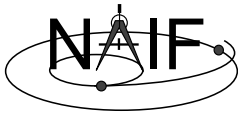




Navigation and Ancillary Information Facility

Motivation for Developing SPICE

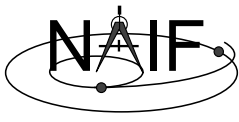
October 2007



Why Did NAIF Build SPICE?

Navigation and Ancillary Information Facility

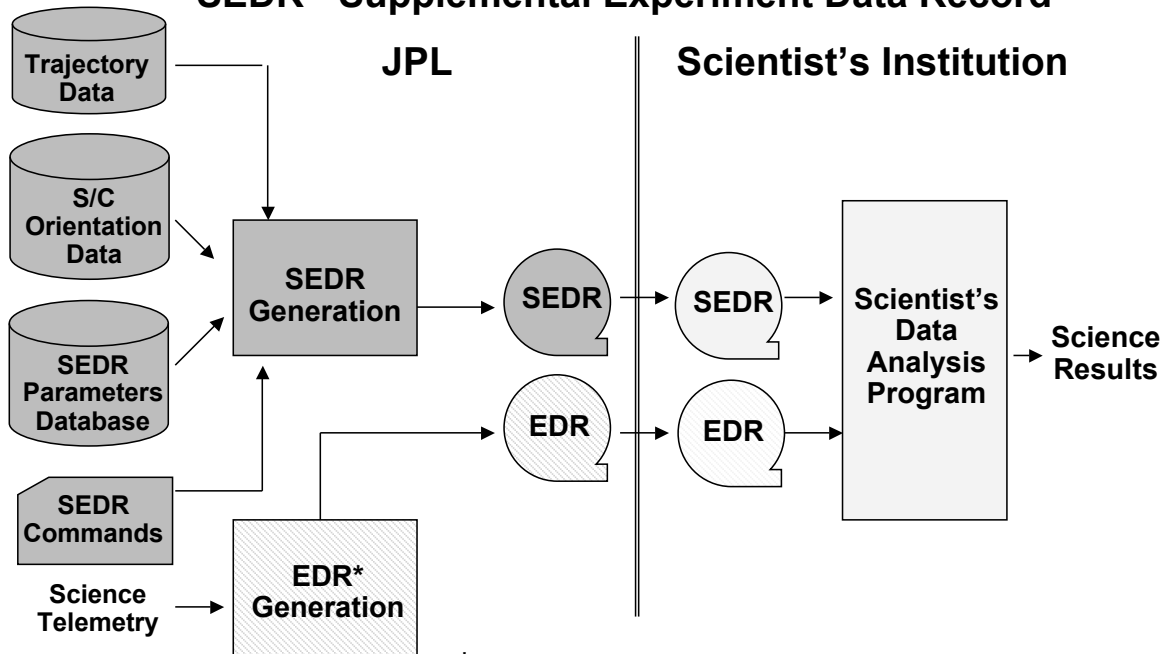
- **Scientists said they would like to:**
 - use common tools and methods throughout a project's lifecycle, and for all projects
 - understand the calculations and transformations used to produce observation geometry data
 - have the ability to revise the fundamental data and software tools used to produce their own observation geometry data
 - be able to produce geometry calculations themselves, whenever and however they want



What Existed Prior to SPICE ?

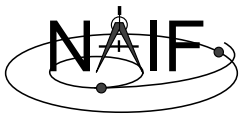
Navigation and Ancillary Information Facility

SEDR - Supplemental Experiment Data Record



Motivation for SPICE

3



SEDR System Characteristics

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- **The SEDR Generation program was built and operated at JPL**
 - **Scientist's requirements on SEDR had to be provided long before launch**
 - » Late or post-launch updates were hard/expensive to accommodate
 - Difficult to change WHAT gets computed
 - Difficult to change HOW items are computed (algorithms, parameters)
 - Difficult to change TIMES at which items get computed
 - **Generally only one SEDR file produced for each period of time**
 - » Result: the scientist can't get better ancillary data if/when better inputs (e.g. spacecraft trajectory or orientation) are determined
 - **SEDR generation was done "in the blind"**
 - » Operators were not familiar with processes used to make the inputs
 - » Operators were not familiar with scientist's processing schemes
 - » Result: SEDR may not optimally meet science team's expectations

