVENT.V,AC.ID(AC),SPOTT THUS
```

```
E = **   AC ** WILL RECOVER TO SPOT **
        FOR EACH ACE IN DELTA.PATTERN, DO
           PRINT 1 LINE WITH
                AC.ID(ACE),AC.PRIORITY(ACE),AC.DESTINATION(ACE),
                AC.FLYING.TIME(ACE) THUS
AC **  WITH PRIORITY **.***  HAS DEST ** AND FLYING.TIME ***.*
        LOOP
        FOR EACH ACE IN DELTA.PATTERN
            WITH ((AC.PRIORITY(ACE) >  EMERGENCY.STAT.AC(AC.TYPE(ACE)))
                AND (AC.DESTINATION(ACE) = 9)),
        FIND THE FIRST CASE
        IF FOUND
           SCHEDULE A SPOT.EMERGENCY GIVING ACE IN .25 MINUTES
           PRINT 1 LINE WITH ACE,TIME.V THUS
AC **  DECLARES EMERGENCY AT ****.**
        ELSE
           FOR EACH ACE IN DELTA.PATTERN
               WITH ((AC.PRIORITY(ACE) >  PRIORITY.STAT.AC(AC.TYPE(ACE)))
                   AND (AC.DESTINATION(ACE) = 9)),
           FIND THE FIRST CASE
           IF FOUND
              SCHEDULE A SPOT.PRIORITY GIVING ACE IN 1 MINUTES
              PRINT 1 LINE WITH ACE,TIME.V THUS
AC **  DECLARES PRIORITY AT ****.**
           ALWAYS
        ALWAYS
        FILE AC IN DELTA.PATTERN
     ELSE
        PRINT 1 LINE THUS
   NO OPEN SPOTS
        LET FLAG = 0
        FOR I BACK FROM 6 TO 1 BY 1
           WHILE FLAG = 0, DO
           LET SPOTT = I
           IF SPOT(SPOTT) < 0
              FOR EACH ACE IN THE SHIP
                 WITH AC.ID(ACE) = - SPOT(SPOTT)
              FIND THE FIRST CASE
              IF FOUND
                 PRINT 1 LINE WITH AC.ID(ACE),AC.LOCATION(ACE),
                         AC.PRIORITY(ACE), AC.DESTINATION(ACE),
                         AC.FUEL.STAT(ACE), AC.LAUNCH.TIME(ACE) THUS
AC ** AT ** HAS PRIORITY *.*** DEST ** FUEL *.*** AND LAUNCH TIME ****
                 IF ((AC.LOCATION(ACE) < 9) OR ((AC.FUEL.STAT(ACE) > .5)
                                 AND (AC.LAUNCH.TIME(ACE) > (TIME.V+15))
                                 AND (AC.PRIORITY(ACE) < .90)
                                 AND (AC.TYPE(ACE) <> 3)))
                    LET FLAG = 1
                    PRINT 1 LINE WITH EVENT.V,NUM.OPEN.SPOTS,SPOTT THUS
                    EVENT ** #OPEN SPOTS ** TARGET SPOT *    ELSE

                    PRINT 1 LINE WITH AC.ID(ACE),AC.LOCATION(ACE),SPOTT THUS
                        AC ** IN TRANSIT FROM ** TO ** MUST BE DISPLACED
                    IF AC.LOCATION(ACE) = 9
                       FOR EACH AC.RECOVERED IN EV.S(I.AC.RECOVERED)
                          WITH AC2 = ACE, DO
                          CANCEL AC.RECOVERED
                          PRINT 1 LINE WITH AC.ID(ACE) THUS
AC.RECOVERED EVENT SCHEDULED FOR AC ** HAS BEEN CANCELLED
                       LOOP
                    ELSE
                       FOR EACH AC.RESPOTTED IN EV.S(I.AC.RESPOTTED)
                          WITH AC3 = ACE, DO
                          CANCEL AC.RESPOTTED
                          PRINT 1 LINE WITH AC.ID(ACE) THUS
AC.RESPOTTED EVENT SCHEDULED FOR AC ** HAS BEEN CANCELLED
                       LOOP
                    ALWAYS
                    FILE ACE IN SPOT.Q
                    LET AC.DESTINATION(ACE) = AC.LOCATION(ACE)
PRINT 1 LINE WITH ACE THUS
AC ** FILED IN SPOT.Q
                 ALWAYS
              ELSE
                 PRINT 1 LINE THUS
**ERROR**    AC NOT FOUND
              ALWAYS
           ELSE
              FOR EACH ACE IN THE SHIP
                  WITH AC.ID(ACE) = SPOT(SPOTT)
              FIND THE FIRST CASE
              IF FOUND
                 PRINT 1 LINE WITH AC.ID(ACE),AC.LOCATION(ACE),
                         AC.FUEL.STAT(ACE), AC.LAUNCH.TIME(ACE) THUS
AC ** AT **  HAS FUEL  *.***  AND LAUNCH TIME   ****
                 IF (AC.DESTINATION(ACE) = 7) OR
                              (AC.DESTINATION(ACE) = 8)
                    LET FLAG = 2
                    PRINT 1 LINE WITH AC.ID(ACE) THUS
  AC ** IS IN TRANSIT TO THE BONE...WILL TAKE THIS SPOT FOR THE PRIORITY
                    IF M.TUG.Q(ACE) = 1
                       ADD 1 TO TUG
                       LET XBAR = TTRESPOT.AC(AC.TYPE(ACE))
                       LET SDEV = S.TTRESPOT.AC(AC.TYPE(ACE))
                       LET TTRESPOT = NORMAL.F(XBAR,SDEV,2)
                       SCHEDULE A BONE.ARRIVAL GIVING ACE
                                IN TTRESPOT MINUTES
                       REMOVE ACE FROM TUG.Q
           PRINT 1 LINE WITH ACE THUS
AC ** REMOVED FROM TUG.Q
                    ALWAYS
                 ALWAYS
              ALWAYS
           ALWAYS
        LOOP
        IF FLAG <> 0

''
            IF (AC.FUEL.STAT(AC) < .25) AND (AC.TYPE(AC) = AC.TYPE(ACE)) ''SWI
                                        AND (AC.LOAD.STAT(ACE) <> 1.0)
               IF AC.LAUNCH.TIME(ACE) < AC.LAUNCH.TIME(AC)
                  FOR EACH FLIGHTE IN PLAN
                      WITH FLT.TIME(FLIGHTE) = AC.LAUNCH.TIME(ACE)
                  FIND THE FIRST CASE
                  IF FOUND

                     PRINT 1 LINE WITH FLT.TIME(FLIGHTE),
                                       N.FLT.WAVE(FLIGHTE) THUS
*AC IN FLIGHT SCHED FOR ****  IS **
                     FOR EACH ACE.P IN FLT.WAVE(FLIGHTE), DO
                     PRINT 1 LINE WITH AC.ID(ACE.P),AC.LAUNCH.TIME(ACE.P) THUS
AC ** IS SCHED TO LAUNCH AT ****
                     LOOP

PRINT 1 LINE WITH AC.ID(AC),AC.ID(ACE) THUS
AC = **    ACE = **

                     REMOVE ACE FROM FLT.WAVE(FLIGHTE)
                     LET AC.LAUNCH.TIME(ACE) = AC.LAUNCH.TIME(AC)
                     LET AC.LAUNCH.TIME(AC) = FLT.TIME(FLIGHTE)
PRINT 1 LINE WITH AC.ID(AC),AC.ID(ACE) THUS
AC = **    ACE = **

                     PRINT 1 LINE WITH FLT.TIME(FLIGHTE),
                                       N.FLT.WAVE(FLIGHTE) THUS
#AC IN FLIGHT SCHED FOR ****  IS **
                     FOR EACH ACE.P IN FLT.WAVE(FLIGHTE), DO
                     PRINT 1 LINE WITH AC.ID(ACE.P),AC.LAUNCH.TIME(ACE.P) THUS
AC ** IS SCHED TO LAUNCH AT ****
                     LOOP
PRINT 1 LINE WITH AC.ID(AC),AC.ID(ACE) THUS
AC = **    ACE = **

                  ALWAYS
                  IF AC.LAUNCH.TIME(ACE) < 9999
                     FOR EACH FLIGHTE.P IN PLAN
                          WITH FLT.TIME(FLIGHTE.P) = AC.LAUNCH.TIME(ACE)
                     FIND THE FIRST CASE
                     IF FOUND
PRINT 1 LINE WITH AC.ID(AC),AC.ID(ACE) THUS
AC = **    ACE = **
                     PRINT 1 LINE WITH FLT.TIME(FLIGHTE.P),
                                       N.FLT.WAVE(FLIGHTE.P) THUS
#AC IN FLIGHT SCHED FOR ****  IS **
                     FOR EACH ACE.P IN FLT.WAVE(FLIGHTE.P), DO
                     PRINT 1 LINE WITH AC.ID(ACE.P),AC.LAUNCH.TIME(ACE.P) THUS
AC ** IS SCHED TO LAUNCH AT ****
                     LOOP

PRINT 1 LINE WITH AC.ID(AC),AC.ID(ACE) THUS
AC = **    ACE = **
                        REMOVE AC FROM FLT.WAVE(FLIGHTE.P)
                        FILE ACE IN FLT.WAVE(FLIGHTE.P)
                     PRINT 1 LINE WITH FLT.TIME(FLIGHTE.P),
                                       N.FLT.WAVE(FLIGHTE.P) THUS
#AC IN FLIGHT SCHED FOR ****  IS **
PRINT 1 LINE WITH AC.ID(AC),AC.ID(ACE) THUS
AC = **    ACE = **
                     FOR EACH ACE.P IN FLT.WAVE(FLIGHTE.P), DO
                     PRINT 1 LINE WITH AC.ID(ACE.P),AC.LAUNCH.TIME(ACE.P) THUS
AC ** IS SCHED TO LAUNCH AT ****
                     LOOP

                     ALWAYS
                  ALWAYS
                  FILE AC IN FLT.WAVE(FLIGHTE)
                     PRINT 1 LINE WITH FLT.TIME(FLIGHTE),
                                       N.FLT.WAVE(FLIGHTE) THUS
#AC IN FLIGHT SCHED FOR ****  IS **
                     FOR EACH ACE.P IN FLT.WAVE(FLIGHTE), DO
                     PRINT 1 LINE WITH AC.ID(ACE.P),AC.LAUNCH.TIME(ACE.P) THUS
AC ** IS SCHED TO LAUNCH AT ****
                     LOOP

PRINT 1 LINE WITH AC.ID(AC),AC.ID(ACE) THUS
AC = **    ACE = **
               ALWAYS
            ALWAYS
''

           LET AC.DESTINATION(AC) = SPOTT
           LET SPOT(SPOTT) = - AC.ID(AC)
           REMOVE THIS AC FROM DELTA.PATTERN
           REMOVE THIS AC FROM SPOT.Q


           LET XBAR = TTRECOVER.AC(AC.TYPE(AC))
           LET SDEV = S.TTRECOVER.AC(AC.TYPE(AC))
           LET TTRECOVER = NORMAL.F(XBAR,SDEV,1)
           IF TTRECOVER < (LAST.RECOVERY.TIME + .5 - TIME.V)
              LET TTRECOVER = LAST.RECOVERY.TIME + .5 - TIME.V
           ALWAYS
           IF TTRECOVER < (LAST.LAUNCH.TIME + 2 - TIME.V)
              LET TTRECOVER = LAST.LAUNCH.TIME + 2 - TIME.V
           ALWAYS
           LET LAST.RECOVERY.TIME = TTRECOVER + TIME.V

           SCHEDULE AN AC.RECOVERED GIVING AC IN TTRECOVER MINUTES
           ADD 1 TO NUM.PRIORITY.RECOVERIES
           PRINT 1 LINE WITH EVENT.V,AC.ID(AC),SPOTT,TTRECOVER THUS
E = **   AC ** WILL RECOVER TO SPOT ** IN ****.* MINUTES
           FILE AC IN DELTA.PATTERN
           FOR EACH ACE IN DELTA.PATTERN
               WITH ((AC.PRIORITY(ACE) >  EMERGENCY.STAT.AC(AC.TYPE(ACE)))
                   AND (AC.DESTINATION(ACE) = 9)),
           FIND THE FIRST CASE
           IF FOUND
              SCHEDULE A SPOT.EMERGENCY GIVING ACE IN .25 MINUTES
              PRINT 1 LINE WITH ACE,TIME.V THUS
AC **  DECLARES EMERGENCY AT ****.**
           ELSE
              FOR EACH ACE IN DELTA.PATTERN
                  WITH ((AC.PRIORITY(ACE) >  PRIORITY.STAT.AC(AC.TYPE(ACE)))
                      AND (AC.DESTINATION(ACE) = 9)),
              FIND THE FIRST CASE
              IF FOUND
                 SCHEDULE A SPOT.PRIORITY GIVING ACE IN 1 MINUTES
                 PRINT 1 LINE WITH ACE,TIME.V THUS
AC **  DECLARES PRIORITY AT ****.**
              ALWAYS
           ALWAYS
        ALWAYS
     ALWAYS
  ELSE
     PRINT 1 LINE WITH AC.ID(AC) THUS
  AC ** HAS ALREADY BEEN ASSIGNED A RECOVERY SPOT
  ALWAYS
  FOR EACH ACE IN DELTA.PATTERN, DO
      PRINT 1 LINE WITH AC.ID(ACE),AC.PRIORITY(ACE),
                       AC.DESTINATION(ACE) THUS
```

```
AC **  WITH PRIORITY **.***  HAS DEST **
  LOOP
  FOR EACH ACE IN DELTA.PATTERN
      WITH ((AC.PRIORITY(ACE) >  EMERGENCY.STAT.AC(AC.TYPE(ACE)))
           AND (AC.DESTINATION(ACE) = 9)),
  FIND THE FIRST CASE
  IF FOUND
     SCHEDULE A SPOT.EMERGENCY GIVING ACE IN .25 MINUTES
     PRINT 1 LINE WITH ACE,TIME.V THUS
AC **  DECLARES EMERGENCY AT ****.**
  ELSE
     FOR EACH ACE IN DELTA.PATTERN
         WITH ((AC.PRIORITY(ACE) >  PRIORITY.STAT.AC(AC.TYPE(ACE)))
              AND (AC.DESTINATION(ACE) = 9)),
     FIND THE FIRST CASE
     IF FOUND
        SCHEDULE A SPOT.PRIORITY GIVING ACE IN 1 MINUTES
        PRINT 1 LINE WITH ACE,TIME.V THUS
AC **  DECLARES PRIORITY AT ****.**
     ALWAYS
  ALWAYS
  RETURN
  END
```

