

# Race to Space Heats Up With Price War

Continued from the prior page

ing the initial part of its ascent, could end up being more than \$50 million per spacecraft.

It is too early to accurately gauge the eventual size of space tourism as a business, particularly since neither these two firms nor others pursuing similar goals are expected to begin operations before 2010. Nonetheless, some estimates see annual revenue reaching hundreds of millions of dollars by the end of the next decade. Champions of commercial space have speculated about even larger potential profits in decades to come, ultimately involving everything from setting up orbiting hotels to mining minerals found on asteroids or the moon.

But for the shorter term, suborbital tourism is most likely the next step. Glossily held XCOR Aerospace has been working on a competitive shooting budget while also scrambling to secure seed money from the Pentagon. The company is betting that its cut-rate prices, combined with the Lynx's adaptability to test space components for the U.S. military, other government agencies and perhaps corporate customers, will help it carve out a niche in the burgeoning commercial space sector.

"Rather than delaying entry into the market until we added all the bells and whistles," said Jeff Greason, XCOR's chief executive, the company concluded the early model "is more than sufficient to address a large enough portion" of the pent-up demand. Rivalry will drive down prices, he added, and "everybody is going to be surprised at how effective real competition will be" in benefiting customers.

Will Whitehorn, Virgin Galactic's president, said he welcomes competitors because "we believe there needs to be an industrial revolution in space, which is never going to happen if governments dominate the industry over the long term."

At Wednesday's news conference in Los Angeles, XCOR's management and private backers also are expected to announce a symbolic first in combining private and federal efforts. The Air Force Research Laboratory has agreed to use the Lynx as a platform to test the performance of space hardware in an actual zero-gravity environment. Instead of investing hundreds of millions or even billions of dollars to build a satellite and then worry about how various components or

subsystems will work in orbit, military officials are looking to leverage private investment to assess reliability during brief suborbital missions. By balancing private investment with federal dollars, XCOR has focused on steady growth and shied away from overly optimistic projections. But the company nevertheless ended up scrapping its original design for a spacecraft. Jim Benson, another entrepreneur trying to foster space tourism, likewise was forced to redesign his vehicle last year to make it lighter and safer. A spokesman for Mr. Benson told he wasn't available to comment.



Virgin Galactic will launch its rocket from a plane.

In the future, XCOR aims to roll out a more powerful version of the Lynx, featuring dual engines so it can climb higher and different composite materials able to withstand higher temperatures during descents. Such a spaceship also could be optimized to launch small satellites for a fraction of what it now costs the Pentagon, government analysts or academic researchers to put such payloads into orbit. On the tourism side, XCOR hopes to entice somewhat less well-heeled prospective customers than those targeted by Mr. Branson. Simplicity and small size, XCOR officials agree, will trump extravagant cabin interiors and aggressive marketing tactics. "The best part of it all," says Rick Searfoss, a former Space Shuttle commander and now an XCOR test pilot, is that passengers "will ride up front, like a copilot, instead of in the back, like cargo."

Mr. Greason also argues that his craft's liquid-fueled engines are more flexible and environmentally friendly than Virgin's Galactic's hybrid rocket motors, which burn a

mixture of rubber and nitrous oxide, or laughing gas. XCOR has demonstrated the ability to stop and restart engines during a descent, which would give the pilot a second chance at a landing.

With frequent daily operations planned, Mr. Greason says the vehicle will "operate much like a commercial aircraft," providing the "enhanced safety, durability, reliability and maintainability that keep operating costs low." When it comes to protecting the safety of human cargo, Congress and federal regulators have designed a relatively simple system: Passengers will have to sign releases acknowledging they understand the inherent risks in strapping themselves inside a modified rocket. Operators, for their part, hope to be protected from lawsuits by offering minimum training to passengers and supplying basic information about the vehicle's safety record.

Mr. Whitehorn of Virgin Galactic, which is further along than any potential competitor, says industry has "been good at developing many cost-effective solutions to technical challenges, and I believe space will be no different." But he says Virgin's plans are the only ones that "allow passengers to move around in the cabin to experience weightlessness."

Renowned aerospace investor Bart Rutan, whose team is designing and building a handful of vehicles for Virgin Galactic, also hopes to find additional partners to operate dozens more of his spacecrafts. Mr. Rutan sees the potential to fly as many as 100,000 passengers in his craft through 2020. From the outset of his pioneering designs, Mr. Rutan has said, "flying people into space was the only thing ... that ever made any business sense to me at all."

The only way "we are going to have a really robust space industry" down the road is to develop "an actual mass market" for space tourism, according to Peter Diamonds, who ran an international competition that previously awarded Mr. Rutan's initial spaceship a \$10 million prize. But for Mr. Rutan, the dean of space-tourism advocates, opportunities seem boundless. In creating a company to operate what he calls spacecoliners, instead of jetliners, Mr. Rutan predicted last fall, "the time to break even" is about half as long as it is for starting an airline. Given that outlook, he concluded, "this industry should attract a tremendous amount of financing."