# Software

## Converting From DDOR SASF to APF

A computer program called "ddor_sasf2apf" converts delta-door (delta differential one-way range) request from an SASF (spacecraft activity sequence file) format to an APF (apgen plan file) format for use in the Mars Reconnaissance Orbiter (MRO) mission-planning-and-sequencing process. The APF is used as an input to "APGEN/AUTOGEN" in the MRO activity-planning and command-sequence-generating process to sequence the delta-door (DDOR) activity. The DDOR activity is a spacecraft tracking technique for determining spacecraft location.

The input to ddor_sasf2apf is an input request SASF provided by an observation team that utilizes DDOR. ddor_sasf2apf parses this DDOR SASF input, rearranging parameters and reformatting the request to produce an APF file for use in AUTOGEN and/or APGEN. The benefit afforded by ddor_sasf2apf is to enable the use of the DDOR SASF file earlier in the planning stage of the command-sequence-generating process and to produce sequences, optimized for DDOR operations, that are more accurate and more robust than would otherwise be possible.

*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-45413.*

## Converting From CVF to AAF

A computer program called "dsn config converter" automates what had been a manual process for updating the multimission adaptation file (multi.aaf) used by a multiple-mission-command-sequence-generating process comprised of a combination of the AUTOGEN and APGEN programs mentioned in the immediately preceding article. The program converts the dsn_config.cvf file that provides DSN (Deep Space Network) antenna configuration code mappings from a context variable file (CVF) format used in another part of the command genera-

tion process to an APGEN activity file (AAF) format used by AUTOGEN and APGEN.

Whereas previously, the information in the dsn_config.cvf file was manually encoded into the multi.aaf file, now the program automatically generates a dsn_config.aaf file from the dsn_config.cvf file. As part of this development effort the multi.aaf file was adapted to use the new dsn_config.aaf representations. Through this automation a tedious error-prone step has now been replaced by a quick and robust step.

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## Documenting AUTOGEN and APGEN Model Files

A computer program called "autogen hypertext map generator" satisfies a need for documenting and assisting in visualization of, and navigation through, model files used in the AUTOGEN and APGEN software mentioned in the two immediately preceding articles. This program parses autogen script files, autogen model files, PERL scripts, and apgen activity-definition files and produces a hypertext map of the files to aid in the navigation of the model. This program also provides a facility for adding notes and descriptions, beyond what is in the source model represented by the hypertext map. Further, this program provides access to a summary of the model through variable, function, sub routine, activity and resource declarations as well as providing full access to the source model and source code. The use of the tool enables easy access to the declarations and the ability to traverse routines and calls while analyzing the model.

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

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## Sequence History Update Tool

The Sequence History Update Tool performs Web-based sequence statistics archiving for Mars Reconnaissance Orbiter (MRO). Using a single UNIX command, the software takes advantage of sequencing conventions to automatically extract the needed statistics from multiple files. This information is then used to populate a PHP database, which is then seamlessly formatted into a dynamic Web page.

This tool replaces a previous tedious and error-prone process of manually editing HTML code to construct a Web-based table. Because the tool manages all of the statistics gathering and file delivery to and from multiple data sources spread across multiple servers, there is also a considerable time and effort savings. With the use of The Sequence History Update Tool what previously took minutes is now done in less than 30 seconds, and now provides a more accurate archival record of the sequence commanding for MRO.

*This work was done by Teerapat Khanampornpan, Roy Gladden, Forest Fisher, and Chris Del Guercio of Caltech for NASA's Jet Propulsion Laboratory.*

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## Extraction and Analysis of Display Data

The Display Audit Suite is an integrated package of software tools that partly automates the detection of Portable Computer System (PCS) Display errors. [PCS is a laptop computer used onboard the International Space Station (ISS).] The need for automation stems from the large quantity of PCS displays (6,000+, with 1,000,000+ lines of command and telemetry data). The Display Audit Suite includes data-extraction tools, automatic error detection tools, and database tools for generating analysis spreadsheets.

These spreadsheets allow engineers to more easily identify many different kinds of possible errors. The Suite supports over 40 independent analyses,