SPICE Toolkit
Common Problems

April 2023

Topics

- **Prevention**
- **Useful Documentation**
- **Reporting a Problem to NAIF**

Prevention - 1

- ## Use a Toolkit obtained directly from NAIF and intended for your specific environment (platform/OS/compiler/compiler options)
  - Be extra careful about **32-bit** versus **64-bit** hardware

- ## Use a current Toolkit
  - Newer Toolkits may have bug fixes and new features you need
    - » Toolkits are always backwards compatible, so you should have no problem re-linking your "old" application to the latest Toolkit

- ## Read the pertinent documentation
  - Tutorials, module headers, Required Reading technical reference documents, comments inside kernels

- ## Use the correct kernels
  - Often, but not always, this means the latest version
  - Verify that contents, time coverage (if applicable) and intended use are suitable for your work

- ## If you are using a Fortran Toolkit, be sure your text kernels all use the line termination appropriate for your platform.
  - Unix/Linux/OSX use <LF>; PC/Windows uses <CR><LF>
  - Using the BINGO utility from the NAIF website to make the change is one solution
  - Be sure the last line in your text kernel ends with an end of line termination

Navigation and Ancillary Information Facility

- ## Avoid common implementation problems
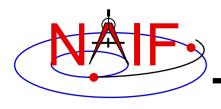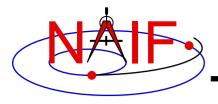 - Verify use of the correct time system for your need
    - » e.g., TDB (also called ET), UTC, or SCLK?
  - When using SCLK time tags, be sure to form your SCLK string to match the specification within the SCLK kernel
    - » Make sure the fractional part is in the form that is expected
  - Verify that correct reference frames are used
    - » e.g., MOON_PA versus MOON_ME versus IAU_MOON?
    - » e.g. IAU_Mars versus MARSIAU? (these are VERY different frames)
  - Check definitions of geometric quantities
    - » e.g. Planetocentric vs. planetographic vs planetodetic coordinates
    - » Oblate, spherical or DSK body shape
  - Check aberration corrections
    - » Converged Newtonian light time + stellar aberration, light time + stellar aberration, light time only, or none?
    - » Target orientation corrected for light time?
  - Don't confuse an instrument <u>reference frame</u> ID with the ID of the instrument itself (the object ID)

Useful Documentation

- **NAIF has compiled a list of common problems, probable causes, and solutions:**
  - **Refer to …/doc/html/req/problems.html or …doc/req/PROBLEMS.REQ, both of which are provided in each Toolkit package. Or, access the HTML document corresponding to the supported language at:**
    - » **https://naif.jpl.nasa.gov/pub/naif/toolkit_docs/FORTRAN/req/problems.html**
    - » **https://naif.jpl.nasa.gov/pub/naif/toolkit_docs/C/req/problems.html**
    - » **https://naif.jpl.nasa.gov/pub/naif/toolkit_docs/IDL/req/problems.html**
    - » **https://naif.jpl.nasa.gov/pub/naif/toolkit_docs/MATLAB/req/problems.html**

- **Some on-line tutorials (e.g. SPK and CK) include a common problems section near the end of the tutorial**

- **It may be useful to read these documents BEFORE embarking on extensive SPICE-based programming projects, since some problems are best solved early in the software development cycle**

Reporting a Problem to NAIF

Navigation and Ancillary Information Facility

- **If you need help troubleshooting a programming or usage problem, you can send email to NAIF. Try to include these items in your email message:**
  - **The SPICE or operating system diagnostic messages written to the screen or to log files**
  - **The name and version of the operating system you're using**
  - **The name and version of the compiler or programming environment (gcc, gfortran, ifort, clang, IDL, Matlab, etc.)**
  - **The Toolkit version you're using, e.g. N0067 (also called N67)**
  - **Names of the kernel files being used**
    - » **Include any meta-kernel you're using**
    - » **You may need to provide the kernels themselves if these are not available to NAIF**
  - **Your inputs to the SPICE modules that signaled the error**
  - **If possible, a code fragment from where the error seems to occur**

- **Send the email to only one person on the NAIF team**
  - **It will get routed to the best person to provide an answer**
  - **Contact information: https://naif.jpl.nasa.gov/naif/contactinfo.html**