

FAILURE MODE EFFECTS ANALYSIS/CRITICAL ITEMS LIST

FMEA NUMBER: EC-PWP72-01 ORIGINATOR: JSC PROJECT: EDFT-03

PART NAME: PLATFORM ASSY	LRU/ORU PART NUMBER: SED39128415-301	QUANTITY: 1
PART NUMBER: SED39126433-301	LRU/ORU PART NAME: APFR	SYSTEM: GFE
LSC CONTROL NO: N/A	DRAWING/REF DESIGNATOR: SEE P/N	SUBSYSTEM: EVA
ZONE/LOCATION: STBD-2	EFFECTIVITY/AFFECT STAGE: STS-72	

CRITICALITY:

CRITICAL ITEM: Yes SUCCESS PATHS: 2
 CRITICALITY CATEGORY: 1R/2 SUCCESS PATH REMAINING: 1

END ITEM NAME: N/A
 END ITEM FUNCTIONAL: N/A
 END ITEM CAPABILITY: N/A
 END ITEM FAILURE TOLERANCE: N/A

REDUNDANCY SCREENS:

- A/1. C/O PRELAUNCH: Pass
2. C/O ON ORBIT: N/A for NSTS
- B/3. DETECTION FLIGHT CREW: N/A
4. DETECTION GROUND CREW: N/A
- C/5. LOSS OF REDUNDANCY FROM SINGLE CAUSE: Pass
6. ON-ORBIT RESTORABILITY: N/A for NSTS

FUNCTION: APFR is a crew restraint worksite platform. The APFRs yaw, roll, pitch and PFRWS yaw joints can be articulated by the EVA crew to position it at each worksite. The yaw and roll joint can be adjusted while the EVA crew is positioned in the foot restraint. The APFR incorporates a load limiter to limit crew induced loads into support structure to less than 4200 in-lb in bending and torsion, and 274 lb. in shear. (1800 in-lb for EDFT-03).

FAILURE MODE CODE: N/A for NSTS

FAILURE MODE: Unable to insert or remove EMU Boot from plate.

CAUSE: Contamination, thermal distortion, wear.

REMAINING PATHS: 1 - EVA Bolts

EFFECT/MISSION PHASE: EVA

CORRECTIVE ACTION: Remove EVA Bolts securing Heel Clip with 7/16" socket.

-FAILURE EFFECTS-

END ITEM/LRU/ORU/ASSEMBLY: Unable to use APFR.

SUBSYSTEM/NEXT ASSEMBLY/INTERFACE: Unable to detach EMU from APFR.

SYSTEM/END ITEM/MISSION: Partial loss of DTO objectives.

CREW/VEHICLE : Possible loss of crew if unable to return to airlock.

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HAZARD INFORMATION:

HAZARD: N/A

HAZARD ORGANIZATION CODE: N/A

HAZARD NUMBER: N/A

TIME TO EFFECT: Minutes

TIME TO DETECT: Seconds

TIME TO CORRECT: Minutes

FAILURE DETECTION/FLIGHT: Tactile

REMARKS:

Crew and APFR will fit through Airlock hatch. There is no planned stowage location for the APFR in the cabin.

-RATIONALE FOR ACCEPTABILITY-

(A) DESIGN: The APFR is designed to interface with an EMU boot per the requirements specified in ICD-HSD-3-0045. EVA removable bolts are provided on each heel clip which will enable a 2nd EVA crewman to release the jammed boot of the affected crewman.

(B) TEST: (Applicable to failure mode being addressed.)

Acceptance:

- 1) Fit check of the APFR to a Pressurized EMU Boot Performed at PDA.
- 2) Force required to actuate side heel lock shall be between 2 and 12 lb. verified at PDA, PIA, Pre and Post Environmental test and during Thermal test.
- 3) Fit check of EVA bolts on heel clip performed with 7/16 in. socket at PDA, PIA, and thermal test.
- 4) Torque required to remove the EVA bolts on the heel clip verified to be less than 120 in-lb. at PDA, PIA, and thermal test.

Qualification:

Qualification Vibration : A vibration test was performed to the following levels for a duration of 1 minute in each axis as a part of the Bay two starboard integrated proto-flight vibration test:

X AXIS		Y AXIS		Z AXIS	
20 - 80 Hz	+3 db/oct	20 - 45 Hz	+10.0 db/oct	20 - 45Hz	.009g ² /Hz
80 - 350 Hz	.040g ² /Hz	45 - 600 Hz	0.060 g ² /Hz	45 - 70 Hz	+12.0 db/oct
350 - 2000 Hz	-3db/oct	600 - 2000Hz	-6.0 db/oct	70 - 600 Hz	.050 g ² /Hz
6.1 grms		7.7 grms		600 - 2000Hz	-6.0 db/oct
					7.0 grms

Qualification / Acceptance Thermal: Functional test performed at -100°F and +140°F.

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(C) INSPECTION:

Fabrication - All APFR components are verified to generally clean individually. The APFR is verified to be visually clean at predelivery acceptance.

Test - Quality Assurance surveillance is required at all test and inspections. Discrepancy reports are written on all noncompliances.

(D) FAILURE HISTORY: None**(E) OPERATIONAL USE:**

1) Operational Effect - Unable to remove boot from APFR boot plate. Crewman not able to return to airlock.

2) Crew Action - 2nd crewman must retrieve wrench or power tool to remove affected heel clip on the APFR.

3) Crew Training - Crew trained in proper operation of APFR and use of tools.

4) Mission constraint - None.

5) In Flight Checkout - Proper function verified during EVA operations.

(F) MAINTAINABILITY: N/A

PREPARED BY: G. Wright

REVISION:

DATE: 8/10/95

WAIVER NUMBER:
