



# PISCES MARCH NEWSLETTER

THE PACIFIC  
INTERNATIONAL  
SPACE CENTER  
FOR  
EXPLORATION  
SYSTEMS  
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LETTER FROM PISCES EXECUTIVE DIRECTOR ROB KELSO

IN THIS ISSUE: ROCKET ENGINE TEST!! PG.2

Mars....the Red Planet. It has fascinated mankind for centuries. Under the Obama administration, NASA has made Mars the ultimate destination for the space agency. But what of a return to the surface of the Moon? The President has stated: "We've been there...done that."

I, along with many other scientists and engineers, believe this to be faulty strategy. There are a number of compelling reasons why there has been a ground-swell in placing the Moon "back on the table."

First, we now know that the Moon contains much water. If we can prospect and mine the water, we can create hydrogen and oxygen for fuel cells and as rocket propellant. The Moon could become a "gas-station" only 3-days from Earth for re-fueling human missions to Mars.

Secondly, the Moon offers a more achievable goal for near-term exploration, and perhaps more importantly for the testing and development of key technologies that will later be needed to live on Mars. These technologies are called "In-Situ Resource Utilization" or ISRU. ISRU is essentially "living off the land." This includes using resources on the Moon or Mars for planetary construction and also the mining for resources such as water. PISCES specifically focuses on testing

such technologies in the lunar and Mars analogue sites in Hawaii.

Thirdly, the international community is interested in figuring out how to live and work on the Moon...not Mars.

Fourth, the private and commercial sector has begun to express interest in both commercial lunar transportation services and in the mining materials on the Moon as for-profit ventures. By allowing private individuals to profit from the moon's resources, lunar exploration may no longer be the limited to only governmental agencies. A near-term example of private sector involvement is the Google Lunar X-Prize, a prized-based competition in the commercial sector to have a private lunar lander on the surface of the Moon before the end of 2017.

For too long, NASA has been stuck in low-earth orbit. It is time to raise our eyes past the International Space Station and onto that glowing globe in our sky- the Moon. I believe it makes the most strategic sense to establish a pathway to Mars....*but by way of the Moon!* Such a venture could leverage international contributions as was done with the Space Station.

Importantly, we can learn how to live on Mars by testing the key technologies on the Moon, thus significantly lowering the risk of having



*Above: The painted gantry for the upcoming lunar landing pad rocket engine firing test! Pgs.2,3,4*

*Below: 7<sup>th</sup> grader Nicolas Barrick wins 2016 Hawaii District Science and Engineering Fair pg.4 .*



to first test the technologies on Mars only to have a major issue. I hope we can see a new strategic direction from Congress and the White House in the next administration that includes a "Return to the Moon". – Mr. Rob Kelso

## PISCES SIGNS MEMORANDUM OF AGREEMENT WITH ENA MEDIA HAWAII

The Pacific International Space Center for Exploration Systems is excited to announce a new partnership with local media company Ena Media Hawaii.

This Hilo-based multimedia enterprise has agreed to document our upcoming rocket engine firing test for our Vertical Take-off/Vertical Landing Pad project.

Ena Media offers a wide-range of services including web, video, photography and design to clients such as National Geographic, Los Angeles Times, and the W.M. Keck Observatory.

Andrew Hara, Ena Media Hawaii's CEO, said he was excited to partner with PISCES.

"It is a personal mission of mine to help empower progressive science and am honored to be a part of scientific discovery," he said.

For more information on Ena Media Hawaii visit [www.enamediahawaii.com](http://www.enamediahawaii.com).



Above: Ena Media Hawaii employees and partners Shawn Pila, Alan Ohara, Andrew Hara and Cory Hajek are seen here atop of Mauna Kea on the Big Island of Hawaii.



