Discovery 2019
Concept Study Kickoff

Planetary Missions Program Office
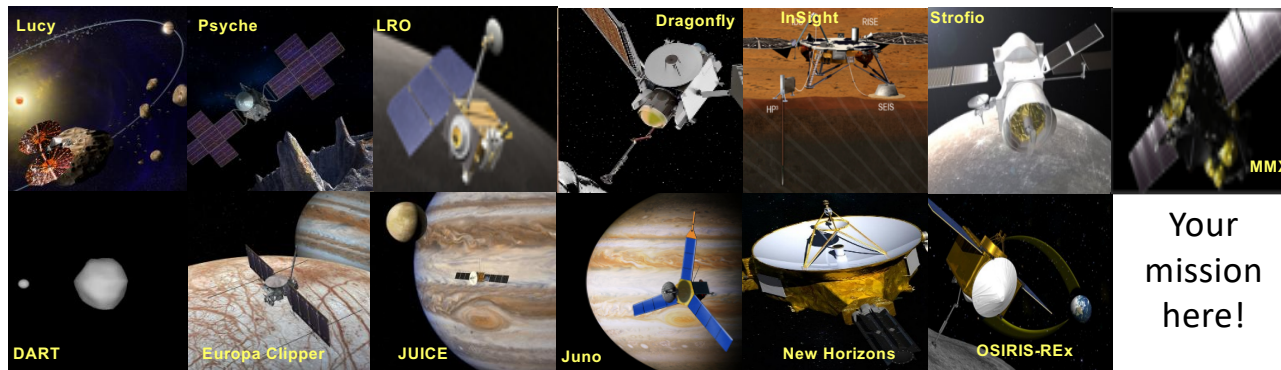**Brad Zavodsky (NASA/MSFC)**
(brad.zavodsky@nasa.gov)

PMPO Goal

Goal:

- Enhance the probability of mission success through independent oversight and insight through all phases of the mission life cycle utilizing a high-powered, effective, and efficient team
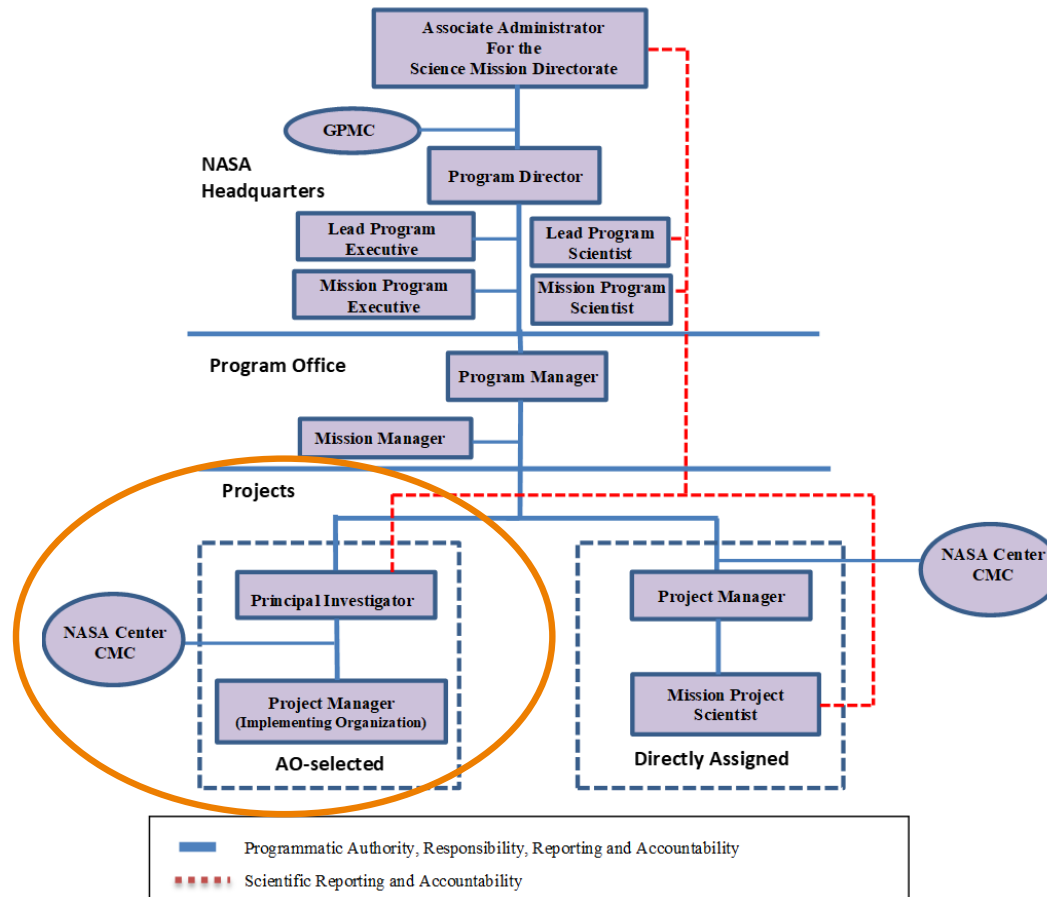
Success is:

