NASA Critical Technology Needs

FEDERAL LABORATORY CONSORTIUM
MID-ATLANTIC REGIONAL MEETING

September 16, 2004

TeCC
Technology Commercialization Center, Inc
NASA's Mid-Atlantic Regional Technology Transfer Center

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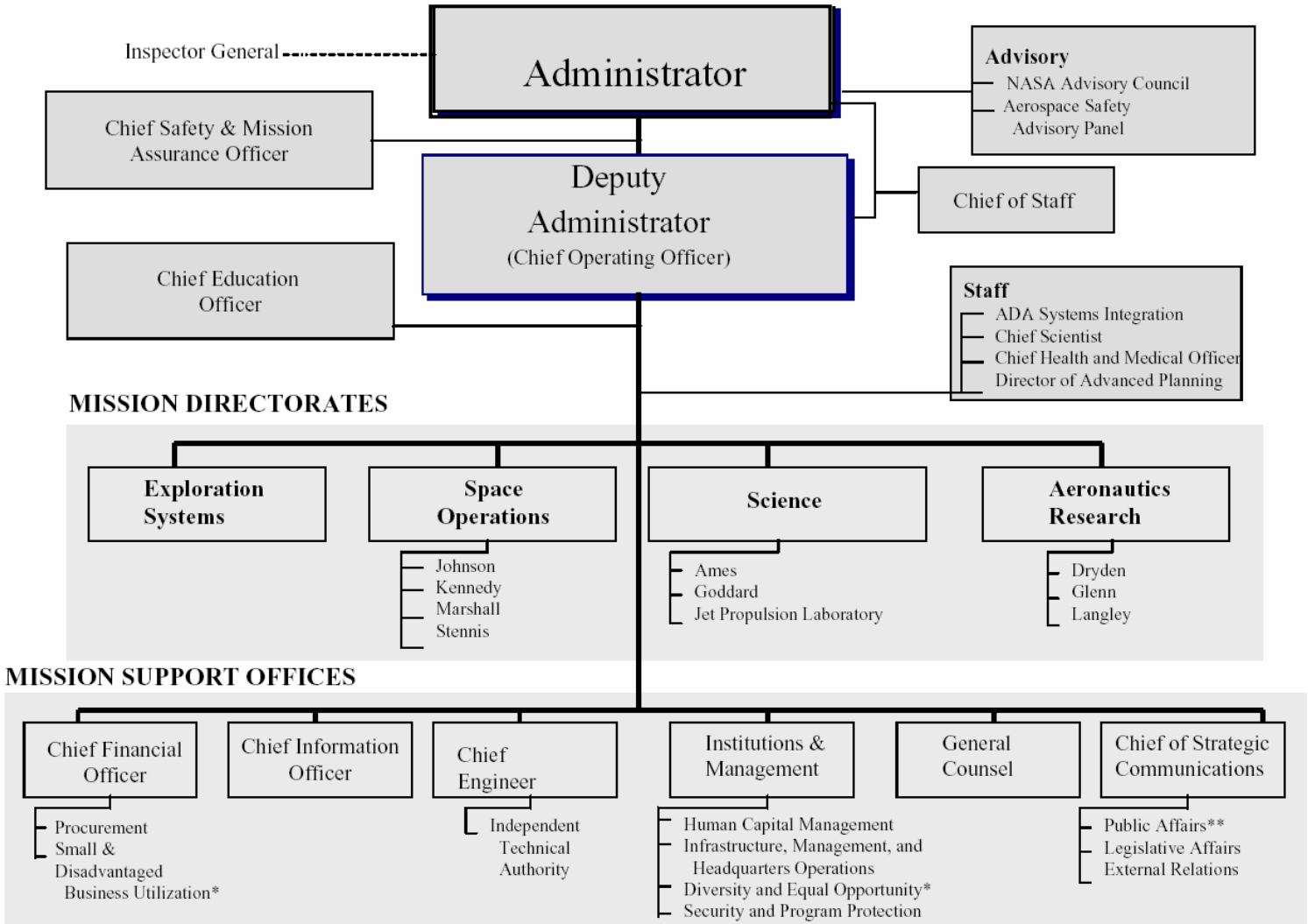
Outline

