Working Together – NASA, Academia and Industry

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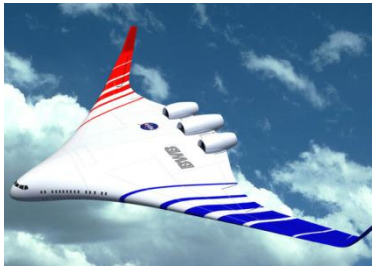
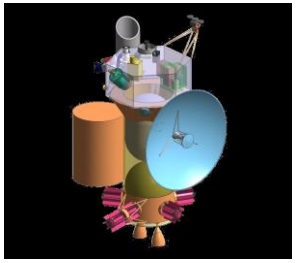
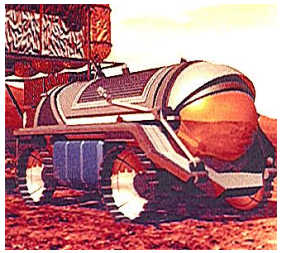


Presented at Gt. Midwestern Regional Space Grant Meeting, Des Moines, IA

Sept. 19, 2014

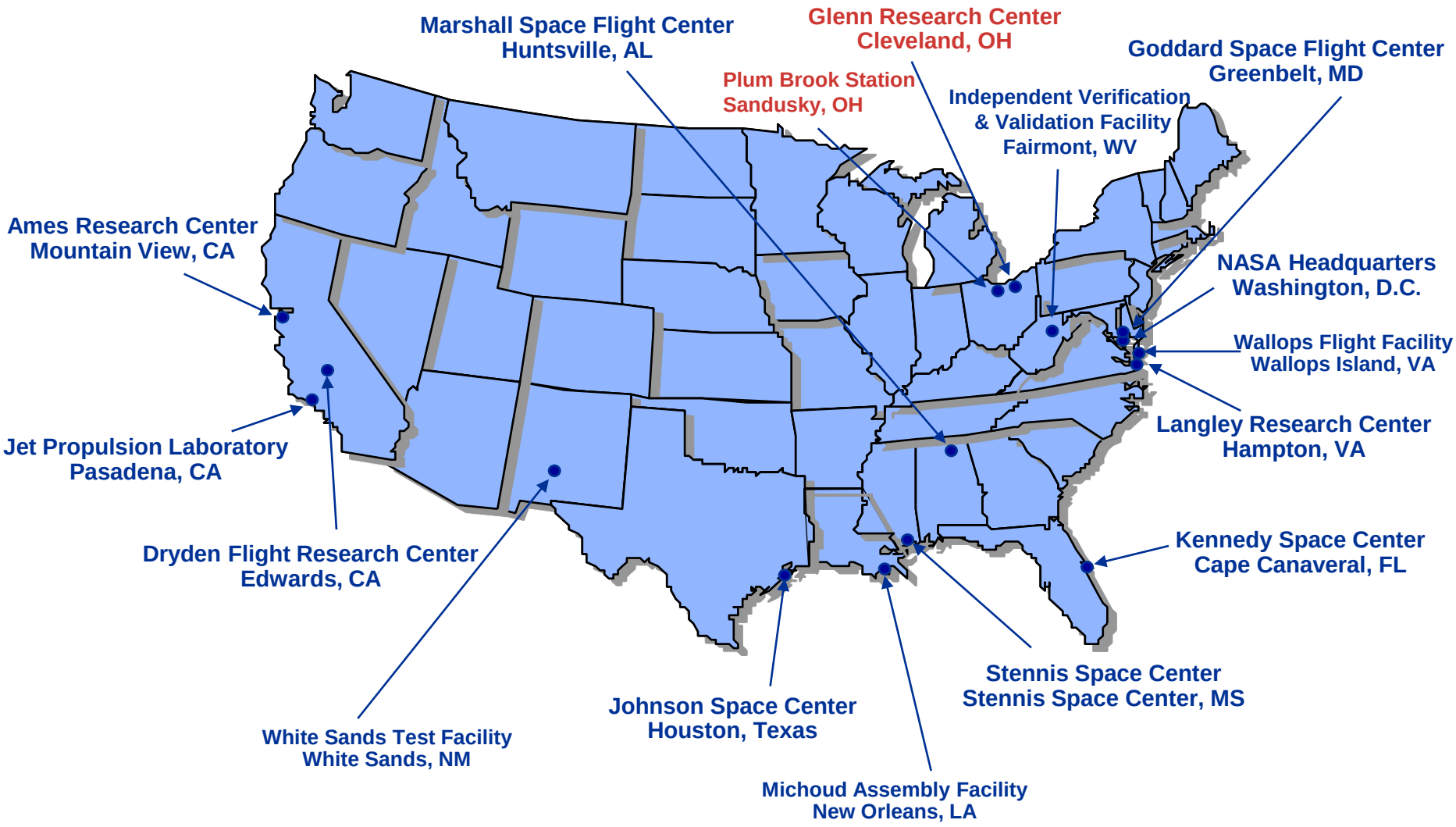




Items Covered

- Introduction to GRC
- GRC Competencies
- Areas of Engagement & Collaboration
- Strategic Partnership Development
- Vehicles for NASA-Academia Interactions
- GRC University Programs
- Some Non-Traditional Partnership Approaches

