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VIRGIN GALACTIC: DIFFUSION OF INNOVATION IN SPACE TOURISM?[[1]](#endnote-1)

Arpita Agnihotri and Saurabh Bhattacharya wrote this case solely to provide material for class discussion. The authors do not intend to illustrate either effective or ineffective handling of a managerial situation. The authors may have disguised certain names and other identifying information to protect confidentiality.

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**Virgin Galactic LLC (Virgin Galactic), founded by Sir Richard Branson, owner of the Virgin Group Ltd.,** was a space tourism company headquartered in California. In early 2019, the company planned to offer commercial suborbital space flights to paying consumers and to host other suborbital space projects. In a suborbital space flight, a spacecraft reached the maximum altitude of 62 miles (100 kilometres [km]) but not an altitude where it could orbit the Earth.[[2]](#endnote-2) In December 2018, after approximately 10 years of effort, **Virgin Galactic** launched its first successful crewed test spacecraft, named Virgin Space Ship (VSS) *Unity*, from the Mojave Air and Space Port in Mojave, California. VSS *Unity* was a SpaceShipTwo-class suborbital aircraft (i.e., an air-launched spacecraft capable of carrying up to six passengers).[[3]](#endnote-3) Branson was optimistic about launching commercial spacecraft in 2019. He also aimed to apply the technology developed during Virgin Galactic’s space tourism research to make supersonic intercontinental flights possible.[[4]](#endnote-4)

However, environmentalists such as Leo Hickman, the chief adviser for climate change at World Wildlife Fund-UK (WWF-UK), were concerned that **Virgin Galactic’s space program** might contribute to environmental pollution. Hickman claimed commercial space flight was an expensive adventure for extraordinarily rich individuals at the cost of the environment.[[5]](#endnote-5) A mere 90-minute flight on Virgin Galactic’s spacecraft was priced at US$250,000.[[6]](#endnote-6)

In addition, experts such as Valerie Neal, of the National Air and Space Museum, had raised concerns about the health of space tourists, as space travel generally resulted in DNA (deoxyribonucleic acid) damage linked to exposure to radiation, bone and muscle loss, and other ailments. Some prominent astronauts, including Andy Thomas of Australia, also believed that Branson’s promotion of space tourism was a marketing gimmick.[[7]](#endnote-7)

Branson believed that the environmental impact of Virgin Atlantic’s spacecraft was less significant than the carbon footprint per person caused by intercontinental travel such as a round trip from London, UK, to New York. He was further confident that, with time, space tourism would become affordable.[[8]](#endnote-8)

Could Branson succeed in launching commercial spacecraft and make it affordable over time? Given environmental and health concerns, could Branson make a case for responsible innovation through space tourism? Should he focus on space tourism or other business possibilities such as supersonic flights?

****Background****

Virgin Galactic was founded in 2004 by Branson and incorporated in 2007. In December 2018, Virgin Galactic had 850 employees and revenues of $114.12 million.[[9]](#endnote-9)

In 2014, Virgin Galactic’s SpaceShipTwo, a suborbital spacecraft designed for space tourism, broke apart during a test flight, resulting in the death of a co-pilot.[[10]](#endnote-10) In 2015, a National Transportation Safety Board report related to the accident stated that the pilot had repositioned the tail wings of SpaceShipTwo early for a return to the ground, and that this had caused the spacecraft to break apart.[[11]](#endnote-11) After this incident, Branson parted ways with **Scaled Composites, a US-based aerospace company responsible for manufacturing the SpaceShipTwo and hiring test pilots for the spacecraft. Virgin** Galactic decided to use its own manufacturing plants and hire its own test pilots.[[12]](#endnote-12)

