The future is now: Innovative advanced concepts selected for continued study

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Looking ahead to an exciting future, NASA is continuing to invest in concepts that may one day revolutionize how we live and work in space with the selection of five technology proposals for continued study under the NASA Innovative Advanced Concepts (NIAC) Program.

NASA's Space Technology Mission Directorate, located at the agency's headquarters in Washington, based the NIAC Phase II selections on their potential to transform future aerospace missions, introduce new capabilities, or significantly improve current approaches to building and operating aerospace systems. The proposals chosen for continued study address a range of visionary concepts, from novel space optics using an orbiting cloud of dust-like objects, to pioneering spacecraft-rover hybrids for exploration of low-gravity asteroids.

"Technology drives our futures in exploration, science and commercial space; and investments in these advanced concepts must be made to ensure we will have the spectrum of capabilities for the near term and well into the 21st century," said Michael Gazarik, associate administrator for Space Technology. "NASA's Space Technology Mission Directorate is creating the technologies needed for today, while also investing in the concepts that will become technological realities of tomorrow. These concepts, anchored to sound science, but rich in 'what if' creativity, will make our science, exploration and commercial space futures possible."

The five studies chosen to advance to Phase II of the NIAC program include:

— A concept for a 10-meter, sub-orbital large balloon reflector that might be used as a telescope inside a high-altitude balloon. The concept uses part of the balloon itself as a reflector for the telescope. The principal investigator is C.K. Walker of the Steward Observatory at the University of Arizona, Tucson.

— A spacecraft-rover hybrid concept for the exploration of small solar system bodies. The small spacecraft would be deployed from a "mothership" onto the surface of a low-gravity object, such as an asteroid or planetary moon. The machines, ranging in size from a centimeter to a meter, would use spinning flywheels to allow the robotic explorers to tumble and hop across the surface of a new frontier. The principal investigator is Marco Pavone of Stanford University in California.

— A concept for deep mapping of small solar system bodies, such as asteroids, using subatomic particles to map the interior and small surface features. These data could be used to better characterize asteroids and gather data about potential resources that could be mined or otherwise used by explorers. The principal investigator is T.H. Prettyman of the Planetary Science Institute in Tucson.

— A concept for a low-mass planar photonic imaging sensor, an innovative sensor and spectrometer design to replace traditional, bulkier telescopes. This concept may provide a higher-resolution, persistent imaging capability for outer planetary missions while reducing costs and development time because no large optics are required. The principal investigator is S.J. Ben Yoo at the University of California, Davis.

— A granular media imager concept called "Orbiting Rainbows" would use an orbiting cloud of dust-like matter as the primary element for an ultra-large space aperture—the space through which light passes during an optical or photographic measurement—that could potentially be used to image distant astronomical objects at extremely high resolution. The principal investigator is Marco Quadrelli of NASA's Jet Propulsion Laboratory (JPL) in Pasadena, California.

NASA selected these projects through a peer-review process that evaluated innovativeness and technical viability. All projects are still in the early stages of development—most being 10 or more years away from use on a NASA mission.

"This was an extremely competitive year for NIAC Phase II candidates," said Jay Falker, NIAC program executive at NASA Headquarters. "But the independent peer review process helped identify those that could be the most transformative, with outstanding potential for future science and exploration."

NIAC Phase II awards can be as much as $500,000 for two years, and allow proposers to further develop the most successful concepts from previously selected Phase I studies. Phase I studies must demonstrate the initial feasibility and benefit of a concept. Phase II studies go to the next level, refining designs and exploring aspects of implementing the new technology.

Through programs like NIAC, NASA is demonstrating that early investments and partnerships with creative scientists, engineers, and citizen inventors from across the nation can provide technological dividends and help maintain America's leadership in the new global technology economy.

More information: www.nasa.gov/niac

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