Technical Capability Assessment

Aeronautics and Space Engineering Board
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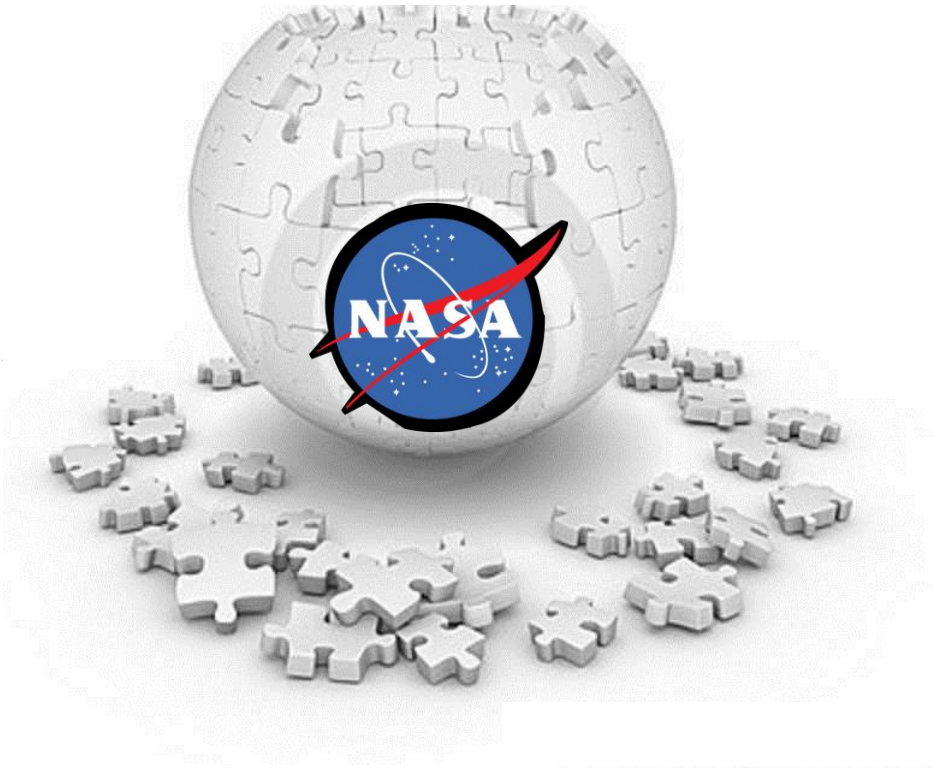
Robert Lightfoot
NASA Associate Administrator

Agenda

- Background and Agency Actions
- Technical Capabilities Assessment Purpose
- Technical Capabilities Assessment Process
- Status and Next Steps

