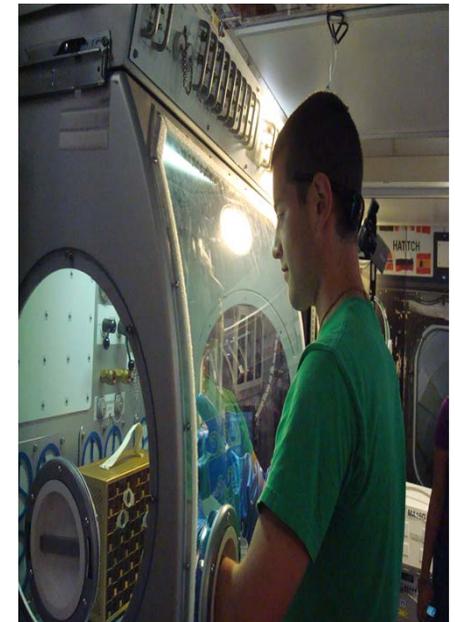




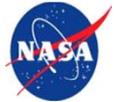
NASA Marshall Space Flight Center Education Program Overview November 27, 2012

*Presented by Tammy B. Rowan
Manager, Academic Affairs
Office of Human Capital*

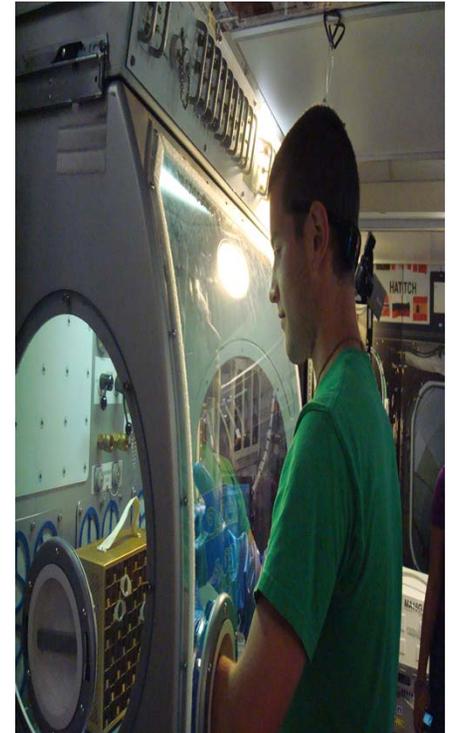


*Tereasa H. Washington, Director
Office of Human Capital*

NASA Education Vision Statement



To advance **high quality** science, technology, engineering, and mathematics (**STEM**) education using **NASA's unique** capabilities.





