LINDA LINGLE
GOVERNOR
THEODORE E. LIU
DIRECTOR
MARK K. ANDERSON
DEPUTY DIRECTOR

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

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Statement of
THEODORE E. LIU
Director
Department of Business, Economic Development & Tourism
before the
HOUSE COMMITTEE ON FINANCE
March 31, 2008
4:30 p.m.
State Capitol, Conference Room 308
in consideration of
SB 2891 SD1 HD1

RELATING TO AEROSPACE DEVELOPMENT.

Chair Oshiro, Vice Chair Lee, and members of the Committee. The department supports the concept behind SB 2891 SD1 HD1. There have been many good ideas introduced this legislative session that support the State's economic development goals. We note, however, that this appropriation was not included in the Executive's Supplemental Budget, and request that this appropriation not displace the priorities contained in that budget.

As you know, the State Legislature provided $400,000 in seed funding for the Pacific International Space Center for Exploration Systems (PISCES) during the 2007 Session through Act 149. Since its formal inception in October of last year, PISCES has been utilizing these funds to achieve several significant

milestones, including the establishment of a headquarters office at the University of Hawaii at Hilo; implementation of a major international conference establishing collaborative R&D teams linking University of Hawaii faculty and local business entrepreneurs with NASA field centers, mainland universities, and major aerospace corporations; the first national student design competition inspiring college students to apply STEM-related disciplines in the conceptual design of a manned lunar base; the development of a curriculum for aerospace studies at the University of Hawaii at Hilo; and two successful proposals to NASA's Innovative Partnership Program resulting in grants totaling $640,000 to support the design, development, testing and evaluation of innovative technologies in Hawaii to support future robotic and human missions to the Moon, Mars and beyond.

Thank you for the opportunity to testify on this bill.

SB 2891 SD1 HD1 RELATING TO AEROSPACE DEVELOPMENT

Testimony Presented to the
House Committee on Finance

March 28, 2008

by

Rose Tseng
Chancellor
University of Hawai`i at Hilo

Aloha,

On behalf of the University of Hawaii at Hilo, I am pleased to provide this testimony in support of Senate Bill 2891 SD1 HD1, for the continued support and funding of the Pacific International Center for Space Exploration Systems (PISCES) which will strengthen Hawaii's capabilities and competitiveness as a major player in the global space industry.

In the year since the Hawai'i State Legislature provided initial funding for PISCES, I have been impressed by the positive effect it has had for the programs and students at the University of Hawai'i at Hilo (UH Hilo) . I write to you now in support of SB 2891 SD1 HD1, which would extend funding for a critical second year.

When I wrote to you last year in support of initial funding for PISCES, it was based on my hope that it would make contributions to international science, our educational programs at UH Hilo, and the economy of the Big Island. To be candid, I took a chance based on my hope that it would fulfill it promises.

I have watched the program develop over the last several months and I am pleased to report that, in its short life, PISCES is having a positive effect and I support its continuation. While still in its infancy, it has accomplished quite a lot but, like any such program, it will need nurturing for a short while longer.

PISCES has assembled a world-class group of scientists working on establishing a sustainable human habitat for the moon, Mars and beyond. It has begun developing academic programs at UH Hilo by establishing a Special Topics in Space Science course with a full enrollment of 20 students already studying the subject. PISCES is developing cooperative academic programs with faculty at UH Manoa to make this a genuinely systemwide program. A Memorandum of Understanding with Colorado School of Mines will increase UH Hilo's ability to provide science education and research for our local students and faculty. This is in keeping with my efforts to expand UH Hilo's capacity to provide outstanding research and educational opportunities for the children of our State.

As a result of its initial State funding, PISCES has already been awarded two NASA Partnership Grants totally approximately $650,000; a degree of leverage that bodes well for the future. Scientists and Engineers from all over the country will be coming to the Big Island in November for a demonstration field test of robotics and in situ resource utilization projects.

I urge passage of SB 2891 SD1 HD1 and look forward to a long and increasing contribution to our State from PISCES.

