



Independent Assessment Dissenting Opinion on T-O Umbilical Issue to STS-114 Flight Readiness Review

June 29, 2005

Phil Deans/JSC IA Office



Independent Assessment Dissenting Opinion on T-O Umbilical Issue

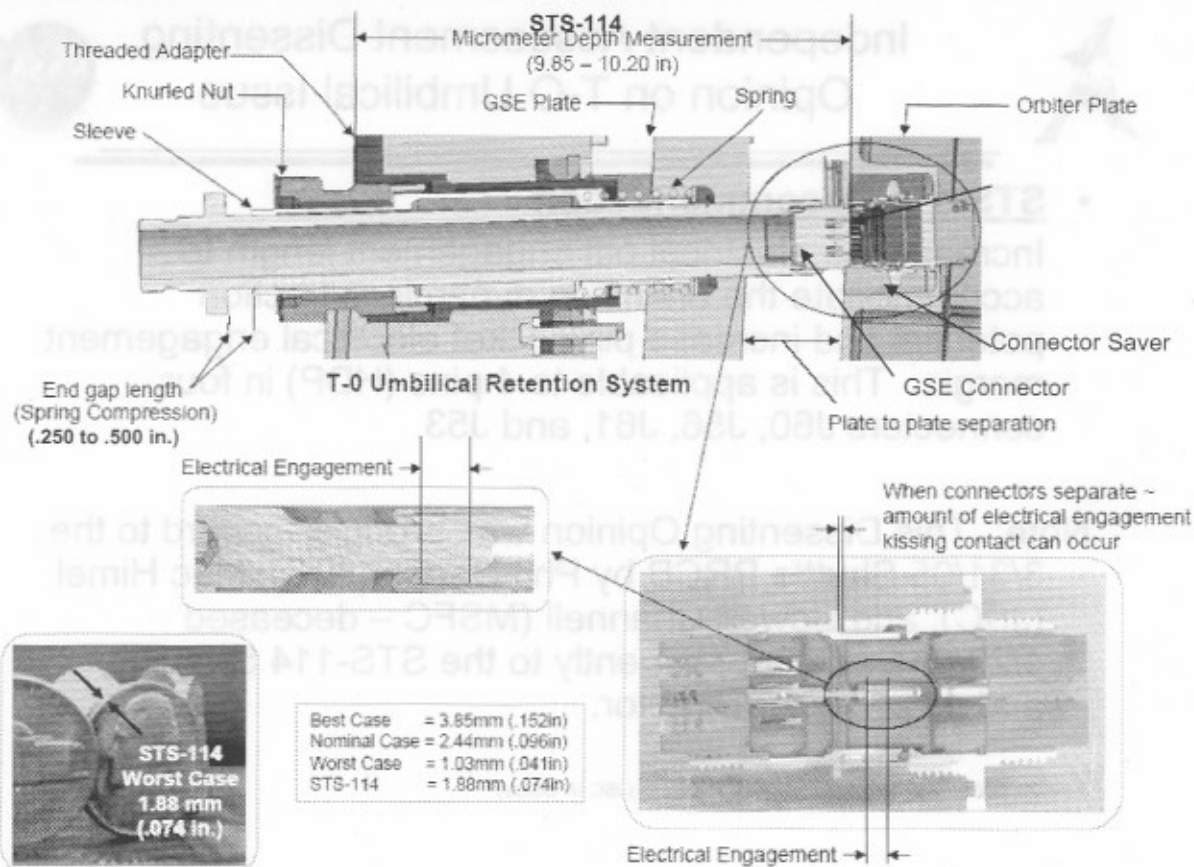


- **Launch Data:**

STS-112 Unexplained Anomaly – Space Shuttle Vehicle Release System A Fire 1 command failed to function at T-0. Previous Launch Anomalies: STS-105 LDB-1 lost during SSME start, STS-108 SRB LH Bus A erratic after SSME start, STS-110 SRB RH Bus A erratic after SSME start, and STS-111 SSME-3 EIU signal erratic at SSME start.

- **The Issue:**

Catastrophic risk from the common cause failure resulting in inadvertent plate / pin / socket separation and loss of electrical continuity to the SRB Hold Down Post Pyrotechnic Initiator Controller Fire 1, Fire 2, and Return paths across the T-O Umbilical due to the dynamic vibro-acoustic environment from SSME startup through T-0.