In December 2018, Virgin Galactic successfully launched the SpaceShipTwo suborbital spacecraft. VSS *Unity* was launched from its mothership, Virgin Mothership (VMS) *Eve*, which was a WhiteKnightTwo carrier plane. VMS *Eve* carried VSS *Unity* to a height of 43,000 feet (13,106 metres) and released it.[[13]](#endnote-13) The pilot of VSS *Unity*, Mark Stucky, and co-pilot Frederick Sturckow then fired the rocket motor of VSS *Unity* for 60 seconds, which accelerated VSS *Unity*’s speed to Mach 2.9 (i.e., 2.9 times the speed of sound). This acceleration helped VSS *Unity* reach the maximum altitude of 51.4 miles (82.7 km), surpassing the 50-mile (80.5 km) mark that the US government recognized as the edge of space.[[14]](#endnote-14) The spacecraft flew into space and earned the pilots “astronaut wings”—recognition from the Federal Aviation Administration (FAA) granted to crewmembers of a space flight for demonstrating “a safe flight to and return from an FAA licensed mission.”[[15]](#endnote-15) Branson claimed, “Today, for the first time in history, a crewed spaceship, built to carry private passengers, reached space.”[[16]](#endnote-16) Representatives of Virgin Galactic mentioned that a lot of work would still be required before the actual commercial flights began. They said, “Whether we complete all our objectives during the next flight or need to wait a little longer, we remain committed to completing the final stages of this extraordinary flight test program as quickly, but more importantly as safely, as possible.”[[17]](#endnote-17)

In early 2019, several other companies—including Astrium GmbH, The Boeing Company, Bigelow Aerospace, Excalibur Almaz, Space Exploration Technologies Corp. (SpaceX), Space Adventures Inc., Space Island Group, and Zero 2 Infinity SL—were also on the verge of launching their own spacecraft.[[18]](#endnote-18) Commenting on the competition, Branson stated, “For space travel, the demand will far outstrip supply. Jeff Bezos and Elon Musk are formidable competitors, and there’s definitely room for all three companies.”[[19]](#endnote-19) Further, space hotel companies, such as California-based Orion Span Inc. (Orion Span), were on the verge of establishing space tourism hotels. Orion Span’s Aurora Space Station, likely to be the first space hotel, was to be launched by 2022. Orion Span decided to offer a 12-day stay at 320 km above Earth for a price of $9.5 million. The hotel was expected to orbit Earth every 90 minutes, enabling guests to see approximately 16 sunrises and sunsets every 24 hours. However, before checking into this hotel, guests were expected to undergo a three-month training program.[[20]](#endnote-20)This type of tourism, where guest could spend considerable time in a space hotel or space station in Earth’s orbit, was known as *orbital tourism*[[21]](#endnote-21) (see Exhibit 1 for a comparison of Virgin Galactic’s competitors and complementors).

The Need for space tourism and the space flight experience

Virgin Galactic aimed to create a basic space access infrastructure that could enhance the research abilities of scientists and entrepreneurs.[[22]](#endnote-22) A *New Yorker* article on Branson quoted him as saying, “We see ours [Virgin Galactic’s] being the spaceship for Earth.”[[23]](#endnote-23) Astronauts have emphasized the human side of space exploration. For instance, in *The Overview Effect*, by Frank White, an astronaut described the view of Earth from space by saying, “You don’t see the barriers of color and religion and politics that divide this world.”[[24]](#endnote-24) Branson corroborated these statements and said, “I believe that, once people have gone to space, they [will] come back with renewed enthusiasm to try and tackle what is happening on this planet” (emphasis in original).[[25]](#endnote-25)

In 2016, Branson invited renowned theoretical physicist and cosmologist Stephen Hawking for a trip to space in Virgin Galactic’s spacecraft. Branson offered Hawking a free ticket into space, which Hawking accepted conditionally because of his health. Branson spoke of Hawking’s belief in the importance of exploring space, stating, “He has made it very clear that he thinks mankind and womankind need to work very hard to try to colonise other planets and that space is very important for people back here on Earth.”[[26]](#endnote-26)

However, Thomas condemned the Virgin Galactic mission, describing it as a “go nowhere, dead-end technology.” He stated, “The thing I’ve got to say about Richard Branson is he could sell refrigerators to Eskimos.”[[27]](#endnote-27) Thomas added,

He’s a businessman and he’s portraying that flight experience in a way that I would not be comfortable saying.

It’s true that he will fly to the edge of space, but he can’t stay there. He falls right back down.