- Delivering Mission Science to the Principal Investigator
- Ensuring the implementing organization's success in delivering the spacecraft on cost and schedule (meet the launch date and cost cap)
- Meeting the Program launch frequency for Science Missions (every 36 months)

Planetary Missions Program Office (PMPO)

Science Mission Directorate
Associate Administrator — Thomas Zurbuchen
Deputy AA — Sandra Connelly

Planetary Science Division
Director — Lori Glaze
Deputy Director — Eric Ianson
AD Flight Programs — Joan Salute
Program Scientist — Thomas Wagner
Program Executive — Andrea Riley

Planetary Missions Program Office
Program Manager — Brian Key
Deputy Manager — Brian Mulac
Contract/Mission Manager — Bradley Zavodsky

DISCOVERY PROGRAM

InSight	Lucy
LRO	Psyche
Strofio	MMX

NEW FRONTIERS Program

New Horizons
Juno
OSIRIS-Rex
Dragonfly

SOLAR SYSTEM EXPLORATION Program

Europa Clipper
JUICE
DART

Program Management Structure

Discovery PIs report directly to the Discovery Program Manager at PMPO but have scientific reporting responsibilities to the Lead Program Scientist and SMD AA

Program Office Roles

Direct Support

Program Management
- Responsible for managing the Program Office
- Program Manager for the Programs

Program Integration
- Responsible for Program-level reporting and cross-cutting products

Mission Managers
- Primary Program interface with the Projects and Program Executives

Education and Communications
- Conducts Program-level Education and Communications activities
- Supports Project activities

Matrix Support

Technical Authority (TA)
- Program Office holds TA for projects managed at non-NASA centers (e.g., APL, Universities)
- MSFC Engineering Directorate provides Chief Engineer
- MSFC SMA Directorate provides Chief SMA Officer and SMA support
- All co-located with Program Office

Program Office: Mission Managers

Mission Managers function as the Program Manager (PM) day-to-day point of contact for all assigned projects, performing technical and programmatic management functions on behalf of the PM and ensuring the PM maintains an awareness of the project status

- Interface directly with the Project Managers to develop inputs for program planning and integration or to resolve project issues
- Perform independent evaluation of project metrics, schedule, cost data, management, and issues for the PM
- Perform independent assessments of projects to identify risks and mitigations
- Serve as the Program Office advocate to NASA management, the public, and other Government entities for assigned projects
- Lead the development of decision packages or products that are fully coordinated within the Discovery Program and with the related PIs and Project Managers
- Coordinate with the PMPO business office and act as technical monitor or COR to ensure that appropriate program resources are provided to the projects in a timely manner

Program Office: Contract/Business Managers

Contract Management:
- Program Office manages contracts with PI organization and implementing organization, if applicable
  - If the organization has an associated NASA Management Office (NMO) the contract is managed by the NMO with input from the Program Office on the project task
- Program Office provides Phase A contract support as a service to SMD; however, the Program Office does not evaluate the scientific or technical merits of the proposals
- Phase B bridge contracts will be worked with each project that has a contract allowing for work to continue while the Phase B contract is negotiated; this process will begin around the time of site visits in early 2021

Business Management:
- Program Business Office coordinates the annual overall program budget planning activity in conjunction with all Discovery projects
  - Results are documented in a Program Funding Agreement with each Project
- Missions are required to provide standard NASA financial reports
- Missions are responsible for the overall project budget
  - Information on project by-pass funding (e.g. direct funding to NASA centers) is provided by the Program Office
- Missions are required to implement Earned Value Management – developed in phase B, utilized during phase C/D

Program Office: Things to Consider

The Program Level Requirements Appendix (PLRA) of the Planetary Missions Program Plan is developed at the start of Phase B and updated after the Confirmation Review (post PDR and KDP-C); start thinking about it in Phase A

The Project must develop a Cost Analysis Data Requirement (CADRe) spreadsheet prior to PDR to support the Confirmation Process

Think hard about number of test beds needed (consider fault protection/autonomy testing)

Watch for optimistic workforce roll off estimates for launch

- Optimistic Test Schedules
- Verification and Validation
- Planned Phase D work rolled into Phase E

PMPO is looking forward to working you on your exciting mission concepts!

