



## Rethinking public–private space travel



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### ABSTRACT

On May 24, 2012 SpaceX's Dragon capsule was launched and in doing so became the first commercially built vehicle to berth with and carry cargo to the International Space Station (ISS). It successfully completed its mission and returned to the Pacific Ocean on May 31, 2012.<sup>1</sup> The docking of Dragon represented a historic moment where a commercial enterprise managed to achieve that which had previously only been accomplished by governments. "In the history of spaceflight – only four entities have launched a space capsule into orbit and successfully brought it back to Earth: the United States, Russia, China, and SpaceX".<sup>2</sup> While this is a monumental accomplishment for private industry, we cannot ignore the value of public–private partnerships and the role that government played in enabling this incredible achievement.

In this paper I will examine how public–private partnerships are enabling the development of the commercial space industry, viewed through the lens of the Rethinking Business Institutional Hybrid Framework put forward by University of Oxford professors Marc Ventresca and Alex Nichols in their Rethinking Business MBA course. I intend to demonstrate that the NASA versus Commercial Space argument is a false dichotomy and that only by working together can both sectors continue to push the boundaries of space travel and exploration. I plan to do this by first discussing how the NASA-SpaceX partnership came about and the reasoning behind it. I will then explore what a public–private partnership (PPP) is, as compared to other government privatization schemes, and explain why Space Act Agreements are significantly different from anything done previously. I will then analyze the impact of these agreements and outline their benefits in order to demonstrate the value they create, especially in areas of mutual value creation and economic development.

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<sup>1</sup> Voices: SpaceX Showered in Praise for Dragon Space Capsule Success. [Space.com](http://Space.com). 31 May 12. Retrieved 23 Mar 13.

<sup>2</sup> SpaceX: Entrepreneur's Race to Space. CBS News. 18 Mar 12. Retrieved 24 Mar 13.

<sup>3</sup> See [Appendix A](#).

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## 1. The NASA-SpaceX partnership

### 1.1. Market void

Elon Musk, Founder and CEO of Space Exploration Technologies (SpaceX), has a reputation for brilliance and brashness. As a successful entrepreneur creating a portfolio of companies including PayPal, Solar City, and Tesla, he decided to use his fortune to pursue his longtime interest in space. Musk explains that the original idea behind SpaceX came from wanting to donate money to NASA to start a greenhouse on Mars. The greenhouse was intended to rekindle enthusiasm about space exploration and encourage additional money in the federal budget for NASA by demonstrating that life could exist on Mars.<sup>4</sup> However, when he realized that NASA had no near-term plans to visit the red planet, he decided to go it alone.

### 1.2. Market opportunity

In the absence of adequate government resources, Musk reconfigured the market and in the process, found a place for himself. When he realized that the issue with getting to Mars wasn't feasibility, but "the perception among American people – correct, given current technology – that it didn't make financial sense to go",<sup>5</sup> and with government timelines of a manned Mars mission pushed back to 2033,<sup>6</sup> Musk bet that he could get to Mars much cheaper and more quickly. His initial idea was to solely fund a philanthropic mission using Russian Intercontinental Ballistic Missiles (ICBMs).<sup>7</sup> The NY Times reported that Musk was determined to send people to Mars "with or without NASA".<sup>8</sup> Speaking to an audience at Oxford University Musk said, "I went to Russia three times to try and buy a couple of their biggest ICBMs".<sup>9</sup> But Musk soon realized that in order to accomplish what he set out to do, he would need to dramatically improve upon existing technology, which hadn't changed much since the Apollo era. For this reason he decided not to buy, but instead set out to develop his own technology. But this was no small ambition. Rocket science is tricky business and after his first three launches failed he was beginning to run out of money. Luckily the fourth launch was a success, because there wouldn't have been enough resources left to mount a fifth.

