Opportunities for NASA Aerospace Related Funding and Collaboration

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A Partnership for Success in Puerto Rico's New Knowledge Economy"

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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

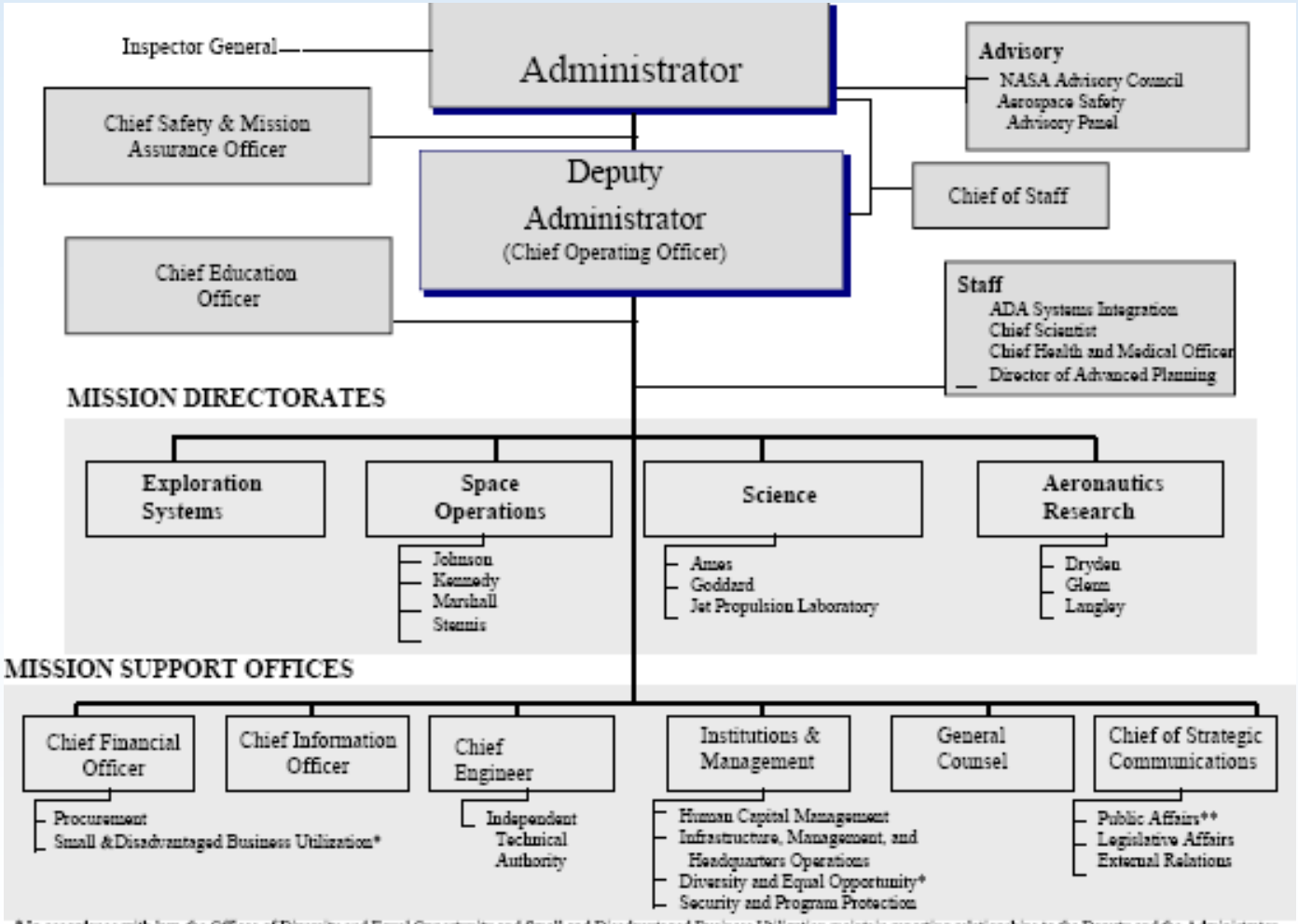
To understand and protect our home planet,
To explore the universe and search for life,
To inspire the next generation of explorers
…As only NASA can.

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.

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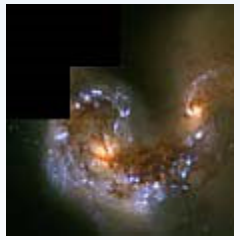
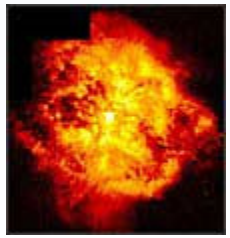
NASA's Guiding National Objectives

- 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.

