

# Opportunities for NASA Aerospace Related Funding and Collaboration

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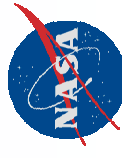
“University of Puerto Rico-Mayagüez & Industry:  
A Partnership for Success in Puerto Rico’s New Knowledge Economy”

Sponsored by: Puerto Rico Techno-Economic Corridor (PRTEC) and The University of Puerto Rico-Mayagüez

Thursday, April 21, 2005  
Mayagüez Resort & Casino  
Mayagüez, Puerto Rico

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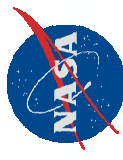
Glenn Research Center at Lewis Field



# Opportunities for NASA Aerospace Related Funding and Collaboration

## ABSTRACT

This presentation describes the different opportunities that NASA offers for effective collaboration with Academia and Industry. In particular, the presentation includes a general overview of opportunities such as SBIRs, STTRs, Educational Programs and NASA Research Announcements. A general description of forthcoming competitive opportunities under the Exploration Systems Mission Directorate (ESMD) as well as the Science Mission Directorate (SMD) are also provided.



# Opportunities for NASA Aerospace Related Funding and Collaboration

## **NASA's VISION**

- To improve life here,
- To extend life to there,
- To find life beyond.



## **NASA's MISSION**

- To understand and protect our home planet,
- To explore the universe and search for life,
- To inspire the next generation of explorers  
...As only NASA can.

