Earth System Science Pathfinder Program

EVI-4 Management Approach

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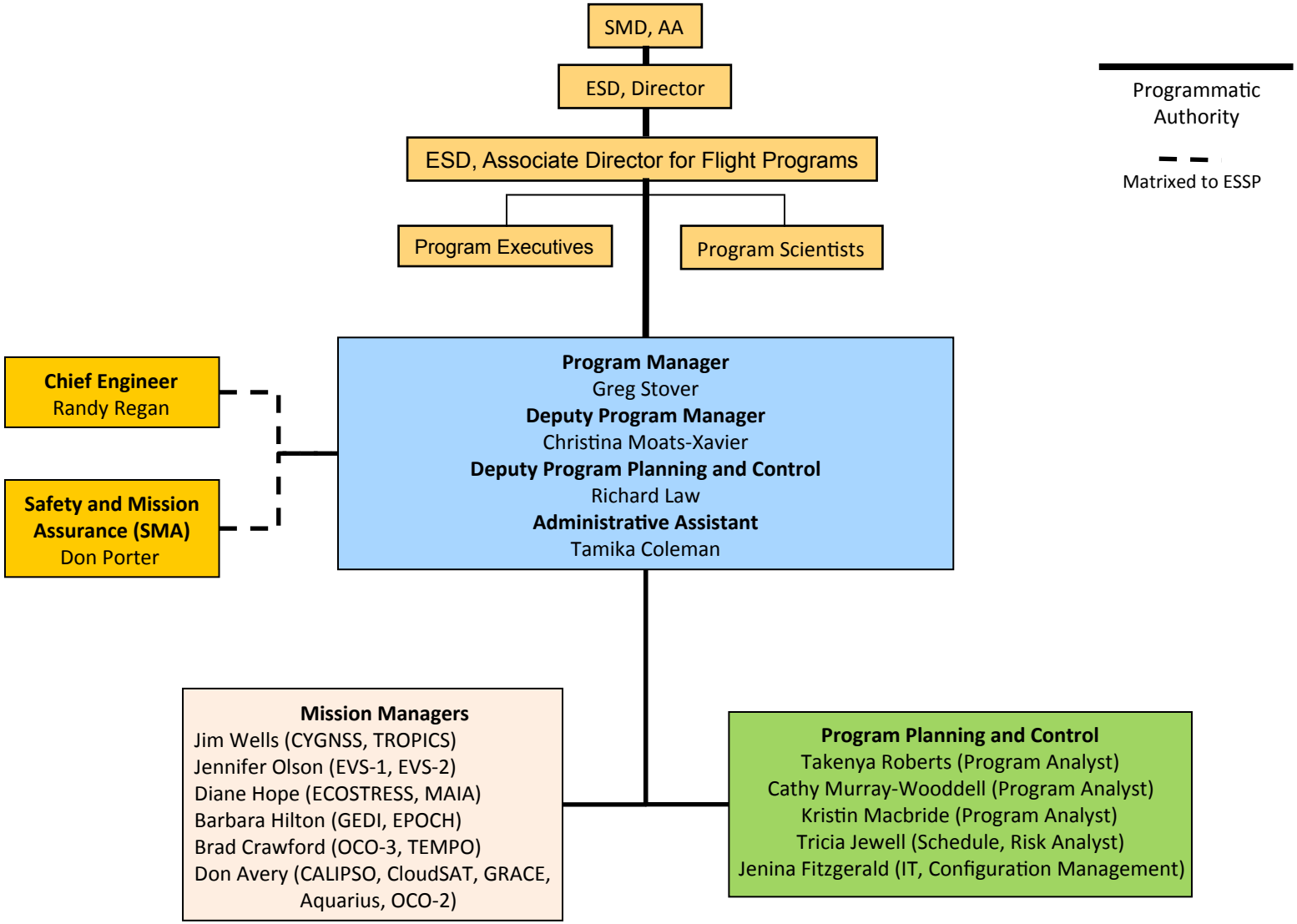
Program Office Organization



EVI-4 Management Philosophy (1 of 2)

