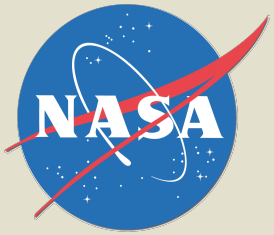


Virtual Observatory: A Tool to Support Data Access & Data-Model Comparison

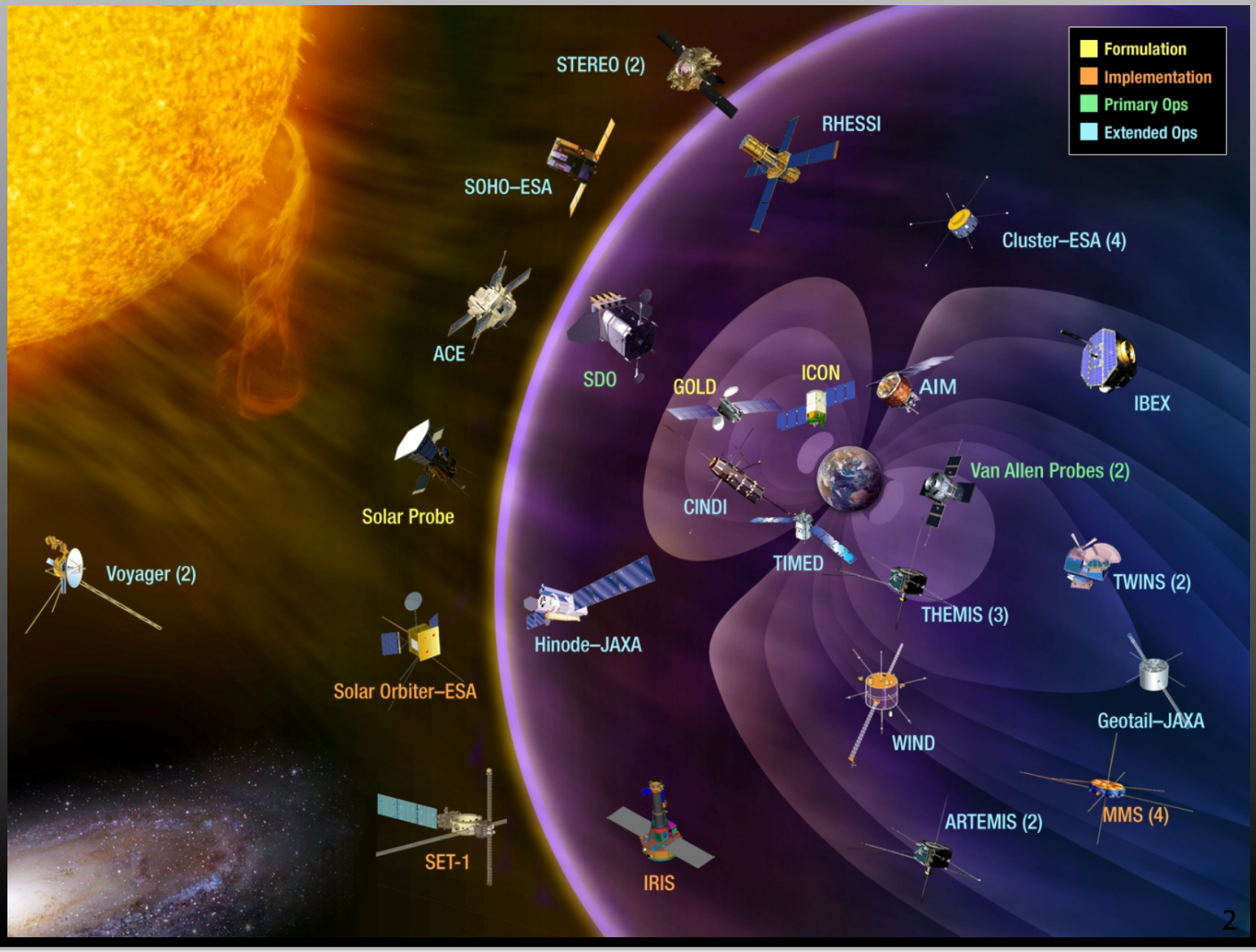
Shing F. Fung