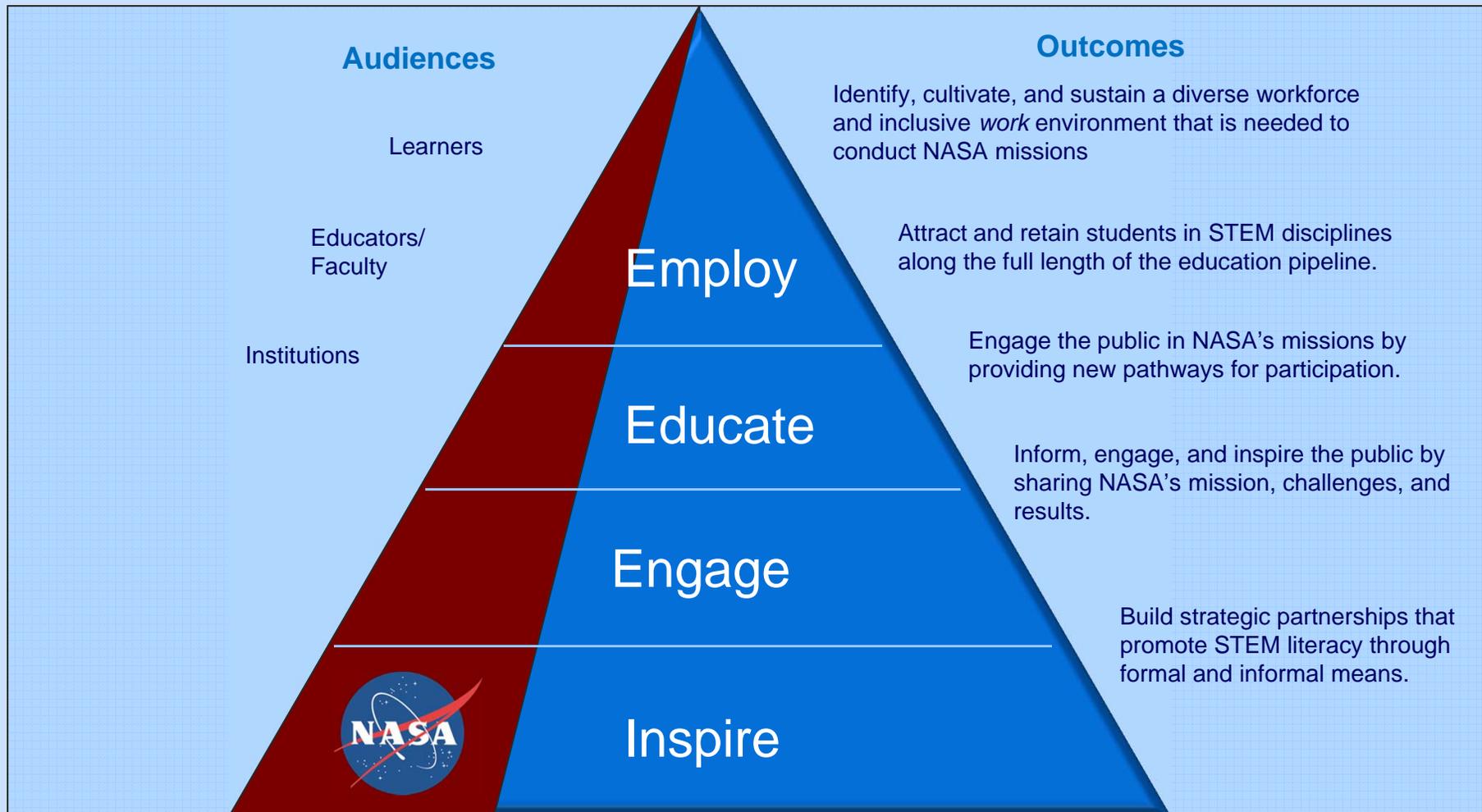
Strategic Goal 5: Enable program and institutional capabilities to conduct NASA's aeronautics and space activities.

- Outcome 5.1: Identify, cultivate, and sustain a diverse workforce and inclusive work environment that is needed to conduct NASA missions.

Strategic Goal 6: Share NASA with the public, educators, and students to provide opportunities to participate in our Mission, foster innovation, and contribute to a strong national economy.

- Outcome 6.1: Improve retention of students in STEM disciplines by providing opportunities and activities along the full length of the education pipeline.
- Outcome 6.2 Promote STEM literacy through strategic partnerships with formal and informal organizations.
- Outcome 6.4: Inform, engage, and inspire the public by sharing NASA's missions, challenges, and results.

