NASA selects early-stage technology concepts for new, continued study

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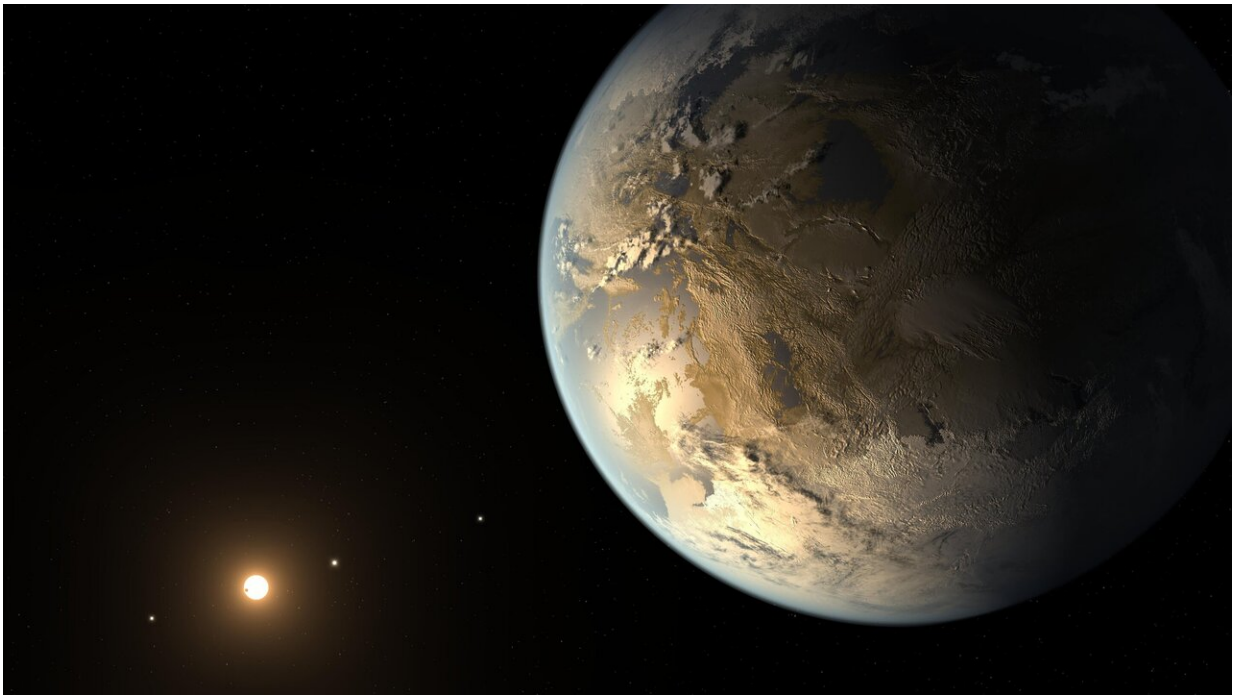

This artist's concept depicts Kepler-186f, the first confirmed Earth-sized exoplanet that may host liquid water on its surface and a candidate for further study. Credit: NASA Ames/SETI Institute/JPL-Caltech

Future technologies that could enable quicker trips to Mars and robotic exploration of ocean worlds might have started out as NASA Innovative Advanced Concepts (NIAC). The program, which invests in early-stage technology ideas from NASA, industry and academic researchers across

the country, has selected 23 potentially revolutionary concepts with a total award value of $7 million.

Among the selections are 16 new concepts and seven studies that previously received at least one NIAC award. A full list of the 2020 Phase I, II and III selections can be found here.

"NIAC is an innovative program that encourages researchers—and the agency—to think outside of the box for solutions that could overcome challenges facing future science and exploration missions," said Walt Engelund, the deputy associate administrator for programs within NASA's Space Technology Mission Directorate (STMD). "We're excited about the new concepts and to see how additional time and resources advances the research selected for follow-on Phase II and III studies."

A mission concept to image Earth-like planets outside of the solar system was selected for a Phase III study. Slava Turyshev, a researcher at NASA's Jet Propulsion Laboratory in Pasadena, California, will receive a $2 million grant to further mature the concept and related technologies.

During his Phase I and Phase II NIAC research, Turyshev outlined the feasibility of a solar gravity lens to enable enhanced viewing of planets orbiting other stars, known as exoplanets. He also developed a mission architecture that uses multiple small spacecraft and solar sail technology to propel them to their target destination 50 billion miles away from Earth.

Illustration of how a solar gravity lens telescope would image an exoplanet. The technology concept received Phase I, II and III awards from the NASA Innovative Advanced Concepts program. Credit: NASA/JPL-Caltech/Slava Turyshev

"This is only the third study selected for Phase III funding in the history of the program," said NIAC Program Executive Jason Derleth. "We're excited by its potential to bring us closer to imaging an exoplanet in detail, at a resolution comparable to the well-known Apollo 8 Earthrise photo."

The selected Phase I and II studies will explore the overall viability of a technology and develop them into mission concepts. Areas researchers will study include mapping asteroids and other small bodies in the solar system with hopping probes, making pharmaceuticals on-demand in space, and extracting water on the Moon. Several of the concepts could

inform capabilities relevant to NASA's Artemis program, which will land the first woman and next man on the Moon in 2024 and establish a sustainable presence on and around the Moon by 2028.

NASA selected the proposals through a peer-review process that evaluates innovation and technical viability. All projects are still in the early stages of development, with most requiring a decade or more of technology maturation, and are not official NASA missions.

NIAC supports visionary research ideas through multiple progressive phases of study. Phase I studies receive $125,000 and are nine-month efforts. Eligible recipients of Phase I awards can submit proposals for a follow-on Phase II study. Selected Phase II researchers receive $500,000 grants to further develop their concepts for up to two years. Phase III is designed to strategically transition NIAC concepts with the highest potential impact for NASA other government agencies or commercial partners. Phase III researchers receive $2 million grants to develop and mature their mission concept over two years.

NIAC is funded by STMD, which is responsible for developing the new cross-cutting technologies and capabilities needed by the agency to achieve its current and future missions.

More information: For more information about NASA's investments in space technology, visit: www.nasa.gov/spacetech

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