SPICE Products and Services Available to the Planetary Cartography Community.

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NASA's SPICE system is used as the mechanism for capturing, archiving and disseminating a variety of ancillary and engineering information needed by scientists involved in mission design, observation planning, science data analysis and visualization, and correlation of data between multiple instruments. SPICE ancillary data includes spacecraft trajectory, target body ephemerides, target size/shape/orientation, spacecraft orientation, instrument mounting and field-of-view geometry, and commands and events associated with the conduct of a mission.

SPICE is the standard for nearly all NASA planetary missions such as Galileo, Clementine, MGS, Mars Odyssey, Cassini, NEAR, DS-1, Stardust, MER, Deep Impact, MRO and CONTOUR. It will also be used on Mars Express (in parallel with ESA standards), and it could be used on ESA's Rosetta, Japan's Nozomi, or other foreign missions.

SPICE data files, often called "kernels," contain fairly primitive data from which numerous quantities of interest can be derived–items such as latitude and longitude, range, smear velocity, lighting angles (phase, incidence, emission), visibility windows, and similar quantities. SPICE kernel files can be easily ported to all popular platforms.

SPICE files are normally generated by active flight projects, although generic SPICE ephemerides for planets, satellites and some comets and asteroids are also available.

A major component of the SPICE system is a large suite of software–the SPICE Toolkit–consisting primarily of a subroutine library named SPICELIB. These subroutines are used to read SPICE kernel files and to compute the derived quantities of most interest to scientists and engineers. The customer integrates appropriate SPICELIB subroutines into an application program designed to accomplish whatever is needed.

The SPICE Toolkit is available in ANSI FORTRAN 77 and in ANSI C. It is ported to and tested on most popular platforms by NAIF staff before being offered to the science community. A version featuring special "wrappers" to facilitate interface with the Interactive Data Language (IDL) will soon be available. The environments supported include Sun/SunOS, Sun/Solaris, HP/HPUX, SGI/IRIX, PC/Windows or NT or LINUX, Macintosh, DEC Alpha/VMS and DEC Alpha/Digital Unix.

In addition to SPICELIB the NAIF Toolkit includes a number of related utility programs, example programs and a large body of documentation. A large set of tutorials is also available.

This presentation is intended to update the cartography community about SPICE products and services available from the Navigation and Ancillary Information Facility (NAIF), emphasizing recent developments, such as new instrument field-of-view software and use of non-native binary format kernels, and outlining plans for possible future work, such as implementation of a new control net kernel, incorporation of terrain models into SPICE, and realization of a substantial WWW interface to SPICE products. It is also intended to elicit suggestions on improvements and extensions needed to support the community.

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