ADVANCED SPACE TECHNOLOGIES RESEARCH & ENGINEERING CENTER

ASTREC

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ASTREC
Advanced Space Technologies Research and Engineering Center

UF UNIVERSITY of FLORIDA
The Foundation for The Gator Nation
NC STATE UNIVERSITY

Outline

- What is ASTREC
- Philosophy of ASTREC
- Uniqueness of ASTREC
- Members of ASTREC
- Projects of ASTREC
- Reasons to Join ASTREC

What is ASTREC

Advanced Space Technologies Research & Engineering Center

- Utilizes innovative fractionated satellite systems to speed delivery and offer good value for money (i.e., multiple small satellites)
- Is an NSF I/UCRC that will offer the space industry a paradigm for innovation
- Represents a partnership between industry, government, and academe
- Industry driven small satellite research and development
- Validation and verification of small satellite technologies

What is ASTREC

Mission Statement

To provide leading-edge research that is industry-driven to produce integrated, concurrent small satellite design including fabrication and validation with the objective of improvements in time to orbit, lower cost, maximum flexibility in design accommodation, and performance. Additionally, through its educational efforts, ASTREC will develop the next generation of "rocket scientists".

What is an I/UCRC

Synopsis of Program:

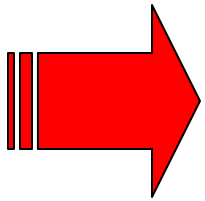
The Industry/University Cooperative Research Centers (I/UCRCs) program develops long-term partnerships among industry, academe, and government. The centers are catalyzed by a small investment from the National Science Foundation (NSF) and are primarily supported by industry center members, with NSF taking a supporting role in their development and evolution. Each center is established to conduct research that is of interest to both the industry and the center. An I/UCRC contributes to the Nation's research infrastructure base and enhances the intellectual capacity of the engineering and science workforce through the integration of research and education.

- NSF provides seed funding which is leveraged by partnerships with industry & government
- I/UCRCs have been in existence since 1981
- Approximately 50 I/UCRC centers currently exists
- I/UCRCs have a greater than 80% success rate

http://www.nsf.gov/eng/iip/iucrc/

ASTREC Philosophy

- **Why small?**
  - **Lower spacecraft costs**
  - **Reduced time to market**
  - **Reduced mass**
    - Lower launch costs
    - More launch opportunities (e.g., piggyback)

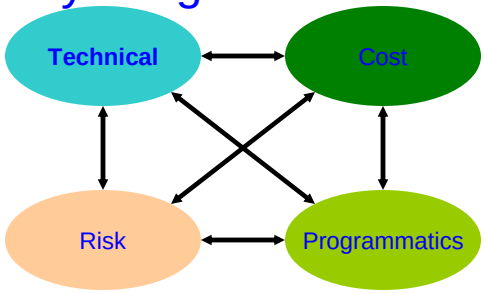


Lower cost, more rapid access to space!

