

NEIL ABERCROMBIE
GOVERNOR



LATE TESTIMONY

BARBARA A. KRIEG
INTERIM DIRECTOR

DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF HUMAN RESOURCES DEVELOPMENT
235 S. BERETANIA STREET
HONOLULU, HAWAII 96813-2437

February 6, 2012

TESTIMONY TO THE
HOUSE COMMITTEES
ON

ECONOMIC REVITALIZATION & BUSINESS
AND
HIGHER EDUCATION

For Hearing on Tuesday, February 7, 2012
11:00 a.m., Conference Room 312

BY

BARBARA A. KRIEG
INTERIM DIRECTOR

House Bill No. 2873
Relating to the Pacific International Space Center for Exploration Systems

WRITTEN TESTIMONY ONLY

TO CHAIRPERSONS McKELVEY AND NISHIMOTO AND MEMBERS OF THE
COMMITTEES:

The purpose of H.B. No. 2873 is to transfer 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. The bill establishes a PISCES Board of Directors and appropriates funds.

The Department of Human Resources Development has **comments** on the proposed transfer. To protect the rights and benefits of the employees to be transferred, we prefer the following proposed transfer language be used in place of the transfer language pertaining to employees in Section 6 of the bill:

“All employees who occupy civil service positions and whose functions are transferred to the department of business, economic development and tourism by this act shall retain their civil service status (permanent or temporary). Employees shall be transferred without loss of salary, seniority, retention points, prior service credit, any vacation and sick leave credits previously earned, and other rights, benefits, and privileges, in accordance with state personnel laws and this Act, provided that the employees possess the minimum qualifications and public employment requirements for the class and/or position to which transferred or appointed, as applicable, provided further that subsequent changes in status may be made pursuant to applicable civil service and compensation laws.

Any employee who, prior to this Act, is exempt from civil service and is transferred as a consequence of this Act, may continue to retain the employee’s exempt status, but shall not be appointed to a civil service position because of this Act. An exempt employee who is transferred by this Act shall not suffer any loss of prior service credit, any vacation and sick leave credits previously earned, or other employee benefits or privileges as a consequence of this Act, provided that the employees possess legal and public employment requirements for the position to which transferred or appointed, as applicable; provided that subsequent changes in status may be made pursuant to applicable employment and compensation laws. The director of the department of business,

economic development and tourism may prescribe the duties and qualifications of such employees and fix their salaries without regard to chapter 76, Hawaii Revised Statutes.”

Thank you for the opportunity to offer comments on this measure.



February 6, 2012

The Honorable Angus McKelvey, Chair
and Members of the Committee on Economic Revitalization & Business
The Honorable Scott Nishimoto, Chair
and Members of the Committee on Higher Education
The House of Representatives
Hawai'i State Capitol
Honolulu, Hawaii 96813

Dear Chairs McKelvey and Nishimoto and Members:

Subject: House Bill No. 2873
Relating to the Pacific International Space Center for Exploration Systems
For Hearing, Tuesday, February 07, 2012 at 11:00 am Rm 312

I am writing this letter of testimony to offer my full and unqualified support of HB 2873. I firmly believe that this is the best way forward. It is the best way not just for PISCES but for the much needed economic opportunities that can be created with it.

Having been involved with PISCES since its inception in 2007 (first as Operations Manager and now serving as Deputy Director), I bear direct witness to the benefits that space technologies and their associated industries have brought to my island of Hawai'i. I have been intimately involved with the creation of a world-class analog testing capability here. This capability is a benefit to NASA as well as other nations (Canadian Space Agency, German Aerospace Agency) and companies.

There comes a time when a good idea becomes a great one; one with opportunities for many along with a strong predilection towards success. This idea can be realized when multiple global forces and timing converge. The PISCES aerospace high-tech development park (known broadly as the International Lunar Research Park or ILRP) is one of those ideas whose time has truly come. Let us not let it be an idea whose time has passed. This is a unique moment in history.

Space exploration is turning into space development. It is undergoing a natural transformation of maturity. Commercial opportunities are now being seen (with sound business plans promulgated) to expand our National economic sphere to include the resources of space and the moon. These are resources linked to energy, water, fuel and strategic materials that are becoming more and more crucial to meet the growing future needs of humanity. This same economic expansion is occurring globally with other nations like Japan, China, Russia and India. Hawai'i sits geographically in the center of all this future development. PISCES can be the piko of this space commerce and become a true center.



The ability to leverage Hawaii's unique natural advantages (location, high-fidelity test sites, year-round access) with our expanding expertise to become the world leader in testing and development of future technologies needed for surface system and ISRU technologies is an opportunity that we cannot afford to ignore. This is a critical time when we will have the chance to create a modest infrastructure seed that will grow and attract multiple industries to Hilo. Most of the key elements are already in place such as access via 2 International airports, existing deep water harbors, willing and trainable workforce, available room and close proximity to a growing university with supporting research expertise across the system. What is needed is a small investment in PISCES to create the attractor and accelerator for the project. For about the current price of installing traffic signals at two intersections (~\$0.5M), the State can develop the beginnings of a long-term (~50 year) aerospace industry here with a steady growth potential.. These will be new industries to Hilo, ones that do not compete with existing companies, and ones who will desire to hire locally. They will benefit from the access to workforce development that HCC and UHH provides with their courses and students.

The technologies needed for space are extreme versions of the energy, solar, robotics, broadband, renewable and recyclable technologies that are in the news and minds of citizens today. The path to developing these will have numerous off-ramps with products and services that will have immediate and beneficial applications locally and nationally. PISCES has already demonstrated (via its successful prior field tests) the abilities to extract oxygen, water and fuel from the native tephra. The scale-up from demonstration to industrial production capability will generate numerous outcomes while expanding the much needed good-paying high-tech skilled jobs for our local populace.

I know that this concept will bear fruit. The ILRP project was the consensus of our November meeting (ILRP Leaders Summit sponsored by OAD). This was the goal that delegates from space agencies (NASA, JAXA and Kazakstan), Google Lunar X-Prize Foundation, and noted company representatives from aerospace, software, broadband, robotics, and universities all agreed that PISCES should pursue. (see attached letters).

The consensus also recommended that PISCES gain the ability to act swiftly and independently (but in concert with) the University of Hawaii (where it current resides as an academic center) but that it is essential to interact with industry on their terms in the arena of commerce and business.

Mahalo for allowing me to share my manao with you.