June 29, 2005

P. Deans (JSC IA Office)

3



Independent Assessment Dissenting Opinion on T-O Umbilical Issue



• Risk Concerns for STS-114:

1. Inadequate margin for electrical connector pin / socket engagement. One new STS-114 cable has less than 2 mm engagement. J56, pin J has 1.87 mm (thickness of a nickel) per Shuttle SE&I Office.
2. Unknown dynamic environment at HDP T-O connectors during SSME startup through T-O. (No test data to verify NESC vibration modeling analysis of 6/21/05 - max predicted dynamic displacement less than 0.060 in (1.5 mm). Analysis did not include all external forces and quasi static loading during the SSME startup and vehicle "twang" maneuver.)
3. Inadequate vibration test article, test Y axis only, and no low frequency vibration spectrum below 20 hertz used by STS-112 Standing Accident Investigation Board and SE&I Tiger Team.
4. Inadequate Certification and Qualification of the TSM Electrical System. (Spec requirement-no discontinuity greater than 10 microseconds, only 2 pins / connector monitored, none recorded).
5. Inadequate instrumentation at the T-O interface (electrical continuity or connector movement) during SSME startup through T-O.

June 29, 2005

P. Deans (JSC IA Office)

4



Independent Assessment Dissenting Opinion on T-O Umbilical Issue



• STS-114 Recommendation

Increase the electrical pin engagement length to accommodate the unknown dynamic extraction potential and increase pin/socket electrical engagement margin. This is applicable to 4 pins (HDP) in four connectors J60, J56, J61, and J53.

Note: This Dissenting Opinion was brought forward to the 3/31/05 Shuttle PRCB by Phil Deans (JSC), Mac Himel (JSC), and Bowes Channell (MSFC – deceased 4/23/05), and subsequently to the STS-114 SMARR, and JSC Center Director.

June 29, 2005

P. Deans (JSC IA Office)

5



Independent Assessment Dissenting Opinion on T-O Umbilical Issue



Risk Concerns for STS-114:

1. Inadequate margin for electrical connector pin / socket engagement. One new STS-114 cable has less than 2 mm engagement. 186 pin J has 1.87 mm (thickness of a nickel) per Shuttle SE&I Office.
2. Unknown dynamic environment at HDP-T-O connectors during SSMC status through T-O. (No test data to verify HESG vibration modeling analysis of 6/21/05 - max predicted dynamic displacement less than 0.001 in (1.5 mm). Analysis did not include all external forces and pulse static loading during the SSMC status and vehicle "twang" maneuver.)
3. Inadequate vibration test article, test Y axis only, and no low frequency vibration spectrum below 20 hertz used by STS-114 Standing Accident Investigation Board and SE&I/Tw Team.
4. Inadequate Certification and Qualification of the TSM Electrical System. (Spec requirement no discontinuity greater than 10 microamps, only 2 pins / connector monitored, none recorded).
5. Inadequate instrumentation at the T-O interface (electrical continuity or connector movement) during SSMC status through T-O.



STS-114

MMT TRAINING CERTIFICATIONS



MMT POSITION	NAME	Complete Date
Deputy Manager, Space Shuttle Program, JSC (MMT Chair)	Wayne Hale	MMT Certified 2/1/05 – 1/31/06
Alternate, Mission Management Team Chair	John Shannon	MMT Certified 3/1/05 – 2/28/06
Manager, Space Shuttle Flight Operations & Integration, JSC	John Shannon	MMT Certified 3/1/05 – 2/28/06
Acting Dep. Manager, Space Shuttle Flight Ops & Integration, JSC	Don McCormack	MMT Certified 4/1/05 – 3/31/06
Manager, Safety & Mission Assurance (SSP), JSC	Terry Wilcutt	MMT Certified 5/1/05 – 4/30/06
Deputy Manager, Safety & Mission Assurance (SSP), JSC	Don Totton	MMT Certified 1/1/05 - 12/31/05
Manager, Space Shuttle Systems Engineering & Integration, JSC	John Muratore	MMT Certified 4/1/05 – 3/31/06
Deputy Manager, Space Shuttle Sys Engineering & Integration, JSC	Richard Schmidgall	MMT Certified 3/1/05 – 2/28/06
Deputy Program Manager for KSC (SSP)	Denny Kross	MMT Certified 4/1/05 – 3/31/06
Alternate, Deputy Program Manager for KSC (SSP)	Carol Scott	MMT Certified 5/12/05 – 5/11/06
Manager, Orbiter Project, JSC	Steve Poulos	MMT Certified 1/1/05 - 12/31/05
Deputy Manager, Orbiter Project, JSC	Ed Mango	MMT Certified 2/1/05 – 1/31/06
Director, Engineering, JSC	Frank Benz	MMT Certified 1/1/05 - 12/31/05
Deputy Director, Engineering, JSC	Steve Altemus	MMT Certified 4/1/05 – 3/31/06

