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

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THE MARS RECONNAISSANCE ORBITER MISSION: 2018 STATUS

Abstract

The Mars Reconnaissance Orbiter (MRO) continues its dual-mode mission of scientific exploration and programmatic support. Now in its 13th year of flight (and its 12th year in its low-altitude, sun-synchronous orbit around Mars), the spacecraft continues in its normal flight mode and its science instruments continue to acquire a treasure trove of data which is being used to study the Martian environment (surface, sub-surface, and atmosphere). To date, more than 315 TB of scientific data has been returned to Earth. UHF relay support for the Mars Science Laboratory (MSL) rover Curiosity and the Mars Exploration Rover (MER) rover Opportunity continues at a pace that provides the engineers and scientists operating those surface vehicles timely information to support their mission planning and science analysis. Most of the landing site characterization requests for the NASA Mars 2020 rover and the ESA ExoMars Rover/Surface Platform (RSP) missions have been completed. Following on to the 2017 IAC paper: "The Mars Reconnaissance Orbiter Mission: Continuing a Record of Exploration from Mars Orbit," this paper provides a 2018 status update on the MRO Mission. Since the 2017 writing, scientists have discovered mid-latitude ice sheets and developed new theories regarding the infamous recurring slope lineae (RSL). The flight team has faced some new engineering challenges as the spacecraft has started to show some age. The team has developed and is implementing actions that are aimed at stretching spacecraft battery life. A new all-stellar capability using the spacecraft's star trackers has been deployed that will allow for normal spacecraft operations without IMUs. In 2018, MRO will be synchronized to provide critical communications support for the InSight Entry, Descent, and Landing (EDL) event and be readied to support InSight's critical commissioning phase with UHF relay support. A new split-pass relay capability has been developed which will allow MRO to relay with two surface vehicles in "close proximity" on the same overflight, i.e. the InSight lander and the Curiosity rover. Extended for another year of operations by NASA, this paper will highlight recent scientific progress and describe a long-term plan that will extend MRO's life well into the 2020's.