**LOOK FOR  
ENA MEDIA HAWAII  
ON SOCIAL MEDIA!!!**

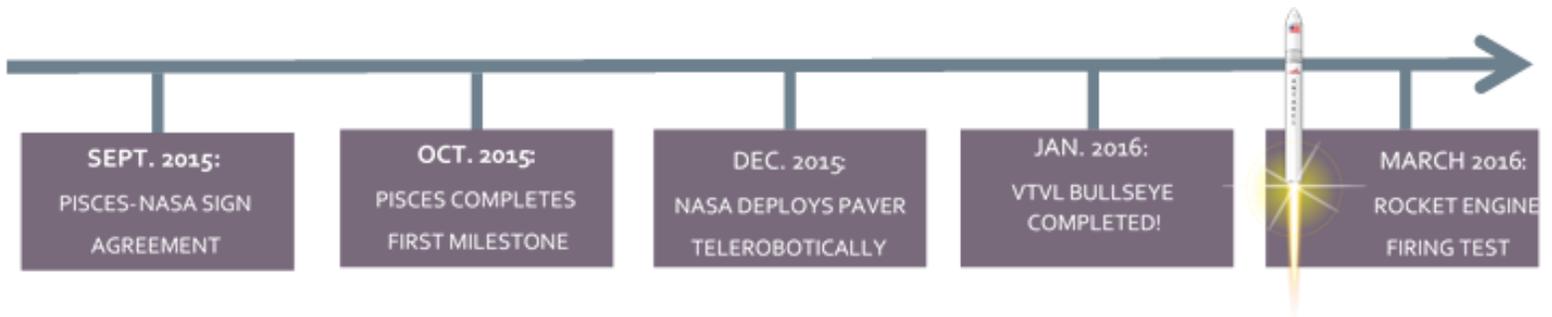


## PISCES UPCOMING ROCKET ENGINE FIRING TEST IS SCHEDULED FOR MARCH 20<sup>th</sup>

AFTER MONTHS OF CONSTRUCTING HAWAII'S FIRST LUNAR LANDING PAD...PISCES AND NASA WILL BE TESTING ITS STRENGTH THIS MONTH WITH A HOT FIRE ENGINE TEST!



# VERTICAL TAKE-OFF/VERTICAL LANDING PAD TIMELINE



## ABOUT THE PROJECT...

The Pacific International Space Center for Exploration Systems (PISCES) has been working to complete the Vertical Take-off/Vertical Landing Pad site on the Big Island of Hawaii. The project involves the use of basalt pavers created in a kiln at 1100 °c to make a lunar landing pad for future space exploration. Landing pads are vital to future space endeavors, as they will help mitigate the problems caused by dust and debris when spacecrafts land on the Moon and Mars!

The project is a joint effort with NASA, Honeybee Robotics, ARGO, the County and State of Hawaii and Ena Media Hawaii.



It is a first of its kind in the state and consists of 100 pavers that were laid in place telorobotically by NASA and PISCES engineers. After the 100<sup>th</sup> paver was placed, the crew got to work to schedule a rocket engine firing test to check the durability of the pavers.

## Winner of the 2016 Hawaii District Science and Engineering Fair

The Pacific International Space Center for Exploration Systems would like to congratulate Nicolas Barrick, a 7th grader at the Hawaii Preparatory Academy, along with his teacher Laura Jim on his first place win at the 2016 Hawaii District Science and Engineering Fair.

Nicolas landed first place for his Gauss Gun investigation. This is a magnetic propulsion device with applications for high speed projectiles, with potential use in space propulsion systems and for kinetic delivery systems (e.g. sending lunar mining resource).

PISCES' very own John Hamilton assisted with the event and was impressed by Nicolas' project.

We're looking forward to next year. Congratulations to all of the participants!



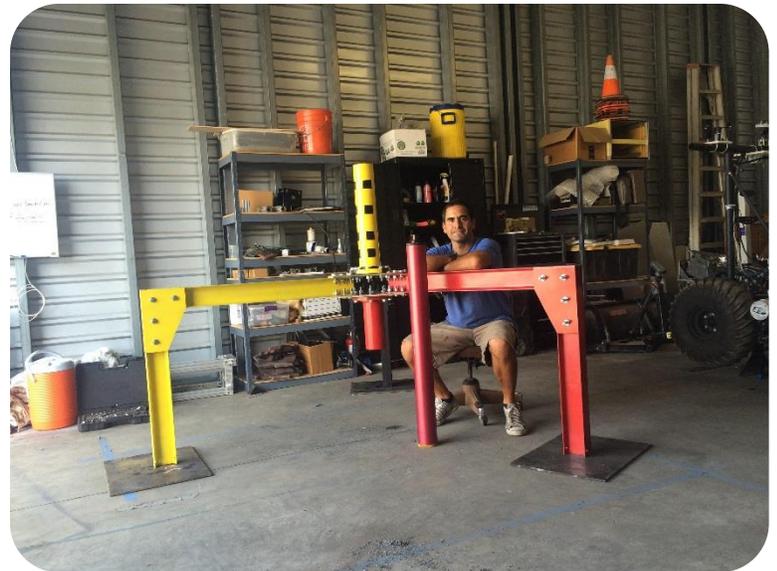
**Left:** PISCES Outreach Coordinator John Hamilton is seen here with Nicolas Barrick, a 7<sup>th</sup> grader from the Hawaii Preparatory Academy.

**PISCES NOW HAS  
AN INSTAGRAM  
ACCOUNT!**

@HAWAIIPISCES



## PISCES/NASA VERTICAL TAKE-OFF/VERTICAL LANDING PAD ROCKET ENGINE FIRING TEST CONTINUED...



**Above:** PISCES Project Manager Rodrigo Romo is seen here with the gantry that will be used for the upcoming rocket engine firing test! The rocket engine will be placed in the middle of the circular apparatus and provide a 4 sec. burn.

### *Rocket Engine Firing Test Facts*

- The rocket engine is powerful enough to launch a 960 pound rocket
- The engine blast will be comparable to 26.5 lbs. of dynamite