NASA Centers and Installations



Glenn Research Center

Lewis Field

(Cleveland)

- **350 acres**
- **1626 civil servants and 1511 contractors**

Plum Brook Station Test Site

(Sandusky)

- **6500 acres**
- **11 civil servants and 102 contractors**

As of Jan., 2013

Glenn Core Competencies – Strong Foundation

- Air-Breathing Propulsion
- Communications Technology and Development
- In-Space Propulsion and Cryogenic Fluids Management
- Power, Energy Storage and Conversion
- Materials and Structures for Extreme Environments
- Physical Sciences and Biomedical Technologies in Space

** GRC aims to deliver technical excellence & institutional capabilities to-

(a)Meet Center commitments;

(b)Grow in areas critical to GRC's future.

Representative Areas of Engagement & Collaboration

- **Air-Breathing Propulsion**

  -Ascent & Thermal Propulsion; Thermal Systems; Engine Combustion; Propulsion Systems; Turbomachinery & Turboelectric Systems; Combustion and Reaction Physics; Aeropropulsion (Acoustics, Icing)

- **Communications Technology and Development**

  -Optics & photonics; Architectures/Networks/System Integration; Intelligent Control & Autonomy; Smart Sensors & Electronics Systems

- **In-Space Propulsion and Cryogenic Fluids Management**

  -Fluids & Cryogenic Systems and Management; Fluid Physics & Transport Processes; Space/Electric/Chemical Propulsion

- **Power, Energy Storage and Conversion**

  -Power Architecture, Mgt. & Distribution; Photovoltaic & Electrochemical Systems; Thermal Energy Conversion;

Representative Areas of Engagement & Collaboration- cont'd

- **Materials and Structures for Extreme Environments**
  -High Temp. Materials (Ceramic Matrix Composite, Thermal Protection Seal); Electric Propulsion Materials (High Power Density Elec. Motors, SiC Semiconductor); Lightweight Concepts (Aerogel, Nanomaterials); Mechanisms and Drive Systems (Shape Memory Alloy-Based Actuation); Computational Modelling; Flight Structures (Low Impact Docking Seal, Vibration Testing)

- **Physical Sciences and Biomedical Technologies in Space**
  -Low Gravity Fluids and Combustion; Fire Safety

Strategic Partnership Development

- **GRC actively pursues development of strategic partnerships with academia, industry, and other government agencies & laboratories**
  - -To cultivate non-NASA business opportunities which use Center Competencies (people, facilities, intellectual property) and compliment NASA business executed by GRC.

- **Emphasis for non-NASA business pursuit is on-**
  - -GRC Core Competencies, including subsets of
  - (a) Advanced Energy; (b) Materials & Structures
  - (c)Non-NASA Space (Fuel Cell) & non-NASA Aviation (Sensors & Controls)
  - -GRC Competency-tied univ. segment may partner with GRC & industry to go after state/federal funding (OH Third Frontier, Dept. of Energy, AF, etc.)

- **GRC Partnership Office Leads Center Strategic Development**
  - -via Regional Economic Development Gp. (MI,PA,OH,NY)
  - -Led by GRC-based HQ Level II Dir. of Venture Development & Partnerships