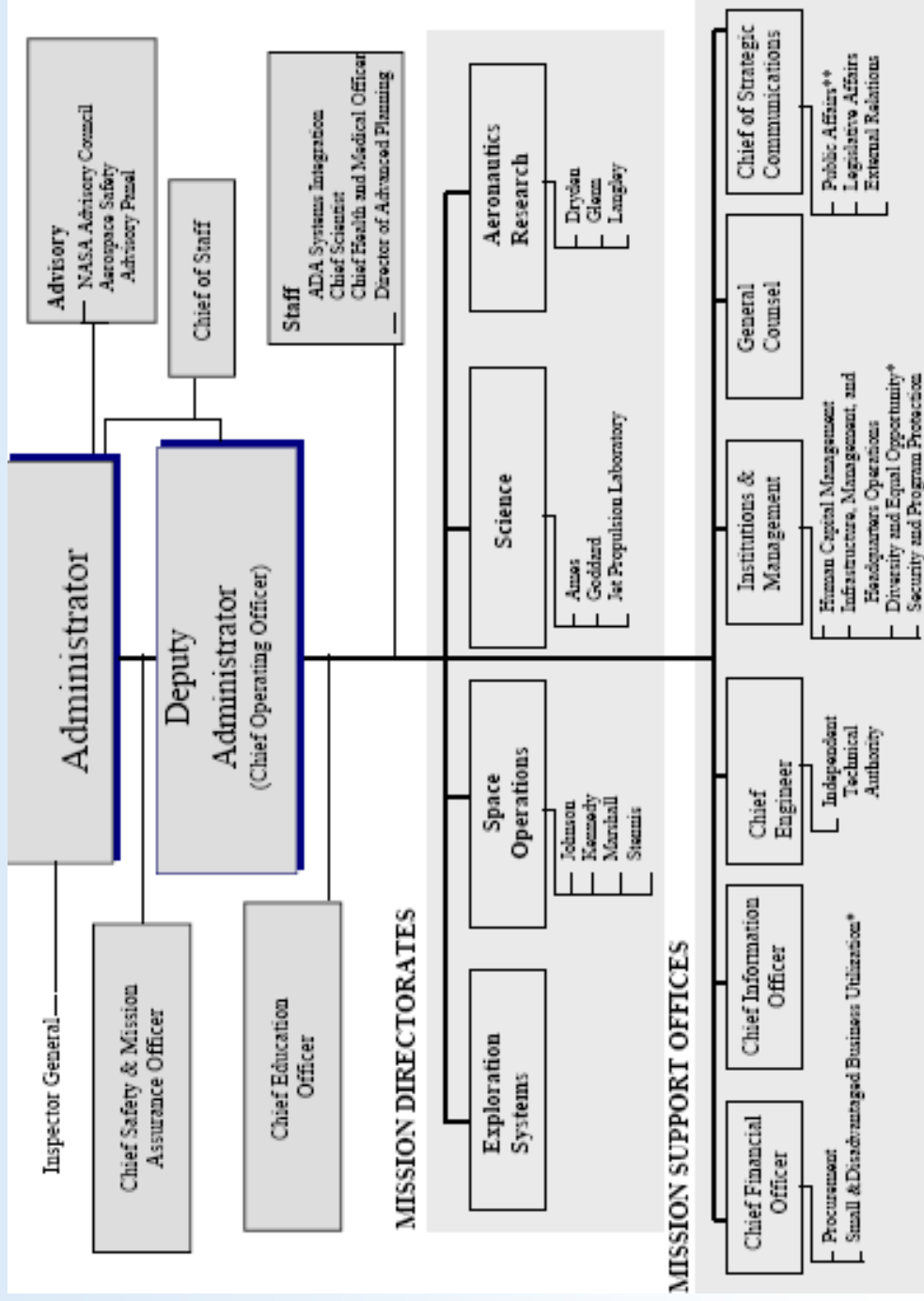


## **NASA's VALUES**

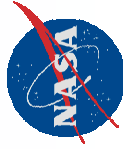
Safety, the NASA Family, Excellence, and Integrity

# Opportunities for NASA Aerospace Related Funding and Collaboration

## NASA HQ Organizational Chart



\* 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.



# Opportunities for NASA Aerospace Related Funding and Collaboration

## NASA's Guiding National Objectives

- Implement a sustained and affordable human and robotic program to explore the solar system and beyond.
- Extend human presence across the solar system, starting with a human return to the moon by the year 2020, in preparation for human exploration of Mars and other destinations.
- Develop innovative technologies, knowledge, and infrastructure both to explore and to support decisions about the destinations for human exploration.
- Promote international and commercial participation in exploration to further U.S. scientific, security, and economic interests.
- Study the Earth system from space and develop new space-based and related capabilities for this purpose.

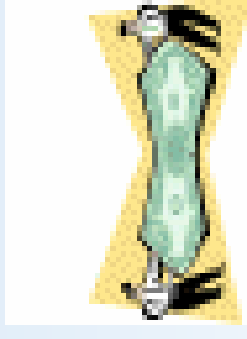


NASA's New Age of Exploration  
([www.nasa.gov/pdf/107490main\\_FY06\\_Direction.pdf](http://www.nasa.gov/pdf/107490main_FY06_Direction.pdf))

# Opportunities for NASA Aerospace Related Funding and Collaboration

## ➤ NASA Sponsored Funding and Collaboration Opportunities:

- Small Business Innovation Research (SBIR)
- Small Business Technology Transfer (STTR)
- Research Announcements (e.g., BAAs)
- Educational Programs



# Opportunities for NASA Aerospace Related Funding and Collaboration

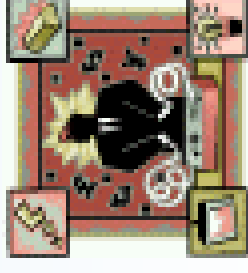
**Small Business Innovation Research (SBIR)**

**&**

**Small Business Technology Transfer (STTR)**



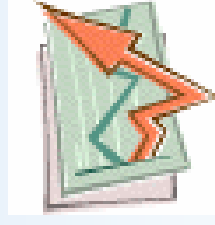
**Programs**



## Opportunities for NASA Aerospace Related Funding and Collaboration

### ➤ **Small Business Innovation Research (SBIR) Program**

- Increases opportunities for small businesses to participate in federal research and development.
- Fosters and encourages socially and economically disadvantaged individuals to participate in technological innovation.
- Increases employment.
- Improves overall U.S. competitiveness.
- Stimulates U.S. technological innovation.
- Format:
  - ❖ Phase I: \$70K to prove feasibility of concept (6 Months)
  - ❖ Phase II: \$ 600K to develop working concept (24 months)
  - ❖ Phase III: Commercialization