```
ROUTINE TRACE
PRINT 3 LINES THUS

-------------------------------------------------------------------

   IF EVENT.V = 1
      PRINT 1 LINE WITH TIME.V,EVENT.V,AC.ID(AC1(AC.LAUNCHED)),
                        AC.LOCATION(AC1(AC.LAUNCHED)) THUS
               TIME: ****.** EVENT: ** AC.ID: ** AC.LOC: **
   ALWAYS
   IF EVENT.V = 2
      PRINT 1 LINE WITH TIME.V,EVENT.V,AC.ID(AC2(AC.RECOVERED)),
                        AC.DESTINATION(AC2(AC.RECOVERED)) THUS
               TIME: ****.** EVENT: ** AC.ID: ** AC.DEST: **
   ALWAYS
   IF EVENT.V = 3
      PRINT 1 LINE WITH TIME.V,EVENT.V,AC.ID(AC3(AC.RESPOTTED)),
                        AC.DESTINATION(AC3(AC.RESPOTTED)) THUS
               TIME: ****.** EVENT: ** AC.ID: ** AC.DEST: **
   ALWAYS
   IF EVENT.V = 4
      PRINT 1 LINE WITH TIME.V,EVENT.V,AC.ID(AC4(AC.LOADED)),
                        AC.LOCATION(AC4(AC.LOADED)) THUS
               TIME: ****.** EVENT: ** AC.ID: ** AC.LOC: **
   ALWAYS
   IF EVENT.V = 5
      PRINT 1 LINE WITH TIME.V,EVENT.V,AC.ID(AC5(AC.REFUELED)),
                        AC.LOCATION(AC5(AC.REFUELED)) THUS
               TIME: ****.** EVENT: ** AC.ID: ** AC.LOC: **
   ALWAYS
   IF EVENT.V = 6
      PRINT 1 LINE WITH TIME.V,EVENT.V,AC.ID(AC6(BONE.ARRIVAL)),
                        AC.LOCATION(AC6(BONE.ARRIVAL)) THUS
               TIME: ****.** EVENT: ** AC.ID: ** AC.LOC: **
   ALWAYS
   IF EVENT.V = 7
      PRINT 1 LINE WITH TIME.V,EVENT.V,AC.ID(AC7(DELTA.ARRIVAL)),
                        AC.LOCATION(AC7(DELTA.ARRIVAL)) THUS
               TIME: ****.** EVENT: ** AC.ID: ** AC.LOC: **
   ALWAYS
   IF EVENT.V = 12
      PRINT 1 LINE WITH TIME.V,EVENT.V THUS
               TIME: ****.** EVENT: **
   ALWAYS
   IF EVENT.V = 13
      PRINT 1 LINE WITH TIME.V,EVENT.V,AC.ID(AC8(SPOT.EMERGENCY)),
                        AC.LOCATION(AC8(SPOT.EMERGENCY)) THUS
               TIME: ****.** EVENT: ** AC.ID: ** AC.LOC: **
   ALWAYS
   IF EVENT.V = 14
      PRINT 1 LINE WITH TIME.V,EVENT.V,AC.ID(AC9(SPOT.PRIORITY)),
                        AC.LOCATION(AC9(SPOT.PRIORITY)) THUS
               TIME: ****.** EVENT: ** AC.ID: ** AC.LOC: **
   ALWAYS
   IF EVENT.V = 15
      PRINT 1 LINE WITH TIME.V,EVENT.V,AC.ID(AC10(HANGER.ARRIVAL)),
                        AC.LOCATION(AC10(HANGER.ARRIVAL)) THUS
               TIME: ****.** EVENT: ** AC.ID: ** AC.LOC: **
   ALWAYS
```

```
 IF EVENT.V = 16
    PRINT 1 LINE WITH TIME.V,EVENT.V,AC.ID(AC11(ELEVATOR.ARRIVAL)),
                       AC.LOCATION(AC11(ELEVATOR.ARRIVAL)) THUS
              TIME: ****.** EVENT: ** AC.ID: ** AC.LOC: **
 ALWAYS
 IF EVENT.V = 17
    PRINT 1 LINE WITH TIME.V,EVENT.V,AC.ID(AC12(DECK.ARRIVAL)),
                       AC.LOCATION(AC12(DECK.ARRIVAL)) THUS
              TIME: ****.** EVENT: ** AC.ID: ** AC.LOC: **
 ALWAYS
 IF EVENT.V = 8
  PRINT 1 LINE WITH TIME.V,EVENT.V,FLT.TIME(FLIGHT1(DECK.DECISION)),
                   FLT.AC.TYPE(FLIGHT1(DECK.DECISION)) THUS
              TIME: ****.** EVENT: ** FLT.TIME **** FLT.TYPE **
 ALWAYS
 IF EVENT.V = 9
  PRINT 1 LINE WITH TIME.V,EVENT.V THUS
              TIME: ****.** EVENT: **
 ALWAYS
 IF EVENT.V = 10
  PRINT 1 LINE WITH TIME.V,EVENT.V,FLT.TIME(FLIGHT2(FLIGHT.LAUNCH)),
                   FLT.AC.TYPE(FLIGHT2(FLIGHT.LAUNCH)) THUS
              TIME: ****.** EVENT: ** FLT.TIME **** FLT.TYPE **
 ALWAYS
 IF EVENT.V = 18
  PRINT 1 LINE WITH TIME.V,EVENT.V,FLT.TIME(FLIGHT3(FLIGHT.CHECK)),
                   FLT.AC.TYPE(FLIGHT3(FLIGHT.CHECK)) THUS
              TIME: ****.** EVENT: ** FLT.TIME **** FLT.TYPE **
 ALWAYS
RETURN
END
```

APPENDIX B

EVENT NUMBER KEY FOR SAMPLE VERIFICATION OUTPUT:

1	AC.LAUNCHED
2	AC.RECOVERED
3	AC.RESPOTTED
4	AC.LOADED
5	AC.REFUELED
6	BONE.ARRIVAL
7	DELTA.ARRIVAL
8	DECK.DECISION
9	SPOT.OPEN
10	FLIGHT.LAUNCH
11	STOP.SIMULATION
12	DELTA.UPDATE.CHK
13	SPOT.EMERGENCY
14	SPOT.PRIORITY
15	HANGER.ARRIVAL
16	ELEVATOR.ARRIVAL
17	DECK.ARRIVAL
18	FLIGHT.CHECK

```
  8
SEED 1 =        889656876
SEED 2 =        575720521
SEED 3 =        251431696
SEED 4 =       1230229622
SEED 5 =       1820681923
SEED 6 =        481856962
SEED 7 =        155710971
SEED 8 =       1492838383
SEED 9 =       1313992727
    HANGER IS CAPABLE OF SLASHING 14 CH-46 EQUIVALENTS
    DISTANCE TO SHORE:  80000 METERS
    TYPES.AC =  3
       NUM AC :  22
       ID:  1  LOC: 7  FUEL: 1.00  LOAD: 0.     OP: 0.90  TYPE:  1
       ID:  2  LOC: 7  FUEL: 1.00  LOAD: 0.     OP: 0.80  TYPE:  1
       ID:  3  LOC: 7  FUEL: 1.00  LOAD: 0.     OP: 0.80  TYPE:  1
       ID:  4  LOC: 7  FUEL: 1.00  LOAD: 0.     OP: 0.80  TYPE:  1
       ID:  5  LOC: 9  FUEL: 1.00  LOAD: 0.     OP: 1.00  TYPE:  1
       ID:  6  LOC: 9  FUEL: 1.00  LOAD: 0.     OP: 1.00  TYPE:  1
       ID:  7  LOC: 9  FUEL: 1.00  LOAD: 0.     OP: 1.00  TYPE:  1
       ID:  8  LOC: 9  FUEL: 1.00  LOAD: 0.     OP: 1.00  TYPE:  1
       ID:  9  LOC: 7  FUEL: 1.00  LOAD: 0.     OP: 0.80  TYPE:  1
       ID: 10  LOC: 7  FUEL: 1.00  LOAD: 0.     OP: 0.80  TYPE:  1
       ID: 11  LOC: 8  FUEL: 1.00  LOAD: 0.     OP: 0.80  TYPE:  2
       ID: 12  LOC: 8  FUEL: 1.00  LOAD: 0.     OP: 0.80  TYPE:  2
       ID: 13  LOC: 9  FUEL: 1.00  LOAD: 0.     OP: 1.00  TYPE:  2
       ID: 14  LOC: 9  FUEL: 1.00  LOAD: 0.     OP: 1.00  TYPE:  2
       ID: 15  LOC: 8  FUEL: 1.00  LOAD: 0.     OP: 0.80  TYPE:  2
       ID: 16  LOC: 8  FUEL: 1.00  LOAD: 0.     OP: 0.80  TYPE:  2
       ID: 17  LOC: 8  FUEL: 1.00  LOAD: 1.00  OP: 1.00  TYPE:  3
       ID: 18  LOC: 8  FUEL: 1.00  LOAD: 1.00  OP: 1.00  TYPE:  3
       ID: 19  LOC: 8  FUEL: 1.00  LOAD: 1.00  OP: 1.00  TYPE:  3
       ID: 20  LOC: 8  FUEL: 1.00  LOAD: 1.00  OP: 1.00  TYPE:  3
       ID: 21  LOC:12  FUEL: 0.    LOAD: 0.     OP: 0.60  TYPE:  3
       ID: 22  LOC:12  FUEL: 0.    LOAD: 0.     OP: 0.60  TYPE:  3
  # SCHEDULED FLIGHTS = 35
         I :  1 FLIGHT.TIME :    20    AC.TYPE :  1  #AC :  4
         I :  2 FLIGHT.TIME :    21    AC.TYPE :  2  #AC :  2
         I :  3 FLIGHT.TIME :    35    AC.TYPE :  1  #AC :  4
         I :  4 FLIGHT.TIME :    36    AC.TYPE :  2  #AC :  2
         I :  5 FLIGHT.TIME :    45    AC.TYPE :  3  #AC :  2
         I :  6 FLIGHT.TIME :    65    AC.TYPE :  1  #AC :  2
         I :  7 FLIGHT.TIME :    66    AC.TYPE :  2  #AC :  2
         I :  8 FLIGHT.TIME :    75    AC.TYPE :  3  #AC :  2
         I :  9 FLIGHT.TIME :    95    AC.TYPE :  1  #AC :  4
         I : 10 FLIGHT.TIME :    96    AC.TYPE :  2  #AC :  2
         I : 11 FLIGHT.TIME :   105    AC.TYPE :  3  #AC :  2
         I : 12 FLIGHT.TIME :   125    AC.TYPE :  1  #AC :  4
         I : 13 FLIGHT.TIME :   126    AC.TYPE :  2  #AC :  2
         I : 14 FLIGHT.TIME :   135    AC.TYPE :  3  #AC :  2
         I : 15 FLIGHT.TIME :   155    AC.TYPE :  1  #AC :  2
         I : 16 FLIGHT.TIME :   156    AC.TYPE :  2  #AC :  2
         I : 17 FLIGHT.TIME :   165    AC.TYPE :  3  #AC :  2
         I : 18 FLIGHT.TIME :   185    AC.TYPE :  1  #AC :  4
```

```
                I : 19 FLIGHT.TIME :  186    AC.TYPE :  2  #AC :  2
                I : 20 FLIGHT.TIME :  195    AC.TYPE :  3  #AC :  2
                I : 21 FLIGHT.TIME :  215    AC.TYPE :  1  #AC :  4
                I : 22 FLIGHT.TIME :  216    AC.TYPE :  2  #AC :  2
                I : 23 FLIGHT.TIME :  225    AC.TYPE :  3  #AC :  2
                I : 24 FLIGHT.TIME :  245    AC.TYPE :  1  #AC :  2
                I : 25 FLIGHT.TIME :  246    AC.TYPE :  2  #AC :  2
                I : 26 FLIGHT.TIME :  255    AC.TYPE :  3  #AC :  2
                I : 27 FLIGHT.TIME :  275    AC.TYPE :  1  #AC :  4
                I : 28 FLIGHT.TIME :  276    AC.TYPE :  2  #AC :  2
                I : 29 FLIGHT.TIME :  285    AC.TYPE :  3  #AC :  2
                I : 30 FLIGHT.TIME :  305    AC.TYPE :  1  #AC :  4
                I : 31 FLIGHT.TIME :  306    AC.TYPE :  2  #AC :  2
                I : 32 FLIGHT.TIME :  315    AC.TYPE :  3  #AC :  2
                I : 33 FLIGHT.TIME :  335    AC.TYPE :  1  #AC :  2
                I : 34 FLIGHT.TIME :  336    AC.TYPE :  2  #AC :  2
                I : 35 FLIGHT.TIME :  345    AC.TYPE :  3  #AC :  2
NUM.OPEN.SPOTS =  6

------------------------------------------------------------------------

                 TIME:     0.   EVENT:  8 FLT.TIME    20 FLT.TYPE  1
THERE ARE 4 AC OF TYPE 1 IN THIS FLIGHT
AC  1    AT   7    SCHED TO LAUNCH AT    20    AND RETURN AT      0
                   AC :   1    COUNTER :    1
                                    NUM.OPEN.SPOTS =  5
AC  2    AT   7    SCHED TO LAUNCH AT    20    AND RETURN AT      0
                   AC :   2    COUNTER :    2
                                    NUM.OPEN.SPOTS =  4
AC  3    AT   7    SCHED TO LAUNCH AT    20    AND RETURN AT      0
                   AC :   3    COUNTER :    3
                                    NUM.OPEN.SPOTS =  3
AC  4    AT   7    SCHED TO LAUNCH AT    20    AND RETURN AT      0
                   AC :   4    COUNTER :    4
                                    NUM.OPEN.SPOTS =  2
T.NUM.AC =  0  FLT.AC.NUM =  4   COUNTER =  4

------------------------------------------------------------------------

                 TIME:     2.00 EVENT:  8 FLT.TIME    21 FLT.TYPE  2
THERE ARE 2 AC OF TYPE 2 IN THIS FLIGHT
AC 11    AT   8    SCHED TO LAUNCH AT    21    AND RETURN AT      0
                   AC :  11    COUNTER :    1
                                    NUM.OPEN.SPOTS =  1
AC 11 FILED IN TUG.Q
AC 12    AT   8    SCHED TO LAUNCH AT    21    AND RETURN AT      0
                   AC :  12    COUNTER :    2
                                    NUM.OPEN.SPOTS =  0
AC 12 FILED IN TUG.Q
T.NUM.AC =  0  FLT.AC.NUM =  2   COUNTER =  2

