Private Industry in the 21st Century Space Race

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The work of governements has typically been associated with human led endeavors into space, to the moon, and beyond. For example, man's first trip to the moon was headed by the United States National Aeronautics and Space Administration (NASA) and the International Space Station is a joint collaboration between American, Russian, European, Japanese, and Canadian governments. What many often fail to realize is that the high-tech spacecraft that have taken us the moon and allowed us to remain in low earth orbit have been built by private contractors under governmental supervision.

In the US, large aerospace companies such as Boeing and Lockheed-Martin have traditionally served as the primary contractors on large NASA projects. As space innovation begins to once again accelerate in the early 21ST century, small private firms are taking the lead as the pioneers and contractors of the “new space (https://arstechnica.com/science/2016/10/blue-origin-just-validated-the-new-space-movement/)” movement. These companies are changing the way we think about space and approach space exploration, and may be key drivers in changing the relationship between government and private companies.

Let’s briefly examine the Apollo 11 mission, possibly the most well-known space flight missions as it ultimately put man on the moon on July 20, 1969. The Apollo 11 spacecraft consisted of five main components: i) Saturn V rocket, ii) Service Module, iii) Command Module, iv) Lunar Module, and v) Launch Escape System. Even though the Apollo spacecraft were designated as NASA vehicles, NASA’s roles in production were limited to spacecraft design. Actual construction of the components
was delegated to various contractors, which included Boeing, Douglas Aircraft, Grumman Aircraft, IBM, Lockheed Propulsion Company, and North American Aviation. Yes, that’s right, construction of the Apollo spacecraft was such a massive undertaking that at least 6 major contracting companies were required to complete construction within government specified timeframe.

Current NASA projects, such as the Deep Space Gateway (DSG) and Deep Space Transport (DST) systems, seek to develop cost-efficient solutions to shuttle humans between different space locations. The DSG will be positioned in cis-lunar space (volume of space within the moon’s orbit around Earth) to serve as a rendezvous point, and will be assembled in space with components delivered throughout three launches of the upcoming Space Launch System (SLS) rocket. The DST is designed to be a reusable spacecraft which will shuttle astronauts back and forth between the DSG and designated locations, such as Mars. It is important to keep in mind that even though the DST will be innovative due to its reusability, the SLS will only be a single-use system but will be used for various purposes. This is seen as problematic by many due to the fact that construction and deployment of core stage and booster rockets are one of the most expensive aspects of a launch. As with the Apollo missions, construction of the SLS, DSG, and DST will be contracted out; as of now it appears Boeing holds the primary contract.

While space exploration in the latter half of the 20TH century was dominated by large aerospace companies like Boeing, the first two decades of the 21ST century gave way to amazing achievements by small startups — particularly SpaceX and Blue Origin. These two companies have been working on cost-efficient solutions for human space travel and spacecraft deployment. In March, SpaceX launched and landed its first re-used Falcon 9 rocket (https://techcrunch.com/2017/03/30/spacex-successfully-re-launches-an-orbital-falcon-9-rocket-for-the-first-time/). This was a massive milestone in space flight; while re-usable rockets will save millions of dollars per launch, technology development for such rocket systems were originally viewed as highly risky. Furthermore, this achievement has significantly increased the possibility of sending humans to Mars on a frequent basis. Blue Origin, though, has been focusing its current efforts on space tourism and has successfully landed its sub-orbital New Shepherd rocket several times (https://www.nasaspaceflight.com/2016/06/blue-origin-fourth-consecutive-test-new-shepard/) since late 2015. As with Space-X, the focus of Blue Origin’s advances is that of re-usable rocketry; something that NASA is not doing with development of the SLS.

Ultimately, the role of government agencies like NASA has been to use research dollars and resources to explore technological advances that are considered too risky for the private sector. If these technologies pan out they can be licensed to recoup costs. Over the last few decades, however, government dollars are more often than not being targeted towards advances that are likely to succeed or to have an immediate public impact; think of the political emphasis on translational as opposed to basic science research. In the space sector, this has left a void of new technology development. Thankfully, companies like Space-X and Blue Origin, owned by multi-billionaires entrepreneurs Elon Musk and Jeff Bezos, respectively, are stepping in to fill that void and changing the dynamics between private industry and government. As the prospects of establishing human colonies on other planets and mining asteroids or other objects have increased dramatically, so too has the value of space and the involvement of private interests. These entrepreneurs are keenly aware of this, along with the prospect of changing the course of mankind, and are investing heavily in technologies that will allow us to easily travel through space and also take advantage of its vast resources.

As the 21ST century "Space Race" develops it is possible we will see a dramatic increase in the number of private companies aiming to bring new technologies to the space market or developing
innovative ways to reduce costs, as is currently being done with reusable spacecraft. More importantly, an increase in the number of private companies vying for a place in space means the government will have a greater pot from which to source contractors, ultimately reducing taxpayer costs and allowing for a better return on invest for planned space research and testing of potentially high risk technologies.

Image: NASA

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