## Opportunities for NASA Aerospace Related Funding and Collaboration

### ➤ **Small Business Technology Transfer (STTR) Program**

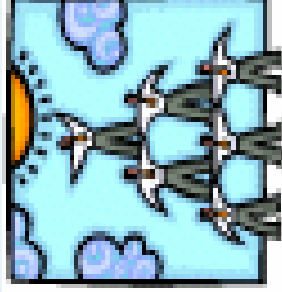
- Requires cooperative research between a small business concern and a nonprofit research institution (RI) such as a university.
- Although similar to the SBIR process, the STTR is a separately funded activity.
- The STTR Program solicitation research areas correspond to the central underlying technological competencies of each participating NASA Center.
- The program awards STTR contracts to small businesses for cooperative research and development through a uniform, three-phase process.
- **Format:**
  - ❖ Phase I: \$100K to prove feasibility of concept (12 Months)
  - ❖ Phase II: \$ 500K to develop working concept (24 months)
  - ❖ Phase III: Commercialization



## Opportunities for NASA Aerospace Related Funding and Collaboration

### ➤ **Additional Information on SBIR and STTR Programs**

<http://sbir.gsfc.nasa.gov/SBIR/SBIR.html>



# Opportunities for NASA Aerospace Related Funding and Collaboration

## NASA Educational Programs



## Opportunities for NASA Aerospace Related Funding and Collaboration

- NASA Graduate Student Researcher Program (GSRP)
- NASA Undergraduate Student Researcher Program (USRP)
- Minority University Research and Education Program (MUREP)
- NASA Experimental Program to Stimulate Competitive Research (EPSCoR)
- NASA Resident Research Associateship (administered by NRC)

(<http://www.nasa.gov/audience/forstudents/postsecondary/learning/>)

## Opportunities for NASA Aerospace Related Funding and Collaboration

- **NASA Graduate Student Researcher Program (GSRP)**
  - Provide graduate students assistantship for M.S. or Ph.D. degrees.
  - \$24K per year for up to three years.
  - Candidates selected competitively at NASA Centers in the Spring. Those selected begins the program in the Fall.

- **NASA Undergraduate Student Researcher Program (USRP)**

- Program is run by NASA HQ.
- Selected students spend 10 weeks at a NASA Field Center
- \$ 5K for ten weeks



## Opportunities for NASA Aerospace Related Funding and Collaboration

### ➤ **Minority University Research and Education (MURED) Faculty Awards for Research (FAR)**

- Provide faculty at MSI with an opportunity to integrate the research and education components with the unique mission requirements of a specific NASA installation or JPL.
- By involving minority institution faculty and students, the Agency hopes to:
  - ❖ increase the interest of traditionally underrepresented communities in the Agency's mission.
  - ❖ enhance a broader array of America's citizenry in the NASA-sponsored research community.

## Opportunities for NASA Aerospace Related Funding and Collaboration

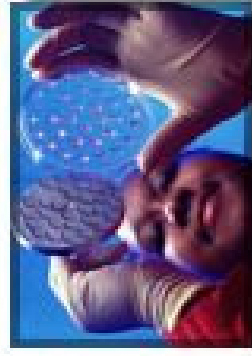
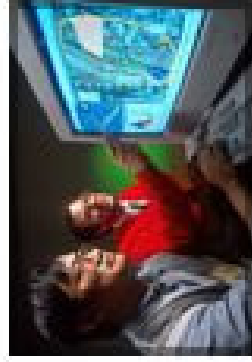
### ➤ Faculty Awards for Research (FAR)

- 20 FAR projects at HBCUs reported the following outcomes:
  - ❖ Research work was conducted by 35 professional-level investigators, including 23 faculty members and 12 research associates.
  - ❖ A total of 114 students-72 undergraduates and 42 graduates - participated in these research activities.
  - ❖ The research accomplishments were documented in 11 refereed papers or book chapters published during this time period.
  - ❖ Significantly, 5 students were authors or co-authors of these publications.
  - ❖ An additional 9 papers or book chapters, including 10 student authors or co-authors, were accepted for publication during this period.
  - ❖ The broader research community was informed of this work through 52 technical presentations, including 14 presentations given by students.
- These projects were able to leverage their NASA MUREP funding of \$1.4 million (including \$0.5 million for students) with an additional \$2.1 million in research support, \$0.3 million from other NASA programs, and \$1.8 million from other agencies.

