images are then displayed on a Web page using customized JAVA scripts to display the appropriate zone of the orbiter based on the location of the user's cursor. The close-up graphic and database entry for that particular zone can then be seen by selecting the zone. This page contains links into the database to access the images used by the inspection engineer when they make the determination entered into the database. Status for the inspection zones changes as determinations are refined and shown by the appropriate color code.

Computer-Aided Parallelizer and Optimizer

Ames Research Center, Moffett Field, California

The Computer-Aided Parallelizer and Optimizer (CAPO) automates the insertion of compiler directives (see figure) to facilitate parallel processing on Shared Memory Parallel (SMP) machines. While CAPO currently is integrated seamlessly into CAPTools (developed at the University of Greenwich, now marketed as ParaWise), CAPO was independently developed at Ames Research Center as one of the components for the Legacy Code Modernization (LCM) project. The current version takes serial FORTRAN programs, performs interprocedural data dependence analysis, and generates OpenMP directives. Due to the widely supported OpenMP standard, the generated OpenMP codes have the potential to run on a wide range of SMP machines.

CAPO relies on accurate interprocedural data dependence information currently provided by CAPTools. Compiler directives are generated through identification of parallel loops in the outermost level, construction of parallel regions around parallel loops and optimization of parallel regions, and insertion of directives with automatic identification of private, reduction, induction, and shared variables.

Attempts also have been made to identify potential pipeline parallelism (implemented with point-to-point syn-
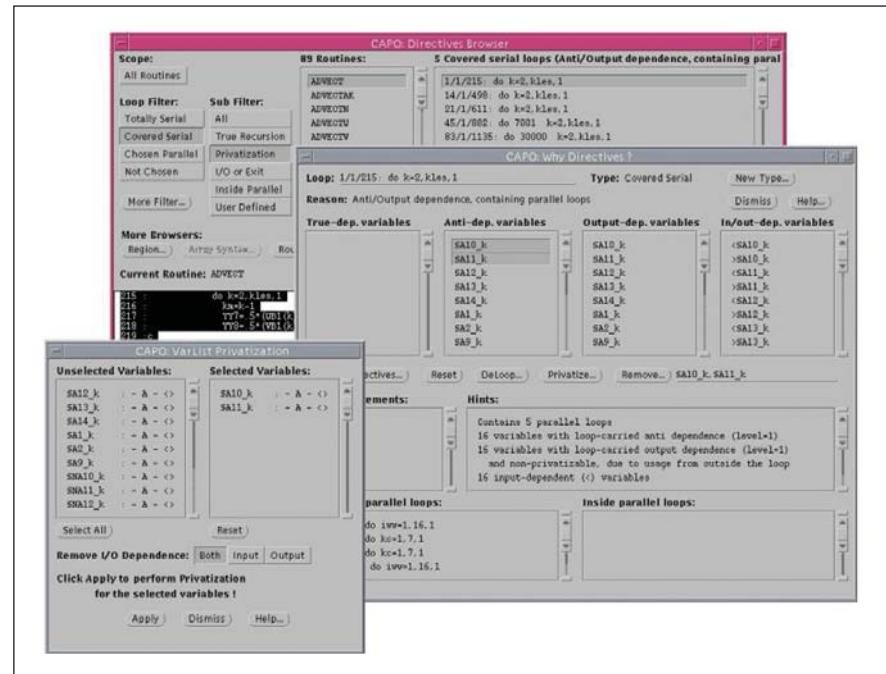
The **Main GUI** (Directives Browser) for CAPO.

chronization). Although directives are generated automatically, user interaction with the tool is still important for producing good parallel codes. A comprehensive graphical user interface is included for users to interact with the parallelization process.

CCSDS Advanced Orbiting Systems Virtual Channel Access Service for QoS MACHETE Model

NASA's Jet Propulsion Laboratory, Pasadena, California

To support various communications requirements imposed by different missions, interplanetary communication protocols need to be designed, validated, and evaluated carefully. Multimission Advanced Communications Hybrid Environment for Test and Evaluation (MACHETE), described in "Simulator of Space Communication Networks" (NPO-41373), *NASA Tech Briefs*, Vol. 29, No. 8 (August 2005), p. 44, combines various tools for simulation and performance analysis of space networks. The MACHETE environment supports orbital analysis, link budget analysis, communications network simulations, and hardware-in-the-loop testing. By building abstract behavioral models of network protocols, one can validate performance after identifying the appropriate metrics of interest. The