STEM Education Framework



Operating Principles

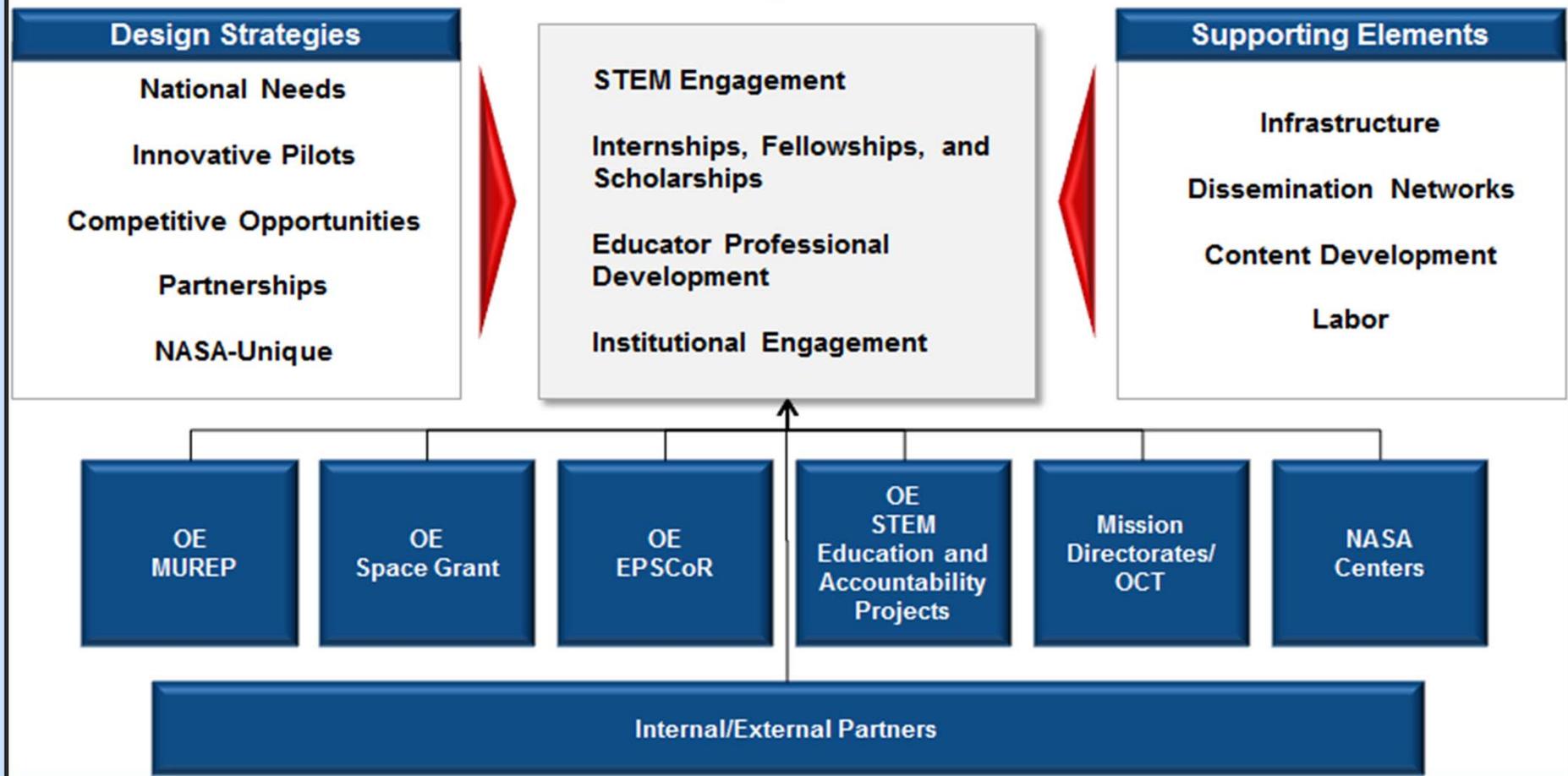
Relevance • NASA Content • Diversity • Evaluation • Continuity • Partnership/Sustainability

