

National Aeronautics and Space Administration



New Frontiers Program Office

Overview/Guidance/Expectations
April 29, 2010



5-43702

Discovery, New Frontiers & Lunar Quest

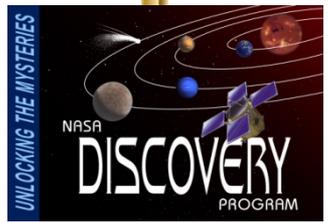


Science Mission Directorate
 Associate Administrator Ed Weiler
 Deputy AA Chuck Gay

Planetary Science Division
 Director Jim Green
 Deputy Director Jim Adams

Discovery, New Frontiers & Lunar Quest Program Office

Program Manager Dennon Clardy
 Deputy D/NF Allen Bacskey
 Deputy LQ John McDougal



- Aspera
- Dawn
- EPOXI
- GRAIL
- MESSENGER
- Stardust-NExT
- M³
- Strofió
- Discovery AO New Mission

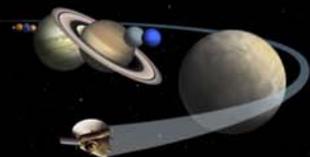


- Juno
- New Horizons
- NF AO 3 New Mission



- LADEE
- LRO
- Robotic Lunar Lander Development Team (RLD)

Program Office Organization



New Frontiers Program

Discovery / New Frontiers / Lunar Quest Program Office
 Program Manager - Dennon Clardy
 DNF Deputy Program Manager - Allen Bacskay
 LQ Deputy Program Manager - John McDougal
 Secretary - Sandra Nixon

Discovery Missions
 New Frontiers Missions
 Lunar Quest Missions

5-43702

Program Integration
 Integration Manager - Bill Kahle
 Integration Analyst - Marilyn Newhouse
 Integration Analyst - Tom Hushka
 Schedule Analyst - Nate Porter

Business
 Business Office Manager - Donna Patterson
 Program Analyst - Derek Wiseman
 Program Analyst - Stephanie Allen

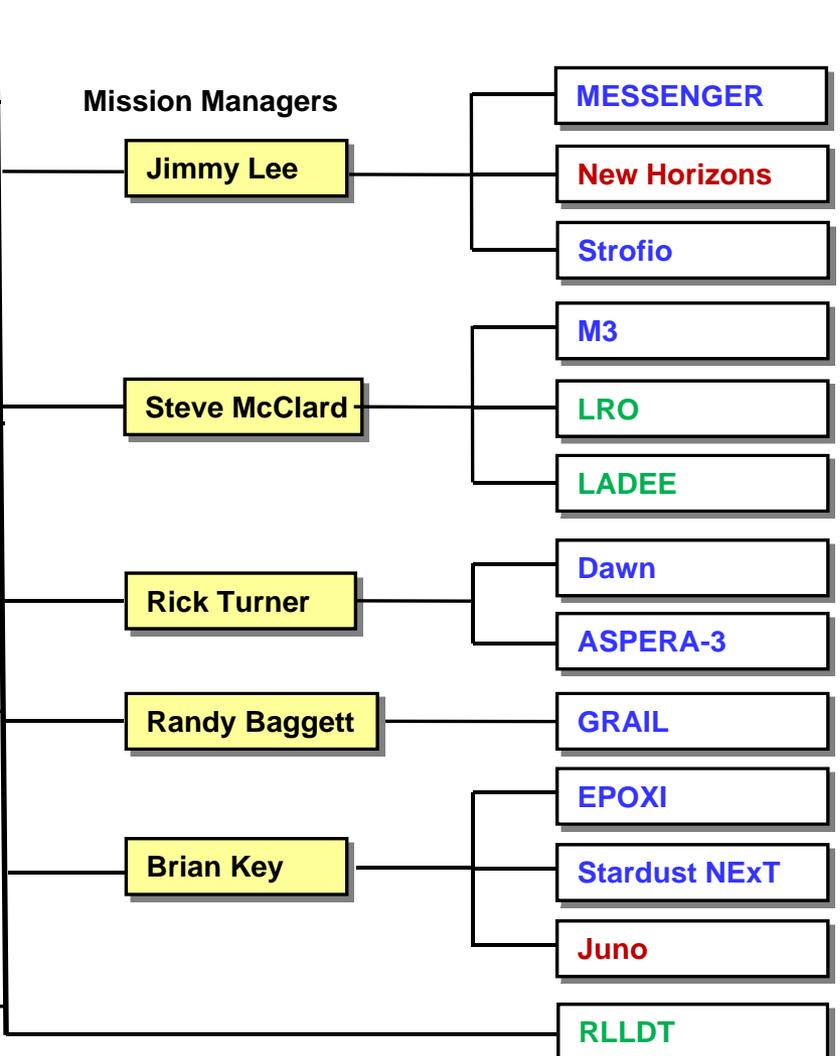
Lunar Quest Formulation
 Program Integration Engineer - Paul Galloway
 Program Formulation Lead - Karen Stephens