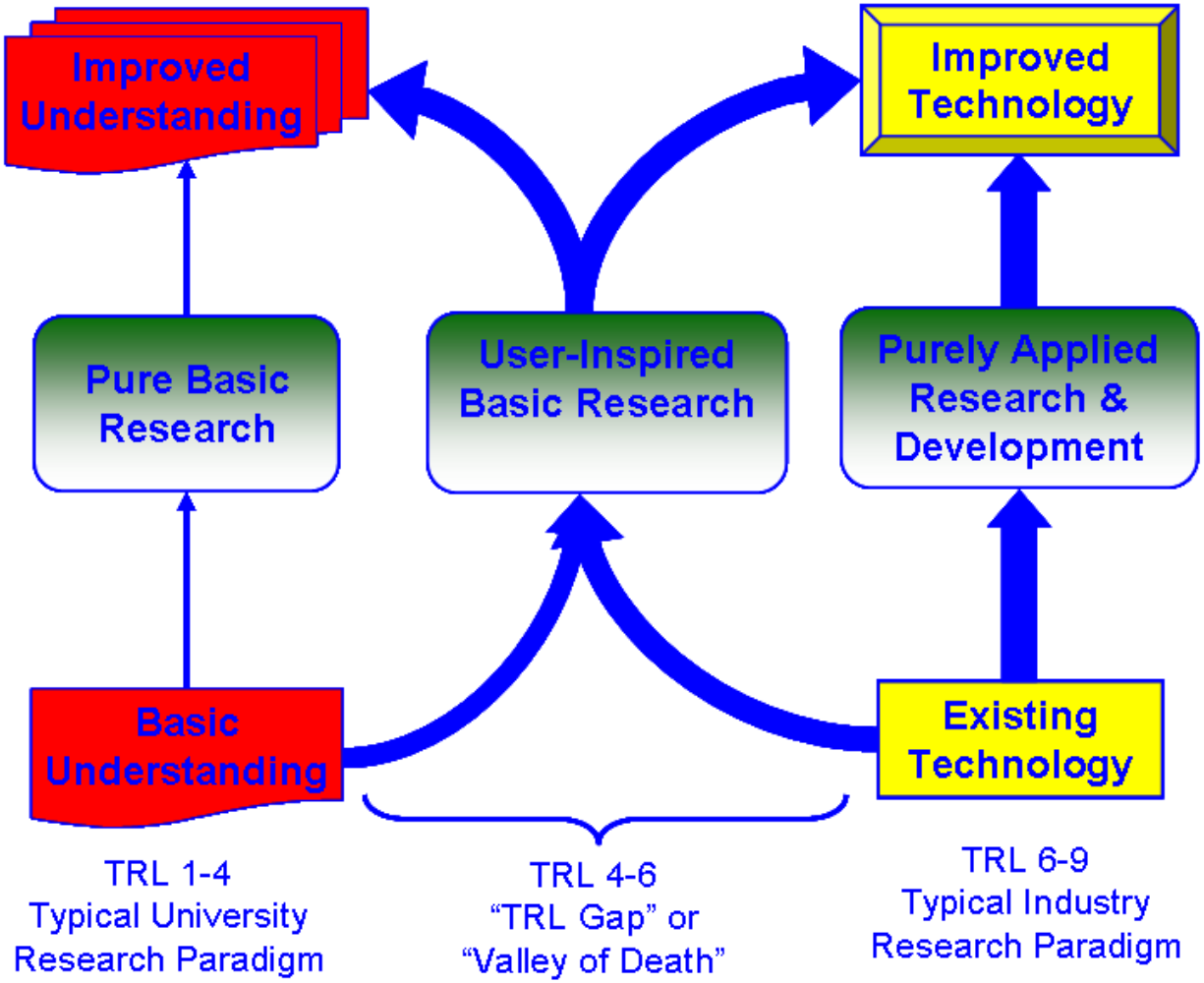
- **Why not widespread yet?**
  - **Small satellites impose new design requirements**
    - Drastic reduction in available power
    - Stringent mass/volume constraints
  - **Technological advances needed in the following subsystems**
    - Precision attitude determination and control system (PADCS)
    - Propulsion (electric)
    - Electrical power (production & transmission)
    - Communications (inter/intra wireless comms)
    - Onboard processing (distributed)
    - Proximity operations (collision avoidance)

Uniqueness of ASTREC

- **Codification of small satellite R&D**
  - **Conduct basic and applied research with a focused outcome**
  - **Small Satellite Development**
    - Pico - Nano - Micro Class
    - On-orbit Verification and Validation of developed technologies
    - Seamless systems integration of technologies
    - "Design-Build-Fly" strategy
  - **Use Concurrent Engineering principles**
    - Tasks done in parallel
    - Interdisciplinary teams working on all aspects of project
    - Multidisciplinary integration and collaboration



ASTREC R&D Model



ASTREC Goals

ASTREC's plan for sustainability

- **Short Term (1-5 yrs)** (To develop and demonstrate s/c expertise)
  - Demonstrate the ability to Design, Build, and Fly (DBF) pico-, nano-, and micro-class of satellites
  - Conduct fundamental spacecraft research

- **Mid Term (5-10 yrs)** (To leverage s/c expertise into sustainable business)
  - Further develop missions and satellites through
    - Lesson learned
    - Technology growth
    - Infuse research outcome
  - Demonstrate Responsive Space Capabilities