------------------------------------------------------------------------

                 TIME:     3.77 EVENT:  3 AC.ID:  4 AC.DEST:  4
AC   4 WITH FUEL 1.00   AND LOAD 0.     HAS OP.STAT 0.80
AC 11 REMOVED FROM TUG.Q

--------------------------------------------------------------------

               TIME:    4.00 EVENT:  8 FLT.TIME   35 FLT.TYPE  1
THERE ARE 4 AC OF TYPE 1 IN THIS FLIGHT
AC  5   AT  9   SCHED TO LAUNCH AT    35   AND RETURN AT    0
                AC :   5   COUNTER :   1
AC  6   AT  9   SCHED TO LAUNCH AT    35   AND RETURN AT    0
                AC :   6   COUNTER :   2
AC  7   AT  9   SCHED TO LAUNCH AT    35   AND RETURN AT    0
                AC :   7   COUNTER :   3
AC  8   AT  9   SCHED TO LAUNCH AT    35   AND RETURN AT    0
                AC :   8   COUNTER :   4
T.NUM.AC =  0   FLT.AC.NUM =  4   COUNTER =  4

--------------------------------------------------------------------

               TIME:    4.11 EVENT:  3 AC.ID:  1 AC.DEST:  1
AC  1 WITH FUEL 1.00    AND LOAD 0.    HAS OP.STAT 0.80
AC 12 REMOVED FROM TUG.Q

--------------------------------------------------------------------

               TIME:    4.37 EVENT:  3 AC.ID:  3 AC.DEST:  3
AC  3 WITH FUEL 1.00    AND LOAD 0.    HAS OP.STAT 0.80

--------------------------------------------------------------------

               TIME:    5.00 EVENT: 12
DELTA.UPDATE.TIME=    0.         TIME-DELTA=    5.0000

--------------------------------------------------------------------

               TIME:    5.00 EVENT:  9
#OPEN SPOTS= 0 LAST DELTA UPDATE=    0 #DELTA AC=  6 N.SPOT.Q =  6
AC  5 WITH DEST  9 HAS PRIORITY  0.81  FUEL.STAT  0.96  FLYING.TIME  115.0
AC  6 WITH DEST  9 HAS PRIORITY  0.81  FUEL.STAT  0.96  FLYING.TIME  115.0
AC  7 WITH DEST  9 HAS PRIORITY  0.81  FUEL.STAT  0.96  FLYING.TIME  115.0
AC  8 WITH DEST  9 HAS PRIORITY  0.81  FUEL.STAT  0.96  FLYING.TIME  115.0
AC 13 WITH DEST  9 HAS PRIORITY  0.81  FUEL.STAT  0.97  FLYING.TIME  145.0
AC 14 WITH DEST  9 HAS PRIORITY  0.81  FUEL.STAT  0.97  FLYING.TIME  145.0
AC 14   AT 9  SCHED TO LAUNCH AT    36
AC 13   AT 9  SCHED TO LAUNCH AT    36
AC  8   AT 9  SCHED TO LAUNCH AT    35
AC  7   AT 9  SCHED TO LAUNCH AT    35
AC  6   AT 9  SCHED TO LAUNCH AT    35
AC  5   AT 9  SCHED TO LAUNCH AT    35

--------------------------------------------------------------------

               TIME:    5.44 EVENT:  3 AC.ID:  2 AC.DEST:  2
AC  2 WITH FUEL 1.00    AND LOAD 0.    HAS OP.STAT 0.80

--------------------------------------------------------------------
```

```
                TIME:    6.00 EVENT:  8 FLT.TIME    36 FLT.TYPE  2
THERE ARE 2 AC OF TYPE 2 IN THIS FLIGHT
AC 13    AT  9    SCHED TO LAUNCH AT    36   AND RETURN AT     0
                  AC :  13   COUNTER :    1
AC 14    AT  9    SCHED TO LAUNCH AT    36   AND RETURN AT     0
                  AC :  14   COUNTER :    2
T.NUM.AC =  0   FLT.AC.NUM =  2   COUNTER =  2

------------------------------------------------------------------

                TIME:    7.33 EVENT:  3 AC.ID: 11 AC.DEST:  5
AC 11 WITH FUEL 1.00    AND LOAD 0.     HAS OP.STAT 0.80

------------------------------------------------------------------

                TIME:    7.36 EVENT:  3 AC.ID: 12 AC.DEST:  6
AC 12 WITH FUEL 1.00    AND LOAD 0.     HAS OP.STAT 0.80

------------------------------------------------------------------

                TIME:    8.00 EVENT:  8 FLT.TIME    45 FLT.TYPE  3
THERE ARE 2 AC OF TYPE 3 IN THIS FLIGHT
AC 17    AT  8    SCHED TO LAUNCH AT    45   AND RETURN AT     0
                  AC :  17   COUNTER :    1
AC 18    AT  8    SCHED TO LAUNCH AT    45   AND RETURN AT     0
                  AC :  18   COUNTER :    2
T.NUM.AC =  0   FLT.AC.NUM =  2   COUNTER =  2

------------------------------------------------------------------

                TIME:    8.00 EVENT:  4 AC.ID: 17 AC.LOC:  8
AC 17 WITH FUEL 1.00    AND LOAD 1.00  HAS OP.STAT 1.000
THIS AC LOADED PREVIOUSLY
  AC.OP.STAT(AC) : 1.000
  AT    8.00  THERE ARE  5 FLIGHTS IN THE PLAN
       AC.ID(AC) :  17   AC.ID(ACE) :  17
       #RDY AC IN FLIGHT =  1

------------------------------------------------------------------

                TIME:    8.00 EVENT:  4 AC.ID: 18 AC.LOC:  8
AC 18 WITH FUEL 1.00    AND LOAD 1.00  HAS OP.STAT 1.000
THIS AC LOADED PREVIOUSLY
  AC.OP.STAT(AC) : 1.000
  AT    8.00  THERE ARE  5 FLIGHTS IN THE PLAN
       AC.ID(AC) :  18   AC.ID(ACE) :  18
       #RDY AC IN FLIGHT =  2
                     AC 17 FILED IN SPOT.Q
                     AC 18 FILED IN SPOT.Q

------------------------------------------------------------------

                TIME:    8.00 EVENT:  9
#OPEN SPOTS= 0 LAST DELTA UPDATE=    5 #DELTA AC=  6 N.SPOT.Q =  8
```

```
AC  5 WITH DEST  9 HAS PRIORITY  0.81  FUEL.STAT  0.93  FLYING.TIME  112.0
AC  6 WITH DEST  9 HAS PRIORITY  0.81  FUEL.STAT  0.93  FLYING.TIME  112.0
AC  7 WITH DEST  9 HAS PRIORITY  0.81  FUEL.STAT  0.93  FLYING.TIME  112.0
AC  8 WITH DEST  9 HAS PRIORITY  0.81  FUEL.STAT  0.93  FLYING.TIME  112.0
AC 13 WITH DEST  9 HAS PRIORITY  0.81  FUEL.STAT  0.95  FLYING.TIME  142.0
AC 14 WITH DEST  9 HAS PRIORITY  0.81  FUEL.STAT  0.95  FLYING.TIME  142.0
AC 14  AT 9  SCHED TO LAUNCH AT   36
AC 13  AT 9  SCHED TO LAUNCH AT   36
AC  8  AT 9  SCHED TO LAUNCH AT   35
AC  7  AT 9  SCHED TO LAUNCH AT   35
AC  6  AT 9  SCHED TO LAUNCH AT   35
AC  5  AT 9  SCHED TO LAUNCH AT   35
AC 17  AT 8  SCHED TO LAUNCH AT   45
AC 18  AT 8  SCHED TO LAUNCH AT   45

-----------------------------------------------------------------------------

             TIME:    8.04 EVENT: 16 AC.ID: 21 AC.LOC: 12
AC GOING TO DECK HAS ARRIVED AT THE ELEVATOR

-----------------------------------------------------------------------------

             TIME:    9.80 EVENT: 17 AC.ID: 21 AC.LOC: 12
HANGER.EQUIV =  1.0

-----------------------------------------------------------------------------

             TIME:   10.00 EVENT: 12
DELTA.UPDATE.TIME=    8.0000    TIME-DELTA=    2.0000

-----------------------------------------------------------------------------

             TIME:   11.66 EVENT:  6 AC.ID: 21 AC.LOC: 11
AC 21 WITH FUEL 0.     AND LOAD 0.     HAS OP.STAT 0.60
N.BONE.FWD=  2    N.BONE.AFT=  7   BONE.TOTAL=  9   NUM.OPEN.SPOTS=  0
   N.LOAD.SET=  1

-----------------------------------------------------------------------------

             TIME:   11.71 EVENT:  4 AC.ID:  4 AC.LOC:  4
AC  4 WITH FUEL 1.00    AND LOAD 0.     HAS OP.STAT 0.800
  AC.OP.STAT(AC) : 1.000
  AT    11.71  THERE ARE  5 FLIGHTS IN THE PLAN
       AC.ID(AC) :   4   AC.ID(ACE) :   4
       #RDY AC IN FLIGHT =  1

-----------------------------------------------------------------------------

             TIME:   11.89 EVENT:  4 AC.ID:  1 AC.LOC:  1
AC  1 WITH FUEL 1.00    AND LOAD 0.     HAS OP.STAT 0.800
  AC.OP.STAT(AC) : 1.000
  AT    11.89  THERE ARE  5 FLIGHTS IN THE PLAN
       AC.ID(AC) :   1   AC.ID(ACE) :   1
       #RDY AC IN FLIGHT =  2
```

```
--------------------------------------------------------------------------------

              TIME:   12.30 EVENT:  4 AC.ID:   3 AC.LOC:   3
AC  3 WITH FUEL 1.00   AND LOAD 0.    HAS OP.STAT 0.800
  AC.OP.STAT(AC) : 1.000
  AT    12.30  THERE ARE  5 FLIGHTS IN THE PLAN
       AC.ID(AC) :   3   AC.ID(ACE) :   3
       #RDY AC IN FLIGHT =  3

--------------------------------------------------------------------------------

              TIME:   12.88 EVENT:  4 AC.ID:   2 AC.LOC:   2
AC  2 WITH FUEL 1.00   AND LOAD 0.    HAS OP.STAT 0.800
  AC.OP.STAT(AC) : 1.000
  AT    12.88  THERE ARE  5 FLIGHTS IN THE PLAN
       AC.ID(AC) :   2   AC.ID(ACE) :   2
       #RDY AC IN FLIGHT =  4
             FLIGHT.LAUNCH HAS BEEN SCHEDULED

--------------------------------------------------------------------------------

              TIME:   13.00 EVENT: 12
DELTA.UPDATE.TIME=    8.0000    TIME-DELTA=    5.0000

--------------------------------------------------------------------------------

              TIME:   13.00 EVENT:  9
#OPEN SPOTS= 0 LAST DELTA UPDATE=    8 #DELTA AC=  6 N.SPOT.Q =  8
AC  5 WITH DEST  9 HAS PRIORITY  0.82  FUEL.STAT  0.89  FLYING.TIME  107.0
AC  6 WITH DEST  9 HAS PRIORITY  0.82  FUEL.STAT  0.89  FLYING.TIME  107.0
AC  7 WITH DEST  9 HAS PRIORITY  0.82  FUEL.STAT  0.89  FLYING.TIME  107.0
AC  8 WITH DEST  9 HAS PRIORITY  0.82  FUEL.STAT  0.89  FLYING.TIME  107.0
AC 13 WITH DEST  9 HAS PRIORITY  0.82  FUEL.STAT  0.91  FLYING.TIME  137.0
AC 14 WITH DEST  9 HAS PRIORITY  0.82  FUEL.STAT  0.91  FLYING.TIME  137.0
AC 14   AT 9  SCHED TO LAUNCH AT    36
AC 13   AT 9  SCHED TO LAUNCH AT    36
AC  8   AT 9  SCHED TO LAUNCH AT    35
AC  7   AT 9  SCHED TO LAUNCH AT    35
AC  6   AT 9  SCHED TO LAUNCH AT    35
AC  5   AT 9  SCHED TO LAUNCH AT    35
AC 17   AT 8  SCHED TO LAUNCH AT    45
AC 18   AT 9  SCHED TO LAUNCH AT    45

--------------------------------------------------------------------------------

              TIME:   13.38 EVENT: 10 FLT.TIME   20 FLT.TYPE  1
INTERVAL=  0.9   LAST.LAUNCH.TIME=    0.    LAST.REC.TIME=    0.
          TIME:   13   AC  1 WILL LAUNCH IN 0.94 MINUTES
          TIME:   13   AC  2 WILL LAUNCH IN 1.44 MINUTES
          TIME:   13   AC  3 WILL LAUNCH IN 2.13 MINUTES
          TIME:   13   AC  4 WILL LAUNCH IN 2.81 MINUTES
FLIGHT   21 IS IN PLAN AND HAS  AC 11 AT LOCATION  5  WITH DEST 10
FLIGHT   21 IS IN PLAN AND HAS  AC 12 AT LOCATION  6  WITH DEST 10
FLIGHT   35 IS IN PLAN AND HAS  AC  5 AT LOCATION  9  WITH DEST  9
FLIGHT   35 IS IN PLAN AND HAS  AC  6 AT LOCATION  9  WITH DEST  9
FLIGHT   35 IS IN PLAN AND HAS  AC  7 AT LOCATION  9  WITH DEST  9
FLIGHT   35 IS IN PLAN AND HAS  AC  8 AT LOCATION  9  WITH DEST  9
FLIGHT   36 IS IN PLAN AND HAS  AC 13 AT LOCATION  9  WITH DEST  9
FLIGHT   36 IS IN PLAN AND HAS  AC 14 AT LOCATION  9  WITH DEST  9
FLIGHT   45 IS IN PLAN AND HAS  AC 17 AT LOCATION  8  WITH DEST  0
FLIGHT   45 IS IN PLAN AND HAS  AC 18 AT LOCATION  9  WITH DEST  0