Education & Public Outreach
 DNF E&PO - Shari Asplund/JPL
 LQ E&PO - Brian Mitchell

Procurement
 Contract Officer/Mgr - Melinda Dodson
 Contract Specialist - Belinda Triplett
 Contract Specialist - Iris Walter

Program Technical Authority
 Lead Chief Engineer, DNF - Judy Ballance
 Asst. Chief Engineer, DNF - Mike Galuska
 Lead Chief Engineer, LQ - Bryan Barley

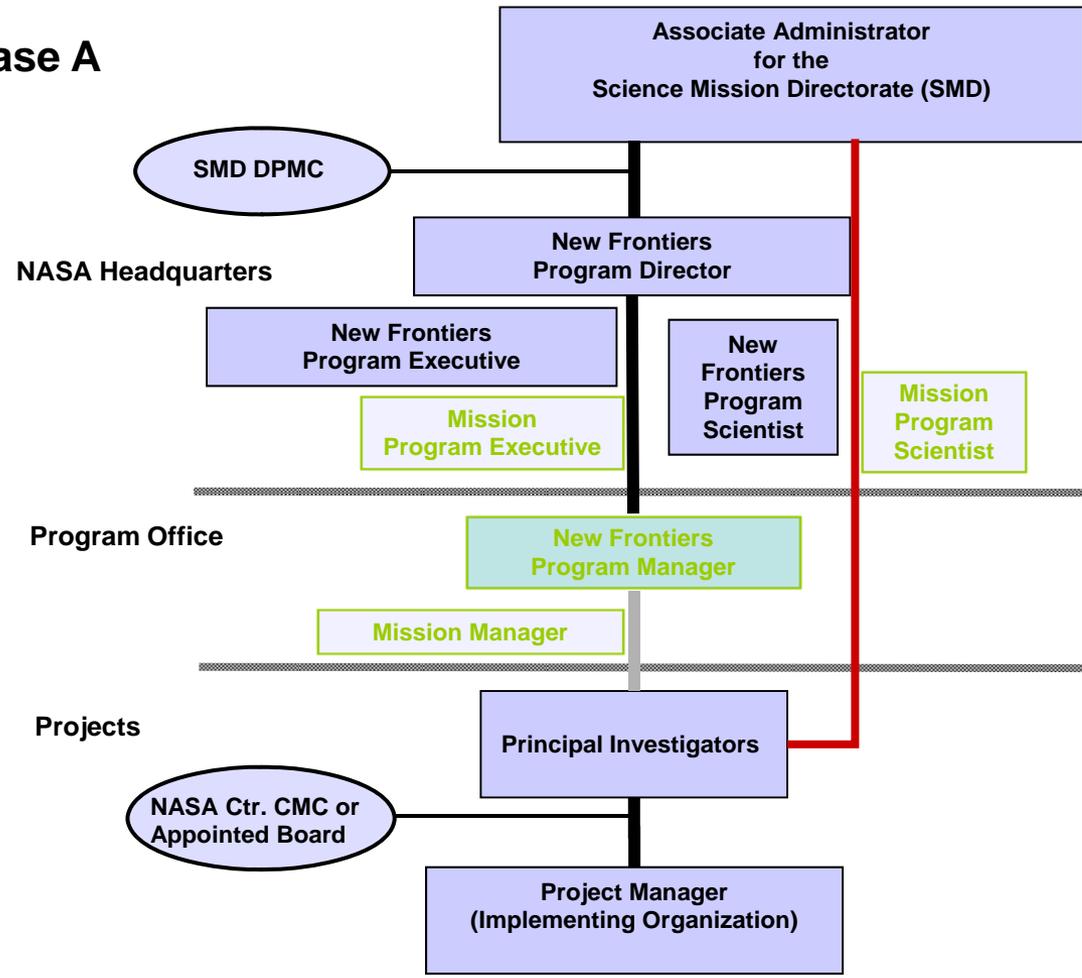
Program Safety & Mission Assurance
 S&MA Lead - Dr. Ruth Jones





Program Structure - Phase A

Phase A



Phase A contracts are established through the Program Office, however this service is performed as a support function to the Program Scientist.

The Program Office has no other official role in the selection process.

