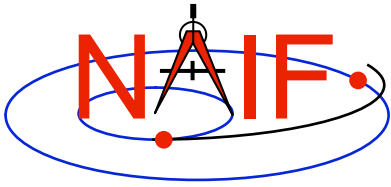


Navigation and Ancillary Information Facility

SPICE Introduction

September 2009



History

Navigation and Ancillary Information Facility

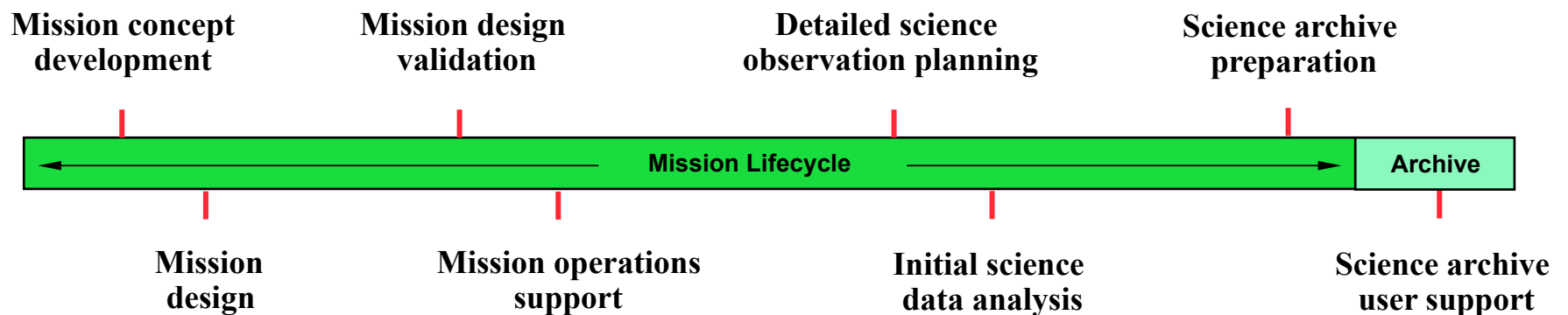
- **Implementation of a precursor to SPICE was initiated by scientists in 1984 as part of a major initiative to improve archiving and distribution of space science data in all NASA disciplines**
- **Responsibility for leading SPICE development was assigned to the newly-created Navigation and Ancillary Information Facility (NAIF), located at the Jet Propulsion Laboratory**
- **Today's SPICE system dates from about 1991**



Breadth of Use

Navigation and Ancillary Information Facility

- The original focus of SPICE was on ancillary data and associated software needed by scientists for:
 - initial science data analysis
 - science archive preparation
- The scope of SPICE usage has now grown to cover the full lifecycle of a mission as well as post-mission archive uses.





Major SPICE Users*

Navigation and Ancillary Information Facility

- **SPICE is used on essentially all NASA solar system exploration projects**
 - Examples: All Mars missions, Cassini, Deep Impact, Messenger, Juno
- **Limited SPICE data have been (or are being) created for some past missions**
 - Examples: Voyager, Viking Orbiter
- **SPICE is used to some degree in support of some space physics and astrophysics missions**
 - Examples: Hubble Telescope, Spitzer Telescope, IBEX, Wise, Kepler
- **SPICE was or is used on many non-NASA missions**
 - **Russia's** Mars 96; **ESA's** Huygens Probe, Smart-1, Mars Express, Rosetta and Venus Express; **Japan's** Hayabusa and SELENE; **India's** Chandrayaan-1
- **SPICE ephemerides are used at some terrestrial observatories**
- **SPICE is used by NASA's Deep Space Network for both scheduling and operating the DSN antennas.**

* Not all are supported by NAIF; some are using SPICE on their own.



Ancillary Data Archives

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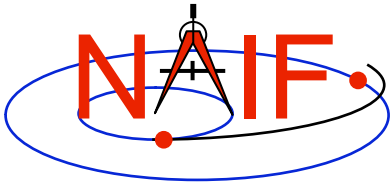
- **SPICE is the U.S. Planetary Data System's normal means for archiving ancillary data**
 - (But it's not a formal requirement)
- **SPICE data for European planetary missions are archived in ESA's Planetary Science Archive**
 - Some of these data will be mirrored on the NAIF server
- **SPICE data for some Japanese and Indian missions will be available in the future from their local archives**
 - Already the case for Hayabusa
- **SPICE, or some SPICE ideas, might play a role in the future International Planetary Data Alliance (IPDA)**
 - An IPDA "project" is addressing this question



Distribution

Navigation and Ancillary Information Facility

- **SPICE system components are freely distributed**
 - Projects pay for local deployment and operation, done either by their own personnel, or by NAIF, or a combination
 - No ITAR restrictions on distribution
- **Users get complete source code and much documentation**



Quality of Training Materials

Navigation and Ancillary Information Facility

- **This set of tutorials has been presented and revised numerous times**
 - **No matter how hard we try, it seems impossible to:**
 - » **Get all the facts absolutely right and up-to-date**
 - » **Get the level of detail “right” for every student**
 - » **Get all of the language clear, complete and concise**
 - » **Present everything in the “correct” order**
- **These training materials are meant to supplement—not replace—the subroutine headers and the “required reading” reference documents that are the primary sources for user information about SPICE**