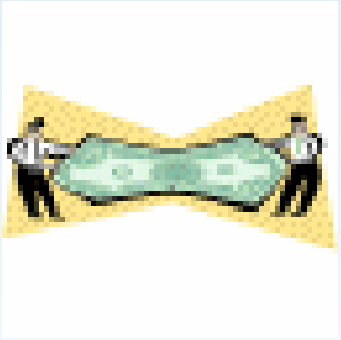




NASA's New Age of Exploration
(www.nasa.gov/pdf/107490main_FY06_Direction.pdf)

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

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➢ 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

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- **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.

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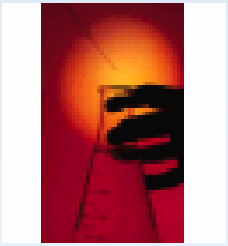
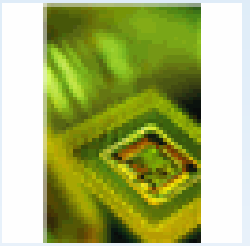
- **NASA Resident Research Associateship**
  (administered by NRC)
  - Provide resident research assistantship for up to three years.
  - Assistantship commensurate to applicant experience.
  - Researcher develops investigation together with Mentor at a NASA field center.



Opportunities for NASA Aerospace Related Funding and Collaboration



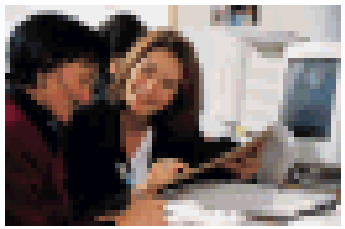
NASA Research Announcements

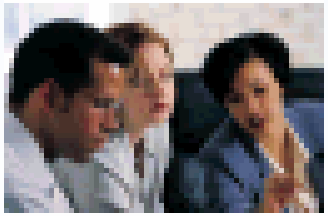
Opportunities for NASA Aerospace Related Funding and Collaboration

- ***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).**

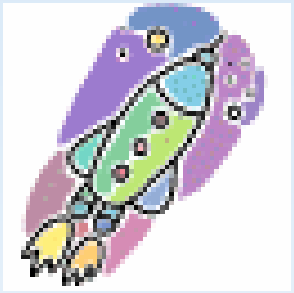
  - ❖ **When is it?**
    - **Potential dates range from May to July 2005**

  - ❖ **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 forTMP 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.**

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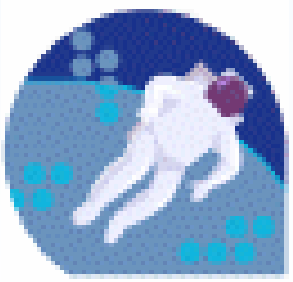
➢ Forthcoming Opportunities:

- **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)*

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?"

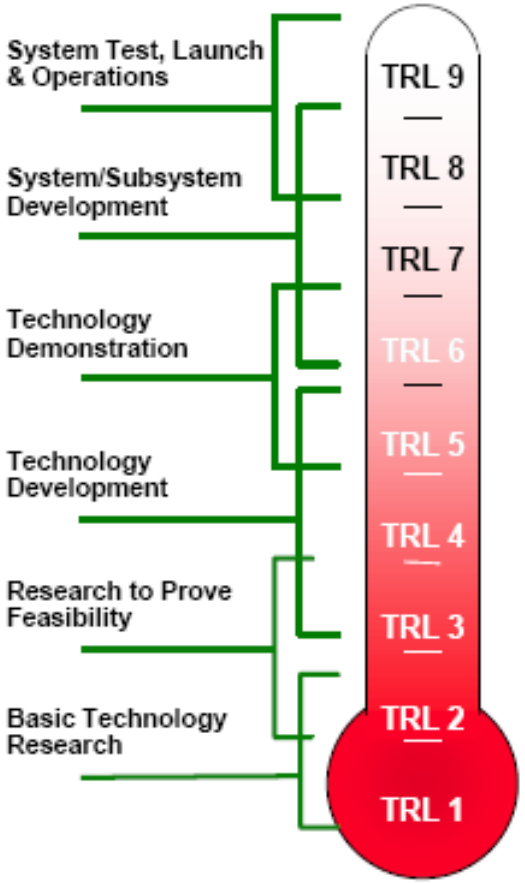
- NASA Feed Programs (i.e., Educational programs): Seed for stronger collaborations between NASA, Academia and Industry.

Opportunities for NASA Aerospace Related Funding and Collaboration

Backup Charts

Opportunities for NASA Aerospace Related Funding and Collaboration

Technology Readiness Level



TRL 9 — Actual system "flight proven" through successful mission operations

TRL 8 — Actual system completed and "flight qualified" through test and demonstration (Ground or Flight)

TRL 7 — System prototype demonstration in a space environment

TRL 6 — System/subsystem model or prototype demonstration in a relevant environment (Ground or Space)

TRL 5 — Component and/or breadboard validation in relevant environment

TRL 4 — Component and/or breadboard validation in laboratory environment

TRL 3 — Analytical and experimental critical function and/or characteristic proof-of-concept

TRL 2 — Technology concept and/or application formulated

TRL 1 — Basic principles observed and reported