

The U.S. Procurement Model as a Tool for Growing Private Industry

*Mark J. Sundahl**

Abstract

The growth of private launch service providers in the United States stems from choices made by legislators and policy-makers that, whether intentional or not, created a market for these launch services. The first of these choices was made in 1985 when President Reagan issued an executive order allowing NASA to use the Space Shuttle to deliver commercial satellites into orbit only if the satellite required the “unique capabilities” of the Shuttle. As a result, the need for launch services for satellites that did not meet this standard quickly grew and private industry soon began filling this need. The demand for private launch services became even greater when, in 1988, President Reagan issued another directive requiring government agencies to use commercial launch service providers “to the fullest extent feasible.” When the last operational Space Shuttle, the Atlantis, was retired in 2011, the U.S. government no longer had an operational launch vehicle that could reach the International Space Station. Not wanting to rely on foreign spacecraft and wanting to spur the further growth of private industry, NASA launched programs to encourage the development of private launch services to deliver crew and cargo to the ISS. These programs resulted in the rapid development of multiple private launch service providers that now compete to deliver cargo and crew to the ISS. This paper will explain the role that these policies played in the evolution of the U.S. launch service industry and whether the adoption of the US approach is appropriate for other countries where the governmental space programs and related private industry are quite different from the space program and private industry of the United States.

I. Introduction

The term “procurement” refers to the acquisition of goods and services by a government. This paper will focus on the procurement rules policies of the United States’ space agency, NASA, and will make the case that the U.S. model of procurement should be adopted (perhaps with some modifications or improvements) by other spacefaring countries. The dimensions of procurement policy are, like most things, multifaceted and somewhat

* Cleveland State University. m.sundahl@csuohio.edu.

complicated. To set the stage with two basic objectives, consider the following goals of procurement from private entities:

- The space agency needs high-quality, readily available products and services at a low cost. Multiple suppliers (or service providers) are desirable to provide redundancy in the supply chain.
- The space agency (or perhaps another government agency that influences space policy) wants to promote the private space industry for generally economic welfare and for government benefit (cost savings or freeing up the space agency's time, manpower, and resources to do the things that it does best – like building deep space probes and Martian rovers.)

The goal of this paper is not necessarily to improve upon the U.S. procurement system, but to help educate other space agencies around the world about the way that public/private partnerships can help grow their private space industry.

We will begin with an inspiring story about the evolution of procurement policy in the United States. It is a tragic story in some ways, but it is still inspiring because it has led to the creation of a robust private space industry and showed how even tragedy is able to bring about a greater good.

II. The History of Procurement in the United States

From the earliest days, private partnership has been part of NASA's mission. One need only look at the statute that started it all: the *National Aeronautics and Space Act of 1958*. The Act provides NASA with five guiding principles, two of which concern private industry. One guideline promotes private industry in general:¹

[NASA] shall seek and encourage, to the maximum extent possible, the fullest commercial use of space.

The other guideline promotes, more specifically, government procurement of private goods and services:²

[NASA] shall encourage and provide for Federal Government use of commercially provided space services and hardware.

1 51 U.S.C. § 20112(a)(4).

2 51 U.S.C. § 20112(a)(5).

The robust implementation of these guidelines can be seen in the Apollo program where the construction of the Apollo spacecraft were subcontracted out to private companies. North American Aviation built the Apollo command and service modules. The lunar module was built by Grumman Aircraft Engineering Corporation. Boeing and McDonnell Douglas worked with North American Aviation to construct the massive Saturn V rocket that carried the Apollo astronauts into space.

The emergence of the private launch service industry is the most interesting part of the history of procurement and will be the focus of the rest of this story. Even as private telecommunications companies emerged in the 1960s, these companies had no choice but to rely on NASA's launch capabilities in order to place their satellites in orbit. However, while NASA provided the services in name, the launch vehicles were in fact built and launched by private companies. For example, NASA's Titan rocket was built by Martin Marietta, the Atlas rocket by General Dynamics, and the Delta rocket by Boeing.

NASA continued to be the only entity in the world that provided launch services to private companies until the first Ariane rocket was launched in 1979. The Ariane program was a joint venture by France, Germany, and the UK that was undertaken to improve Europe's access to space. In 1980, the operation of the Ariane rocket series was taken over Arianespace, which thus become the first private company to offer launch services.

Then in 1982 came the first operational launch of the reusable Space Shuttle. The Shuttle was intended to provide orbital delivery services at a fraction of the cost of expendable vehicles. And here the story turns a bit dark, in that the development of the Space Shuttle threatened to eliminate the possibility of U.S. companies ever offering launch services since NASA planned to rely entirely on the Shuttle for government payloads as well as using the Shuttle to provide launch services to private companies, both domestic and foreign.