John Hamilton

Deputy Director, PISCES

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: 2012.02.06 16:12:36 -10'00'



Pacific International
Space Center for
Exploration Systems

LATE TESTIMONY

February 6, 2012

The Honorable Angus McKelvey, Chair
and Members of the Committee on Economic Revitalization & Business
The Honorable Scott Nishimoto, Chair
and Members of the Committee on Higher Education
The House of Representatives
State Capitol
Honolulu, Hawaii 96813

Dear Chairs McKelvey and Nishimoto and Members:

Subject: House Bill No. 2873
Relating to the Pacific International Space Center for Exploration Systems
Hearing Date: February 7, 2012
Hearing Time: 11:00 AM

As the Operations Manager for PISCES, I support House Bill 2873. The present administrative management of PISCES under the University of Hawaii at Hilo is at its core a mismatch and a roadblock to economically stimulating activities.

In November of 2011, the Office of Aerospace Development held the *International Lunar Research Park Leaders Summit* in Kailua-Kona. The main objective of the conference was to confer with corporate and government leaders in aerospace and to come away with an action plan to make the ILRP a reality. Because the ILRP is a project of PISCES, much of the discussion was how to strengthen PISCES' ability to foster and manage this type of economic development project. The industry consensus was 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.

This bill will enable PISCES to operate more efficiently and react better to the needs of the aerospace sector. PISCES needs the ability to write and issue Memorandums of Understanding and Memorandums of Intent as opportunities arise. PISCES needs to be able to build infrastructure without waiting for our project to gain top priority for CIP within UH.

This bill will allow PISCES to continue working closely with the University of Hawaii at Hilo, while allowing UHH to focus on research and academics and PISCES to focus on stimulating Hawaii's economic development in aerospace. It is a synergy that will enable PISCES to attract the industries and jobs the University so desperately needs for workforce and course development and to stop the "brain drain".



Pacific International
Space Center for
Exploration Systems

The opportunities that make the ILRP a viable project 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 are the first we will be the last.

Christian
Andersen

Digitally signed by Christian
Andersen
DN: cn=Christian Andersen,
o=PISCES, ou,
email=canderse@hawaii.edu, c=US
Date: 2012.02.06 16:04:13 -10'00'

Christian "Kauhiokalani" Blackshear Andersen
PISCES
Operations Manager

LATE TESTIMONY



Skycorp Incorporated
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www.skycorpinc.com
wingod@skycorpinc.com
wingod@earthlink.net

February 4, 2011

To: Jim Crisafulli, Director - Hawaii Office of Aerospace Development
From: Dennis Wingo, CEO Skycorp Incorporated
Subject: Letter in Support of PISCES and the International Lunar Research Park

Dear Jim,

I would like to express my company's support for the ideals and goals of the International Lunar Research Park (ILRP) at the Pacific International Space Center for Exploration Systems (PISCES).

Skycorp Incorporated strongly supports the ideals and vision of the ILRP:

To establish (at PISCES) the world's premiere environment for collaborative development, testing and evaluation of space systems for use on the Moon, Mars, and other extraterrestrial bodies, thereby expanding Earth's economic sphere and advancing science, education and the creation of new technologies for terrestrial application, all of which, in turn, will produce substantial benefits for the people of Hawaii.

I would first like to emphasize the terrestrial applications of the developments that will most certainly spring forth from the ILRP effort. Automation and robotics is the wave of the future. Today robotics is exploding as a discipline in a manner largely unreported in the press. Most certainly we have all seen robots welding cars in Detroit or Japan, but the robotics revolution goes far beyond these large industrial robots.

Robotics technologies are being used today for the most delicate eye surgery, and the robots doing this are controlled over the Internet. The value to Hawaii is large in that in surgeries where there is no local island expertise, lives can be saved through these remote operations. Of course, these sophisticated robots must be maintained, which in turn creates high paying technical jobs in the local economy.

An extension of robotics is 3D printing. Three-dimensional printers are devices that take raw materials and directly "print" parts. These parts can today be made from plastics, metals, wood pulp and other materials. This technology is in its nascent stage, but its value is already being proven in the world of small manufacturing. The value to the Hawaiian economy could be enormous, as the high cost of shipping impacts virtually every person on the island. Think of replacement parts that could be made locally, using local materials to replace parts in machines, appliances, cars, or other devices that otherwise would have to be shipped at great expense from distant host countries. Not

only would this help lower shipping costs for Hawaii consumers, but also help foster local cottage manufacturing industry for those who design, build, operate, and maintain such systems.

There is a resource that Hawaii has more than just about any other place in the world – volcanic rock. Work being undertaken by NASA, industry, and international partners use Hawaiian volcanic rock as a simulant for lunar rocks in developing processes to extract oxygen and metals from these rocks. These efforts could help turn the most plentiful resource in the Hawaiian Islands into feedstock for 3D printing and other industries statewide.

All of these technologies will be tested at the ILRP, and constitute only a representative sample of what lies ahead in the near future. For both NASA and international partners, the Hawaiian volcanic landscape offers a rough simulation of the environment that we expect to encounter on the Moon and Mars. It is also a centralized and desirable location for international partners to bring their equipment to Hawaii for development and testing. This in turn facilitates a brain trust of world leaders in robotics that universities in the islands can utilize for training future leaders in this effort. The best part of the equation is that Hawaii, in a manner of speaking, is conceptually similar to the economic development of the Moon – a locality logistically far from the main planetary economy that, to be maximally successful, must leverage local resources to bolster the local economy and grow more self sufficient.

Skycorp Incorporated, through its sister company Greentrail Energy Inc. is proposing a means whereby to accelerate this development.

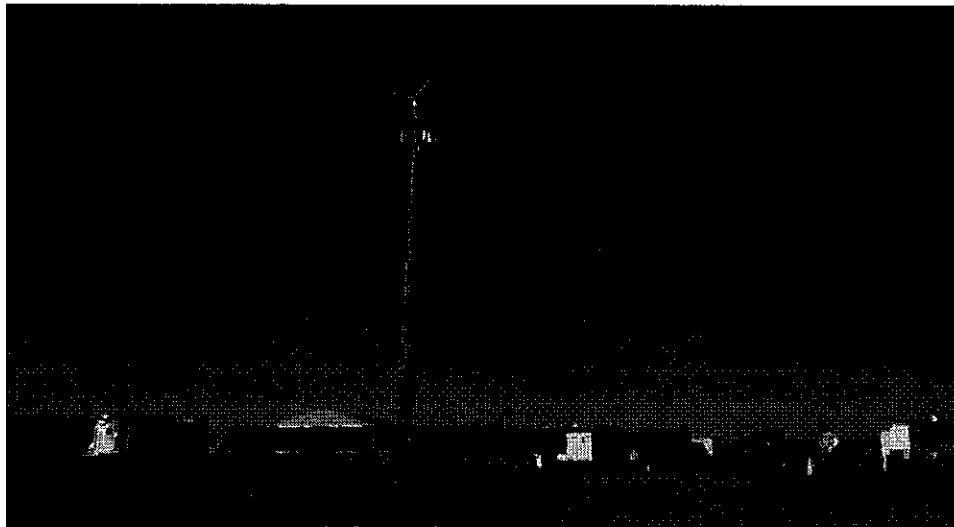


Figure 1: GSW-7000 Providing Power and Communications in Arizona Desert 2010

Figure 1 shows the GTE GSW-7000 in operation at the NASA Desert RATS event in September of 2010. This device is a self-contained trailer that is capable of generating up to 4.4 kilowatts of power from the sun and 2.4 kilowatts of power from wind energy.