FY 2013 Agency's Design Strategies & Funding Sources

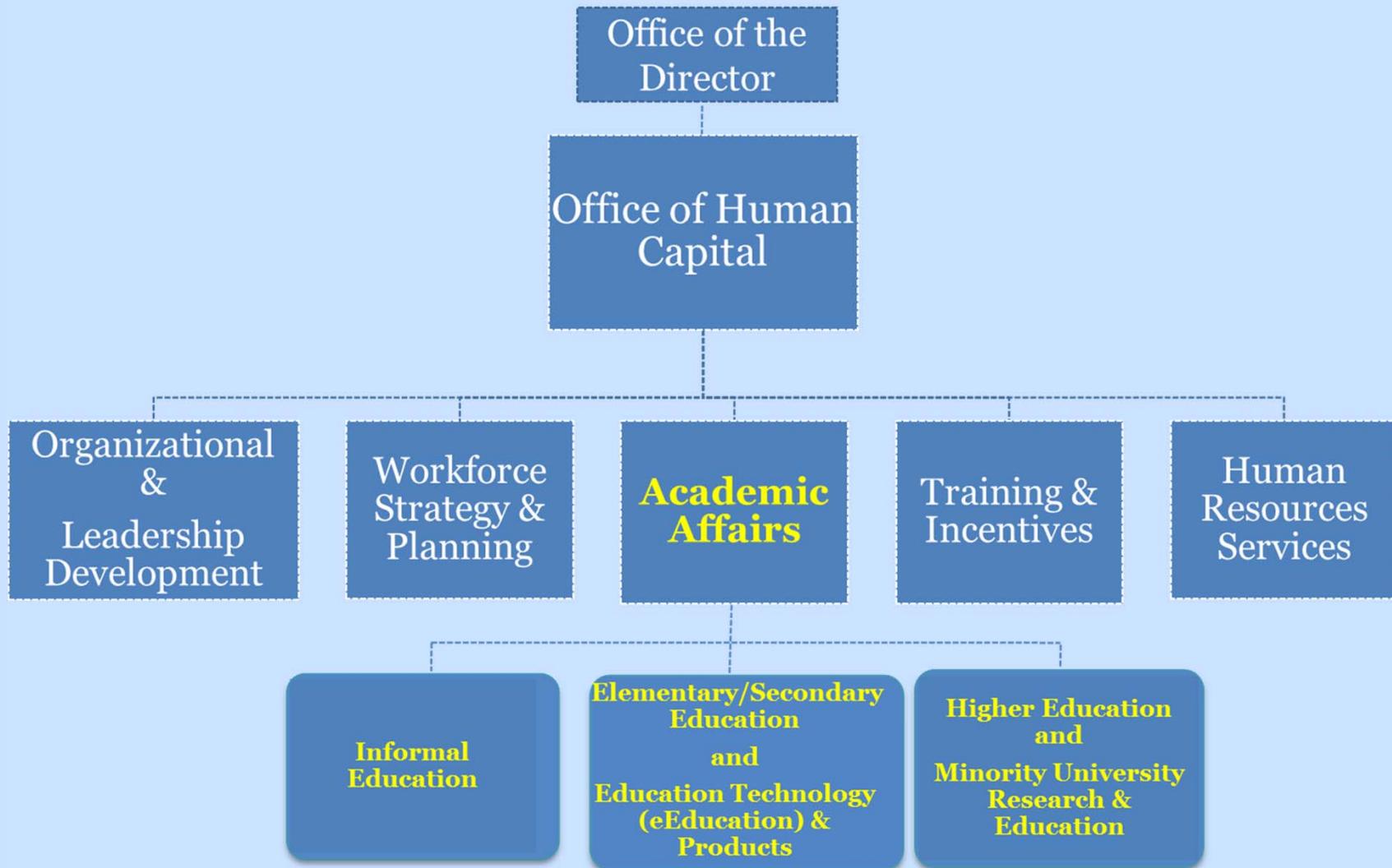


Portfolio Development Architecture

Portfolio Offerings / Business Lines



Education as a Center Function at MSFC



Human Capital Integration to Address Workforce Gaps of Top Competency Areas



NASA Skill Category	Graduate/Undergraduate Field of Study	Elementary/Secondary National Standards Alignment	NASA Education Project/Product/Activity
Systems Engineering	Industrial, Systems and Software Engineering, Finance, Business, Engineering Management	National Science, Mathematics and Technology Standards: Science as inquiry Apply the design process, engineering design Numbers and operations Data analysis, probability, and processes Assess the impacts of products and systems Problem solving Communicating science explanations	<ul style="list-style-type: none"> • NASA Student Launch Projects (includes Student Launch and University Student Launch initiatives) • NASA Great Moonbuggy Race
Power & Propulsion	Aerospace and Mechanical Engineering, Physics	National Science, Mathematics and Technology Standards: Motions and forces Transfer of energy Measurement Energy and power technologies	<ul style="list-style-type: none"> • NASA Student Launch Projects
Electrical and Electronic	Electrical and Software Engineering, Programming, Computer Science	National Science, Mathematics and Technology Standards: Information and communication technologies Abilities of technological design Understanding about science & technology	<ul style="list-style-type: none"> • NASA Student Launch Projects
Structures, Materials and Mechanics	Mechanical, Chemical Structural, and Civil Engineering and Materials Science	National Science and Mathematics Standards: Properties and changes of properties Transportation, construction, and manufacturing technologies	<ul style="list-style-type: none"> • NASA Student Launch Projects • NASA Great Moonbuggy Race
