

Dylan Vo

Dr. Huffman, Dr. Omojokun

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Acquisitions Project

Introduction

Blue Origin is a private aerospace technology company founded and wholly owned by Jeff Bezos, the founder of Amazon. Blue Origin provides services in space tourism, launch services, space robotics, lunar landers, in-space systems, and rocket engines. Blue's goal is to greatly reduce the cost of access to space by creating the infrastructure for future endeavors in space (Blue Origin). Relativity Space is a privately held aerospace manufacturer and launch services provider. Relativity's goal is to revolutionize rocket manufacturing by developing and launching rockets made completely from 3D printed components (Relativity Space). In this paper, a hypothetical acquisition of Relativity Space by Blue Origin will be discussed. This includes more background information about these two companies, the rationale for an acquisition, the feasibility of it, and how due diligence will be performed. Overall, we will find that an acquisition of Relativity Space by Blue Origin will greatly benefit Blue Origin's manufacturing and launch service capabilities.

Company Backgrounds

Blue Origin

Blue Origin is one of the biggest names in the aerospace industry. Their most notable services are the New Shepard rocket, the New Glenn rocket, the Blue Moon lunar landers, and the BE-4 engine. New Shepard is a suborbital space tourism rocket that takes passengers to the edge of space by passing the Karman line, the internationally recognized boundary of space. New Glenn is a heavy-lift rocket capable of bringing heavy, high volume payloads to orbit. It is planned to be Blue Origin's primary launch vehicle for orbital missions (Blue Origin). The Blue Moon lunar landers are a set of cargo-carrying and human-rated vehicles that will be used during NASA's Artemis missions throughout the later 2020's and early 2030's. Lastly, the BE-4 engine is a powerful rocket engine that is used on New Glenn and is sold to United Launch Alliance for use on their Vulcan rocket. All the services mentioned are currently funded by the company's owner, Jeff Bezos. However, they all plan to be fully sustained through contracts with customers like NASA, other aerospace companies, and independents. The company is currently lagging

behind their main competitor, SpaceX, who is favored by NASA as the United States' primary orbital launch provider (Mann).

Relativity Space

Relativity Space is an aerospace manufacturing startup founded by ex-employees of Blue Origin and SpaceX. Their goal is to rethink the way rockets are manufactured by creating systems to build them completely from 3D printed parts (Relativity Space). In March 2023, Relativity launched their prototype vehicle, Terran 1, and nearly reached orbit. The goal of Terran 1 was to demonstrate the capabilities of a fully 3D printed rocket and make it the first 3D printed rocket to reach orbit. Terran 1 was constructed of 85% 3D printed parts. With Relativity's mostly successful launch, they ended development of the Terran 1 and refocused their effort to their larger Terran R reusable rocket. Relativity's new goal is to prove the capabilities of 3D printing for large-scale rocket production and to bring the first 3D printed rocket to orbit. In terms of risks, Relativity has not yet shown that their designs can reach orbit. They will need to prove this with their launch of Terran R in late 2026. They have also not proven that the small-lift design of Terran 1 can scale up to a larger medium-to-heavy lift rocket in the form of Terran R.

Acquisition Rationale

An acquisition of Relativity Space by Blue Origin would provide numerous important benefits that will support Blue Origin's company goals. Blue's current portfolio consists of New Shepard and New Glenn. Since New Glenn is currently Blue's only vehicle capable of sending payloads to orbit, an acquisition of Relativity would provide Blue with Terran R, a medium-lift launch vehicle that can send lighter payloads to orbit at a lower cost. This would strengthen Blue's market against their main competitor, SpaceX, whose portfolio currently consists of Falcon 9 and Falcon Heavy. With an acquisition, Blue would have a direct competitor for both rockets, with Terran R competing with Falcon 9 and New Glenn competing with Falcon Heavy. There is a high demand from NASA and other organizations for low-cost launch vehicles as SpaceX has created a near-monopoly in that market (Chiaravalli). The acquisition would set up Blue as a strong competitor to SpaceX.

