

## 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:** Hand Controller Module (HCM)      **Qty:** 1      **FMEA Number:** US-SFR-310  
 Grip  
**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

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

### Failure (Mode, Cause, Detection, Corrective Action)

**Failure Mode:** HCM Grip fails to terminate thruster 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 – Uncommanded motion. Thruster LED remains illuminated.  
**Ground:** Functional Test.  
**Time To Detect Quantity:** 10      **Time To Detect Units:** Seconds  
**Correcting Action:** IVA – If the IVA checkout detects a failure, the backup SAFER (if available) will be used.  
 EVA - Cycle power. If not successful, no other corrective action.  
**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: Uncommanded motion.  
**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

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