UNIVERSITY
OF HAWAI'I
HILO

March 28, 2008

Testimony in support of SB 2891 SD1 HD1
Relating to Aerospace Development
Submitted by: Judith Fox-Goldstein,
Administrative Director, University of Hawai`i at Hilo Conference Center

Dear Chair Oshiro, Vice Chair Lee and Members of the House Finance Committee:

I serve as Administrative Director for the University of Hawai`i at Hilo Conference Center, and I would like to voice my strong and unqualified support for SB 2891.

SB 2891 advocates for the support and continuation of the Pacific International Space Center for Exploration Systems (PISCES) and, based on the accomplishments of last year, I strongly support this position. In fact, I can not think of an area that deserves more support because we are investing in the *future* of Hawai'i, in the *future* of our students and in the *future* of our economy.

Focusing on potential careers in science, technology and space will offer our students a unique opportunity to remain in the islands while being employed in cutting edge technological positions. We have an obligation to our youth, and to ourselves, to consistently support activities in the sciences that will decrease our BRAIN DRAIN. We are losing valuable resources, in terms of Hawaii's young minds, because there is a scarcity of professional positions and careers in the sciences in Hawaii. PISCES offers an answer and it also contributes to Hawaii's reputation in many other areas.

Hawai`i has long been known as the capital of 'sun and surf'. The time is **NOW** that we expand our reputation as a first class destination where technology, research and the "business of science' are also flourishing. The time is **NOW,** that we back our dreams and aspirations with appropriate funding.

Hawai`i is perfectly positioned to capture the science and technology meetings market. With our strategic location and environmental assets, we should be a leading competitor in the events and meetings market. Again, PISCES can, and will, help us achieve this positive notoriety as we launch ourselves into a business and scientific destination and a 'place of excellence' for conducting business.

Conference Center

200 W. KAWILI STREET
HILO, HAWAI'I 96720-4091
PHONE: (808) 974-7555
FAX: (808) 974-7684

We have an opportunity to take the lead in the growing industry of technology and education. We have an opportunity here to develop strong ties and positive linkages with NASA. How can we possibly consider anything less than full support!

In light of the substantial scientific, educational and economic benefits of PISCES, it behooves us to fully support SB 2891. The question we should all be asking is… "What else can we do to ensure this program is sustained and thrives?

Thank you very much for the opportunity to provide these comments in support of SB 2891.

Respectfully submitted,

Judith Fox-Goldstein

Judith Fox-Goldstein, Administrative Director
University of Hawaii at Hilo Conference Center

Conference Center

200 W. KAWILI STREET
HILO, HAWAI'I 96720-4091
PHONE: (808) 974-7555
FAX: (808) 974-7684

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Marshall Space Flight Center, AL 35812

VP41 (70-08)

January 22, 2008

Pacific International Space Center for Exploration Systems
University of Hawaii-Hilo

Dear Dr. Schowengerdt:

It gives me great pleasure to express my strong support the continued development of the Pacific International Space Center for Exploration Systems, or PISCES. The advent of this center has raised the visibility and stature of the State of Hawai'i as a leader in the developing community of space-faring nations of the Pacific Rim. The close tie between PISCES and Japan through the Japan-US Science, Technology and Space Applications Program (JUSTSAP) will be invaluable in encouraging other Asian nations to participate, thus ensuring that PISCES will be a truly international endeavor and that Hawai'i will take its place at the center of this emerging space-faring community.

The vision of PISCES as an integrated, international research and education center dedicated to developing new technologies that will allow us to live and work on the Moon and beyond is one that has caught the attention of numerous scientists, engineers and program managers within NASA and other space agencies, as well as those within many space-related industries and universities. It was for this reason that the Marshall Space Flight Center Lunar Mapping and Modeling Project sought out PISCES as an opportunity to ensure a broad input of ideas.

Our first interaction with PISCES was very successful in that it has fostered new collaborations in the Lunar Mapping and Modeling area. PISCES has demonstrated that that Hawai'i is stepping up with an initial investment and is serious about becoming a leader in the emerging space exploration era. I am hopeful that a continuing and expanded program to develop the center and its infrastructure will emerge as NASA's need for similar field tests to the ones already underway are likely. As our Project increases in scope and complexity, a more complete and capable infrastructure will be required. The lack of these expanded capabilities would make continuing our future interactions difficult or perhaps impossible.

