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Want to Travel to Space? “Planet” Now!

You might be thinking about a travel destination this summer. How about space? Well, the dream to go to space may become a reality sooner than you think with billionaires such as Elon Musk, Jeff Bezos and Richard Branson all vowing to make space tourism a reality. In fact, Bezos plans to spend his \$131 bln in wealth on space travel through Blue Origin, his space travel company, by liquidating \$1 bln a year in Amazon stock to fund the company, which he called his most important project. In this publication, we provide some background about space tourism, explore the industry at this point in time and discuss the main players involved in sending humans to travel space for recreation and leisure.

Background

When it comes to space travel, the National Aeronautics and Space Administration’s (NASA) plans to send astronauts to space have been experiencing some setbacks. For the delivery of food and equipment to the International Space Station (ISS), NASA is subcontracting a few companies such as Space Exploration Technologies Corp. (SpaceX), Orbital ATK (OA-US), and Sierra Nevada. However, sending humans has been slightly trickier especially over the past few years. While NASA pioneered the technology to send humans to low earth orbit over 50 years ago, the agency has been a target for past administrations wanting to cut budgets. NASA’s annual budget went from a peak of \$18.8 bln in 2009 to \$16.9 bln in 2013 due to sequestration. In 2010, the Obama administration scratched plans to build a shuttle replacement to fly to the ISS and plans to visit the moon. For around 30 years, the US used the Space Shuttle for its crew missions, but July 21, 2011 marked the last flight. As such, since 2011, the US subcontracts Russia’s Soyuz spacecraft to send its astronauts to the space station at a cost of \$80 mln per trip. Plans, however, have been underway to launch US astronauts out of the US again through NASA’s Commercial Crew Program. Companies such as SpaceX and Boeing (BA-US) are among those contracted to develop crew capsules to transport astronauts to and from the ISS – SpaceX has the Dragon cargo capsule (currently used to make supply runs to the ISS) and Boeing has the CST-100 Starliner. It is worth mentioning that SpaceX and Blue Origin have made a big impact on the rocket industry so far. While booster rockets were let to burn up upon re-entry, the two companies have changed the rocket industry by successfully re-landing booster rockets. This process of recycling booster rockets saves millions of dollars, helping drive down the cost of launching rockets. Cheaper launches have led rocket makers to think about sending ordinary people to experience what it is like being an astronaut, or a space tourist. In fact, start-up space ventures have raised over US\$16.6 bln in investments since 2000 from venture capitalists, big corporations and individual investors given increased interest in space flight.

Space tourist businessman astronaut



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International Space Station over Earth



Source: shutterstock.com

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Sky is the Limit

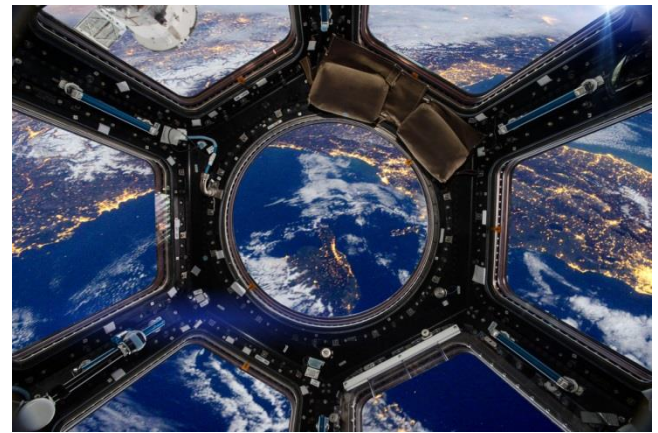
There are different types of space tourism: suborbital, orbital and lunar. Suborbital tourism proposes to take passengers to an altitude of 100-160 km above ground allowing travelers to experience three to six minutes of weightlessness, a view of the stars and that of the Earth below. Sub-orbital space companies currently have prices around US\$200k, with expectations that they decline to US\$50k within the next decade. More companies are involved with this type of tourism given the relatively cheaper price tag and ability to target many more customers. These include SpaceX, Blue Origin and Virgin Galactic. While suborbital trips will involve a flight up to the edge of space and back, orbital tourism involves flight and accommodation in space. This has actually already been taking place. There have been a select few individuals that have flown to the ISS for non-work reasons and have paid large sums of money to do so. Between 2001 and 2009, seven individuals flew and paid between an estimated \$20-\$40 mln for their stay, which lasted between 8 and 15 days with the company Space Adventures. Space Adventures is the only company that sent paying tourists to the ISS aboard the Soyuz. The last person to fly was Guy Laliberté, Canadian businessman and co-founder of Cirque du Soleil, for 11 days in 2009. Since then, while there haven't been any more flights for recreational purposes, many companies have been contemplating the idea of making space tourism a reality. Orion Span Inc. is proposing the "first luxury hotel in space" called Aurora Station. While the project is still in the funding phase, the company hopes to launch by 2021. The altitude would be at roughly 322 km above ground at a price of US\$9.5 mln per person (or \$792K per night), offering travelers the opportunity to experience what it is like being an astronaut. We note that lower launch costs, mentioned earlier, have played a major role in allowing for a price tag below \$10 mln. Tourists would be required to train for three months prior to takeoff and guests have to exercise every day during their 12-day stay. Other space accommodation providers include Bigelow Aerospace LLC, founded by lodging billionaire Robert Bigelow. The company has already launched an 8-foot 3000-pound space accommodation prototype on the ISS currently used for storage purposes. Lunar tourism has also been suggested by Elon Musk in 2017 by looping around the Moon and flying back. The cost for the trip is estimated at US\$70 mln. However, no plans for takeoff have been elaborated on.

