This program is currently specialized to small-body proximity operations, but the underlying method can be generalized to other applications.

This program was written by Behçet Akçmeyes, John Carson, and Linh Phan 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-44346.

**DSN Scheduling Engine**

The DSN (Deep Space Network) Scheduling Engine targets all space missions that use DSN services. It allows clients to issue scheduling, conflict identification, conflict resolution, and status requests in XML over a Java Message Service interface. The scheduling requests may include new requirements that represent a set of tracks to be scheduled under some constraints. This program uses a heuristic local search to schedule a variety of schedule requirements, and is in a DSN-standard format containing page header information. RSOE contains a significant amount of information that is not ITAR-compliant, yet that foreign partners need to see for command support purposes. This software is a Perl script intended for use in the mission operations UNIX environment. It is designed for use to support the MRO (Mars Reconnaissance Orbiter) instrument team. The tool also provides automated DOM (Distributed Object Manager) storage into the special ITAR-compliant DOM collection, and can be used for creating focused RSOE for product review by any of the MRO teams.

This program was written by Bradley Clement, Mark Johnston, Allan Wax, and Caroline Chouinard 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-44291.

**Replacement Sequence of Events Generator**

The soeWINDOW program automates the generation of an ITAR (International Traffic in Arms Regulations)-compliant sub-RSOE (Replacement Sequence of Events) by extracting a specified temporal window from an RSOE while maintaining page header information. RSOE contains a significant amount of information that is not ITAR-compliant, yet that foreign partners need to see for command support purposes. This software is a Perl script intended for use in the mission operations UNIX environment. It is designed for use to support the MRO (Mars Reconnaissance Orbiter) instrument team. The tool also provides automated DOM (Distributed Object Manager) storage into the special ITAR-compliant DOM collection, and can be used for creating focused RSOE for product review by any of the MRO teams.

This program was written by Bradley Clement, Mark Johnston, Allan Wax, and Caroline Chouinard 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-44346.

**Tool for Merging Proposals Into DSN Schedules**

A Practical Extraction and Reporting Language (Perl) script called “merge7da” has been developed to facilitate determination, by a project scheduler in NASA’s Deep Space Network, of whether a proposal for use of the DSN could create a conflict with the current DSN schedule. Prior to the development of merge7da, there was no way to quickly identify potential schedule conflicts: it was necessary to submit a proposal and wait a day or two for a response from a DSN scheduling facility. By using merge7da to detect and eliminate potential schedule conflicts before submitting a proposal, a project scheduler saves time and gains assurance that the proposal will probably be accepted. merge7da accepts two input files, one of which contains the current DSN schedule and one of which contains the proposal. This software is available for commercial licensing. Please contact Karina Edmonds of the California Institute of Technology at (626) 395-2322. Refer to NPO-44377.

**Force-Control Algorithm for Surface Sampling**

A G-FCON algorithm is designed for small-body surface sampling. It has a linearization component and a feedback component to enhance performance. The algorithm regulates the contact force between the tip of a robotic arm attached to a spacecraft and a surface during sampling. The control algorithm is insensitive to the surface properties, enabling it to maintain the right contact force for a wide range of surface compliance properties.

The objective of the algorithm is to bring the sampler in contact with the small body surface, and maintain a desired contact force for a prescribed duration of time for sampling. Once the sampling period is over, the control algorithm guides the spacecraft safely away from the surface.

This work was done by Behçet Akçmeyes, Marco B. Quadrelli, and Linh Phan 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-44582.