

## Spaceflight Startup Announces Plan to Launch Space Tours in Stratosphere



*Above: An artist rendering shows passengers aboard "Shape-ship Neptune" as they glide above Earth near the edge of space. Credit: Space Perspective.*

A new human spaceflight startup has revealed its plans to launch suborbital space tours for the public in less than five years. [The Space Perspective](#), billed as "the off-world travel company," held a press event on June 18 outlining a space-balloon flight that would loft passengers to about 100,000 feet aboard a pressurized capsule. Though the anticipated altitude is short of the commonly recognized boundary with space, the flight would be high enough to see the curvature of Earth and the blackness of space.

One of the company's goals is to shift human perspectives on Earth and the cosmos through "the overview effect"—a phenomenon reported by astronauts who experience a change in consciousness after seeing the Earth from space.

"We're committed to fundamentally changing the way people have access to space, both to perform much-needed research to benefit life

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## Letter from the Director



Rodrigo Romo

Aloha kakou,

COVID-19 has spread worldwide throughout the first half of this year and taken a devastating toll on the well-being, health and financial stability of countless people. Here in Hawaii, we have been fortunate to maintain a relatively low number of cases due to swift and effective measures taken by state officials, and by the kokua and aloha of our communities who continue to look out for one another by following recommended safety guidelines.

But like most states and countries across the planet, Hawaii's economy has suffered immensely as travel restrictions and lockdowns to slow the spread of COVID-19 have devastated our main source of revenue: tourism. This pandemic has shown us how relying too heavily on a single industry in Hawaii can leave us extremely vulnerable in times of crisis.

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## Demonstrating Spacecraft Technology in Zero-Gravity



*Left: Dr. Ian McKinley (left foreground) and Dr. William Jones-Wilson (right background) test their agility in a weightless environment during a microgravity flight and technology demonstration in March 2017.*

*Below: Dr. Zhu getting the hang of notetaking while floating in microgravity.*

*Photo credits: Cornell/NASA JPL.*

**By: Dr. Frances Zhu, Hawaii Institute of Geophysics and Planetology**

During my PhD, I had the pleasure of flying in two [microgravity flight campaigns](#) to demonstrate a spacecraft docking mechanism consisting of magnets and superconductors. I had been developing this technology (called a flux-pinned interface) for three years together with my team at Cornell University, the Space Systems Design Studio led by Dr. Mason Peck, and at NASA's Jet Propulsion Laboratory, led by Dr. Laura Jones-Wilson. Both flight campaigns were made possible through Zero-G, a commercial microgravity flight provider.

Prior to the flight, we went through a series of reviews that increased in rigor to ensure the experiment would not shatter into pieces in the unlikely event of a crash. We packed our humongous, 300-pound testbed into a shipping crate and sent the hardware to Sanford, Florida. In the first week of March 2017 (one week prior to the actual flight), I arrived in Sanford to perform hardware checkouts with a fellow JPL engineer, Dr. Ian

McKinley. We spent long days at the hangar performing every functionality and safety check on our testbed. The rest of the team joined us closer to the flight date to rehearse dry runs of the experiment. Because each microgravity section lasts only 30 seconds, and our bodies are running on a lot of adrenaline, the flight operators can easily forget the order of operations.

We were scheduled to fly on two days, thirty parabolas each. On day one, we waited in the hangar to ensure the weather would comply and we were cleared to fly in our allotted airspace of around 32,000 feet over a 15-mile strip. The planes that fly parabolas are notoriously called "Vomit Comets". Many of us wore motion sickness patches behind our ears that

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## Cont: Spaceflight Startup Announces Plan for Space Tours

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**Top right:** An artist rendering shows Spaceship Neptune rising off the coast of Florida where the company's first operational flight center has been established at Kennedy Space Center.

**Bottom right:** Passengers capture photos of Earth from inside the Neptune capsule.

**Credits:** Space Perspective.

on Earth and to affect how we view and connect with our planet," Space Perspective Co-founder Jane Poynter said in a statement.

