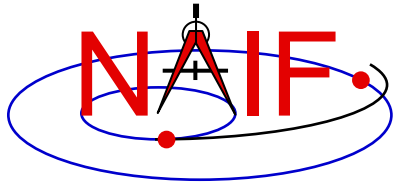


Navigation and Ancillary Information Facility

SPICE Toolkit Common Problems

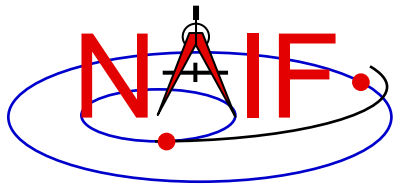
January 2020



Topics

Navigation and Ancillary Information Facility

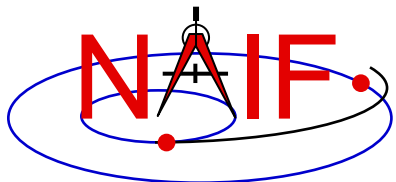
- **Prevention**
- **Useful Documentation**
- **Reporting a Problem to NAIF**



Prevention - 1

Navigation and Ancillary Information Facility

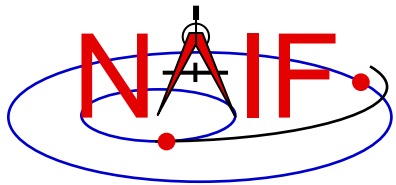
- **Use a Toolkit obtained directly from NAIF and intended for your specific environment (platform/OS/compiler/compiler options)**
 - Be extra careful about **32-bit** versus **64-bit** hardware
- **Use a current Toolkit**
 - Newer Toolkits may have bug fixes and new features you need
 - » Toolkits are 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



Prevention - 2

Navigation and Ancillary Information Facility

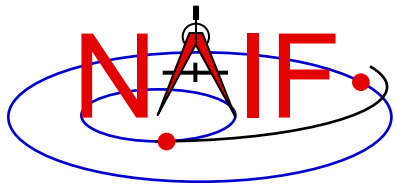
- **Avoid common implementation problems**
 - **Verify use of the correct time system for your need**
 - » e.g., TDB (also called ET), UTC, or SCLK?
 - **When using SCLK time tags, be sure to form your SCLK string to match the specification within the SCLK kernel**
 - » **Make sure the fractional part 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 reference frame ID with the ID of the instrument itself (the object ID)**



Useful Documentation

Navigation and Ancillary Information Facility

- **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. N0066 (also called N66)
 - 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>