

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL HARDWARE
NUMBER: M5-6MR-8027-X**

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

REVISION: 0 OCT, 1995

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	PACU RSC-E	MC521-0087-0007 33Y.5212.006

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

LINE REPLACEABLE UNIT (LRU) PRESSURIZATION ACTUATION CONTROL UNIT (PACU) -
HOOKS MOTORS LOGIC AND POWER CONTROL.

REFERENCE DESIGNATORS: 40V53A1A4
40V53A1A5

QUANTITY OF LIKE ITEMS: 2
(TWO)

FUNCTION:

PROVIDE HOOKS DRIVE MOTOR CONTROL FOR INTERFACE PRESSURIZATION USING
COMMANDS FROM THE DSCU DURING THE AUTOMATIC SEQUENCE OR IN THE MANUAL
CONTROL MODE.

OUTPUT FUNCTIONS:

- 1) PACU-1: PROVIDE POWER TO THE HOOKS #1 MOTORS M6 & M7.
- 2) PACU-1: PROVIDE AUTOMATIC CONTROL FEEDBACK SIGNALS TO DSCU.
- 3) PACU-1: PROVIDE HOOKS POSITION SIGNAL FOR TELEMETRY AND PANEL INDICATION.
- 4) PACU-2: PROVIDE POWER TO THE HOOKS #2 MOTORS M8 & M9.
- 5) PACU-2: PROVIDE AUTOMATIC CONTROL FEEDBACK SIGNALS TO DSCU.
- 6) PACU-2: PROVIDE HOOKS POSITION SIGNAL FOR TELEMETRY AND PANEL INDICATION.

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

NUMBER: M5-6MR-8027-01

REVISION# 0 OCT. 1995

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

LRU: MC621-0087-0007

ITEM NAME: PACU

CRITICALITY OF THIS

FAILURE MODE: 1R3

FAILURE MODE:

LOSS OF ONE OF THREE MOTOR CONTROL SIGNALS FOR A SINGLE HOOK MOTOR.

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:**

DEGRADED CONTROL SIGNAL FOR A SINGLE MOTOR.

(B) INTERFACING SUBSYSTEM(S):

NO EFFECT.

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(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 FIVE FAILURES. 1) LOSS OF ONE CONTROL SIGNAL IN ONE PACU 2) LOSS OF SECOND ASSOCIATED CONTROL SIGNAL FROM THE SAME PACU 3) LOSS OF BOTH MOTORS FOR THE HOOK SET, RESULTING IN INABILITY TO DRIVE SIX HOOKS. 4) ONE PYROBOLT FAILS TO INITIATE, LOSS OF CAPABILITY TO IMPLEMENT PYROTECHNIC SEPARATION. LOSS OF NOMINAL AND PYROTECHNIC SEPARATION CAPABILITY.

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 PERFORM IFM TO DRIVE HOOKS OPEN) - ONE OR MORE HOOKS CANNOT BE OPENED.
FIFTH 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 TO REMOVE 96 BOLTS.

HAZARDS REPORT NUMBER(S): ORBI 401A

HAZARD DESCRIPTION:
INABILITY TO SEPARATE ORBITER AND MIR.

- APPROVALS -

PRODUCT ASS
DESIGN ENGR

ANCE ENGR
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M. NIKOLAYEVA
B. VAKULIN

148

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ORIGINAL