Some Vehicles for NASA Academia Interactions

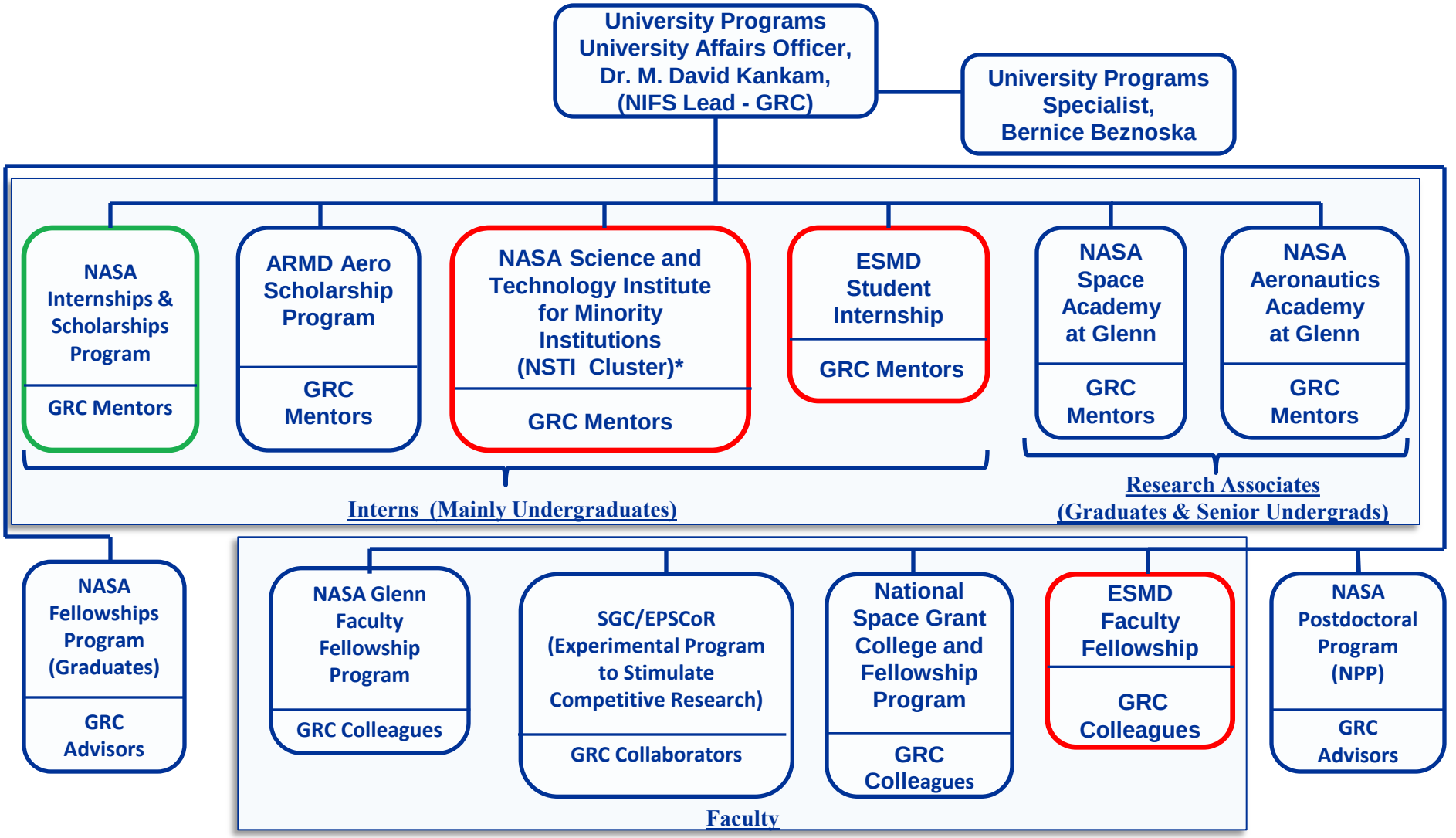
- **Traditional means of NASA/GRC-Academia interactions include:**

  -NASA OE's NIFS; Institutional Engagement (SGs, CCs, etc.);
  Nat'l SGC&FP and EPSCoR
  -NASA Academies (Space, Aeronautics, Propulsion, Robotics, etc.)
  -**N**ASA **P**ostdoctoral **P**rogram (NPP)
  -**N**ASA **R**esearch **A**nnouncements (e.g., MIRO [formerly URC])
  -STMD's STRF (Fellowship-Faculty) & STRG (Grant for Students)
  -**N**ASA **G**lenn **F**aculty **F**ellowship **P**rogram (NGFFP) - **Center-funded**

- **Next slide shows a summary of GRC's oversight Higher Ed. Opportunities**

GRC University (Higher Ed.) Programs

Pipeline of next generation scientists, engineers & STEM



Key: Red – Currently on hold/inactive

Some Non-Traditional Partnership Approaches

- **Suggestions for Consideration:**

(1) Non-Center-funded Summer Faculty Fellowship

-Center offers on-site summer Faculty Fellowship Opportunities to Space Grant-funded faculty members

(2) NASA/Center In-kind Support for Non-paid Faculty Work

-Center may consider in-kind use of its unique facilities in exchange for on-site faculty work of mutual benefit to Center programmatic objectives and faculty/academic institution

Useful Websites for Higher Education Opportunities

***OSSI (One Stop Shopping Initiative)**

- http://intern.nasa.gov/

***NASA Aeronautics & Space Academies at Glenn**

- https://academy.grc.nasa.gov

***NASA Postdoctoral Program (NPP)**

- http://nasa.orau.org/postdoc/

***NASA Glenn Faculty Fellowship Program (NGFFP)**

- https://rt.grc.nasa.gov/main/university-affairs/

***NASA Space Technology Research Fellowships**

- http://www.nasa.gov/directorates/spacetech/strg/archives_nstrf.html

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