

**The SPICE Digital Shape Kernel (DSK) Subsystem.** N. J. Bachman<sup>1</sup> <sup>1</sup>Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Dr. Pasadena, CA. Nathaniel.J.Bachman@jpl.nasa.gov.

### **Introduction:**

The Navigation and Ancillary Information Facility (NAIF) at the Jet Propulsion Laboratory developed the SPICE System in order to store, retrieve and perform analysis of data observed by unmanned NASA planetary missions. [1]

The latest version of the SPICE Toolkit (N0066) includes an implementation of a kernel subsystem which formerly was available only as a prototype: the Digital Shape Kernel (DSK).

The DSK subsystem is the component of SPICE concerned with detailed shape models for extended objects. These objects typically are solar system bodies such as planets, dwarf planets, natural satellites, asteroids, and comet nuclei. DSK data can represent the shapes of such objects, as well as local topography, such as that in the vicinity of a rover or a tracking station.

DSK data also can represent shapes of artificial objects such as spacecraft components, or represent abstractions such as the subset of a target body's surface that has a property of interest.

The DSK subsystem comprises software, the DSK file format specification, and documentation.

The primary purpose of the DSK subsystem is to enable SPICE-based applications to conveniently and efficiently use detailed shape data in geometry computations performed by SPICE routines. DSK data enable these routines to produce more accurate results than those obtainable using triaxial ellipsoid shape models.

The poster will present an overview of the DSK subsystem, together with code examples demonstrating the capabilities of the system.

### **References:**

- [1] Acton, C.H. (1996) PSS, 44 No. 1, pp. 65-70.
- [2] Acton C.H., Bachman N.J., Semenov B.V., Wright E.D. PSS (2017), DOI 10.1016/j.pss.2017.02.013.

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### **Additional Information:**