Completing the Puzzle

NEW AGENCY OPERATING MODEL



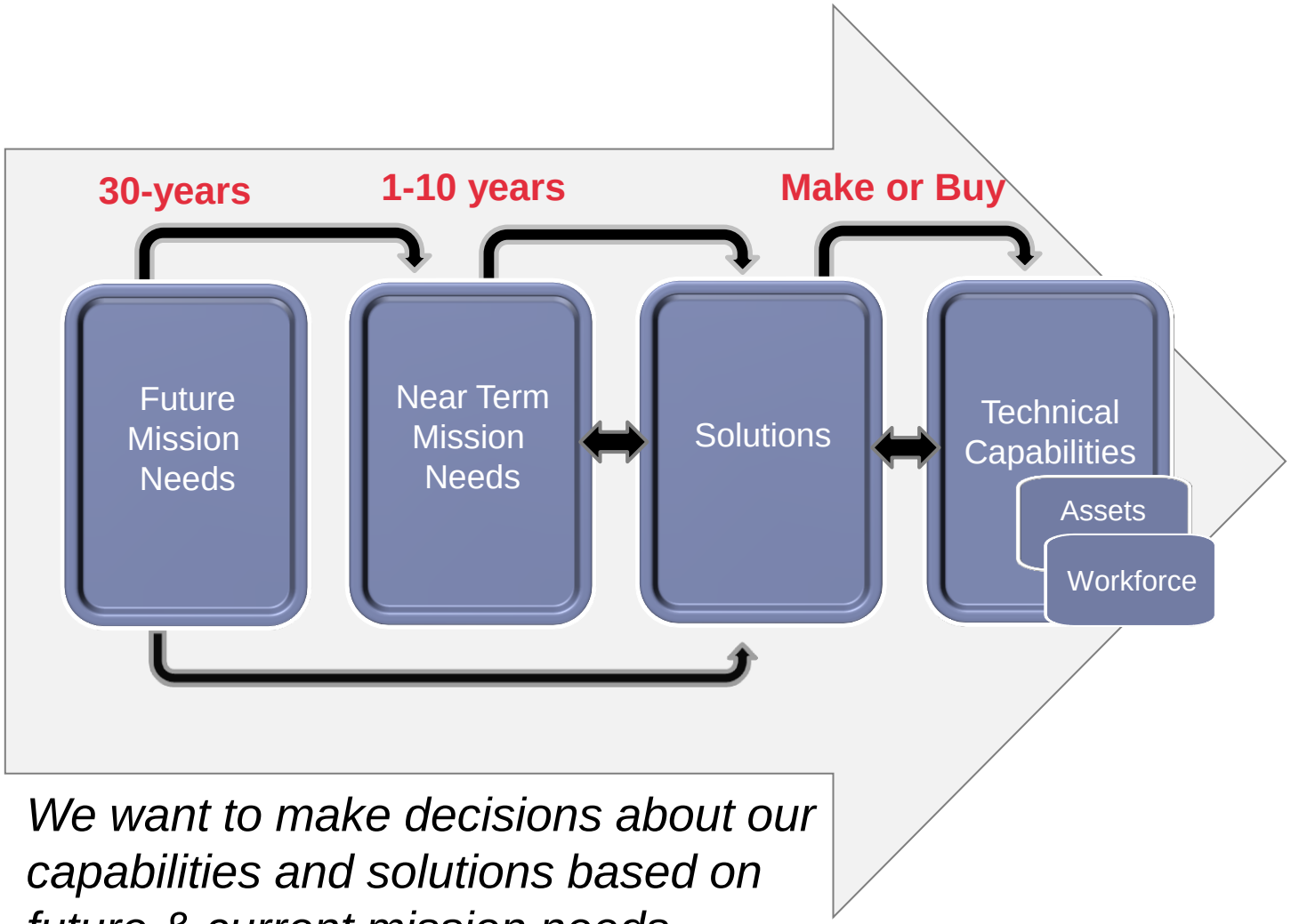
IMPERATIVE: Establish a more efficient operating model that maintains critical capabilities AND meets current and future mission needs

Purpose of the Technical Capabilities Assessment

Establish a more efficient operating model that maintains critical capabilities AND meets current and future mission needs

