

Plans for Evolving the SPICE Ancillary Information System

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NASA's "SPICE" ancillary information system provides space scientists and engineers a convenient and stable means for acquiring and using the host of geometric and timing information needed for designing space missions, planning scientific observations to be acquired by those missions, monitoring spacecraft performance, analyzing the science data returned, and correlating science results across missions that have common target bodies. The SPICE system specifies a standard set of ancillary data products, such as spacecraft trajectory, target body ephemeris, target body size/shape/orientation, spacecraft orientation, instrument field-of-view size/shape/orientation, reference frame specifications, and assorted time system correlation data. "SPICE" also comprises a large suite of software used to help produce SPICE files, to read data from SPICE files, and to compute useful derived parameters from the SPICE data files, items such as spacecraft altitude, latitude and longitude, instrument field-of-view projection onto a target body surface, lighting angles, and so on. The SPICE system has been used on all of NASA's planetary exploration missions since Magellan, and is also used on a number of European and Japanese missions. The SPICE software is free, and is available in several languages--FORTRAN, C and IDL--and for many popular computing environments.

While supporting many current missions, the SPICE authors continue to evolve the system, improving current capabilities and adding new functionality requested by the space science community. This paper provides a brief overview of the extant SPICE system, but pays particular attention to capabilities only recently added or being developed now. From the former category we present the new dynamic reference frames capability, and from the later category we present the so-called "plate model" that is useful in modeling the size and shape of small, irregularly shaped bodies such as asteroids and small satellites like Phobos. A peek into the future of SPICE is also provided, such as plans for incorporating a digital terrain model capability and JAVA Native Interface support.

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