The other main benefit of acquiring Relativity would be to gain their manufacturing capabilities. While Blue does use 3D printing to manufacture some rocket parts, Relativity has developed an entire manufacturing process built around 3D printing. After acquiring the knowledge of these processes, Blue could integrate similar processes into their other products, potentially leading to huge decreases in production time and cost. Blue would also acquire the engineering talent that created these processes.

The benefit of acquiring Relativity rather than developing these processes within Blue would be that developing a production system built entirely around 3D printing is an incredibly difficult task. Since Relativity was built from the ground up as a 3D printer-based manufacturing

company, it would be difficult for Blue to match their capabilities. Also, since Relativity already has proven designs for a fully 3D-printed launch vehicle, Blue wouldn't have to focus effort into designing one themselves. In Relativity's Terran 1 launch in 2023, the vehicle reached Max-Q, meaning it was only a step away from reaching orbit (Relativity Space). It would take Blue many years to meet a similar goal if they were to start working towards it today.

Relativity stands out as the choice for an acquisition by Blue Origin because of its advanced manufacturing techniques, its employee culture striving towards reusability and pushing aerospace boundaries, and its medium-lift launch service capabilities through Terran R. Other aerospace companies operate in traditional ways with extremely stringent production processes, hesitation to innovate, and a lack of focus on reusability. Blue Origin and Relativity Space share a common goal of reducing the cost of access to space and providing launch services to NASA (Blue Origin, Relativity Space). They share a common market rival in the form of SpaceX, who currently dominates the market. An acquisition could easily benefit both Blue and Relativity.

With an acquisition, it is highly likely that priorities may shift in both companies. Blue would attempt to adopt the manufacturing techniques that Relativity uses and try to integrate Terran R into their portfolio. Meanwhile, Relativity would have to stray away from its objective of designing Terran R and begin sharing techniques with the engineers of Blue. With Blue Origin being based in Washington state and Relativity being based in Southern California, the companies would begin integrating teams and facilities between the two, creating a strong hold of the aerospace market on the US west coast.

Feasibility

Financial Feasibility

As of their most recent valuation, Relativity Space is worth approximately \$4.2 billion (Alamalhodaiei). Assuming a premium of 25%, it would cost Blue Origin around \$5.25 billion to purchase Relativity. While this is not an insignificant amount, Blue Origin's owner Jeff Bezos, with an estimated net worth of \$220 billion, would easily be able to cover the cost by selling some of his shares at Amazon (Jeff Bezos). Bezos has already spent \$10 billion on Blue Origin, pledging to sell \$1 billion in shares at Amazon annually to continue funding the company. The acquisition would be a significant investment but has a high potential for return because of Relativity's unique assets.

Regulatory and Legal Considerations

There would be no regulatory concerns with the acquisition because no monopoly or market dominance would be created. Since SpaceX holds most of the launch services market, it would be difficult for Blue Origin to claim that position even with the acquisition of another significant competitor like Relativity Space (Chiaravalli). No key players in the market will be removed.

In terms of scrutiny, Blue Origin may face criticism for removing a promising competitor in the orbital launch services market. Regulators may examine if the acquisition will reduce long-term competition. Another concern may be in the business of government contracts and defense applications. Since both companies seek contracts from the government and US, there may be sensitive information that could be affected by the acquisition (Erwin). Lastly, the acquisition may be investigated for innovation suppression. Because Relativity is at the forefront of 3D printing technology, Blue may be investigated for attempting to reduce technological innovation.

A similar acquisition occurred in 2020 when Amazon acquired Zoox, a self-driving car startup, for \$1.2 billion (Porter). Like this hypothetical acquisition, the Zoox acquisition occurred between a huge Internet technology company with large sums of capital and a smaller startup working on new technologies with ambitious goals. Antitrust regulators reviewed the acquisition deal because Zoox could potentially disrupt the transportation and logistics sectors that Amazon dominates. They examined whether Amazon would disrupt innovation at Zoox and if the acquisition would reduce long-term competition in autonomous logistics. The regulators eventually approved the acquisition.

