



# AFRL Scholars Programs and University Nanosat Program

12 August, 2012

Misty Crown  
RVO/RVB/RVE

Air Force Research Laboratory

*Integrity ★ Service ★ Excellence*



# Outline



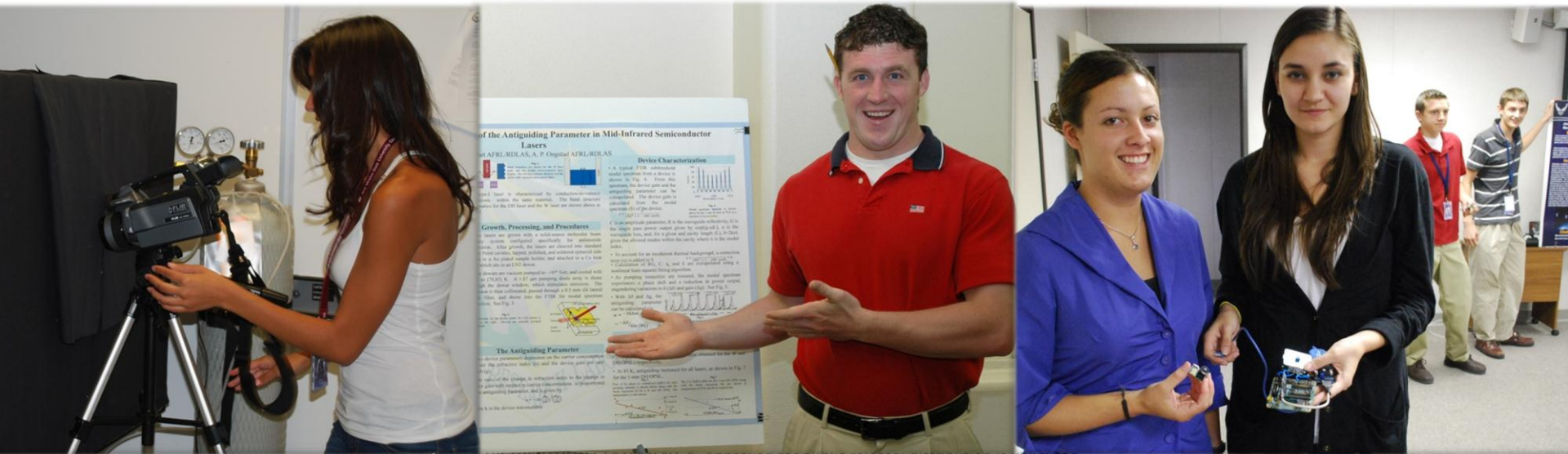
- Scholars Programs
- University Nanosat Program



# 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



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# 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)

Year	Space Scholars	Schools
2000	22	20
2001	20	11
2002	29	25
2003	30	19
2004	26	24
2005	41	33
2006	38	-
2007	28	21
2008	38	27
2009	41	28
2010	42	26
2011	46	29
2012	46	27

