



**DEPARTMENT OF BUSINESS,  
ECONOMIC DEVELOPMENT & TOURISM**

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**NEIL ABERCROMBIE**  
GOVERNOR

**RICHARD C. LIM**  
DIRECTOR

**MARY ALICE EVANS**  
DEPUTY DIRECTOR

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Statement of

**RICHARD C. LIM**  
**Director**

Department of Business, Economic Development & Tourism

before the

**HOUSE COMMITTEE ON FINANCE**

Tuesday, February 25, 2014

11:15 a.m.

State Capitol, Conference Room 308

in consideration of

**HB 2150, HD1**

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

Chair Luke, Vice Chairs Nishimoto and Johanson, and members of the Committee. The Department of Business, Economic Development and Tourism supports the intent of this bill to provide matching state funding to support planetary sustainability technology demonstrations and university-based competitions in partnership with the State of California and the NASA Ames Research Center.

This initiative is designed to promote dual-use technologies that can be applied to both extend human exploration of space for greater distances and durations beyond Earth, as well as diversify economic development options on Earth through applications of self-sufficient technologies related to basaltic construction, off-grid renewable energy, and water reclamation.

We support this measure provided that its passage does not replace or adversely impact priorities indicated in the Executive Budget.

Thank you for the opportunity to testify on this bill.

DENNIS "FRESH" ONISHI  
Council Member  
District 3



PHONE: (808) 961-8396  
FAX: (808) 961-8912  
EMAIL: [donishi@co.hawaii.hi.us](mailto:donishi@co.hawaii.hi.us)

## HAWAI'I COUNTY COUNCIL

25 Aupuni Street, Hilo, Hawai'i 96720

February 24, 2014

The Honorable Sylvia Luke, Chair  
and Members of the Committee on Finance

Dear Representative Luke and Committee Members,

The Pacific International Space Center for Exploration Systems, or PISCES, will play a key role in developing the technology that will allow humans to live on the moon and Mars.

I support House Bill 2150 because it will generate economic development for Hawai'i Island and around the State.

PISCES has been working with national and international space agencies to use Hawai'i as an effective simulator for a long-term human presence on the Moon and Mars.

This bill will allow PISCES to build on its gains from recent years by providing matching funds with the state of California for planetary sustainability technology demonstrations and university-based competitions.

Further, the technologies that will be developed – basaltic construction and fabrication, off-grid renewable energy and water reclamation – will spur sustainable living for others here on Earth.

Thank you for the opportunity to provide testimony in support of this bill.

Sincerely,

Dennis "Fresh" Onishi  
Hawai'i County Council Member



# UNIVERSITY OF HAWAI'I SYSTEM

## Legislative Testimony

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Testimony Presented Before the  
House Committee on Finance  
February 25, 2014 at 11:15 a.m.

by  
Donald O. Straney  
Chancellor, University of Hawai'i at Hilo

### HB 2150 HD1 – RELATING TO THE PACIFIC INTERNATIONAL SPACE CENTER FOR EXPLORATION SYSTEMS' PLANETARY SUSTAINABLE TECHNOLOGIES INITIATIVE

Chair Luke, Vice Chairs Nishimoto and Johanson and Members of the Committee:

My name is Donald Straney, Chancellor of the University of Hawai'i at Hilo (UH Hilo). We support the intent of HB 2150 HD1 to fund the Pacific International Space Center for Exploration Systems (PISCES) to support planetary sustainability technology demonstrations and university-based competitions.

This proposal will help stimulate the growth and diversification of our State economy through applied aerospace research, the development, testing and evaluation new technologies that support the exploration of space and the creation of high-tech careers. UH Hilo views the proposal as an opportunity to collaborate with PISCES to provide higher education and career options to the people of our Hawai'i Island.

We support HB 2150 HD1 provided its passage does not replace or adversely impact priorities in our BOR approved budget.

Thank you for the opportunity to testify on HB 2150 HD1. Aloha.



January 29th, 2014

Jim Crisafulli  
Office of Aerospace Development  
Dept. of Business, Economic Development & Tourism  
State of Hawaii  
Honolulu, Hawaii 96813

Dear Jim:

Per our recent discussions concerning aerospace initiatives in Hawaii, I commend your State for its visionary efforts to help grow and diversify both your local aerospace industry and our national space program. Hawaii has many diverse resources, capabilities and advantages that can positively contribute to our national space endeavors.

For example, your strategic mid-Pacific location and long-standing ties with nations across Asia and the Pacific make the islands an ideal site to support collaborative international scientific, educational, and commercial development programs related to space exploration. In particular, the Big Island's diverse volcanic terrain is most suitable for developing an analog lunar base to test and evaluate new technologies to support future robotic/human missions to the moon and Mars.