Geospace Physics Laboratory

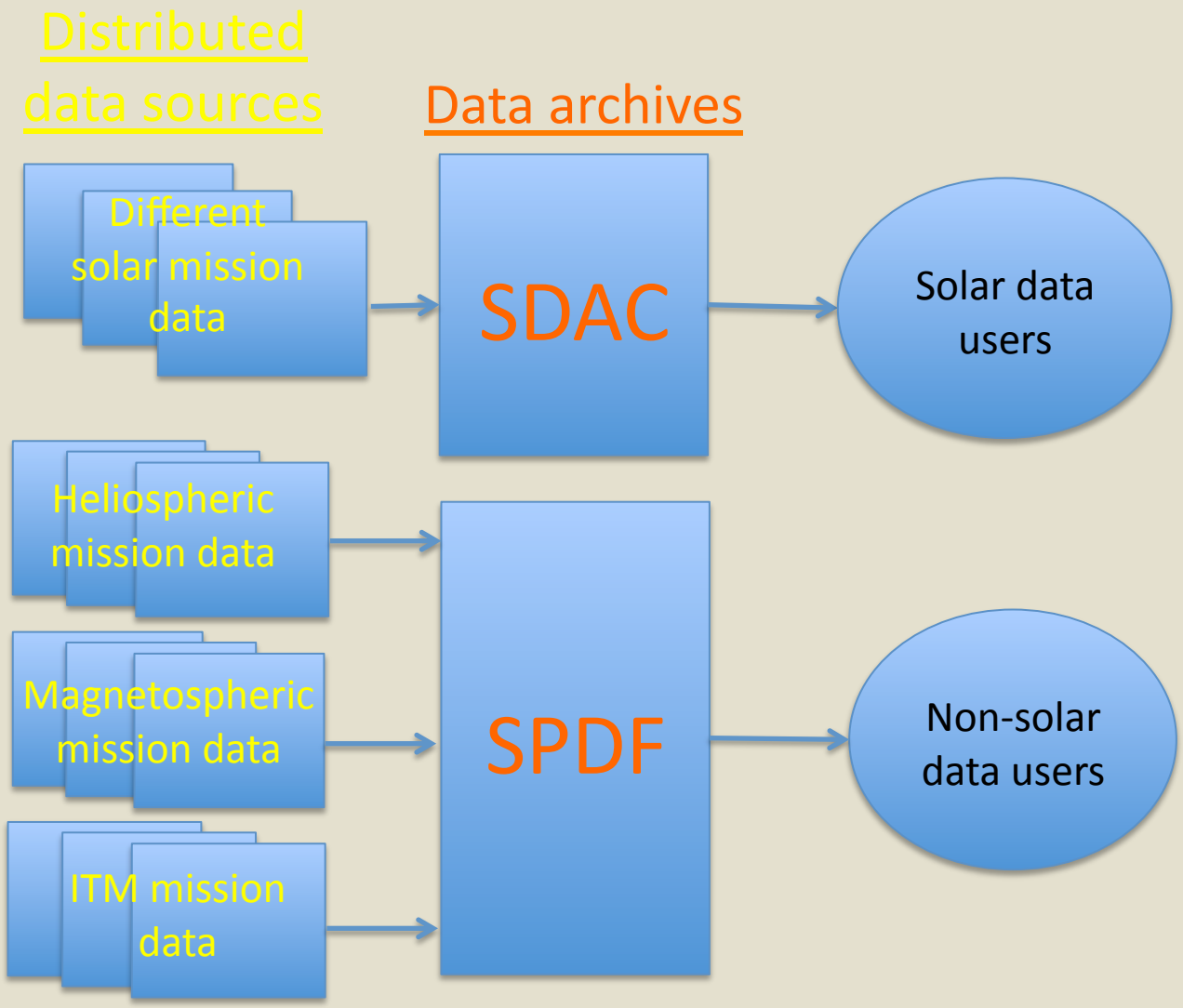
NASA Goddard Space Flight Center

CCMC Workshop, Annapolis, Maryland, April 11-15, 2016

