FUTURE SPACE MISSIONS

Rod Zieger
Manager, JPL Systems Management Office (SMO)

March 5, 2002

TOPICS

- Summary
- SMO/Concept Approach
- Project Life Cycle
  - Industry and Academia Participation
- Teaming with JPL
- JPL Missions Overview
  - Currently Operating
  - In Development
  - Major Instruments and Collaborations
  - Awaiting Near Term Decisions
  - Longer Term Missions
  - Competitively Selected Missions
- Proposal Forecast
- Mission Announcement Opportunities (AO's)
- Opportunities Summary

"Future Space Missions"

- Provide opportunities for Academia,Industry, and JPL...

  ...to participate in space exploration:

  - Earth
  - Solar system
  - Deep space projects
- What's been covered today:
  - Doing business with JPL
  - Science
  - Technology
  - Understanding Competitive Opportunities (AO's and NRA's)

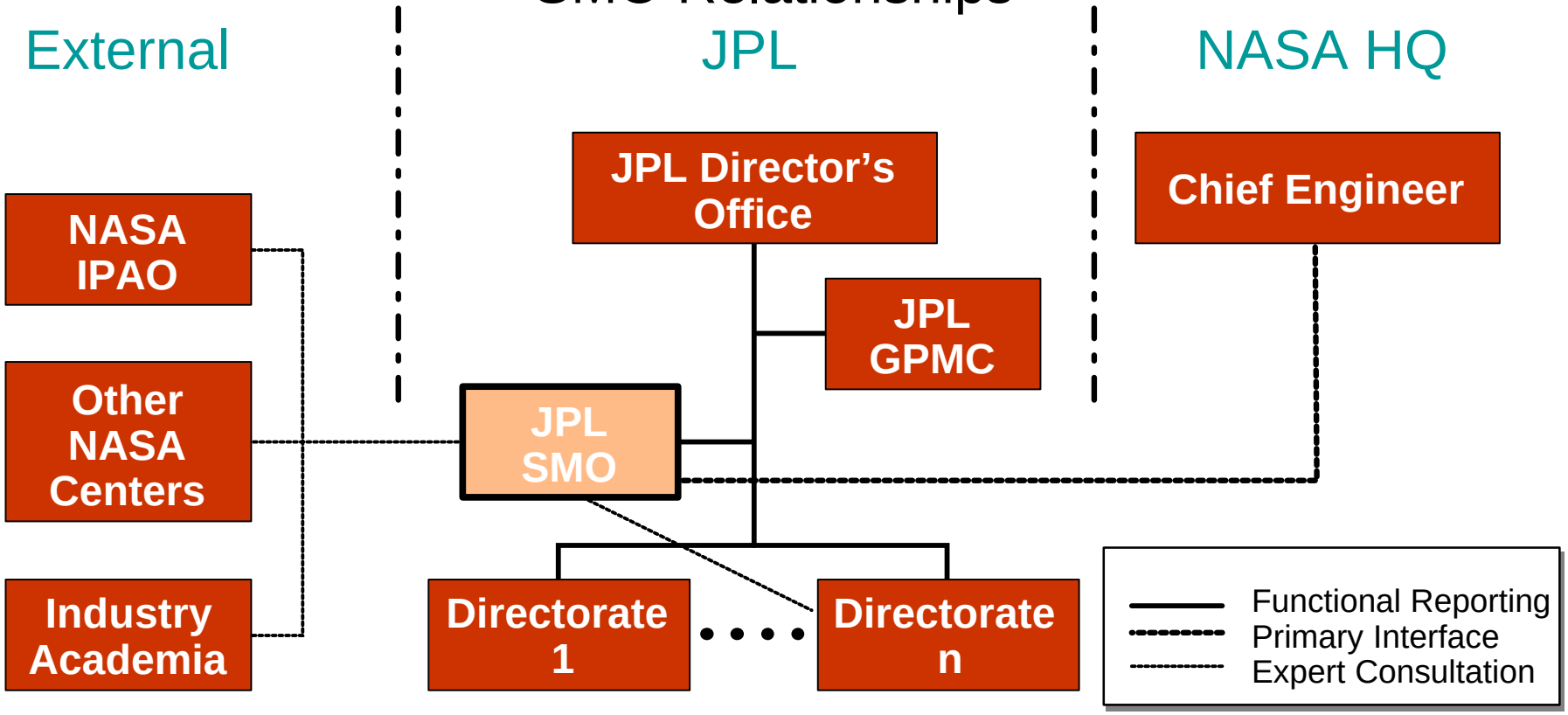
What is the Systems Management Office?

Primary responsibility:

- Help JPL and the JPL director ensure that the commitments JPL makes are appropriate and are properly fulfilled

