FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL HARDWARE
NUMBER:M5-6SS-0600 -X

SUBSYSTEM NAME: ISS DOCKING SYSTEM

REVISION: 0 02/27/98

PART DATA

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:AW18H PANEL	VO75-730151
SRU	:TOGGLE SWITCH	MC452-0102-7103
SRU	:TOGGLE SWITCH	MC452-0102-7603

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
SWITCH, TOGGLE, 1 POLE 2 POSITION, MAINTAINED ON - EMU POWER SUPPLY/BATTERY CHARGER BUS SELECT CONTROL CIRCUIT

REFERENCE DESIGNATORS: 84V73A133S1
84V73A133S2

QUANTITY OF LIKE ITEMS: 2
(TWO)

FUNCTION:
SWITCH ALLOWS EITHER POWER FROM MAIN "A" (THROUGH FPCA-1), OR MAIN "B" (THROUGH FPCA-2) TO BE CONNECTED TO A SINGLE EXTRAVEHICULAR MOBILITY UNIT (EMU) POWER CONNECTOR.

REFERENCE DOCUMENTS: 1) VS70-96009, INTEGRATED SCHEMATIC - 60DF1, AECS EXTRAVEHICULAR MOBILITY UNIT/EXT AIRLOCK

FAILURE MODES EFFECTS ANALYSIS FMEA -- NON-CIL FAILURE MODE
NUMBER: M5-6SS-0600-01

REVISION#: 0 02/27/98

SUBSYSTEM NAME: ISS DOCKING SYSTEM
LRU: AW18H PANEL
ITEM NAME: TOGGLE SWITCH

CRITICALITY OF THIS FAILURE MODE: 1R3

FAILURE MODE:
FAILS OPEN, SHORT-TO-CASE (GROUND)

MISSION PHASE: OO ON-ORBIT

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

CAUSE:
A) PIECE PART STRUCTURAL FAILURE, B) CONTAMINATION, C) VIBRATION, D) MECHANICAL SHOCK, E) PROCESSING ANOMALY, F) THERMAL STRESS

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

CRITICALITY 1R2 DURING INTACT ABORT ONLY (AVIONICS ONLY)? NO

REDUNDANCY SCREEN
A) PASS
B) PASS
C) PASS

PASS/FAIL RATIONALE:
A)

B)

C)

CORRECTING ACTION: NONE

CORRECTING ACTION DESCRIPTION:
DESIGN FAULT TOLERANCE: POWER SUPPLY AND BATTERY CHARGER CAPABILITIES REMAINS AT SECOND EMU SERVICE POINT - BOTH EMU'S CAN STILL BE SERVICED.

FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL FAILURE MODE
NUMBER: M5-6SS-0600-01

- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF CAPABILITY TO PROVIDE POWER TO ONE OF TWO EMU POWER CONNECTIONS IN THE EXTERNAL AIRLOCK.

(B) INTERFACING SUBSYSTEM(S):
CANNOT CHARGE EMU BATTERY, OR PROVIDE POWER TO AN EMU FROM ONE OF TWO EMU POWER CONNECTIONS IN THE EXTERNAL AIRLOCK.

(C) MISSION:
FIRST FAILURE - NO EFFECT

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

(E) FUNCTIONAL CRITICALITY EFFECTS:
POSSIBLE LOSS OF CREW/VEHICLE AFTER FOUR FAILURES:

1) SWITCH FAILS OPEN - LOSS OF POWER SUPPLY AND BATTERY CHARGER CAPABILITIES TO ONE EMU SERVICE POINT ON THE SCU (SERVICE CONNECTION UNIT).
2) SECOND SWITCH FAILS OPEN - LOSS OF POWER SUPPLY AND BATTERY CHARGER CAPABILITIES TO BOTH EMU SERVICE POINTS ON THE SCU. WORSE CASE IF FAILURE OCCURS FOLLOWING AN INITIAL EVA WHERE SUBSEQUENT EVA MUST BE PERFORMED USING ONE EMU WITH THE SPARE BATTERY PACK.
3) LOSS OF THE SPARE BATTERY PACK FOR BOTH EMU'S - LOSS OF BOTH EMU'S WOULD PRECLUDE SUBSEQUENT EVA CAPABILITIES.
4) A FAILURE NECESSITATING AN EVA TO PREVENT A POTENTIAL CATASTROPHIC SITUATION - INABILITY TO PERFORM CONTINGENCY EVA TO CORRECT A CRIT 1 CONDITION COULD RESULT IN LOSS OF CREW/VEHICLE.

DESIGN CRITICALITY (PRIOR TO DOWNGRADE, DESCRIBED IN (F)):

(F) RATIONALE FOR CRITICALITY DOWNGRADE:
ALTHOUGH THE CRITICALITY REMAINS UNCHANGED AFTER WORKAROUNDS CONSIDERATION (ALLOWED PER CR S050107W), THEY ARE PROVIDING ADDITIONAL FAULT TOLERANCE TO THE SYSTEM.

AFTER THE FOURTH FAILURE (FAILURE NECESSITATING AN EVA TO PREVENT A POTENTIAL CATASTROPHIC SITUATION) - INABILITY TO PERFORM CONTINGENCY EVA (FIFTH FAILURE) TO CORRECT A CRIT 1 CONDITION COULD RESULT IN LOSS OF CREW AND VEHICLE.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE
NUMBER: M5-6SS-0600-01

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: DAYS

TIME FROM DETECTION TO COMPLETED CORRECTING ACTION: MINUTES

IS TIME REQUIRED TO IMPLEMENT CORRECTING ACTION LESS THAN TIME TO EFFECT?
YES

RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT:
DESIGN FAULT TOLERANCE: THE SECOND POWER SUPPLY AND BATTERY CHARGER SERVICE POINT IS AVAILABLE ON THE SCU. THE CREW CAN ALTERNATE THE EMU'S ON THIS SERVICE POINT TO CHARGE THE BATTERIES.

HAZARD REPORT NUMBER(S): NONE

HAZARD(S) DESCRIPTION:
NONE

- APPROVALS -

SS&PAE	: T. K. KIMURA	: T. Kimura 4-13-98
DESIGN ENGINEERING	: C. J. ARROYO	: