adjusting mission scenarios using power profiles generated by the model; system engineers for performing system-level trade studies using the results of the model during the early design phases of a spacecraft; and operations personnel for high-fidelity modeling of the essential power aspect of the planning picture.

This work was done by Eric G. Wood, George W. Chang, and Fannie C. Chen of Caltech for NASA's Jet Propulsion Laboratory. For more information, contact iaoffice@jpl.nasa.gov.

This software is available for commercial licensing. Please contact Daniel Broderick of the California Institute of Technology at danielb@caltech.edu. Refer to NPO-48152.

Jupiter Environment Tool

NASA's Jet Propulsion Laboratory, Pasadena, California

The Jupiter Environment Tool (JET) is a custom UI plug-in for STK that provides an interface to Jupiter environment models for visualization and analysis. Users can visualize the different magnetic field models of Jupiter through various rendering methods, which are fully integrated within STK's 3D Window. This allows users to take snapshots and make animations of their scenarios with magnetic field visualizations. Analytical data can be accessed in the form of custom vectors. Given these custom vectors, users have access to magnetic field data in custom reports, graphs, access constraints, coverage analysis, and anywhere else vectors are used within STK.

This work was done by Erick J. Sturm, Kenneth M. Donahue, James P. Biehl, and Michael Kokorowski of Caltech; Cedrick Ngalande of Microcosm, Inc.; and Jordan Boedeker of Iowa State University 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 Daniel Broderick of the California Institute of Technology at danielb@caltech.edu. Refer to NPO-47998.

Jet and Tropopause Products for Analysis and Characterization (JETPAC)

NASA's Jet Propulsion Laboratory, Pasadena, California

This suite of IDL programs provides identification and comprehensive characterization of the dynamical features of the jet streams in the upper troposphere, the lower stratospheric polar night jet, and the tropopause. The output of this software not only provides comprehensive information on the jets and tropopause, but also gives this information in a form that facilitates studies of observations in relation to the jets and tropopauses.

The programs use data from gridded meteorological analyses (including, currently, GEOS-5/MERRA and NCEP/GFS, but are designed to easily adapt to others) to identify the locations and characteristics (wind speed, temperature, wind components, potential vorticity, equivalent latitude, potential temperature, relative vorticity, and other fields) at the jet maximum and the edges of the jet regions. It also compiles detailed tropopause information based on several commonly used definitions of the tropopause, including cataloging times/locations with multiple tropopauses. These products are calculated for the complete gridded meteorological datasets, and the differences between jet locations/characteristics and measurement locations/characteristics cataloged for several satellite (currently, Aura MLS, ACE, and HIRDLS) and aircraft (currently START-08, Winter Storms, SPURT) datasets.

These products are currently being used in studies compiling jet and tropopause climatologies, and to characterize trace gas observations in relation to the jets and tropopauses. The output products will be made available to other collaborators, and eventually will be publicly available.

This work was done by Gloria L. Manney and William H. Daffer of Caltech for NASA's Jet Propulsion Laboratory. Further information is contained in a TSP (see page 1).

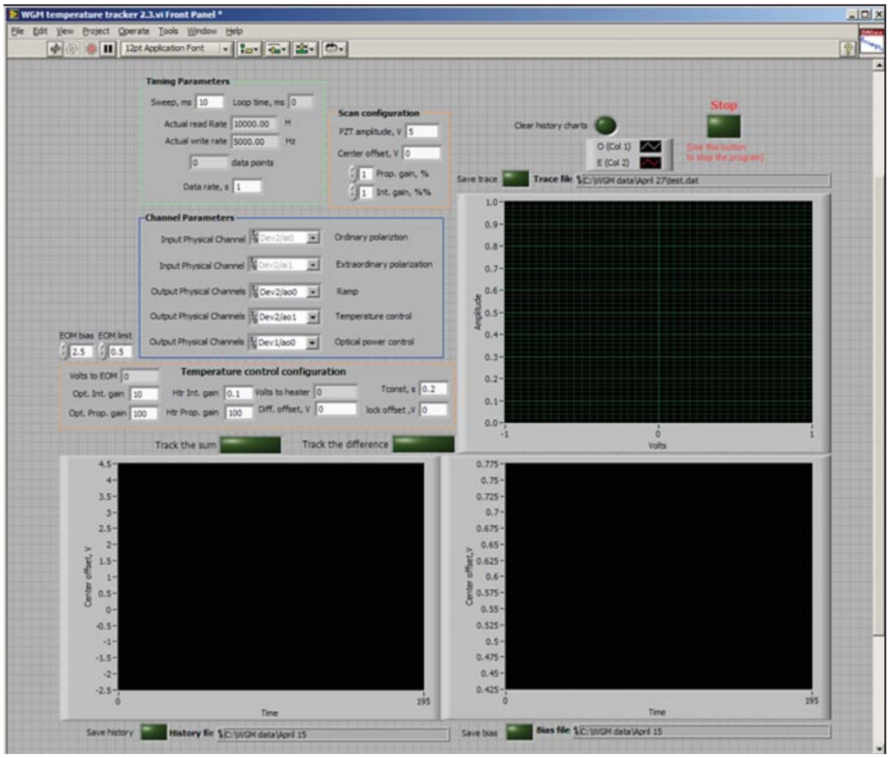
This software is available for commercial licensing. Please contact Daniel Broderick of the California Institute of Technology at danielb@caltech.edu. Refer to NPO-47709.