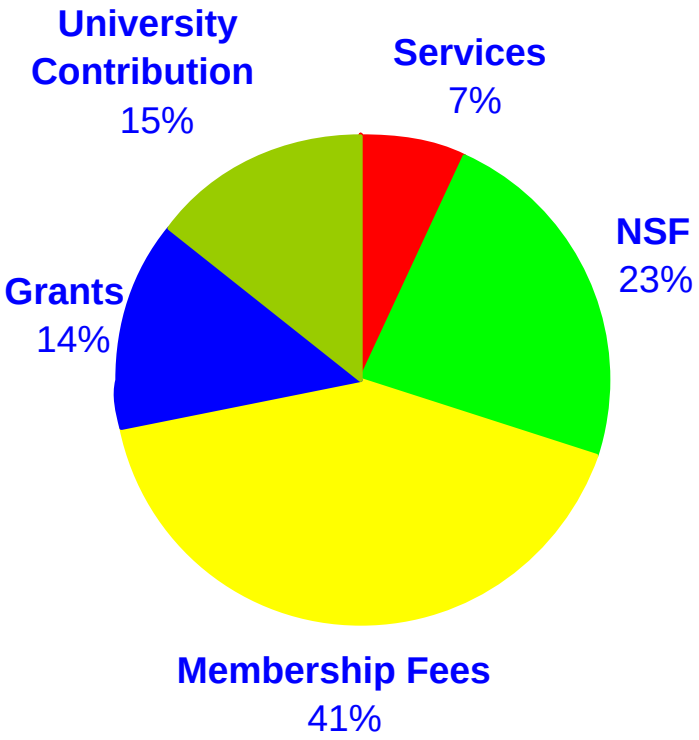
- **Long Term (>10 yrs)** (To create economic impact locally and regionally)
  - Center will be self sufficient and self sustaining
  - Technology Transfer from Research

ASTREC Organization

- ASTREC is a Multi-University I/UCRC
  - National Science Foundation
  - University of Florida
  - North Carolina State University
- Committed Industry Members
  - NASA
    - Ames
    - Langley
  - Cisco
  - Harris
  - Space Missile Defense Command
  - Lockheed
  - Other small business
- Anticipate growth - Institutions, Industry, Government

ASTREC Budget

Budget Categories (Preliminary)



NSF I/UCRC Funding
$50,000/site
$15,000 – center evaluation, etc (Administrative)

Annual Membership Fees
Full members: $35,000
Affiliate Members: $15,000

Grants/Services
Research funding
Non-membership funding

University Contributions
Reduced overhead
Administrative salary
Facility upgrade/maintenance