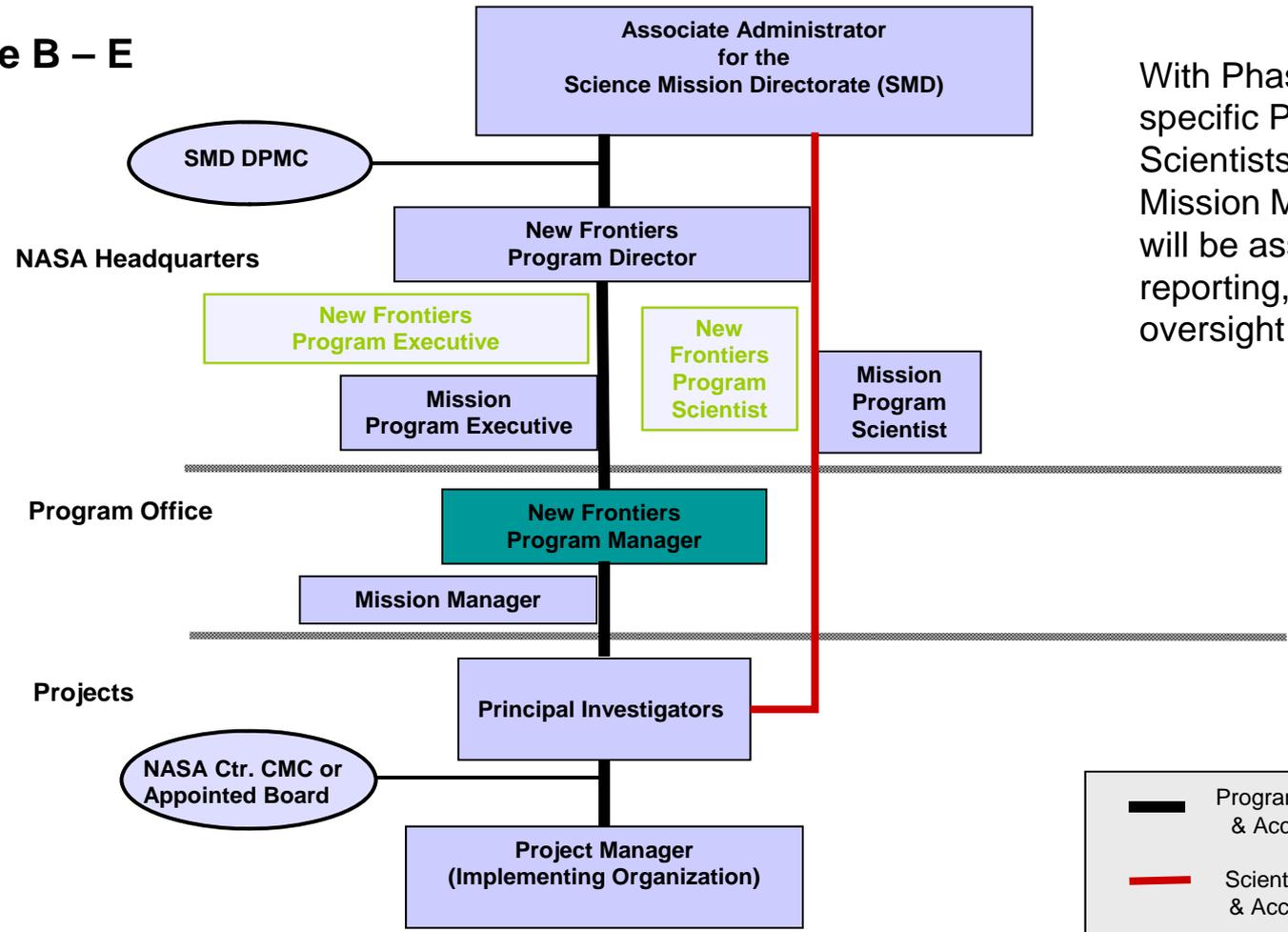
Mission Managers follow the Phase A process in preparation for Phase B





Program Structure- Phases B, C, D, E

Phase B – E



With Phase B, mission specific Program Execs & Scientists at NASA HQ and a Mission Manager at the PO will be assigned to assist the reporting, advocacy and oversight of the project.



Roles



New Frontiers Program

5-43702

- ◆ After selection, **Principal Investigators** are responsible to the Program Manager for programmatic success and to the AA for SMD for scientific success
 - **Principal Investigator (PI)** vested with overall responsibility for scientific integrity and mission success.
 - **Project Manager** is responsible to the PI for the successful development and implementation of the mission. They report to their institutional management and programmatically through the New Frontiers Program Manager.
- ◆ **Program Manager** is responsible for mission project formulation, development, launch, on-orbit checkout, mission operations, and data analysis.
 - Ensuring that the New Frontiers project adheres to committed cost, schedule, performance, reliability, safety requirements, and E&PO.
 - New Frontiers Program Office works directly with Project Manager in accomplishing the mission, particularly in the areas of resource allocation and utilization, oversight, reporting, and resolution of project issues.
 - **Mission Managers** act on behalf of the Program Manager and are the primary Program Office interface for Principal Investigators and Project Managers

Specific roles are defined in the New Frontiers Program Plan (NWFR-PLAN-001), available on-line in the New Frontiers Program Library; <http://newfrontiers.larc.nasa.gov/NFPL.html>

Mission Managers



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5-43702

Key Roles and Responsibilities

- ◆ **Mission Managers (MM)** function as the PMs 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. The MM responsibilities include:
 - 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 New Frontiers Program and with the related PIs and Project Managers.
 - Ensure that appropriate program resources are provided to the projects in a timely manner.