Main Players in the Space

Those at the forefront of space tourism include billionaires and space enthusiasts such as Elon Musk, Jeff Bezos, Paul Allen and Richard Branson. These individuals have led the race to space tourism and have been outspoken about their vision of sending humans to space, be it the Moon or Mars. Below we offer some background of each of these influencers and highlight their flagship endeavors.

- **Elon Musk** is the well renowned co-founder of PayPal (1999) and founder of SpaceX (2002) and Tesla Motors (2003).
 - Musk founded SpaceX with \$100 mln of his capital. In 2015, Google and Fidelity invested \$1 bln in the company.
 - SpaceX has been delivering cargo to the ISS since 2012 and also puts satellites into orbit. The company also plans on sending humans into space.
 - Their Falcon 1 rocket was their first project and took four attempts to be successful. This was the first privately built liquid-fueled booster to reach orbit.

Space Station looking at Earth



Source: shutterstock.com

SpaceX Dragon



Source: shutterstock.com

- In 2006, the company received \$396 mln from NASA to develop systems to transport cargo to the ISS under the Commercial Orbital Transportation Services program.
- That same year, the company unveiled a spacecraft, which they called Dragon (named after the song "Puff, the Magic Dragon").
- In 2008, SpaceX was awarded a \$1.6 bln contract for 12 flights to make supply runs to the ISS.
- The Falcon 9 rocket was the next-gen version of the Falcon 1, created to send the Dragon spacecraft into orbit with an ability to lift 13 tons compared to less than one ton for the Falcon 1. The plan was to make this rocket reusable.
- In 2011, Musk announced that he planned to reach Mars in 10-15 years and developments of the reusable rocket were a step in that direction.
- SpaceX helped push down the cost of rocket launches by re-landing booster rockets; their first successful relaunch was on December 21, 2015.
- The company received contracts from NASA's Commercial Crew Development program worth \$2.6 bln with a test flight expected for late 2018. SpaceX is working on a human version for its Dragon spacecraft.
- Their Falcon Heavy, made up of two rocket boosters, flew for the first time on February 6, 2018, carrying a Tesla Roadster. The two rocket boosters both landed successfully.
- The company's customers include private sector, military and nongovernmental entities allowing them to launch cargo into space.
- In 2016, Musk unveiled the Interplanetary Transport System, a plan to create rockets to send a colony to Mars. In 2017, he envisioned the colony to hold a million people. Later in 2017, he also discussed the Big Falcon Rocket, expected to carry 100 passengers.
- **Jeff Bezos** is the richest man on Earth and founder of Amazon.com and Blue Origin and owner of the Washington Post.
 - Bezos established Blue Origin in the year 2000 and expects to invest \$1 bln a year of his wealth in this venture.
 - Blue Origin has conducted many test flights of New Shepard (named after Mercury astronaut Alan Shepard), their reusable spacecraft expected to send tourists into suborbital flight at around 95 km high and expected to be more powerful than SpaceX's Heavy Falcon.
 - Blue Origin was the first to successfully land a reusable rocket on November 23, 2015 using New Shepard, beating SpaceX. On January 22, 2016, the company reused that same booster from their first flight and sent the New Shepard over 100 km. As of April 2018, New Shepard has made seven test launches.
 - The first space tourists aboard the New Shepard will experience a two and a half minute takeoff before engine cutoff. The capsule will separate after which the travelers will experience weightlessness for around four minutes. At around 95 km, passengers will see the curvature of the Earth. New Shepard will then reenter the atmosphere and land using its autonomous vertical landing system. The total flight will be 11 minutes.
 - The company received \$25 mln in contracts from NASA for their Commercial Crew Development program before the space agency chose to support SpaceX's Dragon and Boeing's CST-100 Starliner.