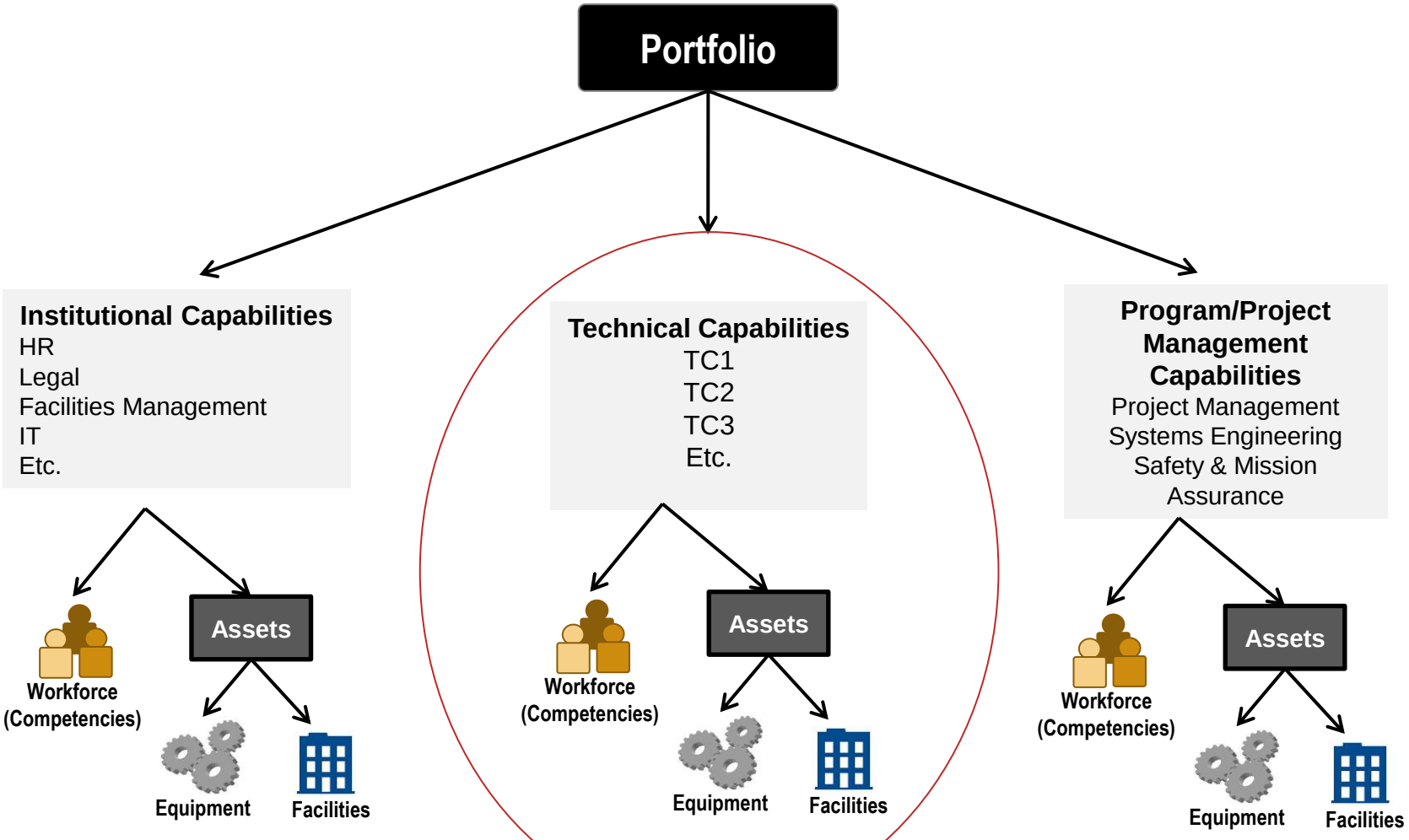
- NASA has a highly complex technical mission.
  - There are significant goal changes on a periodic basis.
  - Technical capabilities are vital to performing the mission.
- NASA has developed, maintains, and partners for technical capabilities.
  - There are many diverse capabilities across the Agency with many customers and partners.
- Budget environment is challenging.
  - We must make informed changes in the way we operate, what we maintain, and where we invest.
- TCAT is developing a method to:
  - Strategically address the technical capabilities required to support Agency goals;
  - Enable decision makers to make informed decisions on investing/divesting strategically within the budget while strengthening innovation in critical areas needed to advance our mission.

The Big Picture



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

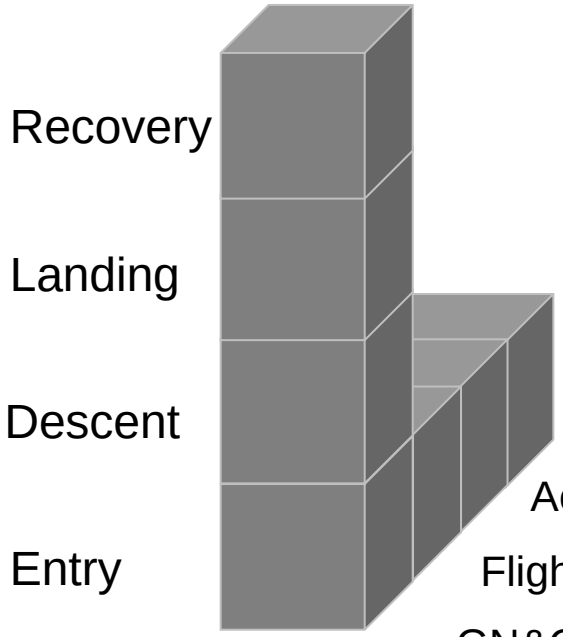
Capability Groups (What are we assessing?)



