HB 2873, HD2

RELATING TO THE PACIFIC INTERNATIONAL SPACE CENTER FOR EXPLORATION SYSTEMS.

Description:

Transfers the Pacific International Space Center for Exploration Systems (PISCES) from the University of Hawaii to the Department of Business, Economic Development, and Tourism's Office of Aerospace Development. Establishes a PISCES board of directors. Appropriates funds. Authorizes the issuance of general obligation bonds. Effective July 1, 2112. (HB2873 HD2)

NEIL ABERCROMBIE
GOVERNOR

RICHARD C. LIM
DIRECTOR

MARY ALICE EVANS
DEPUTY DIRECTOR

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

No. 1 Capitol District Building, 250 South Hotel Street, 5th Floor, Honolulu, Hawaii 96813
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Statement of

RICHARD C. LIM
Director

Department of Business, Economic Development & Tourism
before the

SENATE COMMITTEES ON
PUBLIC SAFETY, GOVERNMENT OPERATIONS, AND MILITARY AFFAIRS
EDUCATION
AND
ECONOMIC DEVELOPMENT AND TECHNOLOGY

Thursday, March 15, 2012
2:45 p.m.
State Capitol, Conference Room 224
in consideration of

HB 2873 HD2

RELATING TO THE PACIFIC INTERNATIONAL SPACE CENTER FOR EXPLORATION SYSTEMS.

Chairs Espero, Tokuda and Fukunaga, Vice Chairs Kidani and Wakai, and members of the Committees. The Department of Business, Economic Development and Tourism supports the intent of this bill, especially as it addresses initiatives supportive of our goals and objectives, but we also are concerned about the potential cost implications generated by this legislation.

We recognize the substantial contributions PISCES has made to date, including its role in supporting aerospace research, education, and the development, testing and evaluation of innovative technologies to support the exploration of space.

DBEDT will work with the University of Hawaii and other interested parties to discuss the issues raised from this measure.

Thank you for the opportunity to testify on this bill.

UNIVERSITY OF HAWAI'I SYSTEM
Legislative Testimony

Testimony Presented Before the
Senate Committee on Public Safety, Government Operations, and Military Affairs
Senate Committee on Education
Senate Committee on Economic Development and Technology

Thursday, March 15, 2012 at 2:45 p.m.
by
Donald O. Straney, Ph.D.
Chancellor, University of Hawai`i at Hilo

HB2873 HD2 - RELATING TO THE PACIFIC INTERNATIONAL SPACE CENTER FOR EXPLORATION SYSTEMS

Chairs Espero, Tokuda, Fukunaga, Vice Chairs Kidani, Wakai and Members of the Committees:

My name is Donald Straney, Chancellor of the University of Hawai`i Hilo. I am testifying in reference to HB 2873 HD2 relating to the Pacific International Space Center for Exploration Systems (PISCES). I support of the intent of this bill.

I am willing to see the Pacific International Space Center for Exploration Systems (PISCES) be operated by the Department of Business, Economic Development, and Tourism as described in the current version of this bill. The University of Hawai`i is willing to continue to participate in aspects of the program in its new home.

The bill would instruct the University to transfer appropriations, etc. obtained with PISCES funding to the Department. Once there is an agreed upon inventory of PISCES materials, the University will facilitate the transfer of materials purchased under state funds to a location of the Department's choosing. The same will be done for materials obtained under federal funds or by private gift following the procedures and rules relating to the disposition of such materials. Costs of the transfer should be the responsibility of the program, which currently has federal funds for its activities. There are currently no state funds appropriated for PISCES, nor does the University have any positions related to PISCES.

The University continues to believe PISCES needs a business plan to fulfill the considerable promise it has. The University of Hawai`i would welcome the opportunity to continue dialogue with the legislature and with the Department of Business, Economic Development, and Tourism to produce a business plan that can serve as a strong foundation for the development of this opportunity.

Testimony to the Senate Committee on Public Safety, Government Operations, and Military Affairs, Committee on Education, and Committee on Economic Development and Technology
Thursday, March 15, 2012
2:45 PM
Conference Room 224

RE: HOUSE BILL NO. 2873, HD2, RELATING TO THE PACIFIC INTERNATIONAL SPACE CENTER FOR EXPLORATION SYSTEMS

Chairs Espero, Tokuda, and Fukunaga, and Vice Chairs Kidani and Wakai, and members of the committee.

