

IAF SPACE EXPLORATION SYMPOSIUM (A3)  
Mars Exploration – missions current and future (3A)

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## OPERATION OF NASA'S SCIENCE AND TELECOMMUNICATIONS NETWORK AT MARS

**Abstract**

Lockheed Martin is currently operating 4 spacecraft at Mars which have returned pathfinding science and continue to support NASA's ongoing and future rover missions. The Odyssey, Mars Reconnaissance Orbiter, and MAVEN orbiters are all in extended mission operations collecting science and supporting NASA's lander fleet on the surface.

Mars Odyssey, launched in 2001, performed its prime science mission, continues to support relay communications 17 years after arrival. The early use of the Electra payload on Odyssey has allowed it to remain a vital part of the relay system well beyond its primary mission. Mars Reconnaissance Orbiter has provided unprecedented atmospheric and surface science, including indications of water on the surface. It has also supported landing site selection, and is the primary communication link for Spirit, Opportunity, Phoenix, Insight, and Curiosity landers. MAVEN was initially launched into an elliptical orbit to measure atmospheric escape and is currently aerobraking into position to support these rovers as well as the upcoming Mars 2020 Sample Cache Rover. Insight, after its successful landing in November 2018, is returning interior measurements through the NASA relay constellation.

The LM Mission Operations team has continually supported science missions dating back to Magellan in the early 1990's. The team has supported 15 missions since then and is currently flying 7 spacecraft. Our Mission Support Area (MSA) has direct connectivity to the Deep Space Network and the capability to command spacecraft as well as monitor health telemetry and return science data. Future plans include extensibility for support of the human tended gateway at the moon, future Mars telecommunication needs, and future missions such as Lucy's exploration of the Trojan asteroids. The MSA is a key link for the Mars Exploration programs ongoing activity at the Red Planet.