



## Software

### EOS MLS Level 1B Data Processing, Version 2.2

A computer program performs level-1B processing (the term “1B” is explained below) of data from observations of the limb of the Earth by the Earth Observing System (EOS) Microwave Limb Sounder (MLS), which is an instrument aboard the Aura spacecraft. This software accepts, as input, the raw EOS MLS scientific and engineering data and the Aura spacecraft ephemeris and attitude data. Its output consists of calibrated instrument radiances and associated engineering and diagnostic data. [This software is one of several computer programs, denoted product generation executives (PGEs), for processing EOS MLS data. Starting from level 0 (representing the aforementioned raw data, the PGEs and their data products are denoted by alphanumeric labels (e.g., 1B and 2) that signify the successive stages of processing.]

At the time of this reporting, this software is at version 2.2 and incorporates improvements over a prior version that make the code more robust, improve calibration, provide more diagnostic outputs, improve the interface with the Level 2 PGE, and effect a 15-percent reduction in file sizes by use of data compression.

*This program was written by Vincent Perun, Robert Jarnot, Herbert Pickett, Richard Cofield, Michael Schwartz, and Paul Wagner for Caltech for NASA's Jet Propulsion Laboratory.*

*This software is available for commercial licensing. Please contact Karina Edmonds of the California Institute of Technology at (626) 395-2322. Refer to NPO-44841.*

### Auto-Generated Semantic Processing Services

Auto-Generated Semantic Processing (AGSP) Services is a suite of software tools for automated generation of other computer programs, denoted cross-platform semantic adapters, that support interoperability of computer-based communication systems that utilize a variety of both new and legacy communication software running in a variety of operating-system/computer-hardware combinations. AGSP has numerous potential uses in military, space-exploration, and other government applications as well as

in commercial telecommunications. The cross-platform semantic adapters take advantage of common features of computer-based communication systems to enforce semantics, messaging protocols, and standards of processing of streams of binary data to ensure integrity of data and consistency of meaning among interoperating systems.

The auto-generation aspect of AGSP Services reduces development time and effort by emphasizing specification and minimizing implementation: In effect, the design, building, and debugging of software for effecting conversions among complex communication protocols, custom device mappings, and unique data-manipulation algorithms is replaced with metadata specifications that map to an abstract platform-independent communications model. AGSP Services is modular and has been shown to be easily integrable into new and legacy NASA flight and ground communication systems.

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*Inquiries concerning rights for the commercial use of this invention should be addressed to the Kennedy Innovative Partnerships Office at (321) 861-7158. Refer to KSC-13072.*

### Geospatial Authentication

A software package that has been designed to allow authentication for determining if the rover(s) is/are within a set of boundaries or a specific area to access critical geospatial information by using GPS signal structures as a means to authenticate mobile devices into a network wirelessly and in real-time has been developed. The advantage lies in that the system only allows those with designated geospatial boundaries or areas into the server.

The Geospatial Authentication software has two parts — Server and Client. The server software is a virtual private network (VPN) developed in Linux operating system using Perl programming language. The server can be a stand-alone

VPN server or can be combined with other applications and services. The client software is a GUI Windows CE software, or Mobile Graphical Software, that allows users to authenticate into a network. The purpose of the client software is to pass the needed satellite information to the server for authentication.

*This work was done by Stacey D. Lyle of Geospatial Research Innovation Design for NASA's Stennis Space Center.*

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*Refer to SSC-00282, volume and number of this NASA Tech Briefs issue, and the page number*

### Maneuver Automation Software

The Maneuver Automation Software (MAS) automates the process of generating commands for maneuvers to keep the spacecraft of the Cassini-Huygens mission on a predetermined prime mission trajectory. Before MAS became available, a team of approximately 10 members had to work about two weeks to design, test, and implement each maneuver in a process that involved running many maneuver-related application programs and then serially handing off data products to other parts of the team. MAS enables a three-member team to design, test, and implement a maneuver in about one-half hour after Navigation has process-tracking data. MAS accepts more than 60 parameters and 22 files as input directly from users.

MAS consists of Practical Extraction and Reporting Language (PERL) scripts that link, sequence, and execute the maneuver-related application programs: “Pushing a single button” on a graphical user interface causes MAS to run navigation programs that design a maneuver; programs that create sequences of commands to execute the maneuver on the spacecraft; and a program that generates predictions about maneuver performance and generates reports and other files that enable users to quickly review and verify