



SPACE SHUTTLE PROGRAM
Flight Software Office
NASA Johnson Space Center, Houston, Texas



Flight Software Office (FSO) STS-123 In-Flight Anomaly Review SR 4173

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FSO STS-123 IFA Review, Overview

Presenter **D. RUTISHAUSER**

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Tracking #	Description	IFA?	IIFA?
MER - 11	TCS Laser Dropped Lock During Rendezvous	N	N



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- **MER-11 – TCS Laser Dropped Lock During Rendezvous**

- During rendezvous, the Trajectory Control Sensor (TCS) laser dropped lock on the target and was unable to reacquire. This caused loss of TCS data just prior to and immediately after the Rendezvous Pitch Maneuver (RPM). TCS data was also lost for the initial phase of the Twice Orbital Rate VBAR Approach (TORVA) instance.
- Cause of initial loss of tracking is suspected to be the sun in the field of view
- During TCS operations, seed values (range estimates) are automatically provided by the Rendezvous and Proximity Operations Program (RPOP). The seed values may also be provided by the crew.
- Acquisition command with an invalid seed value occurred 3 times during the 16 minute gap in tracking.
 - Assessment of recorded data during docking shows that the invalid seed value was introduced by the selection of the Hand-Held Lidar (HHL) as the primary trajectory and using the defaulted seed value.
- Attempts to manually reset the seed value were unsuccessful due to resetting of the seed value via the auto seed function. Eventual commanding to standby and setting the seed value manually restored tracking for the remainder of the mission.



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- **MER-11 – TCS Laser Dropped Lock During Rendezvous, cont.**

- **IFA?** – No, no hardware/software failure identified, operational issues with suspected environment-induced cause and confirmed configuration-induced cause
- **IIFA?** – No, does not impact integrated hazards or multiple elements (per NSTS 08126), no mission impact since nominal operation was restored. The HHL, radar range, CCTV/monitor overlays, and visual observation by pilot are available redundant sources of range and range rate information.
- **Post flight activities –**
 - TCS is still reviewing flight data to determine possible cause for loss or tracking. The assessment has been expanded to STS-122(similar sun angles) and STS-118(previous TCS SN 1010 flight).
 - TCS personnel are performing engineering evaluations with a spare flight unit and the sun in the field of view
 - RPOP personnel will meet with training personnel to emphasize keeping TCS Nav as the prime trajectory on the primary RPOP laptop.