It’s really just a high altitude aeroplane flight and a dangerous one at that.[[28]](#endnote-28)

From launch to touchdown, Virgin Galactic passengers would be inside the spacecraft for approximately 90 minutes.[[29]](#endnote-29) For about four minutes, passengers would be able to unbuckle their seatbelts and float in the cabin, experiencing microgravity (i.e., the absence of gravitational forces). During this period, the passengers would be able to view the Grand Canyon, the California coastline, and the Baja Peninsula. Virgin Galactic pilots, similar to tour-bus drivers, would help passengers recognize various celestial bodies and terrestrial landmarks visible from the window of the aircraft.[[30]](#endnote-30)

Research advantages of Space Tourism

In December 2018, when Virgin Galactic successfully launched VSS *Unity*, the National Aeronautics and Space Administration (NASA) aimed to use the flight to test 12 technology experiments.[[31]](#endnote-31) Christopher Baker, from NASA’s Armstrong Flight Research Center in California, stated, “Regular, commercial access to space will change how we approach technology development by allowing us to invest in early research validation. . . . The payloads on this flight represent a cross section of promising space exploration technologies that could benefit future NASA missions.”[[32]](#endnote-32)

Joshua Colwell, a University of Central Florida physics professor whose research, supported by NASA, was also aboard VSS *Unity*, stated, “This is the kind of experiment you can’t really do on the ground. . . . So, it’s always exciting and a privilege to collect data like this from a high-quality free fall environment like you get from one of these suborbital vehicles.”[[33]](#endnote-33) His research tested how small dust particles ranging from a tenth of a millimetre to about two centimetres acted in conditions of microgravity, which was achieved when VSS *Unity* left Earth’s atmosphere. The research findings were expected to help scientists better understand what could happen if astronauts or robotic landers worked on the surface of small asteroids.[[34]](#endnote-34)

In July 2018, Virgin Galactic also partnered with the Italian Space Agency for a mission from the Mojave Air and Space Port in which a Virgin Galactic space flight would take an Italian researcher to perform a number of scientific experiments.[[35]](#endnote-35) Commenting on the partnership, Branson stated, “I believe Italy’s vision, which has led to this collaboration with our Virgin space companies, will provide a real impetus as we strive to open space for the benefit of life on Earth.”[[36]](#endnote-36) After the successful launch of the VSS *Unity*, Branson stated, “We have shown that Virgin Galactic really can open space to change the world for good.”[[37]](#endnote-37)

Other business opportunities

Virgin Galactic aimed to learn from its space flights to introduce superfast point-to-point intercontinental passenger flight services.[[38]](#endnote-38) These supersonic flights were expected to be much faster than the defunct Concorde, which in 1976 was the first supersonic passenger-carrying commercial airplane, jointly developed by aircraft manufacturers from Britain and France and used by Air France and British Airways; Virgin Galactic’s offering would make a journey between Boston and Beijing or Australia in a matter of a few hours.[[39]](#endnote-39) Branson was confident that intercontinental travel, particularly when operating through space, would be affordable for the masses and would be more environmentally friendly and fuel-efficient than the commercial flights which were currently operating on these routes.[[40]](#endnote-40)

In 2016, to develop supersonic aircraft and thereby make intercontinental travel a possibility, Virgin Galactic allied with Boom Technology Inc., a US-based manufacturer of supersonic passenger aircraft.[[41]](#endnote-41) Commenting on the partnership, Branson stated, “Through Virgin Galactic’s manufacturing arm, the Spaceship Company, we will provide engineering and manufacturing services, along with flight test support and operations [to Boom Technology Inc.] as part of our shared ambitions.”[[42]](#endnote-42) The supersonic craft, named XB-1 and nicknamed Baby Boom, was expected to be 10 per cent faster than the Concorde, which was retired in 2003 following a fatal crash in 2000, which resulted in massive fear among potential passengers.[[43]](#endnote-43) Commenting on the superiority of the XB-1, Blake Scholl, Boom Technology Inc.’s founder and chief executive officer, stated, “Concorde’s designers didn’t have the technology for affordable supersonic travel, but now we do.”[[44]](#endnote-44)

Virgin Galactic also planned to launch satellite services in an affordable manner and started working on the LauncherOne spacecraft. In 2017, the LauncherOne team, which comprised 200 workers, was carved out of Virgin Galactic to form a new company, namely, Virgin Orbit. LauncherOne, which was in its developmental phase in early 2019, was expected to carry non-human payloads, such as satellites of up to 500 pounds (227 kilograms), into low-Earth orbit (i.e., an altitude of 2,000 km, or 1,200 miles).[[45]](#endnote-45) Furthermore, Virgin Galactic’s spacecraft were reusable, unlike other conventional spacecraft. Thus, the cost of each spacecraft launch for Virgin Galactic was only $250,000, in contrast to the conventional spacecraft’s launch cost of approximately $12 million and upward.[[46]](#endnote-46)