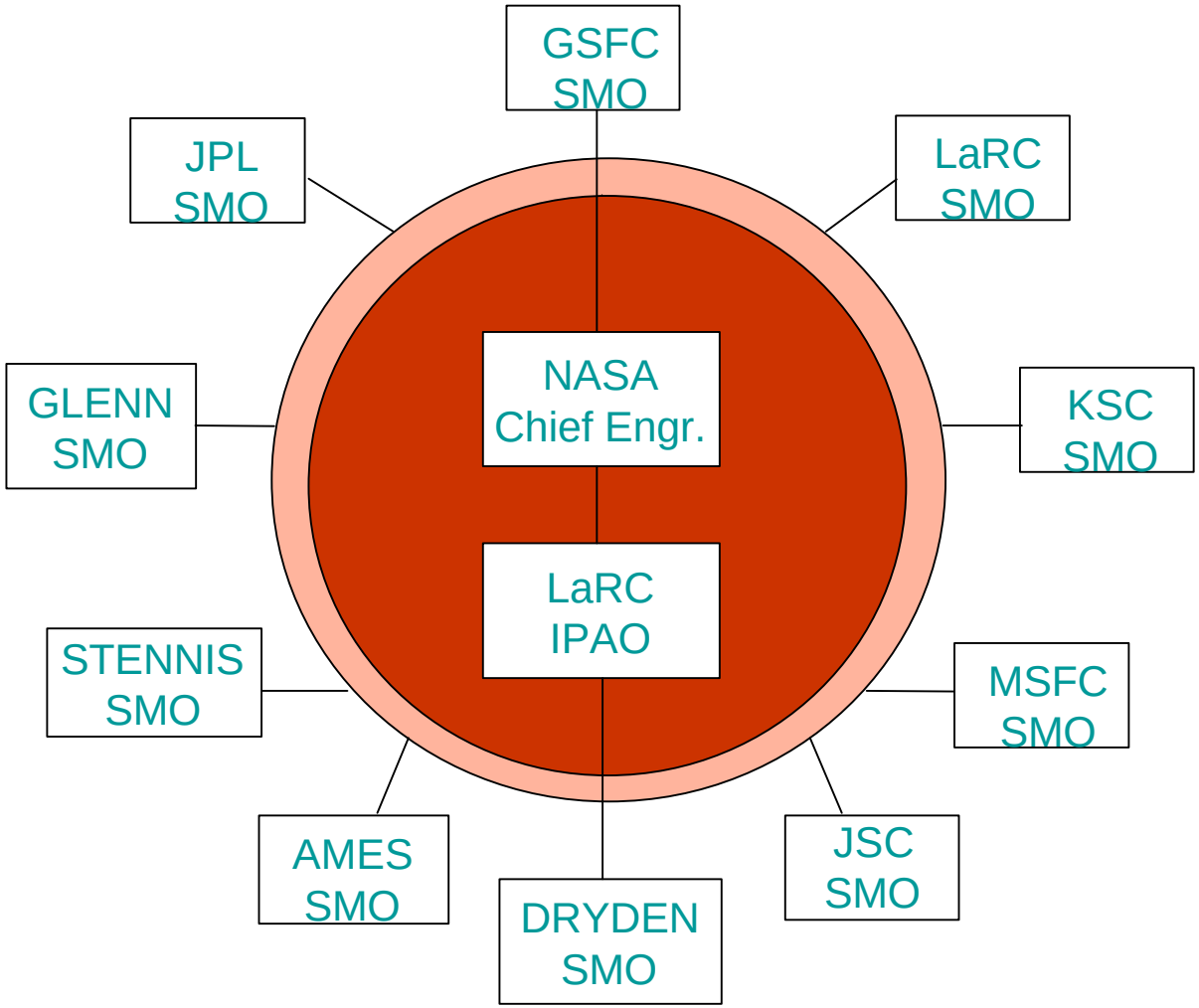
The Manager of the SMO will be the primary interface with the NASA Chief Engineer (Code AE) and the Agency Independent Program Assessment Office (IPAO) on the matters pertaining to the assessment of JPL Programs and Projects (instruments)

