

**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.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE

NUMBER: M5-6MR-B028- 10

REVISION# 1 OCT, 1996

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

LRU: MC621-0087-1002

ITEM NAME: DSCU

CRITICALITY OF THIS
FAILURE MODE: 1R3**FAILURE MODE:**

INADVERTENT ACTIVATION OF ONE OF THREE HOOKS CLOSED CONTROL 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)

N/A

C)

METHOD OF FAULT DETECTION:

NONE.

MASTER MEAS. LIST NUMBERS: NONE

- FAILURE EFFECTS -**(A) SUBSYSTEM:**

DEGRADATION OF REDUNDANCY AGAINST INADVERTENT CLOSURE OF ONE GANG OF SIX HOOKS.

(B) INTERFACING SUBSYSTEM(S):

INADVERTENT ACTIVATION OF ONE OF THREE HOOKS CLOSED COMMANDS TO THE PACU.

(C) MISSION:

FIRST FAILURE - NO EFFECT.

FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL FAILURE MODE NUMBER: M5-6MR-B028- 10

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

(E) FUNCTIONAL CRITICALITY EFFECTS:
FIRST FAILURE (INADVERTENT ACTIVATION OF ONE CONTROL SIGNAL FOR THE HOOKS) - NO EFFECT.
SECOND FAILURE (INADVERTENT ACTIVATION OF ONE OF TWO REMAINING ASSOCIATED SIGNALS) - TEMPORARY LOSS OF CAPABILITY TO OPEN ONE GANG OF SIX HOOKS. CREW WOULD PERFORM AN APDS LOGIC BUS DROP TO RECOVER DOCKING FUNCTIONS.
FIFTH FAILURE (ONE PYROBOLT FAILS TO INITIATE) - LOSS OF CAPABILITY TO IMPLEMENT PYROTECHNIC SEPARATION.

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

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

THIRD FAILURE (INABILITY TO DISABLE AFFECTED APDS LOGIC BUS) - LOSS OF CAPABILITY TO RECOVER FUNCTION.
FOURTH FAILURE (INABILITY TO PERFORM IFM TO DRIVE HOOKS OPEN) - ONE OR MORE HOOKS 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 EVA OR IFM.

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

- APPROVALS -

PRODUCT ASSURANCE ENGR
DESIGN ENGINEER

M. NIKOLAYEVA
B VAKULIN