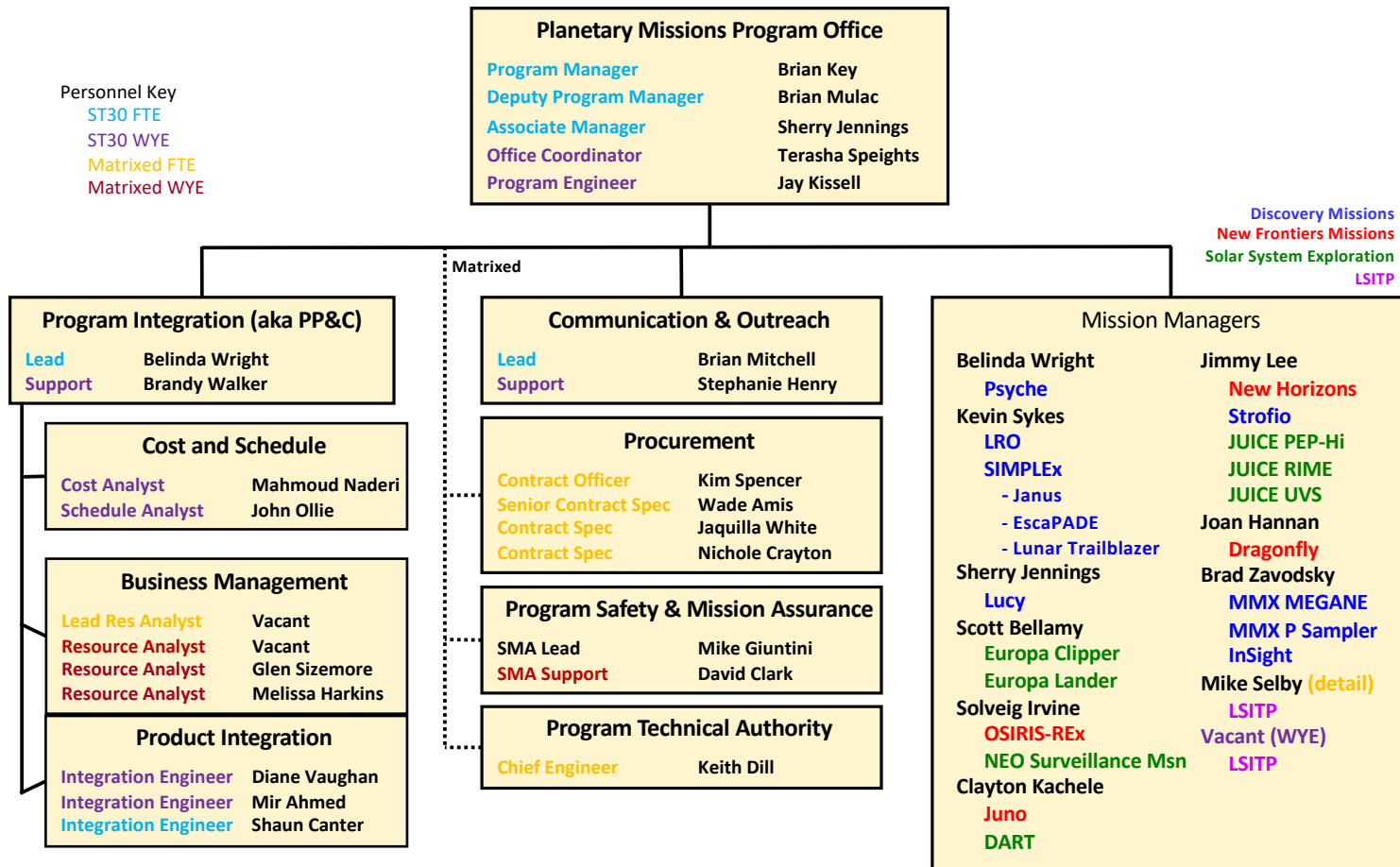For more information on PMPO, visit:
https://www.nasa.gov/planetarymissions/index.html

For any additional questions, please contact Brad Zavodsky (brad.zavodsky@nasa.gov)

