

Life Sciences Research Capability Leadership

Planetary Protection Subcommittee
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The Perennial Challenges



- NASA's aspirations exceed its budgetary resources
- NASA's aspirations change faster than it can complete missions
 - External forces
 - Congress
 - Office of Management and Budget
 - Office of Science and Technology Policy
 - National Academies
 - Scientific community
 - Technological advances
 - Internal forces
- Coordinating across
 - 150+ programs
 - 10 field centers



Towards a Solution: Capability Leadership



- Create a set of advisers to the Agency's top managers and management councils
 - Support annual budget formulation cycle
 - Support ad hoc requests
- Responsibilities
 - Ensure proper alignment across Mission Directorates and Field Centers
 - Guide prioritization of tasks
 - Advise on capability sizing and strategic hiring
 - Assess opportunities for investments and divestments
 - Solicit innovative ideas from outside the capability area
- Form a team to support each adviser
 - Members from programs and field centers
 - Liaisons to other teams and other NASA organizations (e.g., Office of the Chief Health and Medical Officer)



Capability Leadership Areas



Engineering

Avionics
Flight Mechanics
Human Factors
Life Support
Propulsion
(plus 14 more)

Entry, Descent &
Landing
In Situ Resource
Utilization
(plus 2 more)

Research

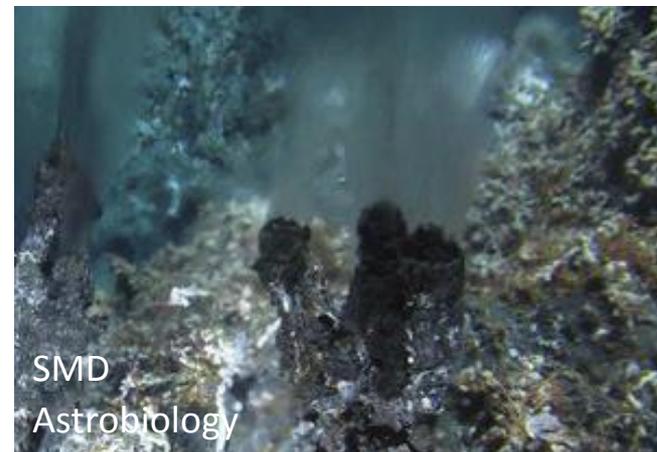
Earth Science
Planetary
Heliophysics
Astrophysics

Life Science

Services

Mission Ops
Aircraft Ops
Environment
Testing

Programmatic Scope



Life Sciences Research Capability Team Membership



1. Capability Leader

2. Astrobiology

3. Human Research Program

4. Planetary Protection

5. Space Biology

1. Ames Research Center

2. Glenn Research Center

3. Goddard Space Flight Center

4. Jet Propulsion Laboratory

5. Johnson Space Center

6. Kennedy Space Center

7. Langley Research Center

LSRCT Goals



- Promote cross-agency awareness and coordination of NASA's Life Science capabilities and needs
- Provide recommendations and status concerning NASA's Life Science Capability to
 - Organizations participating in the LSRCT
 - Senior management
 - Agency Program Management Council
 - Mission Support Council
 - Chief Scientist
 - Chief Health and Medical Officer
 - Other senior NASA management