I commend your vision and the vision of many others in the State for taking the initiative to establish PISCES last year, and I strongly support your efforts to continue and expand the Center in the coming year.

Sincerely,

-Signed-

Mark Nall
Manager, Lunar Mapping and Modeling Project

Center *for* Space Resources

January 30, 2008

Dear Members of the Hawaii State Legislature:

It is my pleasure to submit this letter of encouragement for the continuation of your support to the Pacific International Space Center for Exploration Systems (PISCES). I would first like to congratulate you for your vision to begin the support last year of this one-of-a-kind initiative. PISCES has successfully assembled the natural, economic, entrepreneurial, technical, and scientific assets of the State of Hawaii and offered a unique program to national and international organizations interested on promoting the many benefits, on Earth and space, of the aerospace industry. In the process, PISCES has also started to make a lasting impact on the education of the future generation of scientists and engineers in the state and beyond, by providing access for students to exciting projects on aeronautics and space exploration.

Recognizing these accomplishments, the Colorado School of Mines (CSM), through its Center for Space Resources (CSR), has decided to make an institutional commitment to collaborate with PISCES on a variety of activities. Based on the rich complementary expertise of PISCES and CSR, we have agreed to enter into formal collaboration by putting together a Memorandum of Understanding which will be signed by the President of CSM and the Chancellor of the University of Hawaii at Hilo in April. This agreement will allow us to work jointly on educational initiatives, writing of proposals, development and testing of prototype equipment on our individual facilities, and organizing international forums to attract an even larger number of collaborators and participants to our joint program.

I applaud your efforts to consider the continuation of funding for PISCES into its next phase. We fully support the PISCES activities planned for this year and firmly believe on its potential to contribute to the advancement of the aerospace industry, while making a substantial impact on the economic development and education of the State of Hawaii and the US. Please do not hesitate to contact me personally if you need additional information on our joint activities.

Sincerely,

Dr. Angel Abbud-Madrid
Director, Center for Space Resources
Colorado School of Mines
Golden, CO 80401
Phone: (303) 384-2300 Fax: (303) 384-2327
E-mail: aabbudma@mines.edu
Website: http://www.mines.edu/research/csr

SpacePartnerships.com

Dedicated to the Creation and Promotion of Partnerships for Space Commerce

January 28, 2008

Hawaii State Legislature
State Capitol
Honolulu, Hawaii 96813

Dear Members of the Hawai'i State Legislature:

I am writing to express my strong support and endorsement of SB 2891 and HB 2939, which provide funding for the Pacific International Space Center for Exploration Systems (PISCES) for its second year.

Given my position as the current director of PISCES, you might view my support of these bills as obvious and not meaningful, but let me tell you about my situation here. I am fully retired, having spent a long and productive career in academia, following which time I spent three years at NASA headquarters in Washington, DC managing major programs designed to get companies into space to do research in partnership with NASA. Upon leaving NASA I founded SpacePartnerships.com, which helps bring universities together with companies and federal agencies into partnerships to do mission-related research and education.

When the idea for PISCES first emerged at the Japan-US Science, Technology and Space Applications Program (JUSTSAP) symposium, I realized that it was made to order for an industry/university/government partnership center of the kind I have had extensive experience with, both in academia and in government. I also saw that it needed strong leadership from someone who had the time and the experience to make it a reality. So I agreed to lead the center for its first two years to get it established. We are now at the midway point of that period. I have announced that I will step down as director at the end of the 2008-09 fiscal year and turn the center over to someone chosen in a nationwide search. If the center is to survive, that search must begin this year.

By any measure whatsoever, the first year of existence for PISCES has been spectacular. As soon as the JUSTSAP symposium ended, we organized quickly and wrote a proposal for State of Hawai'i funding. As you know, the legislature was impressed with our plans and decided to fund PISCES for its first year at a level of $400K, and the governor signed the bill. Even before we received any of that money at UHH, we formally established the center, began work on our long-range strategic plan, started planning for our first conference and wrote a number of proposals for external funding from NASA. Two of the latter proposals, one for *In-Situ* Resource Utilization (ISRU) research and education and one for robotics testing, were successful and were funded at a total level of $640K,

for work to be done at and with PISCES. We are now beginning the process of identifying and characterizing field sites where these NASA projects will be conducted.

