The new space race: Beating Branson with balloons

Six years and four deaths after Virgin Galactic claimed it was close to taking tourists into space on rocket-propelled spaceships, the company founded by Sir Richard Branson and backed by Abu Dhabi is at risk of being surpassed by helium balloons. One of the frontrunners in the new space race reveals why.

The recent fatal crash of Abu Dhabi-backed Virgin Galactic's SpaceShipTwo that many hoped would soon take tourists into space has reinvigorated questions about the viability of the mission and whether it will take off any time soon.

About 800 people — mostly celebrities and all wealthy — have paid a reported $250,000 to be among the first to travel to space with Virgin Galactic, founded by serial entrepreneur Sir Richard Branson.

But for all of Branson's hoo-ha and grandiose promises of imminent launch dates since 2008, he may indeed be blasted out of the record books by any one of a number of competitors who have been working towards the same goal but with far less marketing.

Several of those competitors won't be taking visitors to what is called near space — generally defined as between 20-100km above the Earth's surface — in a rocket, but will be doing so in a helium balloon.

One such entrepreneur is Jose Mariano Lopez Urdiales, the founder of zero2infinity, which is planning to make its first test flight with humans next year.

Urdiales is confident — actually, he is certain — that a balloon, whether his or another, will take tourists to space before even Branson makes it there on Virgin Galactic's inaugural flight.

"I believe that. I've been saying this for a while. I haven't changed my mind," Urdiales tells *Arabian Business* from his base in Spain.

"I'm certain. When you're dealing with something that's highly technical like this, the physics and engineering of the problem are very, very important and… you can clearly see that it's a simpler solution and it's a more effective solution to use a balloon than it is to use a rocket."

That could be bad news for Abu Dhabi's Aabar Investments, which has thrown an estimated $380m into Virgin Galactic, taking a 37 percent stake in the company, with exclusive rights to launch tourism and research space flights in the region and to develop a programme to launch small satellites from the Gulf state. When the sovereign wealth fund initially backed Branson in 2010, there were public expectations that rocket-propelled spaceships would be well and truly launching by now, and hopefully making a significant return on Aabar's capital.

Instead Branson has been forced to repeatedly delay his first trip and manage the fallout of four deaths from two fatal accidents. Naysayers have become even louder since the 31 October death of co-pilot Michael Alsbury aboard SpaceShipTwo.

Engineers and a former government official involved with the project have claimed that for years prior to the accident they had concerns, including inadequate rocket-motor thrust, problems in the flight-control system and structural deficiencies that affected the wings of the rocket's carrier plane.

While such problems can be resolved, they say, there is no predictable timeframe on when tourists will be taken into space — contrary to Branson's public statements.

The US's National Transportation Safety Board also has publicly questioned management of the company. "Was there pressure to do testing?" the board's acting chairman Christopher Hart said to reporters following the recent accident. "Was there a problem with the training?"

Warnings from the likes of the lead expert on rocket propulsion at the International Association for the Advancement of Space Safety (IAASS), Carolynne Campbell, US-based British rocket scientist Geoff Daly and Tomasso Sgobba, executive director of IAASS and the former head of safety at the European Space Agency, also have been apparently ignored by Virgin Galactic and Branson.

It also has since been revealed that three senior Virgin Galactic executives — the vice president in charge of propulsion, the vice president in charge of safety, and the chief aerodynamics engineer — had quit the company in the months leading up to the October crash.

The head of operations for the company, Michael Moses, has acknowledged the pressure the technical experts were under.

"There's a difference between the marketing and the engineering" sides of the company, Moses said ten days after the accident, according to the Wall St Journal. Branson represented the ultimate "impatient customer, saying I want to fly by Christmas", Moses added.

The UK's Princess Beatrice became the first celebrity to pull out of the mission in November, along with a reported 24 other ticketholders. However, Dubai-based businessman Ashish J Thakkar, who also has bought a seat on SpaceShipTwo, has told Arabian Business he continues to support the mission.

Urdiales says Aabar has little control or real insight into the project because of the US's International Traffic in Arms Regulations (ITAR) that prevents non-Americans from having access to technology that could be used to develop arms.

The technology involved in the development of the rockets is considered to be transferable to lethal weapons and is therefore subject to ITAR. That means no-one at Aabar and not even Branson, who is a British citizen, can view the engineering and design details of the Virgin Galactic project. Perhaps that can go some way to explaining Branson's bullish-yet-premature launch date projections.

The regulation also prohibits Emiratis from working on the development of the project, despite the UAE capital's hefty investment that has arguably allowed the research to progress.

"If I were Aabar, I would have a very hard time understanding what's going on," Urdiales says. "I don't know how they do their due diligence.

"The technical nitty-gritty of what's going on cannot even be shared with the Emiratis on the board. This is not like a supermarket — there's things that blow up, people that get killed, risk of life; it's complex. [It] has consequences, so [the investor] has to be able to know if the management is really just telling you what you want to hear or is telling you things as they are."