## Opportunities for NASA Aerospace Related Funding and Collaboration

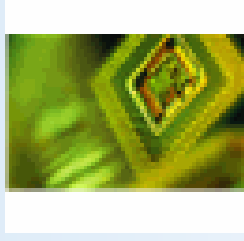
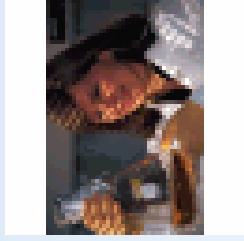
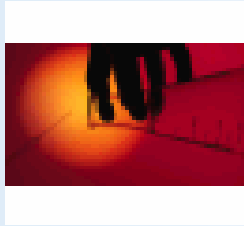
### ➤ **NASA Resident Research Associateship** (administered by NRC)

- Provide resident research assistantship for up to three years.
- Assistantship commensurate to applicant experience.
- Researcher develops investigation together with Mentor at a NASA field center.





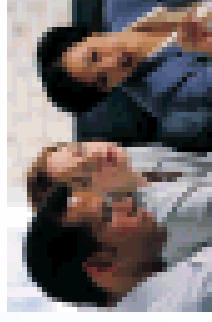
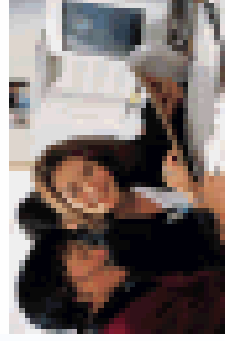
# Opportunities for NASA Aerospace Related Funding and Collaboration



## NASA Research Announcements

## Opportunities for NASA Aerospace Related Funding and Collaboration

- **NASA Research Announcements (NRAs)** provide for the submission of competitive project ideas in one or more program areas of interest. A Research Announcement may result in the award of a contract, grant, or cooperative agreement.
- **Announcements of Opportunity (AOs)** solicit investigative ideas that contribute to broad research objectives.
- **Cooperative Agreement Notices (CANs)** competitively solicit research that envisions a cooperative agreement as the award instrument.



# Opportunities for NASA Aerospace Related Funding and Collaboration

## ➤ Forthcoming Opportunities:



### ▪ Exploration Systems Mission Directorate (ESMD):

❖ The Exploration Research and Technology (R&T) Broad Agency Announcement (BAA) will include topics for Exploration Systems R&T (ESR&T) and Human Systems R&T (HSR&T).

### ❖ When is it?

- Potential dates range from May to July 2005

### ❖ Who can propose?

- All proposals are expected to be led by Industry, universities, or non-profits. NASA CS are expected to be able to team.

### ❖ What is the budget?

- \$8M/yr for 3 yrs for ASTP Projects
- \$16M/yr for 3 yrs for TMP Projects
- TRL 6 in three years
- Emphasis on Spiral 2 of Exploration Systems' Vision.

# Opportunities for NASA Aerospace Related Funding and Collaboration



## ➤ Forthcoming Opportunities:

- **ESMD's Technology Focus Areas:**

- ❖ **HSR&T: EVA systems; fire prevention/detection/suppression; environmental monitoring and control; life support systems; multiphase flow technologies; in-situ life support processes; in-situ fabrication and repair, human health and performance.**
- ❖ **ESR&T: Will likely cover primarily the maturation of “spiral 2” technologies (TRL 4-6). Modular power systems; thermal management; cryogenic propellants; abort systems; environmental testing of systems (power, inflatable, habitats); electric and fluid interfaces for modular systems; wireless LANs; propulsion and power health managements; integrated data communication architecture; technologies for autonomous rendezvous (mechanisms, seals, sensors), communications for virtual operation center; mobility systems; automated (intelligent) propulsion for pinpoint landings; systems studies.**

## Opportunities for NASA Aerospace Related Funding and Collaboration

### ➤ Forthcoming Opportunities:

- **ESMD's Spiral Definitions:**

- ❖ **Spiral 1 = Get humans to low Earth orbit via the Crew Exploration Vehicle (2008 - 2014)**
- ❖ **Spiral 2 = Get humans on the Moon for extended duration (~7 days) (2015 - 2020)**
- ❖ **Spiral 3 = Get humans on the Moon for long durations (~6 months) (2020 - 2030)**
- ❖ **Spiral 4 = Get humans to flyby Mars (>2030)**
- ❖ **Spiral 5 = Get humans on Mars (>2030)**



