patterns are defined in simple, declarative statements that combine point events from given input streams with those from other streams, using conjunction, disjunction, and negation. Patterns can be built on one another recursively to describe very rich, temporally extended combinations of events. Thereafter, a run-time matching algorithm in CERA efficiently matches these patterns against input data and signals when patterns are recognized.

CERA can be used to monitor complex systems and to signal operators or initiate corrective actions when anomalous conditions are recognized. CERA can be run as a stand-alone monitoring system, or it can be integrated into a larger system to automatically trigger responses to changing environments or problematic situations.

This program was written by William A. Fitzgerald and R. James Firby of I/NET, Inc. for Johnson Space Center. Further information is contained in a TSP (see page 1).

❂ TurboTech Technical Evaluation Automated System

Goddard Space Flight Center, Greenbelt, Maryland

TurboTech software is a Web-based process that simplifies and semiautomates technical evaluation of NASA proposals for Contracting Officer's Technical Representatives (COTRs). At the time of this reporting, there have been no set standards or systems for training new COTRs in technical evaluations. This new process provides boilerplate text in response to "interview-style" questions. This text is collected into a Microsoft Word document that can then be further edited to conform to specific cases.

By providing technical language and a structured format, TurboTech allows the COTRs to concentrate more on the actual evaluation, and less on deciding what language would be most appropriate. Since the actual word choice is one of the more time-consuming parts of a COTRs' job, this process should allow for an increase in quantity of proposals evaluated.

TurboTech is applicable to composing technical evaluations of contractor proposals, task and delivery orders, change order modifications, requests for proposals, new work modifications, task assignments, as well as any changes to existing contracts.

This work was done by Dorothy J. Tiffany of Goddard Space Flight Center. Further information is contained in a TSP (see page 1).
GSC-15554-1

❂ 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.

This work was done by Andrew B. Howard, Adnan I. Ansar, and Todd E. Litwin of Caltech and Steven B. Goldberg of Indelible Systems 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-46532.

❂ Perl Modules for Constructing Iterators

Goddard Space Flight Center, Greenbelt, Maryland

The **Iterator** Perl Module provides a general-purpose framework for constructing iterator objects within Perl, and a standard API for interacting with those objects. Iterators are an object-oriented design pattern where a description of a series of values is used in a constructor. Subsequent queries can request values in that series. These Perl modules build on the standard **Iterator** framework and provide iterators for some other types of values.

Iterator::DateTime constructs iterators from **DateTime** objects or **Date::Parse** descriptions and ICal/RFC 2445 style re-

currence descriptions. It supports a variety of input parameters, including a start to the sequence, an end to the sequence, an Ical/RFC 2445 recurrence describing the frequency of the values in the series, and a format description that can refine the presentation manner of the *DateTime*.

Iterator::String constructs iterators from string representations. This module is useful in contexts where the API consists of supplying a string and getting back an iterator where the specific iteration desired is opaque to the caller. It is of particular value to the *Iterator::Hash* module which provides nested iterations.

Iterator::Hash constructs iterators from Perl hashes that can include multiple iterators. The constructed iterators will return all the permutations of the iterations of the hash by nested iteration of embedded iterators. A hash simply includes a set of keys mapped to values. It is a very common data structure used throughout Perl programming. The *Iterator::Hash* module allows a hash to include strings defining iterators (parsed and dispatched with *Iterator::String*) that are used to construct an overall series of hash values.

Tropical Cyclone Information System

NASA's Jet Propulsion Laboratory, Pasadena, California

The JPL Tropical Cyclone Information System (TCIS) is a Web portal (http://tropicalcyclone.jpl.nasa.gov) that provides researchers with an extensive set of observed hurricane parameters together with large-scale and convection-resolving model outputs. It provides a comprehensive set of high-resolution satellite (see figure), airborne, and *in-situ* observations in both image and data formats. Large-scale datasets depict the surrounding environmental parameters such as SST (Sea Surface Temperature) and aerosol loading. Model outputs and analysis tools are provided to evaluate model performance and compare observations from different platforms.

The system pertains to the thermodynamic and microphysical structure of the storm, the air-sea interaction processes, and the larger-scale environment as depicted by ocean heat content and the aerosol loading of the environment.

Currently, the TCIS is populated with satellite observations of all tropical cy-
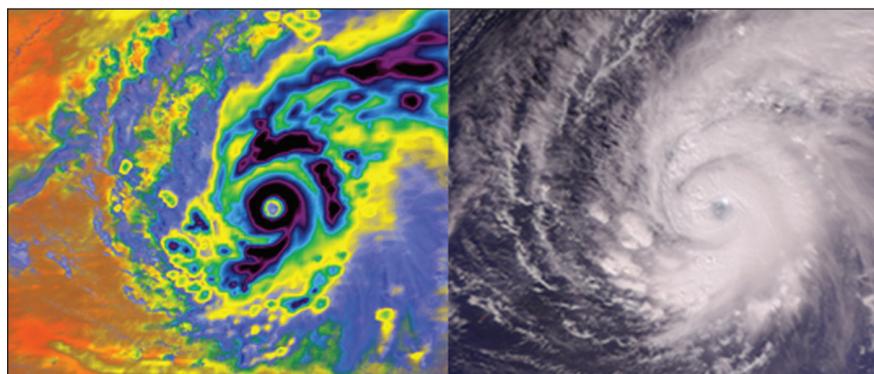
Images of Supertyphoon Pongsona that struck the U.S. island of Guam on December 8, 2002. The composite image on left was made by overlaying data from the infrared, microwave, and visible/near infrared sensors. A standard image is on the right.

clones observed globally during 2005. There is a plan to extend the database both forward in time till present as well as backward to 1998. The portal is powered by a MySQL database and an Apache/Tomcat Web server on a Linux system. The interactive graphic user interface is provided by Google Map.

XML Translator for Interface Descriptions

NASA's Jet Propulsion Laboratory, Pasadena, California

A computer program defines an XML schema for specifying the interface to a generic FPGA from the perspective of software that will interact with the device. This XML interface description is then translated into header files for C, Verilog, and VHDL. User interface definition input is checked via both the provided XML schema and the translator module to ensure consistency and accuracy.

Currently, programming used on both sides of an interface is inconsistent. This makes it hard to find and fix errors. By using a common schema, both sides are forced to use the same structure by using the same framework and toolset. This makes for easy identification of problems, which leads to the ability to formulate a solution.

The toolset contains constants that allow a programmer to use each register, and to access each field in the register. Once programming is complete, the translator is run as part of the make process, which ensures that whenever an interface is changed, all of the code that uses the header files describing it is recompiled.