Contrary to the assumption that Urdiales has sour grapes over the advancement of Virgin Galactic — created by a businessman with no background in aerospace or astrophysics — the trained aerospace engineer whose father was an astrophysicist says he is "very grateful" to Aabar for its investment, which he says has helped the entire industry gain attention.

“A lot more people think of space tourism and want to have that experience thanks to their investment,” he says.

“I think [Aabar] have been brave to go into this sector, which is new, and they should be commended for that. Maybe this step didn’t work or it didn’t work the way it was planned but I think there should be more steps.”

One such step could be to relocate the Virgin Galactic development to the Middle East, where European and/or Russian engineers — which have a long history in space engineering — could work on the project. But it is unlikely the already-developed technology could be exported out of the US.

Urdiales is hoping that rather than SpaceShipTwo’s recent fatal accident turning off interest in the space tourism industry, it will instead encourage investors towards balloons over rockets.

“There’s plenty of opportunities, not just in my company but others. I don’t think it makes sense for the whole investment community to count this as a bad debt, it’s not. Maybe the way they were doing it wasn’t optimal for them and there are other ways.”

“Other ways” being balloons, of course. Urdiales backs up his pleas for money with argument. He says balloons are safer, more economical and provide a better experience than reaching space via a rocket.

“As a rocket engineer, I can say that there’s still a lot that needs to be done to get rockets to reach the level of reliability and safety that balloons have had for a very long time,” Urdiales says. “We have been flying balloons since the 18th century, whereas rockets are a relatively recent development.

“The failures that could put people at risk are a lot more difficult to manage on a system that’s using a rocket to propel itself.”

Ironically, Branson has set several records flying balloons across oceans.

But his spaceships will only be able to offer four to five minutes in near space, compared to a helium balloon that can effectively float there indefinitely.

zero2infinity is selling a four-hour experience. However, while the balloon will reach up to 36km beyond Earth, well below the projected height of 110km for SpaceShipTwo, Urdiales contends that the view will be the same but more comfortable.

“Many more people will find it more enjoyable to fly in a balloon than a rocket because it’s less noisy, it doesn’t vibrate as though the whole thing is shaking apart and the accelerations are not as strong, you don’t feel as though you are five or six times your weight as you will feel in a rocket flight, especially in re-entry,” Urdiales says.

“People sometimes attach a certain significance to [a level of altitude]; a balloon might not get them to the level they want but from an experience point of view there’s no difference in the view that you get [36km to 110km].”

He won't reveal how many people or who has bought tickets to be among the first to travel to space with zero2infinity, but Urdiales says they have paid $150,000 per ticket — $100,000 less than Virgin Galactic's rocket-propelled spaceship.

Cost will inevitably be a factor in determining the size of the potential space tourism market.

Urdiales says ultimately there will be room for both balloons and rockets, with some customers seeking the "I survived it" experience of a rocket, while others will prefer the safer, longer and cheaper trip in a balloon.

But he argues that history dictates that balloons will be the first means of a private space tourism company. Governments that invested in space flight did so first in balloon technology and all of the initial space records were set in high-altitude balloons.

During the 1930s and 1960s, the US and the former USSR used high-altitude balloons to engage in the first space race. Military men from both countries were the first to reach 40km above Earth.

The Russian government is the only organisation to have so far taken paying tourists outside Earth's orbit using a rocket, an experiment introduced to help finance the country's space programme and which is no longer offered.

But Urdiales' point does not take into consideration investors, most of whom are more attracted to rocket science than helium balloons.

"Even though there's been more investment in rocket-based systems than balloon-based systems, that only shows that the investment community is still not well-informed about the actual opportunities and the actual technology," Urdiales says.

"So far Virgin Galactic has done a tremendous job of making people aware of the possibilities of near space, that the view is beautiful, that it makes sense to go there. It has eclipsed everybody else's efforts because of their notoriety but I think it's good investors and clients see that there's many ways to see these views and not all of them imply using very, very complicated systems, that there are simpler systems that can offer it."

Others too have suggested that Virgin Galactic has only been as successful as it has been so far because of the Virgin and Branson brands.

"It's the British part of it that's sold tickets," Urdiales says. "If this was called not Virgin Galactic but South West Galactic or something else, I don't think they'd have sold ten tickets."

But as the recent fatal accident in the Mojave has shown, words often only count for so much.

Urdiales is adamant Virgin Galactic will not succeed without change in the culture of the company. And he fears if the negative publicity continues it could have a detrimental impact on the entire industry, ending his own dream to take tourists to space.

“I think the attitude of just staying the course without any change might work for PR but internally there needs to be changes for it to work,” Urdiales says. “It’s not going to happen unless they do what I’m saying.

“Clearly there’s demand but you need a little bit more focused investment in actual engineering and getting systems to work and testing them than in marketing and communications.”

Branson has successfully cultivated 50 other Virgin businesses, so why not space tourism? The answer may well be that all of his other ventures — including an airline, a mobile phone company, a train network and a music chain — were existing ideas that Virgin simply offered in a new format.

So if history is anything to go by, Urdiales may well be right when he predicts that Branson will not be the first to take tourists to space.