- Goal of ESSP Program Office is to facilitate instrument success:
  - Advocate for instrument/CubeSat team and work closely with HQ on their behalf
  - Provide technical and management expertise as well as access to subject matter experts
  - Inform HQ on progress, issues and accomplishments
  - Work with Program Scientist and Program Executive to assess status and risks
  - Examine the proposed development practices and processes and work with instrument/CubeSat team to utilize these to meet NASA requirements

EVI-4 Management Philosophy (2 of 2)

- Management approach allows flexibility in processes and procedures for implementation while ensuring NASA programmatic requirements and risk posture are visible and acceptable
  - The PI has a large degree of freedom/responsibility to accomplish the proposed science objectives and achieve a successful mission within the cost and schedule constraints
  - NASA is required to perform oversight to ensure project is on-track to meet mission success criteria
  - Instrument/CubeSat will comply with the requirements of NPR 7120.5E and NPR 7123.1B
  - Some tailoring may be appropriate
    - May use developer defined equivalent processes

- Focus will be to work with EVI-4 PI to develop credible technical and programmatic plans and track plans vs. actuals

Project Interaction

Per SALMON-2 AO: "NASA will exercise essential oversight to ensure implementation responsive to requirements and constraints of NPR 7120.5E and other NASA requirements documents"

- Nominal activities
  - Weekly (Class C) or Biweekly (Class D) telecons to understand implementation progress and foster discussion of issues
  - Monthly reporting to ESSP coordinated with implementing organization reporting process & products
  - Participation by NASA in project reviews, technical interchange meetings, science team meetings
  - Ad hoc telecons/meetings

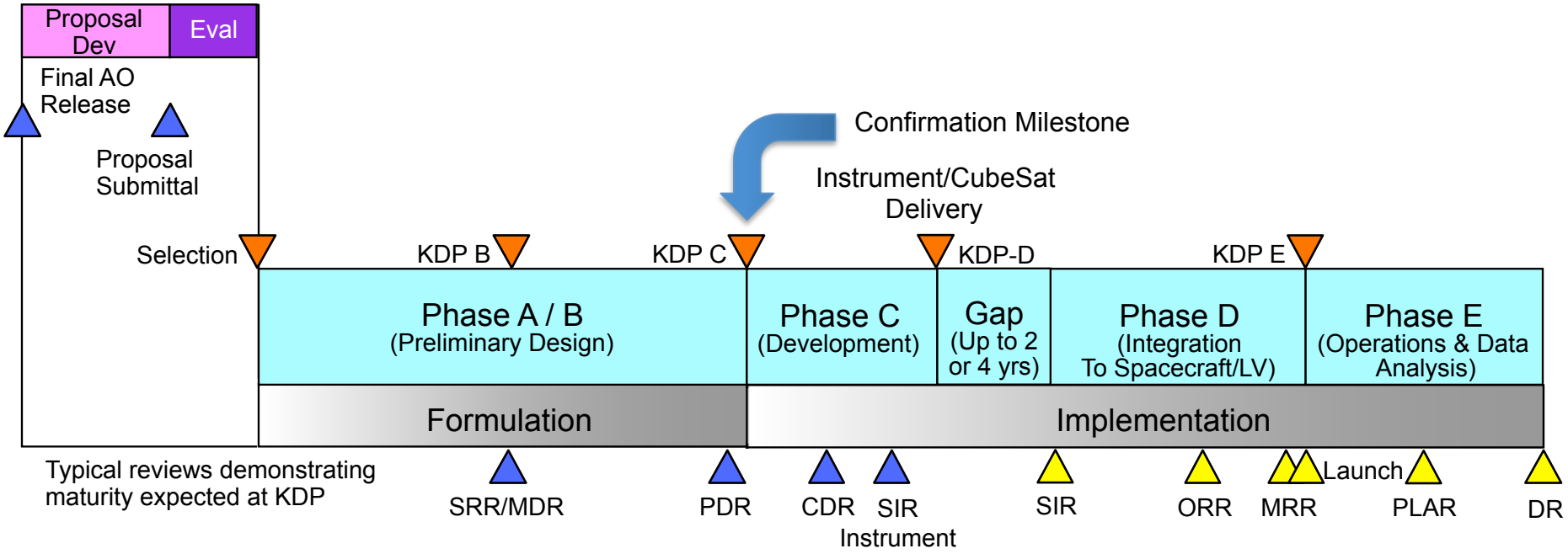
- Subject Matter Expert Assessments
  - May be initiated by the Program Office to inform risk assessments
  - May be performed in conjunction with the project's activity or tiger team
  - Assessments available to the PI for consideration

Project Reviews Implementation

- Project can propose Tailored Technical Reviews – subject to approval through the TOR/Formulation Agreement
- Tailoring options are documented in the Compliance Matrix and have traceability to NPR 7123.1B and 7120.5 E:
  - Products from Technical Review entrance and success criteria (NPR 7123.1B, Appendix G)
  - Expected product maturity (preliminary, baseline, updates) (NPR 7120.5E, Tables I-4 & I-5)

- Approach:
  - Goal is to have a host provider / launch vehicle on board by Instrument PDR
  - Utilize one SRB for all reviews (Hosted mission and Instrument, or Cubesat)
    - Provides continuity across all of the reviews and ensures a mission level perspective
    - Minimizes logistical challenges with multiple review boards
  - Nominal Instrument reviews planned up to Instrument delivery
  - Notional Host Spacecraft reviews; to be confirmed during formulation phase with SRB participation
  - For Cubesats, nominal reviews planned up to delivery

EVI Life Cycle Reviews



Key Decision Points

Instrument Reviews

Host Mission Reviews

SRR/MDR = System Requirements Review/ Mission Definition Review
PDR = Preliminary Design Review
CDR = Critical Design Review
SIR = System Integration Review
ORR = Operations Readiness Review
MRR = Mission Readiness Review
PLAR = Post Launch Assessment Review
DR = Decommissioning Review

Contractual Award Process

- Upon selection, proposal team develops Statement of Work (SOW)

- NASA Mission Manager and selected proposal team, with guidance from the NASA Contracting Officer, finalize the SOW and the deliverables
  - Typically a 4 month process

- The NASA Contracting Officer will:
  - Request revised cost proposal and negotiate based upon finalized SOW and contract type
  - Negotiate type of contract/terms and conditions – based on best method to achieve the objective of the statement of work and project
  - Require a Certificate of Current Cost or Pricing Data

Accommodations Selection Process

- Cost-Cap versus Accommodations
  - Accommodations funded items are those that are outside of the proposal and are necessary to accommodate EVI-4 on a NASA-selected host
  - Potential host platform providers can include NASA (both spacecraft and ISS), other U.S. agencies, foreign space agencies, or commercial vendors
  - A study of potential opportunities will be conducted by ESSPPO/ESD with the intent to make a recommendation to ESD of best host platform (considering Science, schedule, cost, risk)
  - Selected host platform will inform the implementation approach for accommodations
  - PI/Project team support for the host assessment activity is essential – defining requirements and potential impacts to science
  - It is imperative to track accommodations costs by WBS separately from the cost-cap mission costs

We look forward to welcoming the EVI-4 instrument into the ESSP portfolio

Backup

Common Instrument Interface Deliverables

- Hosted Payload Guidelines Document
  - Provides a prospective Instrument Developer with technical recommendations to assist in the design of an instrument that may be flown as a hosted payload either in LEO or GEO

- Hosted Payload Opportunity Database
  - Provides information regarding future Earth satellites containing sufficient breadth and depth so that NASA Earth Science Flight Programs and prospective EVI proposers can be successful when matching instruments with HPOs
  - CII will not publish any updated database entries until NASA announces the results of the EVI-4 selection process

- Both available as a link from the ESSP Program website – Common Instrument Interface – CII Reference Documents

Payload Risk Classifications

Class Risk classification defined in NPR 8705.4, "*Risk Classification for NASA Payloads*"

EVI-4

Characterization	Class A	Class B	Class C	Class D
Priority (Criticality to Agency Strategic Plan) and Acceptable Risk Level	High priority, very low (minimized) risk	High priority, low risk	Medium priority, medium risk	Low priority, high risk
National significance	Very high	High	Medium	Low to medium
Complexity	Very high to high	High to medium	Medium to low	Medium to low
Mission Lifetime (Primary Baseline Mission	Long, >5years	Medium, 2-5 years	Short	Short < 2 years
Cost	High	High to medium	Medium to low	Low
Launch Constraints	Critical	Medium	Few	Few to none
In-Flight Maintenance	N/A	Not feasible or difficult	Maybe feasible	May be feasible and planned
Alternative Research Opportunities or Re-flight Opportunities	No alternative or re-flight opportunities	Few or no alternative or re-flight opportunities	Some or few alternative or re-flight opportunities	Significant alternative or re-flight opportunities
Achievement of Mission Success Criteria	All practical measures are taken to achieve minimum risk to mission success. The highest assurance standards are used.	Stringent assurance standards with only minor compromises in application to maintain a low risk to mission success.	Medium risk of not achieving mission success may be acceptable. Reduced assurance standards are permitted.	Medium or significant risk of not achieving mission success is permitted. Minimal assurance standards are permitted.
Examples	HST, Cassini, JIMO, JWST	MER, MRO, Discovery payloads, ISS Facility Class Payloads, Attached ISS payloads	ESSP, Explorer Payloads, MIDEX, ISS complex subrack payloads	SPARTAN, GAS Can, technology demonstrators, simple ISS, express middeck and subrack payloads, SMEX

Responsibility for Agreements

- Principal Investigator
  - PI develops and approves all agreements between PI and other organizations (Investigation internal)
  - Interagency agreements developed by PI, in coordination with NASA HQ and Program Office, signed by SMD AA
  - International agreements developed by PI, in coordination NASA HQ and Program Office, signed by Office of International and Interagency Relations (OIIR)

- Program Office
  - Task Plans or Contracts between the Program Office and PI and implementing organizations established to document understanding of expectations and funding profile
    - Management/Development Approach
    - Scope of Work/Work Description
    - Schedule
    - Cost Estimate
    - Deliverables
    - Period of Performance

Monthly Reporting

- Monthly reporting provided to ESSP is intended to keep open communication regarding project status, future plans, and issues

- *Typical Report Content*:
  - Report of **Key Technical Performance Parameters**
  - **Technical status** for system and subsystem design and development activities, including subcontract technical performance
  - **Science** Activities
  - Summary of **Integrated Master Schedule*** including summary upper-level schedule, top critical path(s), schedule reserve status and variances with explanations
  - Status of **open Issues and Problems**
  - **Risk and Mitigation** status for significant risks
  - Summary of **Financia**l status including funding and staffing, planned vs. actuals, variances and explanations, reserves – liens and encumbrances
  - **Project Manager's assessment**, significant accomplishments with photos (as available)

**Access to native format schedule on monthly basis requested*

Earned Value Management

- Project value of > $100 million requires an Earned Value Management Systems compliant with EIA-748
- Earned Value Management Reporting begins 3 reporting periods prior to start of Phase C
- Goal is Integrated Baseline Review prior to KDP-C
- Performance Management Baseline (PMB) baselined at Confirmation

- *Monthly Reporting to Include*:
  - Schedule Variance (SV)
  - Cost Variance (CV)
  - Baseline Execution Index (BEI)
  - Hit Miss Index (HMI)
  - Schedule Performance Indices (SPI) and Cost Performance Indices (CPI) with trends to level aligned with B3 table from proposal
  - Estimate at Complete (EAC)
  - To Complete Performance Index (TCPI)
  - Variance explanations

Program Office Assessments

- At Key Decision Points, ESSPPO will perform an assessment of project performance and include a recommendation to DPMC

- Information used in the assessment include:
  - Independent Cost & Schedule Estimates – often produced by more than one independent estimator – focused on estimate at 50% confidence level
  - Cost plans versus actuals
  - Reserve status and burn-down plan
  - Technical performance
  - Integrated Master Schedule
  - Risk Management
  - SRB Assessment from lifecycle review

- Assessment developed with support from project and shared with project prior to DPMC

Lines of Authority and Communications