

C. Acton's Notes from the October 2014 SPICE Class in Columbia, Maryland
10/31/14

SUMMARY

The class was held on October 21 – 23, 2014 in the Sheraton Columbia Town Center, Columbia Maryland. As best I could see the hotel accommodations for the class were excellent, including WiFi performance.

A total of 66 people indicated interest in the class, with seven of those initially saying "maybe" they would attend while the rest said "yes." By the time of the class the expected attendance was down to 48. We think 43 actually attended some or all of the class. Unanticipated job-related business, lack of travel funding and last minute personal matters were contributing factors for at least some of those unable to make it. Initially five foreign persons had signed up, but only two were ultimately able to attend. Two of the "students" were actually SPICE experts from their own institutions (Applied Physics Lab and Space Research Institute) who helped with teaching/mentoring aspects. One student was from a commercial entity and one from a public outreach enterprise. Three "students" were representatives from NASA management who attended some or all of the sessions.

Very roughly speaking, about two students said they would use Fortran, eleven would use C, 17 would use IDL and 15 would use Matlab. (Yes, that totals to more than 43... it includes a few who didn't show up.) Some students had not indicated what programming language would be used.

This was the first time a SPICE class was taught on the East Coast: around 23 students came from that region. (Many of those expressed appreciation that NAIF was finally able to conduct a class "nearby.") Not surprisingly, only three students were from JPL! It is clear that travel—both time and expense—are major considerations for those contemplating attending such a class.

The class was billed as a beginner's class, as has been done in the past. It substantially followed the agenda used in earlier classes, interleaving tutorial lectures and student-executed programming lessons.

NAIF's time to prepare for the class was quite substantial, mostly due to the number of new and changed items resulting from release of the version N65 Toolkit in July.

As has always been the case, a few "bugs" were present in some tutorials. NAIF will correct these in both the "class" versions and the sometimes more extensive "on-line" versions post haste. Students were urged to refer to the "on-line" versions in the future since these are often more comprehensive.

NAIF departed somewhat from the agenda by demonstrating the now emerging "WebGeocalc" tool, and, a prototype of a mission visualization tool named

Cosmographia. The students seemed generally interested in both of these capabilities. NAIF indicated it's not clear if the JPL-supplemented version of Cosmographia, the version needed to fully utilize SPICE capabilities, will end up being distributable.

The measure of the success of the class is certainly an individual determination for each student, but it did appear to the NAIF staff that the attendees were substantially engaged throughout the three-day session. Attendance remained at 43 (max) on the second day, and dropped a bit to 40 (max) on the third day. Quite a few students expressed their appreciation after the class. A number of students also provided suggestions for improving the class and for improving the SPICE system (see Student Feedback below).

Acton solicited any additional student feedback via email, sent either to him or, to remain anonymous, sent to the PDS Project Scientist: Faith Vilas (fvilas@psi.edu).

The NAIF Team thanked the students for taking the time to attend the class, and thanked NASA for making the class arrangements. Chuck Acton thanked the NAIF Team members and the guest instructors for their substantial efforts in support of the class, and in support of SPICE.

STUDENT FEEDBACK

(Probably not complete; please provide updates and corrections.)

- Much interest in a Python version of the Toolkit.
- Much interest in thread-safe Toolkits. (I don't recall any specific discussion about having an object-oriented Toolkit, but NAIF has heard this request many times in other venues.)
- One student was quite interested in NAIF providing a star catalog facility, noting that stars are often used in instrument calibration. This means at least finishing the star catalog subsystem started long ago, but perhaps going further. She provided some specific suggestions.
- Seemed like substantial interest in the new WebGeocalc GUI interface to SPICE. One student suggested WGC be augmented to somehow tell the user which SPICE APIs are used in each kind of calculation.
- Also considerable interest in NAIF (or JPL or ??) providing a mission visualization capability such as demonstrated using Cosmographia.
- Kernel management was, as always, a concern. Several folks suggested improvements to the meta-kernel (a.k.a. "furnsh kernel") mechanism, including platform-independent portability and also support for "operations" kernels.

- One student asked for a more comprehensive explanation of the SPK (ephemeris files) generated by JPL's Horizons System for use in SPICE.
- There was considerable discussion on occultations and transits; probably NAIF could do more to explain how SPICE works.
- Closer integration between SPICE and ISIS (the USGS "image" processing system) was suggested.
- Some students asked about the possibility to use SPICE on non-planetary missions. Acton encouraged anyone interested in such use to push this idea up from the grass roots. And he more generally encouraged everyone to speak up widely and often for whatever they do/don't want out of NASA.
- With regard to the class itself...
 - Several students said that having the in-person classes is very much the way to go: it's hard to do it on one's own and one misses out on lots of discussion if outside of the class setting. But it was also noted that sitting for three days is tiresome.
 - As previously noted, the location of a class significantly affects attendance. A few students suggested a mid-states location be selected for the next one. (Paris and Hawaii were also suggested!)
 - On the first day have each student introduce her-/himself and briefly state what kind of work s/he is doing ("networking"). (Maybe provide name tags as well?)
 - Some found the lesson lengths about right while others found them too long, or too short, or both. (NAIF should at least provide some "extra credit" extensions to the programming lessons, for use by those who finish a lesson early.)
 - Provide more comprehensive graphics associated with the programming lessons. (For instance, what is meant by "boresight?")
 - Some students didn't understand why NAIF implemented one of the code lessons the way it did and suggested a more thorough explanation be given, especially where multiple approaches might have been taken.
 - No comments were made on the notion of NAIF developing and presenting an advanced topics class.
 - Nor do I recall discussion about changing the frequency of classes. (Currently it's about once every 1.5 years.)

- One student thought the morning session on Day 2, covering PcK, CK and FK one right after the other was too much to swallow all at once, and recommended having some intervening programming exercises.
- Comment about "hard to find the most important functions, and basic concepts and terminology."

NAIF response:

- See the "Most Used APIs" and API Permuted Index"
- See the "Summary of Key Points" tutorial

and

- See the "SPICE Conventions" tutorial

Upon seeing this response the student said he had forgotten about the "Most Used APIs". He also suggested showing the "Summary of Key Points" at the beginning of the class so it would serve as an "orientation map" for the rest of the class.

- It was suggested to organize a group dinner on the second day, to promote networking and such. (NAIF says: we have done that a number of times during past classes. We were unsure about arranging such a group dinner, with so many students, when we were also from out of town and unfamiliar with local restaurants.)