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-AA1-435-04

REVISION# 2 06/08/90

SUBSYSTEM: STABILIZED PAYLOAD DEPLOYMENT SYSTEM

ITEM NAME: RELAY, HYBRID

CRITICALITY OF THIS FAILURE MODE: 2R3

FAILURE MODE:
SHORTED. TWO OR MORE SETS OF CONTACTS.

MISSION PHASE:
OO ON-ORBIT

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

CAUSE:
[redacted]CE PART STRUCTURAL FAILURE, CONTAMINATION, VIBRATION, MECHANICAL [redacted]K, 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)
TWO OR MORE PHASE WILL CAUSE MOTOR TO DRIVE - CANNOT CONFIRM RELAY FAILURE.

C)
SEPARATION OF REDUNDANT ELEMENTS

- FAILURE EFFECTS -

[redacted] SUBSYSTEM:
[redacted]OR MORE POWER PHASES WILL BE CONTINUOUSLY APPLIED TO A DRIVE MOTOR. [redacted]NEVER THREE PHASE AC POWER IS PRESENT.

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FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: MO-AA1-435-04

- (B) INTERFACING SUBSYSTEM(S):
  IF UNDETECTED MOTOR WILL DRIVE AGAINST STOPS, OVERHEAT, AND FAIL. MOTOR DRIVE FOR THE SELECTED FUNCTION WOULD BE AT HALF SPEED. IF THE RELAY FOR OPPOSITE MOTOR ROTATION IS ACTIVATED CIRCUIT BREAKER WILL 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 DEPENTENT.
  DUAL MOTOR BERTH-TO-OUTBOARD FUNCTIONAL
  S0790A.080-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-AAI-435-04

- APPROVALS -

RELIABILITY ENGINEERING	W. R. MARLOWE	6/14/90
DESIGN ENGINEERING	T. TAUFER	6/14/90
QUALITY ENGINEERING	M. F. MERGEN	6/14/90
NASA RELIABILITY	G.E	9/17/90
NASA SUBSYSTEM MANAGER		9/25/90
NASA EPD&C RELIABILITY		M.S. Dinkins for T. Woodard 9/19/90
NASA QUALITY ASSURANCE		9/14/90
NASA EPD&C SUBSYS MGR		for L. F. Morris 9/20/90