Software

Processing AIRS Scientific Data Through Level 3

The Atmospheric Infra-Red Sounder (AIRS) Science Processing System (SPS) is a collection of computer programs, known as product generation executives (PGEs). The AIRS SPS PGEs are used for processing measurements received from the AIRS suite of infrared and microwave instruments orbiting the Earth onboard NASA's Aqua spacecraft. Early stages of the AIRS SPS development were described in a prior *NASA Tech Briefs* article: "Initial Processing of Infrared Spectral Data" (NPO-35243), Vol. 28, No. 11 (November 2004), page 39.

In summary: Starting from Level 0 (representing raw AIRS data), the AIRS SPS PGEs and the data products they produce are identified by alphanumeric labels (1A, 1B, 2, and 3) representing successive stages or levels of processing. The previous *NASA Tech Briefs* article described processing through Level 2, the output of which comprises geo-located atmospheric data products such as temperature and humidity profiles among others. The AIRS Level 3 PGE samples selected information from the Level 2 standard products to produce a single global gridded product. One Level 3 product is generated for each day's collection of Level 2 data. In addition, daily Level 3 products are aggregated into two multiday products: an eight-day (half the orbital repeat cycle) product and monthly (calendar month) product.

This work was done by Stephanie Granger, Robert Oliphant, and Evan Manning 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 Karina Edmonds of the California Institute of Technology at (626) 395-2322. Refer to NPO-42146.

Web-Based Requesting and Scheduling Use of Facilities

Automated User's Training Operations Facility Utilization Request (AutoFUR) is prototype software that administers a Web-based system for requesting and allocating facilities and equipment for astronaut-training classes in conjunction with scheduling the classes. AutoFUR also has potential for similar use in such applications as scheduling flight-simulation equipment and instructors in commercial airplane-pilot training, managing preventive-maintenance facilities, and scheduling operating rooms, doctors, nurses, and medical equipment for surgery.

Whereas requesting and allocation of facilities was previously a manual process that entailed examination of documents (including paper drawings) from different sources, AutoFUR partly automates the process and makes all of the relevant information available via the requester's computer. By use of AutoFUR, an instructor can fill out a facility-utilization request (FUR) form on line, consult the applicable flight manifest(s) to determine what equipment is needed and where it should be placed in the training facility, reserve the corresponding hardware listed in a training-hardware inventory database, search for alternative hardware if necessary, submit the FUR for processing, and cause paper forms to be printed. AutoFUR also maintains a searchable archive of prior FURs.

This program was written by Carolyn M. Yeager of Aptek, Inc., for Johnson Space Center. Further information is contained in a TSP (see page 1). MSC-23247-1

AutoGen Version 5.0

Version 5.0 of the AutoGen software has been released. Previous versions, variously denoted "Autogen" and "autogen," were reported in two articles: "Automated Sequence Generation Process and Software" (NPO-30746), *Software Tech Briefs* (Special Supplement to *NASA Tech Briefs*), September 2007, page 30, and "Autogen Version 2.0" (NPO-41501), *NASA Tech Briefs*, Vol. 31, No. 10 (October 2007), page 58.

To recapitulate: AutoGen (now signifying "automatic sequence generation") automates the generation of sequences of commands in a standard format for uplink to spacecraft. AutoGen requires fewer workers than are needed for older manual sequence-generation processes, and greatly reduces sequence-generation times.

The sequences are embodied in spacecraft activity sequence files (SASFs). AutoGen automates generation of SASFs by use of another previously reported program called "APGEN." AutoGen encodes knowledge of different mission phases and of how the resultant commands must differ among the phases. AutoGen also provides means for customizing sequences through use of configuration files. The approach followed in developing AutoGen has involved encoding the behaviors of a system into a model and encoding algorithms for context-sensitive customizations of the modeled behaviors.

This version of AutoGen addressed the MRO (Mars Reconnaissance Orbiter) primary science phase (PSP) mission phase. On previous Mars missions this phase has more commonly been referred to as mapping phase. This version addressed the unique aspects of sequencing orbital operations and specifically the mission specific adaptation of orbital operations for MRO. This version also includes capabilities for MRO's role in Mars relay support for UHF relay communications with the MER rovers and the Phoenix lander.

This program was written by Roy E. Gladden, Teerapat Khanampornpan, and Forest W. Fisher of Caltech for NASA's Jet Propulsion Laboratory.

This software is available for commercial licensing. Please contact Karina Edmonds of the California Institute of Technology at (626) 395-2322. Refer to NPO-45984

Time-Tag Generation Script

Time-Tag Generation Script (TTaGS) is an application program, written in the AWK scripting language, for generating commands for aiming one Ku-band antenna and two S-band antennas for communicating with spacecraft. TTaGS saves between 2 and 4 person-hours per every 24 hours by automating the repetitive process of building between 150 and 180 antenna-control commands. TTaGS reads a text database of communication-satellite schedules and a text database of satellite rise and set times and cross-references items in the two databases. It then compares the scheduled start and stop with the geometric rise and set to compute the times to execute antenna control commands. While so doing, TTaGS determines whether to generate commands for guidance, navigation,