My name is Charles Ota and I am the Vice President for Military Affairs at The Chamber of Commerce of Hawaii (The Chamber). I am here to state The Chamber's support of House Bill No. 2873, HD2, Relating to The Pacific International Space Center for Exploration Systems.

The measure proposes to transfer the Pacific International Space Center for Exploration Systems from the University of Hawaii to DBEDT's office of aerospace development and establishes a PISCES Board of Directors. Appropriates funds.

The Chamber's Military Affairs Council has served as the state liaison in matters relating to the military since 1985 and provides oversight for Hawaii's multi-billion dollar defense industry. This includes the combatant and major component commands for all of the armed services.

Hawaii has the unique presence of diversified US military commands that offer expanded opportunities in high technology development and growth for the emerging R&D sector and aerospace ventures.

The proposal in this measure is one of several steps being considered to create a diversified high technology sector that will encourage innovation and stimulate new commercial industries and provide needed job opportunities in Hawaii.

In light of the above, we recommend the proposal be approved for further discussion.

Thank you for the opportunity to testify.

PISCES | Pacific International Space Center for Exploration Systems

Testimony Presented Before the Senate Committees on Public Safety, Government Operations and Military Affairs, Education, and Economic Development and Technology March 15, 2012 at 2:45 p.m.

by
John C. Hamilton
Deputy Director, PISCES

HB 2873 HD2 RELATING TO THE PACIFIC INTERNATIONAL SPACE CENTER FOR EXPLORATION SYSTEMS

Chairs Senator Will Espero, Senator Jill Tokuda and Senator Carol Fukunaga,
Vice-Chairs Senator Michelle Kidani and Senator Glenn Wakai,
and Members of the Committees,

Aloha. I am John Hamilton, currently serving as Deputy Director of PISCES. I am testifying in favor of HB 2873 relating to the Pacific International Space Center for Exploration Systems.

This bill is essential to the further growth of PISCES and the entire aerospace surface systems testing and development industry in Hawai`i. My comments also apply to these related bills HB 2145 (relating to Economic Development), HB 2319 (relating to Economic Development) and HB 2872 (relating to Aerospace High Technology Districts).

I have served with PISCES[1] since its creation in 2007[2], first as Research Operations Manager and now as Deputy Director. During this time, PISCES has successfully led two major analog field tests with NASA and partner agencies (Canadian Space Agency, CSA and German Aerospace Agency, DLR) and companies (e.g. Michelin, Orbitec, Norcat). PISCES has also conducted smaller tests with other individual companies and universities, participated in national and international conferences, workshops and symposia, and presented at APEC with interisland and international remote internet controlled NASA robotic rovers at our field test site on the Island of Hawai`i. Our team has garnered the attention of the press nationally (Aviation Week and Space Technology) and internationally (Canada, Chile, South Africa). PISCES has received an individual total of 8 NASA Group Achievement Awards. (I hold 3 of these). "This prestigious NASA certificate is awarded to any combination of Government and/or non-Government individuals for an outstanding group accomplishment that has contributed substantially to NASA's mission". [3] Due to our record of past successes, we have been selected to host the 3rd International ISRU (*In-situ* Resource Utilization) and Human and Robotic Systems Test this summer.

PISCES has earned the credentials, expertise and the requisite professional network for moving forward in a manner that will rapidly establish an industrial applied research and development cluster uniquely focused on the core technologies for ISRU and surface systems. This cluster will not only include a sub-sector of the traditional aerospace industry (Boeing, Lockheed) and the "new space" companies (Astrobotics, Sierra Nevada, Space-X) but will also include non-aerospace industries representing the broadband/software/communications market (Google, Neptec), energy collection, generation and storage (Physical Sciences Inc., Aerospace Research Corp., Sky Corp.), superconducting technologies (Flexure), mining and processing (Norcat, SASRA, Hatch), non-petroleum based fuels (Orbitec), robotics (Honeybee, MDA Corp., Michelin), construction equipment (Caterpillar, Kamatsu, Kawasaki Heavy Industries) and management (Battelle). Even agriculture technologies are a needed component for long duration space flights and eventual manned Lunar and Martian surface facilities. It is quite evident that this is not all "Rocket Science"! Applied research and multiple development stages will produce commercially viable, marketable products, techniques and patents along the pathway between the now proven concept tests and the final production systems.

