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Rocket man

Space. The final frontier? **Jessica Arbuckle** speaks to Steve Bennett about a potential new tourist destination

In the 1950s Theodore von Kármán defined the 'edge of space' as being at an altitude of 100km. To most people this is possibly just an interesting bit of trivia, but to some the so-called Kármán line represents much more. For those in the running for the Ansari X-Prize – the award for the first non-governmental project to put a man above the line – it represented £10 million and a world record. Scaled Composites won the competition in October 2004 with SpaceShipOne, designed by Burt Rutan and funded by Virgin Galactic. However, this did not signify the end of the race but rather the beginning; we are still waiting to see space tourism really take off. According to Steve Bennett, one of Britain's leading rocket scientists, a lecturer at the University of Salford and founder and CEO of UK-based space tourism / rocket development firm Starchaser, interest in space tourism was already mounting by 2004.

Inspiration

The moon landing of 1969 and TV programmes such as 'Thunderbirds' having fired his imagination, Bennett began as all teenage amateur enthusiasts do, building and launching model rockets in his garden. He continued with a process of trial and error, developing his own designs, until he was able to give up his day job in order to pursue his ambitions full time. He founded Starchaser Industries in 1992 in order to achieve his dream of taking ordinary (if quite well off) people more than 100km up into space in a three-seater reusable capsule called Thunderstar. The company has since developed engines and rockets from Starchaser 1 up to Starchaser 5, which will be used to launch the capsule into space. As well as working on reusable liquid and hybrid propulsion systems and return-to-origin space capsule parachute systems, the team has put much effort into designing its own capsule specifically for the purpose of space

tourism. Modifications include suitably sized and well-placed windows, as the main reason most people give for wanting to visit space is the view.

Designed using Pro-Engineer software, the capsule will be able to support three men in space at a time. During the launch, those inside will be exposed to acceleration forces of up to 4.5G; to remain comfortable throughout this part of the flight, they will be installed lying down. 70 seconds into the flight, the



main engines will shut down and the launch escape system separate from them, pulling the capsule onwards. The launch escape system will then also fall away, attached to a parachute to carry it back to earth. The main engines will be recovered in the same way and pieces reused where possible. Once separated from the launch escape system, the capsule's momentum will carry it forwards as it manoeuvres into a tail-first trajectory. It will continue upwards to an apogee of more

than 100km – i.e. to the edge of space – and eventually return to earth, also guided by parachutes, tail first. The parachutes have been thoroughly tested – in one instance on an all-terrain vehicle dropped out of the back of a plane and guided back to earth. Environmental concerns about this somewhat extravagant use of rocket fuel have also been taken into consideration. "Usually you would use fuel and an oxidiser in a rocket, such as kerosene and liquid oxygen, which give you that rocket effect," explains Bennett. "Our new system uses just one propellant, high-test peroxide – peroxide such as you'd use to bleach your hair but at 90 per cent concentration. This is put through a silver catalyst and produces just steam and oxygen, so it's completely green rocket fuel." He suggests that this could also be used for power generation and perhaps to run cars, and is "looking to get further funding to investigate this."

Besides developing its own new technology, Starchaser is planning to make use of already existing manufacturing technology and expertise – from European automotive and aircraft manufacturers for instance – to reduce its costs and help Europe stay at the competitive edge of space technology development. The firm has identified self-piercing rivets as one example of a transferable technology that can equally be applied to the latest sports cars and the next generation of space vehicles. This automated fastening method, requiring no holes to be drilled before the rivets are applied, is one of the most suitable and cost-effective for small volume production runs, and Starchaser will adopt the process if it proves to be effective. The company's approach is to experiment, build on past knowledge and keep moving forwards incrementally; new developments are valuable but there is no point letting past experience go to waste.

"Seven out of ten people have said they would like to visit space if they could afford

it and if we could ensure we could keep them safe,” says Bennett. As for affording it, £98,000 will buy a 20-minute flight, “incorporating three to four minutes of weightlessness and a chance to see firsthand the blackness of space.” Each capsule could be launched about once a week, so a fair number of people could potentially make the trip each year. The price also includes two weeks of training, covering everything from parachute training to hypobaric, decompression and centrifuge training, as well as more basic firstaid, radio protocol and survival education.

Crew and passengers will also need to pass a thorough medical and psychological examination before they are allowed to fly. All passengers will wear a Russian Sokol-derived space suit, something Bennett says his competitors are not intending to do – deciding to send a space tourist in only his or her shirtsleeves.

However they are to be dressed, space tourists still have quite a wait ahead as development work continues. “The engine we are working on now is called the Storm rocket, which has so far given 7.5 tonnes of thrust burning for about 70 seconds. That’s built and we’re testing it,” says Bennett. “The first unmanned launch is expected for 2009 and we’ve got about 68 months until our first full-scale people-carrying rocket launch,” he explains, adding that “we need about £7.8 million to get there – as a result, we’re currently in the middle of restructuring as a plc.”

The company is also relocating to new UK premises this Autumn and expanding



to New Mexico, where ‘Spaceport America’ is being developed to provide a home and launch site for commercial space technology companies. Starchaser is working on a 120-acre site about 17km west of the city of Las Cruces, about 50km from Spaceport America but “the UK will still be home to headquarters,” says Bennett. “We will build the capsules here and the rockets in New Mexico. There is the technology base in the UK for spacecraft manufacture, the manufacturing base and the expertise – but not in New Mexico. Besides, we do want to keep elements of the work in the UK and Europe.”

Faith

Bennett evidently has faith in the future of space travel: “Space tourism will open up – it will be worth trillions of dollars. It’s going to be bigger than the Internet revolution, creating industry and jobs.” He therefore recognises the value of promotional activities, especially those aimed at younger children. “I want to enthuse and inspire kids to take up subjects such as science, technology, engineering and maths,” he says. “These are seen as boring but even if the kids are inclined

towards them, they don’t tend to take them up as they see no future in it,” he adds. For this reason more than 150,000 students in more than 200 schools are given the chance to meet the Starchaser outreach team – with rocket in tow – each year. “We can help show them it can be cool and fun and when they are qualified they can come to work in companies like Starchaser. We reinforce the national curriculum; it’s good public relations for us and a great source of revenue; but also from a personal perspective I think it would be really cool if the first person on Mars – who must be in high school now – said they were inspired when our rocket came into their school.”

He admits that those involved in this industry will “make a lot of money,” but this is not his only inspiration: “I’ve always wanted to fly into space,” he says. “In 1992 I said to the Mrs I was going to give up the day job and work on the rockets full time. Which I have done and now we are developing one big enough to carry a person – but obviously I have an ulterior motive, I’ve always wanted to go into space.” It seems he is not alone in this desire but, thanks to his hard work and ambition, he could well be one of the first to achieve it. 