

**NSF workshop on Small Satellite Missions for Space Weather and Atmospheric
Research
George Mason University, Arlington Campus, VA**

AGENDA

Tuesday May 15		
8.30 AM	Welcome and Opening <i>Chair: Richard Behnke, NSF</i>	
Keynote Address	Pete S. Worden <i>NASA Ames Research Center</i>	Emerging opportunities for using micro-satellites with miniaturized sensors to provide cost-effective science and operational data sources for space weather applications
9.30 AM	Launch opportunities for small spacecraft <i>Chair: Kent Miller, AFOSR</i>	
Speakers	Gwynne Shotwell <i>Space X</i>	The Falcon rocket program
	Gerard Szatkowski <i>Lockheed Martin</i>	Ideas and progress for secondary payload capabilities
Coffee break 30 min		
	Luke Flynn <i>University of Hawaii</i>	The Hawaii Space Flight Lab and the LEONIDAS project
	John H. Campbell <i>NASA Wallops Flight Facility</i>	Launch opportunities at NASA Wallops Flight facility
	Robert Caffrey <i>NASA Goddard Space Flight Center</i>	The GeoQuickRide Program
	Sam Myers Sims <i>The Aerospace Corp. Space Test Program Mission Design</i>	DoD Space Test Program: Access to Space
	Mike Marlow <i>STP-SIV Program Manager, USAF</i>	Payload Design Criteria for the Space Test Program-Standard Interface Vehicle (STP-SIV)

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12.00 PM	Lunch break	
1.30 PM	Innovative technology developments for small satellite systems <i>Chair: Charles Gay, NASA HQ</i>	
Speakers	James G. Watzin <i>NASA Goddard Space Flight Center</i>	Revitalizing small-sat based missions
	Dino Lorenzini <i>SpaceQuest</i>	NanoSat payload accommodation
	NN <i>Surrey Satellite Technology LTD</i>	Providing affordable, frequent and rapid access to space
	Vassilis Angelopoulos <i>University of California, Berkeley</i>	THEMIS as a pathfinder for a microsatellite program
	James A. Slavin <i>NASA Goddard Space Flight Center</i>	The ST-5 mission
	Pete Klupar <i>NASA Ames Research Center</i>	Recent nanosat missions and plans for future developments at NASA ARC
	Michael Hurley <i>Naval Research Laboratory</i>	Operationally Responsive Space (ORS) and TacSat Overview
3.30 PM	Poster session & Coffee break	
4.30 PM	Discussion and Conclusions for Platforms and Launches <i>Discussion Lead: Robert McCoy, ONR</i>	
Objective	<p>Identify key issues and possibilities in regard to: Providing launches for a small satellite research program What are the greatest challenges, e.g. cost, availability, regulations, and satellite integration? What are the most promising developments or opportunities, e.g. commercial launchers, partnering with other agencies, international partnerships, and standardized integration for piggy-back launches?</p> <p>Building or providing satellites for a small satellite research program What are the greatest challenges, e.g. development costs, integration of payloads, regulations, power, and communication/ground stations? What are the most promising developments or opportunities, e.g. standardized satellite systems, standardized payload integration, and technological progress on power and communications systems?</p>	
6.00 PM	Adjourn	

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Wednesday May 16		
Advancing Research by means of measurements from small satellites & miniaturization of scientific payloads		
8.30 AM	Solar and Heliospheric Research <i>Chair: Jie Zhang, George Mason University</i>	
Speakers	Robert Lin <i>University of California, Berkeley</i>	High energy measurements for solar, heliospheric, magnetospheric, and atmospheric physics
	Douglas Rabin <i>NASA Goddard Space Flight Center</i>	Solar context observations from lightsats
	Russell Howard <i>Naval Research Laboratory</i>	Advances in solar imaging
	Bernard Jackson <i>University of California, San Diego</i>	Development of a small Solar Mass Ejection Imager
09.45 AM	Coffee break	
10.15 AM	Magnetospheric Research <i>Chair: Rod Heelis, University of Texas at Dallas</i>	
Speakers	Harlan Spence <i>Boston University</i>	The MagCon Mission Concept
	Craig Pollock <i>South West Research Institute</i>	Plasma Instrument Miniaturization and Integration: Approaches and Limitations
	David Klumpar <i>Montana State University</i>	Science requirements flow-down: Impacts on the capabilities of small satellites
	James Clemmons <i>The Aerospace Corp.</i>	Energetic particle measurements
	James Spann <i>NASA Marshall Space Flight Center</i>	Imaging Geospace and Auroras from small satellites