As is well known, the abilities of the Shuttle were overestimated and the need for additional launch service providers soon became evident. As a result, in 1982 Space Services Inc. of America (SSIA) became the first private company to launch a rocket into space without being under contract to do so by a space agency. However, the launch of a NASA payload failed and SSIA did not launch another vehicle for another seven years.

SSIA's first foray into private launch services had powerful repercussions in the development of space law. More specifically, the regulatory framework was tested by the SSIA launches and led to improvements in regulation that was critical in allowing for the growth of the launch industry. In order to launch the Conestoga rocket, Space Services faced a chaotic licensing process and, at the end, was required to acquire licenses from numerous U.S. government agencies, including NASA, the Department of State, the Federal Aviation Administration, the Federal Communications Commission, the Department of Defense and the Bureau of Alcohol, Tobacco, and Firearms.

This regulatory burden was recognized by the U.S. government and a series of governmental actions reshaped the legal landscape to encourage and facilitate the development of private launch services. President Reagan set the wheels in motion in 1983 by issuing a National Security Directive, which set forth the following policy in support of minimizing the regulatory burden:

The U.S. Government fully endorses and will facilitate the commercialization of U.S. Expendable Launch Vehicles. The U.S. Government will license, supervise, and/or regulate U.S. commercial ELV operations only to the extent required to meet its national and international obligations and to ensure public safety.

In 1984, President Reagan issued an Executive Order designating the Department of Transportation (DOT) as the lead agency for commercial space transportation in order to eliminate the regulatory complexity faced by SSIA by identifying a single agency that would serve as a “one-stop-shop” for companies seeking a launch license. That same year, Congress affirmed the role of the DOT as the lead licensing agency for private launches by enacting the Commercial Space Launch Act (CSLA) (Federal Aviation Administration Office of Commercial Space Transportation, n.d.). The CSLA continues to serve as the legal foundation for regulating private space transportation.

Although the licensing process was streamlined by the CSLA, there was still a policy issue that prevented private companies from growing their launch service business. The U.S. government, which was by far the largest potential customer for any private launch company, required all government payloads to be launched on the new reusable launch vehicles, the Space Shuttle orbiter (which was built by a private company, Rockwell International).

This changed, however, in 1986 due to the Space Shuttle Challenger tragedy that resulted in a significant loss in the ability of the Shuttle fleet to provide the launch services required by both government and commercial entities. In order to accommodate government payloads on the Shuttles and to spur the development of private launch service providers that could serve as an alternative to the Shuttle, President Reagan issued an executive order that restricted NASA’s launch of commercial satellites to only those satellites that required the “unique capabilities” of the Shuttle (United States Space Launch Strategy, 1986). As a result, the need for private launch service providers quickly grew and private industry soon began filling this need.

The demand for private launch services accelerated when, two years later in 1988, President Reagan issued another directive requiring government agencies to use commercial launch service providers “*to the fullest extent feasible*” (Presidential Directive on National Space Policy, 1988).

The law and policy of the United States was now optimized for the rapid expansion of the commercial space launch industry. In 1989, SSIA received the first launch license issued under the CSLA to launch its Starfire vehicle on a suborbital mission with a scientific payload developed by the University of

Alabama. Later that same year, McDonnell Douglas performed the first private orbital launch with its Delta I rocket.

When the last operational Space Shuttle, the *Atlantis*, was retired in 2011, the U.S. government no longer had an operational launch vehicle and had to purchase launch services from private companies in order to place government satellites in orbit. Since no private entity was capable of delivering crew and cargo to the International Space Station (ISS), NASA had to rely on its international partners (primarily Russia) for ISS missions. Not content with this reliance on foreign governments, NASA launched programs to encourage the development of private launch services to deliver crew and cargo to the ISS. The cornerstones of this initiative were the Commercial Orbital Transportation Service (COTS) program, the Commercial Resupply Services (CRS) program, and the Commercial Crew Development (CCDev) program. These programs resulted in the rapid development of multiple private launch service providers that competed for NASA contracts to deliver cargo and crew to the ISS. In 2012, SpaceX became the first private company to deliver cargo to the ISS and was followed by Orbital Sciences in 2013. SpaceX and Boeing have been awarded contracts under the CCDev program to deliver crew to the ISS (which will likely begin in 2020).

Between 1962 and 1968, over 90 percent of NASA's expenditures were payments to outside contractors for goods and services.³ These private contractors were used to build NASA's facilities and vehicles, provide support for research and development, and perform service contracts for NASA. As a result, the use of private funds built the early United States aerospace industry and allowed NASA to partner with these companies to achieve common goals.

After NASA landed men on the Moon in 1969, funding for the agency was significantly cut.⁴ As NASA's budget decreased, it had to find better, more efficient ways to use the limited public money that they received. Since the end of the Space Shuttle Program NASA's budget has continued to be cut. The recent emergence of the commercial space industry has allowed NASA to contract out many of its service missions such as launching satellites and resupplying the International Space Station. NASA has found success throughout this reduction in funding because of the effective public-private partnerships that NASA has been using since its commencement. The benefits have been tremendous. Not only can NASA save significant money by procuring private launches from entrepreneurial companies, such as SpaceX, but *NASA is freed up to focus its efforts on those things that it does best, and which only it can do, such as interplanetary exploration* (although with the advent of asteroid mining such exploration will become private as well).

