

MOPSS uses CORBA in conjunction with a multi-tier architecture to allow multiple users to concurrently view and edit schedule data. The adaptable architecture of MOPSS also enables easy integration of tools and models to satisfy new system requirements. MOPSS has two clients: an X/MOTIF client and a Java client. The Java client is effective over the Web and has been used by remote MAP

mission scientists and engineers to monitor spacecraft integration tests.

The most obvious use of MOPSS is for control of commercial satellites. In the television industry, MOPSS could be used to schedule TV commercials on broadcast television based on FCC rules, demographics, and program content. In the medical field, MOPSS could be used to schedule and optimize use of hospitals

in a network and resources within hospitals. In the power industry, MOPSS can be used to schedule nuclear power plant maintenance. The education and transportation fields are also candidates.

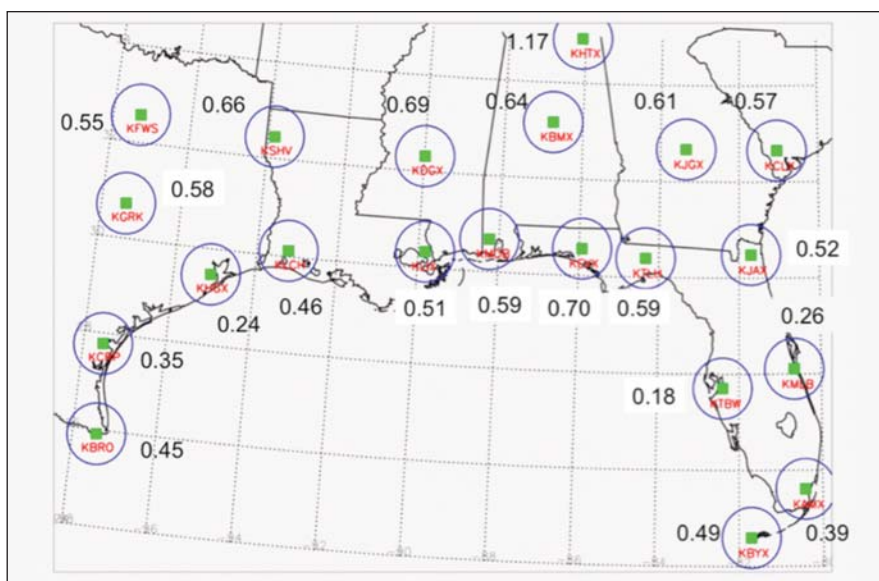
*This work was done by Terri Wood of Goddard Space Flight Center and Paul Hempel of Computer Sciences Corp. Further information is contained in a TSP (see page 1).. GSC-15858-1*

## Global Precipitation Mission Visualization Tool

*Goddard Space Flight Center, Greenbelt, Maryland*

The Global Precipitation Mission (GPM) software provides graphic visualization tools that enable easy comparison of ground- and space-based radar observations. It was initially designed to compare ground radar reflectivity from operational, ground-based, S- and C-band meteorological radars with comparable measurements from the Tropical Rainfall Measuring Mission (TRMM) satellite's precipitation radar instrument. This design is also applicable to other ground-based and space-based radars, and allows both ground- and space-based radar data to be compared for validation purposes.

The tool creates an operational system that routinely performs several steps. It ingests satellite radar data (precipitation radar data from TRMM) and ground-based meteorological radar data from a number of sources. Principally, the ground radar data comes from national networks of weather radars (see figure). The data ingested by the visualization tool must conform to the data formats used in GPM Validation Network Geometry-matched data product generation. The software also performs match-ups of the radar volume data for the ground- and space-based data, as



Location of Validation Network match-up sites and associated site grid domains in the southeastern U.S.

well as statistical and graphical analysis (including two-dimensional graphical displays) on the match-up data.

The visualization tool software is written in IDL, and can be operated either in the IDL development environment or

as a stand-alone executable function.

*This work was done by Mathew Schwaller of Goddard Space Flight Center. For further information, contact the Goddard Innovative Partnerships Office at (301) 286-5810. GSC-15785-1*

## Thermal Protection System Imagery Inspection Management System —TIIMS

*Lyndon B. Johnson Space Center, Houston, Texas*

TIIMS is used during the inspection phases of every mission to provide quick visual feedback, detailed inspection data, and determination to the mission management team. This system consists of a visual Web page interface, an SQL database, and a graphical image generator. These combine to allow a user to as-

certain quickly the status of the inspection process, and current determination of any problem zones.

The TIIMS system allows inspection engineers to enter their determinations into a database and to link pertinent images and video to those database entries. The database then assigns criteria to

each zone and tile, and via query, sends the information to a graphical image generation program. Using the official TIPS database tile positions and sizes, the graphical image generation program creates images of the current status of the orbiter, coloring zones, and tiles based on a predefined key code. These

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.

*This work was done by Sharon Goza and David L. Melendrez of Johnson Space Center, Marsha Hennigan of Jacobs Engineering, Daniel LaBasse of MEI Technologies, and Daniel J. Smith, consultant. Further information is contained in a TSP (see page 1). MSC-24484-1*

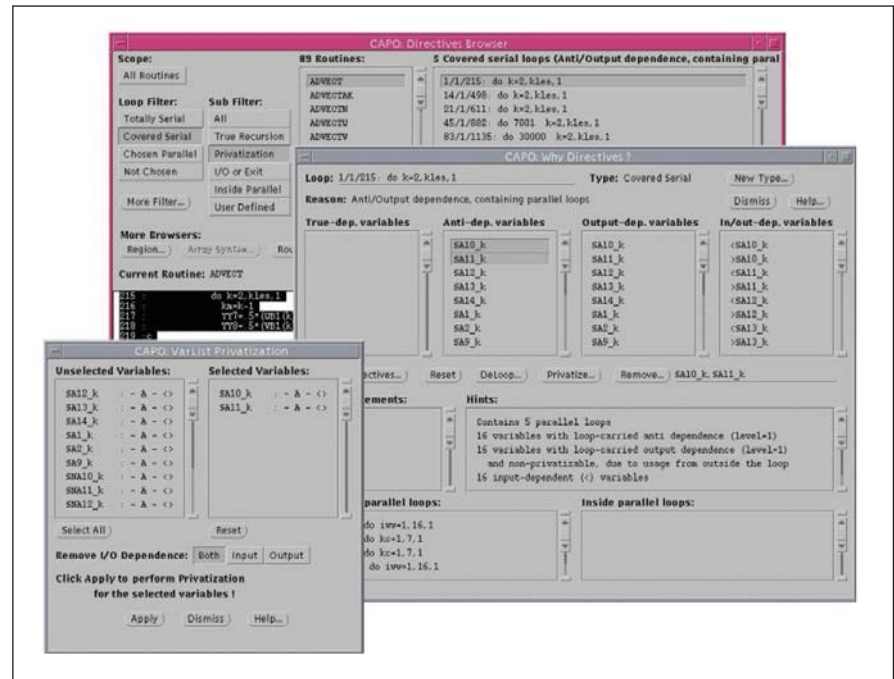
## Computer-Aided Parallelizer and Optimizer

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.

*The work was done by Haoqiang Jin of MRJ Technology Solutions for Ames Research Center. For further information, access <http://people.nasa.gov/~hjin/CAPO/index.html>. ARC-14487-1*

## 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. Multi-mission 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