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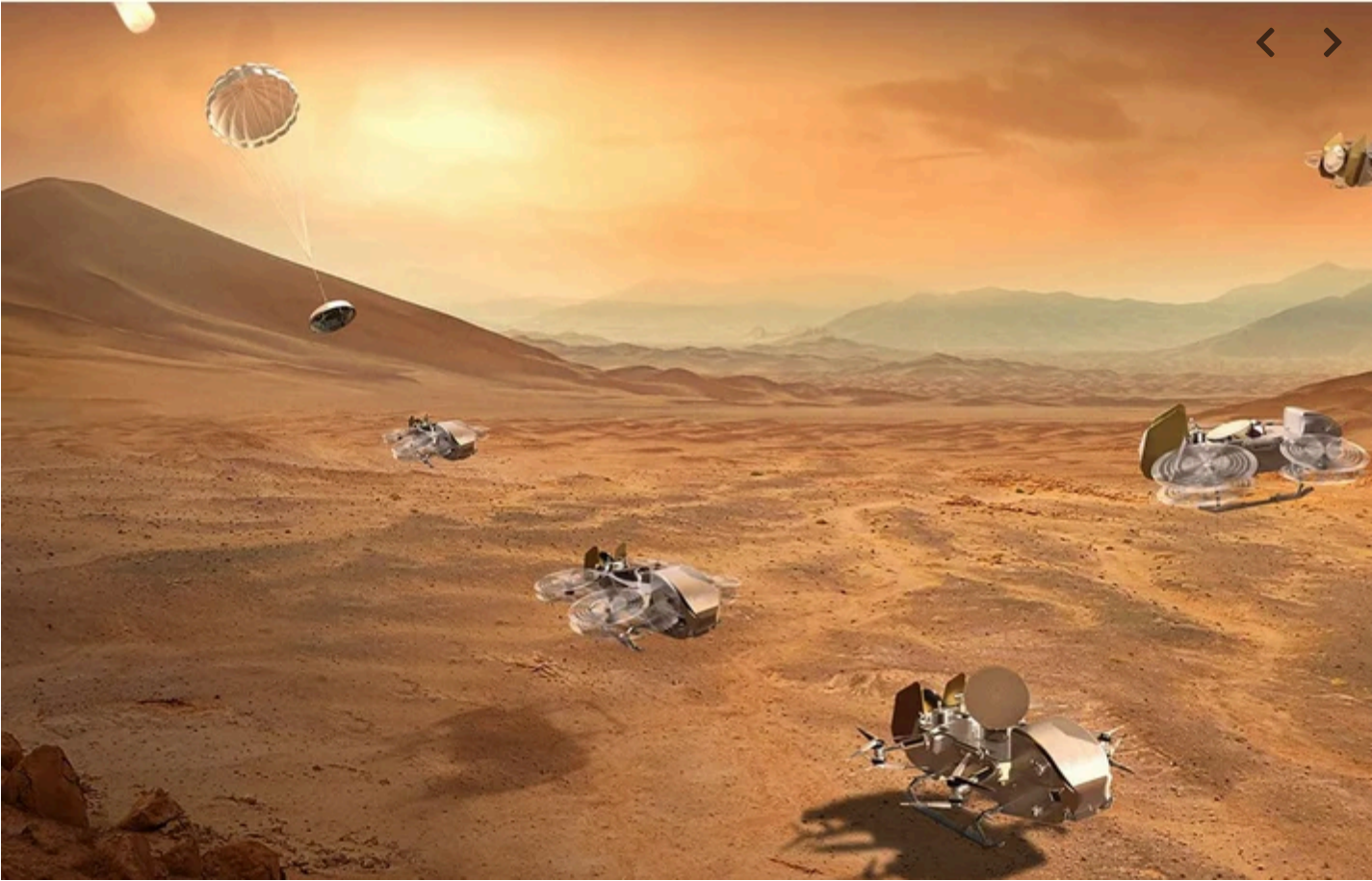
CENTERPIECE

Space

Fairmont State University plays hype man for NASA's Dragonfly mission

By Esteban Fernandez | Times West Virginian
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An artist's rendering of the Dragonfly rotorcraft on Titan.
Submitted Photo

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One of the exercises Todd Ensign, program manager of the Education Resource Center at the College of Science and Technology at Fairmont State University, likes to have children do is imagine how old they'll be when Dragonfly reaches Saturn's moon Titan after six years in flight. The point of the exercise is scale.

"We could like a scale solar system activity," Ensign said. "Which is a pretty classic thing. You can do it with toilet paper, beads or whatever. But, the idea is, all of our rocky planets are very close together. And then we get further and further away."

Scale is just one of several lessons Ensign's Education Resource Center has connected to the Dragonfly mission. Ensign secured a grant to develop educational outreach materials for the mission. The materials will make Dragonfly's mission tangible to school children across the country.

