passing is needed only at the beginning and end of the computation. The minimal message passing ensures the high speed of the proposed parallel implementation.

Trade analyses can be performed and optimization problems can be solved for space mission design with respect to relevant figures of merit. The mission merits/objectives/requirements are calculated with the set of design variables. The tradeoff space given by the design problem is visualized. SOAP is used for DAWN mission design, Cassini mission analyses, Team X mission concept studies, and DOD and Air Force projects.

Automated Sequence Generation Process and Software

NASA's Jet Propulsion Laboratory, Pasadena, California

"Automated sequence generation" (autogen) signifies both a process and software used to automatically generate sequences of commands to operate various spacecraft. Autogen requires fewer workers than are needed for older manual sequence-generation processes and reduces sequence-generation times from weeks to minutes. The autogen software comprises the autogen script plus the Activity Plan Generator (APGEN) program. APGEN can be used for planning missions and command sequences. APGEN includes a graphical user interface that facilitates scheduling of activities on a time line and affords a capability to automatically expand, decompose, and schedule activities. The autogen script performs the following tasks:

• Gathers needed data files from data repositories on the mission operations network.
• Builds other data files needed for the APGEN scheduling algorithms, based on inputs specified by the user.
• Sets up the environment to run APGEN, including scheduling instructions.
• Runs APGEN, which schedules activities and writes the corresponding sequences of commands to files.
• Manipulates the resultant sequence and other files, if needed.
• Initiates any automated sequence processors to prepare the sequence for uplink, if appropriate.

Periodic, On-Demand, and User-Specified Information Reconciliation

Ames Research Center, Moffett Field, California

POUR is a framework that accepts periodic information updates, collects information on demand, and accepts user-specified information while presenting a single unified view to the user. The primary functionality of POUR is through its query interface. A query consists of any number of XPaths, where each XPath returns a list of XML strings that satisfies the query. Depending on the XPaths specified and the contents of the POUR database, query processing may be as simple as a database lookup, or as complex as a series of queries down a POUR hierarchy to a set of POUR repositories that compute the requested information on the fly before the appropriate results are returned.

Users may use any valid XPath to retrieve results integrated from across the relevant periodic, on-demand, and user-specified sources. Periodic information comes from trusted sources at an unknown frequency such that any previous information from the same source can be completely overwritten. On-demand information is computed when needed using queries to other POUR instances or using scripts dynamically executed by the Globus GRAM service. Finally, users may add their own information into a POUR repository if it conforms to a site-defined XML schema.

Simulating Operations at a Spaceport

John F. Kennedy Space Center, Florida

SPACESIM is a computer program for detailed simulation of operations at a spaceport. SPACESIM is being developed to greatly improve existing spaceports and to aid in designing, building, and operating future spaceports, given that there is a worldwide trend in spaceport operations from very expensive, research-oriented launches to more frequent commercial launches. From an operational perspective, future spaceports are expected to resemble current airports and seaports, for which it is necessary to resolve issues of safety, security, efficient movement of machinery and