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An Extensible, User-Modifiable Framework for Planning Activities

This software provides a development framework that allows planning activities for the Mars Science Laboratory rover to be altered at any time, based on changes of the Activity Dictionary. The Activity Dictionary contains the definition of all activities that can be carried out by a particular asset (robotic or human). These definitions (and combinations of these definitions) are used by mission planners to give a daily plan of what a mission should do. During the development and course of the mission, the Activity Dictionary and actions that are going to be carried out will often be changed. Previously, such changes would require a change to the software and redeployment. Now, the Activity Dictionary authors are able to customize activity definitions, parameters, and resource usage without requiring redeployment.

This software provides developers and end users the ability to modify the behavior of automatically generated activities using a script. This allows changes to the software behavior without incurring the burden of redeployment. This software is currently being used for the Mars Science Laboratory, and is in the process of being integrated into the LADEE (Lunar Atmosphere and Dust Environment Explorer) mission, as well as the International Space Station.

This work was done by Joseph C. Joshing, Lucy Abramyan, Megan C. Mickelson, Michael N. Wallick, James A. Kurien, Thomas M. Crockett, and Mark W. Powell of Caltech; Guy Pyrzak of Ames Research Center; and Arash Aghevli of Stinger Ghaffarian Technologies for NASA's Jet Propulsion Laboratory. For more information, contact iaoffice@jpl.nasa.gov.

This software is available for commercial licensing. Please contact Daniel Broderick of the California Institute of Technology at danielb@caltech.edu. Refer to NPO-48308.

Mission Operations Center (MOC) - Precipitation Processing System (PPS) Interface Software System (MPISS)

MPISS is an automatic file transfer system that implements a combination of standard and mission-unique transfer protocols required by the Global Precipitation Measurement Mission (GPM) Precipitation Processing System (PPS) to control the flow of data between the MOC and the PPS. The primary features of MPISS are file transfers (both with and without PPS specific protocols), logging of file transfer and system events to local files and a standard messaging bus, short term storage of data files to facilitate retransmissions, and generation of file transfer accounting reports. The system includes a graphical user interface (GUI) to control the system, allow manual operations, and to display events in real time. The PPS specific protocols are an enhanced version of those that were developed for the Tropical Rainfall Measuring Mission (TRMM).

All file transfers between the MOC and the PPS use the SSH File Transfer Protocol (SFTP). For reports and data files generated within the MOC, no additional protocols are used when transferring files to the PPS. For observatory data files, an additional handshaking protocol of data notices and data receipts is used. MPISS generates and sends to the PPS data notices containing data start and stop times along with a checksum for the file for each observatory data file transmitted. MPISS retrieves the PPS generated data receipts that indicate the success or failure of the PPS to ingest the data file and/or notice. MPISS retransmits the appropriate files as indicated in the receipt when required. MPISS also automatically retrieves files from the PPS.

The unique feature of this software is the use of both standard and PPS specific protocols in parallel. The advantage of this capability is that it supports users that require the PPS protocol as well as those that do not require it. The system is highly configurable to accommodate the needs of future users.

This work was done by Jeffrey Ferrara, William Calk, William Atwell, and Tina Tsui of Goddard Space Flight Center. Further information is contained in a TSP (see page 1).
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