Hawaii also has resident expertise in space-related fields, with over forty NASA principal investigators at the University of Hawaii performing ongoing research in astronomy, planetary geosciences, robotics, satellite communications, laser-based power systems, and other technologies critical for supporting future space exploration missions around and beyond planet Earth.

The NASA Space Portal fully recognizes these strategic advantages, and looks forward to our continued collaboration with the State of Hawaii in advancing our nation's space exploration efforts. In my role as the NASA ex-officio member of the PISCES board, I would like to endorse the activities proposed by the three following Senate Bills that will help advance our mutual goals: H.B. No. 2152, "A Bill for An Act Relating to the Pacific International Space Center for Exploration Systems (PISCES)", H.B. No. 2150, "A Bill for an Act Relating to the PISCES Planetary Sustainability Technologies Initiative", and H.B. No. 2151, "A Bill for an Act Relating to the PISCES NASA Laser Communications Ground Station Initiative".

Sincerely and with best wishes,

A handwritten signature in blue ink that reads "Dan J Rasky".

Dr. Daniel J. Rasky  
Director, Space Portal, NASA Research Park  
Senior Scientist, NASA Ames Research Center  
M/S 555-3, Moffett Field, CA 94035  
Phone/fax: (650) 604-1098/4666

*International Ventures Associates*

January 29, 2014

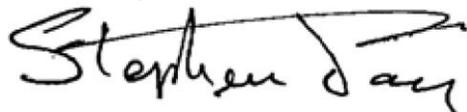
To: Members of the 27th Hawaii State Legislature:

I am writing as a member of the Hawaii Aerospace Advisory Committee (HAAC), and previous chairman of JUSTSAP, where I served for seven years.

In previous years, I have submitted testimonials for initial and continued funding for the Pacific International Space Center for Exploration systems (PISCES). I would like to do so again for House Bills 2150, 2151, and 2152.

In my judgment, these bills enhance Hawaii's competitive position in the international Aerospace sector, and provide an "accelerator" for important R&D projects, facilities testing, and higher skilled labor for the State - as PISCES develops funded projects that will no longer require State funding over the coming years. PISCES is developing a positively differentiated capability that the great State of Hawaii has incubated and nurtured, and that is now on the verge of providing sustainable ROI benefits.

Sincerely,

A handwritten signature in black ink that reads "Stephen Day". The signature is written in a cursive style with a horizontal line extending from the end of the name.

Stephen Day  
President, International Ventures Associates

*IVA, 5333 Potomac Avenue, Suite 100, Washington, DC 20016*



January 29, 2014

Mr. Jim Crisafulli, Director  
Office of Aerospace Development  
Strategic Industries Division  
DBEDT/State of Hawai'i  
P.O. Box 2359  
Honolulu, HI 96804

Dear Mr. Crisafulli and Members of the 27<sup>th</sup> Hawaii State Legislature:

I am very pleased to provide testimony in strong support of the State of Hawaii's efforts through Senate bills HB2150, HB 2151 and HB 2152 to continue development and promote the evolution in capabilities of the Pacific International Space Center for Exploration Systems (PISCES) into a world-class space center in Hawaii that can facilitate the design, testing, and validation of new technologies that support both robotic and human missions to space. Due in large measure to the State of Hawaii's steadfast support for PISCES during the past five years - as well as that of the PISCES team, led by former NASA Flight Director Mr. Robert Kelso - PISCES continues to make notable progress in laying the strategic foundation for such an ambitious endeavor, including endorsements by NASA, Google, Planetary Power, and other private sector and academic organizations involved in development of technologies that will be enabling to lunar and planetary exploration as well as to the future environmental and economic well being of the State of Hawaii. However, their efforts must continue to receive your unwavering support.

I continue to informally serve as a senior industry advisor and staunch advocate for the PISCES team; I am a seventeen-year participant in Hawaii's JUSTSAP forum (recently renamed PISA); I am currently the Chief Executive Officer of JAMSS America, Inc. (a U.S. registered aerospace company with U.S. and international contracts); I formerly served as Senior Vice President of SPACEHAB, Inc.; and, served as a former project manager within the NASA Mission Operations Directorate at the Johnson Space Center. My continuous 47 years in the U.S. aerospace business have made me acutely aware of the unique challenges that space exploration places on human innovation as well as on the resource limitations of sponsoring federal, state and local government, private sector and university organizations. However, it is my experience that the best way to mitigate project and program costs during space exploration hardware and software product development cycles is through rigorous planning on the front end and through use of those research and testing facilities that can best represent the in-space environments within which robots and human space explorers will conduct their actual operations using these products. Hawaii and PISCES provides such a research environment! As those whom I support within PISCES know, as a young NASA engineer during the Apollo Program, I was indeed fortunate to accompany several of the Apollo crews to the Big Island where they experienced a simulated lunar surface training environment unlike any other on Planet Earth. To a crewmember, each Apollo astronaut returning from the moon said that Hawaii was the most useful training environment that they experienced during their extensive geologic and surface operations training program.

