AFRL Scholars Programs and University Nanosat Program

12 August, 2012

Misty Crown
RVO/RVB/RVE
Air Force Research Laboratory
Outline

- Scholars Programs
- University Nanosat Program
Scholars Programs

- The best and brightest science and engineering students from the United States
- Performing cutting-edge research at AFRL laboratory facilities
- In a summer laboratory internship geared to current and future Air Force technology needs
- Mentored by world-renowned AFRL researchers
Scholars Programs

• Three Different Programs
  – Space Scholars (Master’s and PhD Students)
  – Directed Energy Scholars (Master’s and PhD Students)
  – Phillips Scholars (High School through Undergraduate Students)

<table>
<thead>
<tr>
<th>Year</th>
<th>Space Scholars</th>
<th>Schools</th>
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<tbody>
<tr>
<td>2000</td>
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</tr>
<tr>
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<td>2006</td>
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<tr>
<td>2012</td>
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<tr>
<th>Year</th>
<th>Directed Energy Scholars</th>
<th>Schools</th>
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<td>2012</td>
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<table>
<thead>
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<th>Year</th>
<th>Phillips Scholars</th>
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<td>2009</td>
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<td>2010</td>
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<tr>
<td>2011</td>
<td>71</td>
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<tr>
<td>2012</td>
<td>65</td>
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Scholars From the Southwest
<table>
<thead>
<tr>
<th>Arizona State</th>
<th>Iowa State</th>
<th>Rochester Institute of Technology</th>
<th>University of Alabama</th>
<th>University of Missouri</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auburn University</td>
<td>Michigan State University</td>
<td>Rutgers</td>
<td>University of Arizona</td>
<td>University of New Mexico</td>
</tr>
<tr>
<td>Augsburg College</td>
<td>Michigan Tech</td>
<td>San Diego State</td>
<td>University of Buffalo</td>
<td>University of Rochester</td>
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<tr>
<td>Brigham Young University</td>
<td>Millersville University</td>
<td>Southern Methodist University</td>
<td>University of Central Florida</td>
<td>University of Southern California</td>
</tr>
<tr>
<td>California Institute of Technology</td>
<td>Missouri Science and Technology</td>
<td>Southwest Indian Polytechnic University</td>
<td>University of Colorado</td>
<td>University of Texas</td>
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<tr>
<td>Cornell University</td>
<td>New Mexico State University</td>
<td>State University of New York</td>
<td>University of Connecticut</td>
<td>University of Wisconsin</td>
</tr>
<tr>
<td>Embry Riddle Aeronautical University</td>
<td>New Mexico Tech</td>
<td>Texas A&amp;M</td>
<td>University of Florida</td>
<td>University of Wyoming</td>
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<td>Florida International University</td>
<td>Ohio State</td>
<td>Texas Tech</td>
<td>University of Iowa</td>
<td>Virginia Tech</td>
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<tr>
<td>Georgia Tech</td>
<td>Purdue</td>
<td>University California Berkley</td>
<td>University of Massachusetts</td>
<td>Washington State University</td>
</tr>
<tr>
<td>Inter American University</td>
<td>Rice University</td>
<td>University of Akron</td>
<td>University of Michigan</td>
<td>West Virginia University</td>
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</tbody>
</table>
Topics Related To UNP and Aerospace

- Over 10% of the Scholars program has topics relevant to UNP and spacecraft flight; topics from this year's program included:
  - UNP project learning satellite bus design practices, integration and test, mission operations, and requirements analysis are among the many expertise required for designing and developing a flight-worthy satellite
  - SETS satellite project to design, assemble, and test two nanosats (one to be delivered to NASA in 2012)
What is UNP?

- Competition between 10-12 universities
  - design and build flight spacecraft
- Winning university selected for flight
- Currently in our 7th competition cycle
- Sponsored by:

<table>
<thead>
<tr>
<th>AFRL/RV</th>
<th>AFOSR</th>
<th>AIAA</th>
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<tbody>
<tr>
<td><img src="image" alt="AFRL/RV logo" /></td>
<td><img src="image" alt="AFOSR logo" /></td>
<td><img src="image" alt="AIAA logo" /></td>
</tr>
<tr>
<td>Manages Competition</td>
<td>Sponsors competition schools</td>
<td>Sponsors Flight Competition Review</td>
</tr>
<tr>
<td>Manages winner delivery</td>
<td>Sponsors winner final development</td>
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</tr>
<tr>
<td>Assists in post-launch ops</td>
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</tr>
</tbody>
</table>

Focus is on Design & Fabrication
Program Objectives

Primary Objective: Education
- Systems engineering training
- Workforce development
- Foundation for all UNP decisions

Secondary Objective: Technology
- Innovative, low cost technology development
- Motivation for Gov. and industry sponsors
- DoD relevant

Tertiary Objective: University Development
- Develop space hardware laboratories
- Support university PI’s
Growth of UNP Flight Opportunities

<table>
<thead>
<tr>
<th>Year</th>
<th>NS-1/2</th>
<th>NS-3</th>
<th>NS-4</th>
<th>NS-5</th>
<th>NS-6</th>
<th>NS-7</th>
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</thead>
</table>
| 2004       | Arizona State - W  
New Mexico State - W  
U Colorado-Boulder - W  
Stanford University 
Bost University  
Carnegie-Mellon 
Utah State  
Virginia Tech  
Washington University | 2003 NS-3 
UT Austin - W  
Washington U - St. Louis  
Michigan Tech  
Arizona State  
Montana State - Bozeman  
Penn State  
Taylor University  
U Colorado, Boulder  
U Hawaii at Manoa  
U Michigan  
Worcester Polytechnic  
New Mexico State  
Utah State | 2005 NS-4 
U Cincinnati  
U Minnesota  
U Central Florida  
Santa Clara U  
Cornell University - W  
U Missouri - Rolla  
Texas A&M  
New Mexico State  
Washington U - St. Louis  
Utah State  
UT Austin | 2007 NS-5 
Boston U  
U Colorado at Boulder - W  
Montana State U  
Michigan Tech  
Minnesota U  
Penn State U  
Washington U in St. Louis  
UT at Austin  
Texas A&M U  
Santa Clara U  
Utah State U | 2009 NS-6 
Georga Tech  
University of Hawaii  
MIT  
Montana State University  
Missouri S&T  
Michigan Tech - W  
Santa Clara University  
University of Central Florida  
University Minnesota  
Cornell University  
Washington University (St Louis) | 2011 NS-7 
Georga Tech  
MIT  
Montana State University  
Missouri S&T  
St Louis University  
Boston University  
University of Michigan  
University of Texas  
University of Buffalo  
University of Maryland |

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Take-Aways

• **Focus is on building**
  – systems engineers
  – satellites
  – programs

• **Two areas of intent**
  – Military Relevance
  – Technical Maturity

• **University picks volume**
  – Mission requirements
  – Program capability

Apply for the NS-8 BAA NOW on grants.gov!!
Questions?