By utilizing an input file provided by the lander team, along with a managed configuration file, the MRO relay SASF/PTF generation software runs MRO's MTT (Mars Target Tool) software recursively to construct the Relay PTF. It also references these same input products to generate the SASFs needed to support the overflight. Each SASF has all of the parameters and commanding required to instruct MRO to initiate the relay session and to configure the on-board radio to transfer data to and from the landed asset. In addition, the software performs version checking on the current input file and determines any modifications to the file from any previous version. If instructed, it will output only that information which is relevant to the changed entries.

GlastCam: A Telemetry-Driven Spacecraft Visualization Tool

Goddard Space Flight Center, Greenbelt, Maryland

Developed for the GLAST project, which is now the Fermi Gamma-ray Space Telescope, GlastCam software ingests telemetry from the Integrated Test and Operations System (ITOS) and generates four graphical displays of geometric properties in real time, allowing visual assessment of the attitude, configuration, position, and various cross-checks. Four windows are displayed: a "cam" window shows a 3D view of the satellite; a second window shows the standard position plot of the satellite on a Mercator map of the Earth; a third window displays star tracker fields of view, showing which stars are visible from the spacecraft in order to verify star tracking; and the fourth window depicts Sun sensor measurements, enabling verification of the solar array deployment state. Each of these windows has telltales showing useful information applicable to each window, such as spacecraft axes, magnetic field vectors, the Sun-pointing direction, and the like. These can be toggled on or off as desired. By breaking up the data into applicable windows, it is easier to monitor specific data of interest. Because the displays operate in real time and visually, any changes to the spacecraft's configuration or attitude are seen immediately. This allows for fast and intuitive spacecraft geometry assessment.

Robot Vision Library

NASA's Jet Propulsion Laboratory, Pasadena, California

The JPL Robot Vision Library (JPLV) provides real-time robot vision algorithms for developers who are not vision specialists. The package includes algorithms for stereo ranging, visual odometry and unsurveyed camera calibration, and has unique support for very wide-angle lenses (as used on the Mars Exploration Rover HazCams). JPLV gathers these algorithms into one uniform, documented, and tested package with a consistent C API (application programming interface). The software is designed for real-time execution (10–20 Hz) on COTS (commercial, off-the-shelf) workstations and embedded processors.

This package incorporates algorithms developed over more than ten years of research in ground and planetary robotics for NASA, DARPA (Defense Advanced Research Projects Agency) and the Army Research Labs, and is currently being used in applications as diverse as legged vehicle navigation and large-scale urban modeling.

Mission Operations and Navigation Toolkit Environment

NASA's Jet Propulsion Laboratory, Pasadena, California

MONTE (Mission Operations and Navigation Toolkit Environment) Release 7.3 is an extensible software system designed to support trajectory and navigation analysis/design for space missions. MONTE is intended to replace the current navigation and trajectory analysis software systems, which, at the time of this reporting, are used by JPL's Navigation and Mission Design section. The software provides an integrated, simplified, and flexible system that can be easily maintained to serve the needs of future missions in need of navigation services.

MONTE has an integrated case management system that allows users to create taxonomies to describe and categorize runs. It has the ability to plot and display multiple cases and scenarios simultaneously, using color to differentiate, allowing for side-by-side analysis. Users can define