



Office of the Chief Technologist Update

NASA Advisory Council

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Office of the Chief Technologist
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Advanced Technology at NASA



- NASA pursues **breakthrough technologies** to expand our frontiers in aeronautics and space
- **Advanced technologies are critical** for accomplishing NASA's current missions, and today's **technology investments are required** for the bold missions of NASA's future
- These same investments **benefit the United States economy** through creation of new industries, products, services, scientific discoveries, and societal benefits
- NASA's basic and applied research programs **span all of NASA's mission areas**
- NASA is implementing a portfolio of broadly applicable Space Technology programs to take the **best ideas** of our nation's innovators **from concept to flight**

Space Technology Grand Challenges



EXPAND HUMAN PRESENCE IN SPACE



Economical Space Access



Space Health & Medicine



Telepresence in Space



Space Colonization

MANAGE IN-SPACE RESOURCES



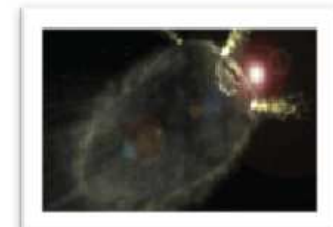
Affordable Abundant
Power



Space Way Station



Space Debris
Hazard Mitigation



Near-Earth Object
Detection & Mitigation

ENABLE TRANSFORMATIONAL SPACE EXPLORATION & SCIENTIFIC DISCOVERY



Efficient In-Space
Transportation



High-Mass Planetary
Surface Access



All Access
Mobility



Surviving Extreme
Space Environments



New Tools
of Discovery

NASA Space Technology Roadmaps



The NASA Space Technology roadmaps, drafted by NASA, and reviewed and vetted for technology investment identification and prioritization by the NRC, will serve NASA as a decadal-like survey, to provide sustained technology investment goals.

- *Interim report: Sept 2011*
- *Final Report: Jan 2012*

- NRC Interim Report on NASA'S Draft Space Technology Roadmaps, August 29, 2011
 - Success in executing future NASA space missions will depend on advanced technology developments that should already be underway.
 - NASA's technology base is largely depleted.
 - Currently, available technology is insufficient to accomplish many intended space missions in Earth orbit and to the Moon, Mars, and beyond.
 - Future U.S. leadership in space requires a foundation of sustained technology advances.
- NASA will utilize the NRC's final report recommendations in refining the Space Technology Roadmaps in FY 2012 and as a guide in developing FY 2013 and beyond space technology investment priorities.