The GSW-7000 has proven itself in NASA remote operations in the desert of Arizona in providing power and communications (through our smaller GSC-1000 on the right), which provided NASA Ames Center Director Dr. Pete Worden with the opportunity to remotely pilot a NASA rover in the desert from his office at Moffett Field, California. We also would like to bring these advanced capabilities to the ILRP in Hawaii. In keeping with the Hawaiian philosophy of limiting permanent changes to the landscape of the islands, this system is fully self-contained and requires no permanent infrastructure (after removal from a site, no trace remains of its presence).

As Skycorp CEO I have mentored many students over my career, and continue to do so. We will extend this assistance to Hawaii to provide talented science and engineering students with opportunities to work, understand, and incorporate lessons learned from practical field experiences into their educational development. This will help nurture a cadre of trained engineers and scientists in the islands who will not have to leave the State in order to reach their full potential in science and technology.

In my last trip to Hawaii, I read of the last king of the islands who brought many of the world's latest advances to Hawaii for the benefit of its people. The work of your local community on the ILRP is a fine addition to that tradition of forward thinking, which ultimately can position your State and its people to be a major contributor toward improving our qualities of life around the world.

Sincerely

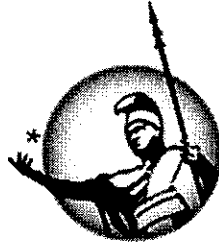
Dennis Wingo

Dennis Wingo

CEO

Skycorp Incorporated

LATE TESTIMONY



HAWAII AEROSPACE
ADVISORY COMMITTEE

Elliot Holokauahi Pulham, Chair

February 6, 2012

The Honorable Calvin K. Y. Say
Speaker of the House of Representatives
Hawaii State Legislature

The Honorable Shan S. Tsutsui
President of the Senate
Hawaii State Legislature

SUBJECT: Support for the Pacific International Space Center for Exploration Systems (PISCES)
And the International Lunar Research Park Initiative

Dear Speaker Say and President Tsutsui:

On behalf of the Hawai'i State Aerospace Advisory Committee, I am writing to encourage the Hawaii State Legislature's strongest possible support for developing the Pacific International Space Center for Exploration Systems (PISCES), which we believe would significantly advance the growth and diversification of the aerospace industry in Hawai'i.

As you know, the creation of the Hawai'i Aerospace Advisory Committee (HAAC) was authorized by the Legislature (Act 52, 2009 Session) and approved by then Governor Lingle on May 6, 2009. Our purpose, per this Act, is to advise and assist the Legislature and State agencies in monitoring, assessing and promoting aerospace development statewide. The Committee is comprised of leading aerospace industry executives, distinguished academicians from across the state, and economic development executives from Oahu, Kauai, Maui and Hawai'i – all united with a common purpose to help the State diversify its economy and promote innovative education and employment opportunities for the people of Hawai'i.

Since its inception, the HAAC has been exploring these opportunities and ways to realize them. One such opportunity that we believe holds tremendous potential to help realize Hawaii's full potential in aerospace is the Pacific International Space Center for Exploration Systems (PISCES) - a multinational space research and education center headquartered at the University of Hawaii at Hilo that already has brought over \$2 million in research funding and private investments to Hawaii, established undergraduate space science curricula at the University, conducted public outreach programs on aerospace at local schools and community centers, and sponsored national aerospace design competitions enabling undergraduate students to apply their skills in STEM-related disciplines to develop prototype models for future human habitats in space.

In collaboration with PISCES, the State of Hawaii (through its Office of Aerospace Development, or OAD) is currently under contract with NASA to develop “an infrastructure-based model for a sustainable human settlement beyond low-Earth orbit”, which is translating into a “blueprint” for an International Lunar Research Park (or ILRP) on the surface of the Moon. In conjunction with this grant, the State has also signed a Space Act Agreement with NASA to develop terrestrial analog sites to test and validate innovative technologies for future space exploration that could support development of an ILRP, as well as other robotic and human missions to other planetary bodies in our solar system.

These analog facilities are targeted for development at PISCES, and will provide an enormous opportunity for Hawai'i to play a major leadership role in humankind's future exploration of space, with substantial opportunities for new federal research grants, private sector investment, and innovate space education and training programs throughout the islands – all of which will help expand Hawaii's role as both a major contributor to and beneficiary of global space enterprise.

As such, and on behalf of the Hawai'i Aerospace Advisory Committee, I strongly encourage your support for PISCES and the analog test facilities on the Big Island of Hawaii.

Me ka ha'aha'a,

A handwritten signature in black ink, appearing to read "E. Pulham", with a long horizontal line extending to the right.

Elliot Holokauahi Pulham

cc: Governor Neil Abercrombie
Lt. Governor Brian Schatz
Senator Brickwood Galuteria, Majority Leader
Senator Sam Slom, Minority Leader
Richard Lim, Interim Director - DBEDT
Jim Crisafulli, Director - Office of Aerospace Development

LATE TESTIMONY

ECONOMIC DEVELOPMENT
ISLAND OF OAHU

February 6, 2012

Jim Crisafulli, Director
Office of Aerospace Development and
Hawaii Aerospace Advisory Committee Secretariat
No. 1 Capitol District Building, Suite 501
250 South Hotel Street
Honolulu, HI 96813

Aloha Jim!

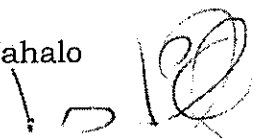
This letter serves as my enthusiastic support for the development of both PISCES and the ILRP here in Hawai'i. PISCES, has already demonstrated many aspects of critical acclaim, by discovering technologies that aid in system design, for uses here on Earth for food and energy security and for survival in places such as the Moon and Mars.

Expanding PISCES and incorporating the ILRP will attract companies engaged in clean, high-tech research and development activities in diverse areas, including aerospace, renewable energy, sustainable agriculture and robotics. There is the possibility to produce new revenue streams, generated through research and commercial development that will help grow Hawaii's knowledge-based industries.

As a member of the Hawai'i Aerospace Advisory Committee, it is an aspiration that the private sector with the collaboration of local communities, State of Hawai'i, academia and federal agencies, engage in furthering these unique opportunities for the people of our state and our country. The process to arrive at solutions is not only the technologies themselves, but about what we value and how we collaborate together – *inclusively*.

Thank you for all the work you are doing to move these initiatives forward through PISA, NASA, OAD in DBEDT and HAAC – and keeping us focused on our mission.