--------------------------------------------------------------------------

                 TIME:    14.31 EVENT:  1 AC.ID:  1 AC.LOC:  1
AC  1 WITH FUEL 1.00    AND LOAD 1.00  HAS OP.STAT 1.00
#OPEN SPOTS =   1
     AC  1 LAUNCHES FROM  1  WITH DELAY  -5.69
AC  1 WILL ARRIVE TO DELTA AT 69 WITH PRIORITY 0.90 AND FLYING.TIME  57.2
FLIGHT AT   20 WITH  5 AC LAUNCHES AC  1 AT   14.3

--------------------------------------------------------------------------

                 TIME:    14.82 EVENT:  1 AC.ID:  2 AC.LOC:  2
AC  2 WITH FUEL 1.00    AND LOAD 1.00  HAS OP.STAT 1.00
#OPEN SPOTS =   2
     AC  2 LAUNCHES FROM  2  WITH DELAY  -5.18
AC  2 WILL ARRIVE TO DELTA AT 67 WITH PRIORITY 0.90 AND FLYING.TIME  59.5
FLIGHT AT   20 WITH  5 AC LAUNCHES AC  2 AT   14.8

--------------------------------------------------------------------------

                 TIME:    15.51 EVENT:  1 AC.ID:  3 AC.LOC:  3
AC  3 WITH FUEL 1.00    AND LOAD 1.00  HAS OP.STAT 1.00
#OPEN SPOTS =   3
     AC  3 LAUNCHES FROM  3  WITH DELAY  -4.69
AC  3 WILL ARRIVE TO DELTA AT 73 WITH PRIORITY 0.91 AND FLYING.TIME  54.3
FLIGHT AT   20 WITH  5 AC LAUNCHES AC  3 AT   15.5

--------------------------------------------------------------------------

                 TIME:    16.19 EVENT:  1 AC.ID:  4 AC.LOC:  4
AC  4 WITH FUEL 1.00    AND LOAD 1.00  HAS OP.STAT 1.00
#OPEN SPOTS =   4
     AC  4 LAUNCHES FROM  4  WITH DELAY  -3.81
AC  4 WILL ARRIVE TO DELTA AT 74 WITH PRIORITY 0.91 AND FLYING.TIME  53.4
FLIGHT AT   20 WITH  5 AC LAUNCHES AC  4 AT   16.2

--------------------------------------------------------------------------

                 TIME:    16.50 EVENT:  9
#OPEN SPOTS= 4 LAST DELTA UPDATE=   13 #DELTA AC=  6 N.SPOT.Q =  8
AC  5 WITH DEST  9 HAS PRIORITY  0.93  FUEL.STAT  0.86  FLYING.TIME  103.5
AC  6 WITH DEST  9 HAS PRIORITY  0.83  FUEL.STAT  0.86  FLYING.TIME  103.5
AC  7 WITH DEST  9 HAS PRIORITY  0.93  FUEL.STAT  0.86  FLYING.TIME  103.5
AC  8 WITH DEST  9 HAS PRIORITY  0.93  FUEL.STAT  0.86  FLYING.TIME  103.5
AC 13 WITH DEST  9 HAS PRIORITY  0.82  FUEL.STAT  0.89  FLYING.TIME  133.5
AC 14 WITH DEST  9 HAS PRIORITY  0.82  FUEL.STAT  0.89  FLYING.TIME  133.5
AC 14  AT 9  SCHED TO LAUNCH AT   36
AC 13  AT 9  SCHED TO LAUNCH AT   36
AC  8  AT 9  SCHED TO LAUNCH AT   35
AC  7  AT 9  SCHED TO LAUNCH AT   35
AC  6  AT 9  SCHED TO LAUNCH AT   35
AC  5  AT 9  SCHED TO LAUNCH AT   35
AC 17  AT 8  SCHED TO LAUNCH AT   45
AC 18  AT 8  SCHED TO LAUNCH AT   45
  #OPEN SPOTS=  4   #SPOT.Q =  8   I = 6   SPOT(I) = 12
  #OPEN SPOTS=  4   #SPOT.Q =  8   I = 5   SPOT(I) = 11
  #OPEN SPOTS=  4   #SPOT.Q =  8   I = 4   SPOT(I) =  0
AV8.LAUNCH.TIME=   45   HELO.LAUNCH.TIME=   21  OPEN SPOT IS  4
  #OPEN SPOTS=  4   #SPOT.Q =  8   I = 3   SPOT(I) =  0
AV8.LAUNCH.TIME=   45   HELO.LAUNCH.TIME=   21  OPEN SPOT IS  3
  #OPEN SPOTS=  4   #SPOT.Q =  8   I = 2   SPOT(I) =  0
AV8.LAUNCH.TIME=   45   HELO.LAUNCH.TIME=   21  OPEN SPOT IS  2
  #OPEN SPOTS=  4   #SPOT.Q =  8   I = 1   SPOT(I) =  0
AV8.LAUNCH.TIME=   45   HELO.LAUNCH.TIME=   21  OPEN SPOT IS  1

----------------------------------------------------------------------

                TIME:   16.73 EVENT: 16 AC.ID: 22 AC.LOC: 12
AC GOING TO DECK HAS ARRIVED AT THE ELEVATOR

----------------------------------------------------------------------

                TIME:   17.09 EVENT:  4 AC.ID: 12 AC.LOC:  6
AC 12 WITH FUEL 1.00    AND LOAD 0.    HAS OP.STAT 0.800
  AC.OP.STAT(AC) : 1.000
  AT    17.09  THERE ARE  4 FLIGHTS IN THE PLAN
       AC.ID(AC) :  12    AC.ID(ACE) :  12
       #RDY AC IN FLIGHT =  1

----------------------------------------------------------------------

                TIME:   17.32 EVENT:  4 AC.ID: 11 AC.LOC:  5
AC 11 WITH FUEL 1.00    AND LOAD 0.    HAS OP.STAT 0.800
  AC.OP.STAT(AC) : 1.000
  AT    17.32  THERE ARE  4 FLIGHTS IN THE PLAN
       AC.ID(AC) :  11    AC.ID(ACE) :  11
       #RDY AC IN FLIGHT =  2
             FLIGHT.LAUNCH HAS BEEN SCHEDULED

----------------------------------------------------------------------

                TIME:   17.69 EVENT:  5 AC.ID: 21 AC.LOC:  8
AC 21 WITH FUEL 0.      AND LOAD 0.    HAS OP.STAT 0.60
  AC.OP.STAT(AC) : 0.80  FLYING.TIME =  75.0
AV8 IS ALREADY BEING LOADED

----------------------------------------------------------------------

                TIME:   17.82 EVENT: 10 FLT.TIME    21 FLT.TYPE  2
INTERVAL=  0.6   LAST.LAUNCH.TIME=   16.2   LAST.REC.TIME=    0.
            TIME:   18  AC 11 WILL LAUNCH IN 0.59 MINUTES
            TIME:   18  AC 12 WILL LAUNCH IN 1.05 MINUTES
FLIGHT   35 IS IN PLAN AND HAS  AC  5 AT LOCATION  9  WITH DEST  9
FLIGHT   35 IS IN PLAN AND HAS  AC  6 AT LOCATION  9  WITH DEST  9
FLIGHT   35 IS IN PLAN AND HAS  AC  7 AT LOCATION  9  WITH DEST  9
FLIGHT   35 IS IN PLAN AND HAS  AC  8 AT LOCATION  9  WITH DEST  9
FLIGHT   36 IS IN PLAN AND HAS  AC 13 AT LOCATION  9  WITH DEST  9
FLIGHT   36 IS IN PLAN AND HAS  AC 14 AT LOCATION  9  WITH DEST  9
FLIGHT   45 IS IN PLAN AND HAS  AC 17 AT LOCATION  8  WITH DEST  0
FLIGHT   45 IS IN PLAN AND HAS  AC 18 AT LOCATION  8  WITH DEST  0

-------------------------------------------------------------------

                 TIME:   17.85 EVENT: 17 AC.ID: 22 AC.LOC: 12
HANGER.EQUIV =  0.

-------------------------------------------------------------------

                 TIME:   18.00 EVENT: 12
DELTA.UPDATE.TIME=   16.4995    TIME-DELTA=    1.5005

-------------------------------------------------------------------

                 TIME:   18.41 EVENT:  1 AC.ID: 11 AC.LOC:  5
AC 11 WITH FUEL 1.00   AND LOAD 1.00  HAS OP.STAT 1.00
#OPEN SPOTS =   5
     AC 11 LAUNCHES FROM  5  WITH DELAY  -2.59
AC 11 WILL ARRIVE TO DELTA AT 70 WITH PRIORITY 0.88 AND FLYING.TIME  90.5
FLIGHT AT   21 WITH  3 AC LAUNCHES AC 11 AT   18.4

-------------------------------------------------------------------

                 TIME:   18.87 EVENT:  1 AC.ID: 12 AC.LOC:  6
AC 12 WITH FUEL 1.00   AND LOAD 1.00  HAS OP.STAT 1.00
#OPEN SPOTS =   6
     AC 12 LAUNCHES FROM  6  WITH DELAY  -2.13
AC 12 WILL ARRIVE TO DELTA AT 79 WITH PRIORITY 0.89 AND FLYING.TIME  81.3
FLIGHT AT   21 WITH  3 AC LAUNCHES AC 12 AT   18.9

-------------------------------------------------------------------

                 TIME:   19.28 EVENT:  9
#OPEN SPOTS= 6 LAST DELTA UPDATE=   16 #DELTA AC=  5 N.SPOT.Q =  8
AC  5 WITH DEST  9 HAS PRIORITY  0.83  FUEL.STAT  0.84  FLYING.TIME  100.7
AC  6 WITH DEST  9 HAS PRIORITY  0.83  FUEL.STAT  0.84  FLYING.TIME  100.7
AC  7 WITH DEST  9 HAS PRIORITY  0.83  FUEL.STAT  0.84  FLYING.TIME  100.7
AC  8 WITH DEST  9 HAS PRIORITY  0.83  FUEL.STAT  0.84  FLYING.TIME  100.7
AC 13 WITH DEST  9 HAS PRIORITY  0.83  FUEL.STAT  0.87  FLYING.TIME  130.7
AC 14 WITH DEST  9 HAS PRIORITY  0.83  FUEL.STAT  0.87  FLYING.TIME  130.7
AC 14   AT 9  SCHED TO LAUNCH AT   36
AC 13   AT 9  SCHED TO LAUNCH AT   36
AC  8   AT 9  SCHED TO LAUNCH AT   35
AC  7   AT 9  SCHED TO LAUNCH AT   35
AC  6   AT 9  SCHED TO LAUNCH AT   35
AC  5   AT 9  SCHED TO LAUNCH AT   35
AC 17   AT 8  SCHED TO LAUNCH AT   45
AC 18   AT 8  SCHED TO LAUNCH AT   45
  #OPEN SPOTS=  6   #SPOT.Q =  8   I = 6   SPOT(I) =  0
```

```
AV8.LAUNCH.TIME=   45   HELO.LAUNCH.TIME=   35  OPEN SPOT IS  6
    AC 14 COMPATIBLE TO GO TO SPOT 6 HAS LAUNCH.TIME=   36 AND FLYING.TIME= 131
                         NUM.OPEN.SPOTS =  5
AC 14 WILL RECOVER TO SPOT  6  IN   4.9 MINUTES
#IN SPOT.Q  7  #OPEN SPOTS 5  I 6  SPOT(I)-14  AC.ID 14  AC.LOC  9
  #OPEN SPOTS=  5   #SPOT.Q =  7   I = 5   SPOT(I) =  0
AV8.LAUNCH.TIME=   45   HELO.LAUNCH.TIME=   35  OPEN SPOT IS  5
    AC 13 COMPATIBLE TO GO TO SPOT 5 HAS LAUNCH.TIME=   36 AND FLYING.TIME= 131
                         NUM.OPEN.SPOTS =  4
AC 13 WILL RECOVER TO SPOT  5  IN   5.5 MINUTES
#IN SPOT.Q  6  #OPEN SPOTS 4  I 5  SPOT(I)-13  AC.ID 13  AC.LOC  9
  #OPEN SPOTS=  4   #SPOT.Q =  6   I = 4   SPOT(I) =  0
AV8.LAUNCH.TIME=   45   HELO.LAUNCH.TIME=   35  OPEN SPOT IS  4
    AC  8 COMPATIBLE TO GO TO SPOT 4 HAS LAUNCH.TIME=   35 AND FLYING.TIME= 101
                         NUM.OPEN.SPOTS =  3
AC  8 WILL RECOVER TO SPOT  4  IN   6.1 MINUTES
#IN SPOT.Q  5  #OPEN SPOTS 3  I 4  SPOT(I) -8  AC.ID  8  AC.LOC  9
  #OPEN SPOTS=  3   #SPOT.Q =  5   I = 3   SPOT(I) =  0
AV8.LAUNCH.TIME=   45   HELO.LAUNCH.TIME=   35  OPEN SPOT IS  3
    AC  7 COMPATIBLE TO GO TO SPOT 3 HAS LAUNCH.TIME=   35 AND FLYING.TIME= 101
                         NUM.OPEN.SPOTS =  2
AC  7 WILL RECOVER TO SPOT  3  IN   6.7 MINUTES
#IN SPOT.Q  4  #OPEN SPOTS 2  I 3  SPOT(I) -7  AC.ID  7  AC.LOC  9
  #OPEN SPOTS=  2   #SPOT.Q =  4   I = 2   SPOT(I) =  0
AV8.LAUNCH.TIME=   45   HELO.LAUNCH.TIME=   35  OPEN SPOT IS  2
    AC  6 COMPATIBLE TO GO TO SPOT 2 HAS LAUNCH.TIME=   35 AND FLYING.TIME= 101
                         NUM.OPEN.SPOTS =  1
AC  6 WILL RECOVER TO SPOT  2  IN   7.4 MINUTES
#IN SPOT.Q  3  #OPEN SPOTS 1  I 2  SPOT(I) -6  AC.ID  6  AC.LOC  9
  #OPEN SPOTS=  1   #SPOT.Q =  3   I = 1   SPOT(I) =  0
AV8.LAUNCH.TIME=   45   HELO.LAUNCH.TIME=   35  OPEN SPOT IS  1
    AC  5 COMPATIBLE TO GO TO SPOT 1 HAS LAUNCH.TIME=   35 AND FLYING.TIME= 101
                         NUM.OPEN.SPOTS =  0
AC  5 WILL RECOVER TO SPOT  1  IN   7.9 MINUTES
#IN SPOT.Q  2  #OPEN SPOTS 0  I 1  SPOT(I) -5  AC.ID  5  AC.LOC  9

