Utilizing Opportunities within the Office of Education
NASA Office of Education

- Minority University Research and Education Project (MUREP)
- Experimental Program to Stimulate Competitive Research (EPSCoR)
- National Space Grant College and Fellowship Program (Space Grant)
- STEM Education and Accountability Projects (SEAP)
MUREP

- Ensure that underrepresented and underserved students:
  - Participate in NASA Education Programs
  - Pursue STEM careers, bridge to NASA
- Enhance the capabilities of HBCUs/MSIs
- Community college through graduate school
- Grants, Fellowships, Scholarships
- MUREP Institutional Research Opportunity (MIRO)
  - Enhance and sustain research competitiveness
  - Increase student activity in NASA related fields
EPSCoR

• Facilitate partnerships with academia
  – Discover NASA research alignment
  – Establish research relationships

• Develop institutional research infrastructure
  – Great resource for new faculty
  – Develop competitive research lab capabilities

• Eligibility determined by state:
  https://www.nasa.gov/offices/education/programs/national/epscor/home/EPSCoR_Directors.html
Space Grant

- 50 States, DC, Puerto Rico
- Scholarships, fellowships, internships
- Enhance STEM Education
- Provide hands on research opportunities
- Partner with Mission Directorates
- Each state has the same goals but may have different implementation
SEAP

- Competitive grants and cooperative agreements, supports NASA center specific and national activities
- Institutional Engagement: Increases STEM capabilities at formal and informal educational institutions and organizations by incorporating content based on NASA’s missions.
- NASA Internships, Fellowships and Scholarships (NIFS): Leverage NASA’s unique missions and programs to enhance and increase the capability, diversity, and size of the Nation’s future STEM workforce.
NIFS

- Spring (16 weeks), Summer (10 weeks), and Fall (16 weeks)
- Full time and on-site (40 hours per week)
- Require US Citizenship (Ames and JPL have international student programs)
- HS Seniors through post-docs
- Summer 2017 internships available now, applications close March 1st
- [https://intern.nasa.gov/](https://intern.nasa.gov/)
Pathways Internships

• Formerly called “Cooperative Education Program”

• Student Employees
  • Work at NASA when not in school
  • Opportunity to rotate through many different areas
  • Earn benefits and full-time conversion often available
  • Many of the full time work force are former pathways interns
  • Able to convert even when external hiring is not possible

• Opportunities posted at: https://www.usajobs.gov/
NASA Centers
AFRC
Suggestions on Education Engagement

• If you have an idea that does not fit into existing activities, ask us how we can make it happen
• The large multiyear grants start with small, pre-existing center level relationships
• Partnering on solicitations with experienced institutions is a great way to get started in a new educational activity
• Leverage and integrate multiple Education projects to stretch resources
• Plan for sustainability beyond NASA Education
Suggestions on Education Engagement

• Focus on doing a few things well in solicitation plans
• Evaluation is mandatory and important
• Establish relationships at the center and agency level
• NASA Education can provide points of contact, access to researchers, subject matter expert help, curriculum content and materials, and virtual meetings
Questions?

• Thank you!
• Please contact me with follow up questions, feedback, and partnership discussions
• David Berger
  – dave.e.berger@nasa.gov
Prandtl-m Introduction

- A Mars aircraft can provide a new science and exploration platform capability
  - Direct atmospheric measurement
  - Higher resolution terrain mapping
  - Faster, longer range coverage than a rover
- Many previous Mars aircraft designs were large “flagship” missions
- Landing missions carry over 50kg of ballast for balance
- What if we replaced part of that with a 3U cubesat containing an airplane?
- What would a minimum viable Mars airplane look like?
Prandtl-m Challenges

- **Gravity**: \(~38\%\) of Earth
- **Atmosphere**:
  - \(~1\%\) Density of Earth at sea level
  - Different chemical composition
  - Very cold \(<-30\ C\)
- **Aerodynamics**
  - Very low Reynolds number
  - Moderate subsonic Mach number
- **Avionics**
  - Cold, low pressure environment
  - Radiation in transit and during flight
- **Navigation**:
  - No GPS
  - Weak magnetic field
- **Size and Weight Constraints**
Preliminary Research AerodyNamic Design to Land on Mars (Prandtl-m)
Prandtl-m Team
NASA Mission Directorates

Aeronautics Research (ARMD)

Human Exploration and Operations (HEOMD)

Space Technology (STMD)

Science (SMD)
1. Safe, Efficient Growth in Global Operations
   • Enable full NextGen and develop technologies to substantially reduce aircraft safety risks

2. Innovation in Commercial Supersonic Aircraft
   • Achieve a low-boom standard

3. Ultra-Efficient Commercial Vehicles
   • Pioneer technologies for big leaps in efficiency and environmental performance

4. Transition to Low-Carbon Propulsion
   • Characterize drop-in alternative fuels and pioneer low-carbon propulsion technology

5. Real-Time System-Wide Safety Assurance
   • Develop an integrated prototype of a real-time safety monitoring and assurance system

6. Assured Autonomy for Aviation Transformation
   • Develop high impact aviation autonomy applications
New Aviation Horizons: Flight Demo Plan

Hybrid Electric Propulsion Demonstrators

“Purpose-Built” UEST Demonstrators

“Small Scale "Build, Fly, Learn""

“Transport Scale”

“Ground Test Risk Reduction”

“Preliminary Design”

“Design & Build”

“Flight Test”

“Potential Candidates”

“Life Cycle Cost: $700M”

“Life Cycle Cost: $430M”

“Life Cycle Cost: $850M”

“Life Cycle Cost: $400-500M”

“Life Cycle Cost: $400-500M”

“Life Cycle Cost: $850M”

“Life Cycle Cost: $430M”

“Potential Candidates”

“New Aviation Horizons: Flight Demo Plan”

FY17 FY18 FY19 FY20 FY21 FY22 FY23 FY24 FY25 FY26