Our current business plan was crafted by over 70 industry representatives at our Leaders Summit conference last November. These participants included global partners such as the Japan Space Agency (JAXA) and the Kazakhstan Space Agency (home to the Russian launch facility Baikonur) as well as private organizations like the Google Lunar-X Prize Foundation. This plan represents the consensus analysis of what PISCES would need to possess along with a sound operational model so that a core minimum infrastructure could be developed. This would then allow direct and immediate participation of industry and government and NGOs in the vitally needed validation and verification areas. This proposed Technology Acceleration Program and a Regional Innovation Cluster for Aerospace and Surface Systems will be able to garner customers world-wide from each of these economic sectors.

This research and development technology park (of which PISCES will be both manager and lead participant) represents a clear value to the Big Island economy with multiple new companies (most of which do not compete with or duplicate services of existing local companies). The real potential for job creation across all sectors from support, supply to the desired high-tech workforce development is crucial and needed immediately for our State (and Big Island) economy. This urgency is doubly reinforced by the global timelines imposed by the rapidly expanding new space industry and their soon-to-be-met benchmark goals. The ground testing for the Lunar-X Prize teams, the development of lunar industrial fuel and water plants and the nationally declared goals of China, Japan, Russian and India to return to the moon with long duration facilities each contain rapidly approaching implementation times. These timelines are the ones for which PISCES and Hawai`i must be prepared. They will not be adjusted to meet our desires.

Today, Hawai`i has this one chance to become the recognized global leader in such an integration and testing facility with a broad customer base. We must start now to prepare for these customers. For if we are not ready to meet their timelines then they will perform this work elsewhere. Hawaii has the advantage now with its access to close proximity high-fidelity analog sites, central geographic location, requisite transportation infrastructure (2 international airports, 2 deep-water

ports) and an operational Space Act Annex with NASA allowing their immediate participation and use. It will only take a modest investment in PISCES to link these assets into a project that has great potential and unlimited future growth. This requested State funding support (although not manini) is on the order of the cost of installing traffic light systems in a few intersections (~ $500K each for design and installation)[4]. The investment in PISCES has a very good potential for returns many times over (not even considering the secondary economic multipliers on the community businesses). As near term example, during the summer analog test (for which I am the Principle Investigator on the Cooperative Agreement), NASA will spend over $300,000 on my home island for this 3 week test.

It is for these reasons that the proper home for PISCES is with the Dept of Business, Economic Development and Tourism (DBEDT). PISCES is not and has never been an academic research unit but instead is closely involved with applied research within industry. PISCES main mission is to facilitate the creation and development of technologies for applications both here in Hawaii and elsewhere. The University has the primary mission for education of students. PISCES creates the jobs for the graduates.

In conclusion, I wish to thank the committees for their attention and allowing me to share my mānao with you. Now is the time, Hawai`i is the place. Please support our island, our economy, our workers and our future. Imua!

John Hamilton

Digitally signed by John Hamilton
DN: cn=John Hamilton, o=University of Hawaii - Hilo, ou=Dept of Physics and Astronomy, email=jch@hawaii.edu, c=US
Date: 2012.03.12 11:30:09 -10'00'

John Hamilton
Deputy Director, PISCES

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[1] http://pisces.uhh.hawaii.edu/

[2] **SB 907**, http://www.capitol.hawaii.gov/session2007/Bills/SB907_CD1_.htm

[3] http://nasapeople.nasa.gov/awards/nasamedals.htm

[4] **$450,000 traffic light cost eyed.** "while the price tag might seem high for one traffic light, city officials insist that's the going rate to design and install such an item."
http://www.masslive.com/news/index.ssf/2009/02/450000_traffic_light_cost_eyed.html

William P. Kenoi
Mayor

Randall M. Kurohara
Director

Laverne R. Omori
Deputy Director

County of Hawaii

DEPARTMENT OF RESEARCH AND DEVELOPMENT

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Thursday, January 19, 2012

Senator Will Espero, Chair
Senator Michelle N. Kidani, Vice Chair
Committee on Public Safety, Government Operations, and Military Affairs

Representative Angus L.K. McKelvey, Chair
Representative Isaac W. Choy, Vice Chair
Committee on Economic Revitalization and Business

RE: Support for Pacific International Space Center for Exploration Systems (PISCES) International Lunar Research Park (ILRP) on Hawai'i Island

Dear Senators Espero and Kidani, and the Committee on Public Safety, Government Operations, and Military Affairs, and Representatives McKelvey and Choy, and the Committee on Economic Revitalization and Business:

The Department of Research and Development's mission is to provide proactive leadership, enhancing the quality of life for Hawai'i Island communities through economic development programs. As Department Director of Research and Development, I urge you to support the International Lunar Research Park on Hawai'i Island.