With the establishment of the highly successful International Space Station Program, space utilization and exploration programs have become increasingly multinational in nature. Many nations have now executed robotic Earth orbit, lunar and planetary missions; Japan has returned surface debris samples from a far-away asteroid; ESA is within months of landing a robotic spacecraft on a comet; China has landed a robotic spacecraft on the lunar surface; India has a robotic spacecraft en route to Mars; and NASA is currently working with other space agencies and a growing number of commercial entities planning for



the start of expeditions to other worlds using their new Orion Spacecraft and mammoth Space Launch System rocket.

As an avid participant in several of these exploration initiatives, I am proud to have been a part of the evolution of Hawaii's PISCES organization and its capabilities and I have been encouraged by the continuing and enthusiastic bipartisan support received for PISCES from your office and from the State of Hawaii's Legislature. NASA also has taken note in your collective support - as have international space agencies, private sector companies and universities - and PISCES has received contract funding over the past five years from multiple sources to support technology development projects within NASA, CSA, DLR and private sector organizations. Within my familiar territory of Japanese industry, academia and the Japan Aerospace Exploration Agency (JAXA), I continue to speak to top management in each sector about the many opportunities for exploration technologies development, test and checkout that PISCES offers. I anticipate an ever-growing interest within Japan for collaboration with other international organizations in the utilization of Hawaii's PISCES assets going forward.

In particular, I strongly endorse the current PISCES plans to promote the use of PISCES assets in support of basaltic-based construction materials, in-situ resources utilization and integrated resources extraction technologies, a planetary analog test site, a secondary school's lunar surface flight experiment, and an international robotics mining competition. Additionally, PISCES plans to develop and beneficially exploit the applications of self-sufficient technologies in renewable energy, water reclamation and basaltic construction will inevitably result in benefits to local, State and National ground and space-based scientific, technological, educational and economic interests. Lastly, the development of a laser communications technology research center in Hawaii will further solidify Hawaii's and PISCES's reputation as forward thinking entities who intend to position themselves at the forefront of our nations efforts to directly improve life on Earth while developing technologies essential to robotic and human exploration of the cosmos. The increasing number of cash and in-kind and "investors" in PISCES programs including NASA, the State of California and Google among others is further evidence of the return-on-investment the State of Hawaii is receiving for its funding support to PISCES through the passage of bills such as those currently being considered.

Jim, and Rob Kelso, I applaud and encourage the continuation of your Hawaii aerospace and PISCES leadership. I also encourage the Hawaii State Government to continue its support of our nation's space exploration program through continuing funding support of PISCES. With the PISCES team of professionals and its access to the abundant resources of the Hawaiian Islands, along with your continuing support through the passage of these three legislative bills, I am confident that PISCES has a great future ahead!

My very best wishes for your continued success,

A handwritten signature in cursive script that reads 'Dan A. Bland'.

Dan A. Bland

Chief Executive Officer  
JAMSS America, Inc.  
16055 Space Center Blvd.  
Houston, Texas 77062



TESTIMONY IN SUPPORT OF HB2150– RELATING TO THE PACIFIC INTERNATIONAL SPACE CENTER FOR EXPLORATION SYSTEMS’ (PISCES) PLANETARY SUSTAINABILITY TECHNOLOGIES INITIATIVE.

Dear Members of the 27th Hawaii State Legislature,

I strongly support the intent of this bill to provide Hawaii State funding to PISCES, on a dollar-for-dollar matching basis with the State of California, to develop with NASA a variety of self-sufficient technologies related to basaltic construction, off-grid, renewable energy, and water reclamation.

I believe this joint technology development effort represents a valuable opportunity for Hawaii to lever its unique geography and the capabilities of PISCES to secure a major role in the development of these important new technologies and to do so with two highly motivated and resourceful partners – California and NASA. California is a major contributor to the nation’s space exploration efforts, has been leading the nation in the development and financing of alternative and sustainable energy technologies such as hydrogen fuel cells and is also driven by the growing water needs of its people, industry and farmers to reclaim and more efficiently manage scarce water resources. Entrepreneurs and venture firms in California have also been prominent founders and backers of 3D printing companies, including Made In Space, a recent new development partner of PISCES.