Safety and Quality	Systems, Chemical and Environmental Engineering, Computer Science, Statistics, Engineering Management, Atmospheric Science	National Science & Technology Standards: Environmental quality Science & technology in local, national, & global challenges. Science as a human endeavor. Effects of technology on the environment	<ul style="list-style-type: none"> • NASA Student Launch Projects • NASA Great Moonbuggy Race

Line of Business: STEM Engagement



Ongoing NASA Human Exploration and Operations-funded projects:

- **[NASA Great Moonbuggy Race](#)**
 - Student teams design, build, and race two person-powered buggies over simulated lunar terrain
 - Project encourages problem-solving in a team environment
 - Seventy-five (75) teams totaling 525 students and teacher/faculty members competed in the 2012 NASA Great Moonbuggy Race (36 high schools and 39 universities) from 20 states and Puerto Rico, Germany, India, Italy, United Arab Emirates, Russia, and Canada
 - 20th Annual NASA Great Moonbuggy Race will be held on April 27-28, 2013
- **[NASA Student Launch Projects](#)**
 - Student teams design, build, and launch a reusable rocket, with scientific payload, to 1-mile in altitude
 - Project engages teams of middle and high school-aged students, selected from the top winning teams in the Team America Rocketry Challenge (TARC) and the Rockets for Schools (R4S) competitions, and university and college teams who compete for awards against their peers
 - Forty-one (41) university-level teams from 25 states and 15 secondary-level teams from 8 states competed in NASA Student Launch during academic year 2011-12 with total engagement over 600 students and teacher/faculty members
 - Seventy (70) schools competed for entry into the FY 2013 project with 57 teams from 26 states selected to participate during academic year 2012-13
 - 2013 Launch Week Activities will be held on April 18-21, 2013

Line of Business: NASA Internships, Fellowships, and Scholarships (NIFS)



- **Center Recruiting Plan Development/Execution**
- **Minority Institution Collaboration Plan Development/Execution**
- **NASA Academies (education interns)**
 - **NASA Academy**
 - **Propulsion Academy**
 - **Robotics Academy**
- **Pathways Program Coordination**
 - **Employment Interns**
 - **Recent Graduates**
 - **Presidential Management Fellows**

