SMAP Applications Workshop

Project Overview

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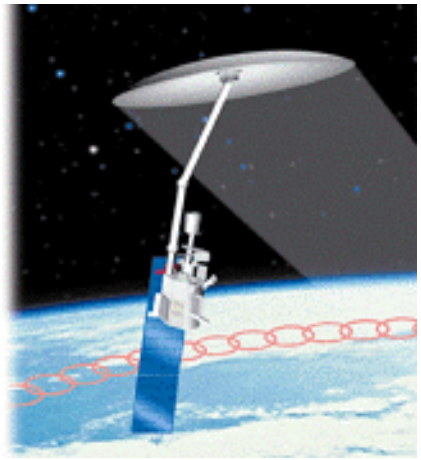
Mission History

SMAP leverages off previous Earth Science projects

- Aquarius project is currently in Phase C (2010 Launch)
  - Sea Surface Salinity Mission
  - Similar partnering arrangement (JPL lead with GSFC supporting)
  - L-Band Radar/Radiometer instrument

Aquarius

- Hydros project discontinued in 2005 due to funding availability
  - Soil Moisture Mission
  - Identical instrument approach: L-Band Radar/Radiometer with 6-meter spinning antenna
  - Professor DaraEntekhabi (MIT) was Principal Investigator (SMAP SDT Lead)
  - Conducted early Phase A risk reduction activities: soil moisture retrieval capabilities studies; antenna stability/performance studies
  - NASA investments in Hydros are directly applicable to SMAP

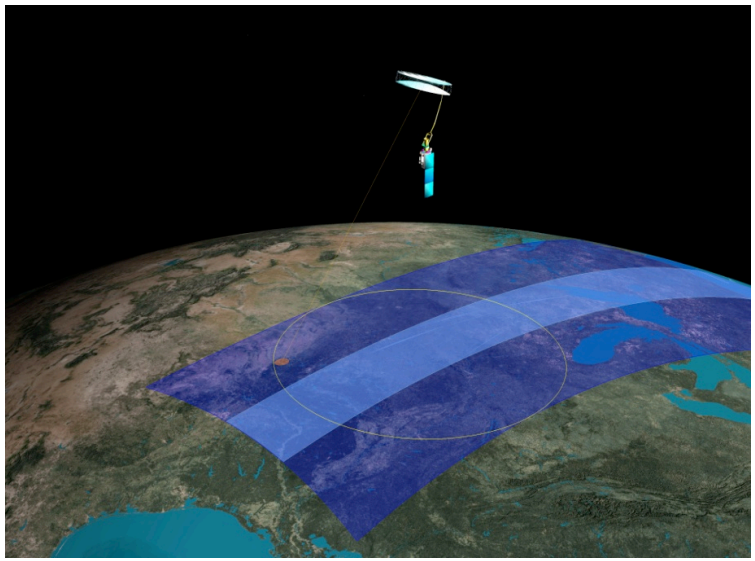


Hydros

SMAP Mission Concept

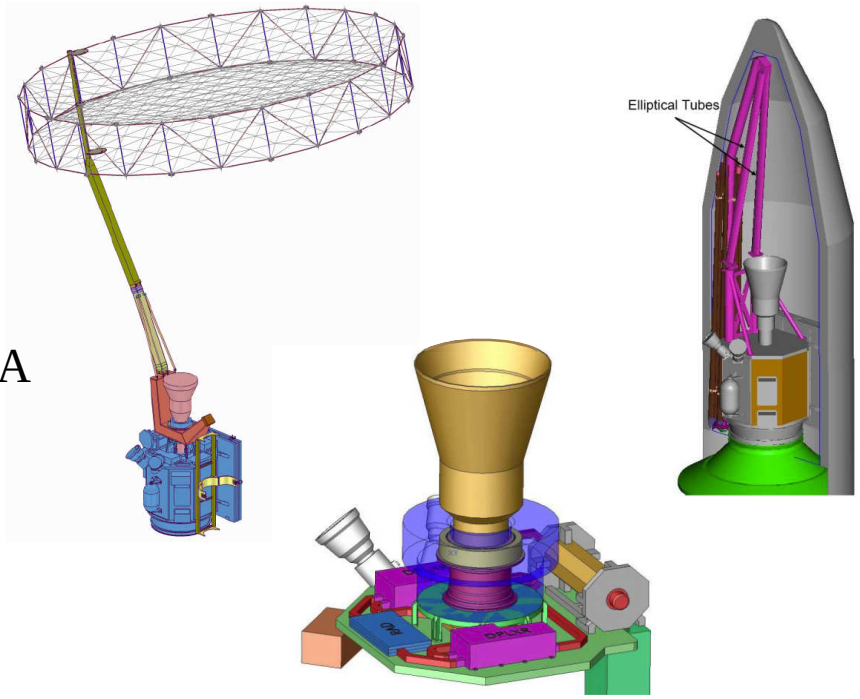
- **Orbit:**
  - *Sun-synchronous, 6 am/pm orbit*
  - *680 km altitude*
- **Instruments:**
  - *L-band (1.26 GHz) radar*
    - *High resolution, moderate accuracy soil moisture*
    - *Freeze/thaw state detection*
    - *SAR mode (non-imaging): 3 km resolution*
    - *Real-aperture mode: 30 x 6 km resolution*
  - *L-band (1.4 GHz) radiometer*
    - *Moderate resolution, high accuracy soil moisture*
    - *40 km resolution*
  - *Shared instrument antenna*
    - *6-m diameter deployable mesh antenna*
    - *Conical scan at 14.6 rpm*
    - *Incidence angle: 40 degrees*
      - *Creates contiguous 1000 km swath*
      - *Swath and orbit enable 2-3 day revisit*

- **Mission operations duration: 3 years**



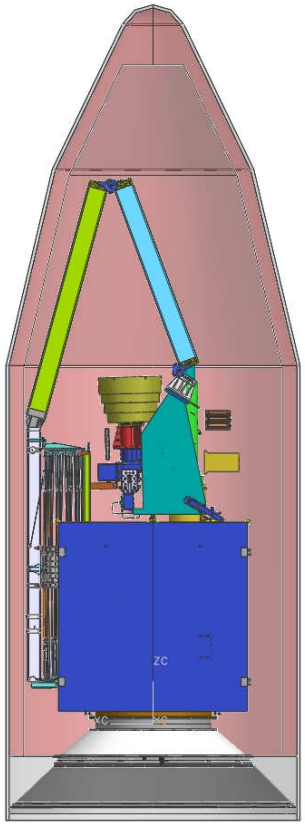
Mission Implementation Overview

- Mission partners: JPL and GSFC
  - GSFC provides Deputy Project Scientist, the radiometer, radiometer algorithms and processing code, and L4 science data products
- Science Team selected competitively by NASA
- Instrument lead: JPL
  - JPL provides radar
  - GSFC provides Radiometer
  - Shared antenna, spin assembly procured from industry by JPL
- Science data processing shared between JPL and GSFC

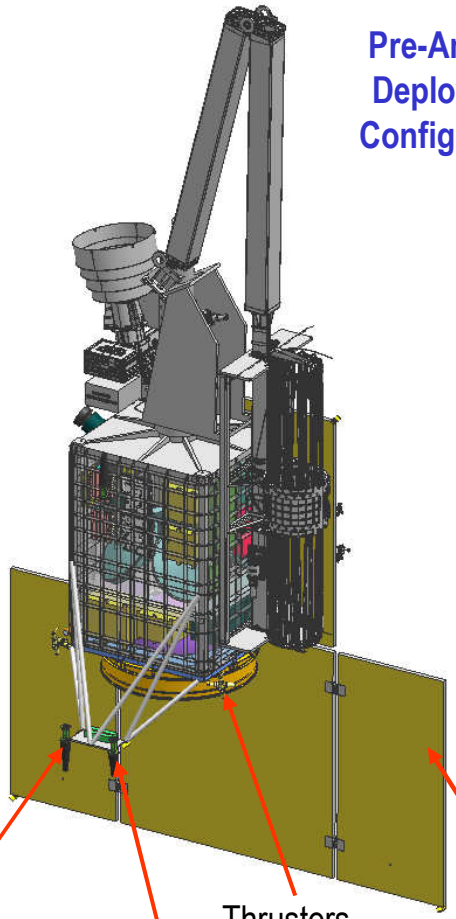


- Mission operations uses JPL's Earth Science Mission Operations infrastructure
  - Communications: NASA GN & SN

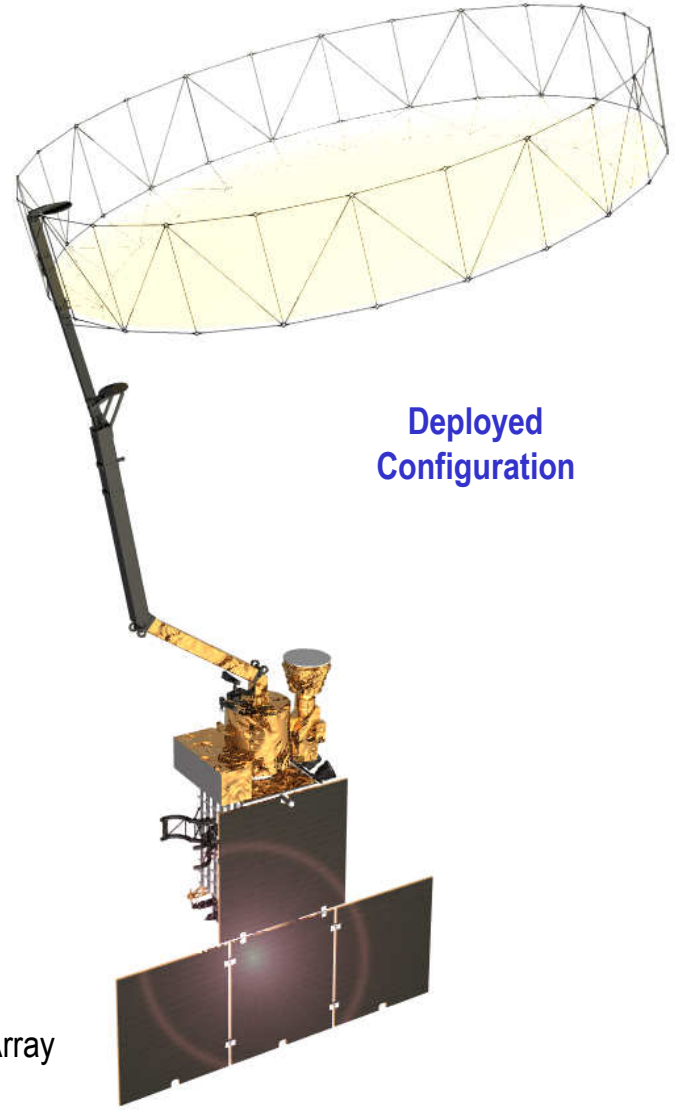
Flight System Overview



Launch Configuration



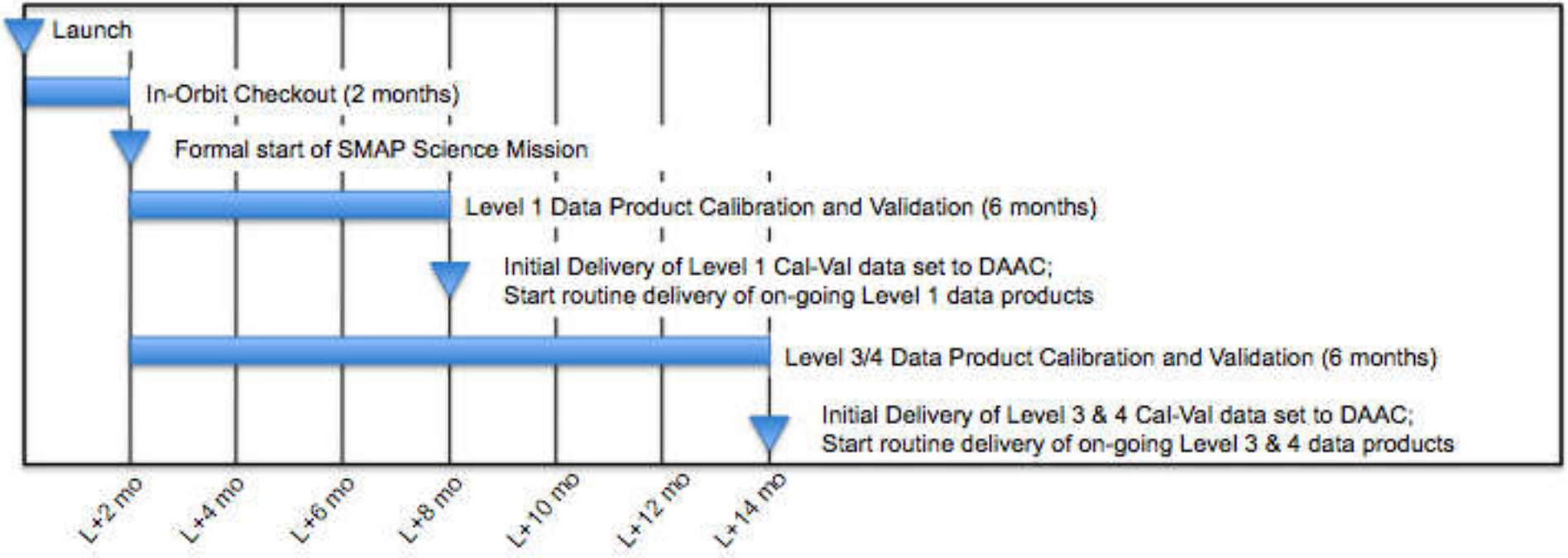
Pre-Antenna Deployment Configuration



Deployed Configuration

Data Availability After Launch

- After In-Orbit Checkout (IOC) period, data product cal/val will be completed
  - 6 months for Level 1 products
  - 12 months for Levels 3 and 4
- During the data cal/val phase, data product distribution will be limited
- After each product's Cal/Val period, data will be publically available through a NASA-designated archive (DAAC)



Project Support to Users of SMAP Data

- The SMAP Project strongly encourages the use of its data products by all scientific and operational and applications communities.
  - NASA, the SMAP Project and the SDT have has taken steps to insure data product utility to the broadest science and applications communities
- Applications development and application-specific data flow provisions (such as near real time data delivery) that require deviation from capability required to meet science mission requirementscannot be implemented under direct (NASA) Project funds
- In the event such capability is required by users, the Project*can* explore working on a cost reimbursable basis to accommodate the additional capability or functionality *(caveat: that such capability does not interfere with or compromise meeting science mission requirements)*

Project Status

- Project is continuing in formulation (Phase A)
  - Successfully completed first major gate review last February (System Requirements Review/Mission Definition Review/Preliminary Non-Advocate Review)
  - NASA & Project working to resolve funding profile, overall cost & launch date
  - Project expects to formally transition into Preliminary Design Phase (Phase B) at the start of the calendar year
- Contracts for Instrument Spin Mechanism Assembly and Reflector-Boom Assembly have been placed
- Proceeding with development of key instrument elements (radiometer, radar transmitter)
- Conducted field campaign last fall to provide data to assess RFI environment and to enable testing of algorithms
- Algorithm testbed has been established

SMAP Briefing for New NASA Administration

- Kyle McDonald & Erika Podest briefed Deputy NASA Administrator Lori Garver on SMAP during her visit to JPL on August 27.
  - JPL Director Charles Elachi and JPL Director for Earth Science and Technology Diane Evans also attended
- The briefing covered aspects of the SMAP mission related to carbon cycle science issues, and SMAP's enabling of the study of the interaction between the carbon and water cycles.