Mahalo


Mark McGuffie
Managing Director


ENTERPRISE
HONOLULU

THE BUSINESS CLIMATE OF PARADISE

735 Bishop Street, Suite 412, Honolulu, Hawaii 96813 • 808-521-3611
Fax: 808-536-2281 • www.enterprisehonolulu.com

February 5, 2012

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

Dear Jim,

I am writing to voice my strong support for two interlinked initiatives in the State of Hawaii, namely the Pacific International Space Center for Exploration Systems (PISCES) and efforts to establish an International Lunar Research Park (i-LRP) analog facility as a component of this Center – both on the Big Island of Hawaii. Once fully developed, I believe these important initiatives will provide substantial global as well as local scientific, educational and economic opportunities and benefits.

Over the past two decades, the Japan-U.S. Science, Technology & Space Applications Program (JUSTSAP), for which I served as Chairman (from 2003 - 2010), has worked closely with the Hawaii State Government to spawn a broad range of innovative projects promoting advanced satellite communications, remote sensing for disaster management, microgravity research, the development of solar-powered alternative energy systems, etc., benefiting communities within the Asia-Pacific region.

I also had the pleasure of overseeing the creation of PISCES, the most recent brainchild of JUSTSAP, which is now being developed in Hawaii as an international center for space related research and development, aerospace education, professional training, and the formulation of collaborative multinational space exploration missions. All of these programs have engaged the substantial scientific and technological expertise resident statewide to promote collaborative research and educational partnerships with University of Hawaii faculty and students, as well as with local business entrepreneurs.

PISCES has already demonstrated its ability to secure NASA contracts over the last few years, especially as a test bed for both robotic as well as longer-term human space exploration. Continued State support for PISCES (and the proposed i-LRP within PISCES) should enable this facility to attract sufficient external funding to make it self-sufficient within the next 1-3 years. One specific and highly visible benefit will be the development and testing of advanced robotics necessary for most future space exploration programs. This should help strengthen and advance our nation's competitive position in this critical technology.

From a local perspective, support for these interrelated initiatives will also generate substantial benefits to the State, including high-expertise jobs and development of a vibrant aerospace industry in Hawaii embracing an "arc of technologies" (including world class astronomy; commercial space transportation; supercomputing/ IT/informatics; robotics with space, marine and terrestrial applications; advanced telecommunications; and next generation aviation). Although it is difficult to quantify the benefits of a \$1 million investment in PISCES/i-LRP for fiscal 2013, the payback will probably be in the order of 10+ times over the next few years, and therefore should provide an attractive investment opportunity for the Hawaii Legislature to consider.

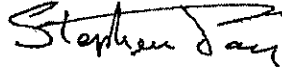
International Ventures, 5333 Potomac Ave. NW. Washington, DC 20016

Looking to the future, innovative programs like PISCES and the proposed i-LRP will be able to leverage Hawaii's diverse natural resources, abundant scientific and technological expertise, unique geographical terrain, and strategic mid-Pacific location to support the development and implementation of pioneering global space missions, including Earth orbiting systems supporting global communications and space-based observations of our planet, as well as robotic and manned missions to the Moon, Mars, and other solar system bodies.

Collectively, I believe such efforts will provide a broad range of scientific, economic, and educational opportunities to help grow Hawaii's research and development infrastructure, expand and diversify private sector initiatives in aerospace-related technologies, enhance secondary and college-level training and mentorship programs in advanced mathematics, engineering and science disciplines; and ultimately strengthen Hawaii's role as a significant participant in space related technologies and exploration.

I wish you and your colleagues every success as you continue to champion Hawaii's expanding potential in aerospace!

Sincerely,



Stephen M. D. Day.

Chairman emeritus, JUSTSAP

President, International Ventures

Member of the Hawaii Aerospace Advisory Committee (HAAC).



PACIFIC SCIENCE ASSOCIATION

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INFO@PACIFICSCIENCE.ORG • WWW.PACIFICSCIENCE.ORG

3 February 2012

Jim Crisafulli
Director
Office of Aerospace Development
No. 1 Capitol District Building, Suite 501
250 South Hotel Street
Honolulu, HI 96813

Dear Jim:

I write in support of the State of Hawaii's initiative to empower and fund the effort by the International Space Center for Exploration Systems (PISCES) to create an International Lunar Research Park (ILRP) on the Big Island of Hawaii. This initiative will be an important catalyst for research and testing in several important areas of research, including robotics, engineering, and green energy. In so doing PICES and ILRP activities will help support critical international, regional as well as local priorities to advance sustainable development goals, STEM education efforts, as well as the important mission of increasing public support and interest in science, technology, and engineering.

The Pacific Science Association (PSA) is a regional non-governmental, scholarly organization that advances science, technology, and sustainable development in the Asia-Pacific region by actively promoting interdisciplinary and international meetings, research, and collaboration. The PSA Secretariat has been based at the Bernice P. Bishop Museum in Honolulu since our founding in 1920. PSA hosts large scientific meetings known as Congresses and Inter-Congresses every two years in rotating venues throughout the Asia-Pacific. These well-attended meetings are recognized as critical venues for the region's senior and junior scientists to meet, present research findings, and forge new interdisciplinary collaborations with colleagues elsewhere in the region.

PSA is composed of national-level members, which are National Academies of Science or leading universities of Australia, China-Beijing, China-Hong Kong, China-Taipei, France, Guam, Indonesia, Japan, Korea, Malaysia, Okinawa, Philippines, the Pacific Islands (Cook Islands, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu), Russia, Singapore, Thailand, United States, and Vietnam, as well as individual member scientists.

Increasingly, the future of science and technology research lies in cross-disciplinary collaborations that link various research networks, and so we are encouraged that ILRP is specifically designed as such an international collaboration. In addition, while space exploration may seem a non-intuitive research priority given other seemingly more immediate concerns in the Asia-Pacific, there are unique needs of island states that

make ILRP highly relevant for Hawaii and the region. The pursuit of new and more effective technologies to keep a crew safely housed with reliable food supplies and access to energy, telemedicine, and communication on the ultimate resource-poor "island" of the moon will surely help drive innovations that facilitate sustainability solutions for the island states of the Pacific.

PISCES and the ILRP project will leverage Hawaii's unique resources and put the state at the center of international and multilateral efforts to advance science and technology. PSA supports the maximally inclusive international scope of this project, and believes that the PISCES / ILRP project will benefit not only the exploration of space, but also lead to new and greater opportunities for sustainable development on Earth, and for all nations.

PSA strongly supports the State of Hawaii's PISCES initiative to establish ILRP. We look forward to the project's success and will encourage our national members to participate in discussions on its goals and operations, as appropriate.

Sincerely,

A handwritten signature in black ink, appearing to read "Burke Burnett". The signature is fluid and cursive, with a prominent initial "B".