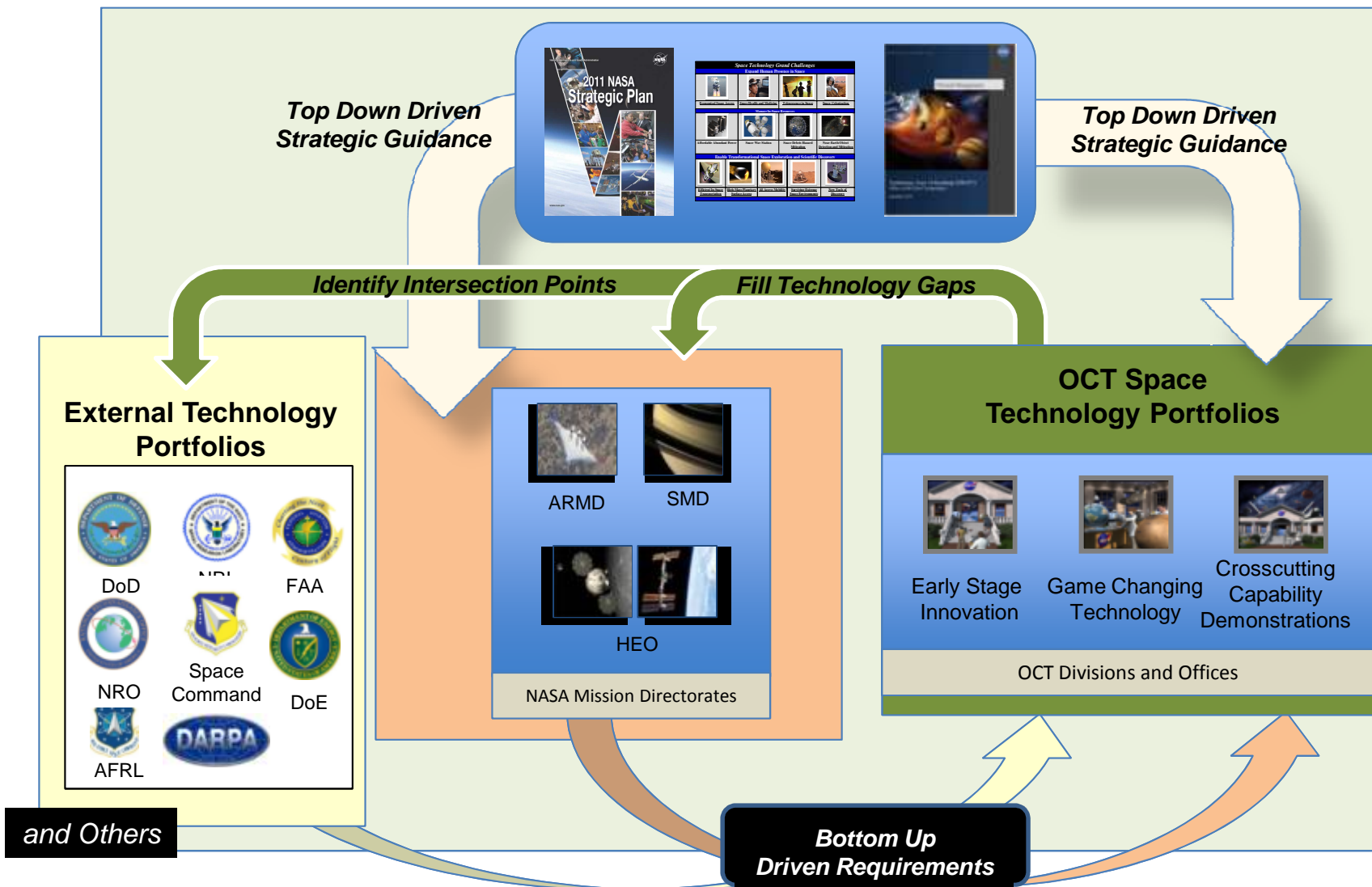
NASA SPACE TECHNOLOGY ROADMAP TECHNICAL AREA BREAKDOWN STRUCTURE

**STR • TABS
TECHNOLOGY AREA BREAKDOWN STRUCTURE**

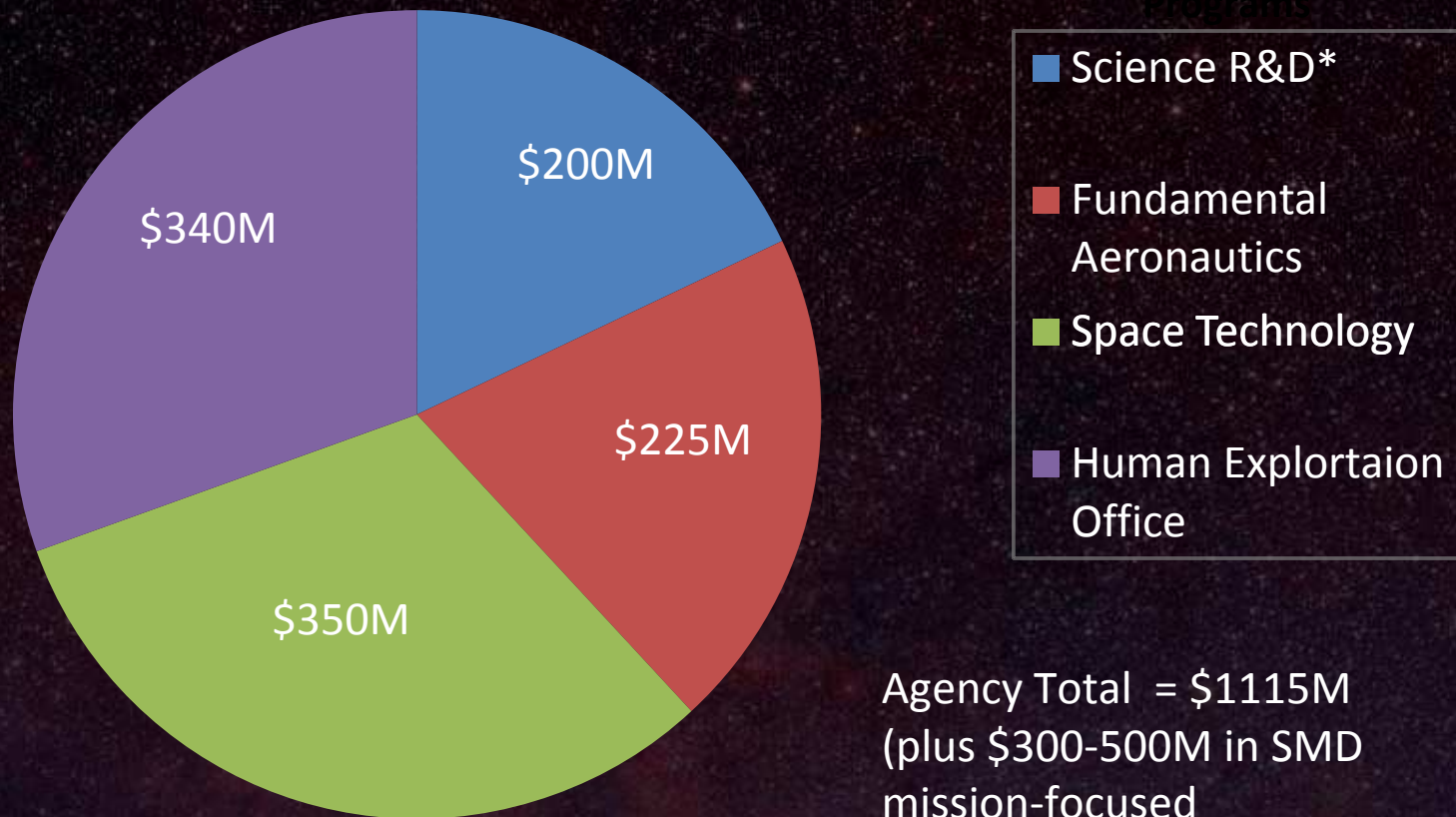
TA01	• LAUNCH PROPULSION SYSTEMS	TA08	• SCIENCE INSTRUMENTS, OBSERVATORIES & SENSOR SYSTEMS
TA02	• IN-SPACE PROPULSION TECHNOLOGIES	TA09	• ENTRY, DESCENT & LANDING SYSTEMS
TA03	• SPACE POWER & ENERGY STORAGE	TA10	• NANOTECHNOLOGY
TA04	• ROBOTICS, TELE-ROBOTICS & AUTONOMOUS SYSTEMS	TA11	• MODELING, SIMULATION, INFORMATION TECHNOLOGY & PROCESSING
TA05	• COMMUNICATION & NAVIGATION	TA12	• MATERIALS, STRUCTURES, MECHANICAL SYSTEMS & MANUFACTURING
TA06	• HUMAN HEALTH, LIFE SUPPORT & HABITATION SYSTEMS	TA13	• GROUND & LAUNCH SYSTEMS PROCESSING
TA07	• HUMAN EXPLORATION DESTINATION SYSTEMS	TA14	• THERMAL MANAGEMENT SYSTEMS

