FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE
NUMBER: MO-AA1-420-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-2	V070-764620
ASSEM	:	MID MCA-3	V070-764630
ASSEM	:	MID MCA-4	V070-764640
SRU	:	RELAY, HYBRID	MC455-0135-0001
■ SRU	:	RELAY, HYBRID	MC455-0135-0002

PART DATA

■ EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

REFERENCE DESIGNATORS: 40V76A117 - K37
: 40V76A117 - K53
: 40V76A118 - K20
: 40V76A119 - K44
: 40V76A119 - K56
: 40V76A120 - K66

QUANTITY OF LIKE ITEMS: 6

■ FUNCTION:
K37, K66 PROVIDE CONTROL OF AC POWER APPLICATION TO DRIVE MOTOR FOR THE REBERTH FUNCTION. K37, K66 FOR SYSTEM 1/PRIMARY PEDESTAL. K20, K56 FOR SYSTEM 2/PRIMARY PEDESTAL. K53 AND K44 PERFORM THE SAME FUNCTION FOR THE SECONDARY PEDESTAL.
DETAIL DISCUSSION OF THE REBERTH OPERATIONS ARE INCLUDED IN THE FRONT SECTION OF REPORT STS87-0120. FOR THIS REBERTH OPERATIONAL MODE TO BE NECESSARY, EARLIER FAILURES WILL HAVE OCCURRED. AN UNSUCCESSFUL DEPLOYMENT OF PAYLOAD REQUIRES THE USAGE OF THE REBERTH RELAYS.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: MO-AA1-420-03

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)
SEPARATION OF REDUNDANT ELEMENTS

- FAILURE EFFECTS -

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

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- (B) INTERFACING SUBSYSTEM(S):
  THE DRIVE MOTOR COULD OVERHEAT 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):
  FIRST FAILURE - NO EFFECT.

- (E) FUNCTIONAL CRITICALITY EFFECTS:
  LOSS OF BOTH RELAYS IN THIS MODE WOULD PREVENT DEPLOYMENT USING PRIMARY PEDESTAL AND REQUIRING A TRANSFER TO THE SECONDARY PEDESTAL. LOSS OF SECONDARY PEDESTAL DRIVE CAPABILITY RESULTS IN INABILITY TO DEPLOY PAYLOAD.

- 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. * 3-PHASE AC MOTOR CIRCUITS
  VERIFY PROPER PHASE ROTATION AND MOTOR PHASE VOLTAGE.
  S0790A.250-A, -C
  S0790A.260-A, -C
  S0790A.270-B
  S0790A.280-B

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

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

- (E) OPERATIONAL USE:
  FAILURE OF BOTH PRIMARY PEDESTAL MOTORS WOULD RESULT IN NEED FOR PEDESTAL DRIVE TRANSFER TO SECONDARY PEDESTAL.

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NUMBER: MO-AA1-420-03

- APPROVALS -

RELIABILITY ENGINEERING	W. R. MARLOWE	6/15/90
DESIGN ENGINEERING	T. TAUFER	6/15/90
QUALITY ENGINEERING	M. F. MERGEN	6/14/90
NASA RELIABILITY	GE	9/21/90
NASA SUBSYSTEM MANAGER		9/25/90
NASA EPD&C RELIABILITY		M.S. Division for I. WOODARD 9/18/9.
NASA QUALITY ASSURANCE		9/19/90
NASA EPD&C SUBSYS MGR		for F. ALEWIS 9/20/90