Backup Slides

Program Office: Organizational Chart

Planetary Missions Program Office

Program Manager	Brian Key
Deputy Program Manager	Brian Mulac
Associate Manager	Sherry Jennings
Office Coordinator	Terasha Speights
Program Engineer	Jay Kissell

Personnel Key
ST30 FTE
ST30 WYE
Matrixed FTE
Matrixed WYE

Matrixed

Discovery Missions
New Frontiers Missions
Solar System Exploration
LSITP

Program Integration (aka PP&C)

Lead	Belinda Wright
Support	Brandy Walker

Cost and Schedule

Cost Analyst	Mahmoud Naderi
Schedule Analyst	John Ollie

Business Management

Lead Res Analyst	Vacant
Resource Analyst	Vacant
Resource Analyst	Glen Sizemore
Resource Analyst	Melissa Harkins

Product Integration

Integration Engineer	Diane Vaughan
Integration Engineer	Mir Ahmed
Integration Engineer	Shaun Canter

Communication & Outreach

Lead	Brian Mitchell
Support	Stephanie Henry

Procurement

Contract Officer	Kim Spencer
Senior Contract Spec	Wade Amis
Contract Spec	Jaquilla White
Contract Spec	Nichole Crayton

Program Safety & Mission Assurance

SMA Lead	Mike Giuntini
SMA Support	David Clark

Program Technical Authority

Chief Engineer	Keith Dill

Mission Managers

Belinda Wright	Jimmy Lee
Psyche	New Horizons
Kevin Sykes	Strofio
LRO	JUICE PEP-Hi
SIMPLEx	JUICE RIME
- Janus	JUICE UVS
- EscaPADE	Joan Hannan
- Lunar Trailblazer	Dragonfly
Sherry Jennings	Brad Zavodsky
Lucy	MMX MEGANE
Scott Bellamy	MMX P Sampler
Europa Clipper	InSight
Europa Lander	Mike Selby (detail)
Solveig Irvine	LSITP
OSIRIS-REx	Vacant (WYE)
NEO Surveillance Msn	LSITP
Clayton Kachele	
Juno	
DART	

Program Office: Technical Authority

NASA governance model provides a separation of Programmatic Authority and Institutional Authority as part of its system of "checks and balances" to provide independent oversight of programs and projects in support of overall safety and mission success

- Engineering Technical Authority (ETA) is provided to the Program Office from the Chief Engineer's (CE) Office at MSFC
- Safety and Mission Assurance (S&MA) Technical Authority is provided to the Program Office from the S&MA Office at MSFC

TA Communication

- Daily verbal discussions with Mission Managers
- Frequent discussions with Project personnel
- Weekly written and verbal reporting to MSFC Management
- Ad-hoc communication as necessary

TA Insight

- The Program TA ensures mission success by performing independent technical insight over the various projects within the Programs
- The TA performs insight by 1) attending review meetings, 2) monitoring telecons, 3) reading status reports, and 4) following on-going issue resolutions
- The level of insight is risk-based

The PMPO CE utilizes technical expertise from across NASA, industry, and academia to study and address issues
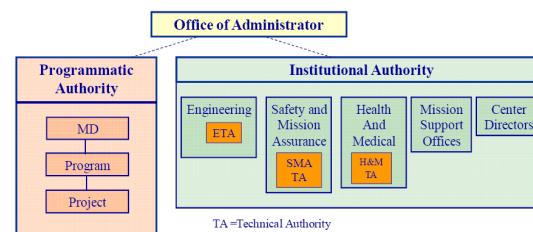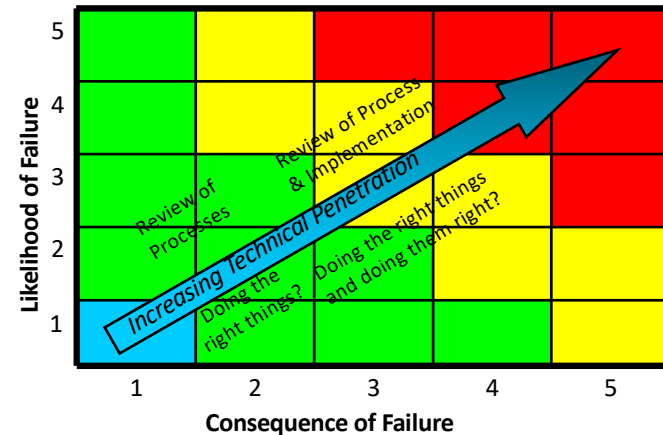
Program Office: Risk-Based Insight