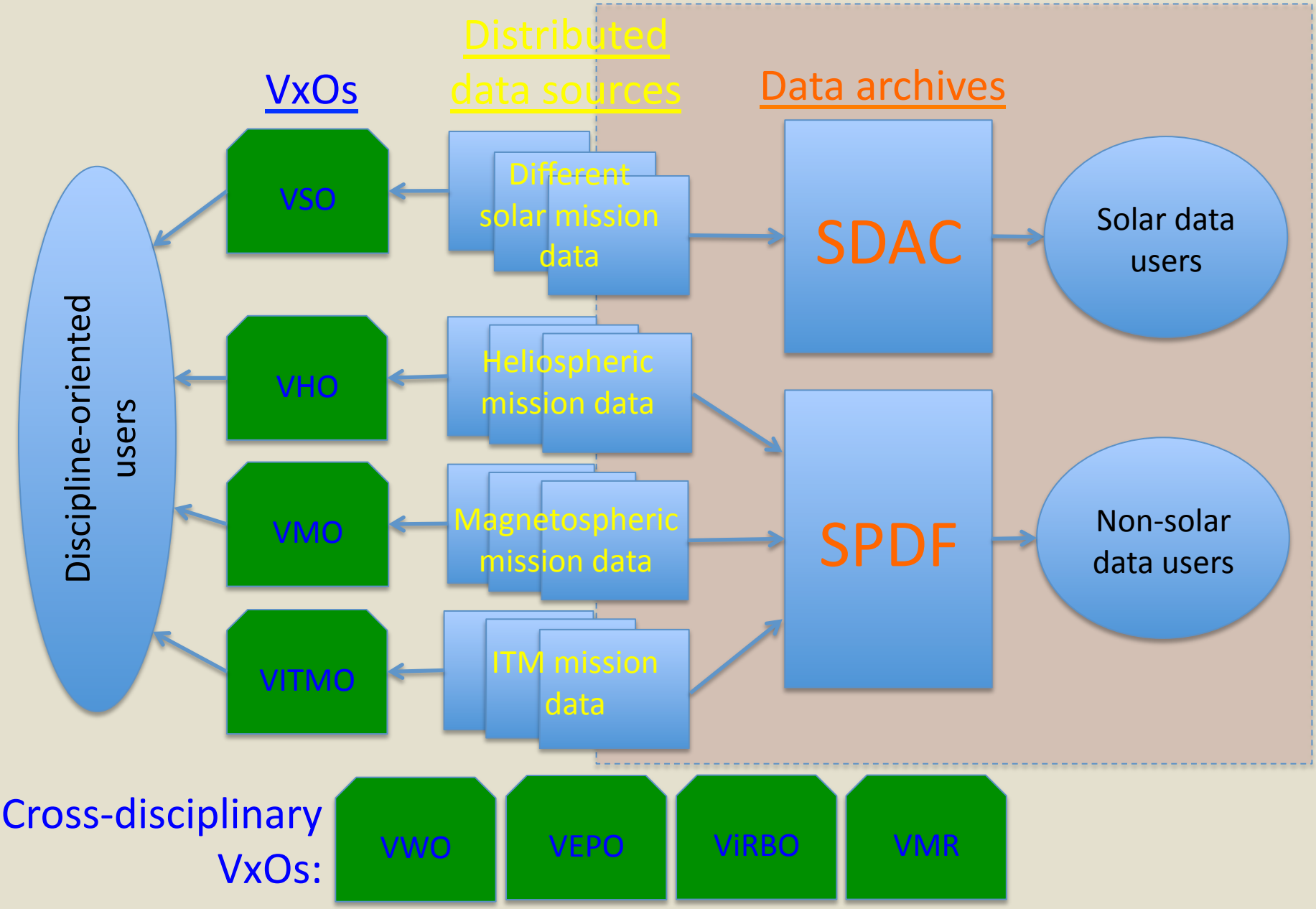
NASA's Heliophysics System Observatory



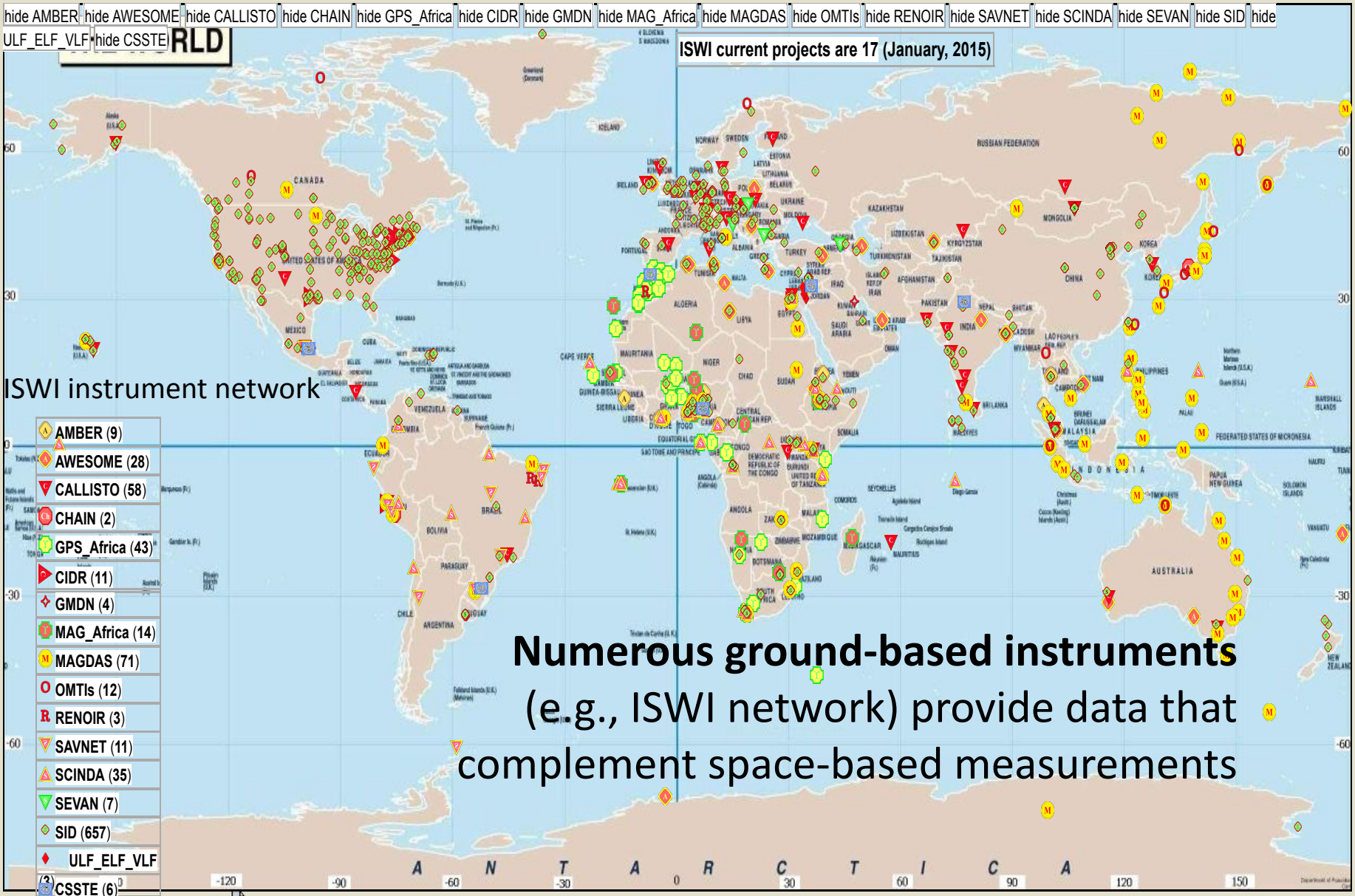
Accessing Data from NASA Heliophysics Archives