The technology demonstrations and university competitions funded by this bill have the potential to create a powerful and mutually beneficial alliance tying Hawaii and California more closely together in the development of these important future technologies. Perhaps as important, the initiative will help encourage and support the STEM education and workforce training required to build these new industries. This initiative also carves out a valuable testing and demonstration niche for the State of Hawaii that may attract other states, countries, universities and corporations. In short, this initiative appears to provide the State of Hawaii with an equal seat at the table with a very capable partner, California, for what may prove to be a very important aspect of future economic development here on Earth as well as in space.

I therefore strongly encourage you to pass HB2150 with the requested funding allocation. I am available to answer any questions you may have and can be reached at 832.628.1730 or by email at [rkelso54@gmail.com](mailto:rkelso54@gmail.com).

Thank you for the opportunity to testify on this bill.

Aloha,

Signed by

A handwritten signature in black ink, appearing to read "R. Kelso", written over a white background.

Robert M. Kelso

Executive Director, PISCES

January 28, 2014

Members of the 27<sup>th</sup> Hawaii State Legislature

Re: Support for House Bills (HB) 2150, 2151 and 2152

Dear State Senators and State Representatives:

Ferraro Choi is a leader in the design of sustainable educational and research projects throughout the State of Hawaii and the Pacific. On the Island of Hawaii we were the architects for the USDA Institute for Pacific Islands Forestry Laboratory, the NELHA Gateway Energy Center and the West Hawaii Exploration Academy charter school. We have worked with NOAA on the planning and design of research and outreach facilities on Oahu, Maui, Kauai and throughout the Papahānaumokuākea Marine National Monument. In Antarctica we designed the Amundsen Scott South Pole Station and various remote support facilities for the National Science Foundation in conjunction with NASA as an analog for lunar and Mars habitats. Closer to home, we recently completed the design of the Stevenson Middle School's Science Center which will house among other projects, the school's award winning robotics program.

Ferraro Choi is in support of SB2583 to provide matching funds in partnership with NASA to assess the feasibility of a laser communication ground station in Hawaii. If established, the ground station would connect Hawaii to the 21<sup>st</sup> century network of super high speed optical communications to spacecraft and extraterrestrial sites on the moon and asteroids. It can stimulate and enhance STEM programs in elementary and secondary schools and provide opportunities for research at our university. If not enacted, Hawaii may be left behind in the space communications network.

We support SB2584 for applied research in self sufficient and sustainable technologies in partnership with the State of California and NASA. Hawaii's remote geographic location and unique natural resources are an analog for extraterrestrial settlement. They also provide our state an opportunity to move forward in independence from polluting energy sources and reduce importation of building materials. This bill will enable research in alternative basaltic construction modules, three dimensional printing, renewable energy systems, and water reclamation all systems.

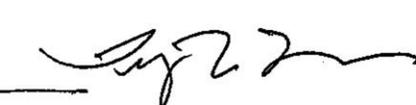
We also support SB2585 for the procurement of land for the construction of the PISCES administrative offices and test facility on Hawaii Island. The project is currently in the pre-design and site investigation stage. Its development will initially support the design and construction industry in the state and thereafter attract a multitude of high technology institutions and national space programs to test their equipment *insitu* at this unique facility.

We respectfully ask your support of these bills during your legislative session. Thank you for your consideration.

Sincerely,



Joe Ferraro, FAIA, LEED AP  
Principal



William Brooks, AIA, LEED AP  
Principal

Troy Miyasato, AIA, MBA  
Principal

Hoyt L. Davidson  
Managing Partner  
Near Earth LLC  
243 Tresser Boulevard, 17<sup>th</sup> Floor  
Stamford, CT 06901

January 21, 2014

TESTIMONY IN SUPPORT OF HB2150 – RELATING TO THE PACIFIC INTERNATIONAL SPACE CENTER FOR EXPLORATION SYSTEMS' (PISCES) PLANETARY SUSTAINABILITY TECHNOLOGIES INITIATIVE.

Dear Members of the 27<sup>th</sup> Hawaii State Legislature,

I strongly support the intent of this bill to provide Hawaii State funding to PISCES, on a dollar-for-dollar matching basis with the State of California, to develop with NASA a variety of self-sufficient technologies related to basaltic construction, off-grid, renewable energy, and water reclamation.

I believe this joint technology development effort represents a valuable opportunity for Hawaii to lever its unique geography and the capabilities of PISCES to secure a major role in the development of these important new technologies and to do so with two highly motivated and resourceful partners – California and NASA. California is a major contributor to the nation's space exploration efforts, has been leading the nation in the development and financing of alternative and sustainable energy technologies such as hydrogen fuel cells and is also driven by the growing water needs of its people, industry and farmers to reclaim and more efficiently manage scarce water resources. Entrepreneurs and venture firms in California have also been prominent founders and backers of 3D printing companies, including Made In Space, a recent new development partner of PISCES.

