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NASA Selects University Teams for New SmallSat Collaborative Projects

NASA has selected 13 university teams for collaborative projects to develop and demonstrate new technologies and capabilities and spur innovation in communication, navigation, propulsion, science instruments, and advanced manufacturing for small spacecraft.

Selected project teams will work with engineers and scientists from six NASA centers. The goal of these efforts is to transform small spacecraft, some of which weigh only a few kilograms, into powerful but affordable tools for science, exploration and space operations.

The project teams will have the opportunity to establish a cooperative agreement with NASA in which each university will be funded as much as \$100,000 a year, beginning this fall, with most projects lasting two years.

"We are excited about this new opportunity for NASA to work with university students, researchers and faculty in 13 different states to advance technology in the emerging field of small spacecraft," said Michael Gazarik, associate administrator for the Space Technology Mission Directorate at NASA Headquarters in Washington. "In addition to enhancing small spacecraft technology, these teams will help strengthen our nation's high-tech workforce."

Results from these projects could lead to the development of miniature radio and navigation devices, a low-power laser communications concept and radiation-tolerant computers. Additional emerging concepts could include energy storage devices and electric propulsion for deep space missions.

Through the cooperative agreements, NASA expects to provide a modest level of civil servant support toward the collaborative work. NASA received nearly 100 proposals from universities across the country in response to this small spacecraft technology solicitation. The agency expects to repeat this solicitation every two years, contingent on the availability of appropriated funds.

"There is a vibrant small spacecraft community within America's universities and with this initiative NASA seeks to increase our collaboration with that community," said Andrew Petro, program executive for NASA's Small Spacecraft Technology Program. "The universities will benefit from the extensive experience NASA has in space research and technology, and NASA will benefit from fresh ideas and cost-conscious innovation at the universities."

NASA's Small Spacecraft Technology Program develops and demonstrates new capabilities employing the unique features of small spacecraft for science, exploration and space operations. A complete list of selected teams and projects for the Smallsat Technology Partnerships can be seen online at:

<http://www.nasa.gov/smallsats>

The Small Spacecraft Technology Program is part of NASA's Space Technology Mission Directorate, which is innovating, developing, testing, and flying hardware for use in NASA's future missions. For more information about NASA's Space Technology Mission Directorate, visit:

<http://www.nasa.gov/spacetech>



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NASA Smallsat Technology Partnerships Projects Selected in 2013

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COMMUNICATIONS

High Rate Cubesat X-band/S-band Communication System

PI: Scott Palo
University Of Colorado
NASA Partner: Goddard Space Flight Center

This project will focus on the development of a communications system that is compatible with the current cubesat standard and will support high data rate downlinks. The result of this project will be the maturation of an S-band 200kbps receiver and X-band 12.5Mbps transmitter to technology readiness level 5, which is compatible with the current NASA Near Earth Network.

Space Optical Communications Using Laser Beam Amplification

PI: Govind Agrawal
University Of Rochester
NASA Partner: Ames Research Center

This project addresses the manner in which data is transmitted from a space terminal using optical communications. In the first year, the objective of the research will be to develop a capability for amplifying a laser beam for use in a modulating retro-reflector (MRR) that is in a satellite in low Earth orbit.

Radiation Tolerant, FPGA-based Smallsat Computer System

PI: Brock LaMeres
Montana State University
NASA Partner: Goddard Space Flight Center

- › [NASA taps MSU project for next phase in building space computer technology](#)

The goal of this project is to mature the technology readiness of a radiation tolerant smallsat computer system for a subsequent orbital flight demonstration. The system is implemented with commercial off-the-shelf (COTS) *field-programmable gate arrays* (FPGAs) to provide space-computing performance that improves upon existing radiation hardened processors. Commercial FPGAs are now yielding acceptable levels of total ionizing dose immunity due to the thinning of gate oxides and relative deepening of isolation trenches. If a single event effect mitigation strategy can be implemented on COTS FPGAs, then reliable, high performance space computing can be accomplished at a fraction of the cost of existing radiation hardened processors.