One chemistry exercise teaches children how scientists look for organic compounds. Another exercise teaches a very simplified version of how a key piece of scientific equipment on the craft will evaluate surface elements.

"What we're trying to do is take a theoretical concept and take things out of a black box," Ensign said. "Like if I said GCMS, we went and actually took teachers that were here and toured one of our labs on campus — it's a box. We have the instrument. A sample goes in here. A result comes out on the computer screen. What's happening? How do you convey to students what's happening inside the box?"

Dragonfly will explore the surface of Titan, one of Saturn's moons. The moon has a thick atmosphere composed of methane, which will give the SUV sized drone the ability to fly from location to location every 16 Earth days. It will be the second craft to fly in an atmosphere other than Earth's.

Ensign said the Dragonfly mission provided a rare way to make the science of the mission tangible. It's a job Ensign has worked at for roughly two years now, ever since the mission team at Johns Hopkins University approached Ensign to develop lessons and



activities that can convey what's going on with the mission in the classroom. In a sense, the Dragonfly mission became a de facto mascot for the drone competitions Ensign organized for high school students as part of his educational outreach work.

It's not just science, technology, engineering and mathematics outreach either. Ensign's lesson plans also ask students to use their artistic skills to make sense of what the surface of Titan looks like using information scientists currently know about the surface of Saturn's moon.

NASA's Cassini-Huygens mission, which investigated Saturn from 2004 to 2017, dropped a lander onto the surface of the moon in 2005. Joe Glaser, an astrophysicist at the WVU Center for Gravitational Waves and Cosmology, said the lander saw a cratered surface that is smoothed over by ice.



“There's flowing liquid, basically liquid methane that's in small oceans and lakes and rivers across the entire surface of the moon,” Glaser said.

But what really tantalizes scientists like Glaser is the possible presence of liquid water under the surface.



“The idea was that maybe there’s liquid water underneath the surface of Titan that could mix with the liquid methane and hydrocarbons,” Glaser said. “And then you have the possibility of life forming.”

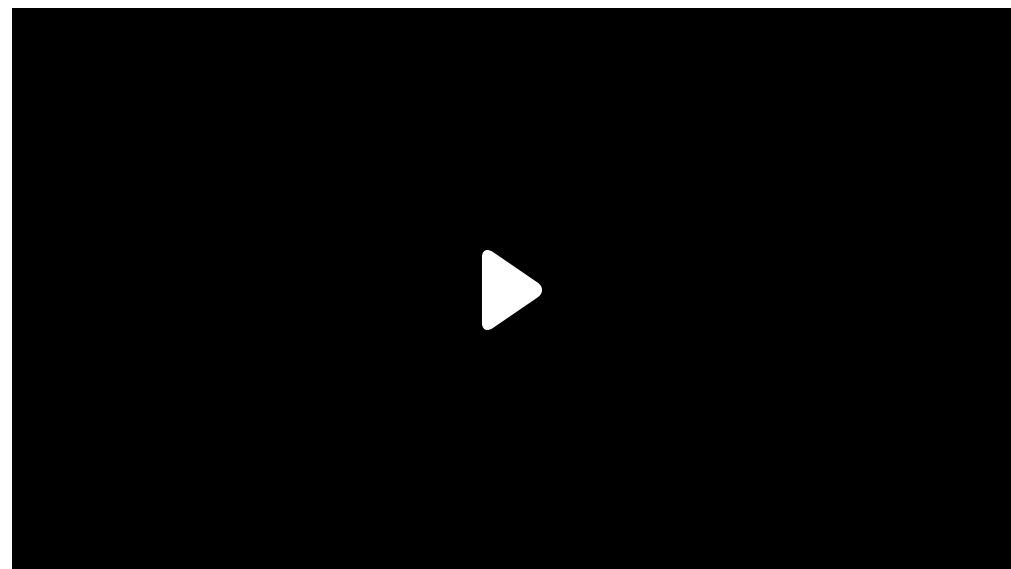
Glaser said if life exists on Titan, the composition of the moon’s environment could create a form of life completely different to what arose on Earth. On Earth, the atmosphere is composed mostly out of 78% nitrogen and 21% oxygen. Methane, while non-toxic to life on Earth, can suffocate it by displacing oxygen. Appalachian coal miners also know how explosive methane can be. However, there are a few examples of organisms that survive off of methane, mostly near undersea vents.

Glaser is unsure what kind of markers life that breathes methane leaves behind, but that’s one of the reasons Dragonfly is going. He said there’s only so much investigation that can be done from space. Dragonfly will be able to investigate Titan up close, and search for signs of life directly.

Missions like Dragonfly inspire children, and adults, to dream about what's out there. Ensign said NASA has always required a certain portion of a mission's budget be focused on public education and outreach.

“If the public doesn't understand the scientific significance, the rationale behind why we want to spend hundreds of millions of dollars developing a spacecraft to go somewhere else, if that's not clear, the voting public is not going to support it,” Ensign said. “So I think helping convey what we're studying and why, is essential.”

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