The ILRP program at the University of Hawai'i at Hilo Science and Technology Park represents Hawai'i County's significant strengths, assets and aspirations. It also represents an important addition to Hawai'i Island's emerging innovation economy.

The combination of our unique natural resources and gifted communities has created the premier environment for world class exploration and research. Complementing the existing observatory community, the new Thirty Meter Telescope project, the University of Hawai'i at Hilo's new Sciences and Technology facility, 'Imiloa Astronomy Center, and the United States Pacific Basin Agricultural Research Center, the ILRP will provide the community an industry that:

- Attracts companies engaged in clean, high-tech research and development activities in aerospace, renewable energy and sustainable agriculture;
- Attracts investment that will help to leverage costs of expanding Hawai`i Island's broadband capacity;
- Creates high-paying 21st century jobs that are designed to support the ILRP, jobs that cannot be outsourced overseas;
- Creates new revenue streams through research and commercial development that will grow our knowledge industry; and
- Supports STEM education for Hawai`i Island and for the State.

Besides the direct economic benefits listed above, this project will help to attract visitors drawn to Hawai'i Island's edu-tourism offerings and the meetings and convention market; and build our Island's and the State's reputation as an international leader in collaborative research and educational excellence.

Thank you for the opportunity to express support for this important project. I humbly ask that the Hawai`i State Legislature provide support for the development of the International Lunar Research Park on Hawai'i Island.

Respectfully yours,

RANDALL M. KUROHARA
Director

RMK:bd

FERRARO CHOI
www.ferrarochoi.com

February 21, 2012

Senator Will Espero, Chair
Senator Michelle N. Kidani, Vice Chair
Committee on Public Safety, Government Operations and Military Affairs

Representative Angus I. K. McKelvey, Chair
Representative Isaac Choy, Vice Chair
Committee on Economic Revitalization and Business

RE: Support for Pacific International Space Center for Exploration Systems (PICES)
International Lunar Research Park (ILRP) on Hawaii Island

Dear Senators Espero and Kidani and Representatives McKelvey and Choy:

Ferraro Choi has been a leader in the design of sustainable educational and research projects throughout the State of Hawaii and for agencies of the Federal Government. On the Island of Hawaii we were honored to be the architects for the USDA Pacific Island Forestry Laboratory in Hilo, the NELHA, Gateway Center and the new West Hawaii Explorers Academy campus both in Kailua Kona. On Oahu, Maui, Kauai, and throughout the Papahanaumokuakea Marine National Monument we have worked with NOAA on the planning and design of research laboratories and scientific outreach facilities. Throughout the Antarctic we have worked with the National Science Foundation most recently on the design of the Amundsen Scott South Pole Station, in conjunction with NASA as an analog for future lunar and Mars based habitats.

Ferraro Choi [illegible] support the PICES and ILRP projects since they will:

- Promote Hawaii's leadership in space research and technology to nations pursuing space exploration.
- Showcase Hawaii's unique geographic terrain for extraterrestrial analog research and testing.
- Make a significant contribution to research programs at the University of Hawaii's Hilo Campus
- Support STEM education on Hawaii Island and throughout the State.
- Support architectural and engineering jobs from companies such as ours.
- Attract a multitude of high technology consultants throughout the world who collaborate on such projects and bring not only revenue but intellectual capital to our state.
- Boost educational tourism to Hawaii Island

I respectfully ask for your support at the State Legislature for development for these unique and important projects for our state. Thank you for your consideration.

Sincerely,

Joe Ferraro FAIA, LEED AP
Principal

FERRARO CHOI And Associates Ltd 1240 Ala Moana Boulevard, Suite 510 Honolulu, Hawaii 96814-4298 Phone: (808)-533-8880 Fax: (808)-599-3769

KELSO AEROSPACE CONSULTING

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Monday, February 06, 2012

Senator Will Espero, Chair
Senator Michelle N. Kidani, Vice Chair
Committee on Public Safety, Government Operations, and Military Affairs

Representative Angus L.K. McKelvey, Chair
Representative Isaac W. Choy, Vice Chair
Committee on Economic Revitalization and Business

Support for Pacific International Space Center for Exploration Systems (PISCES)
International Lunar Research Park (ILRP) on Hawai'i Island

Dear Senators Espero and Kidani, and the Committee on Public Safety, Government Operations, and Military Affairs, and
Representatives McKelvey and Choy, and the Committee on Economic Revitalization and Business:

I take this opportunity to indicate firm support of the State of Hawaii's efforts in the development and promotion of the Pacific International Space Center for Exploration Systems (PISCES) and the International Lunar Research Park (ILRP) project on Hawai'i Island.