The technology demonstrations and university competitions funded by this bill have the potential to create a powerful and mutually beneficial alliance tying Hawaii and California more closely together in the development of these important future technologies. Perhaps as important, the initiative will help encourage and support the STEM education and workforce training required to build these new industries. This initiative also carves out a valuable testing and demonstration niche for the State of Hawaii that may attract other states, countries, universities and corporations. In short, this initiative appears to provide the State of Hawaii with an equal seat at the table with a very capable partner, California, for what may prove to be a very important aspect of future economic development here on Earth as well as in space.

I therefore strongly encourage you to pass HB2150 with the requested funding allocation. I am available to answer any questions you may have and can be reached at (203) 355-3527 or by email at [hoyt@nearearthllc.com](mailto:hoyt@nearearthllc.com).

Thank you for the opportunity to testify on this bill.

Aloha,

A handwritten signature in black ink, appearing to read "Hoyt Davidson". The signature is written in a cursive style with a long horizontal flourish at the end.

Hoyt Davidson



**SHACKLETON ENERGY COMPANY**  
3511 Caldwell Lane, Del Valle, TX 78617-3017

24<sup>th</sup> January 2014

**Testimony in Support of HB2150  
Relating to the Pacific International Space Center for Exploration Systems (PISCES)  
Planetary Sustainability Technologies Initiative**

Dear Members of the 27<sup>th</sup> State Legislature

I strongly support the intent of this bill to provide Hawaii State funding to PISCES, on a dollar-for-dollar matching basis with the State of California, to develop with NASA a variety of self-sufficient technologies related to basaltic construction, off-grid, renewable energy, and water reclamation.

There exists a gathering resurgence of commercial space exploration initiatives that include both surface to space launch activities but of more relevance a number of in-space commercial companies established to provide services such as resource utilization, habitation, autonomous operations and other activities.

The development and utilization of sustainability technologies for the benefit of communities in Hawaii, California and elsewhere is vital to our future State economy and its population. By supporting this Bill, we are demonstrating not only responsibility to the present but an actionable accountability to the future.

The unique geology of the Islands of Hawai'i serves as the ideal testing ground for these and many other operational functions. More than that, the equitable location between the Americas and Asia provides a convenient convergence for a great majority of the participants involved in this field to cooperate and collaborate.

It is essential that this facility receives the required financing for staff and capital equipment to perform these projects which will provide jobs, education and inspiration for an entire generation.

In light of the above, I strongly support the intent of HB2150 and would urge the Legislature to appropriate the full funding amount requested through this legislation.

Best regards

Jim Keravala  
Chief Operating Officer  
Shackleton Energy Company, Inc.  
+1 650 387 0844  
jim.keravala@shackletonenergy.com  
www.shackletonenergy.com

**"Fueling the Space Frontier"**

January 21, 2014

TESTIMONY IN SUPPORT OF HB2150 – RELATING TO THE PACIFIC INTERNATIONAL  
SPACE CENTER FOR EXPLORATION SYSTEMS (PISCES) PLANETARY SUSTAINABILITY  
TECHNOLOGIES INITIATIVE

Dear Members of the 27<sup>th</sup> Hawaii State Legislature,

We strongly support the intent of this bill to provide Hawaii State funding to PISCES, on a dollar-for-dollar matching basis with the State of California, to develop with NASA a variety of self-sufficient technologies related to basaltic construction, off-grid, renewable energy, and water reclamation.

For over two decades Paragon Space Development Corp has been directly involved in space, commercial space and space research. We have a deep understanding of the benefits that projects like the one being supported by Bill HB2150 provide. In today's day and age, collaborative agreements between organizations like PISCES and NASA will expedite the development of new technologies with applications for space as well as Earth.

The work to be funded by this bill will have strong benefits to the State of Hawai'i. The technology supported by this bill will help Hawai'i move towards a more sustainable position with regards to renewable energy, construction materials and water reutilization, all critical factors for an island environment. This will also support the STEM initiative and create local technology job opportunities on the island, benefiting the children of Hawai'i who wish to pursue a career in science.

Therefore we strongly support the passing of HB2150.



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Jane Poynter  
Chairwoman and President  
Paragon Space Development Corp.

**George R. Ariyoshi**  
**999 Bishop Street, 23<sup>rd</sup> Floor**  
**Honolulu, HI 96813**

**February 3, 2014**

TESTIMONY IN SUPPORT OF HB2150 - RELATING TO THE PISCES  
PLANETARY SUSTAINABILITY TECHNOLOGIES INITIATIVE

Dear Members of the 27<sup>th</sup> State Legislature,

I strongly support the intent of this bill to provide matching state funds (in partnership with the State of California and the NASA Ames Research Center) to enable the development of technologies that can advance both human exploration of the Cosmos as well as Earth-based applications of self-sufficient technologies (e.g., related to basaltic construction, off-grid renewable energy, and water reclamation) that can expand and diversify economic development options for our State.

