

Pacific International  
Space Center for  
Exploration Systems



# An Update

**Dr. Frank Schowengerdt, Director of PISCES**

*Presented to a Joint Meeting of the Higher Education and  
Economic Development and Technology Committees,  
Hawai`i State Senate  
January 28<sup>th</sup>, 2009*



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# VISION

***An International Research and Education  
Center Dedicated to Sustaining Life on  
the Moon and Beyond***





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# GOALS

- **To Become an Intellectual Leader of Thought Enabling Human Settlement of Space, Focusing on Lunar Human Ecology: Consumables, Energy, Materials**
- **To Promote STEM Education**
- **To Engage in Public Outreach**
- **To Conduct Tests, Demonstrations and Astronaut Training**
- **To Build Three Major Facilities: Base, Test Site and Analog Lunar Outpost**



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# Major Developments

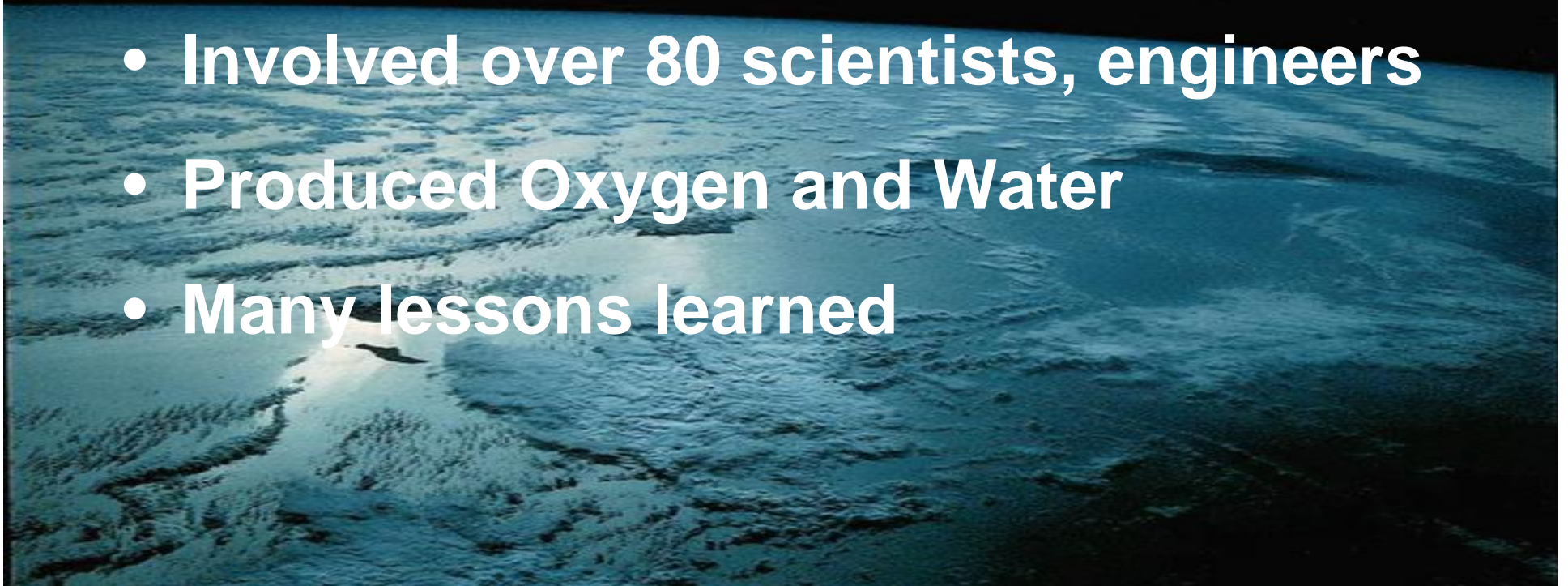
- **International Testing Program**
- **Research Proposals**
- **National Student Design Competition**
- **National Space Seminar**
- **Prototype UHH Space Curriculum**
- **Public Outreach**



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# Testing Program

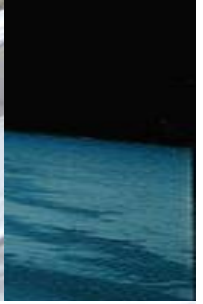
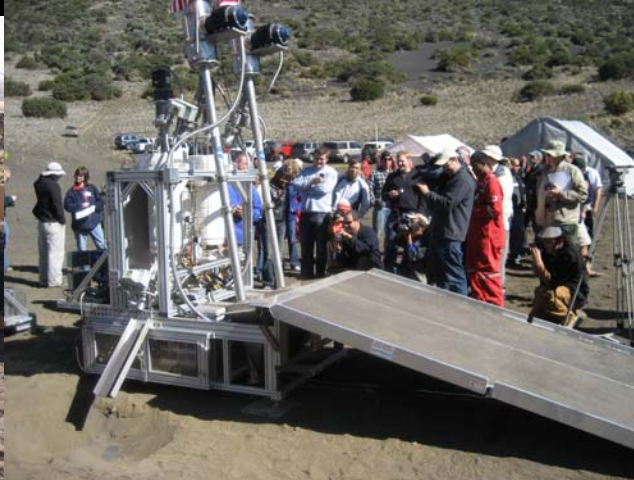
- **NASA, CSA, DLR, JAXA, L-M, Others**
- **November 2008 – 3 weeks, over \$700K**
- **Involved over 80 scientists, engineers**
- **Produced Oxygen and Water**
- **Many lessons learned**