-----------------------------------------------------------------------------

                    TIME:   21.50 EVENT: 12
DELTA.UPDATE.TIME=   19.2766    TIME-DELTA=    2.2229

-----------------------------------------------------------------------------

                    TIME:   22.12 EVENT:  6 AC.ID: 22 AC.LOC: 11
AC 22 WITH FUEL 0.      AND LOAD 0.     HAS OP.STAT 0.60
N.BONE.FWD=  2    N.BONE.AFT=  8   BONE.TOTAL= 10   NUM.OPEN.SPOTS=  0
   N.LOAD.SET=  2

-----------------------------------------------------------------------------

                    TIME:   22.58 EVENT: 18 FLT.TIME   27 FLT.TYPE  1
THIS FLIGHT HAS LAUNCHED

-----------------------------------------------------------------------------
```

```
                    TIME:    22.69 EVENT: 18 FLT.TIME    21 FLT.TYPE  2
THIS FLIGHT HAS LAUNCHED

---------------------------------------------------------------------------

                    TIME:    23.40 EVENT:  2 AC.ID: 14 AC.DEST:  6
AC 14 WITH FUEL 0.87    AND LOAD 0.      HAS OP.STAT 1.00
TO TIME=   36    LOC=  6     N.SPOT.Q=  2     NUM.OPEN.SPOTS=  0  AVG TO TIME=    45
REFUELER=  1     N.REFUELER.Q =  0

---------------------------------------------------------------------------

                    TIME:    24.19 EVENT:  2 AC.ID: 13 AC.DEST:  5
AC 13 WITH FUEL 0.87    AND LOAD 0.      HAS OP.STAT 1.00
TO TIME=   36    LOC=  5     N.SPOT.Q=  2     NUM.OPEN.SPOTS=  0  AVG TO TIME=    45
REFUELER=  2     N.REFUELER.Q =  0

---------------------------------------------------------------------------

                    TIME:    24.28 EVENT: 12
DELTA.UPDATE.TIME=   19.2766    TIME-DELTA=     5.0000

---------------------------------------------------------------------------

                    TIME:    24.28 EVENT:  9
#OPEN SPOTS= 0 LAST DELTA UPDATE=   19 #DELTA AC=  4 N.SPOT.Q =  2
AC  5 WITH DEST  1 HAS PRIORITY  0.84  FUEL.STAT  0.80  FLYING.TIME   95.7
AC  6 WITH DEST  2 HAS PRIORITY  0.84  FUEL.STAT  0.80  FLYING.TIME   95.7
AC  7 WITH DEST  3 HAS PRIORITY  0.84  FUEL.STAT  0.80  FLYING.TIME   95.7
AC  8 WITH DEST  4 HAS PRIORITY  0.84  FUEL.STAT  0.80  FLYING.TIME   95.7
AC 17  AT 8  SCHED TO LAUNCH AT   45
AC 18  AT 8  SCHED TO LAUNCH AT   45

---------------------------------------------------------------------------

                    TIME:    24.81 EVENT:  2 AC.ID:  8 AC.DEST:  4
AC  8 WITH FUEL 0.80    AND LOAD 0.      HAS OP.STAT 1.00
TO TIME=   35    LOC=  4     N.SPOT.Q=  2     NUM.OPEN.SPOTS=  0  AVG TO TIME=    45
REFUELER=  3     N.REFUELER.Q =  0

---------------------------------------------------------------------------

                    TIME:    24.94 EVENT:  5 AC.ID: 14 AC.LOC:  6
AC 14 WITH FUEL 0.87    AND LOAD 0.      HAS OP.STAT 0.77
  AC.OP.STAT(AC) : 0.90  FLYING.TIME = 150.0

---------------------------------------------------------------------------

                    TIME:    25.00 EVENT:  8 FLT.TIME    65 FLT.TYPE  1
THERE ARE 2 AC OF TYPE 1 IN THIS FLIGHT
AC  9   AT  7   SCHED TO LAUNCH AT   65   AND RETURN AT      0
                AC :   9   COUNTER :    1
AC  9 FILED IN SPOT.Q
AC 10   AT  7   SCHED TO LAUNCH AT   65   AND RETURN AT      0
                AC :  10   COUNTER :    2
AC 10 FILED IN SPOT.Q
T.NUM.AC =  0  FLT.AC.NUM =  2   COUNTER =  2

----------------------------------------------------------------

                  TIME:   25.36 EVENT:  2 AC.ID:  7 AC.DEST:  3
AC  7 WITH FUEL 0.80   AND LOAD 0.    HAS OP.STAT 1.00
TO TIME=  35   LOC=  3   N.SPOT.Q=  4    NUM.OPEN.SPOTS=  0  AV8 TO TIME=   45
REFUELER=  3    N.REFUELER.Q =  0

----------------------------------------------------------------

                  TIME:   25.39 EVENT:  4 AC.ID: 21 AC.LOC:  8
AC 21 WITH FUEL 1.00   AND LOAD 0.    HAS OP.STAT 0.800
  AC.OP.STAT(AC) : 1.000
  AT   25.39  THERE ARE  4 FLIGHTS IN THE PLAN

----------------------------------------------------------------

                  TIME:   25.77 EVENT:  5 AC.ID: 13 AC.LOC:  5
AC 13 WITH FUEL 0.87   AND LOAD 0.    HAS OP.STAT 0.77
  AC.OP.STAT(AC) : 0.80  FLYING.TIME = 190.0

----------------------------------------------------------------

                  TIME:   25.93 EVENT:  2 AC.ID:  6 AC.DEST:  2
AC  6 WITH FUEL 0.80   AND LOAD 0.    HAS OP.STAT 1.00
TO TIME=  35   LOC=  2   N.SPOT.Q=  4    NUM.OPEN.SPOTS=  0  AV8 TO TIME=   45
REFUELER=  3    N.REFUELER.Q =  0

----------------------------------------------------------------

                  TIME:   26.00 EVENT:  8 FLT.TIME   66 FLT.TYPE  2
THERE ARE 2 AC OF TYPE 2 IN THIS FLIGHT
AC 15   AT  8   SCHED TO LAUNCH AT   66   AND RETURN AT    0
                 AC :  15   COUNTER :   1
AC 15 FILED IN SPOT.Q
AC 16   AT  9   SCHED TO LAUNCH AT   66   AND RETURN AT    0
                 AC :  16   COUNTER :   2
AC 16 FILED IN SPOT.Q
T.NUM.AC =  0  FLT.AC.NUM =  2   COUNTER =  2

----------------------------------------------------------------

                  TIME:   26.70 EVENT:  2 AC.ID:  5 AC.DEST:  1
AC  5 WITH FUEL 0.80   AND LOAD 0.    HAS OP.STAT 1.00
TO TIME=  35   LOC=  1   N.SPOT.Q=  6    NUM.OPEN.SPOTS=  0  AV8 TO TIME=   45
REFUELER=  4    N.REFUELER.Q =  0

----------------------------------------------------------------

                  TIME:   26.95 EVENT:  5 AC.ID:  9 AC.LOC:  4
AC  9 WITH FUEL 0.80   AND LOAD 0.    HAS OP.STAT 0.76
  AC.OP.STAT(AC) : 0.90  FLYING.TIME = 120.0
```

```
--------------------------------------------------------------------------------

                  TIME:    27.27 EVENT:  5 AC.ID:   7 AC.LOC:   3
AC   7 WITH FUEL 0.80    AND LOAD 0.     HAS OP.STAT 0.76
  AC.OP.STAT(AC) : 0.80  FLYING.TIME = 120.0

--------------------------------------------------------------------------------

                  TIME:    27.70 EVENT:  5 AC.ID:   6 AC.LOC:   2
AC   6 WITH FUEL 0.90    AND LOAD 0.     HAS OP.STAT 0.76
  AC.OP.STAT(AC) : 0.90  FLYING.TIME = 120.0

--------------------------------------------------------------------------------

                  TIME:    27.84 EVENT:  5 AC.ID: 22 AC.LOC:   8
AC 22 WITH FUEL 0.       AND LOAD 0.     HAS OP.STAT 0.60
  AC.OP.STAT(AC) : 0.80  FLYING.TIME =  75.0
AVB IS ALREADY BEING LOADED

--------------------------------------------------------------------------------

                  TIME:    29.28 EVENT: 12
DELTA.UPDATE.TIME=   24.2766    TIME-DELTA=     5.0000

--------------------------------------------------------------------------------

                  TIME:    29.28 EVENT:  9
#OPEN SPOTS= 0 LAST DELTA UPDATE=    24 #DELTA AC=  0 N.SPOT.Q =  6
AC 17   AT 8  SCHED TO LAUNCH AT    45
AC 18   AT 8  SCHED TO LAUNCH AT    45
AC  9   AT 7  SCHED TO LAUNCH AT    65
AC 10   AT 7  SCHED TO LAUNCH AT    65
AC 15   AT 8  SCHED TO LAUNCH AT    66
AC 16   AT 8  SCHED TO LAUNCH AT    66

--------------------------------------------------------------------------------

                  TIME:    29.31 EVENT:  5 AC.ID:   5 AC.LOC:   1
AC   5 WITH FUEL 0.80    AND LOAD 0.     HAS OP.STAT 0.76
  AC.OP.STAT(AC) : 0.80  FLYING.TIME = 120.0

--------------------------------------------------------------------------------

                  TIME:    29.57 EVENT:  4 AC.ID:   7 AC.LOC:   3
AC   7 WITH FUEL 1.00    AND LOAD 0.     HAS OP.STAT 0.800
  AC.OP.STAT(AC) : 1.000
  AT    29.57  THERE ARE  5 FLIGHTS IN THE PLAN
        AC.ID(AC) :    7   AC.ID(ACE) :    7
        #RDY AC IN FLIGHT =  1

--------------------------------------------------------------------------------

                  TIME:    30.68 EVENT:  4 AC.ID:   8 AC.LOC:   4
AC   8 WITH FUEL 1.00    AND LOAD 0.     HAS OP.STAT 0.800
  AC.OP.STAT(AC) : 1.000
  AT    30.68  THERE ARE  5 FLIGHTS IN THE PLAN
        AC.ID(AC) :   8   AC.ID(ACE) :   8
        #RDY AC IN FLIGHT =  2

------------------------------------------------------------------------------

               TIME:   31.75 EVENT:  4 AC.ID:  6 AC.LOC:  2
AC  6 WITH FUEL 1.00   AND LOAD 0.    HAS OP.STAT 0.800
  AC.OP.STAT(AC) : 1.000
  AT    31.75  THERE ARE  5 FLIGHTS IN THE PLAN
        AC.ID(AC) :   6   AC.ID(ACE) :   6
        #RDY AC IN FLIGHT =  3

------------------------------------------------------------------------------

               TIME:   33.09 EVENT:  4 AC.ID:  5 AC.LOC:  1
AC  5 WITH FUEL 1.00   AND LOAD 0.    HAS OP.STAT 0.800
  AC.OP.STAT(AC) : 1.000
  AT    33.09  THERE ARE  5 FLIGHTS IN THE PLAN
        AC.ID(AC) :   5   AC.ID(ACE) :   5
        #RDY AC IN FLIGHT =  4
             FLIGHT.LAUNCH HAS BEEN SCHEDULED

------------------------------------------------------------------------------

               TIME:   33.53 EVENT:  4 AC.ID: 13 AC.LOC:  5
AC 13 WITH FUEL 1.00   AND LOAD 0.    HAS OP.STAT 0.800
  AC.OP.STAT(AC) : 1.000
  AT    33.53  THERE ARE  5 FLIGHTS IN THE PLAN
        AC.ID(AC) :  13   AC.ID(ACE) :  13
        #RDY AC IN FLIGHT =  1

------------------------------------------------------------------------------

               TIME:   33.59 EVENT: 10 FLT.TIME   35 FLT.TYPE  1
INTERVAL=  0.8   LAST.LAUNCH.TIME=   18.9   LAST.REC.TIME=   27.2
           TIME:   34   AC   5 WILL LAUNCH IN 0.81 MINUTES
           TIME:   34   AC   6 WILL LAUNCH IN 1.36 MINUTES
           TIME:   34   AC   7 WILL LAUNCH IN 2.03 MINUTES
           TIME:   34   AC   8 WILL LAUNCH IN 2.44 MINUTES
FLIGHT    36 IS IN PLAN AND HAS   AC 13 AT LOCATION  5  WITH DEST 10
FLIGHT    35 IS IN PLAN AND HAS   AC 14 AT LOCATION  6  WITH DEST 10
FLIGHT    45 IS IN PLAN AND HAS   AC 17 AT LOCATION  9  WITH DEST  0
FLIGHT    45 IS IN PLAN AND HAS   AC 18 AT LOCATION  9  WITH DEST  0
FLIGHT    65 IS IN PLAN AND HAS   AC  9 AT LOCATION  7  WITH DEST  0
FLIGHT    65 IS IN PLAN AND HAS   AC 10 AT LOCATION  7  WITH DEST  0
FLIGHT    66 IS IN PLAN AND HAS   AC 15 AT LOCATION  3  WITH DEST  0
FLIGHT    66 IS IN PLAN AND HAS   AC 16 AT LOCATION  3  WITH DEST  0

------------------------------------------------------------------------------

               TIME:   33.68 EVENT:  4 AC.ID: 14 AC.LOC:  6
AC 14 WITH FUEL 1.00   AND LOAD 0.    HAS OP.STAT 0.800
  AC.OP.STAT(AC) : 1.000
  AT    33.68  THERE ARE  4 FLIGHTS IN THE PLAN
```

```
          AC.ID(AC) :  14    AC.ID(ACE) :  14
          #RDY AC IN FLIGHT =  2
                FLIGHT.LAUNCH HAS BEEN SCHEDULED

---------------------------------------------------------------------

                TIME:    34.18 EVENT: 10 FLT.TIME    36 FLT.TYPE  2
INTERVAL=  0.9   LAST.LAUNCH.TIME=   36.0   LAST.REC.TIME=   27.2
            TIME:    34   AC 13 WILL LAUNCH IN 2.85 MINUTES
            TIME:    34   AC 14 WILL LAUNCH IN 3.53 MINUTES
FLIGHT   45 IS IN PLAN AND HAS  AC 17 AT LOCATION  9  WITH DEST  0
FLIGHT   45 IS IN PLAN AND HAS  AC 18 AT LOCATION  9  WITH DEST  0
FLIGHT   65 IS IN PLAN AND HAS  AC  9 AT LOCATION  7  WITH DEST  0
FLIGHT   65 IS IN PLAN AND HAS  AC 10 AT LOCATION  7  WITH DEST  0
FLIGHT   66 IS IN PLAN AND HAS  AC 15 AT LOCATION  8  WITH DEST  0
FLIGHT   66 IS IN PLAN AND HAS  AC 16 AT LOCATION  9  WITH DEST  0