SMO Relationships



SMO relationships ensure mission success with strategic review insight

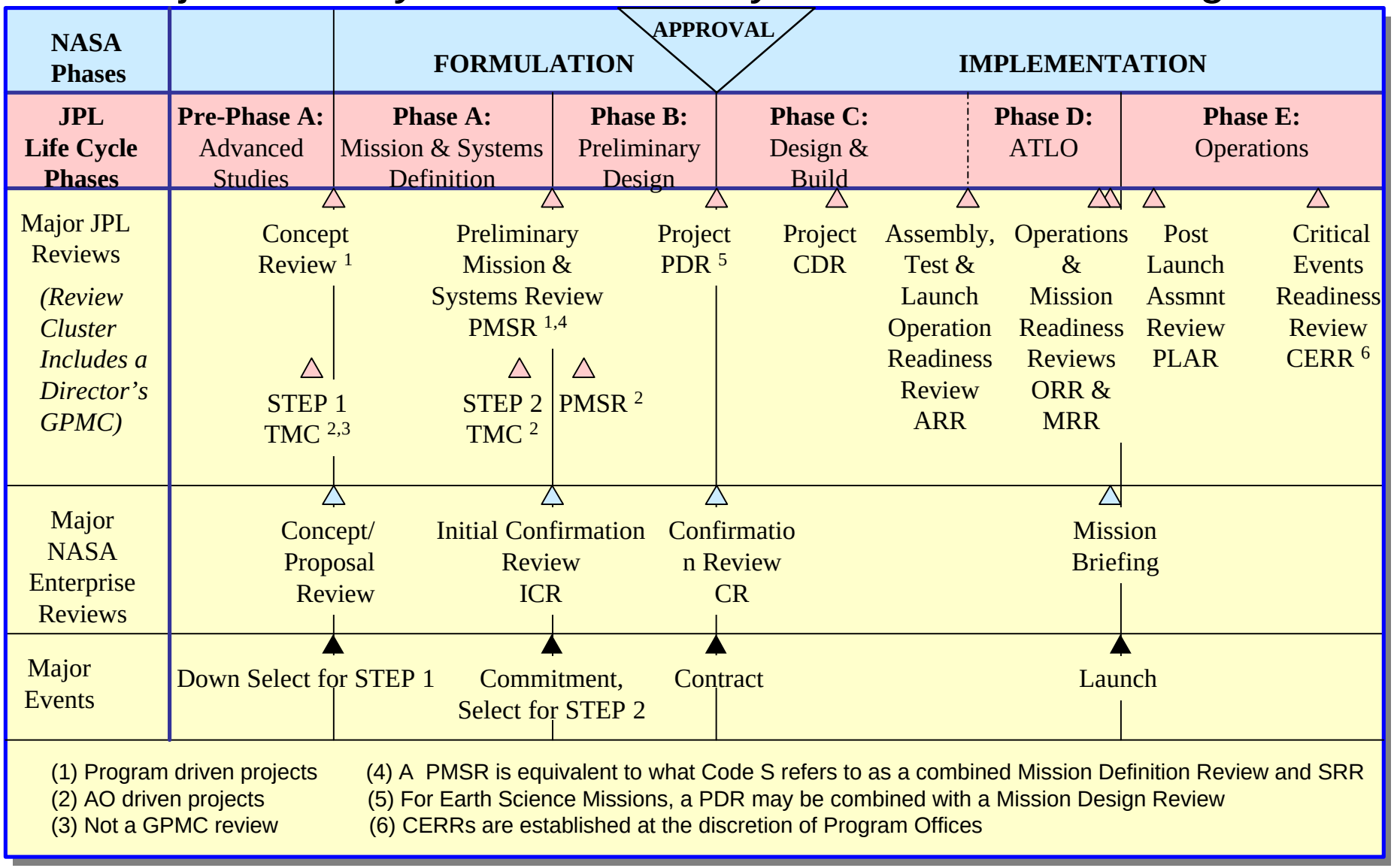
SMO Agency-Wide Interconnections



GSFC	Goddard Space Flight Center
JPL	Jet Propulsion Laboratory
JSC	Johnson Space Center
KSC	Kennedy Space Center
LaRC	Langley Research Center
MSFC	Marshall Space Flight Center

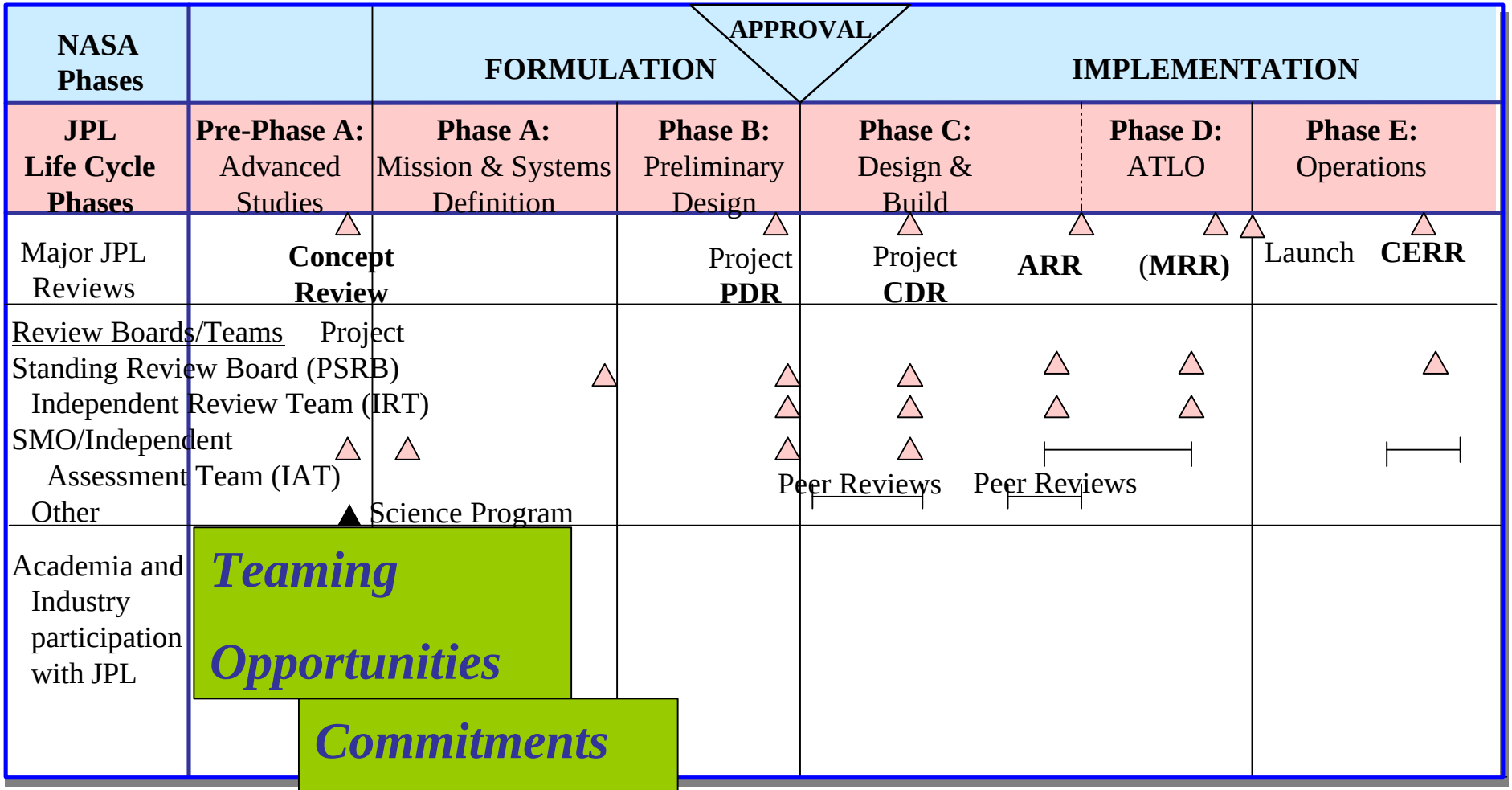
Quarterly SMO Working Groups Ensure Best Practices for NASA Mission Success