Linking Solutions to Technical Capabilities

What does NASA Langley Research Center do in support of Space Solutions?

Solution: Arrival Transportation



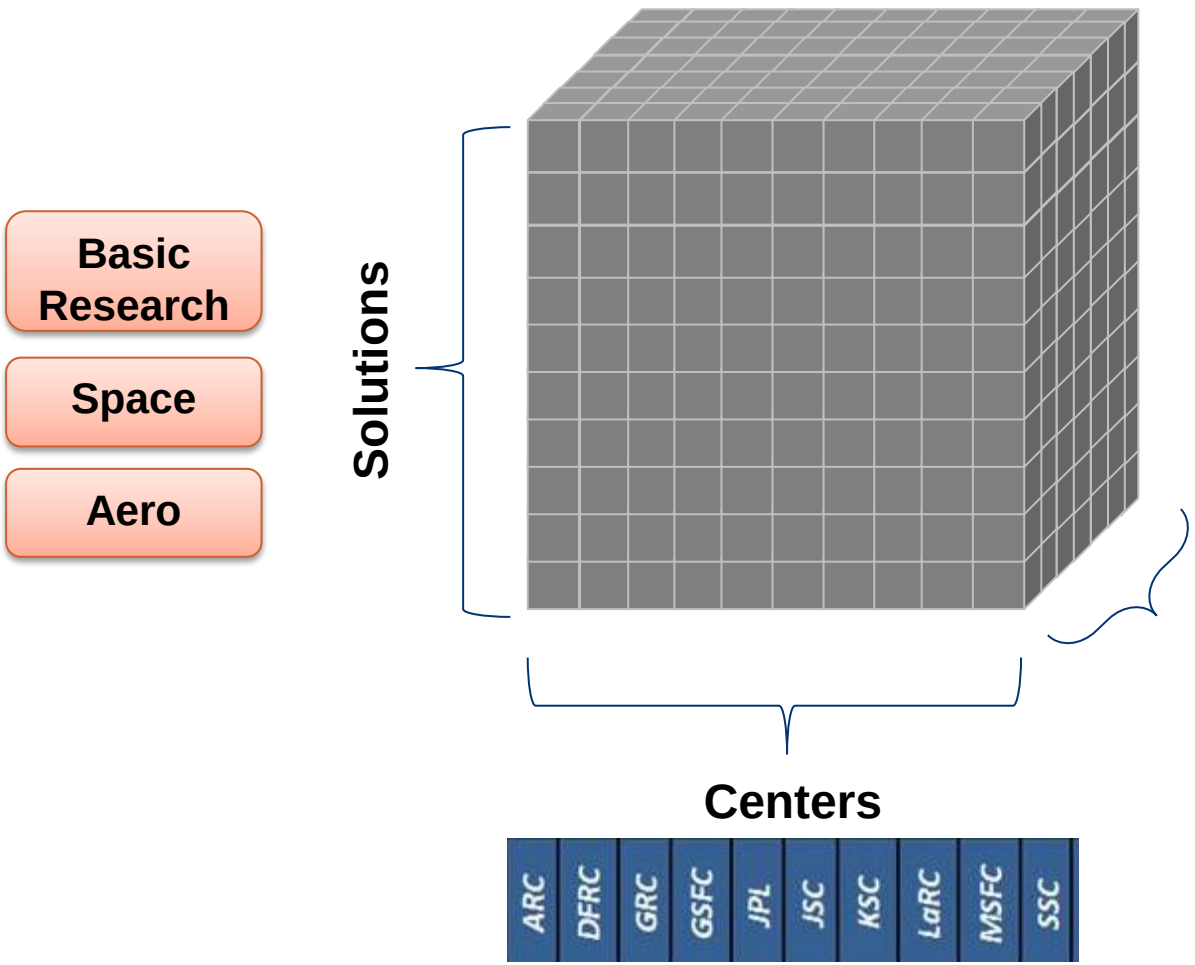
NASA Langley

Structures and Mechanisms
Aerodynamics
Flight Dynamics
GN&C

Capabilities

What skills does NASA Langley use?