SpaceX Falcon 9 rocket



Source: shutterstock.com

Jeff Bezos



Source: shutterstock.com

- Blue Origin's latest rocket, targeting orbital flights, New Glenn (named after John Glenn, who made the first American orbital flight in 1963), is expected to fly around 2020.
- Customers may include Eutelsat Communications, One Web and Thailand's mu Space Corp.
- Blue Moon is the moon flight program expected to take place in the future.
- **Richard Branson** is the founder of Virgin Group.
 - Virgin Galactic became a company in 1999, three years following the announcement of the Ansari X Prize, which was supposed to award \$10 mln to a private company that flew people into space using a reusable aircraft. Scaled Composites won the prize in 2004 using their SpaceShipOne.
 - In 2004, Virgin Galactic pledged to send people into space for a price of \$200k per seat.
 - In 2005, they entered into a JV with Scaled Composites.
 - Their SpaceShipTwo holds six passengers and two pilots.
 - In 2008, the company came out with their carrier aircraft called the WhiteKnightTwo. The carrier aircraft would haul the eight-person SpaceShipTwo and drop it at an altitude of 15 km high. SpaceShipTwo would then engage its rocket motor and blast upward.
 - By 2009, the first SpaceShipTwo, VSS Enterprise, was shown off and held its first crewed test flight in 2010.
 - In 2014, the VSS Enterprise had a fatal crash, leading to doubts about the company's future.
 - In 2016, the VSS Unity was unveiled. May 29, 2018 marked the 13th successful flight for the new spacecraft.
 - The ticket price today is \$250k a seat aboard the VSS Unity. Aboard the plane, passengers will enjoy a suborbital experience for several minutes, feel weightlessness and get to see the curvature of the earth. Other than recreational rides, VSS Unity is also expected to fly to space and back for scientific purposes.
- **Paul Allen** is a philanthropist and the co-founder of Microsoft.
 - Paul Allen and Burt Rutan (founder of Scaled Composites) worked together to create SpaceShipOne in 2004. In 2011, they founded Stratolaunch Systems.
 - In 2012, the company built a carrier assembly hangar at the Mojave Air and Space Port.
 - Projects comprise a carrier aircraft built by Scaled Composites and a launch vehicle deployed at high altitude from under the carrier aircraft.
 - The carrier aircraft has a wingspan of 117m, the largest airplane by wingspan to fly with a range of 2,200 km.
 - The carrier aircraft was showcased on February 24, 2018 and performed taxi tests.
 - Test flights are expected for the earliest by 2019 with commercial flights expected by 2020.

Virgin Galactic WhiteKnightTwo



Source: shutterstock.com

Virgin Galactic reusable, sub-orbital spacecraft



Source: shutterstock.com

Conclusion

These billionaires have all made it clear that the space race is on with intentions to colonize Mars, build an industrial base in space, reduce the cost of launches and further space tourism. The companies they back are in the startup/development phase and have not made allusions to an IPO. While there is no publicly-traded pure-play security to invest in space tourism at the moment, we invite readers to keep an eye out for any spinoffs or IPOs in the future. And we reiterate in the future since SpaceX shot down speculation of an IPO last year given the increased capital from venture capitalists, big corporations and other investors.

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