HOUSE OF REPRESENTATIVES
TWENTY-SEVENTH LEGISLATURE, 2014
STATE OF HAWAII

H.B. NO. 2150 H.D. 1 S.D. 1

A BILL FOR AN ACT

RELATING TO THE PACIFIC INTERNATIONAL SPACE CENTER FOR EXPLORATION SYSTEMS' PLANETARY SUSTAINABILITY TECHNOLOGIES INITIATIVE.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF HAWAII:

SECTION 1. The legislature finds that the Pacific international space center for exploration systems stimulates economic growth for the State, promoting the establishment and growth of new sustainable and green industries, associated jobs, workforce development, internships, and science, technology, engineering, and mathematics education programs. The Pacific international space center for exploration systems focuses on the validation and verification of planetary surface systems and technologies and works to apply these systems and technologies within the State to support economic growth and diversification. The Pacific international space center for exploration systems is an important part of the State's emerging aerospace sector.

The legislature further finds that the National Aeronautics and Space Administration is working to improve technologies for sustaining human exploration for increasingly greater distances and durations beyond Earth. The State can use these technologies to improve economic development opportunities and

develop resident expertise in self-sufficient technologies that will advance the frontiers of space exploration and the future well-being of the State, including but not limited to, applications in renewable energy, advanced water reclamation, and basaltic construction. By engaging in applied research and development to demonstrate and evaluate self-sufficient technologies, the State will not only leverage its unique geographical resources to significantly advance the frontiers of space, but also enable local developers to evaluate how these technologies could be adapted to promote near-term terrestrial applications statewide.

The legislature additionally finds that the Pacific international space center for exploration systems is currently researching and field testing the use of basalt material for construction, as an alternative to traditional concrete currently imported into the State from the mainland. The Pacific international space center for exploration systems is leading this research in collaboration with the National Aeronautics and Space Administration Ames Research Center, Stanford University, National Aeronautics and Space Administration Kennedy Space Center, and the University of Hawaii at Manoa. Living and operating on the moon or on another

planet, such as Mars, will require stabilizing the planetary surface to construct landing pads, berms, shelters, and other facilities. The State's volcanic basalt material simulating that of the moon and Mars provides an ideal location to test and validate planetary construction techniques using basalt materials. This research will not only advance future planetary exploration, but also enable the State to reduce its dependence on imported concrete in moving toward a more sustainable environment.

The Pacific international space center for exploration systems has initiated research and development to infuse more advanced manufacturing within the State, beginning with applications of three-dimensional laser printing technology. The Pacific international space center for exploration systems is now the lead researcher in the use of three-dimensional laser printers to sinter basalt "fines", which are small particles of basaltic powder produced by rock crushers in quarries. Application of this technology is instrumental in constructing small objects on planetary surfaces using indigenous materials. It also enables the development of construction materials from the State's stock of basalt fines, creating advanced manufacturing opportunities within the State. The Pacific

international space center for exploration systems is collaborating with leading advanced manufacturing organizations such as Jenoptics, Honeybee Robotics, and Made In Space to advance this research with applications across the State.

The legislature also finds that the Pacific international space center for exploration systems is partnering with Planetary Power, Inc., to assess high technologies in the area of renewable energy generation. Planetary Power, Inc., has made recent advances in solar concentrator energy systems that provide high efficiency, off-grid power. The Pacific international space center for exploration systems requires such power systems to support remote field tests at various lunar and Mars analog test sites on the island of Hawaii. These systems also could provide off-grid power for emergency response services during natural and man-made disasters. In addition, the Pacific international space center for exploration systems and several renewable power technology companies are investigating the use of methane-based energy systems, as methane can be produced in the State from bio-digesters currently under development at the University of Hawaii-Hilo. The Pacific international space center for exploration systems is also working with these renewable energy companies to assess

marketing opportunities and identify candidates for early adopters of these technologies throughout the State, including options to locate Planetary Power, Inc., manufacturing and production jobs in the State for the company's power systems.

Furthermore, California legislators are interested in collaborating with the State to develop and promote self-sufficient technologies, with the goal of leveraging both National Aeronautics and Space Administration and private sector assets and expertise in "real-world" field operations to promote "living off the land" scenarios that will rapidly advance planetary exploration, as well as multiple terrestrial applications of sustainable technologies.

Matching funds, appropriated through companion legislation in California, will be used to help meet California's goals of energy efficiency, renewable energy development, water use efficiency, waste management, and sustainable construction by increasing and accelerating sustainable measures and strategies. California technology companies and the National Aeronautics and Space Administration will have the opportunity to test innovative technology solutions in Hawaii, providing new market and manufacturing areas for these groups throughout the State.

As such, Hawaii and California will partner to conduct joint research in planetary sustainability through planetary sustainability technology demonstrations and university competitions. University-based competitions will be based on proposals within fourteen technology areas identified by California's planetary sustainability showcase. Each competition must include at least one team from California and one from Hawaii, with each team demonstration linked to technologies that support both terrestrial as well as planetary surface applications. The goal of this project is to enable California and Hawaii to fund compelling technology demonstrations relative to planetary sustainability. Technologies will be chosen that have dual-use applications in at least one of three areas:

(1) Basaltic construction/fabrication, including three-dimensional printing;

(2) Off-grid, renewable energy; and

(3) Water reclamation.

Technologies selected from California will be tested in Hawaii, with the goal of growing these technologies and providing opportunities to expand their application in Asia-Pacific markets.

The purpose of this Act is to provide state funding for the Pacific international space center for exploration systems' planetary sustainability technologies initiative in partnership with California. As the National Aeronautics and Space Administration develops better technologies for sustaining human exploration for greater distances and durations beyond Earth, the State can use these technologies to diversify economic development options and develop resident expertise in self-sufficient technologies that will promote both space exploration and the future well-being of the State.

SECTION 2. There is appropriated out of the general revenues of the State of Hawaii the sum of $ or so much thereof as may be necessary for fiscal year 2014-2015 for the purpose of supporting Pacific international space center for exploration systems' planetary sustainability technologies initiative with the State of California; provided that:

(1) No funds shall be made available under this Act unless the State of California, through companion legislation, provides a dollar-for-dollar match of funds for the purposes for which this sum is appropriated;

(2) Up to $200,000 of the appropriated amount shall be targeted for planetary sustainability technology demonstrations; and

(3) Up to $50,000 of the appropriated amount shall be used for university-based competitions.

The sum appropriated shall be expended by the Pacific international space center for exploration systems for the purposes of this Act.

SECTION 3. This Act shall take effect on July 1, 2050.

H.B. NO. 2150 H.D. 1 S.D. 1

Report Title:
Pacific International Space Center for Exploration Systems' Planetary Sustainability Technologies initiative; Appropriation

Description:
Appropriates funds to support planetary sustainability technology demonstrations and university-based competitions. Effective 7/1/2050. (SD1)

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