We also held our first international conference, in November 2007, which was attended by over 100 people, representing four different countries, five NASA field centers, prominent aerospace companies such as Lockheed-Martin and Boeing, and numerous faculty members from UH-Hilo, UH-Manoa and other universities from around the world. At this conference we also heard from representatives of local business, civic and cultural organizations about their hopes, dreams and concerns for PISCES, along with a health dose of advice about involving local leaders in the planning. Largely as a result of this input, we have now formed a local cultural advisory committee and will hold the first meeting of that group next weekend.

So PISCES is off to a great start, thanks in large part to the vision and generosity of the State Legislature. I respectfully request that you act affirmatively on this continuation legislation so we can continue the progress we've made so far. It is critical, now that we have captured NASA's attention and won their confidence with these first two awards that we build on that confidence by showing them that the State is in this for the long term. As you will recall from our original proposal last year, we are planning for PISCES to be self-supporting after five years, with a State funding profile that increases for the first two years, followed by diminishing support after that. Thus this second year's funding is crucial for demonstrating State commitment and allowing us time to mount a vigorous fundraising campaign from private capital sources to complement our already successful efforts at securing operational funding from NASA.

Thank you for your time and attention. I would be happy to testify before any of your committees concerning these bills.

Sincerely,

Dr. Frank Schowengerdt
President and CEO
SpacePartnerships.com
709 Fitzhugh Way
Alexandria, VA 22314

Phone: 571-309-3815
Email: schoweng@hawaii.edu

JAPAN-UNITED STATES SCIENCE, TECHNOLOGY & SPACE APPLICATIONS PROGRAM (JUSTSAP)

March 28, 2008

Testimony: House Committee on Economic Development & Business Concerns
Subject: Senate Bill 2891 SD1 HD1

Chair Oshiro, Vice-Chair Lee, and members of your committee.
I am writing this testimonial in strong support of Senate Bill 2891 that provides continued funding for the Pacific International Space Center for Exploration Systems (PISCES) in Hawaii.

As you know, PISCES is a project that was envisioned and designed through the Japan-U.S. Science, Technology & Space Applications Program (JUSTSAP) – a unique association of scientists, business leaders, educators, and government officials from both Japan and the United States that convenes in Hawaii annually to promote scientific and technological collaboration in space-related ventures.

Over the years, JUSTSAP has spawned 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, and other space-related applications benefiting communities within the Asia-Pacific region. PISCES, the most recent brainchild of JUSTSAP, is a program being developed in Hawaii as an international center for space-related research and development, aerospace education, astronaut training, and the formulation of collaborative international space exploration missions. It will draw heavily upon the substantial scientific and technological expertise resident within JUSTSAP to promote collaborative research and educational partnerships with University of Hawaii faculty and students, as well as local business entrepreneurs statewide, to develop each component of this initiative.

A long-term project that will grow and mature over the next decade, PISCES' primary objectives will be to: (1) 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 future international robotic and manned missions to the Moon, Mars, and other bodies in our solar system; (2) 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 technology, and enhance secondary and college-level training and mentorship programs in advanced mathematics, engineering and science disciplines; and (3) help establish Hawaii as a globally-recognized leader in aerospace.

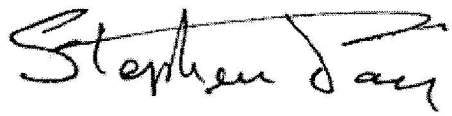
JUSTSAP Secretariat: Office of Aerospace Development – DBEDT / State of Hawaii, P.O. Box 2359, Honolulu, HI 96804
Tel: (808) 586-2388 / Fax: (808) 586-2536 / E.mail: jcrisafu@dbedt.hawaii.gov

Thanks to the visionary and sustained support from your Legislature, initial seed funding appropriated through ACT 149 enabled us to inaugurate PISCES in the fall of 2007. In the brief time since its inception, PISCES has convened an international conference of world-renown scientists, engineers and educators to form collaborative research teams that have (1) begun pioneering a new space science curriculum at the University of Hawaii at Hilo to train undergraduates for careers in aerospace; (2) established a national student design competition challenging college students to apply their skills in STEM-related disciplines to develop detailed designs for a manned lunar base; and (3) inaugurated NASA-funded R&D programs engaging local researchers with colleagues from various NASA centers nationwide to design, develop, and test innovative technologies in Hawaii that will facilitate future robotic and human missions to the Moon, Mars, and beyond.

