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) – CIL FAILURE MODE
NUMBER: M5-6MR-B028-04

REVISION# 1 SEPT 1, 1995

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM
LRU: MC521-0087-1002
ITEM NAME: DSCU

CRITICALITY OF THIS FAILURE MODE: 2R3

FAILURE MODE:
INADVERTENT ACTIVATION OF ONE OF THREE CONTROL SIGNALS FOR EITHER RING EXTENSION OR RETRACTION.

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) ~~FAILS~~ PASS
B) FAILS
C) PASS

PASS/FAIL RATIONALE:
A)
~~FAILURE "MASKED" BY SERIES REDUNDANCY~~
B)
FAILURE "MASKED" BY REDUNDANT CONTROL SIGNAL
C)

METHOD OF FAULT DETECTION:
NONE

MASTER MEAS. LIST NUMBERS: NONE

- FAILURE EFFECTS -

(A) SUBSYSTEM:
DEGRADATION OF REDUNDANCY AGAINST INADVERTENTLY PROVIDING POWER TO THE DOCKING RING

(B) INTERFACING SUBSYSTEM(S):
FIRST FAILURE - NO EFFECT.

(C) MISSION:

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL FAILURE MODE
NUMBER: MS-6MR-8028- 04

FIRST FAILURE - NO EFFECT.

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

(E) FUNCTIONAL CRITICALITY EFFECTS:
POSSIBLE LOSS OF MISSION AFTER TWO FAILURES. 1) INADVERTENT ACTIVATION OF ONE OF THREE DOCKING RING EXTENSION OR RETRACTION CONTROL SIGNALS - NO EFFECT ON DOCKING OPERATIONS. 2) INADVERTENT ACTIVATION OF SECOND ASSOCIATED DOCKING RING EXTENSION OR RETRACTION CONTROL SIGNAL - LOSS OF CAPABILITY TO PERFORM NOMINAL DOCKING MISSION.

DESIGN CRITICALITY (PRIOR TO OPERATIONAL DOWNGRADE, DESCRIBED IN F): 2R3

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

-DISPOSITION RATIONALE-

(A) DESIGN:
REFER TO APPENDIX I, ENERGIA HARDWARE.

(B) TEST:
REFER TO APPENDIX I, ENERGIA HARDWARE.

DSCU CIRCUIT OPERATION IS VERIFIED DURING GROUND CHECKOUT. ANY TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD.

(C) INSPECTION:
REFER TO APPENDIX I, ENERGIA HARDWARE.

(D) FAILURE HISTORY:
REFER TO APPENDIX I, ENERGIA HARDWARE.

(E) OPERATIONAL USE:
AFTER SECOND FAILURE, CREW COULD PERFORM AN IN-FLIGHT MAINTENANCE TO DRIVE THE RING MOTORS DIRECTLY FROM THE FEED-THROUGH CONNECTORS IN THE EXTERNAL AIRLOCK, USING THE ORBITER BREAKOUT BOX. HOWEVER, WORST CASE, CREW WOULD ABORT DOCKING SINCE THIS WORKAROUND REQUIRES A GREAT DEAL OF TIME TO PERFORM.

- APPROVALS -

PRODUCT ASSURANCE ENGR	M. NIKOLAYEVA	
DESIGN ENGINEER	B. VAKULIN	9/21/95
NASA SSMA		
NASA SUBSYSTEM MANAGER		
NASA EPDC SUBSYSTEM MANAGER		9/21/95