FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE
NUMBER: M5-6MR-B028-X

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM
REVISION: 1 **OCT, 1995**

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	DSCU RSC-E	MC521-0087-1002 33Y.5212.005

PART DATA

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

REFERENCE DESIGNATORS: 40V53A1A2

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.
2. PROVIDES CONTROL FOR DOCKING RING EXTENSION AND RETRACTION.
3. PROVIDES FIXERS POWER AND CONTROL.
4. PROVIDES HOOKS OPENING AND CLOSING CONTROL.
5. PROVIDES CAPTURE LATCHES OPENING AND CLOSING CONTROL.
6. PROVIDES TELEMETRY TO THE DCUs AND STATUS INDICATION TO THE APDS PANEL.

ORIGINAL

FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL FAILURE MODE
NUMBER: M5-6MR-B028- 14

REVISION#: 0 OCT, 1995

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM
LRU: MC621-0087-1002 CRITICALITY OF THIS
ITEM NAME: DSCU FAILURE MODE: 1R3

FAILURE MODE:
INADVERTENT ACTIVATION OF ONE OF THREE CAPTURE LATCHES CLOSE SIGNAL.

MISSION PHASE:
OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 104 ATLANTIS

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)

C)

METHOD OF FAULT DETECTION:
NONE.

MASTER MEAS. LIST NUMBERS: NONE

CORRECTING ACTION:
NONE

- FAILURE EFFECTS -

(A) SUBSYSTEM:
DEGRADATION OF REDUNDANCY AGAINST INADVERTENT LATCH CLOSE COMMANDS.

(B) INTERFACING SUBSYSTEM(S):
INADVERTENT ACTIVATION OF ONE OF THREE LATCHES CLOSE COMMANDS TO THE LACU.

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FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL FAILURE MODE
NUMBER: MS-6MR-B028- 14

(C) MISSION:
NO EFFECT.

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

(E) FUNCTIONAL CRITICALITY EFFECTS:
POSSIBLE LOSS OF CREW OR VEHICLE AFTER SIX FAILURES. 1) ONE INADVERTENT LATCH CLOSE COMMAND. 2) SECOND INADVERTENT CLOSE LATCHES COMMAND. ALL THREE CAPTURE LATCHES ARE TEMPORARILY CLOSED SIMULTANEOUSLY. THE CREW WOULD PERFORM AN APDS LOGIC BUS DROP TO RECOVER DOCKING FUNCTIONS. 4) LOSS OF MANUAL UNBLOCKING DEVICE (1 OF 3) CAPABILITY RESULTING IN LOSS CAPABILITY TO RELEASE THE CAPTURE LATCHES FOR VEHICLE SEPARATION.

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

(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:
NONE. CRITICALITY UNCHANGED. WORKAROUNDS ADD TO REDANDANCY.

THIRD FAILURE (INABILITY TO DISABLE AFFECTED APDS LOGIC BUS) - LOSS OF CAPABILITY TO RECOVER FUNCTION.
FIFTH FAILURE (INABILITY TO PERFORM IFM TO DRIVE CAPTURE LATCHES) -THE CAPTURE LATCHES CANNOT BE OPENED.
SIXTH FAILURE (INABILITY TO PERFORM EVA TO REMOVE 96 BOLTS HOLDING DOCKING BASE TO EXTERNAL AIRLOCK) - INABILITY TO SEPARATE ORBITER AND MIR RESULTING IN LOSS OF CREW AND VEHICLE.

- 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?
YES

RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT:
CREW WOULD HAVE SUFFICIENT TIME TO PERFORM IFM OR EVA.

HAZARDS REPORT NUMBER(S) : ORBI 401A
HAZARD DESCRIPTION:
INABILITY TO SEPARATE ORBITER AND MIR.

- APPROVALS -

PRODUCT ASSURANCE ENGR : M. NIKOLAYEVA

DESIGN ENGINEER : B. VAKULIN

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