Heliophysics VxOs: A New Paradigm



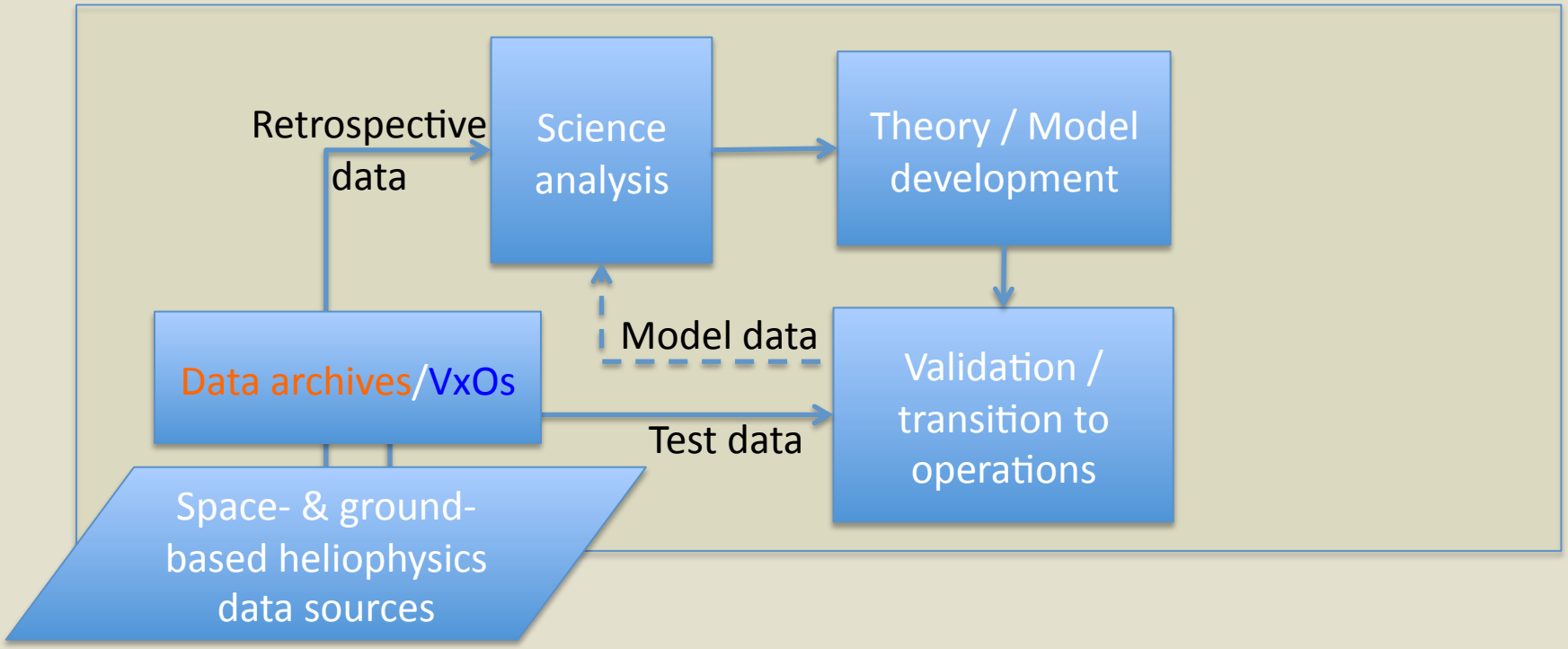
International Space Weather Initiative (ISWI)



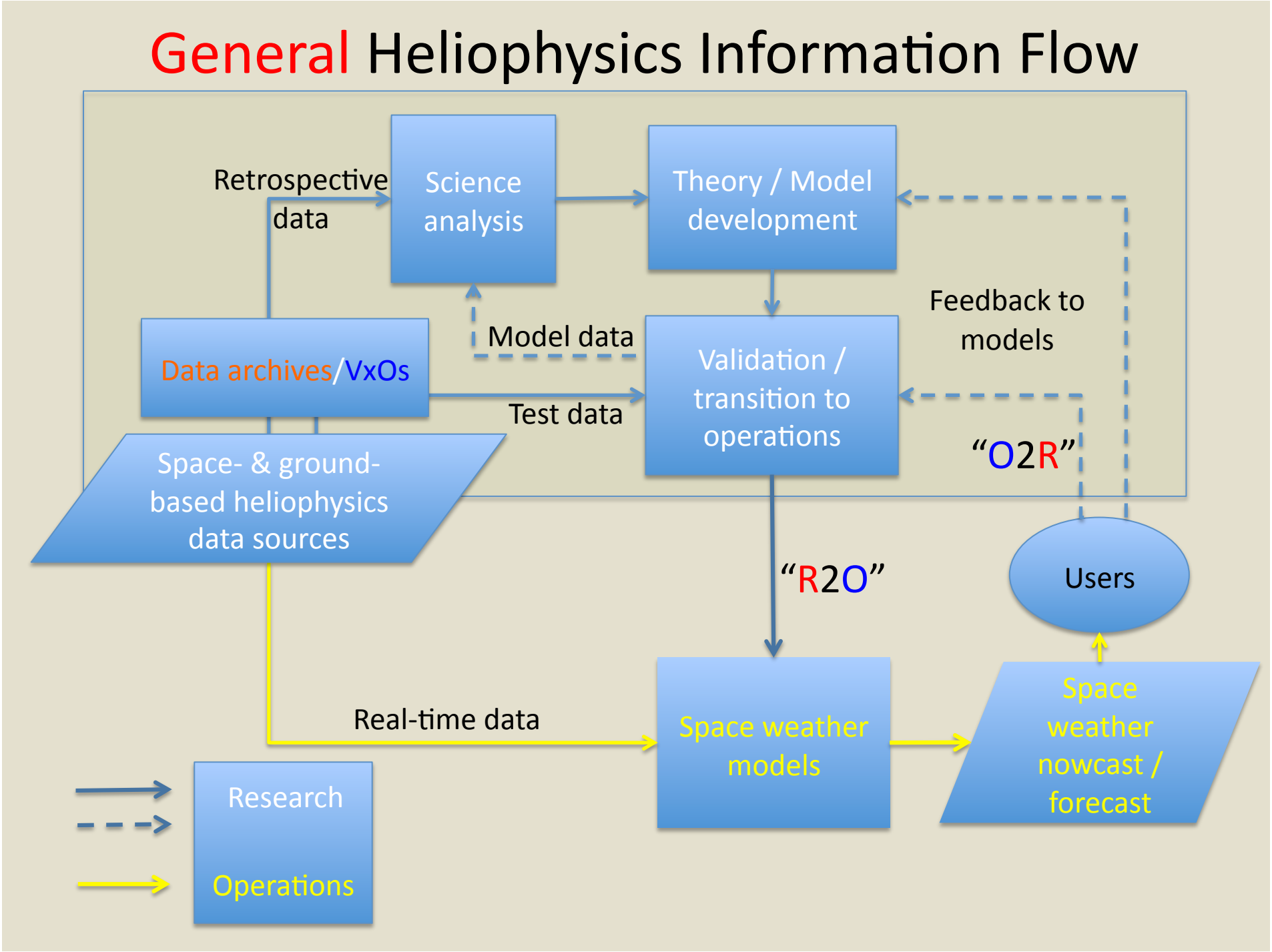
"Big Data" Is Coming!

- Instruments are becoming data-intensive, e.g.,
  - Solar Dynamics Observatory ~1.4TB/day (science telemetry)
  - MMS ~137GB/day (higher-level science)
  - 100's-1000's ground stations, generating ~GB/day/station
- Diverse [space, ground, model (e.g. CCMC)] & distributed (national & international) data sources
- Effective data services need to locate/search/access/retrieve/deliver data efficiently
  - Large data volume in distributed data sources
  - Different data types and products
  - Diverse user needs

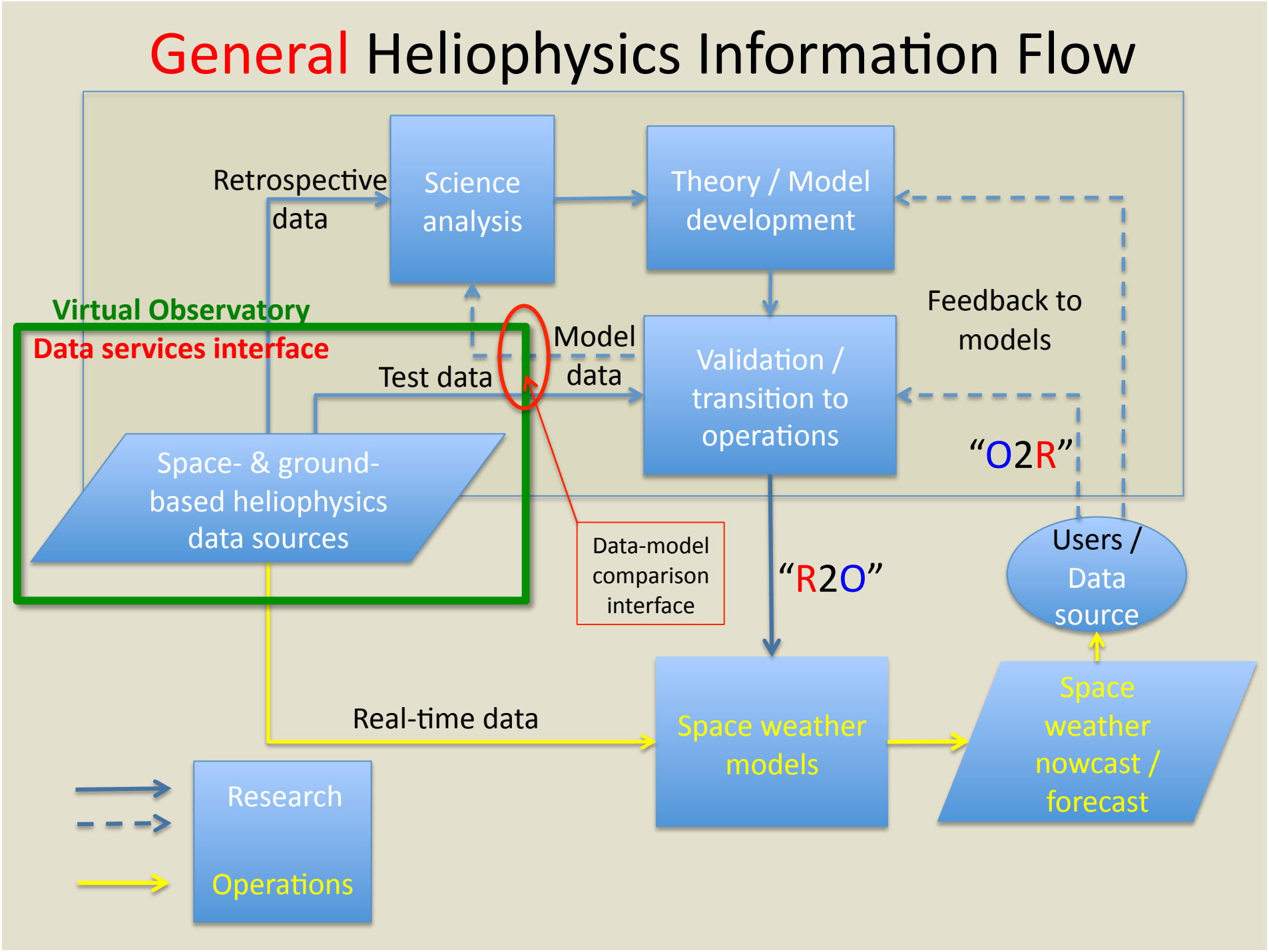
General Heliophysics Information Flow



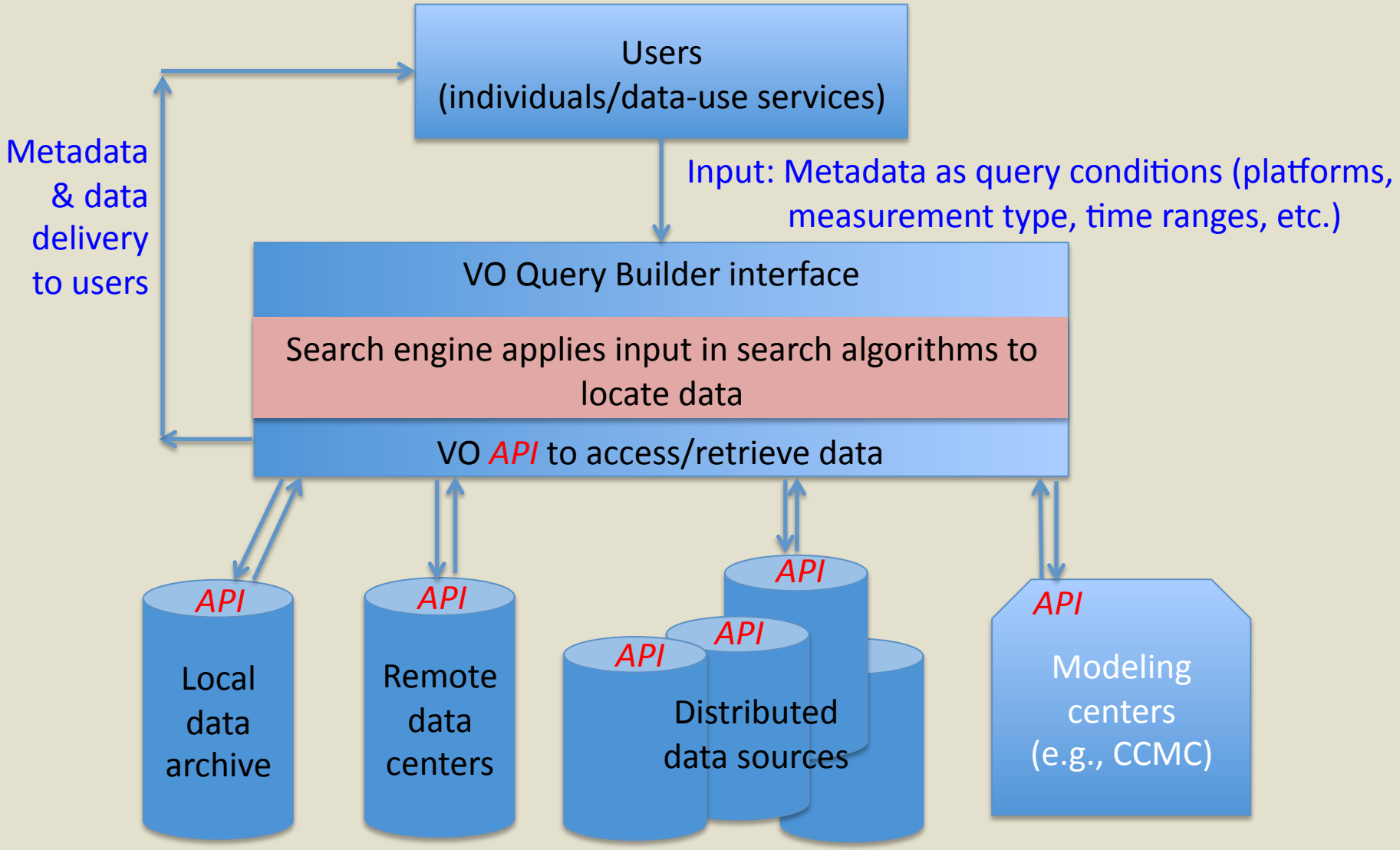
General Heliophysics Information Flow



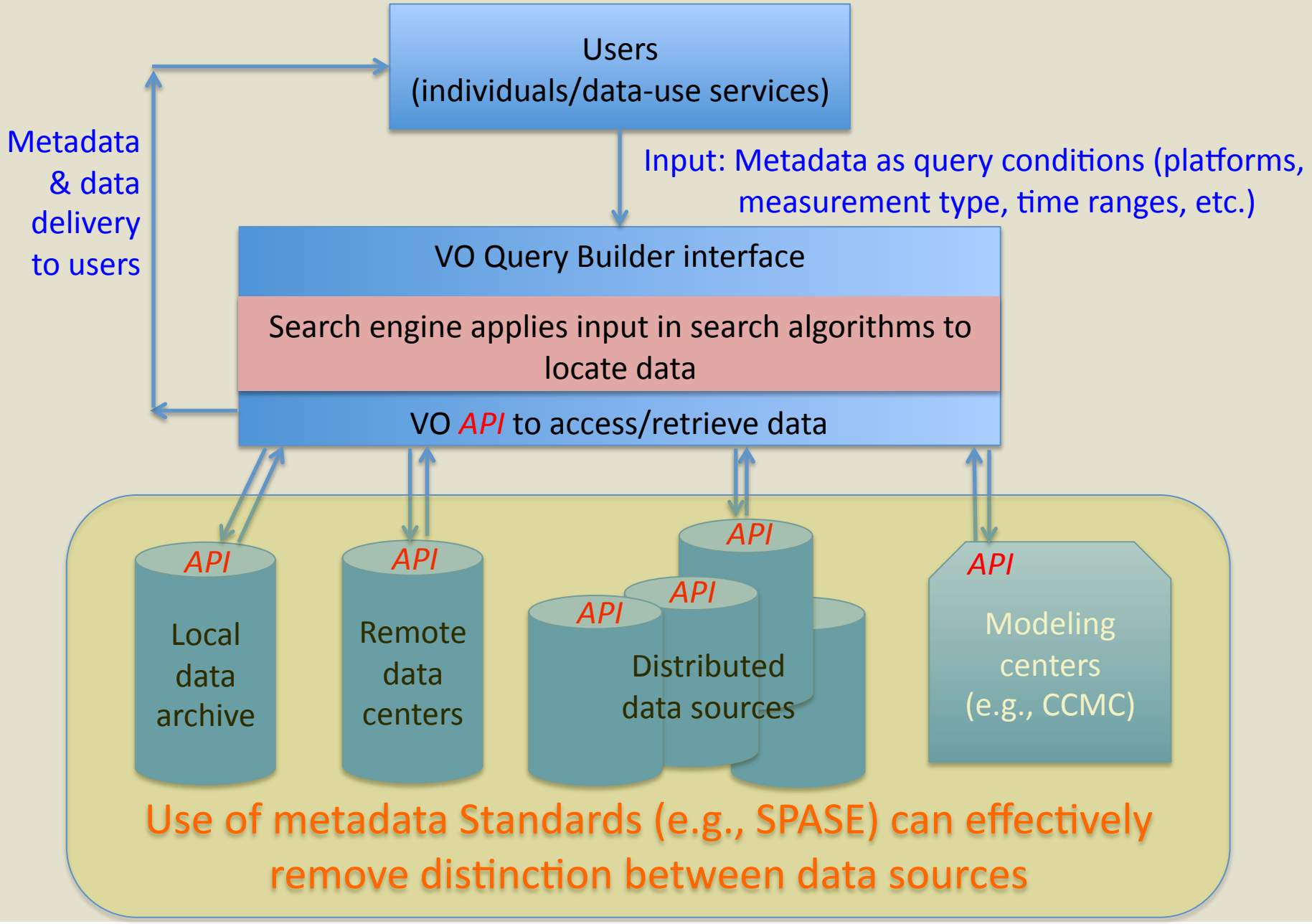
General Heliophysics Information Flow



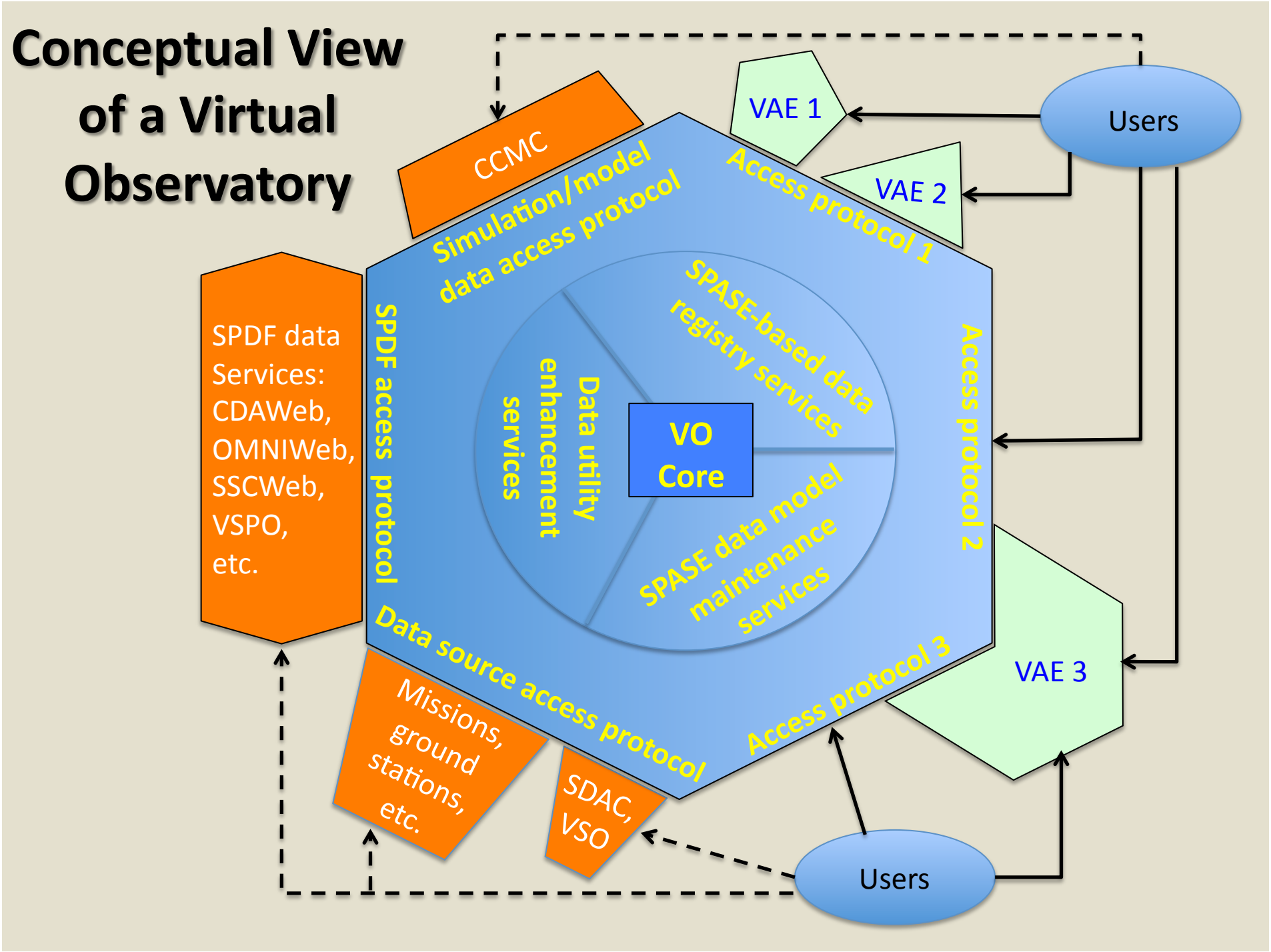
Virtual Observatory Middleware View



Virtual Observatory Middleware View



Summary

- A virtual observatory can provide enhanced data services to
  - Augment existing data archive services
  - Support Diverse & distributed sources (space, ground, model)
  - Support diverse data users (research & operations)
  - Support effective data search mechanisms
    - Discipline orientation
    - Targeted data volume
- Enabling technologies
  - Standard metadata model to reduce s/w complexity
    - Same tools to search & access multi-disciplinary data
  - Standard access protocols (APIs)
    - Ensure interoperability
    - Enable system expandability by interfacing with new services

Conceptual View of a Virtual Observatory