Environmental concerns

Environmental concerns had been raised related to space tourism, which many considered to be a costly, fuel-intensive, and polluting venture. One space shuttle launch required approximately 113 tons of liquid hydrogen fuel, which was equivalent to the electricity consumed by 130 US homes for an entire year.[[47]](#endnote-47) This fuel was expensive, although it appeared to be clean-burning and less polluting than other forms of fuels, such as petrol. Branson believed that Virgin Galactic was very environmentally friendly. He stated, “We will be able to put someone into space for less than the environmental price of an economy class ticket from London to New York and back.”[[48]](#endnote-48) This was because the WhiteKnightTwo carrier plane was capable of running on butanol, a biofuel made from algae. In 2008, an airplane from Virgin Atlantic (the UK-based commercial air transportation company founded by Branson in 1981) used biofuel that was a mixture of Brazilian babassu nuts and coconuts in a flight between London and Amsterdam. Branson marked this a “vital breakthrough” for the airline industry’s attempts to be green.[[49]](#endnote-49)

Furthermore, VSS *Unity*’s rockets were to burn nitrous oxide only at an altitude of 50,000 feet (15,240 metres), after being released by WhiteKnightTwo, not from the ground, as with traditional space shuttles.[[50]](#endnote-50) In fact, 70 per cent of the carbon emissions from the entire 90-minute flight were expected to be from WhiteKnightTwo rather than from VSS *Unity*, owing to the suborbital aircraft’s light weight.[[51]](#endnote-51)

However, a rocket engineer, Caroline Campbell, stated that fuel used in Virgin Galactic space flights was toxic. She mentioned, “There’s so much soot coming out the back. That’s burning rubber. That could be carcinogenic.”[[52]](#endnote-52) Researchers at the Aerospace Corporation in Los Angeles, California, also reported severe environmental concerns. According to their simulation, 1,000 annual launches of spacecraft would emit approximately 600 tonnes of soot, or black carbon—which, unlike aircrafts’ carbon, would stay in the atmosphere for up to 10 years. The aircraft emitted soot at a low altitude, where it was washed away by rainwater in days or weeks; however, rockets were expelled at three times higher altitude than aircraft, and rainwater could not wash away the soot expelled by rockets. Additionally, the black carbon was expected to warm air in the stratosphere, adversely impacting the current that carried air from the equator to the poles, possibly leading to warmer poles and global warming. However, researchers at the Aerospace Corporation also admitted they were uncertain of these findings as they were unsure about the quantity of carbon emitted by space vehicles.[[53]](#endnote-53) In response to such allegations, Branson stated that “Rome was not built in a day. Sending passengers into space is a little more complex!”[[54]](#endnote-54)

Health concerns

Space travel was also expected to expose travellers to certain health risks. Common problems reported by astronauts who had spent several months living in space under microgravity conditions included DNA damage caused by radiation exposure, bone and muscle loss, and blood pressure changes. In an experiment that simulated the forces of acceleration in a space flight, volunteers complained about grayout (i.e., a transient loss of vision), blackout, nausea, and chest discomfort.[[55]](#endnote-55) Health experts also raised concerns about the lack of knowledge about whether minor ailments on Earth, such as gastric problems, could become serious medical concerns at extremely high altitudes. Similarly, unexpected behaviours such as phobia or anger, could become problems. Dr. Tarah Castleberry, an assistant professor of aerospace medicine at the University of Texas Medical Branch in Galveston, discussed the qualifications for space tourists, stating, “We don’t have a specific list of conditions that would be disqualifying, but certainly uncontrolled medical problems (whether it’s hypertension or heart disease or lung disease, or many other conditions), would most likely cause concern and result in disqualification.”[[56]](#endnote-56)

Customer demand perspective

Consumers had several expectations from space travel, such as the experience of weightlessness, the ability to float freely in zero gravity, the experience of pre-flight astronaut training, the ability to communicate from space with significant others on Earth, and the acquisition of memorabilia that identified them as astronauts.[[57]](#endnote-57) In a survey conducted by NASA, ultra-wealthy individuals mentioned that seeing the curvature of the Earth from space was their most important reason for space flight.[[58]](#endnote-58) One Australian tourist stated, “For some people, it’s all about the zero G [zero gravity] experience, but for me it’s about the Overview Effect,” adding, “Earth is wonderful and we have to look after it.”[[59]](#endnote-59) On the other hand, “for businessman and philanthropist David Perez, 55, [from] California, buying a ticket on Virgin Galactic was an instant impulse purchase.” He said, “What, there’s 8 billion people on Earth but only a thousand have been to space, and I’ll be the first Moroccan Jew in space.”[[60]](#endnote-60) Commenting on the risk associated with space travel, Perez stated, “Who knows if I’ll blow up and die . . . But I just love being part of this community of people pursuing their passions and dreams.”[[61]](#endnote-61)

