



Navigation and Ancillary Information Facility

SPICE Development Plans and Possibilities

September 2009



Outline

Navigation and Ancillary Information Facility

- **Work in progress**
- **Future possibilities**
- **Your suggestions?**



Work In Progress

Navigation and Ancillary Information Facility

- **Geometric event finder subsystem**
 - Find time(s) when such-and-such a geometric condition exists
 - First official release was as part of the N63 Toolkit
 - Still more capability is being prepared for future release (N64?)
- **Shape model subsystem**
 - Synthesis of current shape model (triaxial ellipsoid), “plate model” for small, irregularly shaped bodies, and a digital elevation model
 - Beta test release expected in winter of 2009-10



Starting Spring 2009

Navigation and Ancillary Information Facility

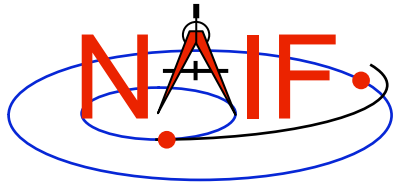
- **Additional interfaces to SPICE**
 - **Java Native Interface (JNI)**
 - » **Well underway**
 - » **A beta-test release is expected early in CY 2010**
 - **Python**
 - » **Considerable prototyping has been done**
 - » **Most development work to take place in FY2010**
 - » **A beta-test release will be offered when ready**



Other Possibilities - 1

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- **Provide a tool that will contrast a set of SPK files, thus aiding you in selecting the one(s) of interest**
- **Provide a tool for easier creation of a SPICE frame, and visualization thereof**
- **Provide a “predict spk” tool that makes it easy to construct an SPK file from simple rules**
- **Add more high-level computations, such as instrument footprint coverage**
- **Star catalog integrated with SPICE capabilities**
- **Run-time creation of SPK and CK**



Other Possibilities - 2

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Java/Spice Interface test

Kernels Computations Drawings Log

Illumination Angles

"GEOCALC"

Target: Mars

Observer: MEX

Surface point longitude: 114.786907

Surface point latitude: -14.773171

Observation epoch: 2004 Jan 4 08:52:00.707724

Compute

Aberration Correction

☐ NONE

☒ LT

☐ LT+S

Coordinate System

☒ Planetocentric

☐ Planetodetic

Illumination angles at surface point, as seen from observer

Target	Mars
Observer	MEX
Aberration correction	NONE
Time	2004 Jan 4 08:52:00.707724
Surface planetocentric longitude (deg)	114.786907
Surface planetocentric latitude (deg)	-14.773171
Phase angle (deg)	37.317459
Solar incidence angle (deg)	37.317454
Emission angle (deg)	0.000007

Provide a GUI interface to a limited set of SPICE computations.

In this example, compute the illumination angles on Mars at LON 114.7 and LAT -14.7 as seen from Mars Express on 2004 JAN 4 08:52:00. The user can pick either a planetocentric or planetodetic reference frame.



Still Other Possibilities?

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- **Additional target models: rings, gravity, atmosphere, magnetosphere, ...**
- **Develop a more flexible and extensible instrument modeling mechanism**



What do **You** Suggest?

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- **NAIF solicits suggestions from the user community.**
 - We're a small team and have a large backlog, so we can't promise any particular action.
- **We're interested in programmatic ideas as well as technical ones.**
 - Should NAIF promote use of SPICE beyond NASA's planetary science program?
 - What amount of cooperation and interoperability with foreign partners is appropriate and achievable?
 - » As of 9/09 the International Planetary Data Alliance (IPDA) is forming a "project" to address this question.