Burke Burnett
Executive Secretary
Pacific Science Association

LATE TESTIMONY

February 3, 2012

Representative Calvin K. Y. Say
Representative Angus L. K. McKelvey
Representative Jerry L. Chang
Representative Cindy Evans
Representative Mark M. Nakashima
Representative Clift Tsuji

Aloha,

My name is Rodrigo Romo, I have been living in Hilo for almost 6 years now. Shortly after my family and I moved here, we had the honor to meet some of the people involved with The Pacific International Space Center for Exploration Systems (PISCES). Having worked for five years at the Biosphere 2 project in Arizona, and being a member of the second crew that resided inside, I see PISCES as an unparalleled opportunity to promote education, research and technology advancement on the Island of Hawai'i.

I strongly believe that PISCES and its International Lunar Research Park project will be an economic development opportunity for the County of Hawai'i and State that could attract companies engaged in clean, high-tech research and development in sustainable energy, sustainable agriculture and in recycling technologies. It is ventures like this what the Big Island needs to further diversify its employment potential. PISCES has worked closely with local High Schools in teaching the local youth the opportunities that exist in high tech careers, this project would set a leading project in Hawai'i's own back yard.

I strongly endorse and support the efforts by the State of Hawaii to increase the effectiveness of PISCES via pending legislation such as HB 2873 and HB 2145.

Sincerely,

Rodrigo F.V. Romo, Ch.E., MBA
Vice President Engineering
Zeta Corporation
1445 Waianuenue Ave
Hilo HI

The South African Space Resources Association
www.sasra.co.za
Email: president@sasra.co.za
Phone: +27 74 117 4494

LATE TESTIMONY

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

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



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 it's 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
President

16-523 Keaau-Pahoa Road Keaau, HI 96749
tel.: 808.966.9325 • fax: 808.966.8522

www.whshipman.com

Page 2

Confidential

2/6/2012

LATE TESTIMONY



January 19, 2012

Jim Crisafulli, Director
Office of Aerospace Development
No. 1 Capitol District Building, Suite 501
250 South Hotel Street
Honolulu, HI 96813

Dear Jim

I am delighted to be able to send you a letter to summarize our support of the continued existence and growth of PISCES as well as the exciting concept of the International Lunar Research Park.

The Google Lunar X PRIZE is the largest incentive prize of all time with \$30 million available to the first privately funded teams who successfully land on the Moon, send back a "Mooncast", travel 500 meters and send back a further transmission.

The key word here is privately funded. In providing this prize, Google is seeking to inspire entrepreneurs and businesses to do something that only governments have done before and in so doing, kick start this next phase of commercial development in the space industry. Typically X PRIZES can generate more than ten times the prize purse in related investment, as well as numerous jobs and spin off opportunities. PISCES and the ILRP represent significant opportunities for the State of Hawaii to capture some of the new investment and development that springs from the Google Lunar X PRIZE, among similar related endeavors.

By way of example, after the successful winning of the \$10 million Ansari X PRIZE in 2004 by Scaled Composites, a human spaceflight revolution occurred that now includes Virgin Galactic, Blue Origin, Armadillo Aerospace, XCOR and many other companies. Entrepreneurs with dreams of going to space have taken their fledgling companies from "crazy idea" to solid commercial entity in a relatively short space of time. Some now even have the government as a customer! We have witnessed the growth of major infrastructure projects such as the New Mexico SpacePort for space tourism. And Mohave SpacePort – formerly a small airfield – is now a major rocket and space plane manufacturing area. None of these would be here without the impetus provided by the Ansari X PRIZE.

Revolution Through Competition.

5510 Lincoln Blvd. • Suite 100 • Playa Vista, CA 90094
T: 310.741.4880 • F: 310.741.4974
www.googlelunarxprize.org



So why is the Google Lunar X PRIZE so interested in PISCES and the wider possibility of the International Lunar Research Park? Firstly, from a practical point of view, many of our teams will need to test their lander, rover and communications technologies. The lunar analog sites operated by PISCES provide a unique location for those activities and over the next couple of years we fully expect to see some of our teams taking advantage of the facilities. This will provide a corresponding opportunity in PR as well as some small economic benefit.

Secondly, for the Google Lunar X PRIZE teams to be able to evolve into a new industry, just as the teams have done in the human spaceflight area, customers are needed. These are companies who have a reason to need to get to the Moon in an efficient and effective way, perhaps for energy, resource, media or science purposes. While our teams and other commercial space entities are developing a new lunar infrastructure, the International Lunar Research Park can be a key location for generating new technologies (that can also be used on Earth) and incubating the companies that will become the first to explore this new frontier. Clearly those companies will eventually need access to talented workforces and a friendly business environment.

In support of that workforce development, PISCES provides us with a natural partner for The Google Lunar X PRIZE flagship STEM education programs, including our Moonbots robotics competition which is a partnership with Lego (www.moonbots.org). Of note is that we have had one team from Molokai whose members have participated in Moonbots for the last two years (<http://molokaimahina.volasite.com/>). Our experience is that children are more motivated in STEM if they have real life examples of what mastering certain skills could allow them to do. By having access to the engineers and scientists in Google Lunar X PRIZE teams who are coming to Hawaii or working with the new endeavors in the ILRP to further their businesses, Hawaiian students and their parents will be able to see the relevance of high tech skill acquisition and the possible future that this can bring.

In conclusion The Google Lunar X PRIZE sees the continued existence and growth of PISCES, as well as the development of the ILRP as key pieces for the commercial exploration of space.

Revolution Through Competition.

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www.googlelunarxprize.org



Sincerely

A handwritten signature in black ink that reads 'Alexandra Hall'. The signature is written in a cursive, flowing style.

Alexandra Hall
Senior Director, Google Lunar X PRIZE
X PRIZE Foundation.

CC: Dr. Frank Schowengerdt
Professor of Physics and Director of PISCES
University of Hawai'i at Hilo

Revolution Through Competition.

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www.googlelunarxprize.org

LATE TESTIMONY

4 February 2012

PISCES and ILRP Letter of Support

To whom it may concern,

I participated in the International Lunar Research Park (ILRP) Workshop in San Jose, California (04/05/11) and the Leaders' Summit in Waikoloa, Hawaii (11/13-17/11) to help define a viable concept for permanent human and economic expansion from geosynchronous orbit out to and including the Moon. An ILRP, integrated with commercial lunar development activities in the planning stage, provides the opportunity to reduce individual country, corporate, and personal cost to travel to, explore, and use the Moon through shared reusable cislunar transportation systems, habitation and laboratory facilities, surface vehicles, and utilities. Therefore, I wish to add my personal support for the PISCES organization and its efforts related to the ILRP project.

The first step in realizing the ILRP on the Moon is to emplace an Earth analog site where lunar systems from around the world can be tested individually and as part of an integrated operational construct. Hawaii offers a unique mix of lunar analog environments, educational facilities, accessibility, and labor force that can provide the backbone of the first ILRP analog.

