

Failure Modes and Effects Analysis/Critical Items List

Document Number: JSC-38378 Document Rev. No.: C Document Date: 8/26/97
 Title: Risk Assessment Executive Summary Report (RAESR) for the USA SAFER

Item Name: Mode Select Switch Qty: 1 FMEA Number: US-SFR-415
 Item Part Number: 232AT203 ORU Name: SAFER
 Subsystem Name: HCM ORU Part Number: SED33105900-311
 Function: Directs hand controller commands for either rotation or translation control modes.

Item Type Designator: C PG/IP Identifier: N/A
 Reference Designator/Find No.: N/A Drawing Number: SED33106100
 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: Mode Select Switch inadvertently switches from rotate to translate mode or from translate to rotate mode.

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 – Loss of full six degrees of freedom.

Ground: Functional Test.

Time To Detect Quantity: 10 **Time To Detect Units:** Seconds

Correcting Action: IVA – If failure is detected during IVA checkout, use back-up SAFER if available.
 EVA – Cycle power. If not successful, no other corrective action.

Remarks: With the mode select switch failed in one position, SAFER has four degrees of freedom capability. Self-rescue with degraded control may still be accomplished.

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: Loss of full six degree-of-freedom capability.

On Subsystem/Next Assembly: N/A

On End Item/Segment: Unable to terminate previously commanded motion. Possible loss of mission objectives if SAFER required for EVA.

On Crew/ISS: Possible loss of crewmember. Possible damage to EMU/Orbiter/ISS.

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:		Passs	Or	Detection Ground Crew: Fail
Loss Of Redundancy From A Single Cause	(C):	N/A		