PRINT DATE: 01/05/96

FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL HARDWARE
NUMBER: M5-GMR-B027-X

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

REVISION: 0 OCT, 1995

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	PACU RSC-E	MC621-0087-0007 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.

ORIGINAL

FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL FAILURE MODE
NUMBER: M5-6MR-B027- 02

REVISION# 1 OCT, 1995

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM
LRU: MC621-0087-0007
ITEM NAME: PACU

CRITICALITY OF THIS FAILURE MODE: 1R3

FAILURE MODE:
INADVERTENT ACTIVATION OF ONE OF THREE MOTOR CONTROL SIGNALS FOR A PAIR OF MOTORS.

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)
AT LEAST ONE REMAINING PATH DETECTABLE.
C)

METHOD OF FAULT DETECTION:
NONE.

MASTER MEAS. LIST NUMBERS: NONE.

ORIGINAL

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE NUMBER: M5-6MR-B027- 02

- FAILURE EFFECTS -

(A) SUBSYSTEM:
DEGRADATION OF REDUNDANCY AGAINST INADVERTENT HOOKS MOTOR ACTIVATION.

(B) INTERFACING SUBSYSTEM(S):
NO EFFECT.

(C) MISSION:
NO EFFECT.

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

(E) FUNCTIONAL CRITICALITY EFFECTS:
FIRST FAILURE (INADVERTENT ACTIVATION OF ONE OF THREE MOTOR CONTROL SIGNALS) - NO EFFECT.
SECOND FAILURE (INADVERTENT ACTIVATION OF SECOND ASSOCIATED MOTOR CONTROL SIGNAL) - INADVERTENT HOOKS CLOSED COMMAND WHICH WOULD TEMPORARILY PRECLUDE HOOKS OPENING. CREW WOULD PERFORM A LOGIC BUS DROP TO RECOVER FUNCTION.
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 REDANDANCY.

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.

ORIGINAL

FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL FAILURE MODE NUMBER: M5-6MR-B027-02

- 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 ASSURANCE ENGR : M. NIKOLAYEVA

DESIGN ENGINEER : B. VAKULIN

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