Line of Business: NIFS

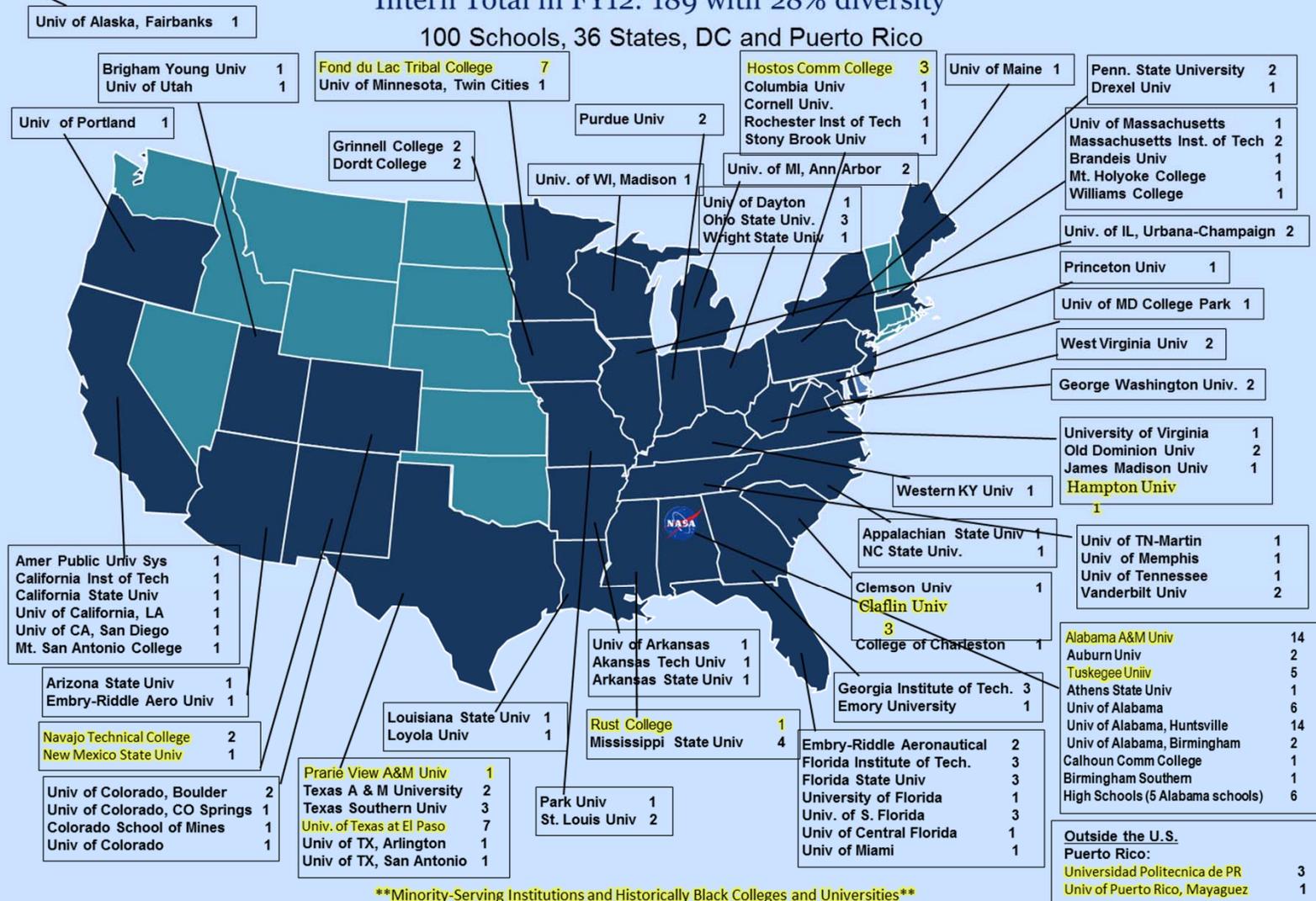
Summer Education Intern Data



FY12 Geographic Representation of MSFC Intern Program Participants

Intern Total in FY12: 189 with 28% diversity

100 Schools, 36 States, DC and Puerto Rico



Minority-Serving Institutions and Historically Black Colleges and Universities

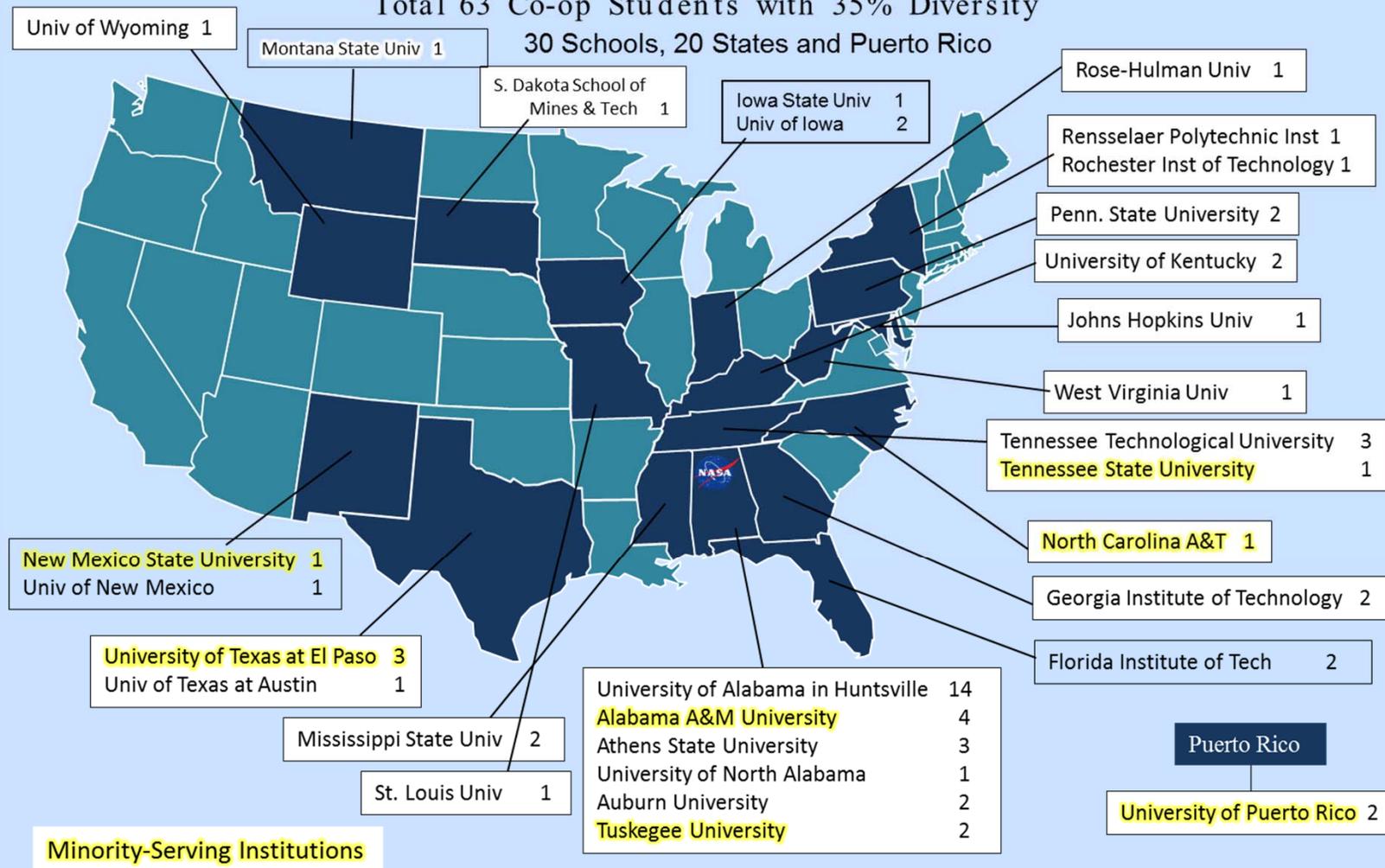
Line of Business: NIFS

Pathways Employment Intern Data



FY12 Geographic Representation of Co-op Program Participants

Total 63 Co-op Students with 35% Diversity
30 Schools, 20 States and Puerto Rico



Line of Business: Institutional Engagement



- **Lead Huntsville/Madison County Chamber of Commerce Education subcommittee of the Workforce Coalition.**
 - **Center formed an Integrated Stakeholder Coalition for Workforce Development (ISCWD) with membership from academia, industry, government, medical, and media.**
 - Focused on workforce development to maintain a technological-edge and to avoid duplication and identify gaps in the integrated system.
 - Aligned community resources to avoid negative impacts of BRAC.
 - Piloted Career/Technical curriculum enhancements in local school systems.
 - **Transitioned the ISCWD to the Chamber Workforce Coalition.**
 - Center had previously founded the Alabama Math, Science, Technology Education Coalition (AMSTEC).
 - AMSTEC-driven State legislation to enact the Alabama Mathematics, Science, & Technology Initiative (AMSTI) to provide professional development, equipment, materials, and on-site support to teachers.
- **Partner with U.S. Space & Rocket Center on intern recruitment/placement and multiple jointly-sponsored activities.**
