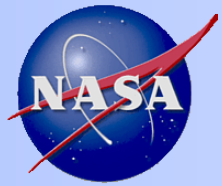


Office of the Chief Engineer Update

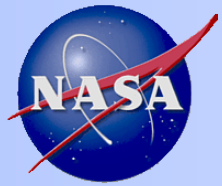
**Dawn M. Schaible
Deputy Chief Engineer**

December 4, 2014



OCE Mission

1. Advise Agency leadership on the technical and programmatic readiness of NASA programs and projects
2. Execute Agency's Engineering Technical Authority
3. *Integrate and provide leadership for the Agency's technical capabilities*
4. Provide "value added" independent assessment across all of NASA's program
5. Steward Agency-level policy and standards for engineering and program and project management
6. Share program/project management and engineering best practices, and lessons learned
7. Support the workforce with training and knowledge management services needed to continuously improve program/project management and engineering skills

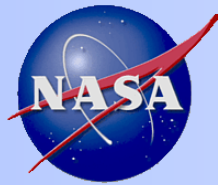


Why Technical Capability Leadership?

As we formulate missions and we move to strategically address workforce and infrastructure, there are four key areas we need address....

- Building a strong foundation to support Agency near and far term goals
- Advancing capabilities to meet long-term needs
- Optimizing deployment of capabilities across all Centers
- Stop doing work we no longer need to do

This is the essence of technical capability leadership



Role of OCE and NASA Technical Fellows in Technical Capability Leadership

- Institutionalizing Technical Capability Leadership:
 - NASA Technical Fellows have been designated as Technical Capability Leaders for their discipline areas
 - Future capability leaders will baseline their own areas
 - Use the Engineering Management Board (EMB) to review the results of all OCE/NASA Technical Fellow-led deep dives/technical assessments
 - NASA Technical Fellows/Capability Leaders and their respective agency-wide teams are responsible for developing recommendations to ensure their capability is ready to support current and future missions
 - Capability Leadership in service and research areas will be assigned as needed on a case-by-case basis



Agency Capability Leadership Areas

TECHNICAL CAPABILITY AREAS- DISCIPLINE LEVEL

1. **Aerosciences**
2. **Avionics**
3. **Electrical Power**
4. **Flight Mechanics**
5. **GN&C**
6. **Human Factors**
7. **Life Support/Active Thermal**
8. **Loads and Dynamics**
9. **Materials**
10. **Mechanical Systems**
11. **NDE**
12. **Passive Thermal**
13. **Propulsion**
14. **Software**
15. **Structures**
16. **Systems Engineering**
17. **Space Environments**
18. **Cryogenics**
19. **Instruments and Sensors**
20. *Others?*

LEADERSHIP:

- NASA Technical Fellows:
 - Agency resource for providing expertise, guidance and advice
 - Lead Capability Leadership/Technical Discipline Teams with membership from Centers
 - Currently recognized engineering disciplines (bold items on left) plus others as Agency Senior leadership identifies (italics items on left)

GOVERNANCE:

- NASA Technical Fellows resident at Centers and managed by NESC
- OCE administers discipline-level Technical Capability Leaders on behalf of Agency
- Capability Leadership plans will document team membership and relationships to other capability areas and Agency-level groups
- EMB (extended if necessary) ensures integration and coordination across all discipline-level Capability Leadership Areas
- Report annually to APMC and as needed for divest/invest decisions
- Issues can be brought to Deputy AA when lower level resolution cannot be reached



Technical Capability Leadership Roles

- Advises Agency and ensures *proper alignment* across Missions and Centers consistent with Agency and capability advancement needs.
- Establishes *plans based on Agency-Level roadmaps and strategic needs* to provide technical guidance to the Agency in the identification and prioritization of tasks necessary to enable discipline-level performance for future missions.
- Determine *gap areas* for advancement and strategic investment.
- Advises on *capability sizing and strategic hiring of FTE and WYE*, across all Centers, so as to avoid Agency excess capacity, duplication in a capability area, or excessive contracting of intrinsic NASA technical capability areas.
- Assesses opportunities for *investments and divestments* within capability scope, including advising Centers on *assets*, and coordinates with other capability areas so as not to duplicate scope between areas.
- Solicits *innovative ideas from outside the capability area*, related to such things as technical content, new approaches, workforce skills, asset use, and disposition.
- Establishes *standards and specifications* within capability scope.