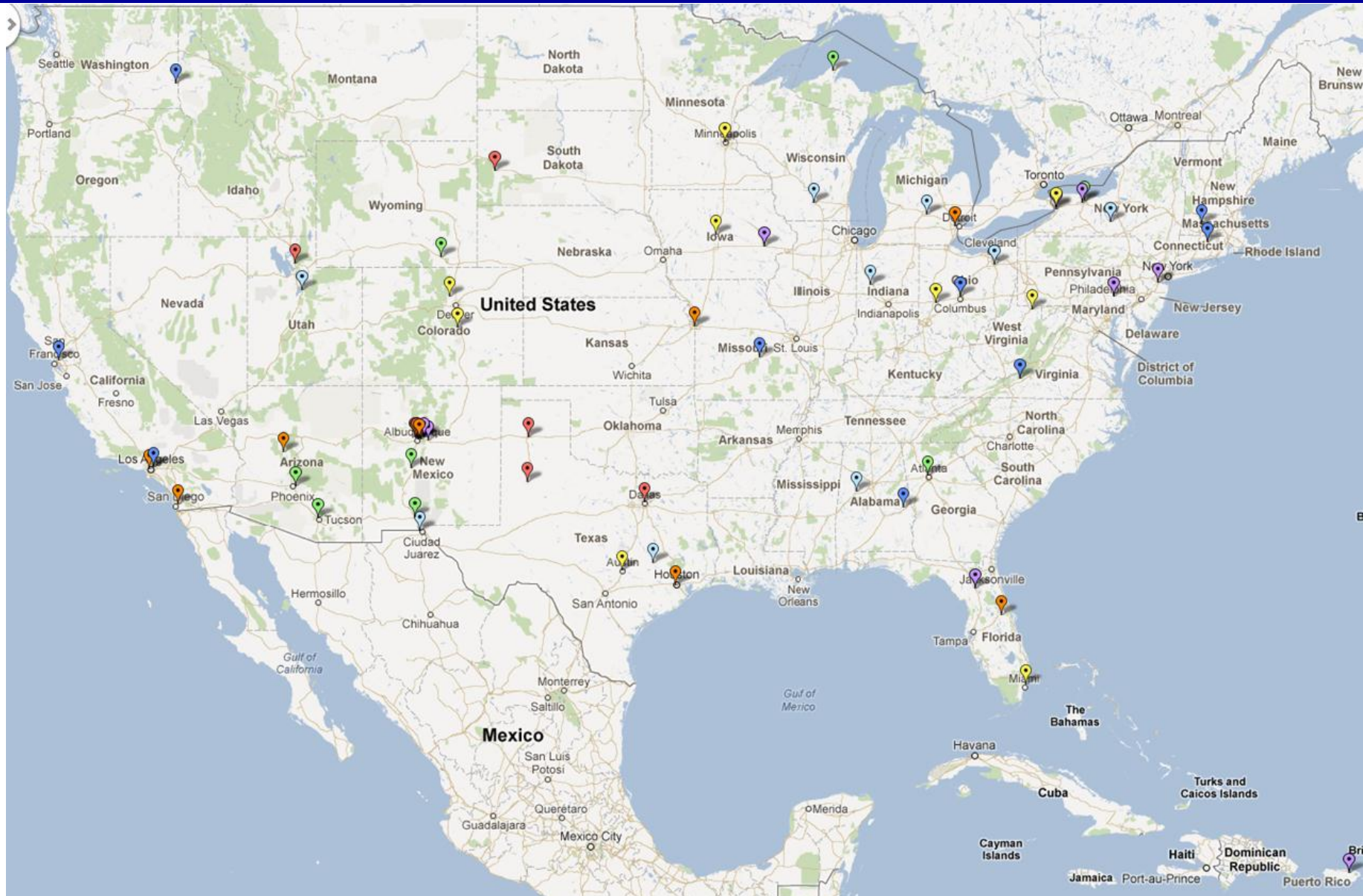


Year	Directed Energy Scholars	Schools
2007	7	4
2008	9	9
2009	6	5
2010	10	7
2011	15	11
2012	17	16

Year	Phillips Scholars	Schools
2008	15	9
2009	50	27
2010	65	36
2011	71	36
2012	65	34



# Scholars From Around The Country







# Scholars From Around The Country



Our Students Are From The Top Schools From Around The Country!

Arizona State	Iowa State	Rochester Institute of Technology	University of Alabama	University of Missouri
Auburn University	Michigan State University	Rutgers	University of Arizona	University of New Mexico
Augsburg College	Michigan Tech	San Diego State	University of Buffalo	University of Rochester
Brigham Young University	Millersville University	Southern Methodist University	University of Central Florida	University of Southern California
California Institute of Technology	Missouri Science and Technology	Southwest Indian Polytechnic University	University of Colorado	University of Texas
Cornell University	New Mexico State University	State University of New York	University of Connecticut	University of Wisconsin
Embry Riddle Aeronautical University	New Mexico Tech	Texas A&M	University of Florida	University of Wyoming
Florida International University	Ohio State	Texas Tech	University of Iowa	Virginia Tech
Georgia Tech	Purdue	University California Berkley	University of Massachusetts	Washington State University
Inter American University	Rice University	University of Akron	University of Michigan	West Virginia University



# Topics Related To UNP and Aerospace



- Over 10% of the Scholars program has topics relevant to UNP and spacecraft flight; topics from this years 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 7<sup>th</sup> competition cycle
- Sponsored by:

***Focus is on  
Design &  
Fabrication***

## AFRL/RV



- Manages Competition
- Manages winner delivery
- Assists in post-launch ops

## AFOSR



- Sponsors competition schools
- Sponsors winner final development

## AIAA



- Sponsors Flight Competition Review



# 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



**NS-1/2: 3-CornerSat**  
Launched: Delta-4



**NS-3: FASTRAC**  
Launched: STP-S26



**NS-5: DANDE**



**NS-4: CUSat**

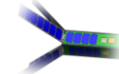


**NS-6: Ho'oponopono**



**Launch: ELaNa**

**NS-7: Armadillo**



**NS-6: Oculus-ASR**  
Launch: TBD



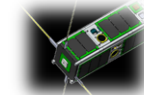
**NS-6: Violet**  
Launch: TBD



**NS-6: Copper**



**NS-7: CADRE**



**NS-7: ARGUS**



2004

2010

2013

2013-2015

**NS-1/2**

- Arizona State - W
- New Mexico State - W
- U Colorado-Boulder- W
- Stanford University
- Boston 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**

- Georgia 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**

- Georgia 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





# 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?

