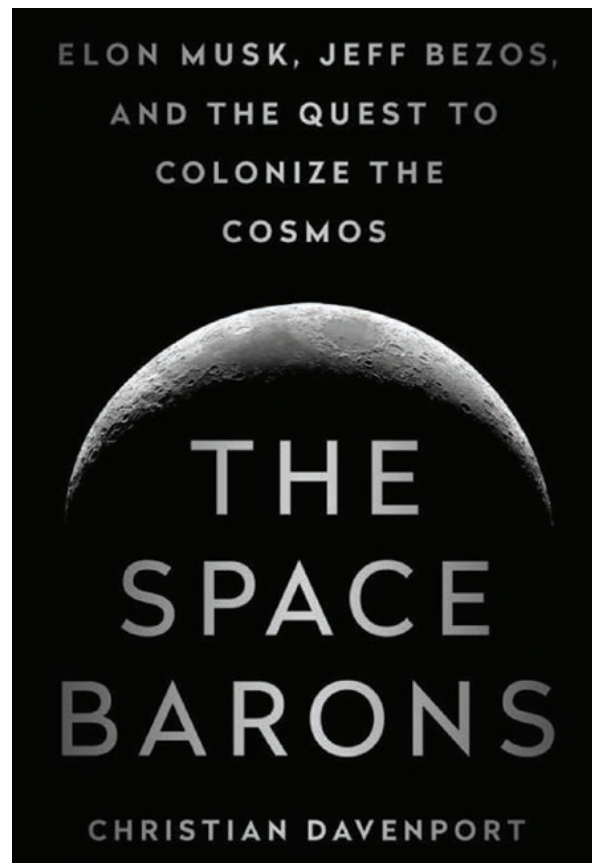


## Lords of the Universe

BHAVYA LAL

*The Space Barons: Elon Musk, Jeff Bezos, and the Quest to Colonize the Cosmos* provides a chronology that traces the trajectory of three space “barons”: Elon Musk, the South African immigrant founder of SpaceX; Jeff Bezos, the stepson of a Cuban immigrant who uses the wealth amassed from his Amazon success to fuel Blue Origin; and Richard Branson, the brash Briton who set up his space company, Virgin Galactic, in the United States. Cameo appearances are made by other barons: Andrew Beal of Beal Aerospace, who made his money in banking and real estate, and Paul Allen, a cofounder of Microsoft who has invested prolifically in space activities. Musk and Bezos are the lead characters in this telling, with a focus on their personalities and what drives them rather than on the companies they created or the technologies they developed. The book’s lack of attention to actual space exploration activities is a regrettable shortcoming, but perhaps that decision was a deliberate one to make it accessible to a broader audience that relishes the human drama more than it does technology landmarks.

The story of Elon Musk is better known, and much of what is written here has already been seen in numerous magazine and newspaper stories and in Ashlee Vance’s 2015 biography, *Elon Musk: Tesla, SpaceX, and the Quest for a Fantastic Future*. Musk, who made a fortune in the dot-com era, worries about an “eventual extinction event that would wipe out human beings from Earth.” He sees a need for a Plan B in which human beings would become a multiplanet and spacefaring species. He felt that



the government wasn’t doing as much as he thought it should to make that possible, so he took it upon himself to settle Mars, an audacious goal for just one man, even one with a few hundred million dollars to spare. But Musk excels at marketing as well as technology development. Davenport notes that Musk was showing off his company’s Falcon 1 rocket a full five years before it reached orbit. He sued the National Aeronautics and Space Administration (NASA) and the Air Force when he felt SpaceX was being excluded from bidding opportunities. Both suits were successful, and Musk was able to bid and win hundreds of millions of dollars from the government to fund SpaceX’s efforts to develop reusable rockets and capsules to launch satellites and to deliver astronauts and cargo to the International Space Station.

Davenport explores the secretive

approach that Jeff Bezos took in creating and nurturing Blue Origin and uncovers quite a bit of new information. He reports that Bezos’s interest in space began in his youth and was reflected in his high school valedictorian speech about settling space. Within six years of starting Amazon, Bezos had jump-started his space dreams by incorporating Blue Origin (a play on Pale Blue Dot, a photograph of Earth taken by the *Voyager I* probe from six billion kilometers away). He is also an avid collector of space memorabilia, both fictional, such as props from *2001: A Space Odyssey* and *Star Trek*, and real, such as engines from Apollo rockets that he salvaged from the bottom of the Atlantic Ocean. But most of all, Davenport talks about Bezos’s storied patience. Unlike Musk, his wealth is in the billions not hundreds of millions,

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and he does not need government or private contracts to build and test his rockets. So he was slow and methodical. His favorite saying, best delivered in an I-think-I-can cadence, is “Slow is smooth, and smooth is fast.”

