Software

Data-Driven Software Framework for Web-Based ISS Telescience

Software that enables authorized users to monitor and control scientific payloads aboard the International Space Station (ISS) from diverse terrestrial locations equipped with Internet connections is undergoing development. This software reflects a data-driven approach to distributed operations. A Web-based software framework leverages prior developments in Java and Extensible Markup Language (XML) to create portable code and portable data, to which one can gain access via Web-browser software on almost any common computer. Open-source software is used extensively to minimize cost; the framework also accommodates enterprise-class server software to satisfy needs for high performance and security. To accommodate the diversity of ISS experiments and users, the framework emphasizes openness and extensibility. Users can take advantage of available viewer software to create their own client programs according to their particular preferences, and can upload these programs for custom processing of data, generation of views, and planning of experiments. The same software system, possibly augmented with a subset of data and additional software tools, could be used for public outreach by enabling public users to replay telescience experiments, conduct their experiments with simulated payloads, and create their own client programs and other custom software.

This program was written by Kam S. Tso of IA Tech, Inc. for **Marshall Space Flight Center**. *Further information is contained in a TSP (see page 1).*
MFS-31848

Software for Secondary-School Learning About Robotics

The ROVer Ranch is an interactive computer program designed to help secondary-school students learn about space-program robotics and related basic scientific concepts by involving the students in simplified design and programming tasks that exercise skills in mathematics and science. The tasks involve building simulated robots and then observing how they behave. The program furnishes (1) programming tools that a student can use to assemble and program a simulated robot and (2) a virtual three-dimensional mission simulator for testing the robot. First, the ROVer Ranch presents fundamental information about robotics, mission goals, and facts about the mission environment. On the basis of this information, and using the aforementioned tools, the student assembles a robot by selecting parts from such subsystems as propulsion, navigation, and scientific tools, the student builds a simulated robot to accomplish its mission. Once the robot is built, it is programmed and then placed in a three-dimensional simulated environment. Success or failure in the simulation depends on the planning and design of the robot. Data and results of the mission are available in a summary log once the mission is concluded.

This program was written by Robert O. Shelton of **Johnson Space Center**, *Stephanie L. Smith of LinCom, and Dat Truong and Terry R. Hodgson of Science Applications International Corp. For further information, contact the Johnson Commercial Technology Office at (281) 483-3809.*
MSC-23595

Fuzzy Logic Engine

The Fuzzy Logic Engine is a software package that enables users to embed fuzzy-logic modules into their application programs. Fuzzy logic is useful as a means of formulating human expert knowledge and translating it into software to solve problems. Fuzzy logic provides flexibility for modeling relationships between input and output information and is distinguished by its robustness with respect to noise and variations in system parameters. In addition, linguistic fuzzy sets and conditional statements allow systems to make decisions based on imprecise and incomplete information. The user of the Fuzzy Logic Engine need not be an expert in fuzzy logic: it suffices to have a basic understanding of how linguistic rules can be applied to the user's problem. The Fuzzy Logic Engine is divided into two modules: (1) a graphical-interface software tool for creating linguistic fuzzy sets and conditional statements and (2) a fuzzy-logic software library for embedding fuzzy processing capability into current application programs. The graphical-interface tool was developed using the Tcl/Tk programming language. The fuzzy-logic software library was written in the C programming language.

This program was written by Ayanna Howard of Caltech for **NASA's Jet Propulsion Laboratory**. *Further information is contained in a TSP (see page 1).*

This software is available for commercial licensing. Please contact Don Hart of the California Institute of Technology at (818) 393-3425. Refer to NPO-40461.

Telephone-Directory Program

eDirectory is a computer program that makes it possible to view entries in the Jet Propulsion Laboratory (JPL) telephone directory by use of PalmPilot™ (or equivalent) personal digital assistants. When one uses eDirectory, a single click causes the downloading of a current copy of the directory (which is updated nightly) from a server. The downloaded directory data can be sorted and searched. The program can append a "JPL" category and save directory information in a file that can be imported into the Palm Desktop™ software.

This program was written by William Vlahos of Caltech for **NASA's Jet Propulsion Laboratory**. *Further information is contained in a TSP (see page 1).*

This software is available for commercial licensing. Please contact Don Hart of the California Institute of Technology at (818) 393-3425. Refer to NPO-30427.

Simulating a Direction-Finder Search for an ELT

A computer program simulates the operation of direction-finding equipment engaged in a search for an emergency locator transmitter (ELT) aboard an aircraft that has crashed. The simulated equipment is patterned after the equipment used by the Civil Air Patrol to search for missing aircraft. The program is designed to be used for training in radio direction-finding and/or searching for missing aircraft without incurring the expense and risk of using real aircraft and ground search resources. The program places a hidden ELT on a map and enables the user to search for the location of the ELT by moving a