An ILRP analog site linked to a future Moon base will be inspirational to the Hawaiian youth, giving them hope for a brighter future, encouraging them to higher educational and professional goals, and offers immediate local job opportunities upon graduation as well as to supporting industries.

Local jobs will be created in construction, transportation, science, technology, education, training, media, and other vocations as the ILRP analog site is developed, new educational facilities are constructed, crew and equipment is moved between locations, and activities are filmed and broadcast worldwide. In addition, tourism related jobs are increased as ILRP participants will likely bring their families during their planned activities at the site and, as other high-tech endeavors show, the ILRP will itself become a tourist draw.

Lunar and other exploration missions will benefit through reduced mission risk and cost as hardware from various nations and organizations are initially tested and integrated into a broader system of systems before ever leaving Earth.

I believe the ILRP, integrated with Bigelow Aerospace (lunar habitats) and Shackleton Energy Company (lunar ice mining and propellant production), can benefit NASA, JAXA, ESA, RSA, ISRO, and other national space agencies by becoming a stepping stone from Earth to the Moon as mankind extends its economic sphere to include all cislunar space.



Dallas Bienhoff

Dallas is a project manager at The Boeing Company focused on human exploration mission definition, in-space transportation system conceptualization, and surface systems development. The opinions expressed in this email are his own and do not reflect the position of The Boeing Company.

Dallas Bienhoff
In-Space & Surface Systems
The Boeing Company
703-872-4004 (office)
571-232-4554 (Blackberry)
703-872-4460 (fax)

LATE TESTIMONY

February 3, 2012

Representative Calvin K. Y. Say
Representative Angus L. K. McKelvey
Representative Jerry L. Chang
Representative Cindy Evans
Representative Mark M. Nakashima
Representative Cliff Tsuji

Aloha,

My name is Charlotte Romo, my husband and I decided to move to Hilo six years ago. We both participated in the Biosphere 2 project in Arizona. I am a Science High School teacher now at Hilo High. We met people from the Pacific International Space Center for Exploration Systems (PISCES) a few years ago and we have shared many positive experiences with them. As a High School teacher I see PISCES as an unparalleled opportunity to promote education, research and technology advancement on the Island of Hawai'i. Members of PISCES have come to my classroom to talk to my students about the opportunities available to them right here in space exploration, they allowed my students to experiment with a remote controlled NASA rover. These unique opportunities would not have been available to my students if it weren't for PISCES.

I strongly believe that PISCES and its International Lunar Research Park project will be an economic development and educational opportunity for the County of Hawai'i and State that could attract companies engaged in clean, high-tech research and development in sustainable energy, sustainable agriculture and in recycling technologies.

I strongly endorse and support the efforts by the State of Hawaii to increase the effectiveness of PISCES via pending legislation such as HB 2873 and HB 2145.

Sincerely,

Charlotte Romo
High School Science Teacher
Hilo High School
1445 Waianuenuue Ave
Hilo HI



Flexure Engineering

4423 Lehigh Road, STE 235
College Park, MD 20740
P: 410-864-8921
F: 443-320-9813

LATE TESTIMONY

6 February 2012

Christian Andersen
PISCES
Operations Manager
University of Hawaii at Hilo

Dear Mr. Andersen:

Flexure Engineering would like to thank you and John Hamilton for the tour of the lunar analog site on Mauna Kea.

We were impressed with your facility and the overall goals of PISCES. As an aerospace start-up, we understand the need to think big and create a valuable infrastructure for amazing things to happen.

Flexure supports your efforts to bring economic development opportunities to Hawaii through the IRLP. We agree that a research park will motivate both small and large companies to come to Hawaii and collaborate with PISCES to engage in clean, high-tech research and the development of sustainable energy, agriculture, and recycling.

Flexure is also excited about PISCES' focus on outreach and education. We feel that helping future scientists and engineers from grade school through college is crucial to the continued development of our national space program.

I know that I speak for the entire Flexure Executive Team when I say that we are eager to begin collaborating with PISCES and look forward to our future Flexure Office on Mauna Kea!

Please keep us informed of your progress and any opportunities to contribute to your vision!

Sincerely,

Gregory Scharfstein
Owner and Chief Engineer
Flexure Engineering

William P. Kenoi
Mayor



Randall M. Kurohara
Director

Laverne R. Omori
Deputy Director

County of Hawaii

DEPARTMENT OF RESEARCH AND DEVELOPMENT

25 Aupuni Street, Room 1301 • Hilo, Hawaii 96720-4252
(808) 961-8366 • Fax (808) 935-1205
E-mail: chresdev@co.hawaii.hi.us

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:

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
January 18, 2012
Page 2

- 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

LATE TESTIMONY


HONEYBEE ROBOTICS
Spacecraft Mechanisms Corporation

John Hamilton
Deputy Director, PISCES

6 February 2012

Dear John,

Over the past few year PISCES has proven itself to be instrumental to the success of the Lunar-focused field campaigns and in promoting of the space exploration. I strongly support the work PISCES has done in the past, and in addition I strongly support its further activities as well as establishing of the exciting new venture: the International Lunar Research Park (ILRP).



Kris Zacny, PhD

PISCES Advisory Board member.

Kris Zacny, PhD
Vice President
Director, Exploration Technology Group

Honeybee Robotics Spacecraft Mechanisms Corporation
398 W Washington Blvd., Suite 200, Pasadena, CA 91103
mob: 510-207-4555 / blackberry: 646-508-9807 / fax: 626-689-4823
zacny@honeybeerobotics.com
<http://www.honeybeerobotics.com>

LATE TESTIMONY

JAMSS AMERICA
INC.



16055 Space Center Blvd. Suite 240 Houston, Texas 77062 • Tel: (281) 461-3700 • Fax: (281) 461-3776

January 31, 2012

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

I am writing this letter in firm support of the State of Hawaii's efforts to develop and promote the University of Hawaii-Hilo's Pacific International Space Center for Exploration Systems (PISCES) and its future Prototype remote surface analog facility supporting the evolution of an International Lunar Research Park (ILRP).

As a current member of the PISCES management team and the ILRP steering committee; a fifteen-year participant in Hawaii's JUSTSAP forum (recently renamed PISA); the current Chief Executive Officer of JAMSS America, Inc. (a U.S. registered aerospace company with U.S. and international contracts); the former Senior Vice President of SPACEHAB, Inc.; and, former manager within the NASA Mission Operations Directorate at the Johnson Space Center, I am acutely aware of the unique challenges that space exploration places on human innovation as well as on the resource limitations of sponsoring government, private sector and university organizations. However, it has been my experience that the best way to mitigate project and program costs during space hardware and software development cycles is through use of simulation facilities that are most representative of those in-space environments within which or on which robots or space explorers will conduct operations using these products.

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.