WGM Temperature Tracker

NASA's Jet Propulsion Laboratory, Pasadena, California

This software implements digital control of a WGM (whispering-gallery-mode) resonator temperature based on the dual-mode approach. It comprises one acquisition (dual-channel) and three control modules. The interaction of the proportional-integral loops is designed in the original way, preventing the loops from fighting. The data processing is organized in parallel with the acquisition, which allows the computational overhead time to be suppressed or often completely avoided.

WGM resonators potentially provide excellent optical references for metrology, clocks, spectroscopy, and other applications. However, extremely accurate (below micro-Kelvin) temperature stabilization is required. This software allows one specifically advantageous



A Screen Shot of the **WGM Temperature Tracker 2.3** graphic interface.

method of such stabilization to be implemented, which is immune to a variety of effects that mask the temperature variation.

WGM Temperature Tracker 2.3 (see figure) is a LabVIEW code developed for dual-mode temperature stabilization of WGM resonators. It has allowed for the temperature stabilization at the level of 200 nK with one-second integration time, and 6 nK with 10,000-second integration time, with the above room-temperature set point.

This software, in conjunction with the appropriate hardware, can be used as a noncryogenic temperature sensor/controller with sub-micro-Kelvin sensitivity, which at the time of this reporting considerably outperforms the state of the art.

This work was done by Dmitry V. Strekalov 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 Daniel Broderick of the California Institute of Technology at danielb@caltech.edu. Refer to NPO-48306.

Large Terrain Continuous Level of Detail 3D Visualization Tool

NASA's Jet Propulsion Laboratory, Pasadena, California

This software solved the problem of displaying terrains that are usually too large to be displayed on standard workstations in real time. The software can visualize terrain data sets composed of billions of vertices, and can display these data sets at greater than 30 frames per second.

The Large Terrain Continuous Level of Detail 3D Visualization Tool allows large terrains, which can be composed of billions of vertices, to be visualized in real time. It utilizes a continuous level of detail technique called clipmapping to support this. It offloads much of the work involved in breaking up the terrain into levels of details onto the GPU (graphics processing unit) for faster processing.

This work was done by Steven Myint and Abhinandan Jain of Caltech for NASA's Jet Propulsion Laboratory. For more information, contact iaoffice@jpl.nasa.gov.

This software is available for commercial licensing. Please contact Daniel Broderick of the California Institute of Technology at danielb@caltech.edu. Refer to NPO-47978.

SE-FIT

John H. Glenn Research Center, Cleveland, Ohio

The mathematical theory of capillary surfaces has developed steadily over the centuries, but it was not until the last few decades that new technologies have put a more urgent demand on a substantially more qualitative and quantitative understanding of phenomena relating to capillarity in general. So far, the new theory development successfully predicts the behavior of capillary surfaces for special cases. However, an efficient quantitative mathematical prediction of capillary phenomena related to the shape and stability of geometrically complex equilibrium capillary surfaces remains a significant challenge. As one of many numerical tools, the open-source Surface Evolver (SE) algorithm has played an important role over the last two decades. The current effort was undertaken to provide a front-end to enhance the accessibility of SE for the purposes of design and analysis. Like SE, the new code is open-source and will remain under development for the foreseeable future.

The ultimate goal of the current Surface Evolver – Fluid Interface Tool (SE-FIT) development is to build a fully integrated front-end with a set of graphical user interface (GUI) elements. Such a front-end enables the access to functionalities that are developed along with the GUIs to deal with pre-processing, convergence computation operation, and post-processing. In other words, SE-FIT