- NASA Organization
- Areas of Technology Needs
- NASA Innovative Partnership Program
- Services and Products
- NASA Mid-Atlantic RTTC
- Summary

NASA Organization



* In accordance with law, the Offices of Diversity and Equal Opportunity and Small and Disadvantaged Business Utilization maintain reporting relationships to the Deputy and the Administrator.

** Including a new emphasis on internal communications.

Areas of Critical Needs

- Space Operations
- Science
- Aeronautics Research
- Exploration Systems

Space Operations

WELCOME TO THE SPACE OPERATIONS MISSION DIRECTORATE

The Space Operations Mission Directorate provides many critical enabling capabilities that make possible much of the science, research, and exploration achievements of the rest of NASA. We do this through the three themes of: International Space Station, Space Shuttle Program, and Flight Support.

+ LAUNCH FUN STUFF

Space Operations Needs

- International Space Station
  - Establishing a permanent human presence in Earth orbit.
  - Providing a long-duration, habitable laboratory for science and research activities investigating the limits of human performance
  - Expanding human experience in living and working in space
  - Enabling the commercial development of space.
- Space Shuttle Program
  - Provides capability in the United States for human access to space.
- Space and Flight Support
  - Space Communications
  - Launch Services
  - Rocket Propulsion Testing

Science

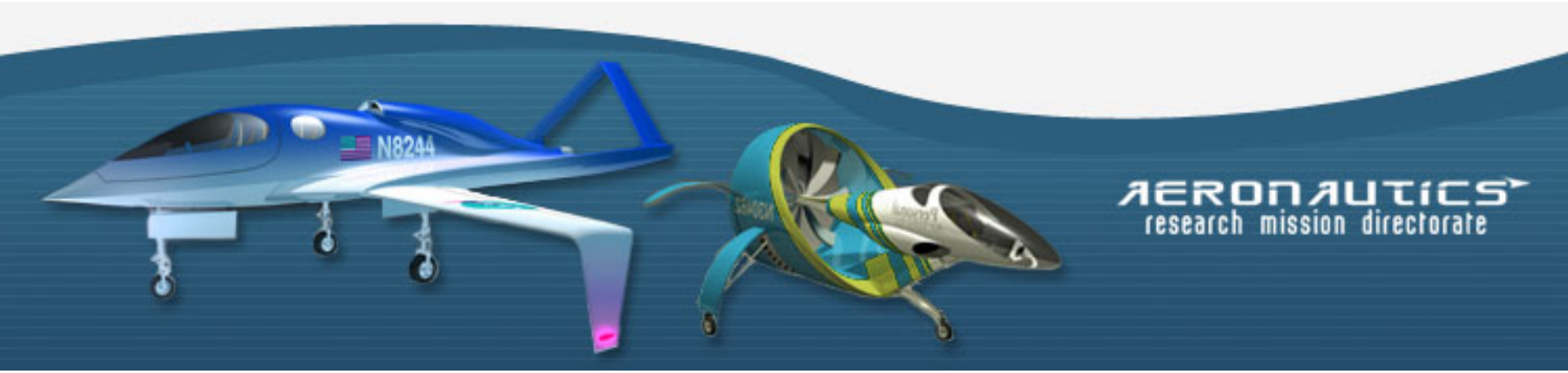
Earth Science: To understand and protect our home planet by using our view from space to study the Earth system and improve prediction of Earth system change.

Space Science: Programs relating to astronomy, the solar system, and the sun and its interaction with Earth.