Contracts / Business Management

Contract Management

- ◆ **Program Office** manages contracts with Principal Investigator 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 is not involved in the selection process

Business Management

- ◆ **Program Business Office** coordinates the annual overall program budget planning activity in conjunction with all New Frontiers projects
 - Results are documented in a Project Budget Report (PBR) 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

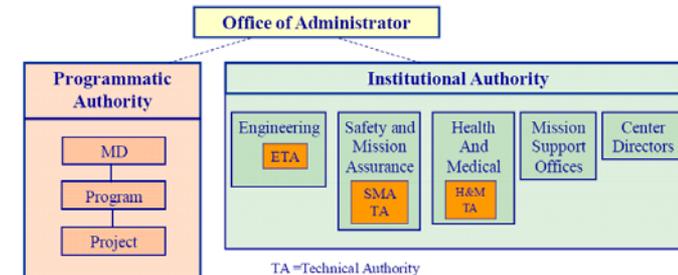
Technical Authority



5-43702

- ◆ 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 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 D&NF&LQ Mission Managers
- Frequent discussions with Project Managers and Project personnel
- Weekly written and verbal reporting to MSFC Management
- Ad-hoc communication as necessary

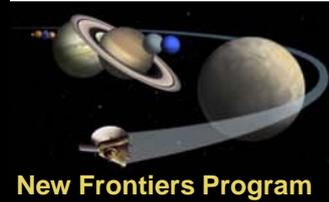
- ◆ TA Insight

- The Program TA ensures mission success by performing independent technical insight over the various projects within the D&NF&LQ Program
- 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 D&NF&LQ CE utilizes technical expertise from across NASA, industry, and academia to study and address issues

Insight/Oversight Approach

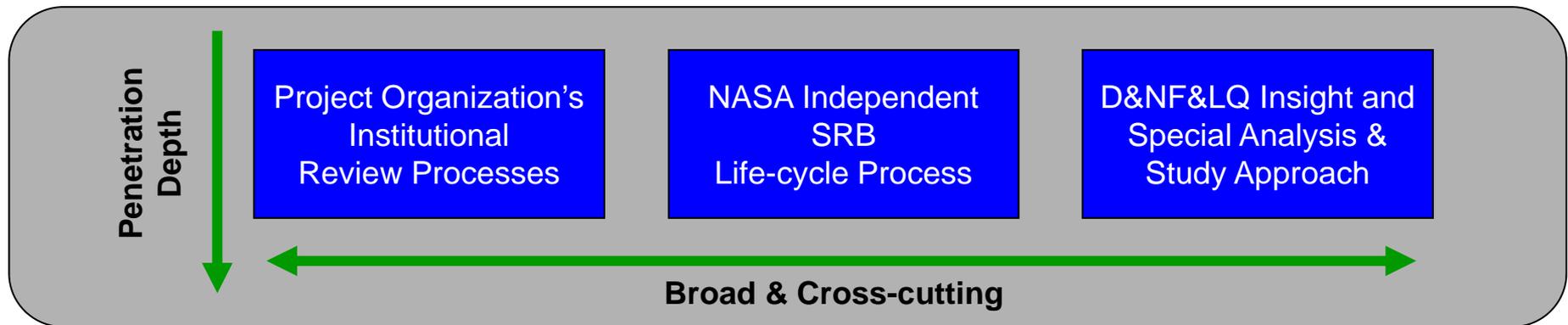
Composite Insight/Oversight Approach



5-43702

D&NF&LQ “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



Schedule Management

Project Schedule Assessment



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5-43702

- ◆ 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 as requested.
 - 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.

Earned Value Management

Project EVM Assessment



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5-43702

- ◆ 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)
- ◆ Program Office participates in IBRs conducted by implementing organizations.

Joint Confidence Level

Project JCL Requirements



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5-43702

◆ What it is:

- Joint (cost and schedule) Confidence Level is the probability that a given project or program's cost will be equal or less than the targeted cost AND schedule will be equal or less than the targeted schedule date
- A product that helps inform management the likelihood of a project's programmatic success
- A product that combines a project's cost, schedule, and risk into a complete picture of the project ability to achieve cost and schedule goals

◆ What is required:

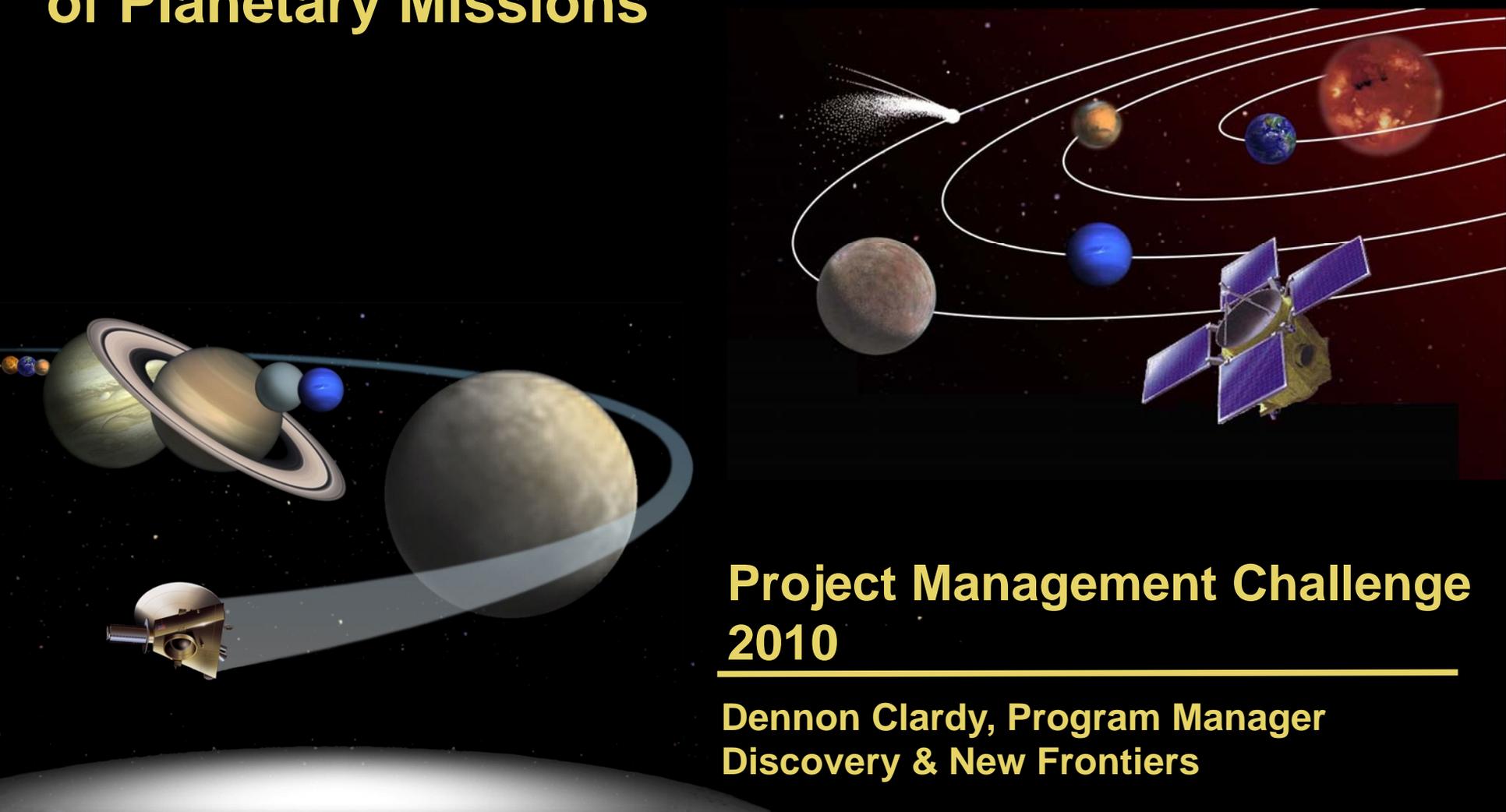
- Projects to be funded at no less than a 50% JCL
- JCLs to be developed and maintained through lifecycle from KDPC
- Project proposed cost and schedule baselines will be assessed by an independent review team
- External commitments will be based on JCL approved by the responsible Agency management council
- Projects are annually reviewed to confirm that current baselines and JCL are consistent with their annual budget submit. Significant changes to funding are to be reviewed and approved by the responsible Agency management council

Misc. Things to Consider

- ◆ The Program Level Requirements Appendix (PLRA) of the New Frontiers 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