Post-Apollo, exploration missions have become increasingly multinational in nature with many nations now having participated in earth orbit, lunar and planetary missions, with Japan even returning surface debris samples from an far-away asteroid. Today, NASA, other space faring nations and the commercial private sector now have their sights set on furthering robotic and human outreach into the cosmos through innovative private ventures as well as through joint, international Agency-sponsored missions; Google Lunar X-Prize contestants are busy preparing their hardware for competition beginning as early as 2014; and NASA and its ISS partners are currently preparing a Global Exploration Roadmap which will define space exploration destinations and schedules which will guide current and future generations in this quest to explore - and eventually inhabit remote lunar and planetary destinations within our solar system.

As an avid participant in several of these exploration journeys, I am proud to have been a part of the evolution of Hawaii's PISCES and ILRP projects and have been encouraged by the continuing and enthusiastic bipartisan support received for these two endeavors from the State of Hawaii's Legislature. NASA also has taken note - as have international space agencies - as PISCES has more than matched its State funding to date with NASA, CSA, DLR and private sector research contracts awarded over the past



four years. Within my familiar territory of Japanese industry, academia and the Japan Aerospace Exploration Agency (JAXA), I have recently had the privilege of speaking to top management in each sector about the many opportunities for exploration technologies development, test and checkout that PISCES offers. I have also recently informed them of the exciting ILRP vision and I anticipate an ever-growing interest within Japan for collaboration with other international organizations in the utilization of Hawaii's PISCES and ILRP Prototype assets going forward.

Jim, your continued ardent support of PISCES and ILRP will surely help facilitate the next remarkable chapter of human space exploration in ways that are a fundamental departure from the Apollo program of over four decades ago: This renewed journey will be international in nature with all major space faring nations as participants. Robotic and human explorers returning to the moon and beyond will require advanced and reliable technologies to sustain their missions. The developers of these technologies will use PISCES and the ILRP Prototype facilities as test beds for verification of their operability. The ILRP will continue to receive international attention as an achievable and efficient way for multinational participants from the government and private sector to synergistically work together to provide stellar *from* the moon, *on* the moon and *about* the moon research results while mitigating exploration costs through shared infrastructure and efficient utilization of lunar resources using technologies developed at the planet's premier two lunar analog facilities, PISCES and the ILRP Prototype - all the while, facilitating the involvement and growth of Hawaiian small businesses and industry and local area use of spinoff (and importantly, green) technologies.

And last but most assuredly not least, the student explorers of Hawaii's K-12 schools and universities - as well as those from other states and nations - will participate in and learn from the many PISCES and ILRP Prototype projects, demonstrations and capabilities evolution and will have an unprecedented opportunity to become tomorrow's space voyagers to the Moon, Asteroids, Mars and beyond.

I applaud and encourage the continuation of your leadership and that of Hawaii's State Government in supporting our nation's space exploration program and in continuing funding support of PISCES and the ILRP Prototype.

Sincerely,

Dan A. Bland

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

KELSO AEROSPACE CONSULTING

2838 Misty Springs
Manvel, Texas 77578

832.628.1730 - E-mail: rkelso54@gmail.com

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.

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
February 6, 2012
Page 2

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:

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
February 6, 2012, 2012
Page 3

- 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;
- 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 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,

(signed)

ROBERT M. KELSO
President

LATE TESTIMONY

National Aeronautics and Space Administration
Kennedy Space Center
Kennedy Space Center, FL 32899



Reply to Attn of:

NE-P

March 3, 2010

TO: Dr. John Hamilton, PISCES, University of Hawaii Hilo
FROM: NE-P/ Space Resources Utilization Project Manager
SUBJECT: PISCES Support for 2010 ISRU Field Test

The 2010 International Lunar Surface Operations and In-Situ Resource Utilization (ILSO/ISRU) Field Test on Mauna Kea, Hawaii, was a resounding success. The test advanced the readiness of critical pieces of space technology and demonstrated a level of technology integration that was far greater than had previously been achieved. That success was due to the dedication of multiple organizations and their personnel, but especially the Pacific International Space Center for Exploration Systems (PISCES)

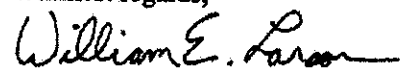
Through PISCES we were able to access a unique test area that has many characteristics of the lunar surface. This allowed us to test a prototype system to produce oxygen on the Moon because the volcanic tephra deposits at the test site were very similar to the mineralogy of the regolith found on the Moon. Not only did the test site have the needed minerals, the altitude of the test site allowed us to obtain higher levels of solar flux than we can obtain at NASA Field Centers. This boosted the oxygen yield of the system under test which uses the power of the sun to provide the energy necessary to produce oxygen.

In addition to our oxygen production system we also were able to test a prototype system that will search for water at the poles of the Moon and also the mid-latitudes on Mars. The system, named RESOLVE (Regolith and Environmental Science & Oxygen and Lunar Volatiles Extraction), will drive around on the moon and extract numerous core samples which will be analyzed by the payload's instruments to help NASA determine if we can obtain usable quantities of water to enable exploration beyond low earth orbit. Finding usable water on the Moon and Mars will fundamentally change our exploration architectures. No longer will we have to launch everything we need for a mission on our launch vehicles. Instead, we will be able to refuel our space exploration vehicles at our destination. This will save billions of dollars.

Let me close by saying that I want to express my heartfelt appreciation for the contributions that you and the PISCES team made to the 2010 field test. The spirit of cooperation and excitement shown by your team was an important element that helped us all succeed. I wish you success in your efforts to obtain continued support from the State of Hawaii so that NASA's ISRU project can return to the Big Island for future field tests as we move closer and

closer to the day when we will change the way we explore space. When that day arrives, PISCES and Hawaii will have played an important role in enabling the use of space resources.

Warmest regards,

A handwritten signature in cursive script that reads "William E. Larson". The signature is written in dark ink and is positioned above the printed name.

William E. Larson



Northern Centre for Advanced Technology Inc. | 1545 Maley DR | Sudbury, ON | Canada P3A 4R7 | t. 705. 521. 8324 | f. 705. 521.1040 | www.norcat.org

February 3, 2012

To Whom It May Concern:

Northern Centre for Advanced Technology Inc (NORCAT) would like to recognize the positive contributions of PISCES (the Pacific International Space Center for Exploration Systems) in promoting education, research and technology advancement on the island of Hawai'i.

NORCAT recognizes that PISCES and its International Lunar Research Park project could be an economic development opportunity for the State of Hawaii which could attract companies engaged in clean, high-tech research and development in sustainable energy, sustainable agriculture and in recycling technologies. PISCES should be tasked with providing the nucleus of a 21st century technology research park based in Hilo. We believe this park has the potential to attract corporations which could provide and support an increased need for broadband service, to create high-tech jobs for the future and engage Hawaii's unique resources and skill-sets. It can also create new revenue streams for scientific research and commercial applications.