ASTREC Multi-Disciplinary Research

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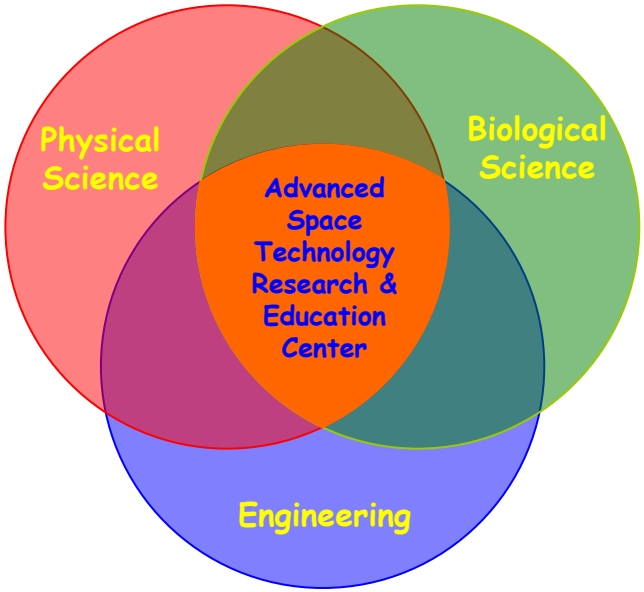
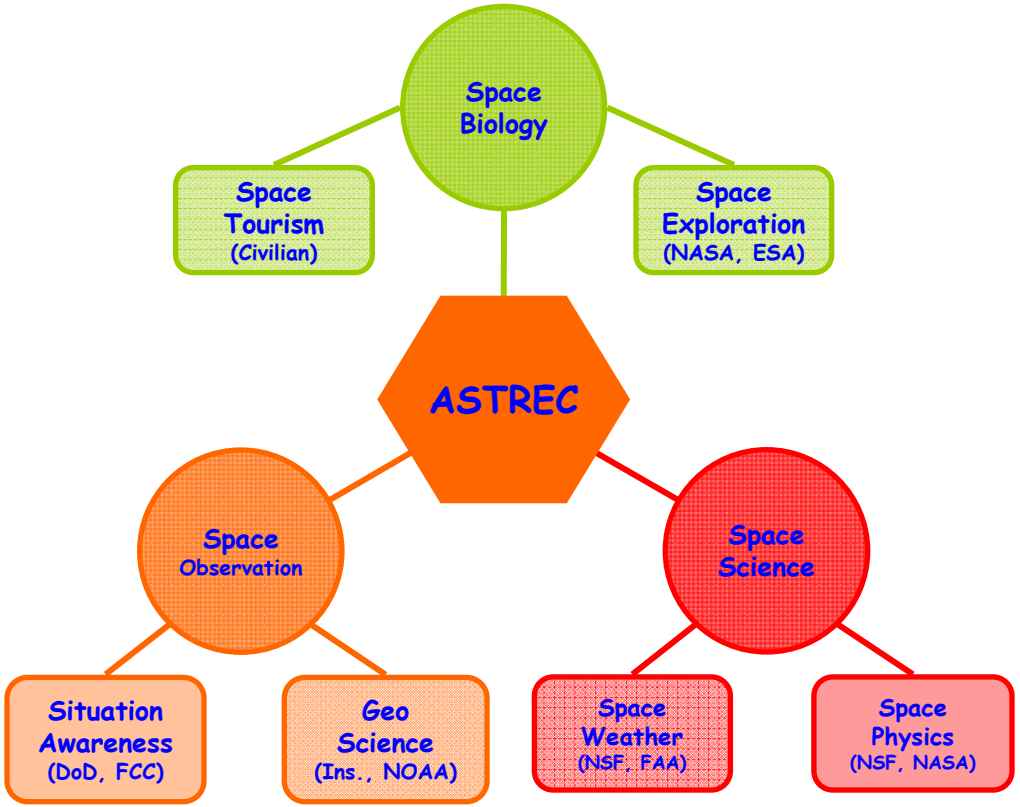
Research Disciplines



ASTREC Research/Mission Areas



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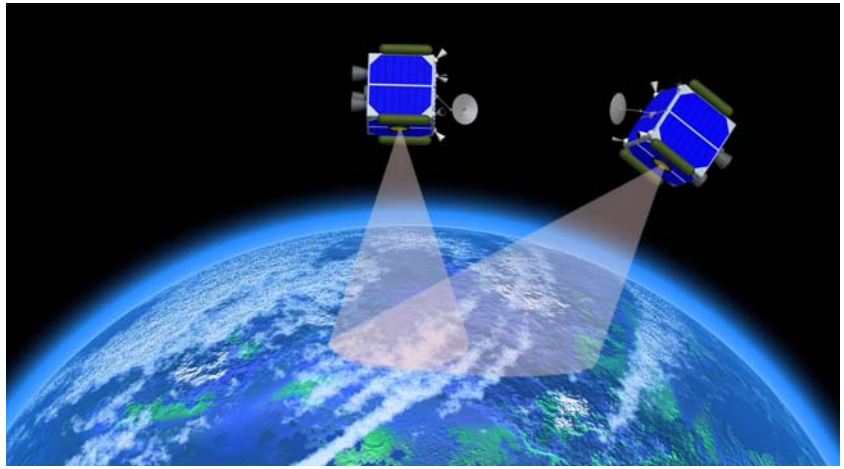
Reasons To Join ASTREC

- NSF Accredited National Research Center
- Research Amplification
- Non-center Research Cost Reduction
- Technology Transfer
- Product Development
- Analytical Services
- Training
- Industrial Networking
- University Networking
- Access to Trained Students



Contact Information

- www.advancedspacetech.org
  - General Information
  - Brochure
  - Prospectus