Improving the Life-Cycle Cost Management of Planetary Missions



**Project Management Challenge
2010**

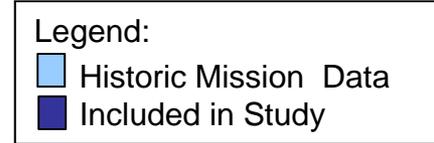
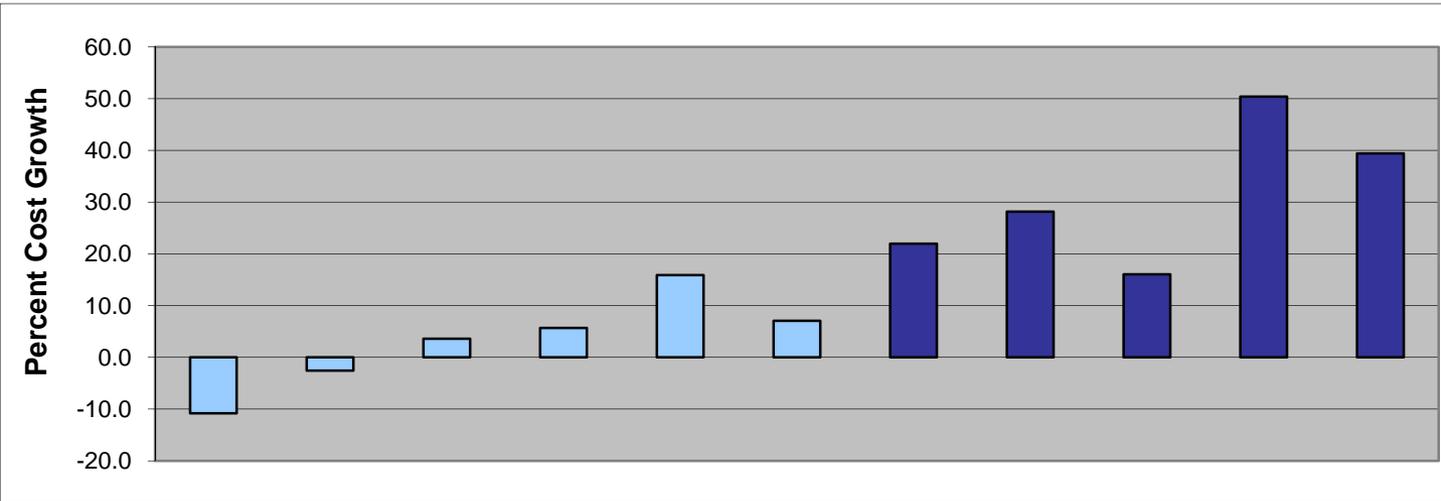
**Dennon Clardy, Program Manager
Discovery & New Frontiers**

Study Impetus: Cost and Schedule

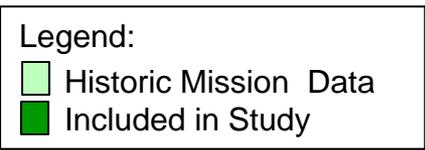
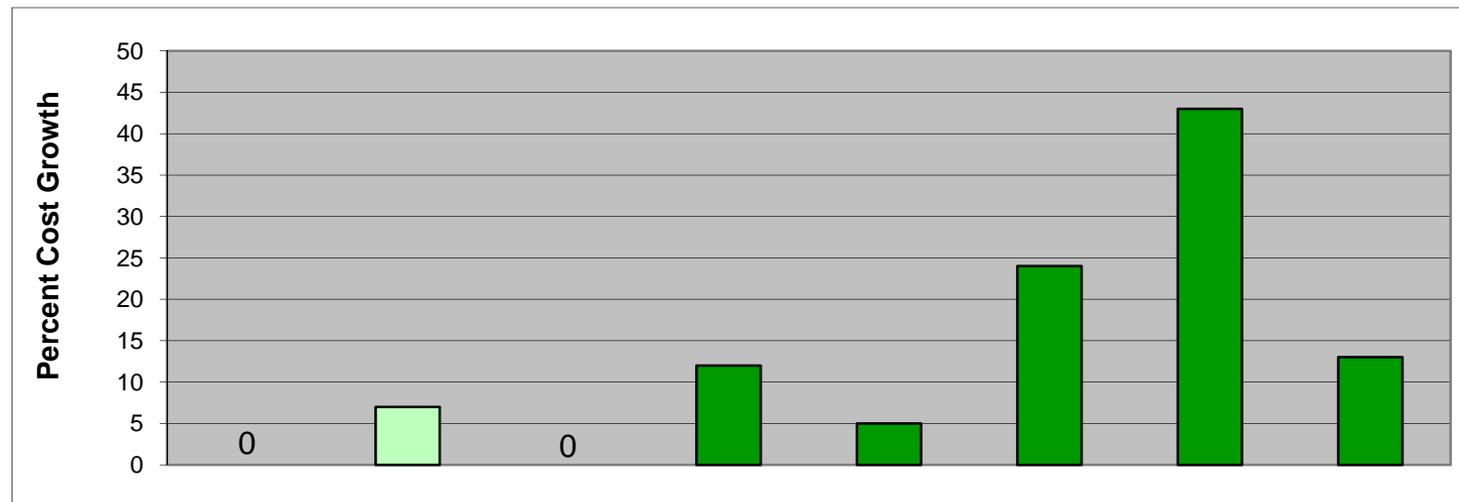


5-43702

Mission Cost Growth (percent of proposed cost)



Mission Schedule Growth (launch date slip)



Program LCC Cost Growth Study

Improving Life-Cycle Cost Management



5-43702

*“Assess the cost escapes that have occurred on recent D&NF missions. Determine how the cost escapes are making it through our processes and determine what **reasonable** things we can do to either prevent them or manage them better.”*

- ✓ Assess LCC growth at **decision gates** throughout the mission development process, identifying causes affecting cost increases over the missions' life cycle
- ✓ **Identify factors** that contribute to the occurrence of unplanned costs and significant mission cost cap overruns
- ✓ Based on findings, provide **specific recommendations** and implementation plans to improve current processes and provide a greater level of insight to make better-informed decisions throughout the mission life-cycle