As such we support efforts by the State of Hawaii to increase the effectiveness of PISCES via pending legislation such as HB 2873 and HB 2145.

Yours truly,

A handwritten signature in black ink, appearing to read 'Dale Boucher', written over a horizontal line.

Dale Boucher
Senior Director, Innovation and Development

LATE TESTIMONY

February 5, 2012

Hello Mr Bland and Mr Todome, and thank you very much for your interesting emails about PISCES, ILRP and JAMMS.

Regarding PISCES and I have been discussing this within our team and I can report back to you that we are most definitely interested to look further into the opportunity of making use of that facility. We have heard in the past that it is a very good lunar analog site and it's also in a relatively convenient location for our Japanese team, which is responsible for our rover developments. Our team's long term strategy is to conduct the final qualification testing of our lunar surface elements (i.e. lander + rover) at such an analog site. If all goes well with our technology developments and fund-raising, we would be in a position to undertake such tests some time in late 2013 I think.

The chances are high that we will have at least one attendee at the GLEX since it will take place directly before the GLXP Team Summit which we plan to attend. That might be a good opportunity to explore the PISCES cooperation further.

Regarding ILRP too, I would certainly be willing to discuss how we could support your vision in the European aerospace community.

Finally, I was very happy to receive the contact from Mr Todome from JAMMS. As you might know, in Japan we are currently working hard to raise the profile of White Label Space, as well as lunar exploration and science in general. We would be quite interested to explore what type of cooperation would be possible with JAMMS in these areas.

Best regards,
Andrew

Andrew Barton
Chairman, White Label Space Foundation
email: andrew.barton@whitelabelspace.com
tel: +31 615867626
<http://www.whitelabelspace.com>

LATE TESTIMONY

February 6, 2012

Jim Crisafulli, Director
Office of Aerospace Development
No. 1 Capitol District Building, Suite 501
250 South Hotel Street
Honolulu, HI 96813

Dear Mr. Crisafulli,

I am writing this letter because it seems that space exploration - from earth based astronomy to astro-robotic moon missions to the eventual human colonization of the Moon, Mars and beyond - is suffering from a lack of understanding, and therefore a lack of support. It is my intention in this letter to perhaps shed some light on why we need to be doing these things and why they are essential economic drivers of our economy, as well as a key to both inspiring young people in Hawaii to become scientists and engineers, and to creating high paying jobs that can ensure our state's future economic strength.

It was the ability to navigate by the stars, coupled with the daring to set off and explore thousands of miles of open ocean in tiny fragile canoes, that gave us the basis for our present day Hawaiian culture. Where is this spirit today?

For it is this very spirit that is once again needed by humankind in these very trying times. For all of the reasons that we, throughout history, have explored and colonized every last habitable spot on this planet, we must now explore and colonize our celestial neighbors.

The most amazing thing that ever happened to this planet is life. It doesn't matter if it was spontaneous generation, divine intervention or pan spermia. It matters that life is here. What could nobler, more historic, than to bring life to another planet? Why would we pass up the chance to be part of such an endeavor?

With the end of the Space Shuttle program, NASA and the rest of the world are scrambling to figure out what the “next step” will be, and where it might be taken – perhaps in Texas, or maybe in Florida? Could it be in Hawaii? Indeed, the next step is up for grabs; and with a Hawaii-born president in the White House, our chances of having it be in the Aloha State have never been better!

If we can base the next phase of space exploration here in Hawaii, leveraging our State’s unique resources and capabilities through our Pacific International Space Center for Exploration Systems (PISCES), the benefits would truly be incredible.

- 1] We would invigorate aerospace as well as other emerging technology-based industries statewide.
- 2] We would attract companies engaged in clean, high-tech research and development activities in diverse areas, including (to name a few) aerospace, alternative energy, recycling, telemedicine, robotics, artificial intelligence and sustainable agriculture.
- 3] We will generate new revenue streams through research and commercial development that will help grow Hawaii's knowledge-based industries.
- 4] We will create high-paying 21st century jobs that cannot be outsourced overseas.
- 5] We will spur investments that will leverage the costs of expanding Hawaii's broadband capacity - especially on the Big Island.
- 6] We will help enrich/diversify educational and community outreach programs in science, technology, engineering and mathematics (the STEM disciplines).
- 7] We will strengthen Hawaii's stature as a center of excellence for exploration, and fuel new opportunities to grow Hawaii's visitor industry.

- 8] We will expand Hawaii's global leadership in space science and exploration, enhancing its role (and recognition) as both a major contributor to and beneficiary of space enterprise.
- 9] We will help catalyze and inspire the next generation of scientists, engineers and entrepreneurs that will pioneer new horizons on the frontiers of space.

For all of these reasons, we should do everything in our power to make Hawaii the next center for space exploration by supporting PISCES, the proposed analog facilities for an International Lunar Research Park (ILRP), and of course our Office of Aerospace Development!

Sincerely Yours,

A handwritten signature in black ink, appearing to read 'H. Rogers', with a horizontal line drawn underneath the name.

Henk B. Rogers
Entrepreneur
55 Merchant Street, Suite 1700
Honolulu HI, 96813

LATE TESTIMONY

From: mailinglist@capitol.hawaii.gov
Sent: Tuesday, February 07, 2012 6:28 AM
To: ERBtestimony
Cc: Mark.W.Henley@Boeing.com
Subject: LATE TESTIMONY - Testimony for HB2873 on 2/7/2012 11:00:00 AM

Testimony for ERB/HED 2/7/2012 11:00:00 AM HB2873

Conference room: 312
Testifier position: Support
Testifier will be present: No
Submitted by: Mark Henley
Organization: Individual
E-mail: Mark.W.Henley@Boeing.com
Submitted on: 2/7/2012

Comments:

Dear State Representatives,

I am writing another private note to again thank you for helping start the Pacific International Space Center for Exploration Systems, and to encourage you to help PISCES grow, including a Space Research and Technology Park. I work for Boeing Research and Technology, a major Aerospace Company which has also supported some of my own efforts to help develop PISCES, but I am writing as a private citizen and a part-time resident of Hawaii.

PISCES offers unique promise to bring together many nations of the Pacific Rim in the best place on Earth to simulate robotic and human space exploration technologies for lunar and planetary surface operation.

PISCES also offers a track to encourage education as well as future employment for the youth of Hawaii in growing high tech industries, motivated and building upon the foundation of PISCES and the associated Research and Technology Park

Please also recognize Jim Crisafulli's incredible drive to help Hawaii enter the Space Age. The State Office of Aerospace Development DBEDT is the best organization to manage PISCES at this time, while continuing strong involvement of the University of Hawaii (including both Hilo and Manoa representatives), but also increasing the involvement of space industry and commercial entrepreneurship.

Thank you again,

Mark Henley