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	Marc Lessard <i>Universtiy of New Hampshire</i>	Observing ion cyclotron waves
12.00 PM	Lunch break	
13.30 PM	Atmospheric and Ionospheric Research <i>Chair: Ennio Sanchez, SRI International</i>	
Speakers	Paul Kintner <i>Cornell University</i>	Utilizing small satellites to address mid-latitude ionospheric space weather science questions
	Robert Pfaff <i>NASA Goddard Space Flight Center</i>	Synergistic Scientific Measurements using Consolidated Instrument Suites on Small Satellites -- Experience from the FAST, DEMETER, and C/NOFS Missions
	Gary Swenson <i>University of Illinois</i>	Optical sensing of atmospheric emissions from Cubesats and Nanosats
	Stephen Mende <i>University of California Berkeley</i>	Tomographic airglow measurements from satellites
	Charles Swenson <i>Utah State University</i>	Ionospheric Nano-satellite Formation (ION-F) and instrumentation
	Kenneth F. Dymond <i>Naval Research Laboratory</i>	The COSMIC mission
	Andrew Nicholas <i>Naval Research Laboratory</i>	The Atmospheric Neutral Density Experiment mission
3.30 PM	Poster session & Coffee break	
4.30 PM	Discussion and Conclusions for Research and Sensors <i>Discussion Lead: Michael Hesse, NASA GSFC</i>	
Objective	<p>Identify key science objectives and measurement technologies for a small satellite program</p> <p>Direct benefit</p> <p style="padding-left: 40px;">Which important measurements could be provided right now by a small satellite program, i.e. utilizing existing science instrument and satellite system capabilities?</p> <p style="padding-left: 40px;">What are presently available technologies or expected developments in miniaturized instrumentation that could be applied to small sat-based research?</p> <p>A vision</p> <p style="padding-left: 40px;">What are the exciting scientific goals that a small satellite program could help advance in the near future?</p>	
6.00 PM	Adjourn	

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Thursday May 17		
8.30 AM	Identifying key space weather needs that can be satisfied by small satellite observations <i>Chair: Robert Robinson, NSF</i>	
Speakers	Howard Singer <i>NOAA Space Environment Center</i>	Space weather measurement needs and capabilities
	Odile de La Beaujardiere <i>Air Force Research Laboratory</i>	The PECOS low Earth orbit space weather satellites
9.15 AM	Discussion and Conclusions for Space Weather <i>Discussion Lead: Robert Robinson, NSF</i>	
Objective	Which important measurements could be provided right now by a small satellite program, i.e. utilizing existing science instrument and satellite system capabilities? What are the most exciting Space Weather goals for a small satellite program in the future, e.g., L1 monitor, ionospheric specification, geomagnetic fields and particles?	
10.00 AM	Coffee break	
10.30 AM	Using small satellites as an educational tool for science and engineering <i>Chair: Thomas Zurbuchen, University of Michigan</i>	
Speakers	Gil Moore <i>Project Starshine</i>	Student space experiment access – a national imperative
	Robert J. Twiggs <i>Stanford University</i>	Using student space assets for atmospheric science research
	Matthew McHarg <i>US Air Force Academy</i>	The FalconSat program: space science
	Timothy Lawrence <i>US Air Force Academy</i>	The FalconSat program: engineering
	Heather Reed <i>University of Colorado</i>	Best practices and lessons learned in Student Instrument Programs: The SNOE case study

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	Scott Franke <i>Air Force Research Laboratory</i>	The University NanoSat program
12.00 PM	Discussion and Conclusions for Education <i>Discussion Lead: Thomas Zurbuchen, University of Michigan</i>	
Objective	<p>Establish key ingredients in making a small satellite program successful in promoting education and learning, in terms of:</p> <p>Educational opportunities for aerospace engineering, including general math, science, and engineering</p> <p style="padding-left: 40px;">What are the pros and cons of university (or student)-built small satellites and/or subsystems, e.g. cheap but high-risk, and collaboration across university departments?</p> <p>Educational opportunities for experimental space science, atmospheric science, earth science, etc.</p> <p style="padding-left: 40px;">What are the main opportunities that a small satellite program could offer that do not exist today, e.g. student participation in building payloads for large missions is limited/ unsuccessful?</p>	
1.00 PM	Adjourn	