Introduction to the Events Kernel EK

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Note: the EK is infrequently used by NASA flight projects.

Only a brief overview of the EK subsystem is provided.

Scope

- **This tutorial provides an overview of the entire Events Kernel subsystem, comprised of three components:**
  - **Science Plan   ESP**
  - **Sequence   ESQ**
  - **Notebook   ENB**

- **Depending on specific circumstances:**
  - **the three components may exist as three distinct and different products**
  - **two components may be implemented with a single mechanism**
  - **one or more components may not be used at all**
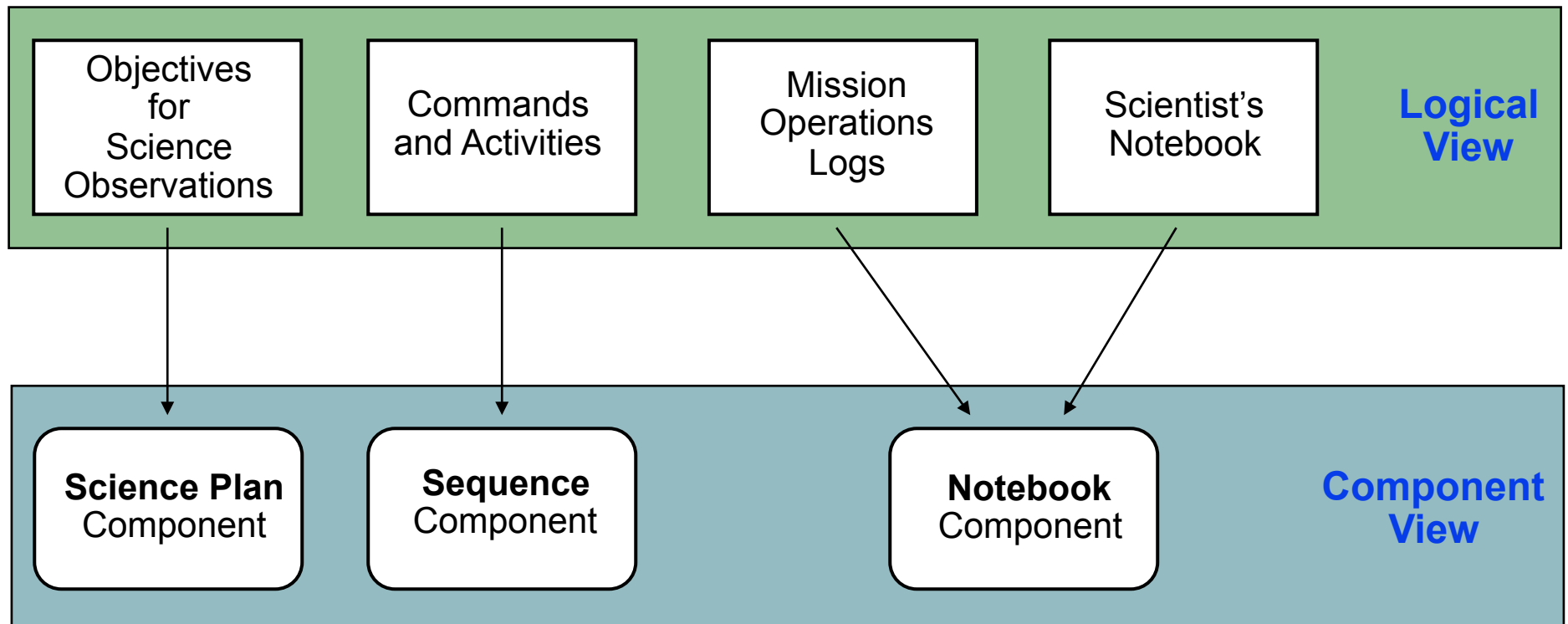
E-Kernel Subsystem Objectives

- **Assemble, archive and provide convenient and useful access to <u>plans</u>, <u>commands</u> and <u>notes</u> about the acquisition of space science observations:**

  - **For use by on-going project science and engineering team members**
  - **For use by post-mission researchers**

