

# New Dawn for RLVs

In addition to SpaceShipOne, other private ventures are pursuing reusable launchers despite tight funding

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## OUTLOOK

The biggest space story in 2004 was the October flight of SpaceShipOne, winner of the \$10-million Ansari X Prize. It may be many years before the true historic impact of this flight is realized, but one thing is certain: The X Prize team led by Paul Allen and Burt Rutan proved that spaceflight is no longer the exclusive domain of large government programs. A private company and a small handful of individuals put a man into suborbital flight, and it's only a matter of time before the same can be said for Earth orbit.

SpaceDev of Poway, Calif., has been actively pursuing plans in terms of both orbital and suborbital human spaceflight. SpaceDev intends to build a reusable spacecraft, known as Dream Chaser, that could be uprated for orbital flights. Dream Chaser would take off vertically like most launch vehicles and glide back for a runway landing. The project is only partially funded, and much more money will be needed to make it a reality. A debut in 2008 is anticipated. A number of designs are being reviewed for Dream Chaser, but NASA's X-34, which was shut down in 2001, appears to be one of the front-runners.

In a world full of expensive expendable launch vehicles, the concept of repeatedly using a booster certainly makes sense, especially if it drastically lowers the cost of placing a payload in orbit. Many reusable launch vehicle (RLV) designs are technologically straightforward (compared to the space shuttle), which also shows the promise of lowered expenses.

Despite these potential financial advantages, some private companies such as Kistler Aerospace are finding it difficult to fulfill their RLV dreams. In early 2004, NASA announced its intention to proceed with a \$135-million contract previously awarded to Kistler. The contract, covering the purchase of K-1 flight data, was contingent on completion of the K-1 RLV and the company's emergence from Chapter 11 bankruptcy protection. Things seemed to be looking up for Kistler, but in May 2004, Space Exploration Technologies' Elon Musk filed a formal protest to NASA's sole-source contract, saying he and others "were denied the opportunity to compete on a level playing field."

In June 2004, NASA withdrew its offer to Kistler. While the loss of the NASA contract in the short term is tough on Kistler, it doesn't change the fact that the company still needs \$500

million to complete K-1 development and emerge from bankruptcy. Kistler may still come up with the necessary funding, as some in the industry are bullish regarding the K-1's prospects. These types of budgetary problems have plagued both government and private RLV programs alike.

In an effort to draw funding and investors to RLV programs, some companies are looking to a fledgling space tourism industry. British entrepreneur Richard Branson has started a company called Virgin Galactic to develop the world's first privately funded spaceships to carry commercial passengers on space flights.

**VIRGIN GALACTIC IS EXPECTED** to begin construction of its first spaceship, the VSS Enterprise, in 2005 with the goal of lofting paying customers starting in 2007. VSS Enterprise is based on a larger version of Scaled Composites' SpaceShipOne. Seats are expected to cost \$190,000, perhaps beyond the reach of most travelers but a veritable bargain compared with the \$20 million some private citizens have paid to get into space.

Designing and flying an RLV is no easy task for private industry, but government-run programs have not had much luck either. The U.S. has a long list of failed programs such as the X-30, X-33, X-34, the second generation RLV and the Orbital Space Plane (OSP). The Pentagon's Defense Advanced Research Projects Agency is trying to breathe new life into the former \$300-plus-million NASA-run X-37 program.

The agency, in cooperation with NASA, is expected to begin drop tests of the Boeing-built X-37 in 2005 with the goal of proving that the X-37 can perform an autonomous runway landing. The success of this phase will determine if an orbital version should be built.

Europe is also trying to field a variety of RLVs, but these programs have been pursued on a national level instead of through a uniting body such as the European Space Agency. This approach has tended to limit the amount and continuity of funding available. One promising program that could be welcomed into the ESA fold is Germany's Phoenix RLV. The Phoenix prototype, built by EADS Space Transportation, is being tested, and a flight version could be selected for production as one of Europe's future means of space access under ESA's Future Launcher Preparatory Program. However, Europe still has not decided whether to use reusable or expendable launch vehicles for its future in space; even if an RLV is chosen, it won't be man-rated until at least 2020. ☐

Boeing-built X-37 Approach and Landing Test Vehicle undergoes construction at Palmdale, Calif. Darpa, in cooperation with NASA, expects to begin drop tests this year.