This collaborative technology development effort represents a valuable opportunity for Hawaii to leverage our State's unique geography and the resources and capabilities available at PISCES to secure a major role in the maturation and utilization of these pioneering technologies.

Historically, California has played a major role in developing our nation's space exploration capabilities, and also has been a leader in the development and financing of alternative and sustainable energy technologies (such as hydrogen fuel cells), as well as the reclamation and efficient management of scarce water resources. In addition, entrepreneurs and venture firms in California have been prominent founders and backers of next-generation 3D printing companies, such as Made In Space – a new industrial partner working with PISCES to support the development and application of basaltic material construction in Hawaii.

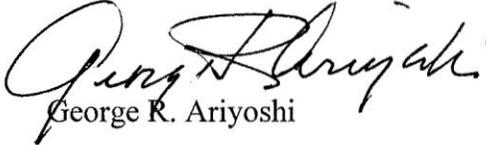
The technical demonstrations and university competitions to be funded through this bill have the potential to create a powerful and mutually beneficial alliance linking Hawaii and California more closely toward the development of these revolutionary technologies. Equally important, this measure will both encourage and support the STEM

education and workforce training programs required to launch these new industries, as well as help establish a valuable testing and demonstration niche for our State that may well attract participation by other state governments, universities and corporations. In short, this initiative will help provide Hawaii with an "equal seat at the table" engaging a very capable and experienced partner (the State of California) to promote innovative economic development opportunities in space as well as on Earth.

As such, I would urge you pass HB2150 with the requested matching fund allocation. I would be happy to address any questions you may have concerning this recommendation, and may be reached by e-mail at [kyahiku@wik.com](mailto:kyahiku@wik.com) , by phone at (808) 544-6765, or by fax at (808) 544-8398.

Thank you for the opportunity to testify on this bill.

Aloha,



George R. Ariyoshi

GRA:khy

Testimony in strong support of Hawaii State Bills HB2150, 2151, and, 2152

Statement of Lewis L. Peach, Jr., NASA (retired), and PISCES Board Secretary

To the Members of the 27th Hawaii State Legislature:

I would like to thank you for the opportunity to offer my strongest endorsement for Hawaii State Bills - HB2150, 2151, and, 2152 to provide continued international leadership in space with the establishment and operation the Pacific International Space Center for Exploration Systems (PISCES).

Having been involved with the development of this exceptional capability for much of its definition and execution phases, it has been very rewarding to see it coming to fruition, so I would like to commend the Great State of Hawaii for the outstanding leadership you are demonstrating by establishing this unique and vitally important capability that will serve Hawaii, the United States, and the international space community, as a premier planetary analog test bed to help prepare for humanity's next bold frontier - the scientific investigation, sustainable exploration, commercial development, and settlement of space.

If the unfortunate circumstances of our Nation's involvement in two World Wars helped establish America as a world super power, certainly our Nation's leadership in space has cemented the US as the technological leader and economic power that has enhanced the quality, prosperity, and well being of our Nation for more than five decades.

Many of the products and services that we now take for granted have direct origins to the technological and scientific advances that resulted from our leadership in space, and this relatively modest investment in our future has provided an exceptional returns that far outweigh their costs.

During my tenure as Director of Advanced Programs at NASA, I co-founded the NASA/NSF Antarctic Analog Program, which continues to serve the international space community as an important capability to validate some of the scientific investigations we will undertake in planetary science for the foreseeable future. Many of NASA's current leaders in planetary science participated in these investigations over the past nearly 25-years since it's founding in 1990.

I also supported other analog research in the northern arctic regions, and in the desert southwest, as well as at most of the NASA centers, as we have found that it is essential to conduct high-fidelity technology development and scientific research investigations in a highly relevant analog research environment.

Fortunately, Hawaii provides one of the very best analog sites to develop, test

and validate the technologies, capabilities and systems that will be required to realize conduct the future scientific and human exploration missions that are being planned within NASA, and by our international space partners, as well as by a growing and vigorous commercial space community.

By virtue of the investments that you are making today in supporting this unique and urgently needed capability, PISCES will undoubtedly help assure Hawaii's leadership role in this challenging new frontier, an investment that will also contribute substantially the economic prosperity and well being of the State, while also inspiring the State's future aerospace workforce to pursue Science, Technology, Engineering and Math (STEM) related academic training in your schools and universities.

I would like to close by thanking you for the opportunity to serve as Secretary to the PISCES Board of Directors, and again , strongly encourage your continued leadership in supporting PISCES - a timely and vitally important asset for not only your State, but also for our Nation, and for the broader international space community.

