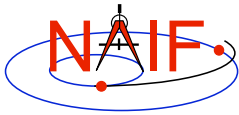# Motivation for Developing SPICE

March 2006

## Why Did NAIF Build SPICE?

- **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**
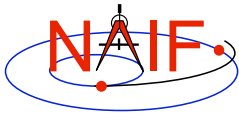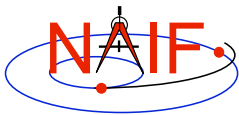
SEDR - Supplemental Experiment Data Record
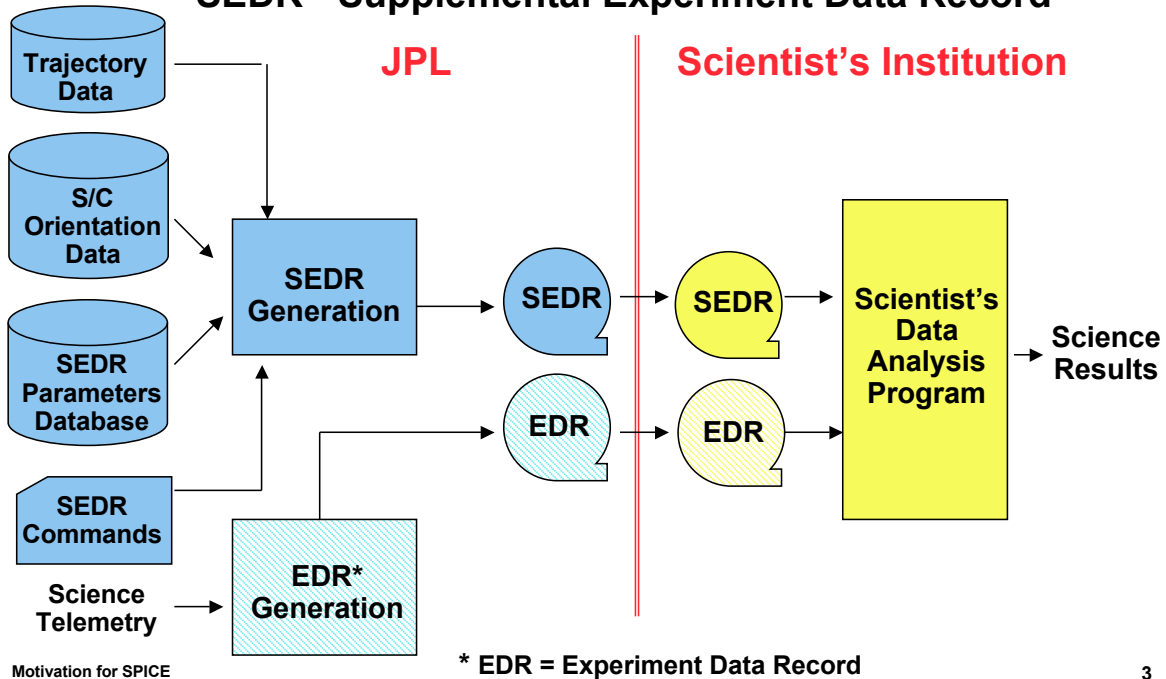
* EDR = Experiment Data Record

- **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
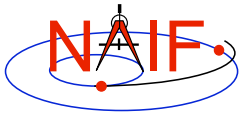   - » Result: SEDR may not optimally meet science team's expectations

The SPICE Idea

Operations Center | **Scientist's Institution**

SPICE Toolkit

SPICE Kernels Collection

Ancillary Data

Scientist's Application Program

Selected SPICE Modules | Scientist's Modules

Science Results

Raw Science Data

EDR* Generation

EDR

EDR
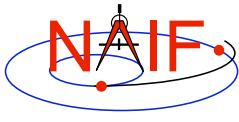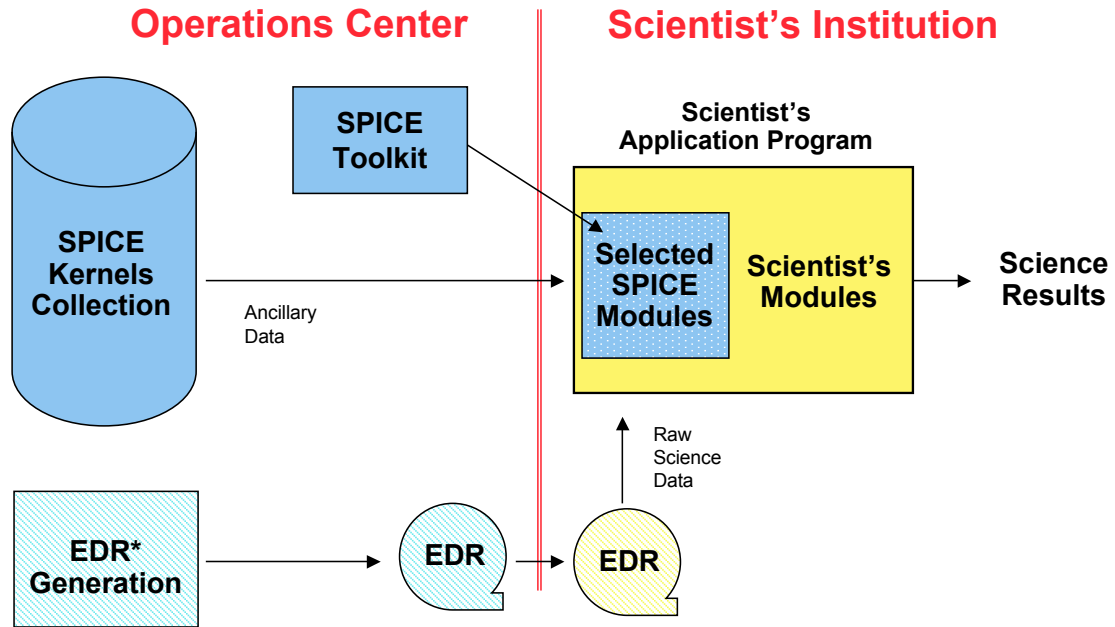
Motivation for SPICE   *** EDR = Experiment Data Record = raw science data**   **5**

SPICE Benefits vs. SEDR

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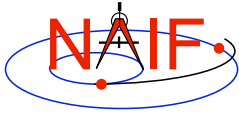
- **The customer must take the time to learn enough about SPICE to find and use the components needed for whatever job is at hand.**
  - **SPICE is rather "big," so finding one's way through it may appear daunting.**
- **In some areas of SPICE the offering of choices to allow correct handling of different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