

Failure Modes and Effects Analysis/Critical Items List

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 Title: Risk Assessment Executive Summary Report (RAESR) for the USA SAFER

Item Name: Hand Controller Module (HCM) Qty: 1 FMEA Number: US-SFR-330
 Item Part Number: SED33106098 ORU Name: SAFER
 Subsystem Name: HCM ORU Part Number: SED33105900-311
 Function: Converts mechanical motion into electrical commands in order to control electronic logic.

Item Type Designator: C PG/IP Identifier: N/A
 Reference Designator/Find No.: N/A Drawing Number: SED33106098
 Logistics Control Number: N/A

End Item Name: SAFER
 End Item Capability: Six degrees of freedom through 24 thrusters, each rated at 0.8 ± 0.08 lbs. force in vacuum.
 End Item Function: Provides emergency EVA self-rescue for separated crewmember.
 ISS Zone: EVA Shuttle Zone: EVA

Criticality

Critical Item: Yes: _____ No: X Criticality Category: ISS Shuttle
 Success Paths: Success Paths Remaining: 1R 1R/3

Failure (Mode, Cause, Detection, Corrective Action)

Failure Mode: HCM fails to initiate Automatic Attitude Hold (AAH) command.
 Failure Mode Code:
 Failure Cause: Switch Failure, EEE part failure, short/open circuit, contamination, software error, radiation event, EMI.
 Failure Detection:
 Flight: IVA – IVA checkout.
 EVA – No AAH. AAH LED does not illuminate.
 Ground: Functional Test.
 Time To Detect Quantity: 10 Time To Detect Units: Seconds
 Correcting Action: IVA – If a failure is detected during the IVA checkout, the back-up SAFER (if available) will be used.
 EVA – Cycle power. AAH will initiate with power being turned on. Assume manual control if necessary to stop rotation.
 Remarks: None.
 Failure Effect Phase: EVA Operations Affected Stage(S): EVA Operations

Failure Effect

On ORU/Assembly:
 First/Second Failure: Inadvertent EVA crewmember separation.
 Third (this) Failure: AAH does not activate. Crewmember unable to automatically arrest uncommanded rotation.
 On Subsystem/Next Assembly: None.
 On End Item/Segment: Prevents self rescue.
 On Crew/ISS: Possible loss of EVA crewmember.
 Time To Effect Quantity: 1 Time To Effect Units: Minutes

Redundancy Screen

ISS (Shuttle)
 Checkout Pre-Launch (A): Pass
 Checkout On-Orbit (B): N/A
 Detection Flight Crew: Pass Or Detection Ground Crew: Fail
 Loss Of Redundancy From A Single Cause (C): N/A