More information at <http://www.nasa.gov/offices/oct/home/roadmaps/index.html>

NASA Technology Portfolio Development



FY 2011 Basic and Applied Research Funding at NASA



Agency Total = \$1115M
(plus \$300-500M in SMD mission-focused technology)

Office of the Chief Technologist

Roles and Responsibilities



NASA Chief Technologist:

- Serves the Administrator as the principal NASA advisor on matters concerning Agency-wide technology policy and programs
- Advocates externally for NASA's research and technology programs

Delegated to NASA Deputy Chief Technologist:

- Integrates, coordinates and tracks the technology investments across the

High-Level Emphasis Areas and Initiatives for FY 2012



1. Execution of Space Technology Program

- Comprehensive execution of all ten ST programs (over 1000 projects)
- Emphasis on FY 2012 “Big Nine” projects

2. Strengthen cross-agency view (SMD, HEOMD, ARMD)

- Ensure appropriate coverage – minimize gaps and overlaps
- Increase infusion of technologies into missions

OCT Technology Transfer and Commercialization Efforts



FY 11 Highlights and Accomplishments:

- ❖ 1,257 new inventions
- ❖ 129 new patent applications filed
- ❖ 221 new copyright licenses executed
- ❖ 34 new invention licenses executed
- ❖ 44 new technology transfer success, including:



Time-saving software derived from a suite of NASA-invented tools for improving the efficiency of air traffic control, now allowing commercial airlines to take the most direct possible flight paths and potentially save millions of gallons of fuel



A health and fitness monitoring technology rendered into a simple strap or even a t-shirt, capable of measuring and recording the vital signs of soldiers, first responders, professional athletes, and consumers seeking to get in shape—developed with help from NASA physiologists.



A manufacturing process, devised for fabricating unique components for NASA deep space science missions, that now creates enabling parts for advanced medical imaging machines and gas turbine engines at a greatly reduced cost.

OCT Technology Transfer and Commercialization Efforts



In FY 2012, NASA will count among its primary Agency-level goals an increase in the amount and quality of its technology transfer activities. Accordingly, the Agency will:

- ❖ Engage external entities in co-development of technologies that simultaneously serve NASA mission needs while offering an expedient path to the transfer of technology and ultimately societal/public benefit.
- ❖ Release a public online portal, improving public access to federally-owned inventions
- ❖ Revise and streamline Agency procedures for execution of Cooperative Research and Development Agreements (CRADAs)
- ❖ Increase Agency engagement with existing regional technology innovation clusters
- ❖ Continue development and implementation of new metrics to measure the quantitative benefit of NASA technology transfer successes