Logistical and Operational Feasibility

Logistically, it would benefit Blue to claim Relativity because of Relativity's presence in many of the same locations as Blue. Blue is based in western Washington in the Seattle area, while Relativity is based in southern California. Blue has offices in most regions of the United States, with a strong presence in regions with a solid aerospace industry (Blue Origin). They operate their launch vehicles in Texas and Florida. Meanwhile, Relativity has offices in a few key regions including Washington, D.C., Florida, Seattle, and Stennis Space Center in Mississippi. Relativity also operates their launch vehicles in Florida (Relativity Space). An acquisition would mean Blue could gain a strong position in the US west coast by having engineering and manufacturing based in the Seattle and Los Angeles areas. Both companies have supply chains that connect them to the east coast in Cape Canaveral, Florida where they both launch their orbital vehicles. It would be a smooth operation to integrate Relativity into Blue's supply chain. Also, since Blue has offices in the Los Angeles area, it would be easy to integrate the engineering force into the Relativity offices.

Due Diligence

Human Capital

While most of Relativity's value most likely comes from their advanced 3D printing technology and the design of the Terran R, another significant portion of its value comes from their engineering talent. As part of the acquisition will need to understand who key personnel are and find any risks with integrating teams with unique cultures. They'll need to pick out founding employees and engineering leads responsible for most of the innovations at Relativity. It will be

very important to ensure those employees are retained after the acquisition. In terms of retention, it will be important to integrate the Relativity employees into the culture at Blue. Because Blue is a larger, slower company with less ability to take risks, the employees at Relativity may dislike the loss of freedom to innovate. They may also not believe in the same missions at Blue. Relativity employees may also disapprove of their loss in equity, since Blue employees do not receive any equity in the company (Smith). Lastly, Blue would need to look into how Relativity organizes their employees and find a way to integrate them into the Blue structure. This is important because Blue wouldn't want disorganization or multiple employees specializing in the same tasks.

To properly perform due diligence, Blue must assess the employee stock plans provided at Relativity and provide compensation options for those employees. They would also need to interview key employees to understand more about the company and their technological properties. This would also provide Blue an opportunity to provide extra compensation to encourage these employees to stay with the company. Then, they would need to investigate employee satisfaction and find ways to retain the new employees. If these actions are not performed, there may be huge losses in talent due to lack of compensation, a cultural mismatch, and poorly integrated teams.

Intellectual Property (IP)

Relativity stands out because of its advanced 3D printing technology and manufacturing processes. Blue would need to obtain clear legal ownership of these technologies to retain value in the acquisition. Blue will need to investigate Relativity's patents, trademarks, trade secrets, and copyrights. Then they'll need to check if there are any pending IP lawsuits or challenges. Lastly, Blue will check if Relativity has full rights to the technology they use. Relativity may be using technology that they don't have the rights for, which could lead to legal troubles at Blue.

To perform due diligence, Blue would need to perform several audits on engineering inventions and software tools. This would bring any issues with ownership of inventions and development resources to light. Next, they will need to receive legal counsel to ensure there are no upcoming lawsuits Blue will need to be aware of. If these due diligence items are not completed, Blue may risk acquiring rights to a company that does not clearly own its technology. This would lead to further legal battles and the need to re-engineer systems and rewrite software.

Manufacturing Facilities

Environment, health and safety (EHS) are very important when it comes to large-scale manufacturing. Relativity's Long Beach facility is a sophisticated factory with advanced 3D printing and automation technologies (Relativity Space). Blue would need to ensure Relativity's facilities meet all safety requirements to continue operations. Blue would collect information on the capacity and scalability of Relativity's facilities. They'll check which EHS regulations

Relativity is following. This may be OSHA, local codes, fire safety, etc. Lastly, they'll need to check whether there are any pending violations or environmental risks.