By December 2018, 600 potential passengers had reserved Virgin Galactic tickets priced between $200,000 and $250,000,[[62]](#endnote-62) and more than 150 were on a waiting list. Commenting on the market potential, Branson stated, “If I have a room full of 10 people, 8 out of 10 would love to go to space if they could afford it.” He believed that the market would be enormous if space tourism could be made safe and affordable.[[63]](#endnote-63) Branson stated that prices of spacecraft tickets in the near future might decline to an extent where mass consumers could go to space; it could be made affordable for at least “tens of thousands of people,” if not millions.[[64]](#endnote-64) Reassuring people that prices would decrease in the future, he argued that, when commercial air travel was developing, “it cost a [relatively] similar sum of money to send wealthy people across the Atlantic [Ocean]. . . . And over the years the price came down to a level where enormous quantities of people were able to go.”[[65]](#endnote-65)

THE ROAD AHEAD

After 2009, when the Russian space agency took billionaire Guy Laliberté to the International Space Station, several space enthusiasts emerged, and much talk has circulated of commercial space flight becoming a reality.[[66]](#endnote-66) However, some companies, such as XCOR Aerospace, had exited the business, and others had changed their focus “from crewed spaceflight to satellites and scientific payloads” in low-Earth orbit.[[67]](#endnote-67) Branson asserted that, among his Virgin Galactic, Bezos’s Blue Origin LLC, and Musk’s SpaceX, Virgin Galactic’s spacecraft would make the first commercial flight in space. He was also confident that none of these companies werecompeting to be first. He stated, “Safety’s all that matters if you’re putting people into space. So, none of us will race to be the first.” Branson further noted that “Space is difficult. Rocket science is rocket science.”[[68]](#endnote-68)

Despite having criticized Branson, Thomas broadly supported the Virgin Galactic project because of the technological by-products it was creating, such as the ability to launch small satellites from under the wing of an aircraft with the help of a small booster.[[69]](#endnote-69) However, David Cowan, a space company investor with Bessemer Venture Partners in California, stated that one fatal accident could “‘inevitably and episodically’ suspend ventures such as Virgin Galactic for months or years.”[[70]](#endnote-70) Cowan was also reluctant about Virgin Galactic’s high-tech efforts to develop a 21st-century version of the Concorde supersonic aircraft that could make travel from New York to Sydney feasible in just a couple of hours.[[71]](#endnote-71) One fatal Concorde accident had spread so much fear that, due to low demand and high maintenance costs, British Airways had to discontinue Concorde services.[[72]](#endnote-72) Commenting on the sustainability of Virgin Galactic, Branson stated, “I’m sure there are many people on the Virgin Group board who may question my level of sanity, but I firmly believe that yes, space travel and space tourism can be truly sustainable.”[[73]](#endnote-73) Was Branson right in pursuing his dream of space tourism? Did investment in space tourism provide enough value to society at large to make up for potential harmful effects?

EXHIBIT 1: VIRGIN GALACTIC’s COMPETITORS AND COMPLEMENTORs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Competitor** | | | **Complementor** |
|  | **Virgin Galactic, LLC** | **Blue Origin, LLC** | **Space Exploration Technologies Corp (SpaceX)** | **Orion Span, Inc.** |
| **Founded** | 2004 | 2000 | 2002 | 2017 |
| **Founder** | Sir Richard C.N. Branson | Jeffrey P. Bezos | Elon R. Musk | Frank Bunger |
| **Type of Commercial Tourism** | Suborbital | Suborbital | Suborbital | Orbital (Space Station/ Space Hotel) |
| **Employees** | 850 | 3,000 | 6,000 | n/a |
| **Seed Funding** | $600 million  ($400 million was from investors based in Dubai, UAE.) | $13 million  (Bezos had also pledged to fund Blue Origin every year with $1 billion.) | $2.5 billion  (Equity funding) | $2 million crowdfunding campaign launched in December 2018 |
| **Spacecraft** | VSS *Unity* | *New Shepard*, *New Glenn* | *Falcon 9*, *Falcon Heavy*, *Dragon* | Aurora Space Station |
| **Payloads** | Astronauts (Tourists)/ Research/ Satellites | Astronauts (Tourists)/ Research/ Satellites | Astronauts (Tourists)/ Research/ Satellites | Orbital Tourists |
| **Price** | $250,000 | $100,000–$200,000 | $200,000 | Initial deposit: $80,000  Full fee: $9.5 million |

Note: n/a = not applicable; all currency amounts are in US$; UAE = United Arab Emirates; VSS = Virgin Space Ship.