Project Life Cycle Commonality Facilitates Risk Mitigation

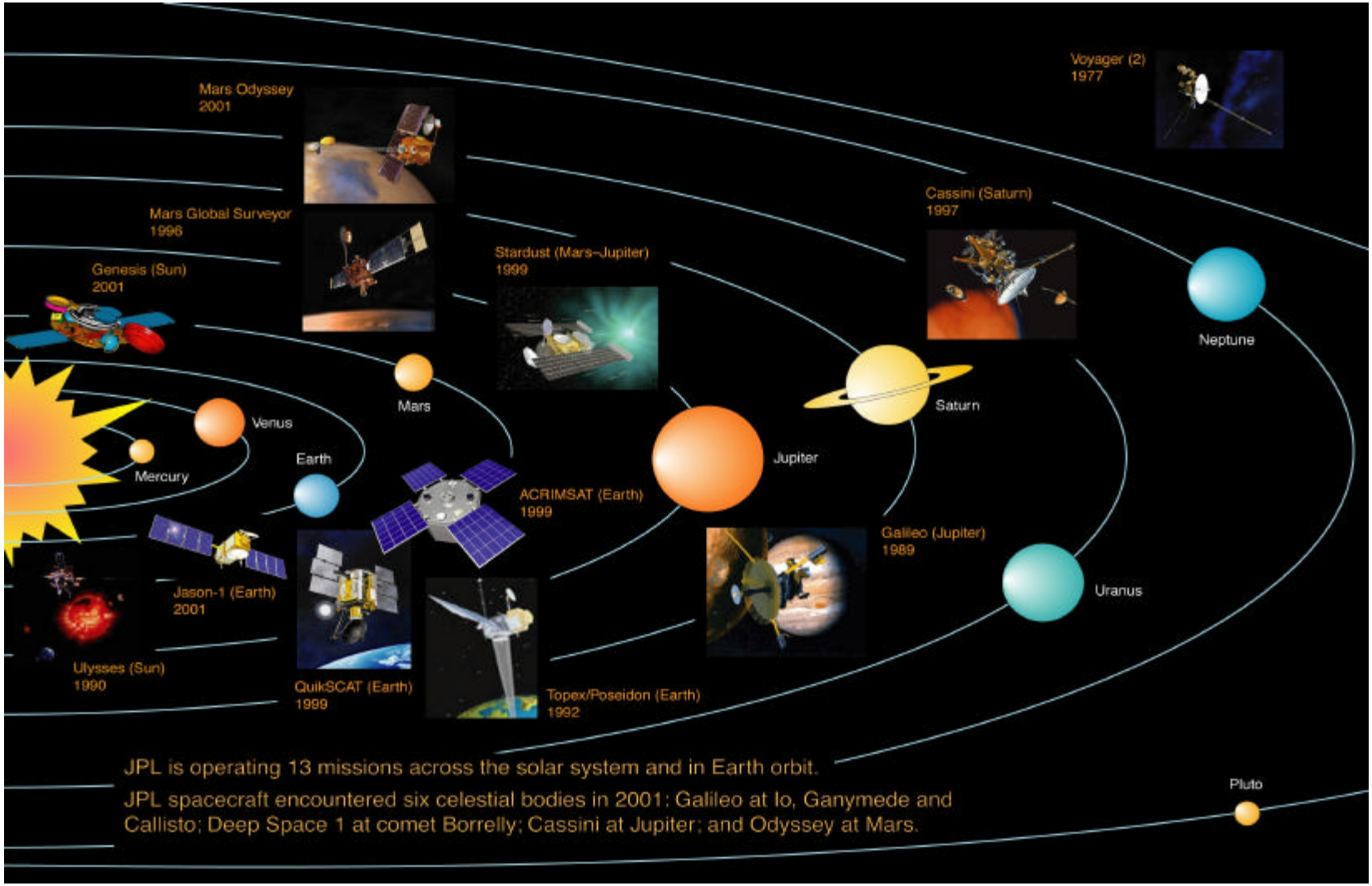


(1) Program driven projects
(2) AO driven projects
(3) Not a GPMC review
(4) A PMSR is equivalent to what Code S refers to as a combined Mission Definition Review and SRR
(5) For Earth Science Missions, a PDR may be combined with a Mission Design Review
(6) CERRs are established at the discretion of Program Offices

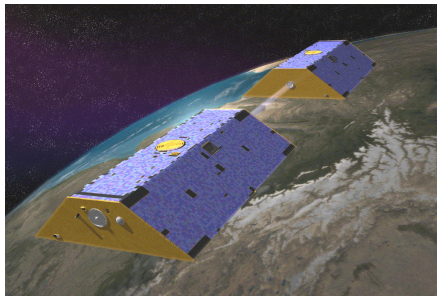
Project Life Cycle Demands Early Team Building Relationships



