“What is Up at Jet Propulsion Laboratory?”

SAE AE-8 Meetings in San Diego, 8 October 2019

Presented by Ray Billig, Cable & Connector SME, 10/08/2019

• Current Missions
  - InSight
  - Tempest-D
  - Mars Science Laboratory “Curiosity”

• Future Missions
  - Mars 2020
  - Europa Clipper

• Discovered a Circular Connector Mating Issue
Some Current JPL Missions
Project InSight, a Mars Lander

- Launched from Vandenberg AFB on 5 May 2018 on an Atlas V rocket.

- Primary mission instrument is the **seismometer**.
  - Seismometer checkout is complete. Now in data capture mode.
  - Needs a year’s worth of seismic data taken on Mars for a data baseline.

- Secondary mission instrument is a **heat probe** that bores into the Mars crust.
  - Boring operation is in progress.
  - The vibrations made by the boring process will be picked up by the seismometer as part of its data collection.
Tempest-D, an Earth Orbiter

- Launched from Wallops Island, VA on 21 May 2018 on an Orbital Sciences rocket.
- Earth orbiting Cubesat (small, low-cost, commercial parts spacecraft)

- Temporal Experiment for Storms and Tropical Systems – Demonstration
- A millimeter wave radar to look at weather on Earth.
- The solar panels are shown deployed in the photo.
Tempest-D Usage for Hurricane Dorian

• Tempest-D observing Hurricane Dorian off the coast of Puerto Rico on 8/28/2019.
• 400 kilometers / 250 miles in altitude.
Mars Science Lander “Curiosity”

- Launched 26 Nov. 2011 at Cape Canaveral, FL.
- Landed 6 August 2012 at Gale Crater, Mars.
- (Seven earth years on Mars)

• Latest released photo from “Curiosity:”
• “Teal Ridge” captured on 18 June 2019 from the MASTCAM instrument.
Some Future JPL Missions
Mars 2020 – The Next Mars Rover
Mars 2020 – The Next Mars Rover

• Launch window 17 July – 5 August, 2020 from Cape Canaveral, FL.
• Lands 18 February 2021 at Jezero Crater, Mars.
• Mission Duration: At least one Mars year (~687 Earth days)
• Mars 2020 “Name the Rover” essay contest with K-12 students will name the Rover.
  ➢ 52 finalists (one from each state or territory). Downselect to 3 finalists.
• Seven new instruments on the Rover, plus a helicopter as a demonstration unit.
• Primary Science: Gather rock & soil samples that could be returned to Earth by a future NASA mission.
• Project is on schedule! Updates on JPL’s YouTube channel.

Mars 2020 – The Next Mars Rover

• Helicopter is a high-risk, high-reward mission on the bottom of the rover.
• No science instruments on the helicopter.
• Demonstration only – Learn best usage for future missions.
Europa Clipper Project – Orbits Jupiter

• NASA's Europa Clipper to conduct detailed study of Jupiter's moon Europa and investigate whether the icy moon could harbor conditions suitable for life.
• Radiation-tolerant spacecraft in a long, looping orbit around Jupiter to perform repeated close flybys of the icy moon Europa.
• Nine science instruments.
• Launch date mid-2020s.
Discovered a Circular Connector Mating Issue
Coupling Ring O.D. Different Between MIL Mfgs.

- Connectors per MIL-DTL-26482, Series II.
- Receptacle connector was rear-panel mounted.
- Receptacle connector on a flight box.
- Flight cable plug (Amph-Matrix) coupling ring interferes with receptacle mounting hardware.
- Test cable plug (Corsair) mates without interference.
Coupling Ring O.D. Different Between MIL Mfgs.

Corsair version reduces to a smaller diameter at the mating interface which allows it to clear the screw heads.

Smaller outer diameter with the same interior mating interface results in the visibly thinner wall on the bayonet channels.

MB18R-1626S-880 Matrix
MS3475L-16-26S Corsair
(Fits)

MB18R-1626S-880 Matrix
MS3475L-16-26S Corsair
(Fits)
Coupling Ring O.D. Different Between MIL Mfgs.

Plug Coupling Ring O.D. is not controlled in the specification.