Engineering Management Board Roles and Responsibilities

- For OCE/NASA Technical Fellow led deep dives, the EMB will review the results and form agency-wide engineering recommendations for presentation to Agency decision-making forums
 - EMB is chaired by the NASA Chief Engineer and membership includes the Engineering Directors/Chief Engineers at each Center
 - The EMB will provide a forum for coordination, integration and communication across Technical Capability (engineering) Leaders/areas
- Implementation is the responsibility of, and driven by, the Centers and their management teams



Status of OCE/NASA Technical Fellow-led Technical Assessments

MSC decisions in implementation:

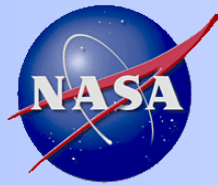
- Human Factors

Assessments briefed to Extended Capability Steering Committee and decisions underway:

- Aerosciences
- Propulsion
- Ascent Transportation Vehicle/Sub-Orbital Rockets (*to be briefed in December*)

Planned for rest of FY15:

- Materials
- Software
- Structures
- Avionics
- Electrical Power
- Loads and Dynamics
- GN&C
- Life Support/Active Thermal
- Mechanical Systems
- Flight Mechanics
- NDE
- Passive Thermal



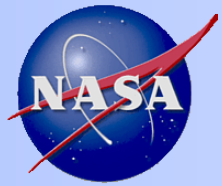
Status of Other Assessments from Technical Capabilities Assessment Team

MSC decisions in implementation:

- Balloons
- Aircraft Operations
- Earth Science R&A
- Life Sciences R&A
- Microgravity Flight Services
- Mission Operations

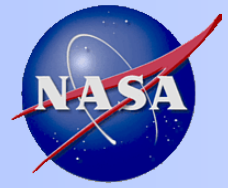
Assessment/decisions underway to be completed in next 3 months:

- Nuclear Power/Propulsion
- Entry, Descent, and Landing
- Space and Natural Environments Test
- Remote Sensor Systems
- Extraterrestrial Surface Systems
- Rendezvous, & Docking
- Long term data management (*transferred to BSA*)

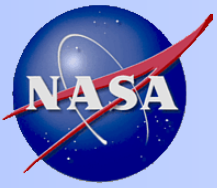


Summary

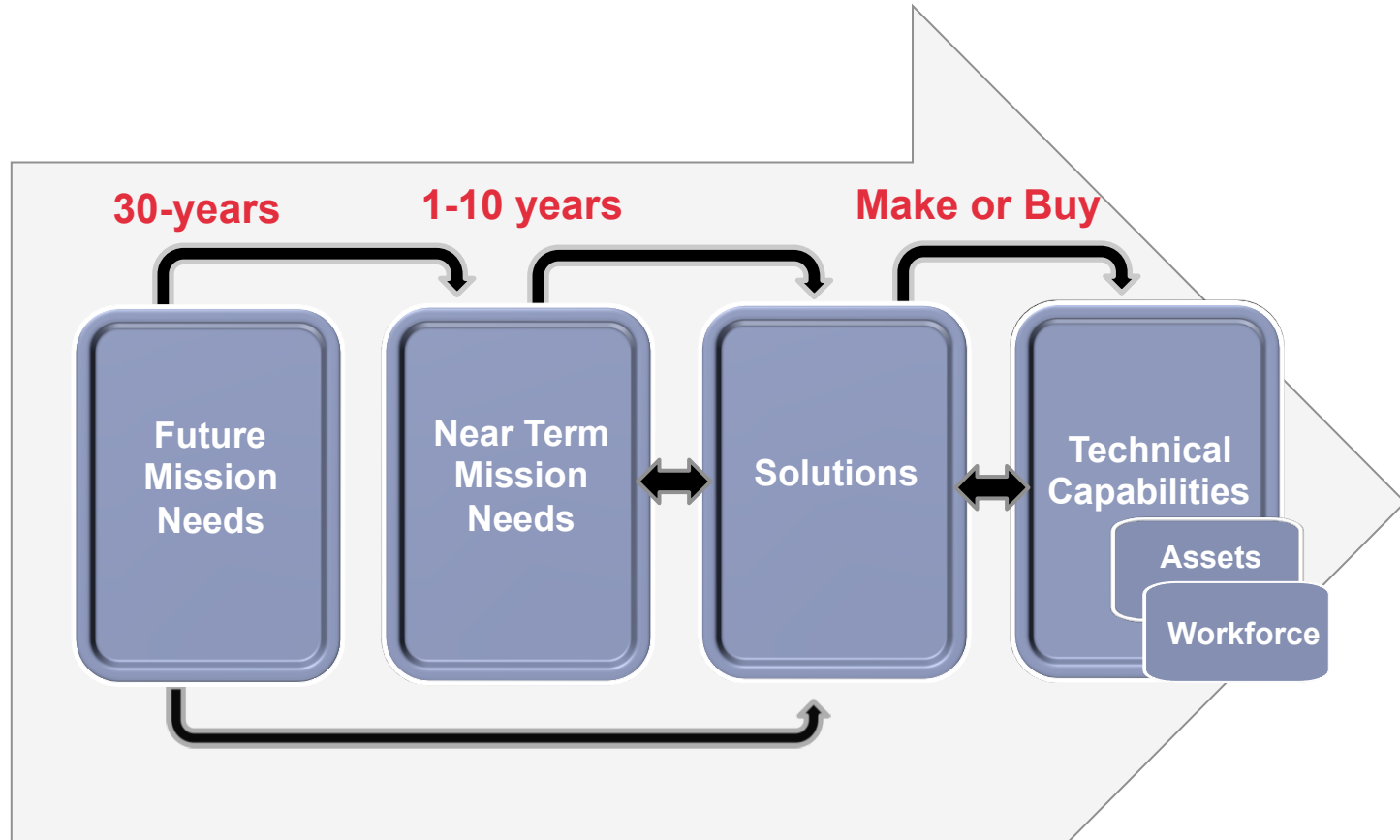
- Technical Capability Assessment Team (TCAT) will be complete by end of calendar year 2014. (Assessments out briefed through end of January 2015)
- Moving to Capability Leadership Model by end of December 2014
- The Office of the Chief Engineer will provide enduring integration and leadership for the Agency's technical capabilities
 - Technical Capability Leadership model will leverage the knowledge and leadership of the NASA Technical Fellows
 - Engineering Management Board will provide integration and prioritization across multiple Technical Capability areas
 - Technical Capability Leaders/NASA Technical Fellows will identify gaps and needed investments for engineering capabilities which will be briefed annually to the APMC



