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 - 05

REVISION# 1 SEPT 1, 1996

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

CRITICALITY OF THIS FAILURE MODE: 2R3

FAILURE MODE:
LOSS OF REDUNDANT (ONE OF THREE) CONTROL SIGNAL FOR FIXER ACTIVATION.

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) FAILS
C) FAILS

PASS/FAIL RATIONALE:
A)

B)
FAILURE OF ONE FIXER COMMAND SIGNAL IS "MASKED" BY REDUNDANT SIGNALS
C)
REDUNDANT FUNCTIONS ROUTED THROUGH THE SAME CONNECTOR.

METHOD OF FAULT DETECTION:
NONE

MASTER MEAS. LIST NUMBERS: NONE

- FAILURE EFFECTS -

(A) SUBSYSTEM:
DEGRADATION OF REDUNDANCY FOR FIXERS ACTIVATION.

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

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

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL FAILURE MODE
NUMBER: MS-6MR-6028 - 05

NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECTS:
POSSIBLE LOSS OF MISSION AFTER TWO FAILURES. 1) LOSS OF ONE CONTROL SIGNAL FOR FIXERS. DEGRADED CONTROL SIGNAL REDUNDANCY. 2) LOSS OF ONE OF TWO REMAINING CONTROL SIGNALS RESULTING IN LOSS OF ALL FIXERS. THE DOCKING RING CANNOT BE ALIGNED IN THE ROLL AND TRANSLATIONAL DIRECTIONS FOR MATING AND STRUCTURAL LATCHING OF THE INTERFACE. LOSS OF CAPABILITY TO PERFORM DOCKING.

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

(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:
N/A (THERE ARE NO WORKAROUNDS TO CIRCUMVENT THIS FAILURE.)

-DISPOSITION RATIONALE-

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

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

DSCU FIXERS 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:
NONE

- APPROVALS -

PRODUCT ASSURANCE ENGR	:	M. NIKOLAYEVA	:
DESIGN ENGINEER	:	B. VAKULIN	:
NASA SS/MA	:		: 9/21/95
NASA SUBSYSTEM MANAGER	:		: 9/22/95
NASA EPDSC SUBSYSTEM MANAGER	:		: 9/21/95