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Richard Branson joins the space race

For \$200,000, you too could soon be blasting out of the Earth's atmosphere thanks to Richard Branson. But is this really a revolution in space travel? By **Bobbie Johnson**

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The Guardian, Friday 4 December 2009

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An artist's impression of Virgin Galactic's SpaceShipTwo transported by WhiteKnightTwo.

The Mojave desert, 160km north of Los Angeles, is best known for its unforgiving weather and ancient, almost alien, landscape. On Monday, however, it will play host to a very modern spectacle when Sir Richard Branson unveils the latest stage of his scheme to transform space travel into a cheap, commercial proposition.

On a barren airstrip tucked into the edge of the desert, the 59-year-old billionaire will pull back the curtain on Virgin Galactic's SpaceShipTwo (SS2) – the carbon-composite craft about the size of a Gulfstream jet (and a third of the size of the Space Shuttle) which aims to carry paying passengers out of the Earth's atmosphere to the brink of space.

Already, 300 wealthy adventurers are said to have signed up for the proposed \$200,000, two-and-a-half-hour flights – among them scientists Stephen Hawking and 90-year-old James Lovelock, and celebrities such as X-Men director Brian Singer and former Dallas star Victoria Principal. In stark contrast to the complexity of an astronaut's training, a flight with Virgin Galactic will only require three days' pre-training. It is rumoured that the very first passengers will be Branson himself, along with his two children and parents.

In all, SS2's 12ft long pressurised cabin is designed to carry six "space tourists" and two pilots beyond the Kármán line (the generally acknowledged boundary of space, 100km

up). For a few minutes, they will experience weightlessness while gazing out of aeroplane-style windows at the curvature of the Earth, the thin surface of the atmosphere and, perhaps, other planets. By then the rocket's engines will have been switched off, so the ensuing silence will add to the power of the experience (trial reports from the prototype SpaceShipOne even described hearing the "ping ping" of molecules striking the bottom of the craft as it re-entered the atmosphere).

The engineering acumen behind this hugely ambitious project is led by 66-year-old Burt Rutan, an aerospace maverick who has broken records and barriers throughout his career. Under Rutan's direction, SS2 has been in development for nearly five years, alongside the construction of WhiteKnightTwo – the 140ft wingspan "mothership" that will ferry the smaller rocket ship 50,000ft into the sky before it detaches, then blasts up to the edge of space at up to 2,600mph.

The construction of both craft out of carbon composite materials – making them much lighter and more fuel efficient – is crucial to the success of cheap commercial space flight. WhiteKnightTwo is the largest all-composite aircraft ever built, and the weight reduction is reckoned by Virgin Galactic to improve fuel consumption by up to 60% – something that has obvious implications for the aircraft industry in the longer term.

Rutan's team have also designed SS2 to curl up or "feather" its wings once out of the atmosphere, meaning it can fall back like a shuttlecock at a near-vertical angle without the need for pilot control, before reforming its wings at 60,000ft for the final gliding descent to the "spaceport's" runway.

While each Space Shuttle mission is estimated to cost around \$1bn, a Virgin Galactic flight (obviously much shorter, and far less complex) is put at less than \$2m. But it is still a huge financial undertaking, and even with those 300 or so advanced bookings (flights are eventually anticipated to run once or even twice a day), Branson has sold part of the business to investors based in Abu Dhabi to bring in \$280m of much-needed capital. He is surely also right when he says that "\$200,000 is still too expensive for the majority of people".

The biggest challenge came in 2007, however, when an explosion at the company's factory killed three engineers and left three others seriously injured. With typical understatement, a distraught Rutan called the blast, which happened when a rocket test stand exploded during a fairly routine trial, "a tough thing". Development was put on hold for a year.

Even now, many observers remain unsure that the project can be entirely safe, and, to his credit, Rutan does not mince words on the subject, suggesting it should be compared to the early days of traditional aviation. "This is designed to be at least as safe as the early airliners in the 1920s," he has said. "But don't believe anyone who tells you that the safety will be the same as a modern airliner, which has been around for 70 years."

For Branson and Virgin, though, who also have new Formula One racing and submarine exploration projects under way, breaking boundaries and taking calculated risks are all part of the brand.

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