---------------------------------------------------------------------

                TIME:    34.28 EVENT: 12
DELTA.UPDATE.TIME=   24.2766    TIME-DELTA=   10.0000

---------------------------------------------------------------------

                TIME:    34.28 EVENT:  9
#OPEN SPOTS= 0 LAST DELTA UPDATE=   24 #DELTA AC=  0 N.SPOT.Q =  6
AC 17   AT 9  SCHED TO LAUNCH AT    45
AC 18   AT 8  SCHED TO LAUNCH AT    45
AC  9   AT 7  SCHED TO LAUNCH AT    65
AC 10   AT 7  SCHED TO LAUNCH AT    65
AC 15   AT 8  SCHED TO LAUNCH AT    66
AC 16   AT 9  SCHED TO LAUNCH AT    66

---------------------------------------------------------------------

                TIME:    34.40 EVENT:  1 AC.ID:   5 AC.LOC:  1
AC  5 WITH FUEL 1.00    AND LOAD 1.00  HAS OP.STAT 1.00
#OPEN SPOTS =    1
      AC  5 LAUNCHES FROM  1  WITH DELAY  -0.60
AC  5 WILL ARRIVE TO DELTA AT 92 WITH PRIORITY 0.91 AND FLYING.TIME  53.2
FLIGHT AT    35 WITH  5 AC LAUNCHES AC  5 AT    34.4

---------------------------------------------------------------------

                TIME:    34.95 EVENT:  1 AC.ID:   6 AC.LOC:  2
AC  6 WITH FUEL 1.00    AND LOAD 1.00  HAS OP.STAT 1.00
#OPEN SPOTS =    2
      AC  6 LAUNCHES FROM  2  WITH DELAY  -0.05
AC  6 WILL ARRIVE TO DELTA AT 92 WITH PRIORITY 0.91 AND FLYING.TIME  53.9
FLIGHT AT    35 WITH  5 AC LAUNCHES AC  6 AT    34.9

---------------------------------------------------------------------

                TIME:    35.00 EVENT:  3 FLT.TIME    75 FLT.TYPE  3
THERE ARE 2 AC OF TYPE 3 IN THIS FLIGHT
```

```
AC 19   AT  8   SCHED TO LAUNCH AT    75   AND RETURN AT     0
                AC :  19    COUNTER :   1
AC 20   AT  8   SCHED TO LAUNCH AT    75   AND RETURN AT     0
                AC :  20    COUNTER :   2
T.NUM.AC =  0  FLT.AC.NUM =  2   COUNTER =  2

---------------------------------------------------------------

              TIME:   35.00 EVENT:  4 AC.ID: 19 AC.LOC:   8
AC 19 WITH FUEL 1.00   AND LOAD 1.00  HAS OP.STAT 1.000
THIS AC LOADED PREVIOUSLY
  AC.OP.STAT(AC) : 1.000
  AT    35.00  THERE ARE  4 FLIGHTS IN THE PLAN
       AC.ID(AC) :  19   AC.ID(ACE) :  19
       #RDY AC IN FLIGHT =  1

---------------------------------------------------------------

              TIME:   35.00 EVENT:  4 AC.ID: 20 AC.LOC:   8
AC 20 WITH FUEL 1.00   AND LOAD 1.00  HAS OP.STAT 1.000
THIS AC LOADED PREVIOUSLY
  AC.OP.STAT(AC) : 1.000
  AT    35.00  THERE ARE  4 FLIGHTS IN THE PLAN
       AC.ID(AC) :  20   AC.ID(ACE) :  20
       #RDY AC IN FLIGHT =  2
                    AC 19 FILED IN SPOT.Q
                    AC 20 FILED IN SPOT.Q

---------------------------------------------------------------

              TIME:   35.00 EVENT:  9
#OPEN SPOTS= 2 LAST DELTA UPDATE=   24 #DELTA AC=  0 N.SPOT.Q =  8
AC 17   AT 8  SCHED TO LAUNCH AT    45
AC 18   AT 8  SCHED TO LAUNCH AT    45
AC  9   AT 7  SCHED TO LAUNCH AT    65
AC 10   AT 7  SCHED TO LAUNCH AT    65
AC 15   AT 8  SCHED TO LAUNCH AT    66
AC 16   AT 8  SCHED TO LAUNCH AT    66
AC 19   AT 8  SCHED TO LAUNCH AT    75
AC 20   AT 8  SCHED TO LAUNCH AT    75
  #OPEN SPOTS=  2    #SPOT.Q =  8    I = 6    SPOT(I) = 14
  #OPEN SPOTS=  2    #SPOT.Q =  8    I = 5    SPOT(I) = 13
  #OPEN SPOTS=  2    #SPOT.Q =  8    I = 4    SPOT(I) =  8
  #OPEN SPOTS=  2    #SPOT.Q =  8    I = 3    SPOT(I) =  7
  #OPEN SPOTS=  2    #SPOT.Q =  8    I = 2    SPOT(I) =  0
AV8.LAUNCH.TIME=   45   HELO.LAUNCH.TIME=   65  OPEN SPOT IS  2
    AC 17 COMPATIBLE TO GO TO SPOT 2 HAS LAUNCH.TIME=   45 AND FLYING.TIME=  75
        AC = 17  WILL RESPOT TO  2
                                  NUM.OPEN.SPOTS =  1
#IN SPOT.Q  7  #OPEN SPOTS 1  I 2  SPOT(I)-17  AC.ID 17  AC.LOC  8
  #OPEN SPOTS=  1    #SPOT.Q =  7    I = 1    SPOT(I) =  0
AV8.LAUNCH.TIME=   45   HELO.LAUNCH.TIME=   65  OPEN SPOT IS  1
    AC 18 COMPATIBLE TO GO TO SPOT 1 HAS LAUNCH.TIME=   45 AND FLYING.TIME=  75
        AC = 18  WILL RESPOT TO  1
                                  NUM.OPEN.SPOTS =  0
```

```
#IN SPOT.Q  6   #OPEN SPOTS 0  I 1  SPOT(I)-18  AC.ID 18  AC.LOC  8

-------------------------------------------------------------------

               TIME:   35.62 EVENT:  1 AC.ID:  7 AC.LOC:  3
AC  7 WITH FUEL 1.00   AND LOAD 1.00  HAS OP.STAT 1.00
#OPEN SPOTS =   1
     AC  7 LAUNCHES FROM  3  WITH DELAY   0.62
AC  7 WILL ARRIVE TO DELTA AT 89 WITH PRIORITY 0.90 AND FLYING.TIME  58.3
FLIGHT AT   35 WITH  5 AC LAUNCHES AC  7 AT   35.6

-------------------------------------------------------------------

               TIME:   36.03 EVENT:  1 AC.ID:  8 AC.LOC:  4
AC  8 WITH FUEL 1.00   AND LOAD 1.00  HAS OP.STAT 1.00
#OPEN SPOTS =   2
     AC  8 LAUNCHES FROM  4  WITH DELAY   1.03
AC  8 WILL ARRIVE TO DELTA AT 94 WITH PRIORITY 0.91 AND FLYING.TIME  53.7
FLIGHT AT   35 WITH  5 AC LAUNCHES AC  8 AT   36.0

-------------------------------------------------------------------

               TIME:   36.40 EVENT:  9
#OPEN SPOTS= 2 LAST DELTA UPDATE=   24 #DELTA AC=  0 N.SPOT.Q =  6
AC  9  AT 7  SCHED TO LAUNCH AT   65
AC 10  AT 7  SCHED TO LAUNCH AT   65
AC 15  AT 8  SCHED TO LAUNCH AT   66
AC 16  AT 9  SCHED TO LAUNCH AT   66
AC 19  AT 8  SCHED TO LAUNCH AT   75
AC 20  AT 9  SCHED TO LAUNCH AT   75
  #OPEN SPOTS=  2   #SPOT.Q =  6   I = 6   SPOT(I) = 14
  #OPEN SPOTS=  2   #SPOT.Q =  6   I = 5   SPOT(I) = 13
  #OPEN SPOTS=  2   #SPOT.Q =  6   I = 4   SPOT(I) =  0
AV8.LAUNCH.TIME=   45   HELO.LAUNCH.TIME=   65  OPEN SPOT IS  4
  #OPEN SPOTS=  2   #SPOT.Q =  6   I = 3   SPOT(I) =  0
AV8.LAUNCH.TIME=   45   HELO.LAUNCH.TIME=   65  OPEN SPOT IS  3
  #OPEN SPOTS=  2   #SPOT.Q =  6   I = 2   SPOT(I) =-17
  #OPEN SPOTS=  2   #SPOT.Q =  6   I = 1   SPOT(I) =-18

-------------------------------------------------------------------

               TIME:   36.93 EVENT: 19 FLT.TIME   35 FLT.TYPE  1
THIS FLIGHT HAS LAUNCHED

-------------------------------------------------------------------

               TIME:   37.03 EVENT:  1 AC.ID: 13 AC.LOC:  5
AC 13 WITH FUEL 1.00   AND LOAD 1.00  HAS OP.STAT 1.00
#OPEN SPOTS =   3
     AC 13 LAUNCHES FROM  5  WITH DELAY   1.03
AC 13 WILL ARRIVE TO DELTA AT 92 WITH PRIORITY 0.38 AND FLYING.TIME  86.9
FLIGHT AT   36 WITH  3 AC LAUNCHES AC 13 AT   37.0