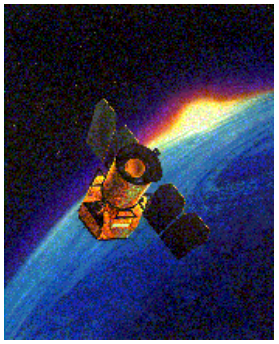
JPL Operates 13 Missions Simultaneously



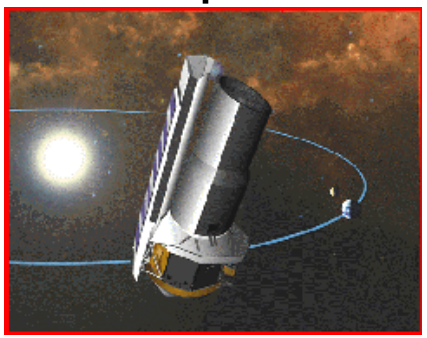
JPL Missions in Development



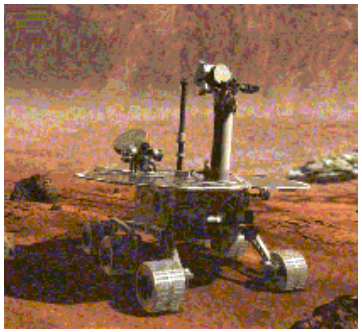
GRACE, March 2002



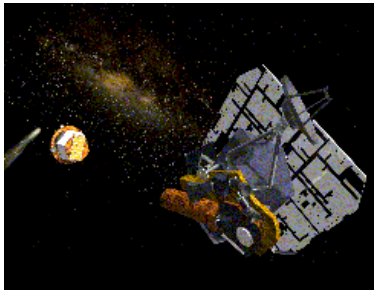
GALEX, July 2002



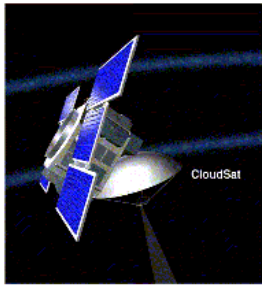
SIRTF, January 2003



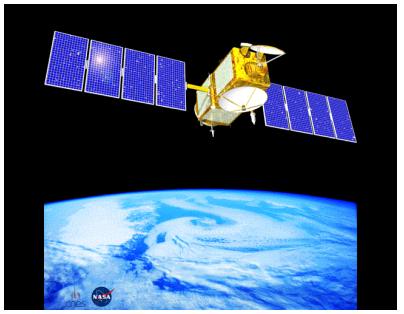
Mars Exploration Rovers, Spring 2003



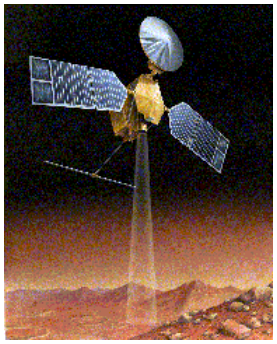
Deep Impact, January 2004



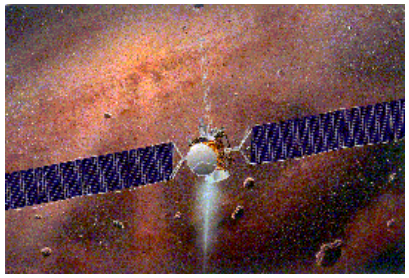
Cloudsat, April 2004



Jason II, January 2005

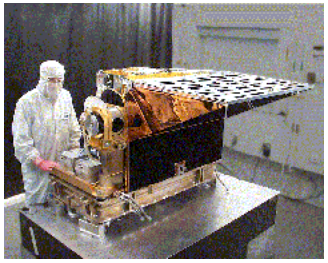


Mars Reconnaissance Orbiter, August 2005

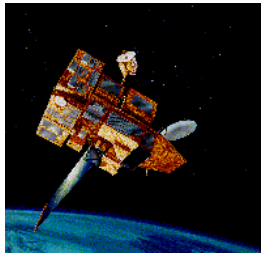


Dawn, June 2006

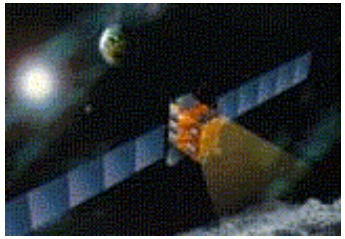
JPL Major Instruments and Collaborations



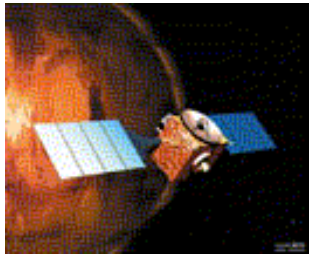
AIRS, April 2002



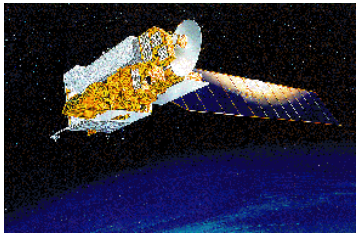
Seawinds: November 2002



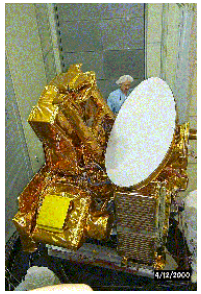
Rosetta Instruments; February 2003



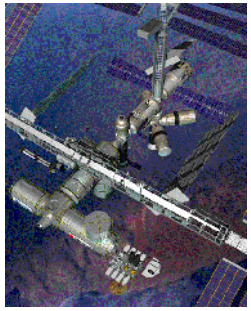
Mars Express, June 2003



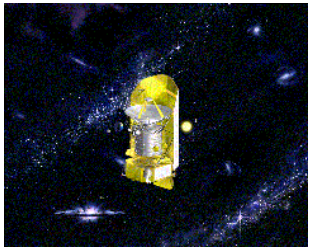
Tropospheric Emission Spectrometer (TES on AURA spacecraft); June 2003