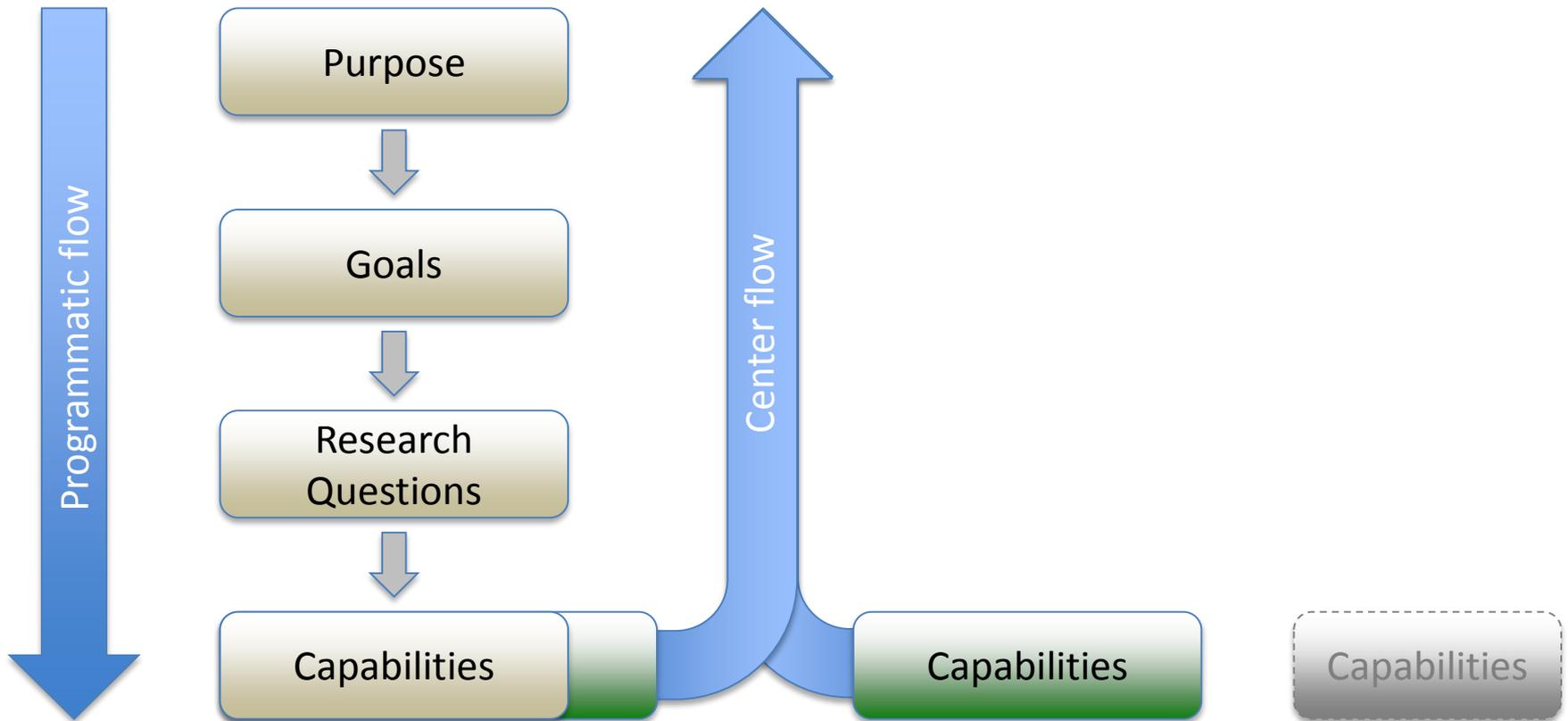
Timescale



- Horizon for Capability analysis
 - 30 year career of civil servant
 - Mars surface exploration by humans



Purpose-driven Framework



Tier 1 Questions

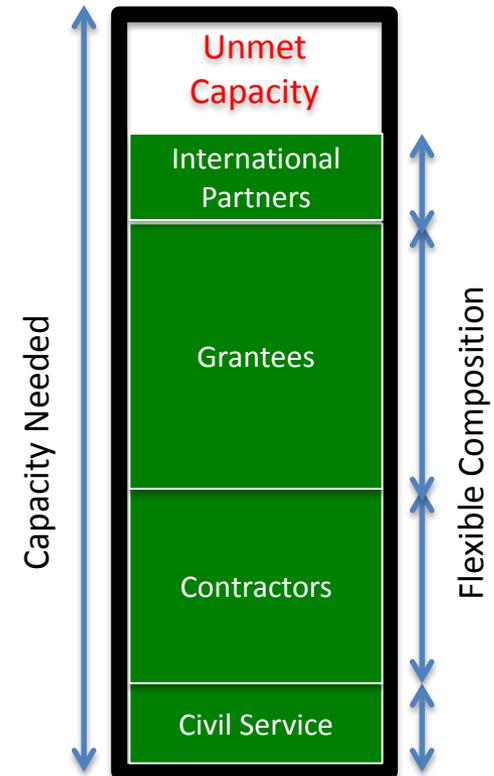


1. Does NASA have the proper Life Sciences Research capability to efficiently execute current and future missions?
2. If not, what corrective measures are recommended?

Tier 2 Questions



- Present
 - What Capabilities do we have now?
 - What Capabilities do we need now?
 - Does current technical capacity match current demand?
 - How much overlap/resiliency/redundancy exists now across the centers?
- Future
 - What Capabilities do we need for future missions?
 - How sensitive are Capability needs to choice of roadmap, mission architecture, etc.?
 - How does projected capacity match projected demand?
 - How much overlap/resiliency/redundancy is planned across the centers?
- Collaborations
 - What collaborations across field centers or programs within each Capability would be beneficial?
 - What collaborations across field centers or programs and between Capabilities would be beneficial?
 - What collaborations with external organizations would be beneficial?