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# Test Site





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# Proposals

## ***“Lunar Human Ecology” – NASA Lunar Science Institute***

***In collaboration with UHH College of  
Agriculture, University of Houston, Colorado  
School of Mines and Lockheed Martin***

***\$ 4.249 million over four years (not funded, but  
will be resubmitted)***



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# Proposals

***“ Ua Ao Hawaii: The Dawning of a New Era In Human Exploration ”***

***In collaboration with Aha Punana Leo and `Imiloa Astronomy Center***

***~\$ 1.6 million over four years (pending)***





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# Proposals

***“Using a mixed reality collaborative framework for sortie planning, training and execution”***

***In collaboration with UH Manoa***

***\$ 1.287 million over four years (pending)***

# Proposals

- **New Submissions:**
  - **Moon and Mars Analog Mission Activities (MMAMA)**
    - **Excavation (\$75K)**
    - **Drilling (\$75K)**
    - **Remote Robotic Control (\$75K)**
    - **NASA-Glenn/Honeybee Robotics (\$75K)**
    - **Honeybee Robotics/Oceanering (\$75K)**
  - **NASA/Steckler Space Grant**
    - **Research and Education for Lunar Colonization**
      - **thru Hawai`i Space Grant Consortium (~\$1M)**



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# Student Design

## 2008 Winners

**Honolulu Community College  
Colorado School of Mines  
University of Colorado**

## 2009 Winners

**Virginia Polytechnic Institute  
Massachusetts Institute of Technology**



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# National Space Seminar

- **George Raiche**
- **Dan Rasky**
- **David Morrison**
- **Peter Schultz**
- **Pete Worden**
- **Kathy Olsen**
- **Paul Graziani**
- **George Nield**
- **Scott Hubbard**
- **Tom Crabbe**
- **Jim Ryder**
- **Lori Garver**
- **Elon Musk**
- **Yvonne Cagle**
- **Steve McLean**
- **Gary Payton**



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# Space Studies Curriculum

**Physics/Astronomy 111**

**Physics/Astronomy 224**

**Physics Astronomy 230**

**Kinesiology 224**

**Computer Science 136**

**Astronomy 281 (UHM)**

**English 760Q (UHM)**

**Philosophy 255 (HonCC)**

**Political Science 342 (UHM)**

**Intro to Space Exploration**

**Space Flight**

**Applied Electronics I**

**Physiology and Space Flight**

**Computing with Robots**

**Astrobiology**

**Science Fiction**

**Cosmology**

**Space Settlements**



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# Public Outreach



***Kamehameha Schools***



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# Public Outreach



*Keakuana Schools*



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# Public Outreach



***PISCES-NASA Day at `Imiloa***





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# Public Outreach



***PISCES-NASA Day at `Imiloa***



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# Public Outreach

## Other PISCES Outreach Events in Hilo:

- **Onizuka Day**
- **Journey Through the Universe**
- **JTTU Family Science Day at `Imiloa**
- **Hawaii Science and Engineering Fair**
- **Hawaiian Family Affair Day**
- **Merrie Monarch**
- **Astro-Day**
- **Robo-Fest**



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# Public Outreach

## State and National PISCES Outreach Events:

- **Discovery Channel (upcoming)**
- **NPR Interview**
- **Channel 9 Morning Show**
- **Associated Press Interview and Article**
- **NASA Press Releases**
- **Pacific Business Journal**
- **Honolulu Advertiser**
- **Star Bulletin**
- **National Geographic**
- **MSNBC**
- **Over 60 lesser national outlets**



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# Benefits

- **Attract High-Tech Industry**
- **Create Space-related Jobs, Which Pay Twice The National Average**
- **Strengthen Higher Education At UH Hilo**
- **Inspire K-12 Students To Study STEM Disciplines**
- **Involve Local Community**
- **Publicize Hawai`i As Space Leader**



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# Summary

- **PISCES is a reality, currently Funded by the State of Hawai`i and NASA, attracting attention from all across NASA, JAXA, CSA, DLR and international industry.**
- **PISCES is a long-term proposition, with a 10-year Strategic Plan to grow into a major force for global space exploration.**
- **Education and Public Outreach are PISCES priorities**
- **PISCES depends on partnerships.**



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# Thank You!



*From the PISCES Community*