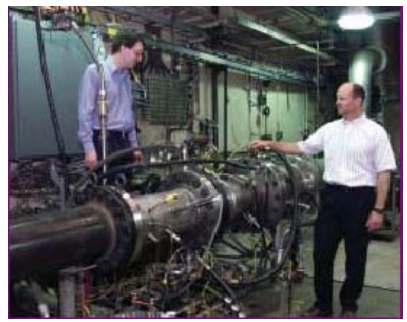
Science Needs

- Space Science
  - Research Opportunities in Space Science
  - New Millennium Program Space Technology
  - Lunar Reconnaissance Orbiter Measurement Investigations
- Earth Science
  - Creating the ability to study the Earth as an integrated physical and biological system
  - Addressing fundamental scientific questions
  - Forging domestic and international partnerships to explore the complex Earth system.

Aeronautical Research



The Aeronautical Research Mission is to pioneer and validate high-value technologies that enable new exploration and discovery and improve quality of life through practical applications.



Aeronautical Research Needs

- NASA's Aeronautics Research Mission Directorate develops advanced concepts and technologies that are critical to the future of aeronautics and beyond the risk level or capability of other organizations.
- The research and technology development is organized into strategic technology areas, which are designed to achieve the following specific NASA objectives.
  - **Decrease the aircraft fatal accident rate**
  - **Reduce Aircraft noise emissions**
  - **Enable more people and goods to travel faster and farther, with fewer delays**

Aeronautics Technology Focus

- **Decrease Fatal Accident Rate**
  - Aircraft self-protection and preservation
  - Hostile act intervention and protection
  - Human error avoidance and mitigation
  - Environmental hazards awareness and mitigation
  - System vulnerability discovery and management
- **Reduce Aircraft noise emissions**
  - Environmentally friendly, clean-burning engines
  - New aircraft energy sources and management
  - Quiet aircraft for community friendly service
  - Aerodynamic performance (for fuel efficiency)
- **Travel Faster and Farther**
  - System-wide operations technologies
  - Airspace human factors
  - Aircraft weight reduction (for expanded access)
  - Aerodynamic vehicle performance (for expanded access)
  - New aircraft energy sources and management
  - Efficient operation of the NAS as an overall nationwide system with global interaction

Exploration Systems

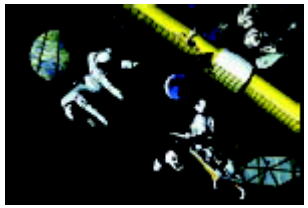
Exploration and discovery are key agents of growth in society—technologically, economically, socially, internationally, and intellectually. The Exploration Systems vision sets in motion activities that will contribute to change and growth in the U.S. and the world over the next century. The fundamental goal is to advance U.S. scientific, security, and economic interests through a robust space exploration program. In support of this goal, the United States will:

- Implement a sustained and affordable human and robotic program
- Extend human presence across the solar system
- Develop innovative technologies, knowledge and infrastructures to insure success
- Promote international and commercial participation in Space Exploration

Exploration Systems Needs

- Human & Robotic Technology
  - Advanced Space Technology Research
  - Innovative Partnerships (IP)
  - Technology Maturation.
- Project Prometheus
  - nuclear fission power and propulsion systems
- Centennial Challenges
  - Revolutionary advances in fundamental technologies
  - Breakthrough robotic capabilities
  - Very low cost space missions
  - Final challenges selected after external inputs and internal review and approval

Exploration Systems Needs



Human and Robotic Technology
NASA will send human and robotic explorers as partners, leveraging the capabilities of each where most useful.

Exploration Transportation Systems
NASA will initiate Project Constellation to develop a new Crew Exploration Vehicle for future crew transport.

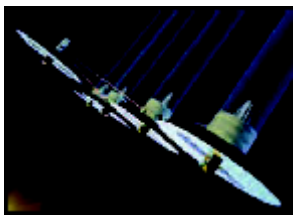
Nuclear Systems Development
Project Prometheus is NASA's program to develop space nuclear power and propulsion technology that is key to enabling advanced robotic missions and human missions beyond Earth's orbit.

