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ELEMENTS OF MISSION CONTROL SOFTWARE FOR A COMMERCIAL LUNAR LANDING AND SURFACE EXPLORATION MISSION

Abstract

Mission Control Software (MCS) for a mission consists of real-time heath monitoring through telemetry (TM), controlling the spacecraft through telecommands (TC), payload data reception and dissemination, and archival and retrieval of all data. Laboratory for Atmospheric and Space Physics (LASP) is providing TeamIndus with OASIS-CC, a CCSDS-compliant real-time health monitoring and commanding software and the interface for communicating with deep space network stations (DSN) over the Space Link Extension (SLE). The software modules involving archival and retrieval of telemetry, time correlation and processing of payload data are all developed by TeamIndus. The MCS described above, with elements built by LASP and TeamIndus, is being used for mission simulations, instrument and ground checkout and real-time mission operations.

To achieve the objectives of the MCS, the telemetry and telecommand definitions form the basis of communication between on-board software and ground processing of spacecraft data. This has been achieved by automation of TM and TC schematics across sub systems, viz. on-board software, MCS and payload processing software. This paper describes in detail the following aspects of TeamIndus's MCS:

- Handling of TM/TC definitions as stipulated by OASIS-CC tables.

- Integration of near real time processing with OASIS-CC.

- Real-time displays of telemetry parameters (Alphanumeric and graphical) as per spacecraft subsystems' requirements.

- Time correlation for time-stamping of telemetry data and time tagged commands.

- Payload data processing and dissemination as per payload users' requirement.