With your continued support during this critical period in its development, PISCES will be able to realize its full potential – becoming a truly international, multidisciplinary, and financially independent center for space exploration that will establish Hawaii as both a major contributor to and beneficiary of the global aerospace enterprise.

Thank you for the opportunity to testify on SB 2891.

Respectfully submitted,



Chairman

Frederick C. Kiga
Vice President
Govt & Community Relations
Commercial Airplanes

The Boeing Company
P.O. Box 3707 MC 21-81
Seattle, WA 98124-2207

January 30, 2008

Hawaii State Legislature
State Capitol
Honolulu, Hawaii 96813

Subject: Endorsement of PISCES Bills HB 2939 and SB 2891

Members of the Twenty-Fifth State Legislature,

The Boeing Company applauds Hawaii's State initiative in funding the University of Hawaii's Pacific International Space Center for Exploration Systems (PISCES). For many years, since Project Apollo, Boeing has performed research using Hawaii's unique volcanic terrain to simulate lunar surface operations. In addition to simulating human space operation, Boeing has supported robotic space exploration using this ideal analog environment, under NASA contracts and internal research, in cooperation with the University.

Thank you for this great opportunity for aerospace research and education in Hawaii,

Sincerely,

Frederick C. Kiga
Vice President, State and Local Government Relations
Northwest Region
The Boeing Company

JAMSS America, Inc.
16055 Space Center Blvd., Suite 240, Houston, TX 77062
Tel: 281-461-3700 • FAX: 281-461-3776

March 28, 2008

Dear Chair Oshiro, Vice Chair Lee, and Members of the House Finance Committee,

As a current member of the PISCES organizing committee, a ten-year participant in Hawaii's JUSTSAP forum, current President of JAMSS America, Inc.(a support contractor to the Japanese Space Agency) , former Senior Vice President of SPACEHAB, Inc., and former NASA Johnson Space Center lunar mission operations specialist, I am acutely aware of the unique challenges that space exploration places on human ingenuity, on hardware and software technologies, and on test and simulation facilities that are representative of those in-space environments within which or on which space explorers will conduct their operations. 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.

The journey is now set to continue as NASA set's its vision on the establishment of a permanent lunar base within this generation. I am proud to have been a part of the evolution of the PISCES program and have been quite amazed at the immediate bipartisan support received for PISCES from the State of Hawaii in this year's budget. NASA also has taken note - as has the Japan Space Exploration Agency (JAXA) - and PISCES has more than matched its original State funding with NASA research contracts awarded over the past six months. On Friday of this week (February 1), I will have the privilege of speaking with representatives of a number of the leading Japanese commercial aerospace corporations and of informing them of the many opportunities for exploration technologies development, test and checkout that PISCES will offer. I will also tell them that NASA has specifically offered to collaborate with each of these companies on the upcoming research projects in November of this year. My goal is to secure the commitment from one or more Japanese companies to investigate the possibilities with their NASA counterparts.

Your continued support of PISCES will help facilitate the next remarkable chapter of human space exploration in ways that are a fundamental departure from the Apollo program of four decades ago: 1) this renewed journey will very likely be international in nature with all major space faring nations as participants, 2) lunar explorers returning to the moon will establish a permanent lunar outpost which will require advanced and reliable technologies to sustain it, and 3) importantly, the students of Hawaii and other states and nations learning from their PISCES participation today will have unprecedented opportunities to be tomorrow's lunar outpost inhabitants.

I thank you for your leadership in supporting our space program through your continued support of PISCES in 2008-2009 through your approval of SB 2891 SD1 HD1.

Sincerely,

Dan Bland
President

FINTestimony

From: Jim Crisafulli [JCrisafu@dbedt.hawaii.gov]
Sent: Friday, March 28, 2008 7:57 PM
To: FINTestimony
Subject: Background materials for SB2891 SD1 HD1 / March 31, 2008 / Agenda #3
Importance: High

This brochure outlines the vision and goals of PISCES, continued State support for which is being requested through SB2891.

Thank you!...