Robotic Missions to the Moon and Mars
NASA will begin its lunar testbed program with a series of robotic missions.

Exploration Systems Needs

Habitable Environments On the Moon and Mars
The Moon will provide an operational environment where we can demonstrate human exploration capabilities within relatively safe reach of Earth.

Exploration of Jupiter's Moons
NASA is in the early stages of planning a mission that will visit Europa, Callisto, and Ganymede during the next decade.



Planet Research and Observation
NASA's Astronomical Search for Origins program will use a variety of techniques this decade to greatly expand the number and variety of known extrasolar planets.

Announcements of Exploration Systems Needs

- **July 2004 Broad Agency Announcement #1 - Human & Robotic Technology**
  Selections made September/October 2004 within available budget allocation

- **Winter 2004/2005 Broad Agency Announcement #2 - Human & Robotic Technology**
  Call for Technology Maturation Program Projects following completion of studies and requirements development efforts, includes technology gaps identified through internal and external analysis

- **January 2005 Requests for Proposal CEV (Tentative)**
  In support of Project Constellation's development and acquisition strategy for unmanned CEV flight by 2011 and manned CEV flight by 2014. Responses due March 2005, with two awards expected in July 2005 (subject to the availability of funds)

Meeting Critical Needs

- Broad Area Announcements (BAA)
- NASA Research Announcement (NRA)
- Space Act Agreements (SSA)
- Request for Proposals (RFP)
- Grants
- SBIR/STTR

NASA’s Innovative Partnership Program

IP Mission

The programs and initiatives directed by the NASA IP Program foster technology partnerships, commercialization and innovation in support of NASA's overall mission and national priorities.

Technology Resources

Explore these unique resources and services to discover and access NASA research, technology, expertise and R&D capabilities.

