ing occurs during scheduled periods every day of the week, the ACR software continuously monitors the antenna equipment.

This work was done by Roger Y. Chao, Scott C. Morgan, Martha M. Strain, Stephen T. Rockwell, Kenneth J. Shimizu, Barzia J. Tehrani, Jaclyn H. Kwok, Michelle Tuazon-Wong, and Henry Valtier of Caltech; Reza Nalbandi of MTC; Michael Wert of ITT; and Patrick Leung of ISDS/Averstar 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-47002.

Efficient Parallel Engineering Computing on Linux Workstations

NASA's Jet Propulsion Laboratory, Pasadena, California

A C software module has been developed that creates lightweight processes (LWPs) dynamically to achieve parallel computing performance in a variety of engineering simulation and analysis applications to support NASA and DoD project tasks. The required interface between the module and the application it supports is simple, minimal and almost completely transparent to the user applications, and it can achieve nearly ideal computing speed-up on multi-CPU engineering workstations of all operating system platforms. The module can be integrated into an existing application (C, C++, Fortran and others) either as part of a compiled module or as a dynamically linked library (DLL).

This software has the following major advantages over existing commercial and public domain software of similar functionality.

1. It is especially applicable to and powerful on commercially, widely available, multi-CPU engineering workstations;
2. It has a very simple software architecture and user interface and can be quickly integrated into an existing application; and
3. Its code size is very small, and its performance overhead is minimal, resulting in nearly ideal parallel-computing performance for many computing-intensive scientific and engineering applications.

The approach adopted in this technology development does not require any additional hardware and software beyond what's typically available on any commercial engineering workstations, that is a native operating system and C, C++ or FORTRAN compilers that an application needs.

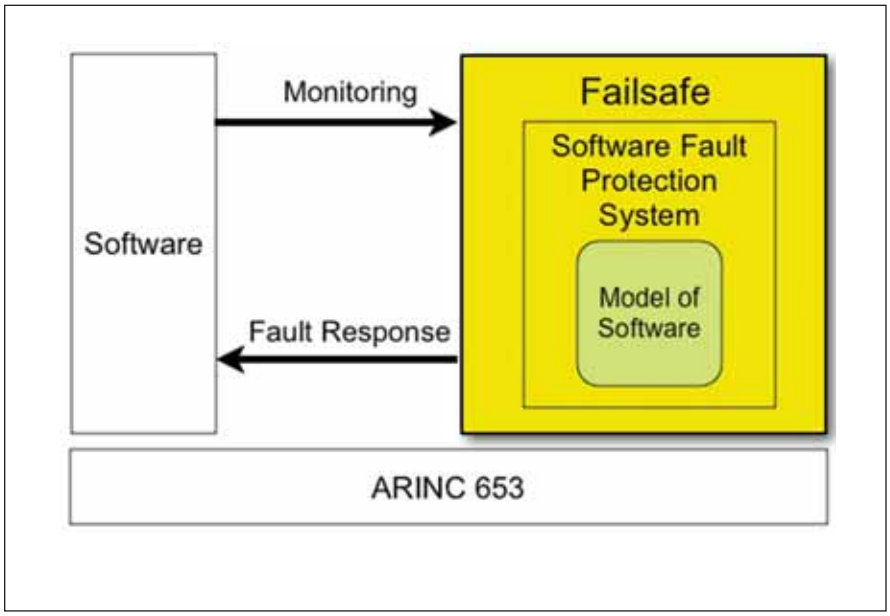
This work was done by John Z. Lou of Caltech for NASA's Jet Propulsion Laboratory. For more information, contact iaoffice@jpl.nasa.gov.

The software used in this innovation is available for commercial licensing. Please contact Daniel Broderick of the California Institute of Technology at danielb@caltech.edu. Refer to NPO-46892.

FAILSAFE Health Management for Embedded Systems

NASA's Jet Propulsion Laboratory, Pasadena, California

The FAILSAFE project is developing concepts and prototype implementations for software health management in mission-critical, real-time embedded systems. The project unites features of the industry-standard ARINC 653 Avionics Application Software Standard Interface and JPL's Mission Data System (MDS) technology (see figure). The ARINC 653 standard establishes requirements for the services provided by partitioned, real-time operating systems. The MDS technology provides a state analysis method, canonical architecture, and software framework that facilitates the design and implementation of software-intensive complex systems. The MDS technology has been used to provide the health management function for an ARINC 653 application implementation. In particular, the focus is on showing how this combination enables reasoning about, and recovering from, application software problems.



The **FAILSAFE** model-based health management concept is depicted in the block diagram.