This software is available for commercial licensing. Please contact Dan Broderick at Daniel.F.Broderick@jpl.nasa.gov. Refer to NPO-47781.

ISTP CDF Skeleton Editor

Basic Common Data Format (CDF) tools (e.g., cdfedit) provide no specific support for creating International Solar-Terrestrial Physics/Space Physics Data Facility (ISTP/SPDF) standard files. While it is possible for someone who is familiar with the ISTP/SPDF metadata guidelines to create compliant files using just the basic tools, the process is error-prone and unreasonable for someone without ISTP/SPDF expertise. The key problem is the lack of a tool with specific support for creating files that comply with the ISTP/SPDF guidelines. There are basic CDF tools such as cdfedit and skeletoncdf for creating CDF files, but these have no specific support for creating ISTP/ SPDF compliant files.

The SPDF ISTP CDF skeleton editor is a cross-platform, Java-based GUI editor program that allows someone with only a basic understanding of the ISTP/SPDF guidelines to easily create compliant files. The editor is a simple graphical user interface (GUI) application for creating and editing ISTP/SPDF guideline-compliant skeleton CDF files. The SPDF ISTP CDF skeleton editor consists of the following components: A swing-based Java GUI program, JavaHelp-based manual/tutorial, Image/Icon files, and HTML Web page for distribution. The editor is available as a traditional Java desktop application as well as a Java Network Launching Protocol (JNLP) application. Once started, it functions like a typical Java GUI file editor application for creating/editing application-unique files.

The editor provides ease of use and support for ISTP/SPDF and project-specific standards. The editor provides support for creating/editing CDF files that comply with the ISTP/SPDF guidelines.

This work was done by Reine Chimiak and Bernard Harris of Goddard Space Flight Center, and Phillip Williams of QSS Group. Further information is contained in a TSP (see page 1). *GSC-16256-1*

Uplink Summary Generator (ULSGEN) Version 1.0

The Uplink Summary Generator (ULSGEN) provides a convenient means of gathering together a set of uplink related files, parsing and analyzing these files, and producing a summary of their contents, which may then be electronically signed by one or more reviewers to verify the commands. Spacecraft operations personnel view this summary as a final sanity check before actual radiation of the uplink data.

Unique features of the software are a browser-based application that can be used both inside and outside the flight operations firewall, file retrieval from the project file server or from the project DOM (Distributed Object Manager), and the ability to parse and analyze spacecraft command files (SCMF). The software also features DSN keyword file (DKF) parsing for uplink windows, and enables hosting of one or more projects in a single server. Each project can define its own uplink summary template.

Each uplink summary is generated based on the analysis results from the parsers and the selected project template. The uplink summary review and signature collection cycle supports both parallel and sequential workflows. RadList file generation enables linkage to the command system.

This work was done by Yeou-Fang Wang, Mitchell Schrock, Timothy J. Reeve, Kristine T. Fong, and Benjamin D. Smith 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 Dan Broderick at Daniel.F.Broderick@jpl.nasa.gov. Refer to NPO-48423.

Robotics On-Board Trainer (ROBoT)

ROBoT is an on-orbit version of the ground-based Dynamics Skills Trainer (DST) that astronauts use for training on a frequent basis. This software consists of two primary software groups. The first series of components is responsible for displaying the graphical scenes. The remaining components are responsible for simulating the Mobile Servicing System (MSS), the Japanese Experiment Module Remote Manipulator System (JEMRMS), and the H-II Transfer Vehicle (HTV) Free Flyer Robotics Operations. The MSS simulation software includes: Robotic Workstation (RWS) simulation, a simulation of the Space Station Remote Manipulator System (SSRMS), a simulation of the ISS Command and Control System (CCS), and a portion of the Portable Computer System (PCS) software necessary for MSS operations.

These components all run under the CentOS4.5 Linux operating system. The JEMRMS simulation software includes real-time, HIL, dynamics, manipulator multi-body dynamics, and a moving object contact model with Tricks discrete time scheduling. The JEMRMS DST will be used as a functional proficiency and skills trainer for flight crews. The HTV Free Flyer Robotics Operations simulation software adds a functional simulation of HTV vehicle controllers, sensors, and data to the MSS simulation software. These components are intended to support HTV ISS visiting vehicle analysis and training. The scene generation software will use DOUG (Dynamic On-orbit Ubiquitous Graphics) to render the graphical scenes. DOUG runs on a laptop running the CentOS4.5 Linux operating system. DOUG is an Open GL-based 3D computer graphics rendering package. It uses pre-built three-dimensional models of on-orbit ISS and space shuttle systems elements, and provides real-time views of various station and shuttle configurations.

This work was done by Genevieve Johnson of Johnson Space Center and Greg Alexander of Harmony Lane Studios, Inc. Further information is contained in a TSP (see page 1). *MSC-25005-1*

Software Engineering Tools for Scientific Models

Software tools were constructed to address issues the NASA Fortran development community faces, and they were tested on real models currently in use at NASA. These proof-of-concept tools address the High-End Computing Program and the Modeling, Analysis, and Prediction Program. Two examples are the NASA Goddard Earth Observing System Model, Version 5 (GEOS-5) atmospheric model in Cell Fortran on the Cell Broadband Engine, and the Goddard Institute for Space Studies (GISS) coupled atmosphere-ocean model called ModelE, written in fixed format Fortran.

To test the tool set, the innovators first extended an annotation and conversation mechanism, known as Activities, allowing developers to provide insights into code without modifying it to include the qualification of Activities with metadata for filtering. Next, the designers created a visualization to present the relationships, or connectivity, between model variables by tracing various constructs through different components and levels of a model.