# Opportunities for NASA Aerospace Related Funding and Collaboration

## ➤ **Forthcoming Opportunities:**

- Science Mission Directorate (SMD)
  - ❖ The SMD's Research Opportunities in Space and Earth Sciences (ROSES- 2005) is seeking collaborative efforts in a diverse spectrum of research areas in support of Earth and Space Sciences.
  - ❖ Open to collaborations between NASA/Industry/Academia.
  - ❖ Awards range from under \$100K per year for focused, limited efforts (e.g., data analysis) to more than \$1M per year for extensive activities (e.g., development of sciences experiment hardware).
  - ❖ Awards will be made as grants, cooperative agreements, contracts, or inter- or intra-Government transfers depending on the nature of the proposing organization and/or program requirements.
  - ❖ The typical period of performance for an award is three years.
  - ❖ ([www.uta.edu/ra/GCS/Forms/FundingOpportunities/Roses.pdf](http://www.uta.edu/ra/GCS/Forms/FundingOpportunities/Roses.pdf))

# Opportunities for NASA Aerospace Related Funding and Collaboration

## ➤ ROSES-2005: Solicited Research Programs

Table 2. Solicited Research Programs (in order of proposal due dates)

\*See Section IV(b)(ii) for a discussion of Notice of Intent (NOI) vs. submissions of a Step-1 proposal.

NRA Appendix	Science Program Element (see Appendices A, B, C, and D)	NOI/Step-1* Due Date [M/D/Y]	Proposal Due Date [M/D/Y]
C.8	GALEX Guest Investigator – Cycle 2	3/11/2005	4/8/2005
B.18	Mars Fundamental Research [1] [2]	2/18/2005	4/15/2005
B.7	Discovery Data Analysis [2]	3/10/2005	4/18/2005
C.5	Astronomy and Physics Research and Analysis	2/25/2005	4/22/2005
A.3	Large Scale Biosphere-Atmosphere Experiment in Amazônia	3/10/2005	4/26/2005
B.11	Outer Planets Research [1] [2]	3/2/2005	4/27/2005
A.28	Advanced Component Technology	2/28/2005	4/29/2005
B.10	Planetary Atmospheres [1] [2]	3/4/2005	4/29/2005
C.11	Terrestrial Planet Finder Coronagraph / Instrument Concept Studies	3/4/2005	4/29/2005
B.3	Planetary Geology and Geophysics [1] [2]	3/9/2005	5/6/2005
B.20	In-Space Propulsion Program	TBD	TBD
A.19	Sun-Solar System Connection Guest Investigators	3/18/2005	5/13/2005
A.26	Advancing Collaborative Connections for Earth-Sun System Science	2/22/2005	5/20/2005
B.2	Cosmochemistry [1] [2]	3/25/2005	5/20/2005

# Opportunities for NASA Aerospace Related Funding and Collaboration

## ➤ ROSES-2005: Solicited Research Programs

A.9	Ice Cloud and Land Elevation Satellite (ICESat) and Cryosat	3/25/2005	5/25/2005
B.4	Origins of Solar Systems [1]	4/1/2005	5/27/2005
C.10	Terrestrial Planet Finder / Foundation Science	4/1/2005	5/27/2005
A.8	Ocean Vector Winds Science Team	4/1/2005	6/1/2005
B.6	Sample Return Laboratory Instruments and Data Analysis	4/8/2005	6/3/2005
B.9	Near Earth Object Observations [1]	4/8/2005	6/3/2005
C.4	Astrophysics Theory	4/8/2005	6/3/2005
C.6	Beyond Einstein Foundation Science	4/8/2005	6/3/2005
B.8	Planetary Astronomy [1] [2]	4/15/2005	6/10/2005
A.14	Atmospheric Composition	4/29/2005	6/15/2004
D.2	Interdisciplinary Exploration Science	4/15/2005	6/17/2005
C.2	Astrophysics Data Analysis	4/29/2005	6/24/2005
C.3	Long-Term Space Astrophysics	4/29/2005	6/24/2005
B.19	Mars Instrument Development	TBD	TBD
A.5	Ocean Biology and Biochemistry	5/2/2005	7/1/2005
A.10	CloudSat and CALIPSO Science Team and Modeling/Analysis of A-Train Related Data	5/2/2005	7/1/2005



