

and complements formal testing by being comprehensive (all displays can be checked) and by revealing errors that are difficult to detect via test. In addition, the Suite can be run early in the development cycle to find and correct errors in advance of testing.

*This software suite was developed by Chris Land of The Boeing Company and Kathryn Moye of the Dynacs Co. for Johnson Space Center. Further information is contained in a TSP (see page 1). MSC-23630-1*

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### ➤ MRO DKF Post-Processing Tool

This software tool saves time and reduces risk by automating two labor-intensive and error-prone post-processing steps required for every DKF [DSN (Deep Space Network) Keyword File] that MRO (Mars Reconnaissance Orbiter) produces, and is being extended to post-process the corresponding TSOE (Text Sequence Of Events) as well. The need for this post-processing step stems from limitations in the seq-gen modeling resulting in incorrect DKF generation that is then cleaned up in post-processing.

*This work was done by Shanti Ayap of LMCO, and Forest Fisher, Roy Gladden, and Teerapat Khanampornpan of 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-45481.*

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### ➤ Rig Diagnostic Tools

Rig Diagnostic Tools is a suite of applications designed to allow an operator to monitor the status and health of complex networked systems using a unique interface between Java applications and UNIX scripts. The suite consists of Java applications, C scripts, Vx-Works applications, UNIX utilities, C programs, and configuration files. The UNIX scripts retrieve data from the system and write them to a certain set of files. The Java side monitors these files and presents the data in user-friendly formats for operators to use in making troubleshooting decisions. This design allows for rapid prototyping and expansion of higher-level displays without affecting the basic data-gathering applications. The suite is designed to be extensible, with the ability to add new system components

in building block fashion without affecting existing system applications. This allows for monitoring of complex systems for which unplanned shutdown time comes at a prohibitive cost.

*This program was written by Kerry M. Soileau of Johnson Space Center and John W. Baicy of The Boeing Co. Further information is contained in a TSP (see page 1). MSC-24158-1*

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### ➤ MRO Sequence Checking Tool

The MRO Sequence Checking Tool program, `mro_check`, automates significant portions of the MRO (Mars Reconnaissance Orbiter) sequence checking procedure. Though MRO has similar checks to the ODY's (Mars Odyssey) Mega Check tool, the checks needed for MRO are unique to the MRO spacecraft.

The MRO sequence checking tool automates the majority of the sequence validation procedure and check lists that are used to validate the sequences generated by MRO MPST (mission planning and sequencing team). The tool performs more than 50 different checks on the sequence. The automation varies from summarizing data about the sequence needed for visual verification of the sequence, to performing automated checks on the sequence and providing a report for each step. To allow for the addition of new checks as needed, this tool is built in a modular fashion.

*This work was done by Forest Fisher, Roy Gladden, and Teerapat Khanampornpan of Caltech for NASA's Jet Propulsion Laboratory.*

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### ➤ Science Activity Planner for the MER Mission

The Maestro Science Activity Planner is a computer program that assists human users in planning operations of the Mars Explorer Rover (MER) mission and visualizing scientific data returned from the MER rovers. Relative to its predecessors, this program is more powerful and easier to use. This program is built on the Java Eclipse open-source platform around a Web-browser-based user-interface paradigm to provide an intuitive user interface to Mars rovers and landers.

This program affords a combination of advanced display and simulation capabilities. For example, a map view of terrain can be generated from images acquired by the High Resolution Imaging Science Explorer instrument aboard the Mars Reconnaissance Orbiter spacecraft and overlaid with images from a navigation camera (more precisely, a stereoscopic pair of cameras) aboard a rover, and an interactive, annotated rover traverse path can be incorporated into the overlay. It is also possible to construct an overhead perspective mosaic image of terrain from navigation-camera images.

This program can be adapted to similar use on other outer-space missions and is potentially adaptable to numerous terrestrial applications involving analysis of data, operations of robots, and planning of such operations for acquisition of scientific data.

*This program was written by Jeffrey S. Norris, Thomas M. Crockett, Jason M. Fox, Joseph C. Joswig, Mark W. Powell, Khawaja S. Shams, Recaredo J. Torres, Michael N. Wallick, and David S. Mittman 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-45871.*

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### ➤ UAVSAR Flight-Planning System

A system of software partly automates planning of a flight of the Uninhabited Aerial Vehicle Synthetic Aperture Radar (UAVSAR) — a polarimetric synthetic-aperture radar system aboard an unpiloted or minimally piloted airplane. The software constructs a flight plan that specifies not only the intended flight path but also the setup of the radar system at each point along the path.

A user first specifies the desired image swath by specifying certain geographic and geometric features of the swath or the desired flight path. Using an input digital elevation map (DEM), the software predicts the image swath and sets such variables as a data window position (DWP). A raster backscatter classification file co-registered with the input DEM can be used to estimate radar attenuation settings. The software determines whether such radar constraints as those pertaining to duty cycles and data rates are obeyed, and de-