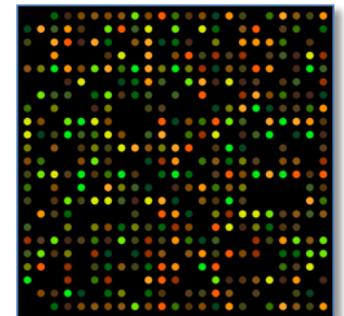
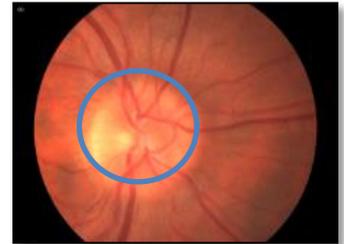
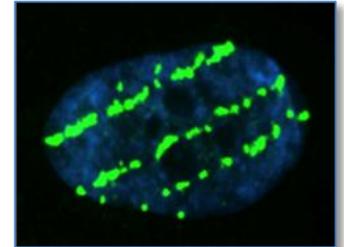


*Immunology
Technical
Capacity
(NOTIONAL)*



Example Workforce Considerations

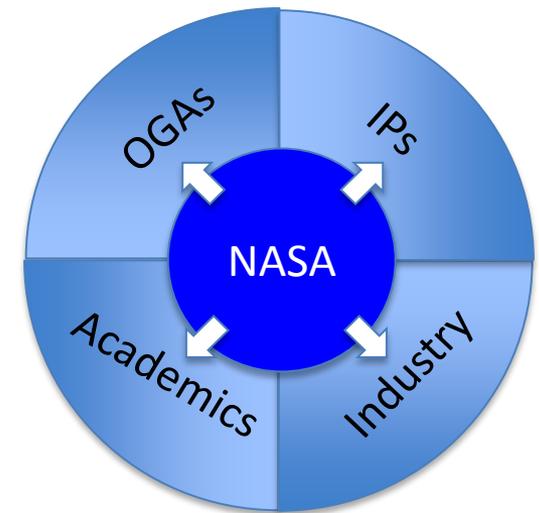
- Example 1: Radiation Biology
 - The interaction of SPE and GCR with human biology is unique to space agencies
 - Radiation biology will be important as humans explore beyond LEO
 - Needs junior and senior level civil servants
 - Alternate views
 - Succession plan
 - Expertise does not exist outside of NASA
- Example 2: Visual Impairment / Intracranial Pressure (VIIP)
 - Phenomenon observed with long duration crew
 - Important in LEO and beyond
 - NASA and outside community predict prevention or treatment will be available in 5-10 years
 - Utilize IPAs, contractors, and grantees rather than hire civil servants
- Example 3: Systems Biology
 - Important approach for understanding organism's response to space flight
 - New techniques available every few months
 - Field moving too fast for NASA to commit to specific expertise
 - Utilize IPAs, contractors, and grantees rather than hire civil servants



LSRCT Schedule



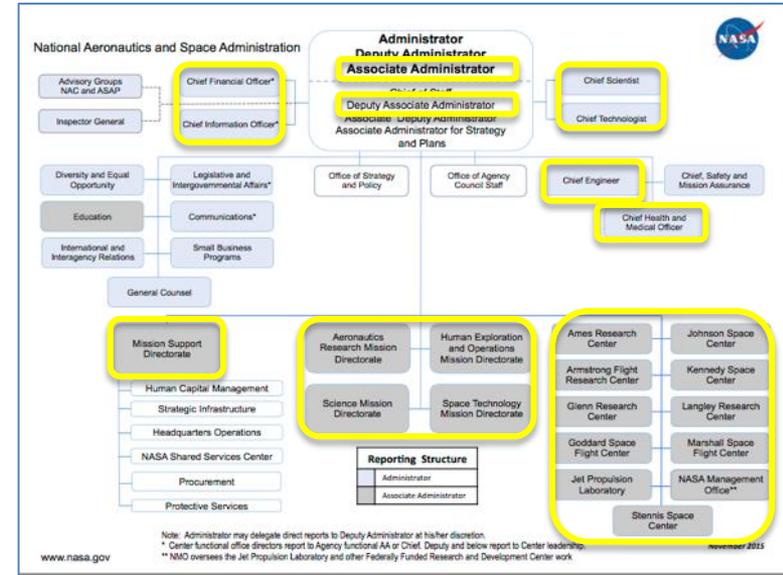
- Year One Emphasis: NASA
 - Assess the match between our needs and our capability
 - Identify valuable collaborations within the Agency
- Year Two Emphasis: Coordinate with outside organizations to increase our capability
 - Federal agencies (e.g., NIH, NSF, DoD, CDC)
 - International Partners
 - Industry
 - Academics
- Continuous: Facilitate strategic hiring decisions with an agency wide strategic framework