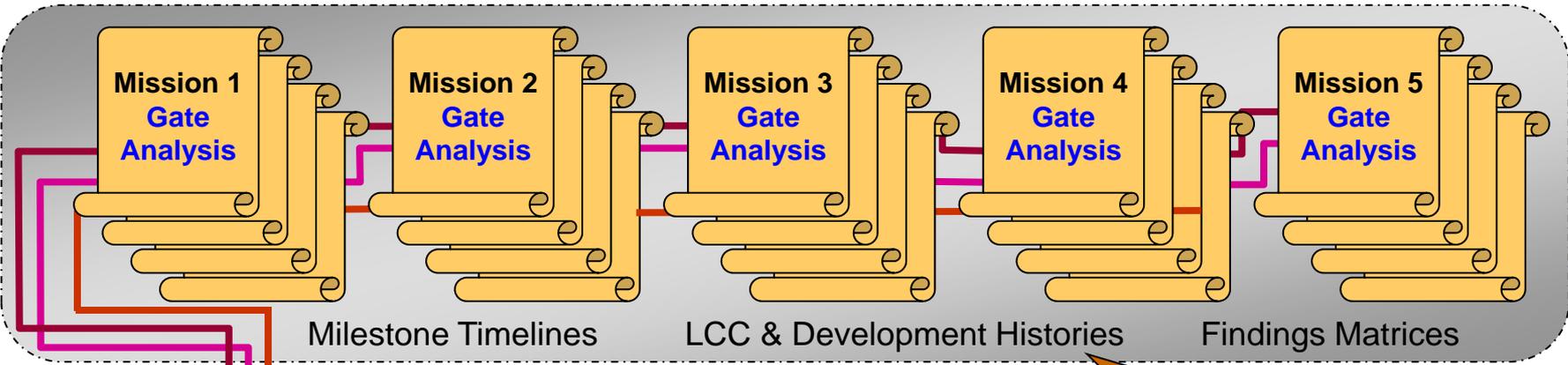
Look for and address the “boulders” that are under the control of the program and project

Study Implementation



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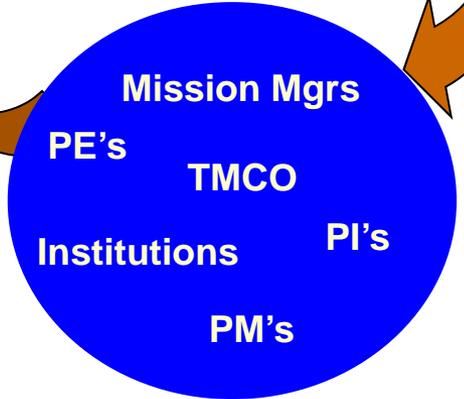
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INADEQUATE PLANNING FOR OPERATIONS / PHASE E	Project
OPTIMISTIC HARDWARE / SOFTWARE INHERITANCE and TECHNOLOGY READINESS ASSUMPTIONS	Project
INEXPERIENCED PROJECT TEAM FOR PLANETARY MISSIONS	Project
INSUFFICIENT MANAGEMENT OF AND INSIGHT INTO CONTRACTOR TASKS/PERFORMANCE	Project
LACK OF OR INADEQUATE INTEGRATED PROJECT SCHEDULES	Project
UNIQUE/SPECIAL TASKS/WORK OUTSIDE OF AREAS OF DEMONSTRATED EXPERTISE	Project
ADDITION OF NEW NASA REQUIREMENTS AFTER SELECTION	Project
INSTABILITY IN NASA PROGRAM BUDGETS	Project
NO LESSONS LEARNED FEEDBACK/FEEDFORWARD PROCESS	Program
INADEQUATE RISK MANAGEMENT PROCESS AT TRANSITION TO IMPLEMENTATION	Program
INADEQUATE CONSIDERATION OF INDEPENDENT REVIEW TEAM FINDINGS AND RECOMMENDATIONS	Program
INABILITY TO PROVIDE CREDIBLE COST ESTIMATES EARLY IN DEVELOPMENT	Program

