## CSAM Metrology Software Tool

CSAM Metrology Software Tool (CMeST) is a computer program for analysis of false-color CSAM images of plastic-encapsulated microcircuits. ("CSAM" signifies C-mode scanning acoustic microscopy.) The colors in the images indicate areas of delamination within the plastic packages. Heretofore, the images have been interpreted by human examiners. Hence, interpretations have not been entirely consistent and objective. CMeST processes the color information in image-data files to detect areas of delamination without incurring inconsistencies of subjective judgement. CMeST can be used to create a database of baseline images of packages acquired at given times for comparison with images of the same packages acquired at later times. Any area within an image can be selected for analysis, which can include examination of different delamination types by location. CMeST can also be used to perform statistical analyses of image data. Results of analyses are available in a spreadsheet format for further processing. The results can be exported to any data-base-processing software.

*This program was written by Duc Vu, Michael Sandor, and Shri Agarwal of Caltech for* **NASA's Jet Propulsion Laboratory**. *Further information is contained in a TSP (see page 1).*

*This software is available for commercial licensing. Please contact Karina Edmonds of the California Institute of Technology at (818) 393-2827. Refer to NPO-40475.*

## Update on Rover Sequencing and Visualization Program

The Rover Sequencing and Visualization Program (RSVP) has been updated. RSVP was reported in "Rover Sequencing and Visualization Program" (NPO-30845), *NASA Tech Briefs*, Vol. 29, No. 4 (April 2005), page 38. To recapitulate: The Rover Sequencing and Visualization Program (RSVP) is the software tool to be used in the Mars Exploration Rover (MER) mission for planning rover operations and generating command sequences for accomplishing those operations. RSVP combines three-dimensional (3D) visualization for immersive exploration of the operations area, stereoscopic image display for high-resolution examination of the downlinked imagery, and a sophisticated command-sequence editing tool for analysis and completion of the sequences. RSVP is linked with actual flight code modules for operations rehearsal to provide feedback on the expected behavior of the rover prior to committing to a particular sequence. Playback tools allow for review of both rehearsed rover behavior and downlinked results of actual rover operations. These can be displayed simultaneously for comparison of rehearsed and actual activities for verification. The primary inputs to RSVP are downlink data products from the Operations Storage Server (OSS) and activity plans generated by the science team. The activity plans are high-level goals for the next day's activities. The downlink data products include imagery, terrain models, and telemetered engineering data on rover activities and state. The Rover Sequence Editor (RoSE) component of RSVP performs activity expansion to command sequences, command creation and editing with setting of command parameters, and viewing and management of rover resources. The HyperDrive component of RSVP performs 2D and 3D visualization of the rover's environment, graphical and animated review of rover predicted and telemetered state, and creation and editing of command sequences related to mobility and Instrument Deployment Device (robotic arm) operations. Additionally, RoSE and HyperDrive together evaluate command sequences for potential violations of flight and safety rules. The products of RSVP include command sequences for uplink that are stored in the Distributed Object Manager (DOM) and predicted rover state histories stored in the OSS for comparison and validation of downlinked telemetry. The majority of components comprising RSVP utilize the MER command and activity dictionaries to automatically customize the system for MER activities. Thus, RSVP, being highly data driven, may be tailored to other missions with minimal effort. In addition, RSVP uses a distributed, message-passing architecture to allow multitasking and collaborative visualization and sequence development by scattered team members.

*This tool was developed by Brian Cooper, Frank Hartman, Scott Maxwell, Jeng Yen, John Wright, and Carlos Balacuit of Caltech for* **NASA's Jet Propulsion Laboratory**. *Further information is contained in a TSP (see page 1).*

*This software is available for commercial licensing. Please contact Karina Edmonds of the California Institute of Technology at (818) 393-2827. Refer to NPO-40353.*

## Selecting Data From a Star Catalog

MCDUMP is a computer program that selects data from the SKYMAP SKY2000 Master Star Catalog — a database about 150 MB in size, stored on a computer hard drive. The database describes about 300,000 stars, each by means of a 500-byte entry. MCDUMP reads all 300,000 entries, then generates an output file that comprises a subset of entries selected according to one or more criteria entered by the user. Examples of criteria that could be entered include: location in a selected portion of the sky; constancy or a specified degree of variability of brightness; absence of nearby, bright companion stars; a particular surface temperature; and brightness sufficient to enable detection by a specified astronomical instrument. The output of MCDUMP can be in the form of either a single 520-column file or multiple files that contain fewer columns to facilitate printing. MCDUMP has been configured and tested for use under the HP-UX 10.20 operating system (a Hewlett-Packard version of the UNIX operating system). It should also be possible to adapt MCDUMP to other versions of UNIX.

*This program was written by David A. Tracewell of* **Goddard Space Flight Center** *and Christopher B. Sande of Computer Sciences Corporation. Further information is contained in a TSP (see page 1).*
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