Linking Solutions to Technical Capabilities



Solutions

- Solutions are the systems, subsystems and activities that result from the decomposition of Agency objectives, while being independent of budget, organization, and programs. These are grouped in levels known as “Tiers.”
- Solutions refer to both current and future portfolio content.

Space Solution Example:

Arrival Transportation	
Entry, Descent & Landing	Entry
	Descent
	Landing
	Aerobraking
	Aerocapture
	Recovery
Rendezvous Dock	Acquisition & Rendezvous
	Docking
	Berthing

Numbers of Solutions:

	Tier 1	Tier 2	Tier 3
Research	1	9	43
Space	9	26	97
Aero	3	12	31
Total	**13**	**47**	**171**

Tier 1 and 2 Solutions List

General Space
- System Architecture

Ascent Transportation
- Vehicle
- Ground Support
- Propulsion

In-space Transportation
- Vehicle
- In-space Servicing
- Propulsion

Arrival Transportation
- Entry, Descent & Landing
- Rendezvous & Dock

Extraterrestrial Surface Systems
- Surface Transportation
- Off-surface Transportation
- Power & Energy
- In-situ Sample and/or Resource Access & Utilization
- Infrastructure Platform Bus
- In-situ Servicing
- Communications & Navigation

Human Sustainment (Space)
- Launch & EDL
- In-space
- Extraterrestrial

Instruments
- Sensor Systems
- Experiment Apparatus

Spacecraft (Bus)
- Instrument Platform
- Habitation Platform
- In-space Servicing

Specialized Systems
- Long Term Management
- Communications

Space

Science & Exploratory Technology
- Earth
- Astrophysics
- Heliophysics
- Planetary Science
- Space Environments Characterization & Effects
- Life Science
- Physical Science
- Human Research
- Information Systems

Research

Air Vehicles
- Systems Architecture
- Vehicle Platform
- Propulsion
- Ground Support
- Aviation Safety