Thank you for the opportunity to testify on this important Legislation and opportunity for Hawaii, and for our Nation.



Lewis L. Peach, Jr.  
Aerospace Consultant  
Former Director, Advanced Programs, NASA (retired)  
Secretary, PISCES Board of Directors

Harvey S. Tajiri  
569 Puloku Street  
Hilo, HI 96720

TESTIMONY IN SUPPORT OF:

HB2150 and SB2584– RELATING TO THE PACIFIC INTERNATIONAL SPACE CENTER FOR EXPLORATION SYSTEMS (PISCES) PLANETARY SUSTAINABILITY TECHNOLOGIES INITIATIVE.

HB2151 and SB2583 – RELATING TO THE PACIFIC INTERNATIONAL SPACE CENTER FOR EXPLORATION SYSTEMS AND NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LASER COMMUNICATIONS GROUND STATION INITIATIVE.

HB2152 and SB2585 – RELATING TO THE PACIFIC INTERNATIONAL SPACE CENTER FOR EXPLORATION SYSTEMS.

Dear Members of the 27<sup>th</sup> Hawaii State Legislature,

I am writing in support of the passage of HB2150/SB2584, HB2151/SB2583 and HB2152/SB2585.

The State of Hawaii has a genuine need to broaden its economic base. We now have the opportunity to move towards that end.

Section I of all six measures aptly elucidates the positive aspects of their enactment and funding.

Your affirmative consideration of these six bills will be deeply appreciated.

Mahalo,

A handwritten signature in black ink, appearing to read "Harvey S. Tajiri". The signature is written in a cursive, flowing style.

Harvey S. Tajiri

Henk B. Rogers  
55 Merchant Street, 17<sup>th</sup> floor  
Honolulu, HI 96813

January 28, 2014

TESTIMONY IN SUPPORT OF HB2150 – RELATING TO  
THE PACIFIC INTERNATIONAL SPACE CENTER FOR  
EXPLORATION SYSTEMS (PISCES) PLANETARY  
SUSTAINABILITY TECHNOLOGIES INITIATIVE

Dear Members of the 27<sup>th</sup> State Legislature,

I strongly support the intent of this bill to provide matching Hawaii State funding to PISCES on a dollar-for-dollar matching basis with the State of California to develop with NASA a variety of self-sufficiency technologies related to basaltic material construction, renewable energy “off-grid” solutions as well as closed loop water reclamation.

These technologies are not only vital to our survival on other planets; they are the basis for our survival on this one.

As economic levels of people throughout the world rise, they will be asking for their fair share of the finite resources this planet has to offer. This is the reason for rising prices of oil and other commodities. Since we are an island state, the prices are much higher than anywhere else in the nation. Our electricity cost is four times the national average. We should not idly stand by and wait for solutions to be invented elsewhere and once again import them from other places. We should learn how to live off the land here in Hawaii. Indigenous building materials, energy generation and storage, efficient use of water and water reclamation are the key to our survival and to our prosperity.

We are very fortunate to be able to partner with California in the development of these technologies. Having a much larger population, they are able to put much more money into all of this R&D than Hawaii can. Cooperation between Hawaii and California has many other benefits.

The development of these technologies here in Hawaii will give our students a unique opportunity to be at the forefront Science and Engineering. They will gain the skills necessary to build and maintain these systems. At the end of the day, we will have a highly skilled labor force with high paying local jobs to keep our young people from having to go overseas to look for opportunities.

I strongly urge you to pass HB2150 with the requested funding allocation. You can reach me at 808-954-6100 or by e-mail at [henk@tetris.com](mailto:henk@tetris.com) should you have any questions about my testimony.

Thank you for the opportunity to testify on this bill.

Aloha,

A handwritten signature in black ink, appearing to read "Henk". The signature is stylized with a large, looped initial "H" and a long horizontal stroke extending to the right.

Henk B. Rogers

January 21, 2014

TESTIMONY IN SUPPORT OF HB2150 – RELATING TO THE PACIFIC INTERNATIONAL SPACE CENTER FOR EXPLORATION SYSTEMS (PISCES) PLANETARY SUSTAINABILITY TECHNOLOGIES INITIATIVE.

Dear Members of the 27<sup>th</sup> Hawaii State Legislature,

As a middle school Science teacher in the state of Hawai'i and a former Biosphere 2 crew member, I understand the value that the research and work that this bill will fund, therefore, I support the intent of this bill to provide Hawaii State funding to PISCES, on a dollar-for-dollar matching basis with the State of California, to develop with NASA a variety of self-sufficient technologies related to basaltic construction, off-grid, renewable energy, and water reclamation.