This due diligence will be completed by checking site blueprints and performing safety audits on each facility. EHS officers and plant managers will be interviewed to ensure there are no EHS issues. Lastly, any local environment or public health records will be checked for compliance records. These items are required for due diligence so Blue can understand any liabilities or upgrades needed to the facilities. It'll also contribute to the cost of the acquisition because costly retrofits may not be worth it. Blue may also risk being shut down if the facilities face legal compliance issues.

Conclusion

An acquisition of Relativity Space by Blue Origin could benefit both companies in their race against SpaceX to dominate the orbital launch services market. Relativity Space offers advanced 3D printing technologies and engineering talent that could vastly improve Blue Origin's manufacturing capabilities. Blue's position in the market and high funding make an acquisition of Relativity feasible. If an acquisition were to occur, the correct due diligence will need to be performed to ensure Blue retains engineering talent, facilities, and intellectual property. In this paper, it was found that these things have a strong feasibility and could one day happen.

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Appendix

Company Background: Acquirer

The company I have chosen for this assignment is Blue Origin, a private aerospace technology company focused on reducing the cost of access to space, enabling a future where "millions of people live and work in space." Founded in 2000, the company is working towards this goal by developing the infrastructure needed to sustain a long-term human presence in space. The company is headquartered in Kent, Washington, but has other manufacturing and launch facilities in Texas, Florida, and Alabama. Blue Origin's current markets are in aerospace engineering, advanced manufacturing, and commercial spaceflight. Being owned and funded entirely by billionaire Jeff Bezos, the company does not currently make a profit. However, its business model relies on government contracts like NASA's human landing system and commercial launch services to eventually drive revenue.

Since Blue Origin operates in a wide variety of markets in the aerospace industry they have many competitors. In the rocket payload market, New Glenn is their fully reusable orbital launch system capable of carrying large payloads with significantly larger volumes compared to its competitors. There are many other competitors with rockets capable of carrying payloads, but SpaceX would be the primary competitor as they are the main provider of reusable rockets. In the commercial spaceflight market, New Shepard is the company's fully reusable suborbital rocket designed for microgravity research and space tourism. The only competitor in this market is Virgin Galactic. Finally, in the in-space systems market, Blue Origin has technology from their space station, Orbital Reef. They also have a variety of in-space vehicles and robots. Lastly, they have a lunar lander that will be used in NASA's Artemis program. With the in-space systems market being very large, there are many competitors, namely SpaceX, Boeing, Lockheed Martin,

and many more. They are currently falling far behind their major competitor, SpaceX, in the launch services market. As Blue Origin transitions from a research and development company to an operating commercial spaceflight company, they will need all the resources they can get.

Company Background: Acquisition Target

For the acquisition target, I have chosen Relativity Space. Relativity Space is a private launch services provider and aerospace manufacturer. It was founded in 2015 by former Blue Origin and SpaceX engineers and is currently based in Long Beach, California. The company is unique in its new approach to rocket manufacturing focused on automation, 3D printing, and vertical integration. In terms of goals, the company aims to hasten humanity's multi-planetary presence by reworking the aerospace manufacturing and supply chain. Relativity Space produces two orbital launch vehicles that are composed of 85-95% 3D printed parts - Terran 1 and Terran R. Terran 1 was launched in 2023 but failed to reach orbit. They are now using what they learned from that launch to design and build Terran R, a fully reusable, heavy lift launch vehicle designed to compete with SpaceX's Falcon 9.

Like other launch providers such as SpaceX and Blue Origin, Relativity's business model is centered around providing launch services to commercial satellite providers, government agencies, and defense companies. They have already received over \$1.6 billion in launch contracts. In terms of challenges, Relativity is a pre-revenue company with a small history of launches. The company must prove that they can produce reliable and cost-effective launch systems in a highly competitive market where other companies like SpaceX, Rocket Lab, and ULA already provide proven systems. Because Relativity is the only company in the aerospace industry with a redefined manufacturing process focused on 3D printing, they face many challenges and pressures.