As a member of the ILRP steering committee over the last two years, I am very aware of the potential that these programs/projects bring to both the aerospace community and the State of Hawaii.

As a former NASA senior executive with 38 years of government service, I most recently led NASA's efforts in beyond-Low Earth Orbit (LEO) commercial initiatives. Specifically, I worked with many within the commercial sector that have interest in providing lunar transportation services (landers) and surface robotic mobility systems on the lunar surface. These efforts have grown significantly over the last few years.

It is clear to me that there is a significant interest in both the commercial and international sector in re-initiating lunar surface exploration for the first time in over 40 years! It is my belief, that we will see some of these commercial groups (example: Google Lunar X-Prize) successfully achieve a lunar landing and surface activity within the next 2-3 years (by late 2014). As such, the opportunity presents itself in providing suitable test locations for pre-mission checkout/validation of these systems prior to launch.

Further, having been a key part of NASA's assessment in regard to testing key technologies on the Moon (like in-situ resource utilization (ISRU)), there will be a growing need to continue to expand NASA's testing of these technologies in field sites having suitable environments/analogues leading to launch.

With the State of Hawai'i providing the "outer ring" of infrastructure/support capabilities at the ILRP test site, the aerospace community (international, commercial, NASA) can supply the "demand " for the site with its robotic systems and associated prototyping hardware. ILRP could become a state-of-the-art test site serving and supporting the emergence of world-wide demand in space exploration.

The ILRP program at the University of Hawai'i at Hilo Science and Technology Park represents Hawai'i County's significant strengths, assets and aspirations. It also represents an important addition to Hawai'i Island's emerging innovation economy.

The combination of our unique natural resources and gifted communities has created the premier environment for world class exploration and research. Complementing the existing observatory community, the new Thirty Meter Telescope project, the University of Hawai'i at Hilo's new Sciences and Technology facility, 'Imiloa Astronomy Center, and the United States Pacific Basin Agricultural Research Center, the ILRP will provide the community an industry that will:

- Attract companies engaged in clean, high-tech research and development activities in aerospace, renewable energy and sustainable agriculture;
- Attract investment that will help to leverage costs of expanding Hawai`i Island's broadband capacity;
- Create high-paying 21st century jobs that are designed to support the ILRP, jobs that cannot be outsourced overseas;
- Create new revenue streams through research and commercial development that will grow our knowledge industry; and
- Support STEM education for Hawai`i Island and for the State.

Besides the direct economic benefits listed above, this project will help to attract visitors drawn to Hawai'i Island's edu-tourism offerings and the meetings and convention market; and build the Island's and the State's reputation as an international leader in collaborative research and educational excellence.

Thank you for the opportunity to express support for this important project. I humbly ask that the Hawai`i State Legislature provide support for the development of the International Lunar Research Park on Hawai'i Island.

Respectfully yours,

Robert M. Kelso

ROBERT M. KELSO
President

W.H. Shipman
Limited

January 18, 2012

Senator Will Espero, Chair
Senator Michelle N. Kidani, Vice Chair
Committee on Public Safety, Government Operations, and Military Affairs

Representative Angus L.K. McKelvey, Chair
Representative Isaac W. Choy, Vice Chair
Committee on Economic Revitalization and Business

RE: **Pacific International Space Center for Exploration Systems (PISCES)/International Lunar Research Park on Hawaii Island**

Dear Sirs/Madams:

W. H. Shipman, Limited is a Kama'aina corporation with a history of 130 years on the Island of Hawaii. We support carefully planned economic growth of the Island and the State. Our ever-growing population has an increasing need for quality jobs in a safe and clean environment.

Long term economic well being for our islands is based on a number of factors that we all know well including a strengthening agricultural sector increasingly able to support our population's needs. It also includes a careful embrace of those industries where our unique location and culture are a particular fit.

