ciency has been found or normal network saturation has been attained. Net-Stress was written for execution in the VxWorks real-time operating system, but could easily be ported to other operating systems.

*This program was written by Kurt Leucht and Guy Bedette of* **Kennedy Space Center**. *For further information, contact the Kennedy Innovative Partnerships Office at (321) 861-7158.*
*KSC-12589*

## Framework for Flexible Security in Group Communications

The Antigone software system defines a framework for the flexible definition and implementation of security policies in group communication systems. Antigone does not dictate the available security policies, but provides high-level mechanisms for implementing them. A central element of the Antigone architecture is a suite of such mechanisms comprising micro-protocols that provide the basic services needed by secure groups. Policies are implemented through the composition and configuration of these mechanisms. Mechanisms are composed in different ways to address new requirements and environmental constraints. The Antigone framework provides an easy-to-use application programming interface (API), from which secure group application programs can be built. Written entirely in the C++ programming language, the system consists of over 18,000 lines of source code and has been ported to several versions of Linux, FreeBSD, and SunOS. Information for accessing recent versions of the source code and related documentation is available at http://antigone.eecs.umich.edu.

*This program was written by Patrick Mc-Daniel and Atul Prakash of the University of Michigan for* **Kennedy Space Center**.

*In accordance with Public Law 96-517, the contractor has elected to retain title to this invention. Inquiries concerning rights for its commercial use should be addressed to:*

*Electrical Engineering and*
  *Computer Sciences Department*
*University of Michigan*
*3115 EECS*
*1301 Beal Ave.*
*Ann Arbor, MI 48109*
*Refer to KSC-12207, volume and number of this* NASA Tech Briefs *issue, and the page number.*

## Software for Collaborative Use of Large Interactive Displays

The MERBoard Collaborative Workspace, which is currently being deployed to support the Mars Exploration Rover (MER) Missions, is the first instantiation of a new computing architecture designed to support collaborative and group computing using computing devices situated in NASA mission operations rooms. It is a software system for generation of large-screen interactive displays by multiple users. The architecture provides a platform and applications programming interface (API) for the development of collaborative applications for NASA mission operations. The standard deployment configuration provides an integrated whiteboard, Web browser, remote viewing and control for collaboration over distance, and personal and group storage spaces that provide ubiquitous access and sharing of data. Customization for specific domains is provided through plug-ins. For the MER mission, plug-ins include a flow-charting tool for strategic rover operations and mission planning, 3D visualization of the Martian terrain, a data navigator to navigate the mission database, and situational awareness tools. The MERBoard software is designed to run on large plasma displays with touch-screen overlays, thus providing an immersive and interactive environment for teams to view, annotate, and share data. The MERBoard overcomes the obstacles to communication, retention, and collaborative modification of information in diverse forms that can include text, data (including images) from scientific instruments, handwritten notes, hand drawings, and computer graphics. The MERBoard provides a unifying interface for the integration of heterogeneous applications, and provides those applications with a consistent model for saving and retrieving data. All applications may be viewed and controlled from any location that has a MERBoard. A personal client provides integration of a user's personal computing environment with the MERBoard environment.

*This program was written by Jay Trimble, Thodore Shab, Roxana Wales, Alonso Vera, Irene Tollinger, Michael McCurdy, and Dmitriy Lyubimov at* **Ames Research Center**. *For further information, contact the Ames Technology Partnerships Division at (650) 604-2954.*
*ARC-14951-1*