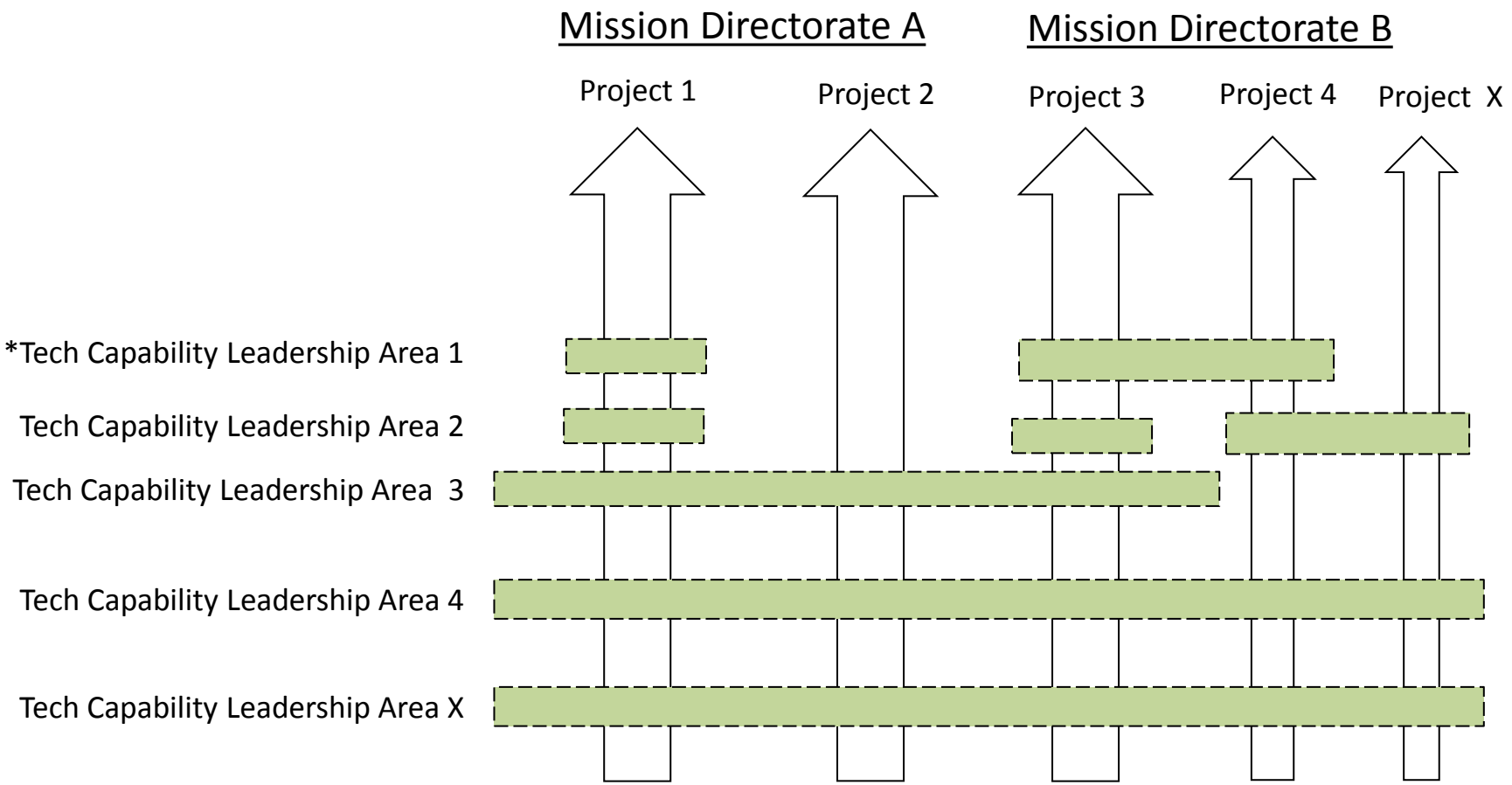
Aero

Air Traffic Management
- Strategic Management
- Tactical Management
- Unmanned Aerial Systems
- ATM Human Systems Integration
- General Air Traffic Management

Human Sustainment (Aero)
- Air Crew & Passengers
- Ground Crew

The Next Steps and Status

1. **Moving into decisions; transparency of data, analysis, and decisions is critical across the Agency, and with stakeholders.**
2. **Approach must be integrated with other initiatives: Improving how we operate (business model) as we right-size our capabilities.**



*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.

Agency Capability Leadership Area Roles

- Advises Agency and ensures *proper alignment* across Missions and Centers.
- Establishes *plans/roadmaps* to provide technical guidance to the Agency.
- Determine *gap areas* for advancement and strategic investment.
- Advises on capability *sizing and strategic hiring*, including contracting, across all Centers.
- Determines *investments and divestments* within capability scope, including advising Centers on assets.
- Solicits *innovative ideas* from outside the capability area.
- Establishes *standards and specifications* within capability scope.

Accomplishments to Date

1. **Held All Hands at all ten NASA Centers to brief NASA Actions and Technical Capability Assessment plans for transparency to our workforce. Had sessions with all SES/ST/SL as part of the Virtual Executive Summit. Established an internal employee web site for transparency of process and decisions.**
2. **Briefed Authorization and Appropriations Congressional Committee staff and Congressional Member staff on NASA Technical Capability Assessment.**
3. **Reviewed and incorporated lessons learned from previous Agency decisions on capabilities, specifically meeting with Arc Jet teams at JSC and Ames.**
4. **Provided Agency direction on next steps for institutionalizing technical capability assessment and management approach.**
5. **Made NASA Council decisions on Microgravity Flight Services, Balloon Services, Aircraft Operations, Life Sciences, Earth Sciences, Human Factors, and Mission Operations. Established Aircraft Operations, Earth Science Research, Life Sciences Research, and Human Factors as Agency technical capabilities to be managed under new model.**

Assessments Plan

Assessments that complete over the next three months:

- **Nuclear Power and Propulsion**
- **Instrument & Sensors**
- **Aerosciences**
- **Materials**
- **Propulsion**
- **Ascent Transportation – Vehicle**
- **ET Surface Systems (e.g. ISRU)**
- **Entry, Descent, and Landing**
- **Acquisition, Rendezvous, & Docking**
- **Space Environments and Natural Environments Test**