One such industry is astronomy and sciences dealing with space and its exploration. We can expect dynamic growth in this arena as governments and industry work increasingly closely in coming years. In this State, and particularly on this Island, we have a significant location advantage over other competitors. Our location in the mid pacific near the equator residing in a dynamic and open economic environment is a combination that will provide particular efficiencies to the industry. At the same time this industry will provide high quality, well paying jobs available to a wide spectrum of our population.

In a community already moving rapidly to fill the requirements of this industry, we ask for your support for the International Lunar Research Park to be located in East Hawaii.

Sincerely,

Bill Walter

Bill Walter
President

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tel.: 808.966.9325 • fax: 808.966.8522
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6 February 2012

Letter of Support for PISCES and
The International Lunar Research Park

To whom it may concern,

I recently had the opportunity to attend the International Lunar Research Park (ILRP) Leader's Summit at Waikoloa, Hawaii the week of November 13, 2011. The goal of the ILRP Leader's Summit was to investigate ways to move the ILRP and PISCES forward toward becoming a true multi-national, industrial-academic partnership. This was accomplished by sharing experiences in international consortiums gained by attendees from a wide variety of backgrounds, including the US State Department, the Pacific Science Association, the Japan Aerospace Exploration Agency, NASA, the University of Hawaii, and over twenty potential industrial partners.

During the course of this conference, several noteworthy announcements were made by the participants. These included a visionary dream of the Shimizu Corporation to create solar panels on the surface of the Moon to beam power to Earth, and the intent of two US companies, Moon Express and Shackleton Energy, to begin industrial operations on the Moon. These announcements present Hawaii with a unique opportunity to leap to the forefront of this wave of research, technology and industrial development. By taking the lead with the ILRP, Hawaii has the chance to generate dramatic economic growth and become the focal point of a new high-tech region similar to Silicon Valley.

As an example of this type of economic growth, let me describe my experiences with the World's leading research consortium, the Advanced Manufacturing Research Centre (AMRC) in Sheffield, England. The AMRC is the anchor tenant for the Advanced Manufacturing Park, the site of a now defunct coal mine.

After the collapse of UK Coal in 1980, Sheffield became an economically impoverished region. In 2001, with the aid of Boeing, the University of Sheffield created the AMRC, with a staff of 6 people in a vacant warehouse. By the end of 2011 (after only 10 years), the AMRC has grown to a world renowned research center, with 70 industrial partners and a staff of over 200, which is expected to double in the next 2 years. Their partners include Boeing, Rolls-Royce, BAE Systems, Messier-Dowty, ALCOA, TiMet, and Carpenter Steels. Their 200 staff members are mostly engineering graduates with PhDs and Masters Degrees, earning substantial salaries. They have won over $300 MILLION in research grants over their 10 year existence.

The AMRC is now housed in 3 new, purpose-built buildings, with 3 more under construction, for a total under-roof area of 180,000 square feet. These include a new Knowledge Transfer Centre, and an Apprentice Training Centre, both of which are aimed at continuing to improve the Yorkshire region's competitive economic standing. In addition, more than a dozen companies have moved onto the AMP. Rolls-Royce has recently announced plans to build 2 new factories on the AMP, with plans to employ over 300 people at this site.

The AMRC has also had a tremendous effect on the University of Sheffield. Always known for its fine cutting tools, the University's faculty now ranks NUMBER 2 in the UK, ahead of such prestigious institutions as Oxford and Cambridge. The AMRC brings over $25 Million of research funds to the University, and in 2009 was awarded the Queen's Anniversary Prize, which led to Her Majesty's recent visit to the AMRC (only the second time a Monarch has visited Sheffield).

With the AMRC as its guide, the International Lunar Research Park could likewise vault Hawaii and the University of Hawaii to the forefront of a variety of technological fields, including tele-operated robotics, remote site material processing, telecommunications, low cost sustainable solar energy, astronaut & crew training and a variety of science and mathematics disciplines. The potential for job creation in these high tech fields, as well as construction and infrastructure support is extremely large. Transportation and entertainment sectors will likewise benefit, as a host of international partners' employees and representatives make Hawaii their preferred vacation spot. Image the impact if, after ten years, the ILRP and PISCES are able to bring $100 Million to the State of Hawaii.

I believe the ILRP and PISCES are crucial to the economic development of a high-technology sector in Hawaii, as well as for the development of Lunar Commerce. This Lunar Commerce has the potential to create massive economic benefit to the world, and could provide a clean, continuous source of Space Based Solar Power (the only truly green energy source).