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```

```
               TIME:    37.09 EVENT:  3 AC.ID: 17 AC.DEST:   2
AC 17 WITH FUEL 1.00    AND LOAD 1.00   HAS OP.STAT 1.00
          AV8 17 RDY TO LAUNCH AT    37 FROM SPOT  2
    AV8 FLIGHT SCHED TO LAUNCH AT    45 HAS  1 AV8'S RDY ON SPOTS

-----------------------------------------------------------------

               TIME:    37.24 EVENT: 18 FLT.TIME    36 FLT.TYPE  2
THIS FLIGHT HAS LAUNCHED

-----------------------------------------------------------------

               TIME:    37.71 EVENT:  1 AC.ID: 14 AC.LOC:   6
AC 14 WITH FUEL 1.00    AND LOAD 1.00   HAS OP.STAT 1.00
#OPEN SPOTS =    4
     AC 14 LAUNCHES FROM  6  WITH DELAY    1.71
AC 14 WILL ARRIVE TO DELTA AT 91 WITH PRIORITY 0.88 AND FLYING.TIME  88.5
FLIGHT AT    36 WITH  3 AC LAUNCHES AC 14 AT    37.7

-----------------------------------------------------------------

               TIME:    38.06 EVENT:  9
#OPEN SPOTS= 4 LAST DELTA UPDATE=   24 #DELTA AC=  0 N.SPOT.Q =  6
AC  9   AT 7  SCHED TO LAUNCH AT    65
AC 10   AT 7  SCHED TO LAUNCH AT    65
AC 15   AT 8  SCHED TO LAUNCH AT    66
AC 16   AT 8  SCHED TO LAUNCH AT    66
AC 19   AT 8  SCHED TO LAUNCH AT    75
AC 20   AT 8  SCHED TO LAUNCH AT    75
  #OPEN SPOTS=  4   #SPOT.Q =  6    I = 6   SPOT(I) =  0
AV8.LAUNCH.TIME=   45    HELO.LAUNCH.TIME=    65  OPEN SPOT IS  6
  #OPEN SPOTS=  4   #SPOT.Q =  6    I = 5   SPOT(I) =  0
AV8.LAUNCH.TIME=   45    HELO.LAUNCH.TIME=    65  OPEN SPOT IS  5
  #OPEN SPOTS=  4   #SPOT.Q =  6    I = 4   SPOT(I) =  0
AV8.LAUNCH.TIME=   45    HELO.LAUNCH.TIME=    65  OPEN SPOT IS  4
  #OPEN SPOTS=  4   #SPOT.Q =  6    I = 3   SPOT(I) =  0
AV8.LAUNCH.TIME=   45    HELO.LAUNCH.TIME=    65  OPEN SPOT IS  3
  #OPEN SPOTS=  4   #SPOT.Q =  6    I = 2   SPOT(I) = 17
  #OPEN SPOTS=  4   #SPOT.Q =  6    I = 1   SPOT(I) =-18

-----------------------------------------------------------------

               TIME:    38.25 EVENT:  4 AC.ID: 22 AC.LOC:   8
AC 22 WITH FUEL 1.00    AND LOAD 0.     HAS OP.STAT 0.800
  AC.OP.STAT(AC) : 1.000
  AT    38.25  THERE ARE  4 FLIGHTS IN THE PLAN

-----------------------------------------------------------------

               TIME:    39.20 EVENT:  3 AC.ID: 18 AC.DEST:  1
AC 18 WITH FUEL 1.00    AND LOAD 1.00   HAS OP.STAT 1.00
          AV8 18 RDY TO LAUNCH AT    39 FROM SPOT  1
    AV8 FLIGHT SCHED TO LAUNCH AT    45 HAS  2 AV8'S RDY ON SPOTS
        AV8 FLIGHT SCHE TO LAUNCH AT    45 HAS BEEN SENT TO FLIGHT.LAUNCH
```

```
------------------------------------------------------------------

                 TIME:   39.28 EVENT: 12
DELTA.UPDATE.TIME=   24.2766    TIME-DELTA=   15.0000

------------------------------------------------------------------

                 TIME:   39.28 EVENT:  9
#OPEN SPOTS= 4 LAST DELTA UPDATE=   24 #DELTA AC=  0 N.SPOT.Q =  6
AC  9   AT 7  SCHED TO LAUNCH AT    65
AC 10   AT 7  SCHED TO LAUNCH AT    65
AC 15   AT 8  SCHED TO LAUNCH AT    66
AC 16   AT 8  SCHED TO LAUNCH AT    66
AC 19   AT 8  SCHED TO LAUNCH AT    75
AC 20   AT 8  SCHED TO LAUNCH AT    75
  #OPEN SPOTS=  4   #SPOT.Q =  6   I = 6   SPOT(I) =  0
AV8.LAUNCH.TIME=   45   HELO.LAUNCH.TIME=   65  OPEN SPOT IS  6
  #OPEN SPOTS=  4   #SPOT.Q =  6   I = 5   SPOT(I) =  0
AV8.LAUNCH.TIME=   45   HELO.LAUNCH.TIME=   65  OPEN SPOT IS  5
  #OPEN SPOTS=  4   #SPOT.Q =  6   I = 4   SPOT(I) =  0
AV8.LAUNCH.TIME=   45   HELO.LAUNCH.TIME=   65  OPEN SPOT IS  4
  #OPEN SPOTS=  4   #SPOT.Q =  6   I = 3   SPOT(I) =  0
AV8.LAUNCH.TIME=   45   HELO.LAUNCH.TIME=   65  OPEN SPOT IS  3
  #OPEN SPOTS=  4   #SPOT.Q =  6   I = 2   SPOT(I) = 17
  #OPEN SPOTS=  4   #SPOT.Q =  6   I = 1   SPOT(I) = 18

------------------------------------------------------------------

                 TIME:   39.51 EVENT: 10 FLT.TIME   45 FLT.TYPE  3
INTERVAL=  0.9   LAST.LAUNCH.TIME=   37.7   LAST.REC.TIME=   27.2
            TIME:   40  AC 17 WILL LAUNCH IN 0.88 MINUTES
            TIME:   40  AC 18 WILL LAUNCH IN 1.42 MINUTES
FLIGHT   65 IS IN PLAN AND HAS  AC  9 AT LOCATION  7  WITH DEST  0
FLIGHT   65 IS IN PLAN AND HAS  AC 10 AT LOCATION  7  WITH DEST  0
FLIGHT   66 IS IN PLAN AND HAS  AC 15 AT LOCATION  8  WITH DEST  0
FLIGHT   66 IS IN PLAN AND HAS  AC 16 AT LOCATION  8  WITH DEST  0
FLIGHT   75 IS IN PLAN AND HAS  AC 19 AT LOCATION  8  WITH DEST  0
FLIGHT   75 IS IN PLAN AND HAS  AC 20 AT LOCATION  8  WITH DEST  0

------------------------------------------------------------------

                 TIME:   40.39 EVENT:  1 AC.ID: 17 AC.LOC:  2
AC 17 WITH FUEL 1.00   AND LOAD 1.00  HAS OP.STAT 1.00
#OPEN SPOTS =   5
     AC 17 LAUNCHES FROM  2  WITH DELAY  -4.61
AC 17 WILL ARRIVE TO DELTA AT 73 WITH PRIORITY 0.90 AND FLYING.TIME  37.1
FLIGHT AT   45 WITH  3 AC LAUNCHES AC 17 AT   40.4

------------------------------------------------------------------

                 TIME:   40.93 EVENT:  1 AC.ID: 18 AC.LOC:  1
AC 18 WITH FUEL 1.00   AND LOAD 1.00  HAS OP.STAT 1.00
#OPEN SPOTS =   6
     AC 18 LAUNCHES FROM  1  WITH DELAY  -4.07
AC 18 WILL ARRIVE TO DELTA AT 67 WITH PRIORITY 0.88 AND FLYING.TIME  45.4
```

```
FLIGHT AT   45 WITH  3 AC LAUNCHES AC 18 AT   40.9

-------------------------------------------------------------------

                TIME:   41.28 EVENT:  9
#OPEN SPOTS= 6 LAST DELTA UPDATE=   24 #DELTA AC=  0 N.SPOT.Q =  6
AC  9  AT 7  SCHED TO LAUNCH AT   65
AC 10  AT 7  SCHED TO LAUNCH AT   65
AC 15  AT 8  SCHED TO LAUNCH AT   66
AC 16  AT 8  SCHED TO LAUNCH AT   66
AC 19  AT 3  SCHED TO LAUNCH AT   75
AC 20  AT 8  SCHED TO LAUNCH AT   75
  #OPEN SPOTS=  6   #SPOT.Q =  6    I = 6   SPOT(I) =  0
AV8.LAUNCH.TIME=  75   HELO.LAUNCH.TIME=   65  OPEN SPOT IS  6
    AC 15 COMPATIBLE TO GO TO SPOT 6 HAS LAUNCH.TIME=   66 AND FLYING.TIME= 150
                    AC 15 WILL RESPOT TO SPOT  6
                       NUM.OPEN.SPOTS =  5
#IN SPOT.Q  5  #OPEN SPOTS 5  I 6  SPOT(I)-15  AC.ID 15  AC.LOC  8
  #OPEN SPOTS=  5   #SPOT.Q =  5    I = 5   SPOT(I) =  0
AV8.LAUNCH.TIME=  75   HELO.LAUNCH.TIME=   65  OPEN SPOT IS  5
    AC 16 COMPATIBLE TO GO TO SPOT 5 HAS LAUNCH.TIME=   66 AND FLYING.TIME= 150
                    AC 16 WILL RESPOT TO SPOT  5
                       NUM.OPEN.SPOTS =  4
#IN SPOT.Q  4  #OPEN SPOTS 4  I 5  SPOT(I)-16  AC.ID 16  AC.LOC  8
  #OPEN SPOTS=  4   #SPOT.Q =  4    I = 4   SPOT(I) =  0
AV8.LAUNCH.TIME=  75   HELO.LAUNCH.TIME=   65  OPEN SPOT IS  4
    AC  9 COMPATIBLE TO GO TO SPOT 4 HAS LAUNCH.TIME=   65 AND FLYING.TIME= 120
                    AC  9 WILL RESPOT TO SPOT  4
                       NUM.OPEN.SPOTS =  3
#IN SPOT.Q  3  #OPEN SPOTS 3  I 4  SPOT(I) -9  AC.ID  9  AC.LOC  7
  #OPEN SPOTS=  3   #SPOT.Q =  3    I = 3   SPOT(I) =  0
AV8.LAUNCH.TIME=  75   HELO.LAUNCH.TIME=   65  OPEN SPOT IS  3
    AC 10 COMPATIBLE TO GO TO SPOT 3 HAS LAUNCH.TIME=   65 AND FLYING.TIME= 120
                    AC 10 WILL RESPOT TO SPOT  3
                       NUM.OPEN.SPOTS =  2
#IN SPOT.Q  2  #OPEN SPOTS 2  I 3  SPOT(I)-10  AC.ID 10  AC.LOC  7
  #OPEN SPOTS=  2   #SPOT.Q =  2    I = 2   SPOT(I) =  0
AV8.LAUNCH.TIME=  75   HELO.LAUNCH.TIME=   65  OPEN SPOT IS  2
  #OPEN SPOTS=  2   #SPOT.Q =  2    I = 1   SPOT(I) =  0
AV8.LAUNCH.TIME=  75   HELO.LAUNCH.TIME=   65  OPEN SPOT IS  1

-------------------------------------------------------------------

                TIME:   43.22 EVENT:  3 AC.ID: 15 AC.DEST:  6
AC 15 WITH FUEL 1.00   AND LOAD 0.    HAS OP.STAT 0.80

-------------------------------------------------------------------

                TIME:   44.28 EVENT: 12
DELTA.UPDATE.TIME=   24.2766    TIME-DELTA=   20.0000

-------------------------------------------------------------------

                TIME:   44.28 EVENT:  9
#OPEN SPOTS= 2 LAST DELTA UPDATE=   24 #DELTA AC=  0 N.SPOT.Q =  2
```

```
AC 19  AT 8  SCHED TO LAUNCH AT    75
AC 20  AT 8  SCHED TO LAUNCH AT    75
  #OPEN SPOTS=  2   #SPOT.Q =  2   I = 6   SPOT(I) = 15
  #OPEN SPOTS=  2   #SPOT.Q =  2   I = 5   SPOT(I) =-16
  #OPEN SPOTS=  2   #SPOT.Q =  2   I = 4   SPOT(I) = -9
  #OPEN SPOTS=  2   #SPOT.Q =  2   I = 3   SPOT(I) =-10
  #OPEN SPOTS=  2   #SPOT.Q =  2   I = 2   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   65  OPEN SPOT IS  2
  #OPEN SPOTS=  2   #SPOT.Q =  2   I = 1   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   65  OPEN SPOT IS  1

---------------------------------------------------------------------

                TIME:   44.38 EVENT:  3 AC.ID: 10 AC.DEST:   3
AC 10 WITH FUEL 1.00    AND LOAD 0.    HAS OP.STAT 0.30

---------------------------------------------------------------------

                TIME:   44.66 EVENT:  3 AC.ID: 16 AC.DEST:   5
AC 16 WITH FUEL 1.00    AND LOAD 0.    HAS OP.STAT 0.80

---------------------------------------------------------------------

                TIME:   45.48 EVENT:  3 AC.ID:  9 AC.DEST:   4
AC  9 WITH FUEL 1.00    AND LOAD 0.    HAS OP.STAT 0.80

---------------------------------------------------------------------

                TIME:   46.80 EVENT: 18 FLT.TIME    45 FLT.TYPE  3
THIS FLIGHT HAS LAUNCHED

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                TIME:   49.28 EVENT: 12
DELTA.UPDATE.TIME=   24.2766    TIME-DELTA=   25.0000

---------------------------------------------------------------------

                TIME:   49.28 EVENT:  9
#OPEN SPOTS= 2 LAST DELTA UPDATE=   24 #DELTA AC=  0 N.SPOT.Q =  2
AC 19  AT 8  SCHED TO LAUNCH AT    75
AC 20  AT 8  SCHED TO LAUNCH AT    75
  #OPEN SPOTS=  2   #SPOT.Q =  2   I = 6   SPOT(I) = 15
  #OPEN SPOTS=  2   #SPOT.Q =  2   I = 5   SPOT(I) = 16
  #OPEN SPOTS=  2   #SPOT.Q =  2   I = 4   SPOT(I) =  9
  #OPEN SPOTS=  2   #SPOT.Q =  2   I = 3   SPOT(I) = 10
  #OPEN SPOTS=  2   #SPOT.Q =  2   I = 2   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   65  OPEN SPOT IS  2
  #OPEN SPOTS=  2   #SPOT.Q =  2   I = 1   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   65  OPEN SPOT IS  1

---------------------------------------------------------------------

                TIME:   54.28 EVENT: 12
DELTA.UPDATE.TIME=   24.2766    TIME-DELTA=   30.0000
```

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                    TIME:    54.29 EVENT:  9
#OPEN SPOTS= 2 LAST DELTA UPDATE=    24 #DELTA AC=  0 N.SPOT.Q =  2
AC 19   AT 8  SCHED TO LAUNCH AT    75
AC 20   AT 8  SCHED TO LAUNCH AT    75
  #OPEN SPOTS=  2   #SPOT.Q =  2    I = 6   SPOT(I) = 15
  #OPEN SPOTS=  2   #SPOT.Q =  2    I = 5   SPOT(I) = 16
  #OPEN SPOTS=  2   #SPOT.Q =  2    I = 4   SPOT(I) =  9
  #OPEN SPOTS=  2   #SPOT.Q =  2    I = 3   SPOT(I) = 10
  #OPEN SPOTS=  2   #SPOT.Q =  2    I = 2   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   65  OPEN SPOT IS  2
    AC 19 COMPATIBLE TO GO TO SPOT 2 HAS LAUNCH.TIME=   75 AND FLYING.TIME=  75
#IN SPOT.Q  2  #OPEN SPOTS 2  I 2  SPOT(I)  0  AC.ID 19  AC.LOC  8
  #OPEN SPOTS=  2   #SPOT.Q =  2    I = 1   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   65  OPEN SPOT IS  1
    AC 19 COMPATIBLE TO GO TO SPOT 1 HAS LAUNCH.TIME=   75 AND FLYING.TIME=  75
#IN SPOT.Q  2  #OPEN SPOTS 2  I 1  SPOT(I)  0  AC.ID 19  AC.LOC  8

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                    TIME:    55.00 EVENT:  8 FLT.TIME    95 FLT.TYPE  1
THERE ARE 4 AC  OF TYPE 1 IN THIS FLIGHT
AC  1    AT 10    SCHED TO LAUNCH AT    95   AND RETURN AT    69
                  AC :   1   COUNTER :   1
AC  2    AT 10    SCHED TO LAUNCH AT    95   AND RETURN AT    67
                  AC :   2   COUNTER :   2
AC  3    AT 10    SCHED TO LAUNCH AT    95   AND RETURN AT    73
                  AC :   3   COUNTER :   3
AC  4    AT 10    SCHED TO LAUNCH AT    95   AND RETURN AT    74
                  AC :   4   COUNTER :   4
T.NUM.AC =  0   FLT.AC.NUM =  4   COUNTER =  4

----------------------------------------------------------------------------------------

                    TIME:    56.00 EVENT:  8 FLT.TIME    96 FLT.TYPE  2
THERE ARE 2 AC  OF TYPE 2 IN THIS FLIGHT
AC 11    AT 10    SCHED TO LAUNCH AT    96   AND RETURN AT    70
                  AC :  11   COUNTER :   1
AC 12    AT 10    SCHED TO LAUNCH AT    96   AND RETURN AT    79
                  AC :  12   COUNTER :   2
T.NUM.AC =  0   FLT.AC.NUM =  2   COUNTER =  2

----------------------------------------------------------------------------------------

                    TIME:    56.97 EVENT:  4 AC.ID:  9 AC.LOC:  4
AC  9 WITH FUEL 1.00    AND LOAD 0.     HAS OP.STAT 0.800
  AC.OP.STAT(AC) : 1.000
  AT    56.97  THERE ARE  5 FLIGHTS IN THE PLAN
        AC.ID(AC) :   9   AC.ID(ACE) :   9
        #RDY AC IN FLIGHT =  1

----------------------------------------------------------------------------------------
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```
                  TIME:    57.37 EVENT:  4 AC.ID: 10 AC.LOC:  3
AC 10 WITH FUEL 1.00    AND LOAD 0.     HAS OP.STAT 0.600
  AC.OP.STAT(AC) : 1.000
  AT    57.37  THERE ARE  5 FLIGHTS IN THE PLAN
       AC.ID(AC) :  10   AC.ID(ACE) :  10
       #RDY AC IN FLIGHT =  2
              FLIGHT.LAUNCH HAS BEEN SCHEDULED

