Commercial Hosting Lessons Learned from the Multi-Angle Imager for Aerosols (MAIA) Project

Barbara Hilton
Earth System Science Pathfinder Program Office
MAIA Mission Manager
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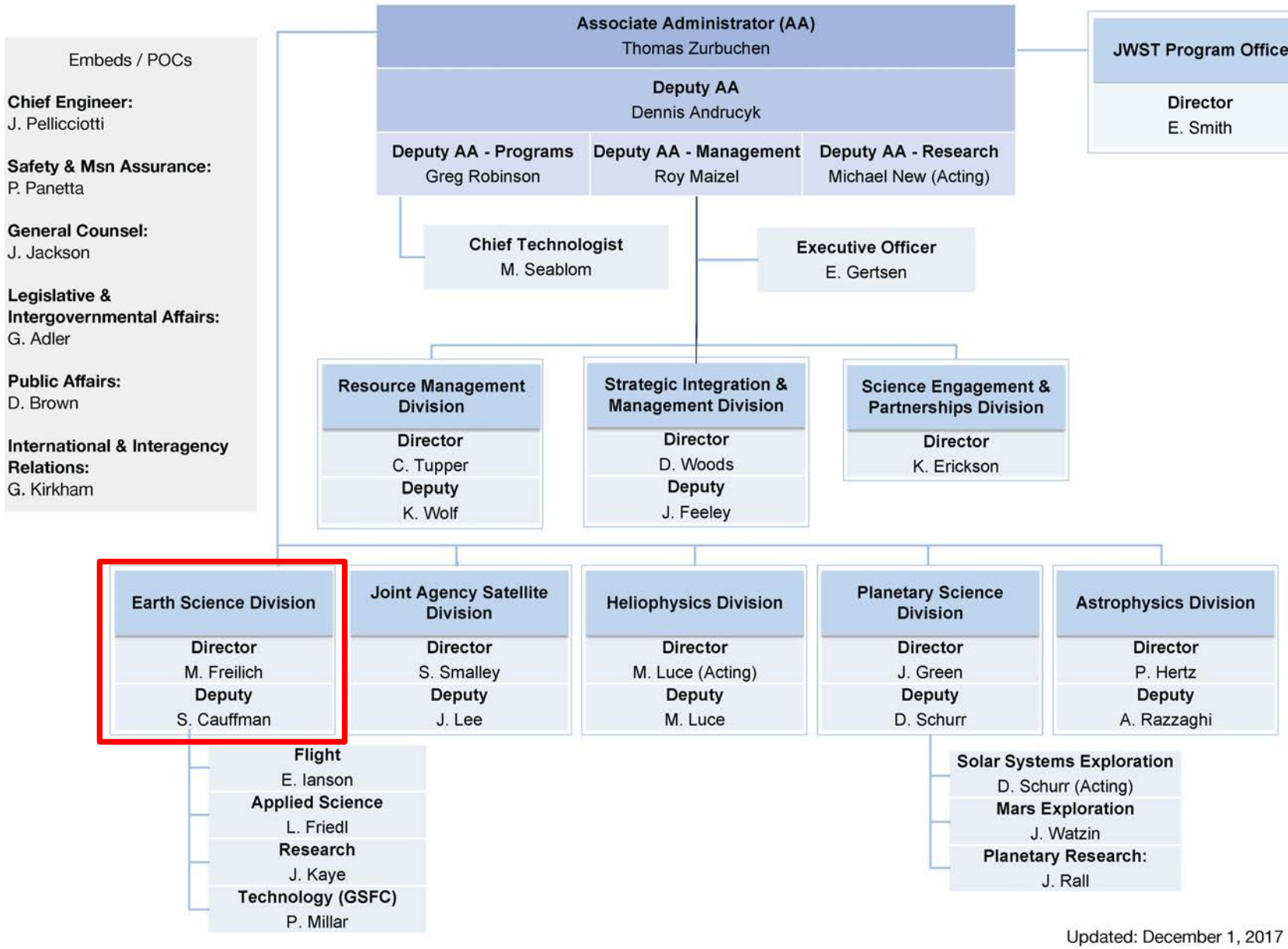
ESSP Program Office

- January 2008 the current ESSP Program Office formed at Langley Research Center
- Addresses unique highly focused requirements in Earth system science research
- Science-driven, PI-led, competitively selected, cost- and schedule-constrained, regularly solicited through Science Mission Directorate (SMD), orbital and suborbital
- Low-to-moderate cost ($15M-$180M), small-to-medium sized orbital (class C/D) and sub-orbital projects
  - Cost capped for entire project life-cycle
- Uncoupled program where projects do not compete for budget resources
- Currently at steady state 21 missions/investigations in 2018 (peaked at 26 missions/investigations)

ESSP in NASA Organization



Updated: December 1, 2017

ESSP Program Description Summary

Features of Venture Mission Line

- Yearly calls as recommended by the National Research Council (NRC) decadal survey, both in 2007 and affirmed again in 2017.
  - Science-driven, PI-led, competitively selected, cost- and schedule-constrained, regularly solicited, orbital and suborbital
  - Optimal mix of sub-orbital, instrument, and orbital mission opportunities
- Venture Class is fully funded, with 3 elements
  - EV Suborbital (EVS)-x: suborbital/airborne investigations (5-year duration); cost capped at $150M per solicitation; solicited every 4 years
  - EV Mission (EVM)-x: small complete missions (5 years to launch); Class-D allowable; small-sat or stand-alone payload as part of larger mission cost capped at $180M; solicited every 4 years
  - EV Instrument (EVI)-x: Spaceborne instruments for flight on Mission of Opportunity (MoO) (≤5 years for development); Class-C or Class-D allowable; $30-$90M total cost for development and operations; solicited every 15-18 months

Earth Venture facilitates the demonstration of innovative ideas and higher risk measurement techniques to achieve science objectives.

Hosting Services Overview

- Hosting Services and accommodations are outside of the cost-capped Instrument development
  - Hosting services will include the following:
    - Host spacecraft
      - Integration to the spacecraft
      - Operations (command uplink)
    - Access to space (Launch Vehicle)
    - Data downlink from the host spacecraft and delivered to the instrument science data processing system
  - Accommodations are investigation-unique items or activities required for integration and operation on the Host (or launch vehicle) that are outside of the PI-managed cost cap
- Cubesats are selected under the Earth Venture Instrument solicitations and require access to space arrangements using dedicated launch vehicles or rideshares.

Hosting Services Options

- Hosting Services for instruments can be obtained through:
  - NASA spacecraft (e.g., ISS, various Earth-observing platforms)
  - Other U.S. government Agencies' spacecraft (JPSS-3)
  - International partner spacecraft
  - Commercial spacecraft
    - The Hosting services procurement is the contracting of the host and all deliverables, tasks, and support needed for the procurement of a hosting service for the Instrument

For the MAIA Project it was determined that a Commercial Hosting Opportunity would be pursued

Status of MAIA Commercial Hosting

Jan 24th, 2018 - Draft RFP Released

May 29th, 2018 - Solicitation Released

- MAIA Hosting Services solicitation: https://www.fbo.gov/spg/NASA/LaRC/OPDC20220/80LARC18R0004/listing.html

August 30th, 2018 - MAIA Hosting Services Contract Awarded to General Atomics

- Press Release: https://www.nasa.gov/press-release/nasa-awards-contract-for-earth-science-mission-hosting-services

Programmatic Lesson Learned

Industry Involvement: Get industry involved early and often to develop solid relationships and flow of information. Keep industry updated regularly (e.g., we released strategy highlights to industry right after PSM approval). Further, industry can really help clarify requirements and expectations for the Final RFP, resulting in fewer amendments and questions.

Schedule: It is critical to align the procurement schedule as much as practical to the mission schedule and when to when requirements will be mature enough to be used in a firm fixed price solicitation. This will go far to avoid substantial RFP amendments and proposal submission extensions.

Common Instrument Interface (CII)

- The Common Instrument Interface (CII) Study activity supports NASA's Earth Science Directorate (ESD) by identifying a common set of Earth Science instrument-to-spacecraft interface guidelines that will improve the likelihood that these instruments become secondary payloads on missions of opportunity. The CII team works with industry, academia and other government agencies to analyze the interface trade space, which helps ESD understand the key drivers in the matching process.
- CII also hosts periodic workshops to bring together stakeholders to review team guidelines and nurture relationships within the community.
- The guidelines are documented in the CII Hosted Payload Interface Guide which can be found online.

Summary

Hosting on commercial spacecraft is predicated on industry stating there is capacity to sell at a mutually advantageous price.

The commercial space community has been supportive in ensuring pathways exists for hosting instruments on commercial satellites.