While this might have begun as a lone venture by an aspirational entrepreneur, the success of SpaceX is in fact the result of a deeply collaborative effort with NASA. Indeed, SpaceX has operated on total funding of about \$1 billion in its first ten years of operation, of which about half has come from progress payments on government contracts.<sup>10</sup> Following the successful mission of the Dragon capsule, Musk showed his appreciation for his new government partners. "I

would like to start off by saying what a tremendous honor it has been to work with NASA. And to acknowledge the fact that we could not have started SpaceX, nor could we have reached this point without the help of NASA", Musk said at a press conference after the launch.<sup>11</sup>

### 1.3. Commercial innovation

With the void left by the decommissioning of the space shuttle program in July 2011, there was tremendous opportunity for private enterprise to meet the demand for cost-effective travel to and from the ISS. For the first time in three decades, the United States had no way to launch astronauts into space.<sup>12</sup> But the White House had a long-term plan to rely on private industry solutions for space transport, and private industry was ready to step up, even if it meant that the government would have to temporarily rely on Russian transport during the transition. The technological feasibility of space travel had been proven decades ago by the awe inspiring accomplishments of NASA, pushing the boundaries of new frontiers and driving research at the limits of human knowledge. As governments and private enterprises look to expand their activities in space, both have the opportunity to generate greater total value by focusing on their respective core competencies. Bob Richards, CEO of another NASA contracted commercial business has said, "As a first order rule, if it needs to be done once, that's a government opportunity; if it needs to be done repetitively, that's a business opportunity".<sup>13</sup>

The NASA versus commercial space argument is a false dichotomy; the answer lies in partnerships.<sup>14</sup> These partnerships allow each party to focus on their core competencies, while leveraging the strengths of the other. The commercial space industry can build upon the existing transportation infrastructure and make it better by focusing on profits, cost-cutting, and efficiency. NASA can focus on what it is meant to do, that which pushes the boundaries of human knowledge and has common value but no clear path to profitability. With NASA focused on deep space missions, private US companies are likely to operate most, if not all, flights between Earth and the International Space Station, saving NASA a lot of money and bringing millions of dollars to American enterprises.<sup>15</sup>

According to The Space Foundation's annual report on the state of the industry, the global space economy grew to \$290 billion in 2011 fueled primarily by growth in the commercial sector.<sup>16</sup> The global outlook in that same report is largely positive claiming that, "As governments across the globe evaluate budgets devoted to space programs and make difficult investment decisions, a host of public-private, private-private, and international partnerships are emerging..." In the United States, these partnerships are a large driver of growth in the commercial sector as the government relies more heavily on services from commercial providers. NASA now constitutes 25% of all SpaceX launches, with the other 75% from commercial customers. Musk said, "The whole purpose of that was

<sup>4</sup> Elon Musk-SpaceX Testing New Reusable Rockets. [Forbes.com](http://Forbes.com). 9 Mar 13. Retrieved 23 Mar 13.

<sup>5</sup> Elon Musk's Mission to Mars. [Wired.com](http://Wired.com). 21 Oct 12. Retrieved 24 Mar 13.

<sup>6</sup> NASA aims for human rendezvous at Mars in 2033. Nature News Blog. 23 May 12. Retrieved 23 Mar 13.

<sup>7</sup> SpaceX Founder Elon Musk Considered Buying Russian Ballistic Nukes?! [FastCompany.com](http://FastCompany.com). 9 Mar 13. Retrieved 23 Mar 13.

<sup>8</sup> Private Sector Edges Deeper in Space. [NYTimes.com](http://NYTimes.com), Space & Cosmos Section. 14 May 12. Retrieved 23 Mar 13.

<sup>9</sup> Elon Musk – The Future of Energy and Transport. Oxford Martin School Web-cast. Nov 12. Retrieved 23 Mar 13.

<sup>10</sup> SpaceX. [Wikipedia.org](http://Wikipedia.org) (Funding section). 15 Mar 13. Retrieved 24 Mar 13.

<sup>11</sup> Not So Private Space: The SpaceX-NASA Partnership is Blasting Off Good is 24 May 12. Retrieved 23 Mar 13.

<sup>12</sup> SpaceX: Entrepreneur's Race to Space. CBS News. 18 Mar 12. Retrieved 24 Mar 13.

<sup>13</sup> NASA versus Commercial Space. Moon Express Blog. Google Lunar X Prize. 10 Sep 12. Retrieved 17 Mar 13.

<sup>14</sup> NASA versus Commercial Space. Moon Express Blog. Google Lunar X Prize. 10 Sep 12. Retrieved 17 Mar 13.

<sup>15</sup> Space Tech Conference 2013. Commercial Crew & Cargo (10:00 – 10:55 session). Retrieved 17 Mar 13.

<sup>16</sup> Space Foundation's 2012 Report Reveals 12.2% Global Space Industry Growth in 2011. [spacefoundation.org](http://spacefoundation.org). 5 Apr 12. Retrieved 24 Mar 13.

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