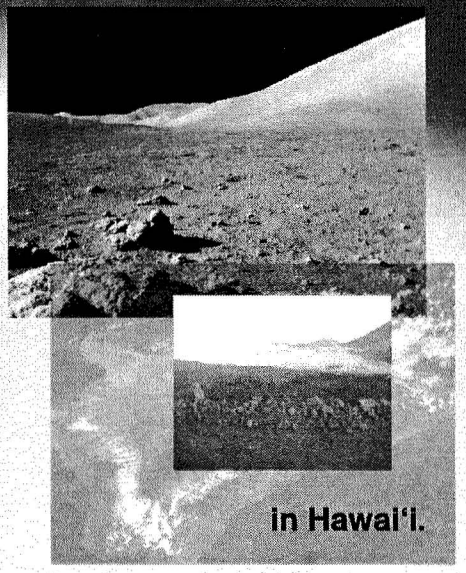
Jim Crisafulli, Director
Office of Aerospace Development
Strategic Industries Division
DBEDT/State of Hawaii
P.O. Box 2359
Honolulu, HI 96804
Tel: (808) 586-2388
Fax: (808) 586-2536
E.mail: jcrisafu@dbedt.hawaii.gov

The Vision

Research laboratories, solar power systems, rover terrain, ISRU pilot plants, life support systems, habitats, communications, class-rooms, staff shops, visitor center...

in an environment unlike any on Earth.

Bringing space exploration down to earth...



in Hawai'i.

PISCES | Pacific International Space Center for Exploration Systems

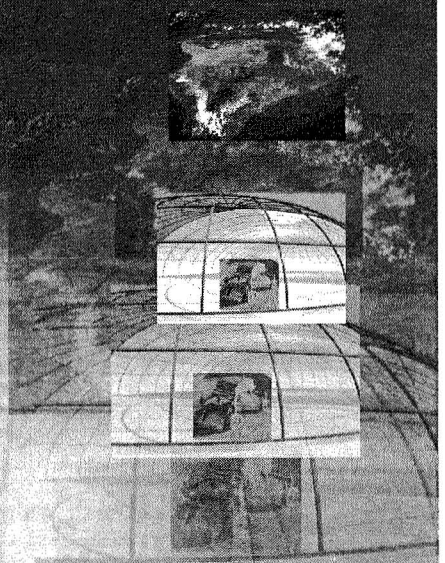
For more information on PISCES, visit or contact:

Web: http://pisces.hilo.hawaii.edu

Dr. Frank Schowengerdt
Phone: (571) 309-3815
Email: schoweng@hawaii.edu

Dr. Robert Fox
Phone: (808) 974-7731
Fax: (808) 974-7693
Email: rfox@hawaii.edu

PISCES | Pacific International Space Center for Exploration Systems



A comprehensive, international research center for the development of new technologies to sustain human presence on the Moon and beyond.

Featuring a simulated lunar outpost on the Big Island of Hawai'i.

http://pisces.hilo.hawaii.edu

PISCES

Pacific International Space Center for Exploration Systems

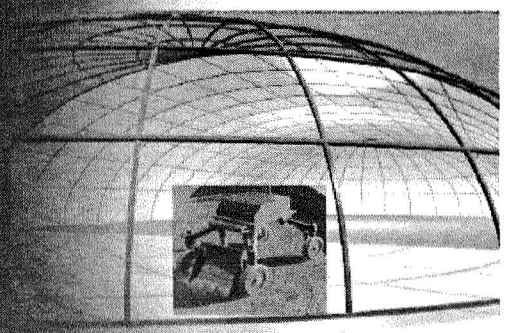
The future vision for space exploration differs fundamentally from that which spawned the Apollo program. This time we're going to stay.

As we journey back to the Moon and on to Mars, it will be prohibitive if not impossible to take everything we'll need with us. We must learn to "live off the land."

New technologies will need to be developed to produce life support consumables such as oxygen, food and water, rocket propellants to continue the journey, energy for heat and power, materials for construction and manufacturing, and nearly every other item we use here on Earth.