- **Support of educational alliances and scientific community resulted in corporate sponsorship, initially from Northrop Grumman but now numerous community partners, for NASA Great Moonbuggy Race.**
 - **Cancelation of the Moonbuggy project triggered response from faculty and teachers.**
 - Endorsed by colleges/universities as an engineering design course and by the Alabama Dept. of Education as pre-engineering curriculum and as a successful skills training program at vocational schools like the Huntsville Center of Technology.
 - Benchmarked by the Kennedy Space Center for development of their Lunabotics Competition.
 - **NASA Student Launch also benefits from corporate sponsorship from the ATK Aerospace Group.**

In 2009, the National Conference of State Legislators benchmarked MSFC efforts to improve STEM education and in 2007, the National Governors Association benchmarked MSFC as a STEM learning lab.

Line of Business: Educator Professional Development



- **MSFC Educator Resource Center Network (Alabama, Arkansas, Iowa, Missouri, and Tennessee)**
- **Digital Learning Network (National/International)**
- **HEO-funded (pre-service, in-service and informal) Educator Professional Development (National)**
- **Reappointment to Alabama State Board for Career Technical Education**
- **Member (MSFC educator and engineer) of the Alabama Department of Education Engineering Curriculum Development Team**

Supporting Elements: Web Infrastructure



MSFC manages content for the Educators, Students, and Kids sections of the NASA Portal. NASA Educational Technology Services (NETS) project team working with field centers and mission directorates deliver timely content to customers. Metrics for FY 2012 include:

- 1.6 Million Downloads of Educational Products
- 18,500 Subscribers EXPRESS Mailing List
- 7,600 Subscribers Facebook for Students
- 40.6 Million Page Views
- NASA Kids' Club recognized as a 2012 Best Website for Teaching and Learning by the American Association of School Librarians in the Curriculum Collaboration category



MSFC Education Program



- Questions
- Discussion

Description of 5-year Federal STEM Education Strategic Plan



The Strategic Plan will provide common goals, outcomes, and strategies to create a coordinated portfolio of STEM education across the Federal government. It requires Federal agencies to design and revise their STEM education investments to accomplish the following objectives:

1. **Do What We Know Works** – Ensure Federal STEM investments utilize what is known about effective STEM education and best practices in STEM education.
2. **Learn More About and Share What Works** – Improve assessment and evaluation of STEM education investments to facilitate continual improvement and tracking of outputs and outcomes.
3. **Increase Efficiency and Cohesion** – Ensure Federal STEM education investments are coordinated to efficiently utilize and leverage Federal resources.
4. **Identify and Focus on Priority Issues** – Effective K-12 STEM Teacher Education, Engagement in STEM, Undergraduate STEM Education, and Serving Groups Traditionally Underrepresented in STEM.



NASA Education - Model

Vision: To advance high quality Science, Technology, Engineering and Mathematics (STEM) education using NASA's unique capabilities.