Finally, with the vision of Mālama Hawai'i (caring for and protecting Hawai'i) and Mālama Honua (for the Earth), the Hawaiian people can again navigate the stars by leading the way back to the Moon.

Mahalo nui loa!

David Heck

David Heck

David Heck is an Associate Technical Fellow at The Boeing Company on the Manufacturing Technology Team and works with several domestic and international research consortiums to develop new manufacturing technology for the aerospace industry.
The opinions expressed in this document are his own and do not reflect the position of The Boeing Company

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19 January 2012

To whom it may concern

SASRA supports the PISCES International Lunar Research Park

The South African Space Resources Association (SASRA) finds much merit in the PISCES International Lunar Research Park (ILRP) concept. It will serve as a vessel for the development of existing and new technologies enabling energy and space mining techniques, with potential for significant Earth-based benefits.

Despite being geographically distanced from South Africa, PISCES have demonstrated they are capable of fostering collaboration with our country. Having partaken in one of the PISCES teleoperations demonstrations, SASRA is reassured we can contribute remote experiments to the ILRP.

South Africa has a long and successful history of mining and associated technologies and engineering, while growing its participation in space activities. These will certainly be assets for future involvement in the ILRP.

We support the planning and build-out of such a commercial research and development park as the first important step in incorporating the moon into the Earth's economic sphere.

Yours truly

2012/01/19

X

Michael Neale
SASRA President
Signed by: Michael Neale

With support of the SASRA executive committee:
Johan Kruger
JJ Mare
Miguel Coelho
Theo Ireton
Bernhardt Garlipp

PISCES | Pacific International Space Center for Exploration Systems

Testimony Presented Before the Senate Committees on Public Safety, Government Operations and Military Affairs, Education, and Economic Development and Technology March 15, 2012 at 2:45 p.m.

by
Christian Andersen
Operations Manager, PISCES

HB 2873 HD2 RELATING TO THE PACIFIC INTERNATIONAL SPACE CENTER FOR EXPLORATION SYSTEMS

Chairs Senator Will Espero, Senator Jill Tokuda and Senator Carol Fukunaga,
Vice-Chairs Senator Michelle Kidani and Senator Glenn Wakai,
and Members of the Committees,

As the Operations Manager for PISCES, a resident of Hawai'i and a native Hawaiian, I support House Bill 2873. In November of 2011, the Office of Aerospace Development held the *ILRP Leaders Summit* in Kailua-Kona. In attendance were NASA directors of Space Commercialization (from Johnson Space Center and Ames Research Center), the CEO of Google Lunar X-Prize, the CEO of ISU, the CEO of Moon Express, the CEO of JAMSS America, Batelle Memorial Institute, Google, Boeing, Lockheed Martin, NORCAT, the Japanese Space Agency (JAXA), Electric Vehicle Control (EVC), Ontario Drive Gear (ODG), MDA Corporation, Shackleton Energy, Shimizu Corporation and many others in attendance. These groups all have interest in joining a research park here in Hilo/Keaau to work cooperatively on In-Situ Resource Utilization Technologies and related fields. What looks like a concept that is purely space related is in fact rife with direct local applications and benefits to our state. In-Situ Resource Utilization technologies involve energy generation (non-combustive & sustainable), data and power transmission, energy storage, sustainable agriculture, waste processing, and robotics. This provides a local market for these companies here in Hawaii, because ISRU technologies can be applied to the same problems here in Hawaii: energy sustainability, food sustainability, construction, and broadband to name a few. The outcome of the November summit was an updated business plan for PISCES and an action plan to make the research and technology park a reality in Hilo. These plans were the direct result of input from our industry partners at the *ILRP Leaders Summit*. The plan calls for a 3 year buildup of PISCES and needed support infrastructure. Their urgency is a reflection of industry timelines that require PISCES be fully operating by 2015.

House bill 2873 reflects the industry consensus that PISCES needed to be moved out from under UH and into an organization like DBEDT that is structured to promote and foster economic development. To be a successful economic driver, we also need to be funded at levels that will

enable us to succeed in our plan. The opportunities that make PISCES and our technology park viable are not going to wait a couple of years; they are coming and are coming fast. We may be the best place in the world for a project of this caliber, but unless we act it is for naught.

Mahalo Nui Loa,

Christian Andersen

Digitally signed by Christian Andersen
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