TeCC
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NASA IP Network

1-800-472-6785

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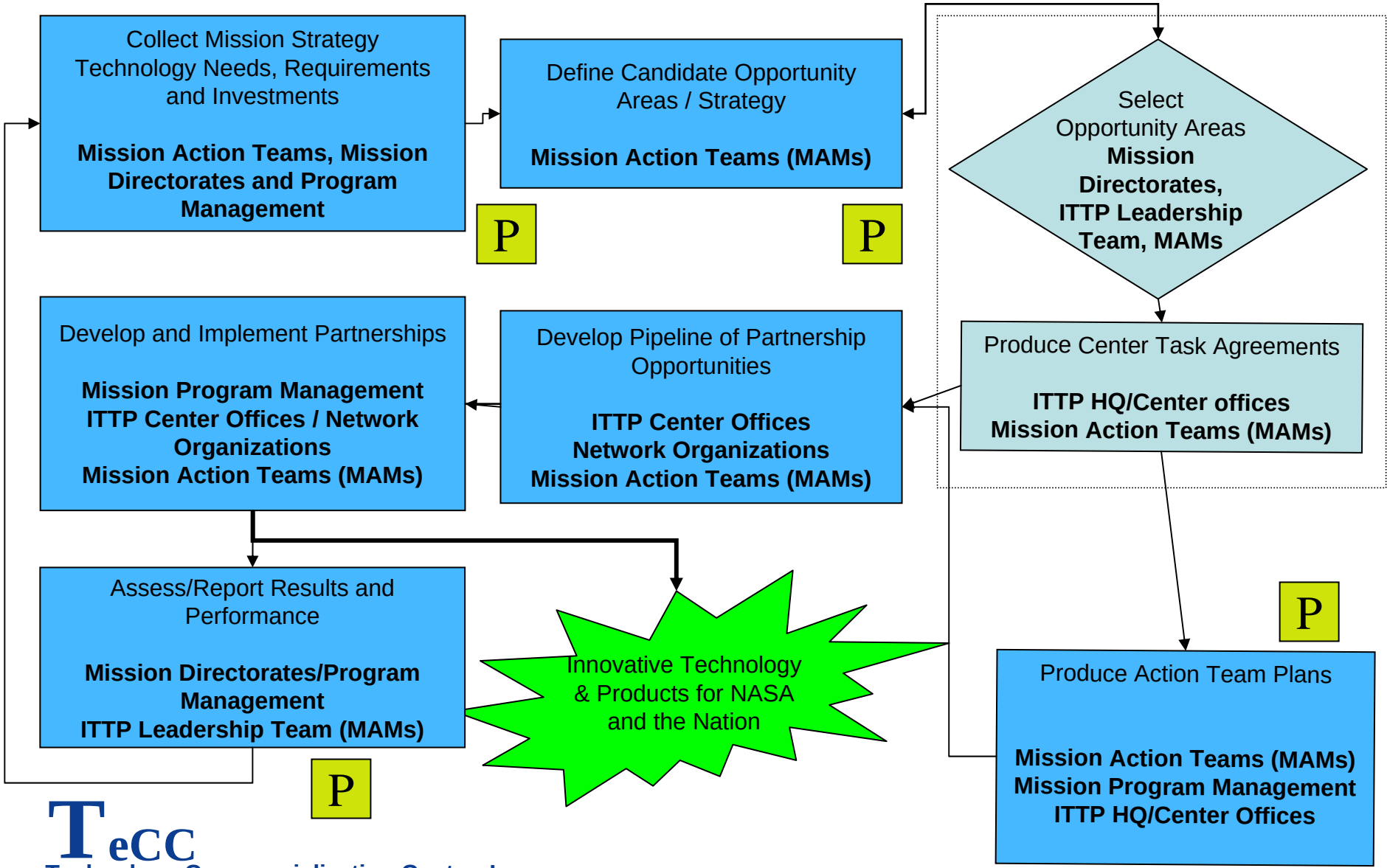
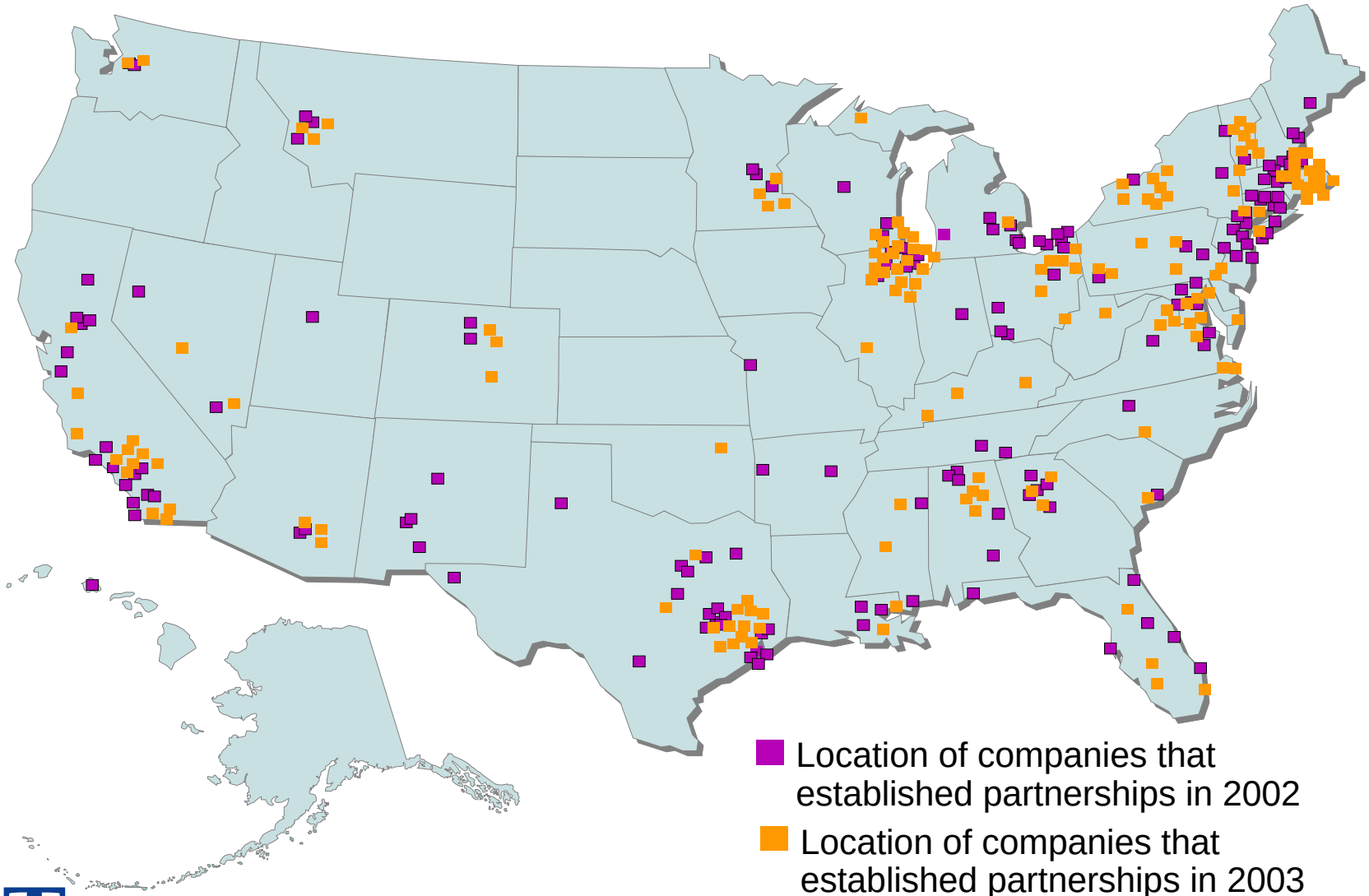
NASA's IP Program Operating Concept



