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FAILURE MODES EFFECTS ANALYSIS (FMEA) — CRITICAL HARDWARE
NUMBER: MO-AA3-405-X

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

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
■ SRU :	SWITCH ASSEMBLY	V790-544180

PART DATA

■ EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
SWITCH ASSEMBLY - Yo DRIVE, GEAR BOX ASSEMBLY

■ QUANTITY OF LIKE ITEMS: 2
ONE SWITCH ASSEMBLY ON EACH PEDESTAL, PRIMARY AND SECONDARY.

■ FUNCTION:
THE SWITCH MECHANISM CONSISTS OF THREE SETS OF DUAL LIMIT SWITCHES, ACTUATED BY A COMMON CAM. THE SWITCH ASSEMBLY ON THE PRIMARY PEDESTAL I: USED TO INDICATE Y-AXIS PEDESTAL POSITION. THE SWITCH ASSEMBLY ON THE SECONDARY PEDESTAL IS USED TO CONTROL START-STOP FUNCTIONS OF THE Yo ACTUATOR DRIVE MOTORS. SWITCHES S7 AND S10 CONTROL THE OUTBOARD FUNCTION, SWITCHES S8 AND S11 CONTROL THE (RE)BERTH FUNCTION, AND SWITCHES S9 AND S12 CONTROL THE INBOARD FUNCTION. ALSO PROVIDES LOGIC INPUTS.

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FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: MO-AA3-405-11

REVISION# 2 06/06/90

SUBSYSTEM: STABILIZED PAYLOAD DEPLOYMENT SYSTEM

ITEM NAME: SWITCH ASSEMBLY

CRITICALITY OF THIS FAILURE MODE:1R3

■ FAILURE MODE:
ERRONEOUS OUTPUT (OF "OUTBOARD"/"REL" POSITION)

MISSION PHASE:
OO ON-ORBIT

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

■ CAUSE:
ELECTRICALLY OPEN OR SHORTED PIECE-PART STRUCTURAL FAILURE, SNEAK CIRCUIT, CONTAMINATION

■ CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

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

PASS/FAIL RATIONALE:
■ A)
PRELAUNCH INSTALLATION AND CHECKOUT

■ B)
PANEL INDICATION; CANNOT CONFIRM SWITCH FAILURE.

■ C)
SEPARATION OF REDUNDANT ELEMENTS

- FAILURE EFFECTS -

■ (A) SUBSYSTEM:
INDICATES THAT THE YO DRIVE IS IN THE "OUTBOARD"/"REL" POSITION WHEN IT IS NOT. POSSIBLE DAMAGE TO SUBSYSTEM OR INTERFACES IF PAYLOAD IS NOT IN A SAFE POSITION FOR DEPLOYMENT. FAILURE WILL MANIFEST AFTER 3

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: MO-AA3-405-11

FAILURES.

- (B) INTERFACING SUBSYSTEM(S):
  INDICATES THAT THE YO DRIVE IS IN THE "OUTBOARD"/"REL" POSITION WHEN IT IS NOT. POSSIBLE DAMAGE TO SUBSYSTEM OR INTERFACES IF PAYLOAD IS NOT IN A SAFE POSITION FOR DEPLOYMENT. FAILURE WILL MANIFEST AFTER 3 FAILURES.

- (C) MISSION:
  POSSIBLE DAMAGE TO PAYLOAD IF THE PAYLOAD IS NOT IN THE "OUTBOARD"/"REL" POSITION.

- (D) CREW, VEHICLE, AND ELEMENT(S):
  POSSIBLE CONTACT BETWEEN ORBITAL AND PAYLOAD WHICH COULD RESULT IN POSSIBLE LOSS CREW/VEHICLE.

- (E) FUNCTIONAL CRITICALITY EFFECTS:
  LOSS OF FUNCTION COULD RESULT IN ADDITIONAL CREW ACTIVITY TO VERIFY CORRECT POSITION.

-

- HAZARDS: 1
  POSSIBLE CONTACT BETWEEN THE ORBITER STRUCTURE AND PAYLOAD.

- DISPOSITION RATIONALE -

- (A) DESIGN:
  REFER TO APPENDIX A, ITEM 4.

- (B) TEST:
  REFER TO APPENDIX A, ITEM 4.
  QUALIFICATION TESTS PER DTP4779-801 WERE SUCCESSFULLY COMPLETED ON JANUARY 5, 1990 AND WILL BE DOCUMENTED IN TEST REPORT STS9000115

  OMRSD: GROUND TURNAROUND
  FREQUENCY OF CHECKOUT IS MISSION DEPENDENT. S0790A.080-A, -B, -C.

- (C) INSPECTION:
  REFER TO APPENDIX A, ITEM 4.

- (D) FAILURE HISTORY:
  REFER TO APPENDIX A, ITEM 4.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: MO-AA3-405-11

■ (E) OPERATIONAL USE:
FUNCTION CAN BE REGAINED BY DISABLING LIMIT-SWITCH POWER AT PANEL A6;
FUNCTIONS ON PANEL A8 ARE RETAINED.

- APPROVALS -

RELIABILITY ENGINEERING	W. R. MARLOWE	
DESIGN ENGINEERING	G. CAMPBELL	
DESIGN ENGINEERING	T. TAUFER	
QUALITY ENGINEERING	M. F. MERGEN	
NASA RELIABILITY	G.E	
NASA SUBSYSTEM MANAGER		
NASA QUALITY ASSURANCE		