*Note: Bold – Prime MMT for this mission



STS-114

MMT TRAINING CERTIFICATIONS



MMT POSITION	NAME	Complete Date
Director, Engineering, MSFC	Chris Singer	MMT Certified 1/1/05 - 12/31/05
Alternate, Director Engineering, MSFC	John Chapman	MMT Certified 1/1/05 - 12/31/05
Manager, EVA Project, JSC	Steve Doering	MMT Certified 1/1/05 - 12/31/05
Alternate, Manager, EVA Project, JSC	Jeff Dutton	MMT Certified 1/1/05 - 12/31/05
Director, Flight Crew Operations, JSC	Ken Bowersox	MMT Certified 4/1/05 – 3/31/06
Deputy Director, Flight Crew Operations, JSC	Ellen Ochoa	MMT Certified 1/1/05 - 12/31/05
Director Mission Operations, JSC	Allen Flynt	MMT Certified 4/1/05 – 3/31/06
Alternate, Mission Operations, JSC	Bob Castle	MMT Certified 2/1/05 - 1/31/06
Director, Space Life Sciences, JSC	Dr. Jeff Davis	MMT Certified 1/1/05 - 12/31/05
Alternate, Director, Space Life Sciences, JSC	Dr. Michael Duncan	MMT Certified 1/1/05 - 12/31/05
Deputy Program Manager for MSFC (SSP)	Mike Rudolphi	MMT Certified 1/1/05 - 12/31/05
Alternate, Program Manager for MSFC (SSP)	Jim Reuter	MMT Certified 1/1/05 - 12/31/05
Manager, RSRM Project, MSFC	Jody Singer	MMT Certified 1/1/05 - 12/31/05
Deputy Manager, RSRM Project, MSFC	David Beaman	MMT Certified 1/1/05 - 12/31/05

*Note: Bold – Prime MMT for this mission



STS-114



MMT TRAINING CERTIFICATIONS

MMT POSITION	NAME	Complete Date
Manager, SSME Project, MSFC	Gene Goldman	MMT Certified 1/1/05 - 12/31/05
Deputy Manager, SSME Project, MSFC	Mike Kynard	MMT Certified 1/1/05 - 12/31/05
Manager, ET Project, MSFC	Sandy Coleman	MMT Certified 1/1/05 - 12/31/05
Deputy Manager, ET Project, MSFC	Don Noah	MMT Certified 4/1/05 - 3/31/06
Manager, SRB Project, MSFC	David Martin	MMT Certified 1/1/05 - 12/31/05
Deputy Manager, SRB Project, MSFC	Tom Williams	MMT Certified 1/1/05 - 12/31/05
Director, Shuttle Processing, KSC	Mike Wetmore	MMT Certified 2/1/05 - 1/31/06
Deputy Director, Shuttle Processing, KSC	Pepper Phillips	MMT Certified 1/1/05 - 12/31/05
Space Shuttle System Technical Warrant Holder, JSC	Paul Shack	MMT Certified 4/1/05 - 3/31/06
Alternate, Space Shuttle Sys Technical Warrant Holder, JSC	Bobbie Gail Swan	MMT Certified 4/1/05 - 3/31/06
Manager, ISS Program, JSC	Kirk Shireman	MMT Certified 6/15/05 - 6/14/06
Deputy Manager, ISS Program, JSC	Scott Gehring	MMT Certified 1/1/05 - 12/31/05
Manager, Launch Integration, KSC	Greg (RayJ) Johnson	MMT Certified 2/1/05 - 1/31/06
Alternate, Manager, Launch Integration, KSC	Randy Segert	MMT Certified 1/1/05 - 12/31/05

*Note: Bold - Prime MMT for this mission

MISSION STS-114 TRAINING - 2005 - 2006 3



STS-114



MMT TRAINING CERTIFICATIONS

MMT POSITION	NAME	Complete Date
Flight Manager, Prime	Robert Galvez	MMT Certified 2/1/05 - 1/31/06
Alternate, Flight Manager	Ladonna Miller	MMT Certified 1/1/05 - 12/31/05
Program Manager, Hamilton Sundstrand	Chuck Seaback	MMT Certified 1/1/05 - 12/31/05
Alternate, Program Manager, Hamilton Sundstrand	Alan Plough	MMT Certified 1/1/05 - 12/31/05
VP, Lockheed Martin Space Systems Company	Ron Wetmore	MMT Certified 1/1/05 - 12/31/05
Alternate, Lockheed Martin Space Systems Co.	Mike Quiggle	MMT Certified 1/1/05 - 12/31/05
ATK Thiokol Corporation, VP RSRM Program	Cary Ralston	MMT Certified 1/1/05 - 12/31/05
Alternate, ATK Thiokol Corporation, VP RSRM Program	Harry Reed	MMT Certified 2/1/05 - 1/31/06
Boeing-Rocketdyne	Jim Paulsen	MMT Certified 2/1/05 - 1/31/06
Alternate, Boeing-Rocketdyne	Dan Hausman	MMT Certified 1/1/05 - 12/31/05
SSP, Deputy Program Manager, SFOC	Loren Shriver	MMT Certified 1/1/05 - 12/31/05
Alternate, SSP, Deputy Program Manager, SFOC	Bob Lang	MMT Certified 2/1/05 - 1/31/06

*Note: Bold - Prime MMT for this mission

MISSION STS-114 TRAINING - 2005 - 2006 4