List of Major Findings

Associated Recommendations

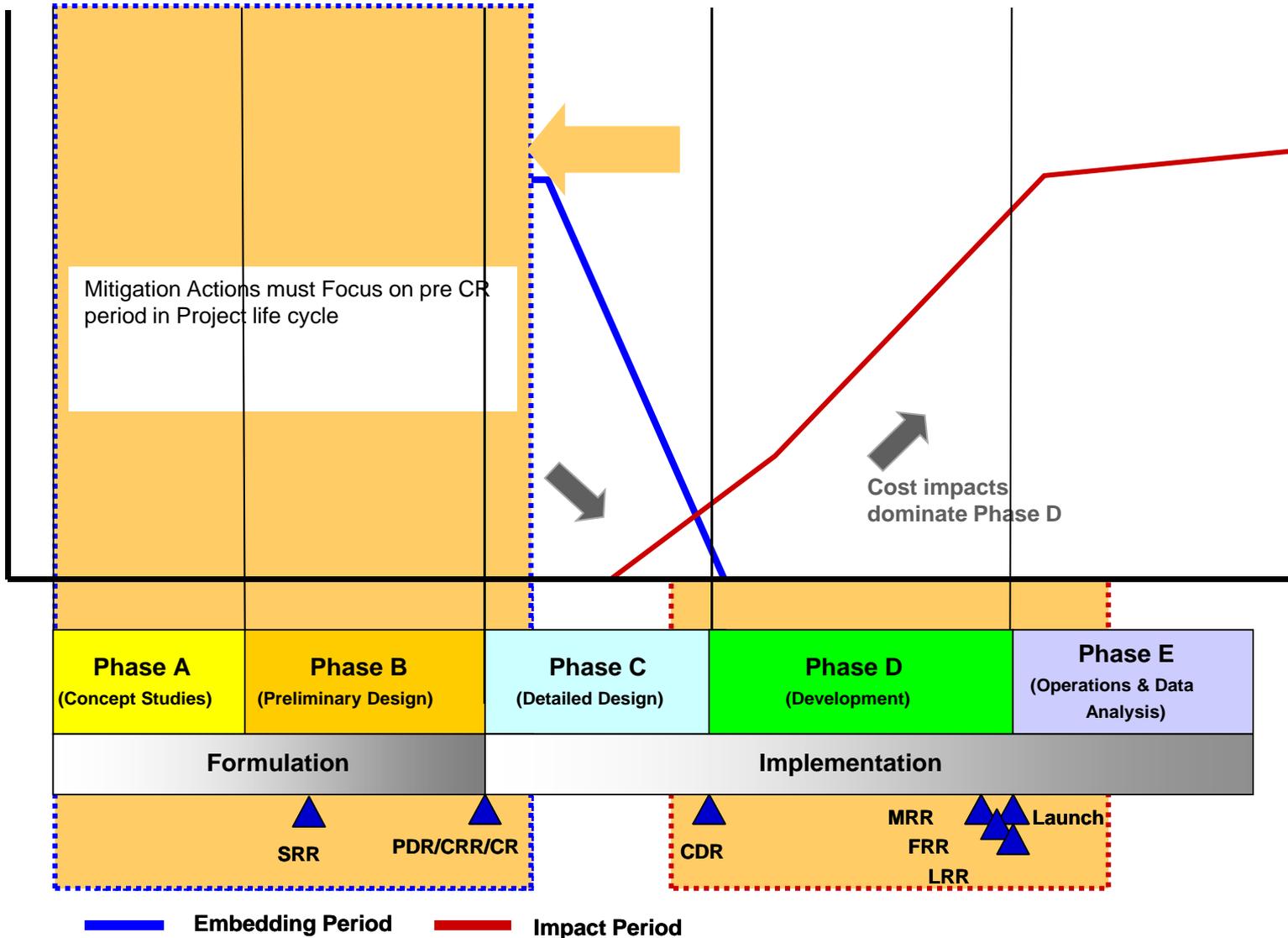


Contributors

***We did not find a “magic bullet” in any of our findings...
There is no single action that ensures cost and schedule control...***

CONSIDERATION OF REVIEW TEAM FINDINGS
INEFFECTIVE MANAGEMENT STRUCTURE
INTEGRATED PROJECT SCHEDULES
INSUFFICIENT PROJECT INSIGHT
PROJECT TEAM INEXPERIENCE
INADEQUATE MISSION REPLANS
INADEQUATE PLANNING FOR OPERATIONS / PHASE E
HERITAGE and TECHNOLOGY ASSUMPTIONS
FAULT PROTECTION AND AUTONOMY

Embedding and Impact Realization Timing



Conclusion

***We did not find a “magic bullet” in any of our findings...
There are no surprises here...***

except that we continue to have problems in these areas

So what do we do with the results?

- First, avoid the temptation to acknowledge and then put on a shelf along with most of the previous cost growth studies
- Second, while there were no surprises, that does not mean there are no actions the entire community can take to significantly improve performance against approved budgets
- D/NF Program Office is implementing a fairly disciplined approach to
 - Continually identify actions we can take to avoid the traps identified in the study
 - Avoid the “checklist” mentality and ensure that project management activities and tools directly contribute to planning, tracking, and controlling cost and schedule
- We are also available to engage in more detailed discussions concerning the study approach, findings, and potential actions with groups inside and outside of the D/NF community

The Discovery and New Frontiers Program Office Life Cycle Cost Study was performed under the direction of Paul Gilbert (MSFC), led by Bryan Barley (MSFC), and supported by Kenny Mitchell (MSFC-retired) and Marilyn Newhouse (CSC)