PRINT DATE: 13.02.97

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL HARDWARE
NUMBER: M6-6SS-B028-X

SUBSYSTEM NAME: E - DOCKING SYSTEM

REVISION: 0 FEB/DEC. 19976

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU :	DSCU RSC-E	MC621-0087-1002 33Y.5212.005

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
LINE REPLACEABLE UNIT (LRU) DSCU - DOCKING SYSTEM CONTROL UNIT.

REFERENCE DESIGNATORS: 45V53A2A2

QUANTITY OF LIKE ITEMS: 1
(ONE)

FUNCTION:
THE DSCU IS USED TO IMPLEMENT THE AUTOMATED DOCKING SEQUENCE AND TO RECEIVE AND PROCESS THE COMMANDS FROM THE APDS CONTROL PANEL. THE UNIT PROVIDES TELEMETRY TO THE DCUs AND STATUS INDICATION TO THE APDS CONTROL PANEL.

OUTPUT FUNCTIONS:

1. PROVIDES HI-ENERGY DAMPERS POWER AND CONTROL FOR THE -HARD- DOCKING MECHANISM.
2. PROVIDES HI-ENERGY AND LOW-ENERGY DAMPERS POWER AND CONTROL (FOR THE "SOFT" DOCKING MECHANISM).
3. PROVIDES CONTROL FOR DOCKING RING EXTENSION AND RETRACTION.
4. PROVIDES FIXERS POWER AND CONTROL.
5. PROVIDES HOOKS OPENING AND CLOSING CONTROL.
6. PROVIDES CAPTURE LATCHES OPENING AND CLOSING CONTROL.
7. PROVIDES TELEMETRY TO THE DCUs AND STATUS INDICATION TO THE APDS PANEL.
8. PROVIDES LOW LEVEL AXIAL SLIP CLUTCH LOCKING DEVICE POWER AND CONTROL (FOR THE "SOFT" DOCKING MECHANISM).

FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL FAILURE MODE
NUMBER: MS-6SS-B028- 08

REVISION# 0 DEC, 1996

SUBSYSTEM NAME: E - DOCKING SYSTEM
LRU: MC621-0087-1002
ITEM NAME: DSCU

CRITICALITY OF THIS FAILURE MODE: 1R3

FAILURE MODE:
INADVERTENT ACTIVATION OF ONE OF THREE HOOKS OPEN CONTROL SIGNAL

MISSION PHASE:
OO ON-ORBIT

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

CAUSE:
MULTIPLE INTERNAL COMPONENT FAILURES

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

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

REDUNDANCY SCREEN A) PASS
B) N/A
C) PASS

PASS/FAIL RATIONALE:
A)

B)
N/A - AT LEAST TWO REMAINING PATHS ARE DETECTABLE IN FLIGHT.

C)

METHOD OF FAULT DETECTION:
NONE.

MASTER MEAS. LIST NUMBERS: NONE

CORRECTING ACTION:
NONE

- FAILURE EFFECTS -

(A) SUBSYSTEM:
DEGRADATION AGAINST REDUNDANCY FOR INADVERTENT HOOKS OPEN ACTIVATION COMMAND.

FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL FAILURE MODE
NUMBER: M5-6SS-B028- 08

(B) INTERFACING SUBSYSTEM(S):
INADVERTENT ACTIVATION OF ONE OF THREE HOOKS OPEN CONTROL SIGNALS TO THE PACU 1(2).

(C) MISSION:
FIRST FAILURE - NO EFFECT.

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

(E) FUNCTIONAL CRITICALITY EFFECTS:
WORST CASE - SHUTTLE MECHANISM CONTROL: POSSIBLE LOSS OF CREW/VECHICLE AFTER EIGHT ~~TEN~~ FAILURES.
1) INADVERTENT ACTIVATION OF ONE OF THREE HOOKS OPEN CONTROL SIGNALS TO PACU 1(2). - NO EFFECT.
2) INADVERTENT ACTIVATION OF SECOND HOOKS OPEN CONTROL SIGNAL TO PACU 1(2) - HOOKS OPEN COMMAND PRESENT AT PACU INPUT.
3 & 4) TWO APDS POWER CIRCUIT BREAKERS ~~FOR A SINGLE MAIN LOGIC BUS~~ IN THE A8A3A7A2 PANEL FAIL CLOSED - LOSS OF CIRCUIT PROTECTION.
5&6) TWO ASSOCIATED ~~ADDITIONAL~~ APDS CONTROL PANEL CIRCUIT BREAKERS ~~FOR ANOTHER MAIN LOGIC BUS~~ IN THE A8A3A7A2 PANEL FAIL CLOSED - LOSS OF CIRCUIT PROTECTION.
7) ONE RPC FAILS ON (PSU MAIN BUS POWER) - INADVERTENT POWER TO THE PSU.
8) PSU POWER ON SWITCH FAILS CLOSED - INADVERTENT OPENING OF ONE GROUP OF SIX HOOKS. POSSIBLE LOSS OF HABITABLE ENVIRONMENT.
~~9 &10) INADVERTENT ACTIVATION OF TWO OF THREE HOOKS OPEN CONTROL SIGNALS TO PACU 1(2) - POSSIBLE LOSS OF HABITABLE ENVIRONMENT.~~

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

(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:
N/A

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: MINUTES

TIME FROM DETECTION TO COMPLETED CORRECTIVE ACTION: HOURS

TIME REQUIRED TO IMPLEMENT CORRECTIVE ACTION LESS THAN TIME TO EFFECT?
/A

RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT:
/A

FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL FAILURE MODE
NUMBER: M5-6SS-B028- 08

HAZARDS: REPORT NUMBER(S): ORBI 511

HAZARD DESCRIPTION:
LOSS OF PRESSURE IN HABITABLE VOLUME.

- APPROVALS -

PRODUCT ASSURANCE ENGR	: M. NIKOLAYEVA	:
DESIGN ENGINEER	: B. VAKULIN	: