



Earth System Explorers Program (ESEP) Overview

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Explorers Background

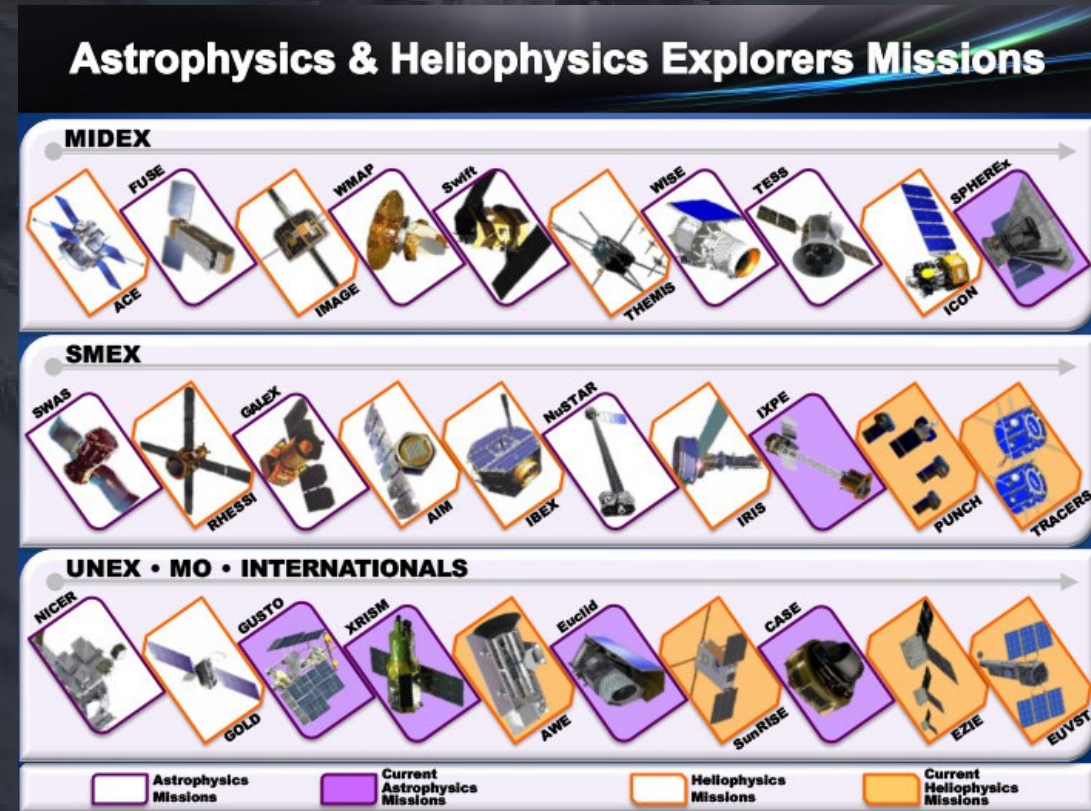
- Explorers is NASA's oldest, continuous program with over 100 successful small / medium sized missions
 - Explorers 1 launched in 1958
 - 25 of 100 missions were Earth Science missions
- Explorers represents missions that fall between sub-orbital and flagship missions.



Explorer 1 led by Wernher von Braun, James Van Allen and William Pickering

Advancing the Explorers Program Legacy

- Astro/Heliophysics Explorers program established in 1990s
 - Competitively selected through Announcement of Opportunity
 - Principal Investigator-led
 - Cost-capped missions
- The Earth System Explorers Program (ESEP), tailors the highly successful Astro/Heliophysics model to implement only MDEX-caliber, category 2, Class C, Earth science missions that address ESE target observables.

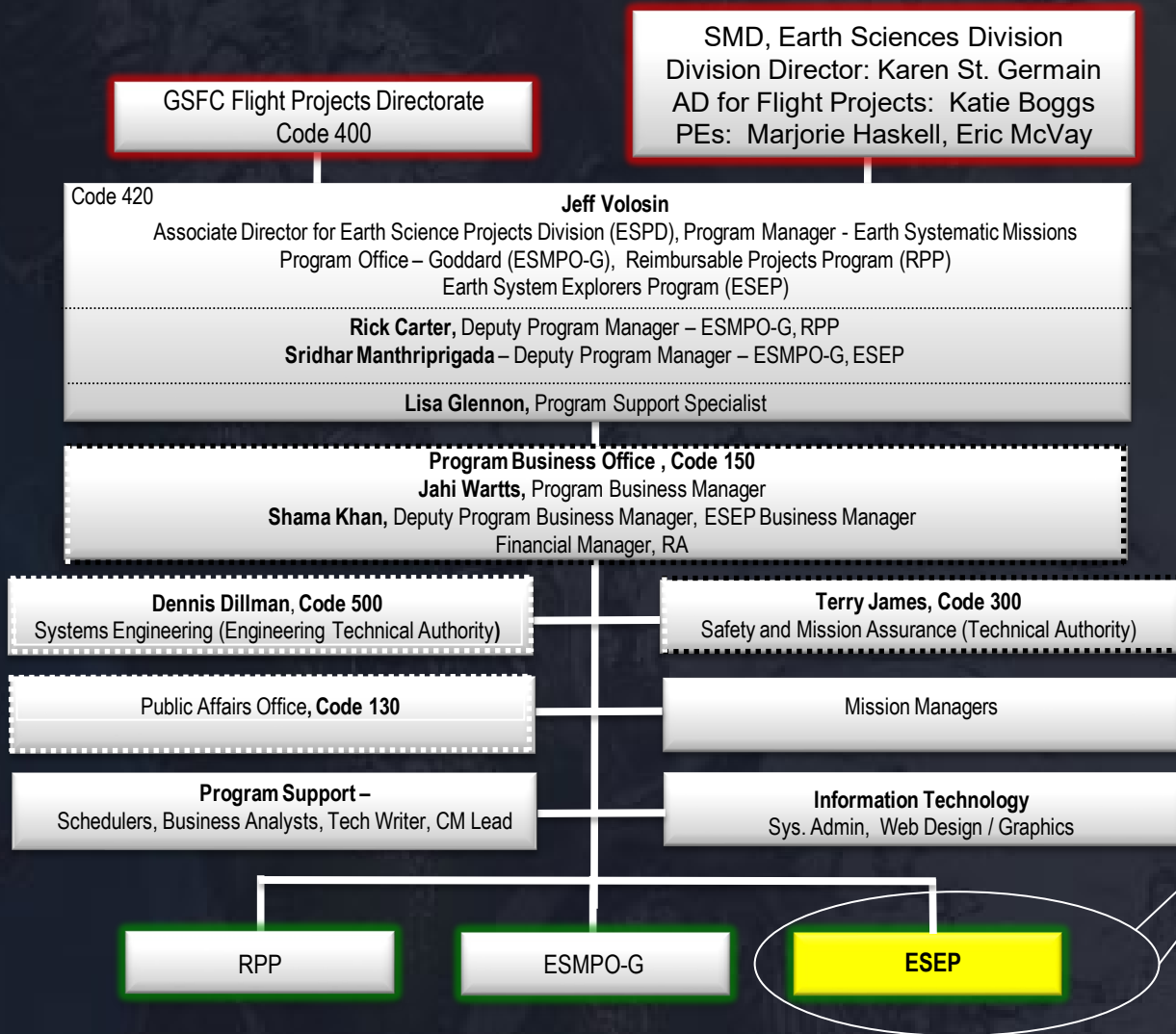


ESEP tailors the approach of highly successful Astro/Heliophysics Explorers Program

ESEP Implementation Approach

- Consistent with NPR 7120.5F for Uncoupled Program guidance
- Implementation approach defined in Earth System Explorers (ESE) Program Plan
 - Program provides oversight and enforces Agency requirements and ESEP MAR on Projects
- Developed an Earth System Explorers Mission Assurance Requirements (MAR) tailored for risk class C missions
- Support HQ-led AO process to competitively select ESE missions
 - Provide Program Plan and MAR to proposers as applicable documents
- PI leads all aspects of project and is responsible for mission success
 - PI develops Level 1 requirements
- ESE Projects propose mission implementation approach in their project plan, which is approved by SMD AA.
 - Projects make-buy approach, partnerships (international partnerships controlled by OIIR) in Phase A concept study report to support an SMD selection, then finalized in Phase B.
 - Projects develop acquisition strategy in accordance with NASA and Center procurement processes to ensure cost, schedule, technical, and risk performance with appropriate insight/oversight and the use of appropriate contractual vehicles including cost plus incentive fee, cost plus award fee, etc.
- Program provides project oversight / insight and support to help ensure mission success
 - In Phase B, Program will conduct TRL formal assessment and ensure Project develops action plans to address low TRL areas and weaknesses found by TMC

GSFC Earth Science Projects Division Organization



- Earth System Explorers Program is incorporated into GSFC's existing Code 420 Program Office
 - Earth Systematic Missions Program Office – Goddard (ESMPO-G)
 - Reimbursable Projects Program (RPP)
 - Earth System Explorers Program (ESEP)
- ESEP Leverages existing program Office functions
 - Program Leadership with Explorers Experience
 - Configuration Management
 - Business Management
 - Systems Engineering
 - IT Services
 - Administrative Support
- Customizes processes and governance model from Heliophysics and Astrophysics Explorers Program Office at GSFC to fit ESE requirements

ESEP Leverages Explorers Experience



- Close relationship with Astrophysics / Heliophysics Explorers Program (GSFC Code 460) is being leveraged to transfer knowledge and ensure lessons learned are incorporated



- ESPD (GSFC Code 420) senior staff includes key members with Explorers Program experience:
 - **Earth System Explorers Program Manager**
 - Jeff Volosin – 420 Associate Director - former TESS/MIDEX Project Manager
 - **Earth System Explorers Deputy Program Manager**
 - Sridhar Manthripragada – 420 Deputy Program Manager - former NICER/MO Project Manager
 - **Earth System Explorers Program Systems Engineer**
 - Dennis Dillman – 420 Lead Systems Engineer - former 460 Systems Engineer
 - **Earth System Explorers Program Chief Safety and Mission Assurance Officer (CSO)**
 - Terry James – 420 CSO – former 460 Mission Assurance CSO and TESS/MIDEX Project CSO
 - **ESPD Deputy Business Manager**
 - Shama Khan — former TESS/MIDEX Resource Analyst
 - **ESEP Consultant** – Greg Frazier – former Astro/Helio Explorers Dep. Prog. Mgr.

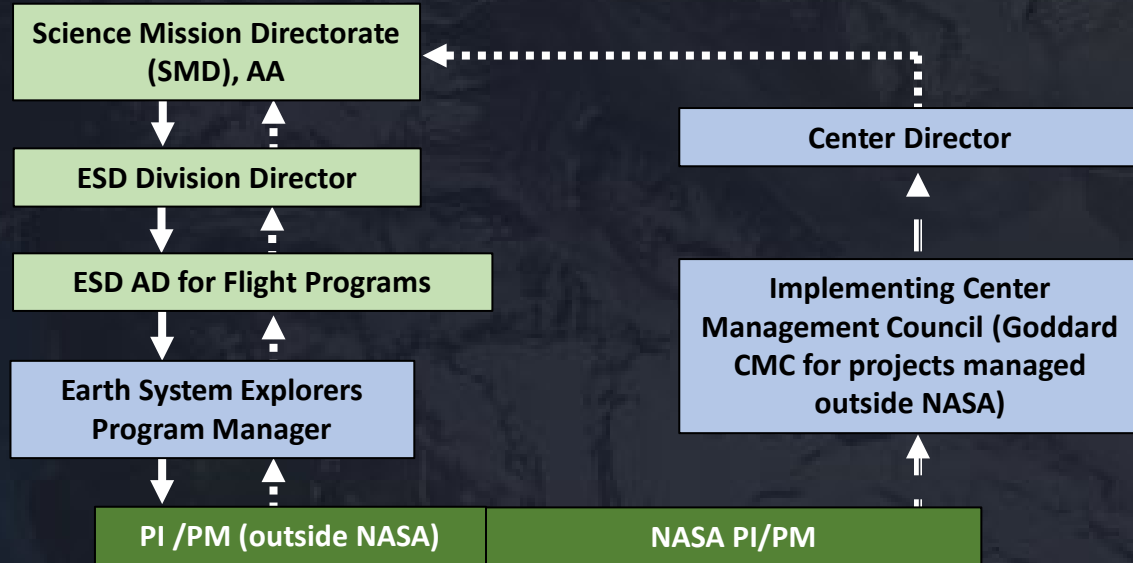
Earth System Explorers Program Office Roles and Responsibilities

- Support HQ-led Announcement of Opportunity (AO) process
 - Program Office is firewalled from review and selection process but holds Phase A and Bridge contracts
- Support the Principal Investigator in achieving mission success and ensure that the mission complies with all applicable government and NASA-specific policies and regulations
- Provide comprehensive oversight of the mission development process by conducting ongoing assessments of the mission's cost, schedule and technical progress
- Provide mission status to SMD Earth Sciences Division & GSFC Center Management, through monthly reviews, weekly reporting and timely notification of problems & resolution plans
- Coordinate the provision of certain services and equipment as required, such as space communication support, launch services, etc.
 - Provide interface to LSP for outside missions unfamiliar with launch service process or support Project LV lead
- Provide recommendations for the chair and membership of the project Standing Review Boards
- Maintain technical authority
- Appoint a Mission Manager for missions not managed by Goddard. Mission Manager is primary POC to PI.
 - For GSFC missions, Project Manager reports directly to the Earth System Explorers Program Manager

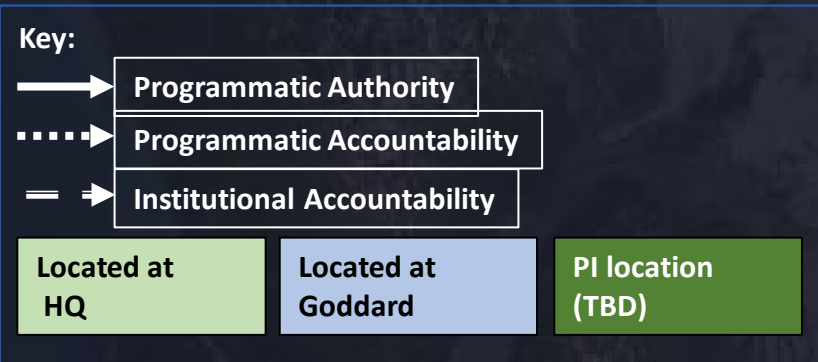
Principal Investigator Roles and Responsibilities

- PI is responsible for all aspects of mission success including scientific integrity, cost, schedule, technical performance and mission safety.
- PI manages the mission in accordance with the best practices and standards of implementing Center
 - PI may delegate day to day project implementation to the project manager
- Develops L1 mission requirements (PLRA) and project plan in early Phase B per 7120.5F
 - Draft PLRA provided with proposal and submitted in Phase B for review and approval by KDP-C
 - SMD AA approved PLRA is documented in ESEP Program Plan
- Project Plan
 - Agreement between NASA and the PI on the terms and conditions under which the PI executes the mission.
 - Baselined at KDP-C
- At KDP-C
 - PI demonstrates minimum unencumbered cost reserves including adequate funded schedule reserve per GPR 7120.7B, Funded Schedule Margin and Budget Margin for Flight Projects.

Earth System Explorers Program Governance Structure

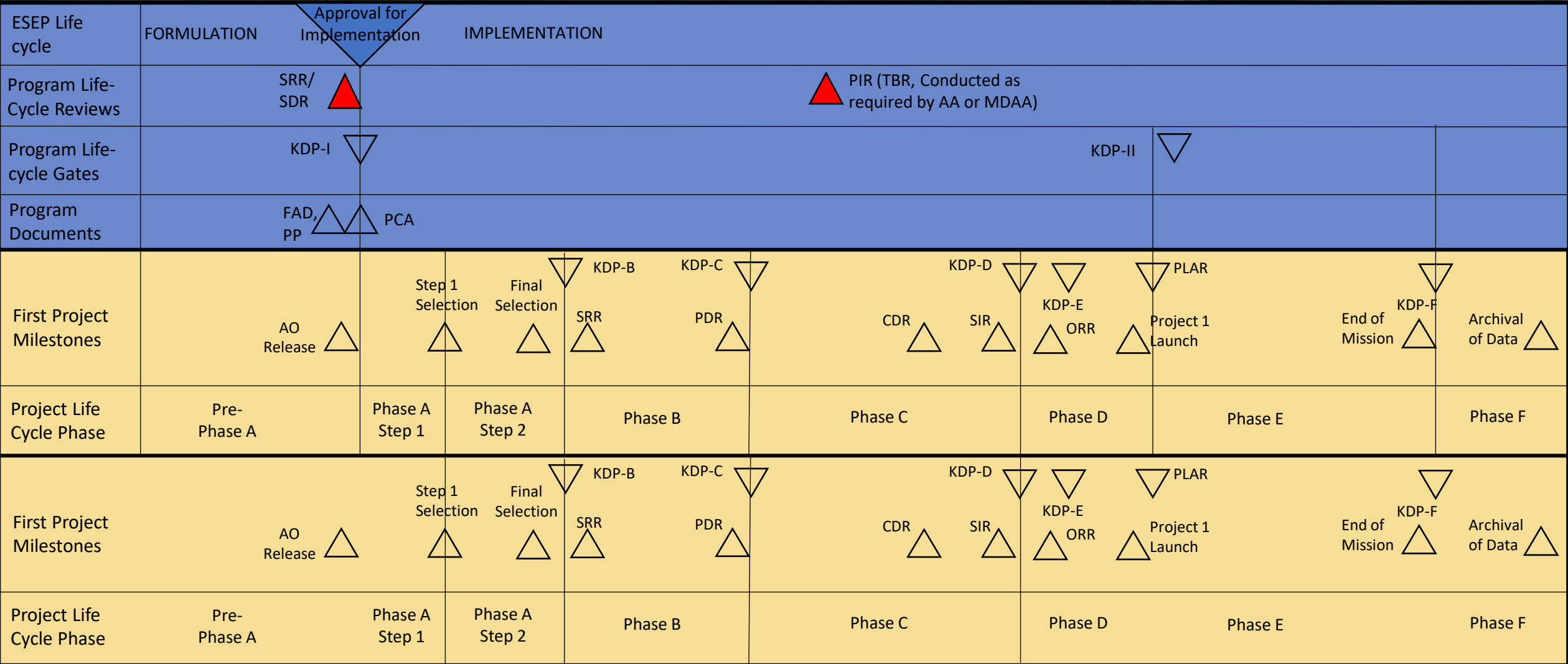


- APMC is governing council for the ESEP
- DPMC is the governing council for all ESEP projects
- SMD AA is the decision authority for ESEP projects, including making all final decisions to proceed from one phase to the next.
- Figure shows the lines of authority and reporting for projects within the program
- Technical Authority and Center's command media apply for implementing NASA Centers



Top-Level Program Schedule

CY 2022	CY 2023	CY 2024	CY 2025	CY 2026	CY 2027	CY 2028	CY 2029	CY 2030	CY 2031	CY 2032	CY 2033	CY 2034	CY 2035
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Pre-decisional – For Internal Use Only

Summary

- Earth System Explorers Program (ESEP) Implementation is consistent with the 2017 decadal survey recommendations and NASA Strategic goals
 - Competitively selected, cost-capped, PI-led, Category 2, Class C science investigations
 - Designed to accomplish high-quality Earth system science investigations addressing one or more observables identified as ESE Targeted Observables (TO)
- Program Implementation is consistent with NPR 7120.5F Uncoupled Program guidance
- Implementation approach is modeled after highly successful Astro/Helio Explorers program and Leverages existing ESPD infrastructure
- ESEP supports the PI toward mission success