

## DSN Array Simulator

NASA's Jet Propulsion Laboratory, Pasadena, California

The DSN Array Simulator (wherein "DSN" signifies NASA's Deep Space Network) is an updated version of software previously denoted the DSN Receive Array Technology Assessment Simulation. This software (see figure) is used for computational modeling of a proposed DSN facility comprising user-defined arrays of antennas and trans-

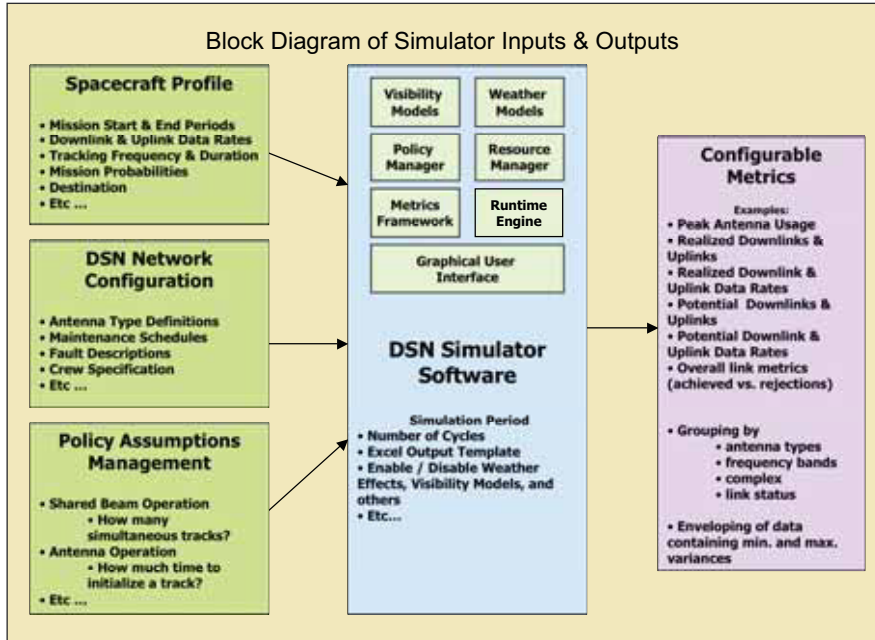
mitting and receiving equipment for microwave communication with spacecraft on interplanetary missions. The simulation includes variations in spacecraft tracked and communication demand changes for up to several decades of future operation. Such modeling is performed to estimate facility performance, evaluate requirements that gov-

ern facility design, and evaluate proposed improvements in hardware and/or software.

The updated version of this software affords enhanced capability for characterizing facility performance against user-defined mission sets. The software includes a Monte Carlo simulation component that enables rapid generation of key mission-set metrics (e.g., numbers of links, data rates, and data volumes), and statistical distributions thereof as functions of time. The updated version also offers expanded capability for mixed-asset network modeling — for example, for running scenarios that involve user-definable mixtures of antennas having different diameters (in contradistinction to a fixed number of antennas having the same fixed diameter). The improved version also affords greater simulation fidelity, sufficient for validation by comparison with actual DSN operations and analytically predictable performance metrics.

*This program was written by Raffi Tikidjian and Ryan Mackey 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-44506.*

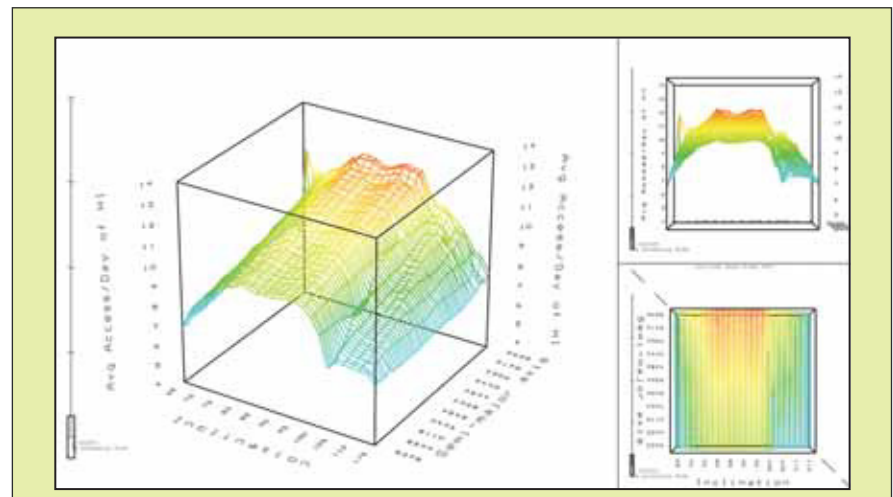


DSN Array Simulator Overview

## Parametric-Studies and Data-Plotting Modules for the SOAP

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"Parametric Studies" and "Data Table Plot View" are the names of software modules in the Satellite Orbit Analysis Program (SOAP). Parametric Studies enables parameterization of as many as three satellite or ground-station attributes across a range of values and computes the average, minimum, and maximum of a specified metric, the revisit time, or 21 other functions at each point in the parameter space. This computation produces a one-, two-, or three-dimensional table of data representing statistical results across the parameter space. Inasmuch as the output of a parametric study in three dimensions can be a very large data set, visualization is a paramount means of discovering trends in the data (see figure).



Sample Output