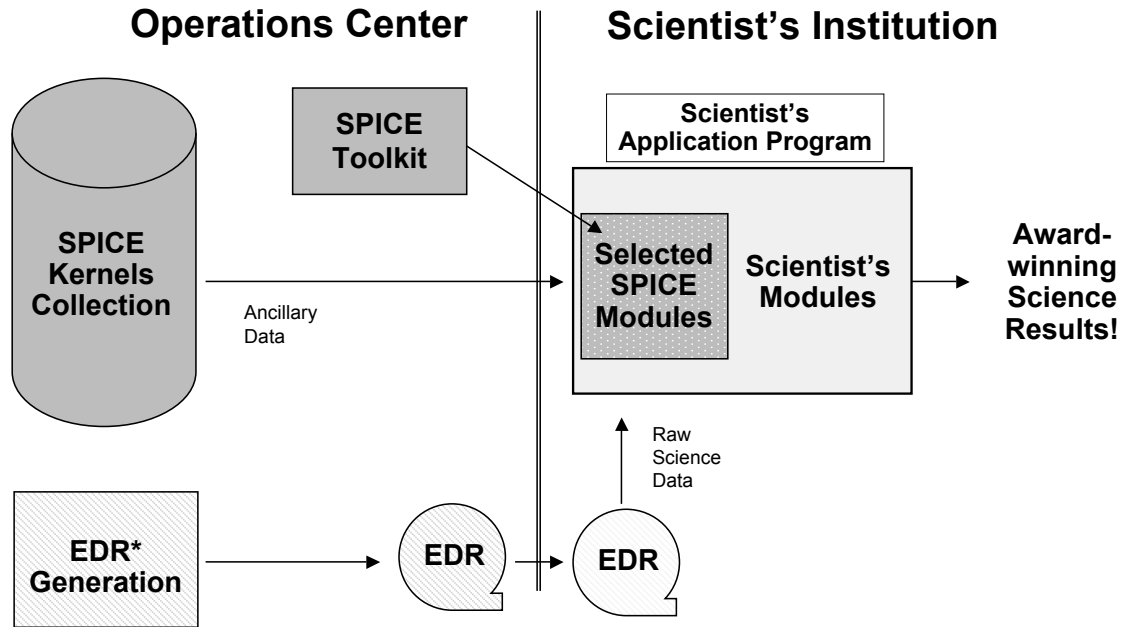
Motivation for SPICE

4



The SPICE Idea

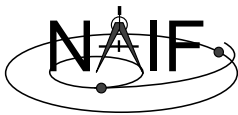
Navigation and Ancillary Information Facility



Motivation for SPICE

* EDR = Experiment Data Record = raw science data

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SPICE Benefits vs. SEDR

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- **The customer has great flexibility in deciding:**
 - what observation geometry parameters are computed
 - at what times or frequency these parameters are computed
 - for what time span these parameters are computed
 - electing if/when to re-do parameter computations using new (better) or otherwise different kernels or other data as inputs
- **The customer also has:**
 - common tools and methods that can be reused on many tasks
 - good visibility into algorithms and data used in geometry calculations
- **The flight project operations center can:**
 - concentrate on producing better kernel data, rather than on producing lots of SEDRs and frequently updating the SEDR software

Motivation for SPICE

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SPICE Detriments vs. SEDR

Navigation and Ancillary Information Facility

- **To use SPICE you must do some programming**
- **The customer must make the time to learn enough about SPICE to find and use the components needed for whatever job is at hand**
 - SPICE is rather “big,” so finding one’s way through it may appear daunting
- **In some areas of SPICE the offering of choices to allow correct handling of different situations may present complexity that is unwarranted for a particular problem**