-------------------------------------------------------------------------

                  TIME:    57.87 EVENT: 10 FLT.TIME    65 FLT.TYPE  1
INTERVAL=  0.6   LAST.LAUNCH.TIME=   40.9   LAST.REC.TIME=   27.2
                TIME:    58   AC 10 WILL LAUNCH IN 0.64 MINUTES
                TIME:    58   AC  9 WILL LAUNCH IN 1.14 MINUTES
FLIGHT   66 IS IN PLAN AND HAS  AC 15 AT LOCATION  6  WITH DEST 10
FLIGHT   66 IS IN PLAN AND HAS  AC 16 AT LOCATION  5  WITH DEST 10
FLIGHT   75 IS IN PLAN AND HAS  AC 19 AT LOCATION  8  WITH DEST  0
FLIGHT   75 IS IN PLAN AND HAS  AC 20 AT LOCATION  8  WITH DEST  0
FLIGHT   95 IS IN PLAN AND HAS  AC  1 AT LOCATION 10  WITH DEST  9
FLIGHT   95 IS IN PLAN AND HAS  AC  2 AT LOCATION 10  WITH DEST  9
FLIGHT   95 IS IN PLAN AND HAS  AC  3 AT LOCATION 10  WITH DEST  9
FLIGHT   95 IS IN PLAN AND HAS  AC  4 AT LOCATION 10  WITH DEST  9
FLIGHT   96 IS IN PLAN AND HAS  AC 11 AT LOCATION 10  WITH DEST  9
FLIGHT   96 IS IN PLAN AND HAS  AC 12 AT LOCATION 10  WITH DEST  9

-------------------------------------------------------------------------

                  TIME:    58.51 EVENT:  1 AC.ID: 10 AC.LOC:  3
AC 10 WITH FUEL 1.00    AND LOAD 1.00  HAS OP.STAT 1.00
#OPEN SPOTS =   3
      AC 10 LAUNCHES FROM  3  WITH DELAY  -6.49
AC 10 WILL ARRIVE TO DELTA AT117 WITH PRIORITY 0.91 AND FLYING.TIME  52.4
FLIGHT AT    65 WITH  3 AC LAUNCHES AC 10 AT    58.5

-------------------------------------------------------------------------

                  TIME:    59.01 EVENT:  1 AC.ID:  9 AC.LOC:  4
AC  9 WITH FUEL 1.00    AND LOAD 1.00  HAS OP.STAT 1.00
#OPEN SPOTS =   4
      AC  9 LAUNCHES FROM  4  WITH DELAY  -5.99
AC  9 WILL ARRIVE TO DELTA AT119 WITH PRIORITY 0.92 AND FLYING.TIME  51.0
FLIGHT AT    65 WITH  3 AC LAUNCHES AC  9 AT    59.0

-------------------------------------------------------------------------

                  TIME:    59.28 EVENT: 12
DELTA.UPDATE.TIME=   24.2766    TIME-DELTA=   35.0000

-------------------------------------------------------------------------

                  TIME:    59.28 EVENT:  9
#OPEN SPOTS= 4 LAST DELTA UPDATE=   24 #DELTA AC=  0 N.SPOT.Q =  2
AC 19  AT 8  SCHED TO LAUNCH AT    75
AC 20  AT 8  SCHED TO LAUNCH AT    75
  #OPEN SPOTS=  4   #SPOT.Q =  2   I = 6   SPOT(I) = 15
  #OPEN SPOTS=  4   #SPOT.Q =  2   I = 5   SPOT(I) = 16
  #OPEN SPOTS=  4   #SPOT.Q =  2   I = 4   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   66  OPEN SPOT IS  4
  #OPEN SPOTS=  4   #SPOT.Q =  2   I = 3   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   66  OPEN SPOT IS  3
  #OPEN SPOTS=  4   #SPOT.Q =  2   I = 2   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   66  OPEN SPOT IS  2
    AC 19 COMPATIBLE TO GO TO SPOT 2 HAS LAUNCH.TIME=   75 AND FLYING.TIME=  75
#IN SPOT.Q  2  #OPEN SPOTS 4  I 2  SPOT(I)  0  AC.ID 19  AC.LOC  8
  #OPEN SPOTS=  4   #SPOT.Q =  2   I = 1   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   66  OPEN SPOT IS  1
    AC 19 COMPATIBLE TO GO TO SPOT 1 HAS LAUNCH.TIME=   75 AND FLYING.TIME=  75
#IN SPOT.Q  2  #OPEN SPOTS 4  I 1  SPOT(I)  0  AC.ID 19  AC.LOC  8

-------------------------------------------------------------------

                 TIME:   59.57 EVENT:  9
#OPEN SPOTS= 4 LAST DELTA UPDATE=   24 #DELTA AC=  0 N.SPOT.Q =  2
AC 19  AT 8  SCHED TO LAUNCH AT   75
AC 20  AT 8  SCHED TO LAUNCH AT   75
  #OPEN SPOTS=  4   #SPOT.Q =  2   I = 6   SPOT(I) = 15
  #OPEN SPOTS=  4   #SPOT.Q =  2   I = 5   SPOT(I) = 16
  #OPEN SPOTS=  4   #SPOT.Q =  2   I = 4   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   66  OPEN SPOT IS  4
  #OPEN SPOTS=  4   #SPOT.Q =  2   I = 3   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   66  OPEN SPOT IS  3
  #OPEN SPOTS=  4   #SPOT.Q =  2   I = 2   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   66  OPEN SPOT IS  2
    AC 19 COMPATIBLE TO GO TO SPOT 2 HAS LAUNCH.TIME=   75 AND FLYING.TIME=  75
#IN SPOT.Q  2  #OPEN SPOTS 4  I 2  SPOT(I)  0  AC.ID 19  AC.LOC  8
  #OPEN SPOTS=  4   #SPOT.Q =  2   I = 1   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   66  OPEN SPOT IS  1
    AC 19 COMPATIBLE TO GO TO SPOT 1 HAS LAUNCH.TIME=   75 AND FLYING.TIME=  75
#IN SPOT.Q  2  #OPEN SPOTS 4  I 1  SPOT(I)  0  AC.ID 19  AC.LOC  8

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                 TIME:   62.65 EVENT:  4 AC.ID: 15 AC.LOC:  6
AC 15 WITH FUEL 1.00   AND LOAD 0.    HAS OP.STAT 0.800
  AC.OP.STAT(AC) : 1.000
  AT   62.65  THERE ARE  4 FLIGHTS IN THE PLAN
       AC.ID(AC) :  15   AC.ID(ACE) :  15
       #RDY AC IN FLIGHT =  1

-------------------------------------------------------------------

                 TIME:   64.28 EVENT: 12
DELTA.UPDATE.TIME=   24.2766    TIME-DELTA=   40.0000

-------------------------------------------------------------------

                 TIME:   64.28 EVENT:  9
#OPEN SPOTS= 4 LAST DELTA UPDATE=   24 #DELTA AC=  0 N.SPOT.Q =  2
AC 19  AT 8  SCHED TO LAUNCH AT   75
AC 20  AT 8  SCHED TO LAUNCH AT   75
```

```
  #OPEN SPOTS=  4   #SPOT.Q =  2   I = 6   SPOT(I) = 15
  #OPEN SPOTS=  4   #SPOT.Q =  2   I = 5   SPOT(I) = 16
  #OPEN SPOTS=  4   #SPOT.Q =  2   I = 4   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   66  OPEN SPOT IS  4
  #OPEN SPOTS=  4   #SPOT.Q =  2   I = 3   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   66  OPEN SPOT IS  3
  #OPEN SPOTS=  4   #SPOT.Q =  2   I = 2   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   66  OPEN SPOT IS  2
    AC 19 COMPATIBLE TO GO TO SPOT 2 HAS LAUNCH.TIME=   75 AND FLYING.TIME=  75
#IN SPOT.Q  2  #OPEN SPOTS 4  I 2  SPOT(I)  0  AC.ID 19  AC.LOC  8
  #OPEN SPOTS=  4   #SPOT.Q =  2   I = 1   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   66  OPEN SPOT IS  1
    AC 19 COMPATIBLE TO GO TO SPOT 1 HAS LAUNCH.TIME=   75 AND FLYING.TIME=  75
#IN SPOT.Q  2  #OPEN SPOTS 4  I 1  SPOT(I)  0  AC.ID 19  AC.LOC  8

---------------------------------------------------------------

                  TIME:   64.65 EVENT:  4 AC.ID: 16 AC.LOC:  5
AC 16 WITH FUEL 1.00   AND LOAD 0.    HAS OP.STAT 0.800
  AC.OP.STAT(AC) : 1.000
  AT    64.65  THERE ARE  4 FLIGHTS IN THE PLAN
       AC.ID(AC) :  16   AC.ID(ACE) :  16
       #RDY AC IN FLIGHT =  2
             FLIGHT.LAUNCH HAS BEEN SCHEDULED

---------------------------------------------------------------

                  TIME:   65.00 EVENT:  8 FLT.TIME  105 FLT.TYPE  3
THERE ARE 2 AC OF TYPE 3 IN THIS FLIGHT
AC 21   AT  8   SCHED TO LAUNCH AT  105   AND RETURN AT    0
                AC :  21   COUNTER :   1
AC 22   AT  8   SCHED TO LAUNCH AT  105   AND RETURN AT    0
                AC :  22   COUNTER :   2
T.NUM.AC =  0  FLT.AC.NUM =  2   COUNTER =  2

---------------------------------------------------------------

                  TIME:   65.00 EVENT:  4 AC.ID: 21 AC.LOC:  8
AC 21 WITH FUEL 1.00   AND LOAD 1.00  HAS OP.STAT 1.000
THIS AC LOADED PREVIOUSLY
  AC.OP.STAT(AC) : 1.000
  AT    65.00  THERE ARE  5 FLIGHTS IN THE PLAN
       AC.ID(AC) :  21   AC.ID(ACE) :  21
       #RDY AC IN FLIGHT =  1

---------------------------------------------------------------

                  TIME:   65.00 EVENT:  4 AC.ID: 22 AC.LOC:  8
AC 22 WITH FUEL 1.00   AND LOAD 1.00  HAS OP.STAT 1.000
THIS AC LOADED PREVIOUSLY
  AC.OP.STAT(AC) : 1.000
  AT    65.00  THERE ARE  5 FLIGHTS IN THE PLAN
       AC.ID(AC) :  22   AC.ID(ACE) :  22
       #RDY AC IN FLIGHT =  2
                     AC 21 FILED IN SPOT.Q
```

```
                          AC 22 FILED IN SPOT.Q

-------------------------------------------------------------------

                 TIME:   65.00 EVENT:  9
#OPEN SPOTS= 4 LAST DELTA UPDATE=   24 #DELTA AC=  0 N.SPOT.Q =  4
AC 19   AT 8  SCHED TO LAUNCH AT   75
AC 20   AT 8  SCHED TO LAUNCH AT   75
AC 21   AT 8  SCHED TO LAUNCH AT  105
AC 22   AT 8  SCHED TO LAUNCH AT  105
  #OPEN SPOTS=  4    #SPOT.Q =  4    I = 6   SPOT(I) = 15
  #OPEN SPOTS=  4    #SPOT.Q =  4    I = 5   SPOT(I) = 16
  #OPEN SPOTS=  4    #SPOT.Q =  4    I = 4   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   66  OPEN SPOT IS  4
  #OPEN SPOTS=  4    #SPOT.Q =  4    I = 3   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   66  OPEN SPOT IS  3
  #OPEN SPOTS=  4    #SPOT.Q =  4    I = 2   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   66  OPEN SPOT IS  2
    AC 19 COMPATIBLE TO GO TO SPOT 2 HAS LAUNCH.TIME=   75 AND FLYING.TIME=  75
        AC = 19  WILL RESPOT TO  2
                                NUM.OPEN.SPOTS =  3
#IN SPOT.Q  3  #OPEN SPOTS 3  I 2  SPOT(I)-19  AC.ID 19  AC.LOC  8
  #OPEN SPOTS=  3    #SPOT.Q =  3    I = 1   SPOT(I) =  0
AV8.LAUNCH.TIME=   75   HELO.LAUNCH.TIME=   66  OPEN SPOT IS  1
    AC 20 COMPATIBLE TO GO TO SPOT 1 HAS LAUNCH.TIME=   75 AND FLYING.TIME=  75
        AC = 20  WILL RESPOT TO  1
                                NUM.OPEN.SPOTS =  2
#IN SPOT.Q  2  #OPEN SPOTS 2  I 1  SPOT(I)-20  AC.ID 20  AC.LOC  8

-------------------------------------------------------------------

                 TIME:   65.15 EVENT: 10 FLT.TIME   66 FLT.TYPE  2
INTERVAL=  0.8   LAST.LAUNCH.TIME=   59.0  LAST.REC.TIME=   27.2
           TIME:   65  AC 16 WILL LAUNCH IN 0.75 MINUTES
           TIME:   65  AC 15 WILL LAUNCH IN 1.35 MINUTES
FLIGHT   75 IS IN PLAN AND HAS  AC 19 AT LOCATION  8  WITH DEST  2
FLIGHT   75 IS IN PLAN AND HAS  AC 20 AT LOCATION  8  WITH DEST  1
FLIGHT   95 IS IN PLAN AND HAS  AC  1 AT LOCATION 10  WITH DEST  9
FLIGHT   95 IS IN PLAN AND HAS  AC  2 AT LOCATION 10  WITH DEST  9
FLIGHT   95 IS IN PLAN AND HAS  AC  3 AT LOCATION 10  WITH DEST  9
FLIGHT   95 IS IN PLAN AND HAS  AC  4 AT LOCATION 10  WITH DEST  9
FLIGHT   96 IS IN PLAN AND HAS  AC 11 AT LOCATION 10  WITH DEST  9
FLIGHT   96 IS IN PLAN AND HAS  AC 12 AT LOCATION 10  WITH DEST  9
FLIGHT  105 IS IN PLAN AND HAS  AC 21 AT LOCATION  8  WITH DEST  8
FLIGHT  105 IS IN PLAN AND HAS  AC 22 AT LOCATION  9  WITH DEST  9

-------------------------------------------------------------------

                 TIME:   65.90 EVENT:  1 AC.ID: 16 AC.LOC:  5
AC 16 WITH FUEL 1.00   AND LOAD 1.00  HAS OP.STAT 1.00
#OPEN SPOTS =   3
      AC 16 LAUNCHES FROM  5  WITH DELAY  -0.10
AC 16 WILL ARRIVE TO DELTA AT121 WITH PRIORITY 0.88 AND FLYING.TIME  86.3
FLIGHT AT   66 WITH  3 AC LAUNCHES AC 16 AT   65.9
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[2] Listings for Professional Papers issued prior to PP 407 can be found in *Index of Selected Publications (through December 1983)*, March 1984

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