Paper ID: 87741
oral

IAF SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Extra-Terrestrial and Interplanetary Communications, and Regulations (5)

Author: Dr. Massimiliano Marcozzi
Thales Alenia Space Italia (TAS-I), Italy

Dr. Marilena Amoroso
Italian Space Agency (ASI), Italy
Dr. raffaele mugnuolo
Italian Space Agency (ASI), Italy
Dr. Michelle Viotti
United States
Dr. Charles D. Edwards
Jet Propulsion Laboratory - California Institute of Technology, United States

MARS ICE MAPPER COMMUNICATIONS SYSTEM

Abstract

The Italian Space Agency (ASI) and Thales Alania Space in Italy (TAS-I) in the context of the Mars International Ice Mapper (I-MIM) mission and in collaboration with the NASA Jet Propulsion Laboratory (JPL) are studying the innovative multi-band Communication Subsystem designed to deliver from the I-MIMsatellite scientific data of at least 500 Gbit per day data acquired from on board primary instruments polarimetric SAR in L-band VHF Sounder, High resolution imager and submillimeter sounding are under consideration being all instruments with Large data rate (>¿ 100 Mbps) acquisition and consequently large data volumes generation. The mission while continuing in its delineation phase, with analysis and definition of mission scenarios, two main communication links have been identified. The Direct to Earth (DTE) link to exchange, at high data rate in X-bands and primary in Ka-bands (32 GHz) and with data transmission above 10 Mbps with Deep Space Network ground stations, the Science data and telecommand and telemetry for the satellite control. The preliminary defined architecture foresees the 6-m aperture Large Deployable Reflector antenna (LDR), shared with the SAR instrument. The other main link under definition is the Proximity Link to communicate with Mars surface, interacting with landers, rovers and future surface potential assets as well as connect the orbiter with other satellites in Mars vicinity. While for the proximity link on Mars both UHF and X-band are the primary considered band for the proximity link on Mars, also the Ka-band and optical link are being considered taking into account the evolution of the future exploration missions. I-MIM , with the goal to identify and characterize accessible, near-surface water-ice in the mid latitudes of Mars, in support of future human exploration is an international Mission collaboration being developed by the Agenzia Spaziale Italiana (ASI), the Canadian Space Agency (CSA), the Japan Aerospace Exploration Agency (JAXA), and the National Aeronautics and Space Administration (NASA) .