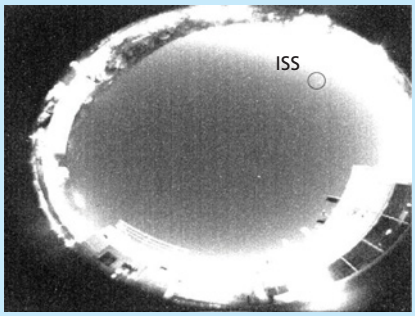

ALL-SKY IMAGE BEFORE FRAME SUBTRACTION
The ISS is concealed by glare from the horizon

ALL-SKY IMAGE AFTER FRAME SUBTRACTION
The ISS is clearly visible. The bright patch at the left is from trees moving in wind near light sources

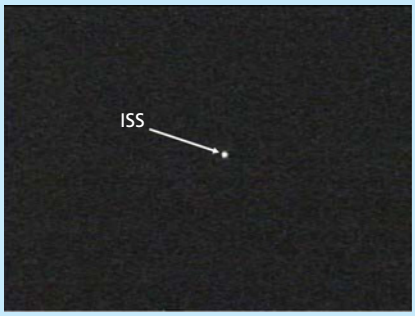

IMAGE IN GIMBALLED NARROW-FIELD-OF-VIEW CAMERA

Figure 2. **Images of the International Space Station** (ISS) were acquired by the prototype apparatus and used to track the ISS as it moved across the sky.

manifests itself in the processed image as a bright spot on a dark background (see Figure 2). The moving target is detected computationally as a spot of pixels brighter than a set threshold level. The location of the target is determined, to within a fraction of a pixel, as a brightness-weighted average pixel location. By use of a straightforward transformation that utilizes the image-detector-plane calibration, the target location is converted to azimuth and elevation coordinates, then by use of another calibrated transformation, the azimuth and elevation coordinates are converted to gimbal commands for initial aiming of the narrow-field-of-view camera.

Once the narrow-field-of view camera has been initially aimed and has acquired an image of the target, the apparatus switches into a tracking mode. In this mode, the gimbal commands are formulated to move the image of the target toward the center of the CCD image plane.

This work was done by Abhijit Biswas, Christopher Assad, Joseph M Kovalik, Bedabrata Pain, Chris J. Wrigley, and Peter Twiss of Caltech for NASA's Jet Propulsion Laboratory. Further information is contained in a TSP (see page 1). ***NPO-45237***

Visual Data Analysis for Satellites

Stennis Space Center, Mississippi

The Visual Data Analysis Package is a collection of programs and scripts that facilitate visual analysis of data available from NASA and NOAA satellites, as well as dropsonde, buoy, and conventional *in-situ* observations. The package features utilities for data extraction, data quality control, statistical analysis, and data visualization.

The Hierarchical Data Format (HDF) satellite data extraction routines from NASA's Jet Propulsion Laboratory were customized for specific spatial coverage and file input/output. Statistical analysis includes the calculation of the relative error, the absolute error, and the root mean square error. Other capabilities include curve fitting through the data points to fill in missing data points between satellite passes or where clouds obscure satellite data. For data visualization, the software provides customizable Generic Mapping Tool (GMT) scripts to generate difference maps, scatter plots, line plots, vector plots, histograms, time-series, and color fill images.

This program was written by Yee Lau, Sachin Bhate, and Patrick Fitzpatrick of the GeoResources Institute at Mississippi State University for Stennis Space Center.

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Refer to SSC-00266-1, volume and number of this NASA Tech Briefs *issue, and the page number.*

A Data Type for Efficient Representation of Other Data Types

Some obstacles to programming of parallel computers are removed.

NASA's Jet Propulsion Laboratory, Pasadena, California

A self-organizing, monomorphic data type denoted a sequence has been conceived to address certain concerns (summarized below) that arise in programming parallel computers. ["Sequence" as used here should not be confused with "sequence" as the word is commonly understood or with "sequence" as used elsewhere to denote another, polymorphic data type that is also relevant to computer programming.] A sequence in the present sense can be regarded abstractly as a vector, set, bag, queue, or other construct. A sequence is defined in terms of the behavior of the operators that can be applied to it without any foreknowledge of the underpinnings of its representation or particular implementation.

Heretofore, in programming a parallel computer, it has been necessary for the programmer to state explicitly, at the