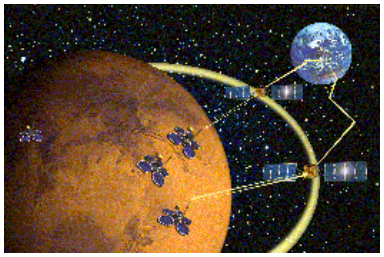
Microwave Limb Sounder (MLS); June 2003



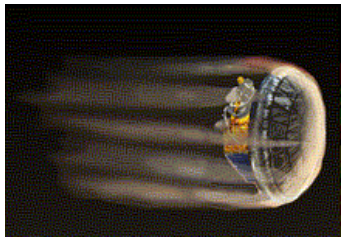
Low Temp Physics Exp, Nov 2005



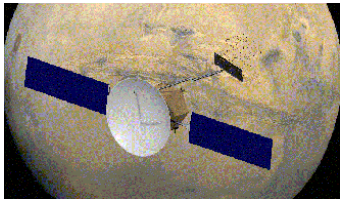
Herschel/Planck: 2006 (ESA, JPL)



Mars NetLander, Sept 2007

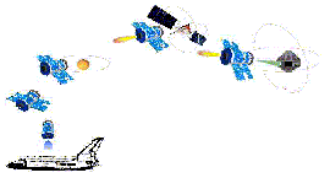


Mars French Orbiter: 2007 (CNES, JPL)

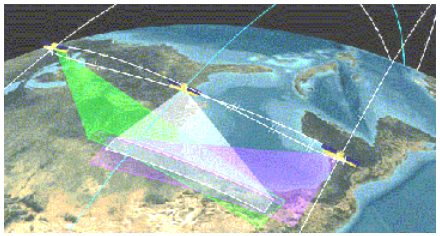


Marconi Mars Telecom: 2007 (ASI, JPL)

Mid-Infrared Instrument (MIRI) on NGST

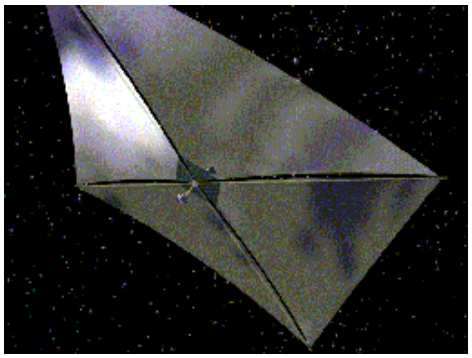


NMP ST6 autonomous rendezvous with XSS11

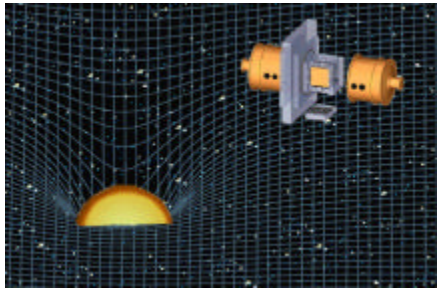


NMP ST6 USAF Techsat-21 constellation

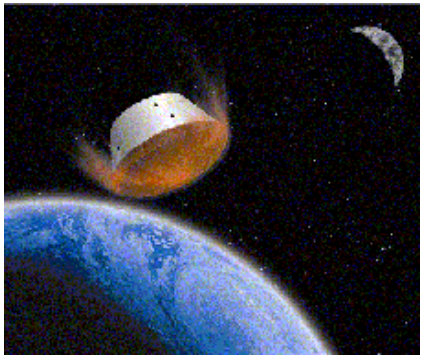
JPL Missions Awaiting Near-term Decisions



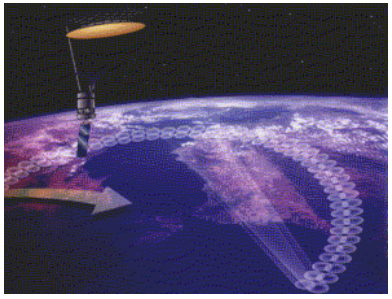
New Millennium ST7 solar sail proposal



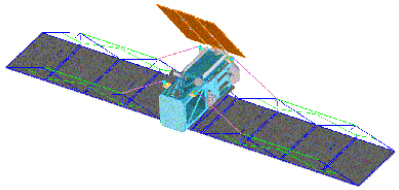
New Millennium ST7 drag reduction system proposal



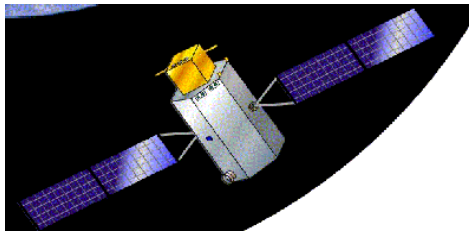
New Millennium ST7 Aerocapture Flight Test Experiment