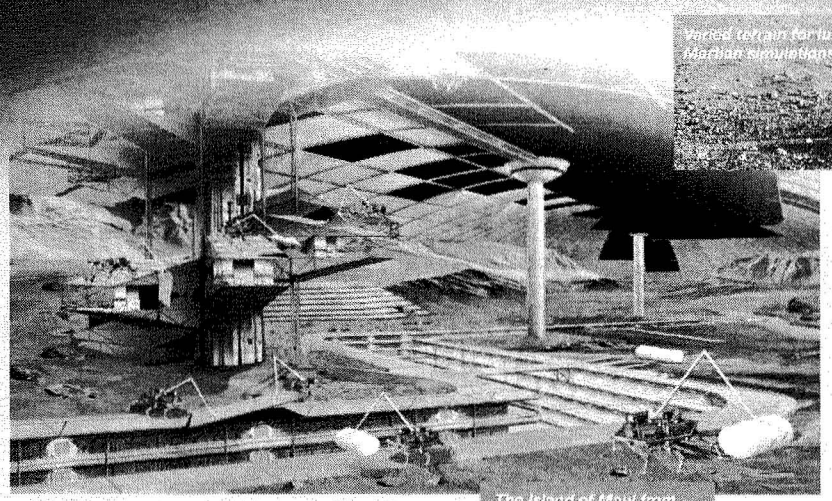
Although basic research can be done in the laboratory, untested technology must be proven out in realistic environments. PISCES was conceived to fulfill this requirement.

When it is fully developed, PISCES will be the only international, integrated research center in the world devoted to the development of new technologies to enable sustained human presence on an extraterrestrial body. It will consist of research laboratories and field testing sites on the Big Island of Hawai'i and will involve faculty and students from its host institution, the University of Hawai'i at Hilo as well as from the UH Mānoa campus, the Tokyo institute of Technology and other participating universities.



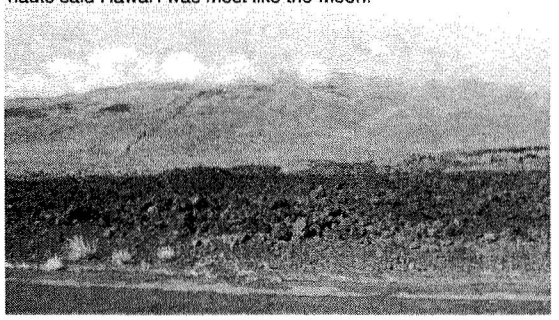
HABITATS

Habitats will be constructed as much as possible from raw and processed soil, using a minimum of imported materials. They will eventually be self-sustaining in energy, food, air and life support. They will be modular and expandable. Central laboratories will be connected to the habitats and adjacent to the field test areas to facilitate rapid technology maturation from laboratory to pilot plant.



THE BIG ISLAND OF HAWAI'I

The volcanic soils and lunar-like terrain, diverse multi ethnic population, and substantial scientific and technical expertise found on the Big Island of Hawai'i make it an ideal location to support international programs for creating and maturing innovative technologies to support future robotic and manned exploration of the Moon and Mars, as well as for training scientists, engineers and astronauts for future space missions. NASA recognized these attributes when it chose Hawai'i as a training site for the Apollo astronauts. Of all their training experiences, the Apollo astronauts said Hawai'i was most like the Moon.



The Island of Maui from atop Mauna Kea on the Big Island of Hawai'i

In-Situ Resource Utilization (ISRU)

PISCES will have laboratories for ISRU research with large field areas for ISRU pilot plants. The laboratories will contain vacuum chambers for volatile extraction and processing, equipment for dust analysis and control, instruments for soil characterization and complete analytical facilities. The field areas will include unit operations facilities for oxygen and propellant production.

Varied terrain for lunar and Martian simulations.

Deep deposits of fine volcanic ash for ISRU

Robot Testing

PISCES will offer a realistic setting for testing robots, enabling long traversals over varied terrain; from numerous craters with large rocks to flat, mare-like areas containing wide expanses of ash, lava and small rocks.

Russian Rovers being tested in Hawai'i

Solar Power

With almost continuous daytime sunshine, low latitude (<20 degrees) and a possible direct line of sight to Haleakala Volcano on Maui for beaming demonstrations, the Big Island offers ideal conditions for developing and testing new solar power concepts for use on the Moon and for future applications on Earth.

