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Actually, it is rocket science: Madison's Orbitec defies gravity

BY **LIZ MERFELD** FEBRUARY 21, 2013 3:00 PM

When you think of technology in Madison, perhaps a software startup or app developer comes to mind. "Defying Gravity: An Evening with the Rocket Scientists from Orbitec," held last month at the Fluno Center, offered a refreshing diversion.

Orbital Technologies Corp., or Orbitec, develops technologies that make space travel easier and cheaper and markets them to such clients as the military, NASA and Boeing. This includes figuring out how to harvest resources from space to be sustainable while there, such as extracting water from lunar rocks. Or cultivating plant systems that work in microgravity. It also includes using black widow spiders to make super-strong Phytosilk and selling the product as well as the biological process.

But the star of the night was Orbitec's vortex liquid rocket engine. Last October, this small, 800-pound engine made headlines around the world when it successfully launched a rocket in the Mojave Desert's Koehn Lake bed. (To watch a [video of the launch and flight](#), go to orbitec.com/video and click on P-15 Flight Compilation.)

The launch was newsworthy because it represented a giant step toward Orbitec's development of an advanced, upper-stage 30,000-pound iteration, dubbed the VR-3A Vision engine. After 15 years in development, the Vision engine is poised to launch humans and satellites into space for the U.S. Air Force, NASA and outfits like Lockheed Martin, Space X and Sierra Nevada. "We hope our propulsion systems will be used by these companies," Orbitec president Thomas Crabb said.

Compared to conventional liquid rocket engines, Orbitec's vortex engine is smaller, lighter, cheaper to make, more durable, more efficient and potentially reusable. It's all thanks to the creative cooling system.

Dr. Marty Chiaverini, manager of Orbitec's Propulsion Division, explained that conventional liquid rocket engines are equipped with a weighty, expensive labyrinth of coolant tubes, which keep the combustion chamber walls from melting as the fuel and oxidizer burn.

Orbitec's vortex engine, on the other hand, keeps the searing heat away from the chamber walls altogether, eliminating the need for coolant tubes by creating a vortex, or "a tornado within a tornado," as Crabb put it. As a bonus, it also offers a bit more thrust.

While Orbitec has, by design, kept a low profile locally, that's all changing as it looks for more funding to expand and broadcast its success. In just the last year the company won four NASA contracts, three of which involve the International Space Station. The goal is to be the number-two liquid engine provider in the country in two years.

Crabb founded Orbitec in 1998 with Dr. Eric Rice and Ronald Teeter. He told the Fluno Center audience, "We feel like we are 'the space guys' in Madison. We like being here. We're not too close to anyone else. That allows fresh ideas in."

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