Paul Allen entered the space game at roughly the same time as Bezos and Musk, though this is not discussed in the book. Like the other barons, Allen is an “orphan of Apollo,” who was thrilled by the moon landing and felt abandoned when the government ended the Apollo program. Allen was the angel investor behind *SpaceShipOne*, which won the Ansari XPRIZE for flying to space twice in two weeks while reusing 80% of the vehicle. But Davenport portrays him as more apprehensive than the other barons about the risks to human space explorers. Allen continues to be an investor (he is the funder behind Stratolaunch, the company currently making the world’s largest air launch to orbit system), but Davenport gives him little notice because although he was a space enthusiast, he made for an “uncomfortable pioneer.”

Nor will readers learn much about Branson, which is a shame because he is as interesting a character as Musk and Bezos. Davenport describes Branson as a thrill-seeking, media-savvy marketer who founded Virgin Galactic to make a bid for the Ansari XPRIZE. Branson continues to make strides with the Virgin endeavor, but after making a detailed deep dive into the company’s initial exciting and dangerous suborbital flights (where one pilot died), the book unfortunately gives him and his company short shrift.

Davenport’s snapshot portrayal of Beal describes a man frustrated by government action that rewarded the status quo over the upstart. He describes Beal shuttering his company in 2000, three years after starting it, when NASA decided to create a multibillion-dollar program that Beal saw as favoring traditional firms such as Lockheed Martin and Boeing. This is one place where the lack of technical depth hurts

the book. Davenport buys into Beale’s complaint with the government without exploring the perceived flaws in Beale’s technology and approach to launch.

Through all the stories Davenport tells—the bullying of Musk as a teen growing up in South Africa, the helicopter accident that nearly killed Bezos, or the loss of the pilot’s life in a Virgin test flight—the book is chock-full of insights about what drives these men, their unique approaches to realizing their visions, and their desire to transcend the government-run launch business. Despite their different approaches, all the men (yes, they are all men) profoundly believe that the cost of launch has to fall orders of magnitude before humans can be a spacefaring species (Musk) or move heavy manufacturing into space (Bezos).

Indeed, perhaps the most fun parts of the book are where the author describes the frugal innovation approaches used by the fledgling firms, especially SpaceX, trying to reduce the cost of access to space. He provides entertaining examples: a SpaceX employee purchased for one dollar a massive 125,000-gallon liquid nitrogen tank that was going to be scrapped for metal; another employee found a \$10,000 air conditioning chiller on eBay instead of paying \$75,000 for a new one; and rather than paying \$1,500 for a custom-designed latch, an employee found a \$30 bathroom-stall latch that would suffice. Although Blue Origin does not have to have the same scrappy Silicon Valley ethos as SpaceX, it also pays close attention to cost. Instead of using highly toxic cleaners for its nozzle engines, which would have required clean rooms and other expenses, for example, Blue Origin used citric acid, which worked just as well and was significantly cheaper.

The book somewhat exaggerates the “budding tensions” between Musk the “brash hare” and Bezos the “secretive and slow tortoise.” In

Davenport’s retelling, the rivalry appears to have reached its apogee when Blue Origin lands a first-stage rocket engine (booster) after SpaceX’s earlier attempt was a failure. Musk is piqued by Bezo’s tweet “Welcome to the Club” because SpaceX’s feat was far more difficult than Blue Origin’s. The SpaceX booster was traveling much faster because it was returning from orbit, whereas the Blue Origin booster was returning from a suborbital flight.

The reality is that the more significant drama was not the competition among the barons but the struggle between the private sector and the government for primacy in space travel and development.

Nevertheless, Davenport does effectively capture the essence of the barons by citing their companies’ mottos: SpaceX with “Keep your head down, plough through the line”; Bezos with “*Gradatim Ferociter*,” or step-by-step ferociously; and Branson with “Screw it, let’s do it.”

Apple visionary Steve Jobs famously said: “Here’s to the crazy ones, the misfits, the rebels, the troublemakers, the round pegs in the square holes... the ones who see things differently... they push the human race forward, and while some may see them as the crazy ones, we see genius, because the ones who are crazy enough to think that they can change the world, are the ones who do.” The space barons aspire to this type of craziness, and they are changing the world. Davenport tells an important and entertaining story, but it would be more satisfying if it included a bit more about the nature of the changes and where they are likely to lead. That too is a thrilling story.

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