On a tour, eight passengers and a pilot would be carried skyward by a massive space balloon roughly the size of a football stadium. The capsule, called Spaceship Neptune (a nod to the far-flung planet's mostly hydrogen and helium atmosphere), would offer rarely glimpsed views of Earth and space, comfortable seating, a mini-bar and lavatory. The total flight time would be about six hours.

The company has already established an operations center at NASA's Kennedy Space Center in Florida and plans to launch from the old Space Shuttle runway. Additional launches are planned from Cecil Spaceport in Florida, in Hawaii and Alaska, and other locations around the world, according to the company's website.

In addition to tours, Space Perspective also plans to offer opportunities for scientific experiments by researchers, students and educators. At 19 miles off the ground, atmospheric pressure is almost zero, providing a near-vacuum environment to do research related to the atmosphere, solar physics and other natural sciences. Space Perspective's first test flights are planned during the first quarter of next year with crewed flights be-



ginning in 2023. The first commercial flights are expected by 2024.

The company's founders, Jane Poynter and Taber MacCallum, were crew members of Biosphere 2 in the early 1990s. In 2013, they founded World View with a mission similar to Space Perspective using high-altitude balloons. Though tours never got off the ground, scientific experiments did. Poynter and MacCallum are now revisiting their original vision through Space Perspective. Their staff have led, designed and/or operated all the human suborbital balloon flights staged in the last five decades, according to the company's website.



## **Cont: Letter from the Director**

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Hawaii lawmakers and government agencies are now working to find solutions for our economic recovery, and one of the top priorities in this effort is to find new ways to diversify our economy away from tourism. Here at PISCES, we have been working to identify Aerospace Industry opportunities that could provide significant and sustainable new sources of revenue. While not all aerospace ventures may be suitable for Hawaii, the geographic positioning and geologic features of the islands offer among the best opportunities found in the U.S. to create an Aerospace Industry cluster. This includes: small satellite manufacturing, testing and in-orbit operations, small vehicle orbital launch, Unmanned Aerial Vehicle Systems (UAS) testing, applied research in dual-use technologies, technical training, and planetary surface test and training programs.

Though Hawaii's main industry will surely continue to be tourism, Aerospace opportunities also have the potential to complement it. Space Perspective, a new human spaceflight startup, recently announced their plan to begin ferrying tourists to the upper edges of the stratosphere aboard a space-balloon. The company has already established a launch operations center at Kennedy Space Center in Florida and has plans to set up operations in Alaska and here in Hawaii. Sight-seeing tours in space would be a totally unique experience, and offer more incentive for tourists to visit Hawaii.

The next step in forging a plan to diversify Hawaii's economy is to find strategies to convince stakeholders involved in these various ventures to do business in Hawaii. It is not a simple task, but one that we must focus on.

At PISCES, we are continuing to work for Hawaii's recovery through Aerospace development—a sector that promises exciting new possibilities and tangible returns—and, together with members of the private sector, public sector, and the community, restore the strength of our economy.

*A hui hou,  
Rodrigo Romo  
Program Director*

## **Cont: Tech Demo in Zero-G**

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would slowly release medicine to numb our inner ears from sensing wild shifts in acceleration. We also carried bottles of anti-nausea and anti-motion sickness pills for quick release during flight. Once clear, we loaded our experiment into the empty, white-padded hull of the plane. About thirty minutes later, we had reached altitude and the pilot issued a notice of “steady flight” over the intercom. We briskly popped out of our seats and began setting up the experiment amid the deafening sound of the plane's jet engines.

When the parabolic segments of our flight began, we were all sitting or lying on the ground. As the pilot pulled on the plane's yoke, we could feel the increase in gravity from 1G to 2Gs over 30 seconds. As the pilot rounded the bend at the peak of the parabola, we felt the transition from 2Gs into 0G. We were weightless! My team propped up both spacecrafts in the testbed and released them toward one another to demonstrate a docking maneuver. After a few attempts, the spacecrafts successfully docked in the microgravity environment. When the spacecrafts joined, our team cheered and floated along with the experiment testbed.

Both flights were an amazing experience—first and foremost to demonstrate that this novel technology would indeed work in orbital conditions—but also as a fun and rewarding team experience. I think back fondly on what a dozen engineers achieved and the ways it may impact the future of technology.