Education and Public Outreach

PISCES will present a publicly accessible venue for first-hand exposure to space exploration, including a recently launched student design competition for a lunar outpost (http://pisces.hilo.hawaii.edu/competition.php), virtual lab courses for grades 5-12 on the SpaceClass™ web site (http://www.spaceclass.org) and a new curriculum in Space Exploration Operations Technology at the University of Hawai'i at Hilo. Public outreach programs will promote space exploration to the local population and visiting tourists from the U.S., Japan and other nations around the globe.

SpaceClass™ 2006

31 March 2008

To: **House Committee on Finance**

Hon. Karen Awana	Hon. Sharon Har	Hon. Bob Nakasone
Hon. Della Au Belatti	Hon. Jon Karamatsu	Hon. Karl Rhoads
Hon. Tom Brower	Hon. Michael Magaoay	Hon. Roland Sagum, III
Hon. Mele Carroll	Hon. Joey Manahan	Hon. James Tokioka
Hon. Faye Hanohano	Hon. John Mizuno	Hon. Colleene Meyer
Hon. Kymberly Pine	Hon. Gene Ward	

I am writing to you in support of SB2891, SD1, HD1 (HSCR 1332-08) being heard by the Finance Committee which extends current state funding for the Pacific International Space Center for Exploration Systems (PISCES). PISCES shows promise of playing a major role in the expansion of UH Hilo's ability to provide high quality education to the citizens of our state. In all fairness, I must alert you to the fact that I am Deputy Director of PISCES and admittedly have a vested interest in its continued success. However, I am writing to you as Chairman of the Department of Physics and Astronomy at UH Hilo. In addition, as a former elected member of the Hawai'i State Board of Education, I am well acquainted with the importance of providing our youngsters with the opportunity to develop their strengths so that they can find their future here in Hawai'i, rather than being forced to seek employment elsewhere. PISCES helps us to do that.

PISCES combines exciting, culturally sensitive research and development with an elaborate K-12 and Higher Education outreach program. Its underlying premise is to support the development of sustainable human habitats that will enable us to live for long periods on Mars and the moon. This involves engineering and science projects associated with Robotics, the production of useful materials from the soil, the sociology of persons living together in small, confined groups, the protection of human biological systems from ultra-violet light and other space dangers, etc. We believe that Hawai'i is the world's most perfect site for this work.

UH Hilo is the ideal site for such a program. It has a long history of concentrating on undergraduate, culturally-sensitive education for our young people. In keeping with this, PISCES is already supporting two courses for students interested in space. The first one is completely subscribed and we expect similar student interest in the other. PISCES is committed to emphasizing the University of Hawai'i as a *system* and is working with faculty members at several of UH Manoa's colleges to be sure that students throughout the state can benefit from its educational programs without having to move from one island to the other. A coordinated K-12 program of space-related instructional modules is already being developed and will be made available to the children of our state without additional costs to the already-strapped schools.

PISCES' sensitivity to its hosts in evident in the establishment of a local advisory group to make sure that our scientific activities have support *before*, not after, they are begun. A distinguished panel of Big Islanders will assist us and make sure that PISCES respects our history and culture.

During the last year's legislative session, PISCES was fortunate to receive bi-partisan support for a state appropriation to begin its work. In the few months since that appropriate was implemented, PISCES has already received two NASA grants totaling $640,000, written proposals for several more similar grants, and entered into a Memorandum of Understanding with Colorado School of Mines both to increase its ability to conduct its work and to improve opportunities for our students. Word is beginning to get out and we are starting to receive unsolicited inquiries from outside agencies asking whether PISCES would be available to collaborate and offering additional support funds. This represents the beginning of the 'leverage' which we believe made PISCES so attractive to last year's legislature.

Clearly, the state's limited resources will not permit indefinite state support for PISCES, no matter how successful it may be. But this second year is a critical time in the development of PISCES and continued support for another year or so is clearly indicated. Put directly, PISCES has done what it said it was going to do and deserves your support. It has attracted many hundreds of thousands of outside dollars, begun programs both in research/development and in community outreach/education, strengthened UH Hilo's ability to serve the students of our state, and brought nationally-respected scientists and educators to Hawai'i. We urge your continued support.

Robert A. Fox, Ph.D.

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