SPICE PRODUCTS AVAILABLE TO THE PLANETARY SCIENCE COMMUNITY

Poster Presentation by
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LPSC
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What Are SPICE Data?

SPICE data tell you:

• when an instrument was taking data

• how an instrument was acquiring data (operating mode)

• where the spacecraft was located

• how the spacecraft and its instruments were oriented (pointed)

• what was the location, size, shape and orientation of the target being observed

• what other relevant events were occurring on the spacecraft or within the ground data system
SPICE File Types

- Spacecraft/lander/rover ephemerides (position & velocity) SPK
- Target body ephemerides SPK
- Target body size/shape/orientation PCK
- Instrument and other structures mounting alignment FK
- Instrument field-of-view geometry and similar information IK
- Spacecraft and other articulating structures orientation CK
- Spacecraft clock correlation coefficients SCLK
  Used for spacecraft clock time conversion
- Leapseconds LSK
  Used for ephemeris time conversion
- Events (EK):
  - Science observation plans ESP
  - Sequence (spacecraft and instrument commands) ESQ
  - Experimenter's Notebook ENB
- Star catalog (coming soon)
SPICE Software

- Subroutines to write some kinds of SPICE files (SPK, CK, ESQ)
- Programs to write some kinds of SPICE files (SPK, ENB)
- Subroutines to read SPICE files (all types except ESP, ENB)
- Subroutines to compute parameters derived from SPICE kernels data
  - Examples: position, direction, lighting angles, LAT/LON, etc.
- Program for querying contents of EVENTS kernels (ESQ)
- Programs for utility and data management functions
  - Porting binary files between dissimilar CPUs (SPK, CK, ESQ)
  - Merging binary files (SPK, CK)
  - Summarizing contents/coverage (SPK, soon CK)
  - Annotating binary files with metadata (SPK, CK, ESQ)
  - Reading or extracting metadata from files (SPK, CK, ESQ)
Examples of What Can Be Computed Using SPICE Data and Software

- Position, velocity, range, altitude, light-time
- Target body orientation
- Sub-spacecraft latitude and longitude
- Spacecraft or spacecraft structure orientation
- Instrument orientation ("look direction")
- Instrument "look direction" intercept location on a target
- Instrument field-of-view projection on a target
- Lighting angles (phase, incidence, emission) at a specified location
- Smear magnitude and orientation
## SPICE File Availability

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* = full or partial  
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