- **Cost cap – cost constraint**
- **Planetary missions – schedule constraint**
- **Complex instruments/mission designs – technical constraints**

- **Program Office insight effort modulated by budgetary constraints**

- **Risk identification through multiple vehicles**
  - ➢ **Formal project reporting**
  - ➢ **Regular and gate reviews**
  - ➢ **Regular interactions with project teams**
  - ➢ **Input from Standing Review Boards**

- **Risk Management Process requires Mission Managers to:**
  - ➢ **Assess and monitor resolution of project-identified risks and mitigations**
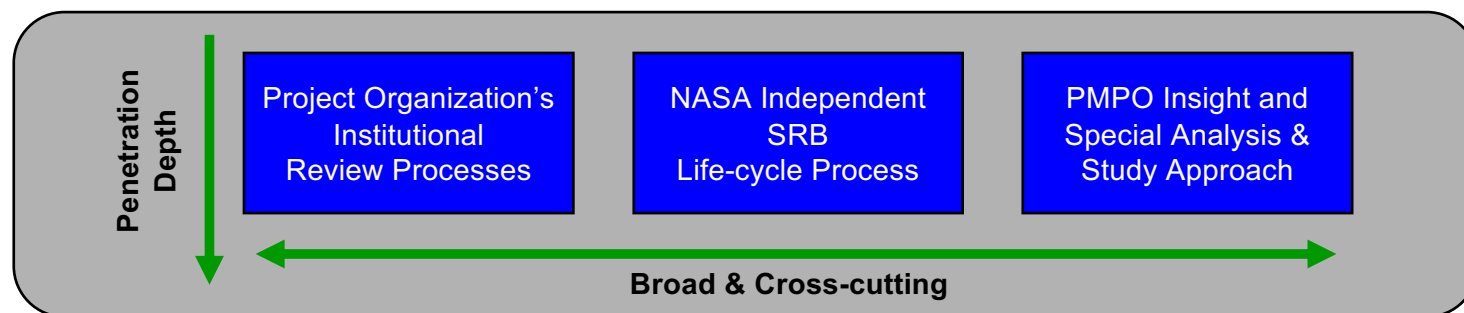 - ➢ **Independently identify and assess project risks and mitigations**

- **Risk-Based Insight of projects, where depth of technical insight is applied proportionally to severity of known risks and within balance of total program's priorities and limited resources**

Risk matrix chart: Likelihood of Failure (y-axis, 1–5) vs Consequence of Failure (x-axis, 1–5), with arrow labeled "Increasing Technical Penetration" and annotations "Review of Processes", "Review of Process & Implementation", "Doing the right things?", "Doing the right things and doing them right?"

Program Office: Insight/Oversight Approach

PMPO "3-pronged" composite insight/oversight approach to achieving the "right-level" of review and analysis, expertise, and objectivity for enhancing probability of project and program success.

- Adjust insight penetration levels as required by risk/technical severity
- Broadly balance insight/oversight resources (e.g., processes, budget, schedule)
- Leverage use of all existing insight/oversight capabilities within the implementing institution, NASA, and the program office

Penetration Depth

| Project Organization's Institutional Review Processes | NASA Independent SRB Life-cycle Process | PMPO Insight and Special Analysis & Study Approach |

Broad & Cross-cutting

Program Office: Project Schedule Assessment

Projects in Phases B, C, & D independently maintain their detailed schedules and report on schedule performance monthly

Mission Managers assess project schedules periodically

- Program Office schedule analyst provides assessments to individual Mission Managers
- Project schedules are included in monthly reports to the PM and NASA HQ/PSD
- Risk management process identifies and tracks potential impacts to project schedules (and any associated impacts to cost)

Detailed reviews of the project schedules are performed periodically

- Coordinated with major project milestones or special program evaluations
- Schedules assessed for completeness and feasibility

Program Office schedule analyst uses various internally developed and commercially available software products and metrics to analyze project schedule performance

Program Office schedule analysis results are provided to and iterated with Project Management and individual project scheduling personnel

Program Office: Earned Value Management

Program Office receives Earned Value Management (EVM) information, as it is available, from individual projects during Phases B, C & D

Program Office uses the EVM data and resultant analysis at various levels of the WBS to monitor project progress and foretell potential problem areas. Specifically,

- **Cost Performance Index (CPI)**
- **Schedule Performance Index (SPI)**

Integrated Baseline Review (IBR)

- **Program Office participates in IBRs conducted by implementing organizations**
- **Program Office conducts IBR on the project**