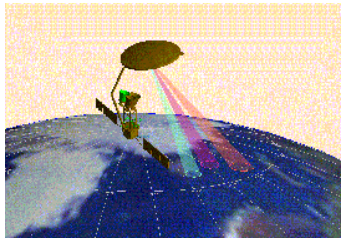
ESSP Hydros soil moisture and freeze/thaw mission



Earth System Science Program (ESSP) Earth Change and Hazard Observatory (ECHO)



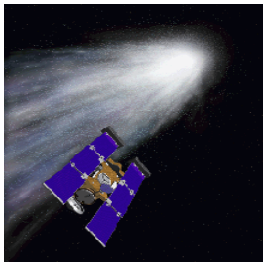
ESSP Orbiting Carbon Observatory



ESSP Aquarius sea surface salinity mission

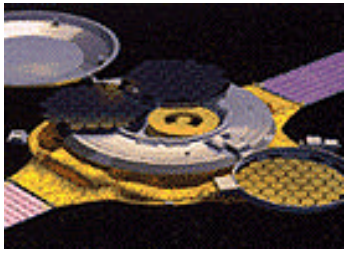
Missions Competitively Selected from Announcements of Opportunity

Comet dust sampling:
Stardust



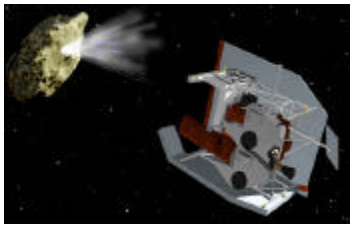
PI: D. Brownlee (U of Washington)

Solar wind sampling:
Genesis



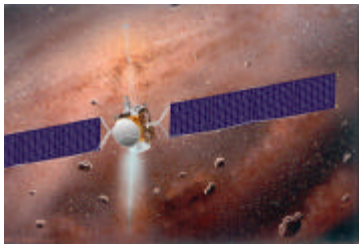
PI: D. Burnett (Caltech)

Comet internal structure:
Deep Impact



PI: M. A'Hearn (U of Maryland)

Asteroid composition and diversity:
Dawn

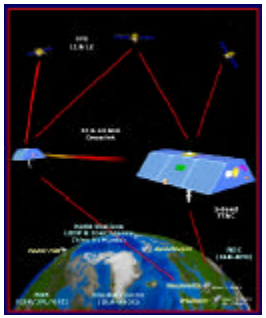


PI: C. Russell (UCLA)

Galaxy evolution and star formation:
GALEX

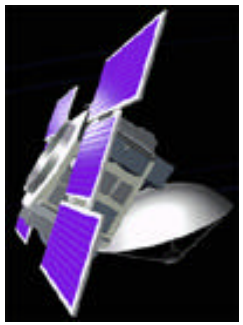
PI: C. Martin (Caltech)

High-resolution Earth gravity mapping:
GRACE



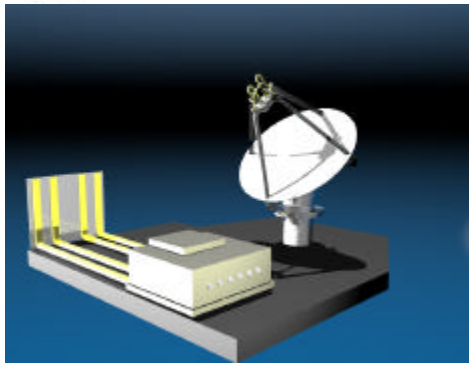
PI: B. Tapley (UT)

Structure of clouds:
CloudSat

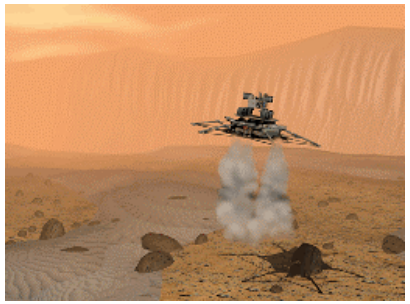


PI: G. Stephens (CSU)