Source: Marc Prosser, “5 Space Companies Zeroing In on First Launch of Tourists into Orbit and Beyond,” Singularity Hub, May 10, 2018, accessed March 17, 2019, https://singularityhub.com/2018/05/10/5-space-companies-zeroing-in-on-first-launch-of-tourists-into-orbit-and-beyond/#sm.000z26fx5143jff3ura2lk6j3i0wp; “Space Exploration Technologies Corp.,” Bloomberg*,* accessed April 12, 2019, www.bloomberg.com/research/stocks/private/snapshot.asp?privcapId=7702894; “Blue Origin, LLC,” Bloomberg*,*accessed April 12, 2019, www.bloomberg.com/research/stocks/private/snapshot.asp?privcapId=30959253; “Virgin Galactic,” Bloomberg*,*accessed April 12, 2019, www.bloomberg.com/research/stocks/private/snapshot.asp?privcapId=25116311; “Orion Span, Inc.,” Bloomberg*,*accessed April 12, 2019, www.bloomberg.com/research//stocks/private/snapshot.asp?privcapId=589283893; “Company,” SpaceX, accessed April 12, 2019, www.spacex.com/about; Reuters, “Bezos Throws Cash at Rocket Program as Space Race Accelerates,” *New York Post*, August 3, 2018, accessed April 12, 2019, https://nypost.com/2018/08/03/bezos-throws-cash-at-rocket-program-as-space-race-accelerates/; “Virgin Galactic, LLC,” Buzzfile, accessed April 12, 2019, www.buzzfile.com/business/Virgin-Galactic,-LLC-562-384-4400; Matt Burns, “SpaceX Said to Be Raising $500M to Help Fund Internet Service,” TechCrunch, December 18, 2018, accessed April 12, 2019, https://techcrunch.com/2018/12/18/spacex-said-to-be-raising-500m-to-help-fund-internet-service/; Michael Sheetz, “Jeff Bezos’ Space Company Blue Origin Just Landed a Major Rocket Deal,” CNBC Markets, September 27, 2018, accessed April 12, 2019, www.cnbc.com/2018/09/27/blue-origin-lands-major-rocket-engine-deal-with-ula-source.html; Doug Messier, “How Richard Branson Has Been Funding Virgin Galactic,” Parabolic Arc, January 26, 2015, accessed March 26, 2019, www.parabolicarc.com/2015/01/26/richard-branson-funding-virgin-galactic/; “Falcon 9 & Dragon to Return Astronauts to Space,” SpaceX, accessed April 12, 2019, www.spacex.com/falcon9; “Suborbital Spaceflight: New Shepard,” Blue Origin, accessed April 12, 2019, www.blueorigin.com/new-shepard/; Elizabeth Howell, “SpaceShipTwo: On a Flight Path to Space Tourism,” Space, March 5, 2019, accessed April 12, 2019, www.space.com/19021-spaceshiptwo.html; Justin Bachman, “New Luxury Hotel Will Be 200 Miles Up and $792,000 a Night,” Bloomberg, April 6, 2018, accessed April 12, 2019, www.bloomberg.com/news/articles/2018-04-06/this-luxury-hotel-will-be-200-miles-up-and-792-000-a-night.

Endnotes

1. This case has been written on the basis of published sources only. Consequently, the interpretation and perspectives presented in this case are not necessarily those of Virgin Galactic LLC or any of its employees. [↑](#endnote-ref-1)
2. “Virgin Galactic,” Crunchbase, accessed March 15, 2019, www.crunchbase.com/organization/virgin-galactic#section-overview; Oscar Gonzalez, “What Is a Suborbital Flight? How SpaceX and Blue Origin’s Launches Differ,” Inverse, April 28, 2018, accessed March 15, 2019, www.inverse.com/article/44283-suborbital-flight-blue-origin-spacex-difference. [↑](#endnote-ref-2)
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12. Ibid. [↑](#endnote-ref-12)
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