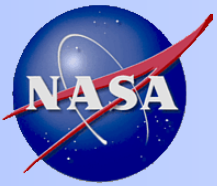
Backup



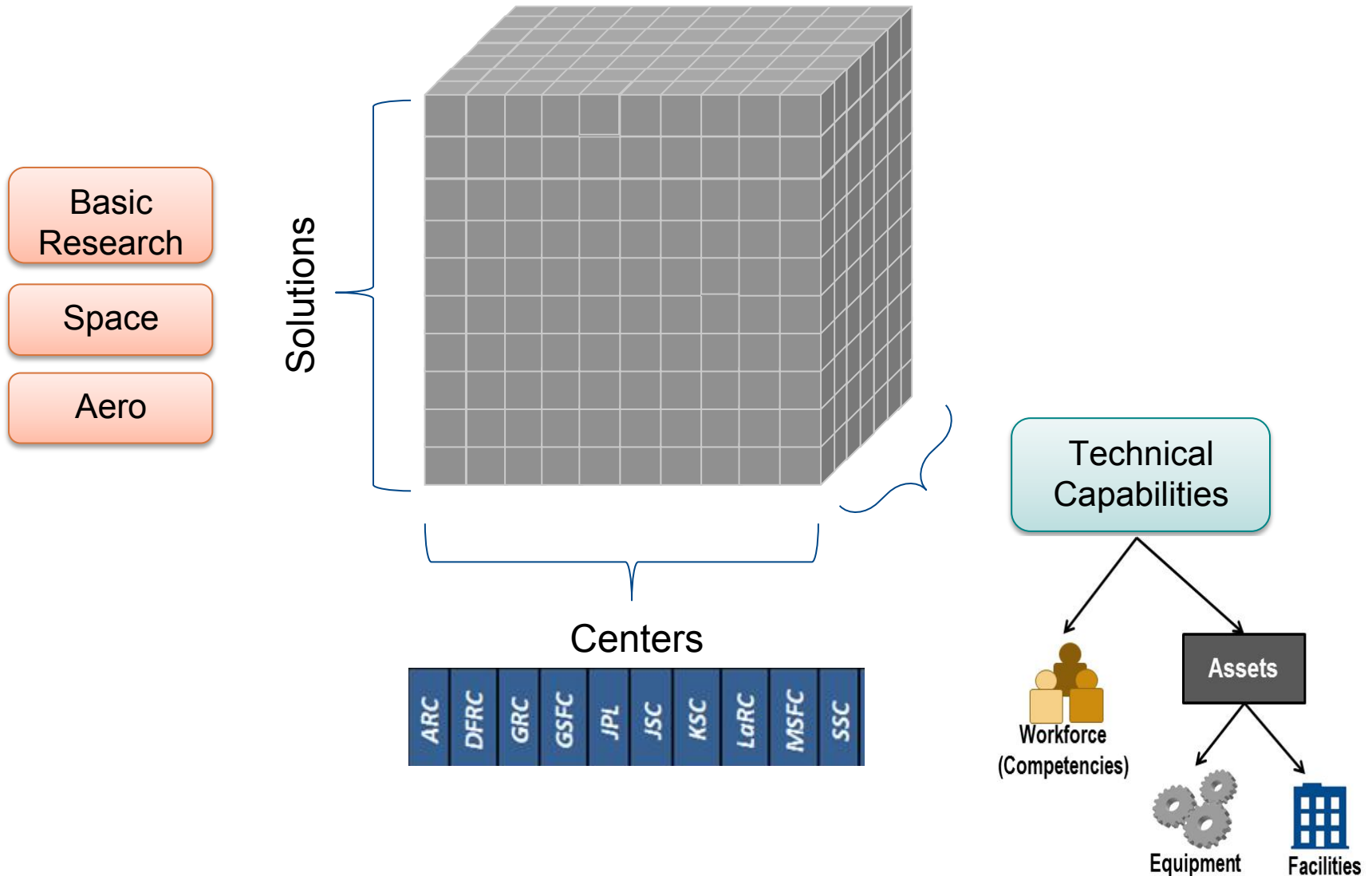
The Big Picture

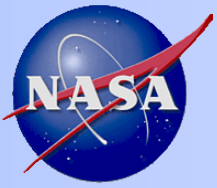


We want to make decisions about our capabilities and solutions based on future & current mission needs



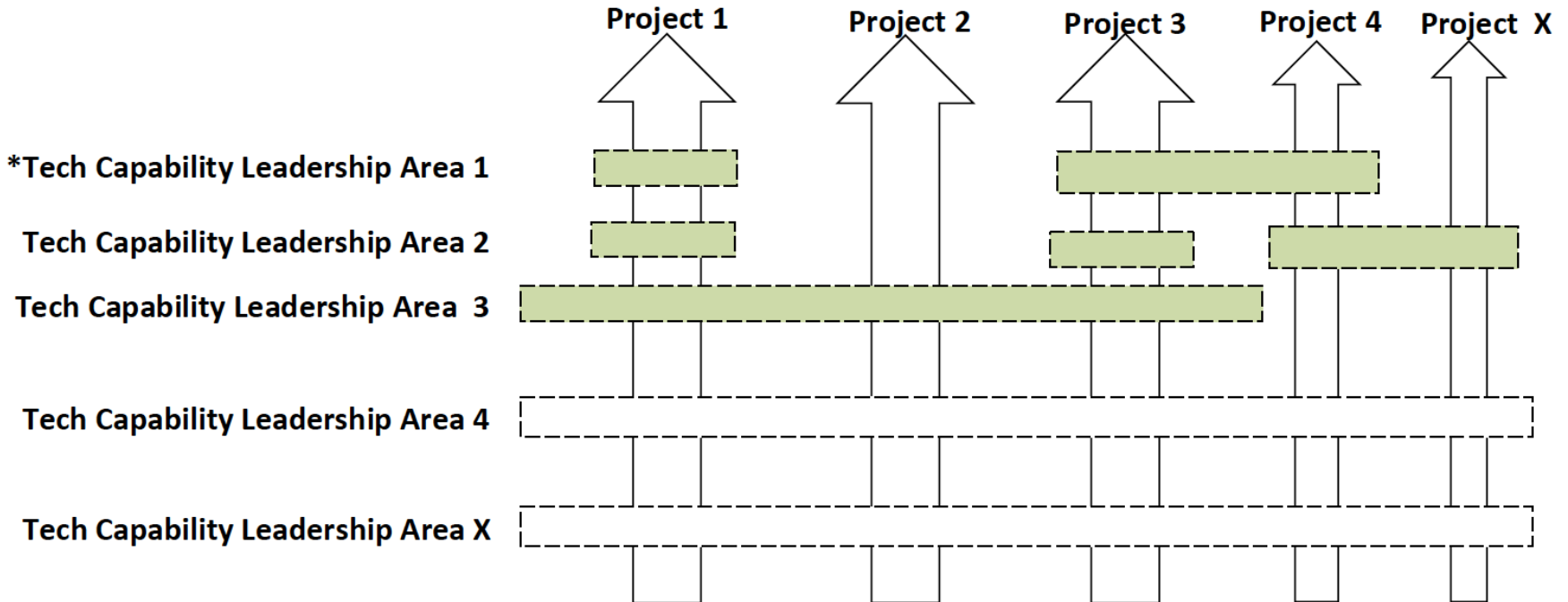
Linking Solutions to Technical Capabilities





Mission Directorate A

Mission Directorate B



*Technical Capability Leadership can be discipline, research, service, or systems level

When do we determine something to be an Agency Technical Capability :

- Based on technical nature, complexity, and criticality for the Agency,
- Where a short-term programmatic approach is not sufficient,
- Where greater coordination and alignment is needed,
- And/or where an integrated advancement approach is required to address future Agency objectives.