

their own plots with minimal effort, and can gain access to all of the features of the case management system. Users can also define their own models (including gravitational and non-gravitational force models), types of measurement, and optimizers, using software hooks that are made available in the scripting layer of the tool. This enables users to extend the functionality of MONTE without restriction.

MONTE provides maneuver optimization as well as re-optimization capability that includes support for particular constraints, such as cones and directions. The software has integrated support to help satisfy planetary quarantine requirements.

*This work was done by Richard F. Sunseri, Hsi-Cheng Wu, Robert A. Hanna, Michael P. Mossey, Courtney B. Duncan, Scott E. Evans,*

*James R. Evans, Theodore R. Drain, Michelle M. Guevara, Tomas J. Martin Muir, and Ahlam A. Attiyah of 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-46083.*

## Extensible Infrastructure for Browsing and Searching Abstracted Spacecraft Data

*NASA's Jet Propulsion Laboratory, Pasadena, California*

A computer program has been developed to provide a common interface for all space mission data, and allows different types of data to be displayed in the same context. This software provides an infrastructure for representing any type of mission data. Existing software requires that each type of mission data be treated separately. The new program's representations provide identifying information, and provide a means

of opening the data for further inspection. This is useful for searching and browsing large quantities of data across multiple databases.

The software is written in Java as part of the MSLICE program, and can be run on any Windows, Mac OS, or Linux computer. The software may be adapted to other mission operation software.

*This work was done by Michael N. Wallick, Thomas M. Crockett, Joseph C. Joswig,*

*Recaredo J. Torres, Jeffrey S. Norris, Jason M. Fox, Mark W. Powell, David S. Mittman, Lucy Abramyan, Khawaja S. Shams, and Michael B. Vaughn of Caltech and Guy Pyrzak and Melissa Ludowise of Ames Research Center 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-46397.*

## Lossless Compression of Data Into Fixed-Length Packets

*NASA's Jet Propulsion Laboratory, Pasadena, California*

A computer program effects lossless compression of data samples from a one-dimensional source into fixed-length data packets. The software makes use of adaptive prediction: it exploits the data structure in such a way as to increase the efficiency of compression beyond that otherwise achievable.

Adaptive linear filtering is used to predict each sample value based on past sample values. The difference between predicted and actual sample values is encoded using a Golomb code. The particular Golomb code used is selected using a

method described in "Simpler Adaptive Selection of Golomb Power-of-Two Codes" (NPO-41336), *NASA Tech Briefs*, Vol. 31, No. 11 (November 2007), page 71. As noted therein, the method is somewhat suboptimal (suboptimality  $\leq 1/2$  bit per sample) but offers the advantage that it involves significantly less computation than does a prior method of adaptive selection of optimum codes through "brute force" application of all code options to every block of samples. Hence, the computer program is relatively simple and produces packets relatively rapidly.

The method and, hence, the program are robust to loss of packets: All parameters needed to decompress a packet are encoded in the packet. Therefore, the loss of one or more packets does not diminish the ability to reconstruct samples in remaining packets.

*This work was done by Aaron B. Kieley and Matthew A. Klimesh of 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-45942.*

## Video-Game-Like Engine for Depicting Spacecraft Trajectories

*NASA's Jet Propulsion Laboratory, Pasadena, California*

GoView is a video-game-like software engine, written in the C and C++ computing languages, that enables real-time, three-dimensional (3D)-appearing visual representation of spacecraft and trajectories (1)

from any perspective; (2) at any spatial scale from spacecraft to Solar-system dimensions; (3) in user-selectable time scales; (4) in the past, present, and/or future; (5) with varying speeds; and (6) for-

ward or backward in time. GoView constructs an interactive 3D world by use of spacecraft-mission data from pre-existing engineering software tools. GoView can also be used to produce distributable ap-