The work to be funded by this bill will have strong benefits to the State of Hawai'i. The technology supported by this bill will help Hawai'i move towards a more sustainable position with regards to renewable energy, construction materials and water reutilization, all critical factors for an island environment. This will also support the STEM initiative and create local technology job opportunities on the island, benefiting the children of Hawai'i who wish to pursue a career in science.

One of the biggest challenges we see the students of Hawai'i facing is the lack of science or technology related jobs available on the island. This causes those students who wish to remain on the island to lose interest in science, or those who are interested in science look to move outside of the island. The opportunities that the projects in which PISCES is involved have a tremendous value for the future generations in Hawai'i. Therefore I strongly support the passing of HB2150.

Mahalo.

Charlotte Godfrey-Romo  
1445 Waianuenue Ave  
Hilo, HI 96720



**BUZZ ALDRIN**  
*Astronaut*

01/28/2014

Testimony in strong support of Hawaii State HB2150, HB2151, and HB2152

Statement of Buzz Aldrin, Apollo XI

To the Members of the 27th Hawaii State Legislature:

I am pleased to offer my strongest endorsement of Hawaii State Bills HB2150, HB2151, and HB2152, which will provide continued support for the Pacific International Space Center for Exploration Systems (PISCES).

I commend the Great State of Hawaii for the outstanding leadership you are demonstrating in developing and maintaining this unique and vitally important capability that will serve Hawaii, the United States, and the international space community as a premier planetary analog test bed to help prepare for humanity's next bold frontier - the scientific investigation, sustainable exploration, commercial development, and settlement of space.

One of the most important lessons learned from our remarkably successful Apollo experience was the need to conduct high-fidelity simulation and training sessions in a highly relevant analog research environment, and Hawaii provides perhaps the best site on Earth to develop, test and validate the technologies, capabilities and systems that will be required to realize the vision I have articulated above.

The investment that you are making today in supporting this urgently needed capability will undoubtedly assure Hawaii a unique leadership role in this challenging new frontier – an investment that will also contribute substantially to the economic prosperity and well being of the State, while also inspiring Hawaii's future aerospace workforce to pursue Science, Technology, Engineering and Math (STEM) related academic training in your schools and universities.

I have had the pleasure of personally attending and participating in several PISCES conferences and workshops over the past several years, and have seen, first hand, how well this new capability is coming together. As such, I urge you to continue to support its development and operations so it can achieve its full potential to meet this critical need for our space program – an investment that I am confident will be returned many fold to the great State of Hawaii.

As you may be aware, I recently published my latest book – *Mission to Mars, My Vision for Space Exploration* – in which I lay out my long term strategy for the exploration and settlement of space, as well as the steps I feel are required to implement this strategy. As I emphasize in my book, it is my view that future journeys into space can and will begin here in Hawaii - with innovators, scientists, technologists, and explorers from across the world conducting vital research at PISCES on the Big Island. These Hawaii-based experiments will subsequently be operated tele-robotically from other sites around our planet to simulate the control of lunar robots on the surface of the Moon from stable orbits near our natural satellite - thus reducing the time delays associated with attempting to conduct these operations from Earth.

Ultimately, I expect this approach will enable space commerce on the surface of the Moon on a scale that we have yet to anticipate, and that PISCES will continue to serve as the premier Earth-based proving ground for these systems for the foreseeable future.

In the longer term, having demonstrated the value of conducting these planetary research investigations with PISCES, I anticipate we will use these same capabilities and procedures to prepare for a permanent international settlement of Mars by exploiting the moons of Mars to conduct similar, nearly real-time tele-robotic operations on the Martian surface.

This approach would afford PISCES several decades of sustained pioneering research on the Big Island, bringing long-term development and prosperity to this region, and indeed to all islands of Hawaii.

In support of the vision I have articulated in my new book, I have spent the past six-months meeting with senior leadership in the U.S. Administration and on the Hill, and have hosted book signings and forums all over the world. At each venue I have also made it clear that this bold journey into space can begin with PISCES and the Great State of Hawaii.

By supporting PISCES through the legislation before you today, you will affirm that Hawaii will expand its role as a leader in the international exploration and development of space, which in turn will afford exceptional economic and societal returns to humanity on Earth, as well as to the Aloha State – enhancing economic prosperity and wellbeing for generations to come.

I again, strongly encourage your continued leadership in supporting PISCES – a timely and vitally important asset not only for Hawaii, but also for our Nation and the broader international space community.

Thank you for the opportunity to testify on this important initiative.

Buzz Aldrin  
Apollo XI

A handwritten signature in black ink that reads "Buzz Aldrin". The signature is written in a cursive style and is underlined with a single horizontal line.

BUZZ ALDRIN