RTTC Services: **Result in NASA Partnerships**



Services to NASA

- Market NASA Technology Portfolio
- Technology and Market Assessments
- Technology Road Maps
- Identification/Evaluation/Intro of Partners
- Commercialization Strategy Development
- SBIR Workshops & Proposal Assistance

Services to Industry

- Identify & Enable NASA Partnering Opportunities
- Technology Assessment, Acquisition and Licensing
- Technology Road Maps
- Technology Needs Assessment, Scouting & Eval.
- Product Development/Cost Reduction
- Technology Commercialization
- Patent Application & IP Asset Management
- Technical Info and Marketing Services
- Market Assessments
- Business Development Strategies

Technology Commercialization Center (TeCC)

- Provides: Full Range of Technology Transfer and Commercialization Services
  - Technology Evaluation
  - IP Matters/Assessment/Protection
  - Value Added Processes
  - Information Services
- Operates: NASA's Mid-Atlantic Regional Technology Transfer Center (RTTC)

Implementation Features

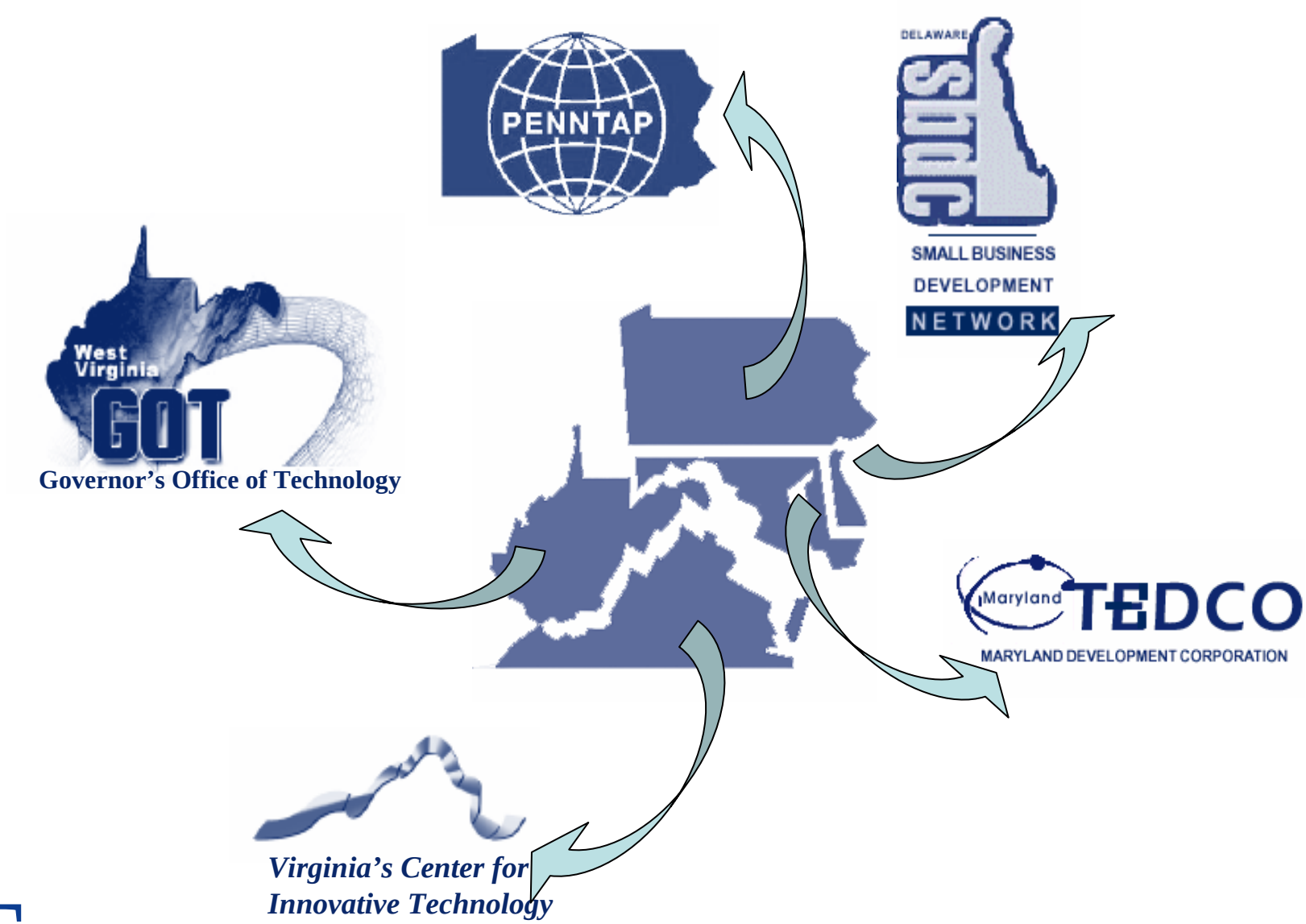
- MA-RTTC Organized and Aligned with Key NASA Technologies
- Strong State Affiliates:

