Spectral Analysis Tool 6.2 for Windows

NASA's Jet Propulsion Laboratory, Pasadena, California

Spectral Analysis Tool 6.2 is the latest version of a computer program that assists in analysis of interference between radio signals of the types most commonly used in Earth/spacecraft radio communications. [An earlier version was reported in "Software for Analyzing Earth/Spacecraft Radio Interference" (NPO-20422), *NASA Tech Briefs*, Vol. 25, No. 4 (April 2001), page 52.] SAT 6.2 calculates signal spectra, bandwidths, and interference effects for several families of modulation schemes. Several types of filters can be modeled, and the program calculates and displays signal spectra after filtering by any of the modeled filters. The program accommodates two simultaneous signals: a desired signal and an interferer. The interference-to-signal power ratio can be calculated for the filtered desired and interfering signals. Bandwidth-occupancy and link-budget calculators are included for the user's convenience. SAT 6.2 has a new software structure and provides a new user interface that is both intuitive and convenient. SAT 6.2 incorporates multi-tasking, multithreaded execution, virtual memory management, and a dynamic link library. SAT 6.2 is designed for use on 32-bit computers employing Microsoft Windows operating systems.

This program was written by Feiming Morgan, Miles Sue, Ted Peng, Harry Tan, and Robert Liang of Caltech and Peter Kinman of California State University, Fresno, 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-43129.

Multi-Platform Avionics Simulator

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Multi-Platform Avionics Simulator (MPAvSim) is a software library for development of simulations of avionic hardware. MPAvSim facilitates simulation of interactions between flight software and such avionic peripheral equipment as telecommunication devices, thrusters, pyrotechnic devices, motor controllers, and scientific instruments. MPAvSim focuses on the behavior of avionics as seen by flight software, rather than on performing high-fidelity simulations of dynamics. However, MPAvSim is easily integrable with other programs that do perform such simulations. MPAvSim makes it possible to do real-time partial hardware-in-the-loop simulations. An MPAvSim simulation consists of execution chains (see figure) represented by flow graphs of models, defined here as stateless procedures that do some work. During a simulation, MPAvSim walks the execution chain, running each model in turn. Using MPAvSim, flight software can be run against a spacecraft that is all simulation, all hardware, or part hardware and part
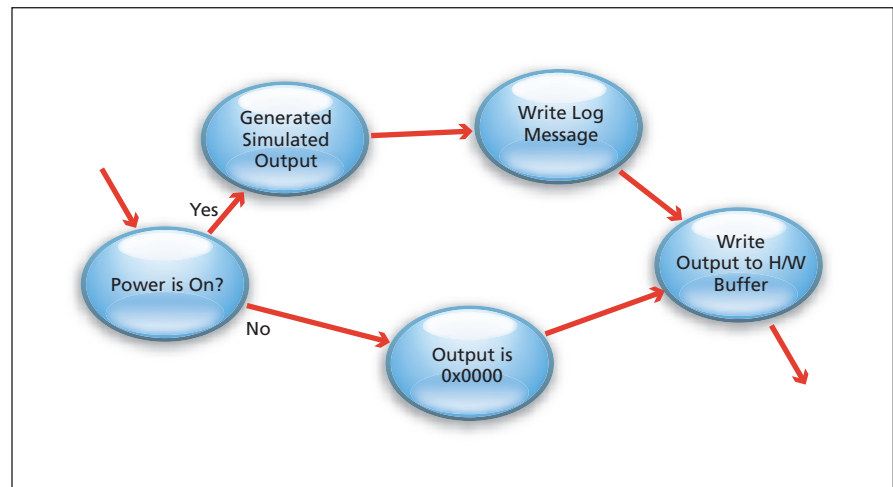
A **Simple Execution Chain** is shown for a device with a power switch.

simulation. With respect to a specific piece of hardware, either the hardware itself or its simulation can be plugged in without affecting the rest of the system. Thus, flight software can be tested before hardware is available, and as items of hardware become available, they can be substituted for their simulations, with minimal disruption.

This program was written by Micah Clark, Robert Steinke, and Elihu McMahon 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-41277.