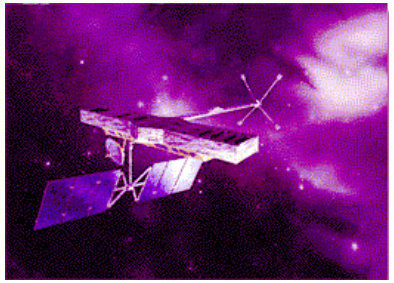
Mission Concepts in Development at JPL



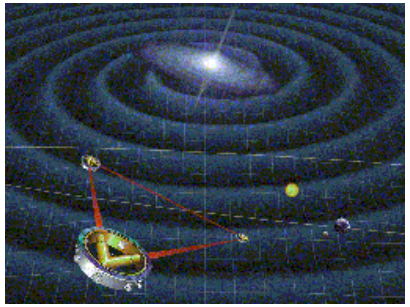
Ocean Vector Winds, 2007



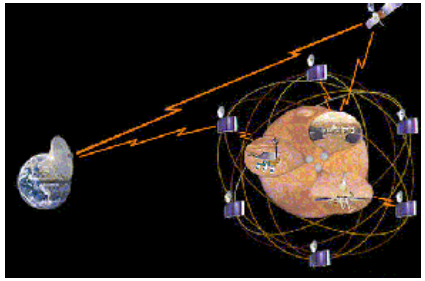
Mars Smart Lander, 2009



SIM, 2009



Laser Interferometer Space Antenna (LISA), 2011



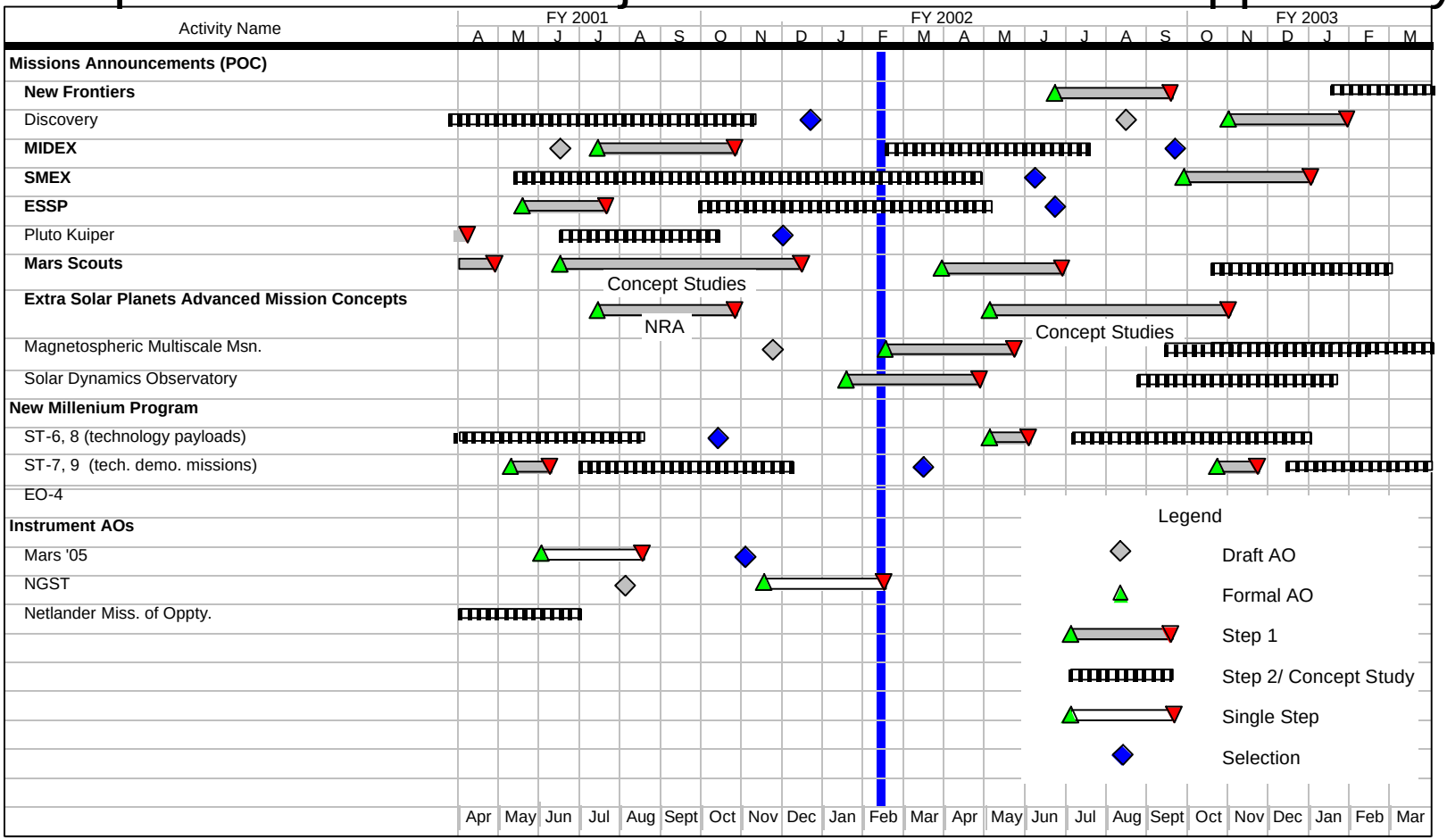
Interplanetary Network

Future Competitive Opportunities

- **Mars Scouts: 2007**
- **New Frontier: 2007-2008**
- **Discovery: 2008-2010**
- **Earth System Science Program (ESSP): 2008-2010**
- **Small Explorer (SMEX): 2006-2010**
- **Mid-sized Explorer: (MIDEX): 2007-2010**

In concert these missions provide many opportunities for team relationships

Proposal Forecast - Major Announcement of Opportunity



Project Life Cycle lead time demands early team relationships

Mission AO's Summary

- JPL successfully acquires and executes missions from AOs.
  - New Frontiers provide new challenges:
    - Nuclear power source
    - New technology risks
- Competitive mission proposals became major activities at JPL and accessed larger mission market share
- JPL constantly examines best practices to ensure effective and efficient proposal generation processes
  - Concurrent Engineering Teams X, A, I, G AT JPL
  - Review Process Workshop
  - Costing Office
  - Proposal Center Upgrade
  - Proposed PDC Upgrades

Summary

- Space mission concepts
  - Come from many sources
  - Create projects that give access to
    what we do not know
    that we do not know
- Open your imagination for future explorations...
  - Ideas and opportunities
- Form team relationships early in Project Life Cycle

> *"**People Team With People**"*
>
> *"**Relationships Make the Difference**"*
>
> ***Mel Roberts February 2002***