both the L1 (1.57542-GHz) and L2 (1.2276-GHz) GPS signals.

This program was written by Sung Byun, George Hajj, and Lawrence Young 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 Don Hart of the California Institute of Technology at (818) 393-3425. Refer to NPO-40463.

Parallel Adaptive Mesh Refinement Library

Parallel Adaptive Mesh Refinement Library (PARAMESH) is a package of Fortran 90 subroutines designed to provide a computer programmer with an easy route to extension of (1) a previously written serial code that uses a logically Cartesian structured mesh into (2) a parallel code with adaptive mesh refinement (AMR). Alternatively, in its simplest use, and with minimal effort, PARAMESH can operate as a domain-decomposition tool for users who want to parallelize their serial codes but who do not wish to utilize adaptivity. The package builds a hierarchy of sub-grids to cover the computational domain of a given application program, with spatial resolution varying to satisfy the demands of the application. The sub-grid blocks form the nodes of a tree data structure (a quad-tree in two or an oct-tree in three dimensions). Each grid block has a logically Cartesian mesh. The package supports one-, two- and three-dimensional models.

This program was written by Peter Mac-Neice of Raytheon/STX and Kevin Olson of George Mason University for **Goddard Space Flight Center**. *For further information, access http://sdcd.gsfc.nasa.gov/RIB/repositories/in house_gsfc/Users_manual/amr_tutorial.html. GSC-14626-1*

Space Physics Data Facility Web Services

The Space Physics Data Facility (SPDF) Web services provides a distributed programming interface to a portion of the SPDF software. (A general description of Web services is available at *http://www.w3.org/* and in many current software-engineering texts and articles focused on distributed programming.) The SPDF Web services distributed programming interface enables additional collaboration and inte-

gration of the SPDF software system with other software systems, in furtherance of the SPDF mission to lead collaborative efforts in the collection and utilization of space physics data and mathematical models. This programming interface conforms to all applicable Web services specifications of the World Wide Web Consortium. The interface is specified by a Web Services Description Language (WSDL) file. The SPDF Web services software consists of the following components:
- A server program for implementation of the Web services; and
- A software developer's kit that consists of a WSDL file, a less formal description of the interface, a Java class library (which further eases development of Java-based client software), and Java source code for an example client program that illustrates the use of the interface.

This program was written by Robert M. Candey, Bernard T. Harris, and Reine A. Chimiak of **Goddard Space Flight Center**. *For further information, access http://spdf.gsfc.nasa.gov/. GSC-14730-1*

Predicting Noise From Aircraft Turbine-Engine Combustors

COMBUSTOR and CNOISE are computer codes that predict far-field noise that originates in the combustors of modern aircraft turbine engines — especially modern, low-gaseous-emission engines, the combustors of which sometimes generate several decibels more noise than do the combustors of older turbine engines. COMBUSTOR implements an empirical model of combustor noise derived from correlations between engine-noise data and operational and geometric parameters, and was developed from databases of measurements of acoustic emissions of engines. CNOISE implements an analytical and computational model of the propagation of combustor temperature fluctuations (hot spots) through downstream turbine stages. Such hot spots are known to give rise to far-field noise. CNOISE is expected to be helpful in determining why low-emission combustors are sometimes noisier than older ones, to provide guidance for refining the empirical correlation model embodied in the COMBUSTOR code, and to provide insight on how to vary downstream turbine-stage geometry to reduce the contribution of hot spots to far-field noise.

These programs were written by P. Gliebe, R. Mani, S. Salamah, and R. Coffin of General Electric Co. and Jayesh Mehta of Diversitec, Inc., for **Glenn Research Center**. *Further information is contained in a TSP (see page 1).*

Inquiries concerning rights for the commercial use of this invention should be addressed to NASA Glenn Research Center, Commercial Technology Office, Attn: Steve Fedor, Mail Stop 4-8, 21000 Brookpark Road, Cleveland, Ohio 44135. Refer to LEW-17385-1.

Generating Animated Displays of Spacecraft Orbits

Tool for Interactive Plotting, Sonification, and 3D Orbit Display (TIPSOD) is a computer program for generating interactive, animated, four-dimensional (space and time) displays of spacecraft orbits. TIPSOD utilizes the programming interface of the Satellite Situation Center Web (SSCWeb) services to communicate with the SSC logic and database by use of the open protocols of the Internet. TIPSOD is implemented in Java 3D and effects an extension of the pre-existing SSCWeb two-dimensional static graphical displays of orbits. Orbits can be displayed in any or all of the following seven reference systems: true-of-date (an inertial system), J2000 (another inertial system), geographic, geomagnetic, geocentric solar ecliptic, geocentric solar magnetospheric, and solar magnetic. In addition to orbits, TIPSOD computes and displays Sibeck's magnetopause and Fairfield's bow-shock surfaces. TIPSOD can be used by the scientific community as a means of projection or interpretation. It also has potential as an educational tool. Documentation and links for downloading the software can be found at *http://sscweb.gsfc.gov/tipsod/*.

This program was written by Robert M. Candey, Reine A. Chimiak, and Bernard T. Harris of **Goddard Space Flight Center**. *For more information contact the Goddard Commercial Technology Office at (301) 286-5810. GSC-14732-1*

Diagnosis and Prognosis of Weapon Systems

The Prognostics Framework is a set of software tools with an open architecture that affords a capability to integrate various prognostic software mechanisms and to provide information for operational and battlefield decision-making and logistical planning pertaining to weapon systems. The Prognostics