  DE-SBDC MD-TEDCO PA-PENNTAP

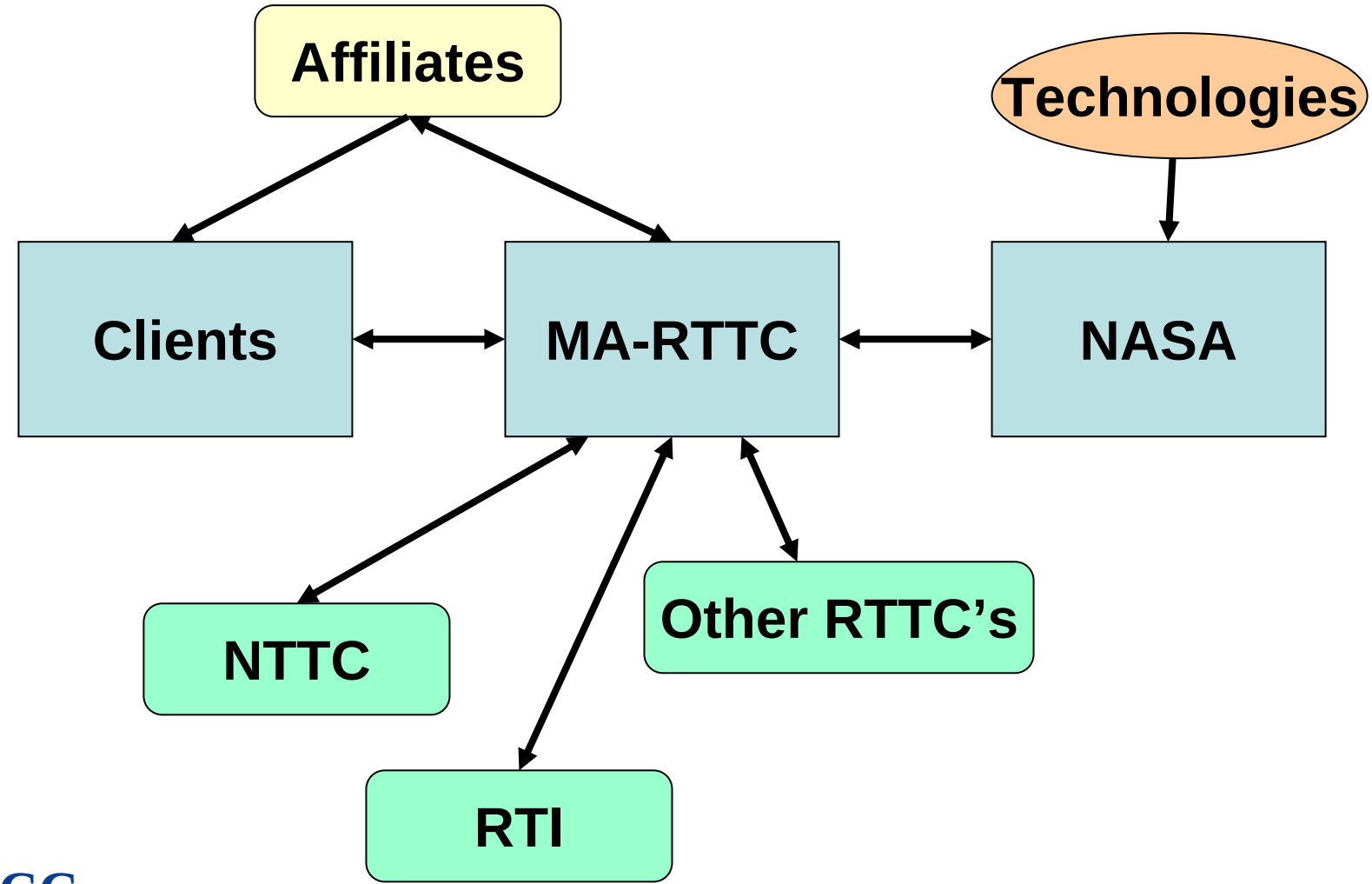
  VA-CIT WV-GOT

  - Resource Synergy:
    - 40% of Funds to States,
    - Matching (1:1) by All States
  - "Feet-on-the-Street" (Over 30 State Field Staffers)
- Emphasize NASA Technology Opportunities
  - Technology Transfer
  - Technology Partnerships

State Affiliates



MA-RTTC Process



Summary

- NASA has Critical Technology Needs in all Areas of Research and Operations
- A summary of the Major Needs Areas is Presented
- Additional Information is Available through the NASA Web Site at http://www.nasa.gov or the IP Network at http://www.ip.nasa.gov