Implications for Planetary Protection Research



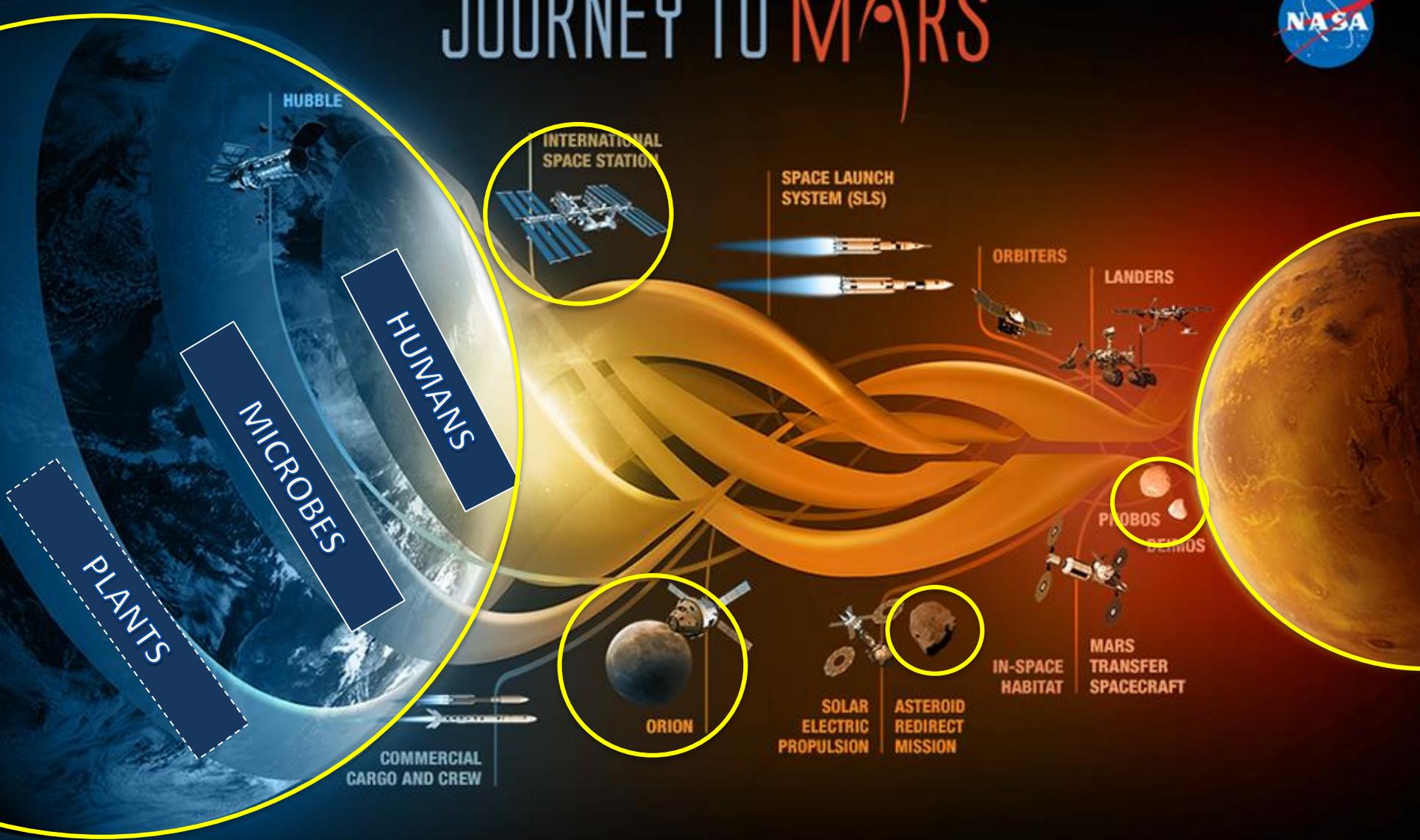
- Access to senior management



- Venue for developing cooperation between HEOMD and SMD



JOURNEY TO MARS



Capability Leadership Summary



- NASA has adopted the Capability Leadership Model to better employ resources and respond to changes in direction
- The Life Sciences Research Capability is part of the CLM
 - Includes Human Research Program, Space Biology, Astrobiology and Planetary Protection
- The Life Sciences Research Capability provides
 - Access to senior management
 - A new venue for fostering coordination and collaboration across NASA