- **Accomplish the above with minimal impact on science and mission operations team members**
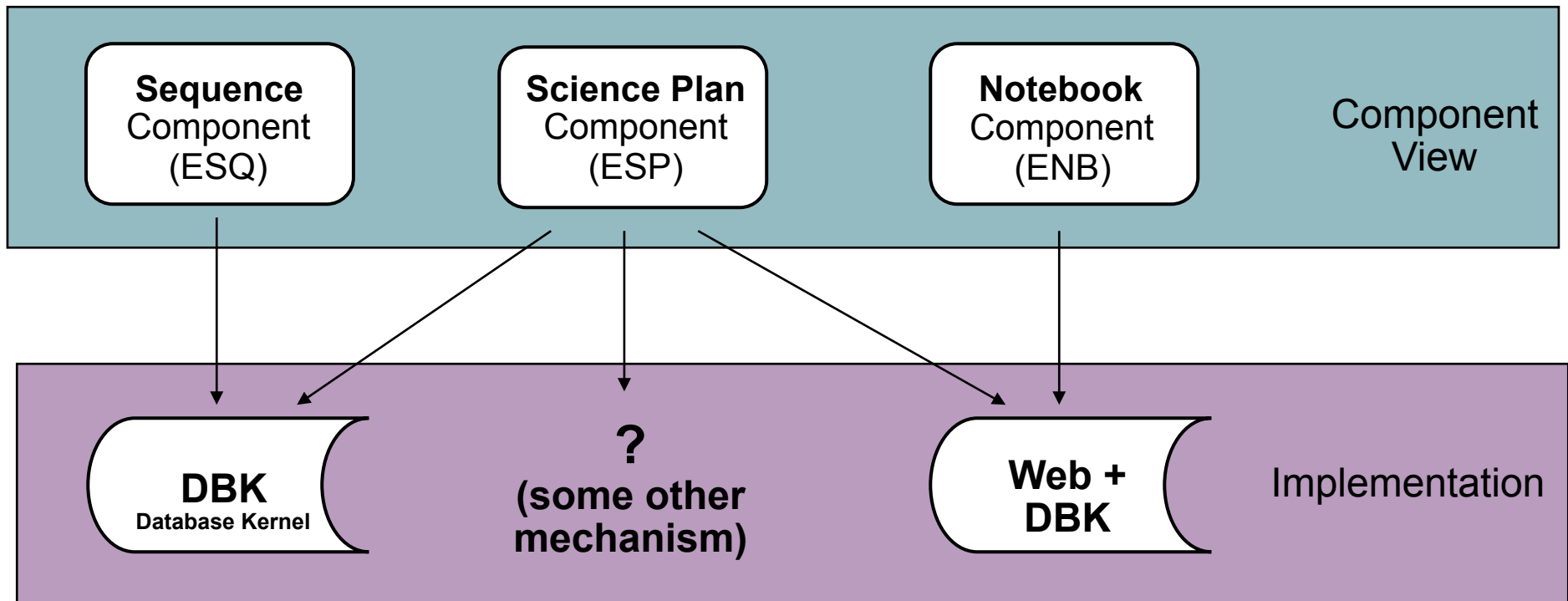
Nominal E-kernel Composition
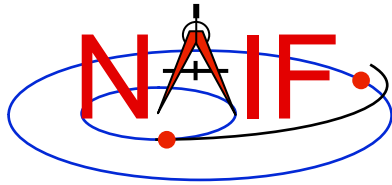
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Objectives for Science Observations	Commands and Activities	Mission Operations Logs	Scientist's Notebook	**Logical View**

Science Plan Component	**Sequence** Component	**Notebook** Component	**Component View**

Nominal E-kernel Implementation

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- **Each entry is a statement of science objectives for a series of coordinated observations to be made over a stated period of time**

  - **Might include some information about the planned mechanics (observation design) for obtaining the data**

- **This component could be implemented as a part of the SEQUENCE component (ESQ), or as a part of the NOTEBOOK component (ENB), or as a separate product using some other mechanism**

- **Principal entries are instrument and spacecraft "commands" or "macro calls" that carry out the objectives of the Science Plan. These contain the lowest level of detail that could be helpful while also being practical for inclusion in the E-kernel product**
  - Could include ground system events, such as tracking station status
  - Could include "announcements" of the occurrence of geometric conditions of wide interest, such as equator crossing, occultation entry, etc.
  - Could include "state records" that summarize the status of an instrument or subsystem or spacecraft at a given epoch. (If to be included, state records might be derived rather than actually stored as physical objects.)

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- **Entries are notes provided by scientists and flight team engineers about what happened as mission operations are conducted, including unplanned, unanticipated or unexplained occurrences**

- **Entries could also be general notes thought to be of interest to scientists**

- **Entries submitted using e-mail can include MIME attachments, such as GIF, JPEG, EXCEL, WORD, etc., in addition to plain ASCII text**

- **Entries submitted using WWW are limited to plain ASCII text**

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- **The E-kernel is the least well developed and least used component of the SPICE system**
  - Due in part to not being of as much interest to flight project instrument and engineering teams as the other components
    - » Their perception is that EK information could be useful to future users of a mission's data, but not so much to an active flight team, and since they are already very busy they have not time to contribute input to an EK

- **Unfortunately NAIF and other kernel producers seem unlikely to produce EK components in the future**