# Opportunities for NASA Aerospace Related Funding and Collaboration

## ➤ ROSES-2005: Solicited Research Programs

NRA Appendix	Science Program Element (see Appendices A, B, C, and D)	NOI/Step-1* Due Date [M/D/Y]	Proposal Due Date [M/D/Y]
C.12	Swift Guest Investigator – Cycle 2	5/13/2005	7/8/2005
A.22	Virtual Observatories for Solar and Space Physics Data	5/13/2005	7/15/2005
D.3	Applied Information Systems Research	4/15/2005	7/15/2005
A.17	Geospace Science	5/20/2005	7/22/2005
A.15	Earth Surface and Interior	5/27/2005	7/27/2005
B.17	Astrobiology Science & Technology for Exploring Planets [2]	5/27/2005	7/29/2005
A.2	Land Cover/Land Use Change	4/28/2005 (Step-1)	8/1/2005 (Step-2)
A.7	Remote Sensing Science for Carbon and Climate	6/3/2005	8/3/2005
A.24	Decision Support through Earth-Sun Science Research Results	5/25/2005 (Step-1)	8/5/2005 (Step-2)
B.12	Astrobiology: Exobiology and Evolutionary Biology [1] [2]	6/3/2005	8/5/2005

# Opportunities for NASA Aerospace Related Funding and Collaboration

## ➤ ROSES-2005: Solicited Research Programs

B.13	Planetary Protection Research	6/3/2005	8/5/2005
B.14	Planetary Instrument Definition And Development	6/3/2005	8/5/2005
B.5	Mars Data Analysis [2]	6/10/2005	8/12/2005
A.11	NASA Energy and Water Cycle Study	6/16/2005	8/16/2005
A.25	New Investigator Program in Earth-Sun System Science	6/30/2005	8/31/2005
A.12	Terrestrial Hydrology	7/1/2005	9/1/2005
A.21	Living with a Star Targeted Research and Technology	7/8/2005	9/9/2005
A.23	Living with a Star/CEDAR Collaborative Studies with C/NOFS	7/8/2005	9/9/2005
A.4	Terrestrial Ecology and Biodiversity	7/19/2005	9/12/2005
C.9	FUSE Guest Investigator – Cycle 7	8/5/2005	9/16/2005
C.7	Rossi X-ray Timing Explorer Guest Observer – Cycle 11	7/18/2005	9/19/2005
B.16	Astrobiology Science and Technology Instrument Development and Mission Concept Studies [2]	10/7/2005	12/9/2005
A.6	North American Carbon Program	10/14/2005	12/15/2005
A.16	Solar and Heliospheric Physics	12/9/2005	2/10/2006

## Opportunities for NASA Aerospace Related Funding and Collaboration

### ➤ **NASA Research Opportunities Online:**

- Provides links to research Announcements from NASA Centers & HQ.  
(<http://research.hq.nasa.gov/research.cfm>)



### ➤ **NASA Office of Procurement:**

- NASA Acquisition Internet Service (NAIS) provide industry with immediate access to current NASA acquisition information.  
(<http://www.hq.nasa.gov/office/procurement/>)



## Opportunities for NASA Aerospace Related Funding and Collaboration

### Closing Remarks

- SBIRs and STTRs offer viable opportunities to foster collaborations between NASA, small businesses, and academia.
- NASA BAA's:
  - ❖ NASA Mission Relevance: i.e., Is the proposed work relevant to the ESMD, SOMD, SMD or ARMD?
  - ❖ Technical Merit: i.e, is the proposed concept a feasible solution to a NASA mission challenge?
  - ❖ **Effective Teaming:** Past visibility, high impact project examples, track record, and current high visibility projects for the PI's that are relevant to the proposal.
  - ❖ Cost: Consistent with what is proposed
  - ❖ Clarity: The basic question any proposal must answer is “Why should NASA fund this?”
- NASA Feed Programs (i.e., Educational programs): Seed for stronger collaborations between NASA, Academia and Industry.

# Opportunities for NASA Aerospace Related Funding and Collaboration

## Backup Charts

# Opportunities for NASA Aerospace Related Funding and Collaboration

## Technology Readiness Level

