

The Other Guys

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Former astronaut Jim Voss came out of retirement to help lead the underdog effort.

Standing beside Dream Chaser, it's hard to ignore its resemblance to the space shuttle. It's smaller—only 30 feet long from nose to tail—and the wings are upswept and canted. But in overall shape, the kinship is clear. Still, the company building this vehicle says it is not trying to make Shuttle 2.0. "We're not fixing all the shuttle's problems," avows Jim Voss, the avuncular vice president of Sierra Nevada Corporation's Space Exploration Systems division. "We're an evolutionary step from the shuttle, taking everything we learned from it and applying that to our vehicle to take [spaceflight] to the next generation."

Voss himself is a familiar figure from an earlier era of spaceflight. A former astronaut, he flew six shuttle missions and spent 163 consecutive days on the International Space Station. Now 63, he says: "I've retired three times already." When we met last November at Sierra Nevada's headquarters in Louisville, a bedroom community near Denver, he said, "I believe we're doing something important for our nation. It's the opportunity to get the United States back into launching humans into space."

Voss showed me around the bay where Sierra Nevada is constructing Dream Chaser, a seven-passenger reusable spaceplane that, if it is selected by NASA, would be carried to space atop an Atlas V rocket. After decoupling from its launch vehicle, Dream Chaser would ignite its engines to reach its final destination. It's capable of docking with the ISS, or performing a variety of multi-day missions in low Earth orbit, then returning home in a glide to a runway landing. While Dream Chaser is based on a long-established aerodynamic concept called a

lifting body, it incorporates numerous innovations never before used on a manned orbital vehicle, including hybrid-fueled engines and a carbon-fiber fuselage.

With Dream Chaser, Sierra Nevada hopes to win the contract for NASA's Commercial Crew Integrated Capability program, a partnership between the space agency and commercial aerospace firms. The primary aim of the program is to furnish NASA with a reusable vehicle that can ferry astronauts to and from the ISS (cargo will also travel aboard commercial rockets). It will be the first time the U.S. government will hire a private entity to transport astronauts into space.

For the contract, worth up to \$1 billion, Sierra Nevada is competing against two heavyweights pursuing conventional capsule designs. Boeing, the most experienced aerospace contractor in history, having had its hand in virtually every human spaceflight system flown by the United States, is developing the CST-100 capsule. The other competitor is SpaceX, led by billionaire Elon Musk, the entrepreneur who co-founded PayPal and luxury electric-car maker Tesla Motors. On May 25, 2012, the SpaceX capsule, called Dragon, made history when it became the first privately built vehicle to dock with the space station. Though the mission was unmanned, Dragon gave NASA a convincing proof-of-concept demonstration. The winning design (or designs—NASA has hinted it might choose two), set to be announced in May 2014, will proceed to the program's Phase 4, with trips to the space station commencing three years later. To date, NASA has awarded \$460 million to Boeing and \$440 million to SpaceX, while funding Sierra Nevada with just \$212 million.

Why so little? Even though Sierra Nevada is a 49-year-old aerospace corporation with more than 2,100 employees and \$1.2 billion in annual revenue, it has never built a crewed space vehicle. The company manufactures navigation and avionics equipment, microsatellites, and various components for other spacecraft. Sierra Nevada's claim to fame is the innovative sky-crane system it built for Curiosity, which enabled the rover to safely touch down on Mars in August 2012 (see "Dropping in on Mars," Dec. 2011/Jan. 2012).

Sierra Nevada's lack of experience in crewed spacecraft could be a NASA deal killer. "They've worked on airplane systems and on unmanned space systems but never done human spaceflight," notes James Muncy, president of PoliSpace, an aerospace consulting firm. Muncy also co-founded the Space Frontier Foundation, an advocacy group for public-private partnerships in space exploration. "This is a new thing for Sierra Nevada, which sets them up automatically as an underdog. They're a credible company, and have put together a good team. But they're not Boeing and they're not flying something now. By definition they're behind."

Voss, who leads the 200-member Dream Chaser team, defends his company: "We've flown 4,000 things on over 413 different space missions and we've never had a failure." And Dream Chaser has already made one successful flight test. In May 2012, a Sikorsky S-64 Skycrane helicopter hoisted the spacecraft aloft, carrying it from the end of a 100-foot-long steel cable. Dream Chaser "flew" for about an hour, doing roughly 115 mph at an altitude averaging 3,000

feet, while dozens of sensors embedded in its composite-fiber airframe collected performance data. A far more critical test occurs later this summer, when Dream Chaser will make its first autonomous flight at NASA's Dryden Flight Research Center in Edwards, California.