FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE
NUMBER: MO-AA1-435-X

SUBSYSTEM NAME: STABILIZED PAYLOAD DEPLOYMENT SYSTEM
REVISION : 2 06/08/90

		PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
ASSEM	:	MID MCA-1	V070-764610
ASSEM	:	MID MCA-3	V070-764630
SRU	:	RELAY, HYBRID	MC455-0135-0001
■ SRU	:	RELAY, HYBRID	MC455-0135-0002

PART DATA

■ EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

REFERENCE DESIGNATORS: 40V76A117 - K48
: 40V76A119 - K55

QUANTITY OF LIKE ITEMS: 2

■ FUNCTION:
THE RELAYS PROVIDE ON/OFF CONTROL OF THE Yo DRIVE MOTOR POWER FOR "BERTHING" THE PAYLOAD DURING GROUND OPERATIONS. HOWEVER THE "BERTH" FUNCTION COULD AGAIN BE REQUIRED SHOULD PAYLOAD DEPLOYMENT ON-ORBIT PROVE UNSUCCESSFUL. BOTH RELAYS, K48 AND K55, RESPOND TO COMMAND SIGNALS FROM SWITCH S36.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: MO-AA1-435-03

REVISION# 2 06/08/90

SUBSYSTEM: STABILIZED PAYLOAD DEPLOYMENT SYSTEM

ITEM NAME: RELAY, HYBRID

CRITICALITY OF THIS FAILURE MODE:2R3

■ FAILURE MODE:
SHORTED. ANY SINGLE SET OF CONTACTS.

MISSION PHASE:
OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 102 COLUMBIA
: 103 DISCOVERY
: 104 ATLANTIS
: 105 ENDEAVOUR

CAUSE:
PIECE PART STRUCTURAL FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL STRESS, PROCESSING ANOMALY

■ CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

■ REDUNDANCY SCREEN A) PASS
■ B) FAIL
■ C) PASS

PASS/FAIL RATIONALE:
■ A)
PRELAUNCH CHECKOUT

■ B)
ONE PHASE WILL NOT CAUSE MOTOR TO DRIVE - CANNOT CONFIRM RELAY FAILURE.

■ C)
PHYSICAL AND ELECTRICAL ISOLATION OF REDUNDANT ELEMENTS.

- FAILURE EFFECTS -

■ (A) SUBSYSTEM:
A SINGLE PHASE OF POWER WILL BE CONTINUOUSLY APPLIED TO A DRIVE MOTOR. WHENEVER THREE PHASE AC POWER IS PRESENT.

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- (B) INTERFACING SUBSYSTEM(S):
  THE DRIVE MOTOR COULD OVER HEAT AND FAIL. A FAILED MOTOR WOULD CAUSE A PEDESTAL FUNCTION TO BE AT HALF SPEED. IF THE RELAY FOR OPPOSITE MOTOR ROTATION IS ACTIVATED CIRCUIT BREAKER COULD TRIP.

- (C) MISSION:
  NO EFFECT. FIRST FAILURE

- (D) CREW, VEHICLE, AND ELEMENT(S):
  NO EFFECT - FIRST FAILURE

- (E) FUNCTIONAL CRITICALITY EFFECTS:
  LOSS OF BOTH RELAYS IN THIS MODE RESULTS IN LOSS OF OUTBOARD YO DRIVE CAPABILITY WHICH CAUSES LOSS OF MISSION.

- DISPOSITION RATIONALE -

- (A) DESIGN:
  REFER TO APPENDIX C, ITEM 1.

- (B) TEST:
  REFER TO APPENDIX C, ITEM 1.

  OMRSD: GROUND TURNAROUND
  FREQUENCY OF CHECKOUT IS MISSION DEPENDENT.
  DUAL MOTOR BERTH-TO-OUTBOARD FUNCTIONAL
  S0790.A080-B

- (C) INSPECTION:
  REFER TO APPENDIX C, ITEM 1.

- (D) FAILURE HISTORY:
  REFER TO APPENDIX C, ITEM 1.

- (E) OPERATIONAL USE:
  NO OPERATIONAL WORKAROUND AFTER SECOND FAILURE, HOWEVER, EVA IS AVAILABLE TO DRIVE PEDESTAL OUTBOARD.

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NUMBER: MO-AA1-435-03

- APPROVALS -

RELIABILITY ENGINEERING	W. R. MARLOWE	6/11/90
DESIGN ENGINEERING	T. TAUFER	6/14/90
QUALITY ENGINEERING	M. F. MERGEN	6/4/90
NASA RELIABILITY	G.E	9/17/90
NASA SUBSYSTEM MANAGER		9/25/90
NASA EPD&C RELIABILITY		M. S. Dixon for I. Woodard 9/18/90
NASA QUALITY ASSURANCE		9/20/90
NASA EPD&C SUBSYS MGR		for F. Adams 9/20/90