the satellite, provides command processing and interface to the spacecraft communications and data bus, and provides watchdog functions for error detection.

The Special Test Equipment (STE) software was designed to operate specific test equipment used to support the LIS hardware through development, calibration, qualification, and integration with the TRMM spacecraft. The STE software provides the capability to control instrument activation, commanding (including both data formatting and user interfacing), data collection, decompression, and display and image simulation.

The LIS STE code was developed for the DOS operating system in the C programming language. Because of the many unique data formats implemented by the flight instrument, the STE software was required to comprehend the same formats, and translate them for the test operator. The hardware interfaces to the LIS instrument using both commercial and custom computer boards, requiring that the STE code integrate this variety into a working system. In addition, the requirement to provide RTEP test capability dictated the need to provide simulations of background image data with short-duration lightning transients superimposed. This led to the development of unique code used to control the location, intensity, and variation above background for simulated lightning strikes at user-selected locations.

This program was written by Kathleen Freestone, Louis Simeone, Byran Robertson, Maytha Frankford, David Trice, Kevin Wallace, and DeLisa Wilkerson of Marshall Space Flight Center. Further information is contained in a TSP (see page 1). MFS-32339-1

Processing AIRS Scientific Data Through Level 2

NASA's Jet Propulsion Laboratory, Pasadena, California

The Atmospheric Infrared Spectrometer (AIRS) Science Processing System (SPS) is a collection of computer programs, denoted product generation executives (PGEs), for processing the readings of the AIRS suite of infrared and microwave instruments orbiting the Earth aboard NASA's Aqua spacecraft. AIRS SPS at an earlier stage of development was described in "Initial Processing of Infrared Spectral Data" (NPO-35243), *NASA Tech Briefs*, Vol. 28, No. 11 (November 2004), page 39. To recapitulate: Starting from level 0 (representing raw AIRS data), the PGEs and their data products are denoted by alphanumeric labels (1A, 1B, and 2) that signify the successive stages of processing. The cited prior article described processing through level 1B (the level-2 PGEs were not yet operational).

The level-2 PGEs, which are now operational, receive packages of level-1B geolocated radiance data products and produce such geolocated geophysical atmospheric data products such as temperature and humidity profiles. The process of computing these geophysical data products is denoted "retrieval" and is quite complex. The main steps of the process are denoted microwave-only retrieval, cloud detection and cloud clearing, regression, full retrieval, and rapid transmittance algorithm.

This program was written by Robert Oliphant, Sung-Yung Lee, Moustafa Chahine of Caltech; Joel Susskind of Goddard Space Flight Center; Christopher Barnet, Larry McMillin, and Mitchell Goldberg of the National Oceanic and Atmospheric Administration; John Blaisdell of Science Applications International Corp; Philip Rosenkranz of Massachusetts Institute of Technology; and Larrabee Strow of the University of Maryland, Baltimore County, 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-40459.

Triaxial Probe Magnetic Data Analysis

NASA's Jet Propulsion Laboratory, Pasadena, California

The Triaxial Magnetic Moment Analysis software uses measured magnetic field test data to compute dipole and quadrupole moment information from a hardware element. It is used to support JPL projects needing magnetic control and an understanding of the spacecraft-generated magnetic fields.

Evaluation of the magnetic moment of an object consists of three steps: acquisition, conditioning, and analysis. This version of existing softward was extensively rewritten for easier data acquisition, data analysis, and report presentation, including immediate feedback to the test operator during data acquisition.

While prior JPL computer codes provided the same data content, this program has a better graphic display including original data overlaid with reconstructed results to show "goodness of fit" accuracy and better appearance of the report graphic page. Data are acquired using three magnetometers and two rotations of the device under test. A clean acquisition user interface presents required numeric data and graphic summaries, and the analysis module yields the best fit (least squares) for the magnetic dipole and/or quadrupole moment of a device.

The acquisition module allows the user to record multiple data sets, selecting the best data to analyze, and is repeated three times for each of the *z*-axial and *y*-axial rotations. In this update, the *y*-axial rotation starting position has been changed to an option, allowing either the *x*- or *z*-axis to point towards the magnetometer. The code has been rewritten to use three simultaneous axes of magnetic data (three probes), now using two "rotations" of the device under test rather than the previous three rotations, thus reducing handling activities on the device under test. The present version of the software gathers data in one-degree increments, which permits much better accuracy of the fit-