

FAILURE MODE EFFECTS ANALYSIS/CRITICAL ITEMS L

FMEA NUMBER: CSD-TB-12A ORIGINATOR: JSC PROJECT: GFE Orbiter
 PART NAME: O/O INST. WIF LRU/ORU PART NUMBER: SED39126212-301 QUANTITY: 1
 PART NUMBER: SED39126489-301 LRU/ORU PART NAME: TASK BOARD SYSTEM: DTO 671
 LSC CONTROL NO: N/A DRAWING/REF DESIGNATOR: SEE P/N SUBSYSTEM: EVA EXP.
 ZONE/LOCATION: CABIN/PLB EFFECTIVITY/AFFECT STAGE: STS-69&SUBS

CRITICAL ITEM? Yes
 CRITICALITY CATEGORY: 1R/2

CRITICALITY:
 SUCCESS PATHS: 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
- 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

FUNCTION: The on orbit installed WIF interfaces with its adapter plate mounted on the task board. For the DTO, the on orbit installation features will be evaluated. Two spring loaded shear pins will drop into holes on the mounting plate located on the task board to secure the device. A EVA release is incorporated to facilitate multiple evaluations. The on orbit installed WIF will remain attached to the toolboard after EVA operations are completed.

FAILURE MODE CODE: N/A
FAILURE MODE: Inadvertent release of WIF.

CAUSE: contamination, galling, piece part defect

REMAINING PATHS: 2nd pin

EFFECT/ MISSION PHASE: on orbit ops.

CORRECTIVE ACTION: None required.

-FAILURE EFFECTS-

END ITEM/LRU/ORU/ASSEMBLY: One of the two spring loaded pins comes out of hole in mounting plate.

SUBSYSTEM/NEXT ASSEMBLY/INTERFACE: N/A

SYSTEM/END ITEM/MISSION: None.

CREW/VEHICLE : None, for single failure. Second spring loaded pin will restrain WIF for landing. Possible impact damage to vehicle if both pins float out of holes in the adapter plate and WIF slides of wedge on mounting plate.

FAILURE MODE EFFECTS ANALYSIS/CRITICAL ITEMS LIST

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PART NUMBER: SED39126489-301 **LRU/ORU PART NAME: TASK BOARD** **SYSTEM: DTO 671**
LSC CONTROL NO: N/A **DRAWING/REF DESIGNATOR: SEE P/N** **SUBSYSTEM: EVA EXP.**
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HAZARD INFORMATION:HAZARD: YES NO

HAZARD ORGANIZATION CODE: N/A

HAZARD NUMBER: N/A

TIME TO EFFECT: Seconds

TIME TO DETECT: N/A

TIME TO CORRECT: Immediate

FAILURE DETECTION/FLIGHT - None during landing.

REMARKS:**-RATIONALE FOR ACCEPTABILITY-****(A) DESIGN:**

The On Orbit Installed Worksite Interface incorporates 2 spring loaded pins and a dovetail shape sliding receptacle which restrain the item to the task board. Locked status indication is provided by windows on the WIF housing which provide a visual indication of each pins position.

(B) TEST:**Acceptance:**

- 1) Functional: Verified at Predelivery Acceptance Test, Preinstallation acceptance, and Pre/Post environmental test. Minimum of 30 actuation cycles
 - a) Force to install and remove the on-orbit install WIF to and from it's mounting plate shall between 3.5 and 8 lb per TPS.

Qualification:**Environmental:**

Thermal: Functional verification performed at -100°F and + 200°F. Additionally a functional test was performed where a temperature difference of a minimum of 100 °F existed between the mounting plate and the WIF.

Vibration: A vibration test of the WIF was done during the integrated Task board Assy. test to the following levels. Duration of the test was 1 minute per axis.

| X axis | Y axis | Z axis |
|--|--|--|
| 20 to 80 Hz +3.0 db/oct | 20 to 45 Hz +10.0 db/oct | 20 to 45 Hz 0.009 g ² /Hz |
| 80 to 350 Hz 0.040 g ² /Hz | 45 to 600 Hz 0.060 g ² /Hz | 45 to 70 Hz +12.0 db/oct |
| 350 to 2000 Hz -3.0 db/oct | 600 to 2000 Hz -6.0 db/oct | 70 to 600 Hz 0.050 g ² /Hz |
| | | 600 to 2000 Hz -6.0 db/oct |
| Overall = 6.1 grms | Overall = 7.7 grms | Overall = 7.0 grms |

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(C) INSPECTION:

Fabrication - All task board components are verified to be built to print and generally clean individually. The task board assy. 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 noncompliance's.

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

- 1) Operational Effect -Unsecured On-Orbit Installed WIF on task board.
- 2) Crew Action - None
- 3) Crew Training - Crew trained in proper operation of mounting the On-Orbit Installed WIF and verifying that the pins are in the locked position at the end of operations with the WIF.
- 4) Mission constraint - None.
- 5) In Flight Checkout - Proper function of on orbit installed WIF mounting verified during EVA operations.

(F) MAINTAINABILITY: N/A**PREPARED BY:** G.Wright**REVISION:****DATE:** 04/15/95**WAIVER NUMBER**