3 HISTORICAL DATA BOOK 1958-1968, 1 NASA SP-4012 5 (1976).

4 NASA's budget returned to about 1 percent of the federal budget by 1972, and has remained between 0.5-1 percent.

Evidence that public/private partnerships will continue is found in the first bullet point of the President Trump's 2018 NASA budget proposal, to wit:⁵

The President's 2018 Budget supports and expands public-private partnerships as the foundation of future U.S. civilian space efforts.

This recognition of PPPs promises that the near future of U.S. space exploration will continue to be driven by cooperation between NASA and the commercial space industry.

III. A Closer Look at the Mechanics of Procurement

NASA uses two methods of contracting with private industry. The first method is to follow the procedures of the Federal Acquisition Regulations (FAR) which apply, with some variations, to all federal agencies.⁶ In addition to FAR, NASA has an agency-specific FAR Supplement that gives additional requirements that are unique to NASA.⁷ Within the NASA FAR Supplement are guidelines on acquisition planning, contracting methods and requirements, and a list of forms used during the acquisition process.⁸ Through FAR contracting, NASA is able to enter into contracts, cooperative agreements, and grants. These can be awarded through competitive bidding or through non-competitive procurement. Either way, the procedure that NASA uses to conform to FAR is a four-step process that begins with pre-solicitation, followed by solicitation and award, administration, and finally, closeout. NASA uses this traditional procurement process to procure most day-to-day needs.

NASA's other method of procurement (or, more broadly, method of partnering with private industry) is through so-called Space Act Agreements. This method is used for projects where the FAR process is inappropriate due to the nature of the partnership.⁹ These agreements are typically used by NASA to fund projects that further NASA's goals and missions outside of the standard procurement procedure and require NASA to commit its resources in the form of goods, services, facilities, or equipment.¹⁰ The authority to enter into the Space Act Agreements is found within the "other transactions"

5 *America First: A Budget to Make America Great Again*, 43, Office of Management and Budget, 2018.

6 48 CFR Chapter 18.

7 *Id.*

8 *Id.*

9 51 USC § 20113(e); *NASA's Use of Space Act Agreements Audit Report*, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION OFFICE OF INSPECTOR GENERAL, IG-14-020, 17 (2014).

10 NAI 1050-1B, *NASA Advisory Implementing Instructions*, SPACE ACT AGREEMENTS GUIDE, B-2, (2011).

clause of the National Aeronautics and Space Act of 1958. Under 51 U.S.C. § 20113(e), NASA is able “to enter into and perform such contracts, leases, cooperative agreements, or *other transactions as may be necessary* in the conduct of its work and on such terms as it may deem appropriate.”¹¹ While the first part of the statute provides for the typical agreements that NASA enters into through the traditional FAR procurement procedure, the second part of the statute, which describes “other transactions,” grants NASA the authority to create legally enforceable agreements to further NASA’s missions and goals outside of the normal procurement procedure.¹²

There are four main types of Space Act Agreements: nonreimbursable, reimbursable, funded, and international agreements.¹³ A nonreimbursable Agreement is when NASA and one or more partners work together in a “mutually beneficial activity that furthers NASA’s mission, where each party bears the cost of its participation, and there is no exchange of funds between the parties.”¹⁴ Although NASA does not provide any funding for this type of Agreement, it allows NASA to provide support in the form of “personnel, support services, equipment, expertise, information, or facilities.”¹⁵ This type of agreements is specifically used when NASA and a partner are working collaboratively toward a common goal, but NASA is unwilling or unable to provide funding. Nonreimbursable Agreements are typically research and development agreements that provide NASA with new technology that the partner can take to the commercial market. The main advantage to NASA for using nonreimbursable agreements is that the NASA is provided with new technology without having to provide funding to its partner. This benefits NASA’s partner because they can rely on NASA’s vast resources, expertise, and guidance to further a commercial purpose. In addition, NASA is often the primary consumer for the technology that was developed by the Partner, essentially allowing NASA to develop a product without spending money on research and development.

The second type of Space Act Agreement is the reimbursable agreement. Reimbursable agreements allow a Partner to pay NASA for the use of NASA’s resources. In contrast to nonreimbursable agreements, Reimbursable agreements allow NASA to support the partner financially with the

11 51 USC § 20113(e).

12 Office of General Counsel, NPD 1050,1I AUTHORITY TO ENTER INTO SPACE ACT AGREEMENTS, Attachment A, A.3, <https://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPD&c=1050&s=1I> (last visited Nov 4, 2017).

13 *NASA Space Act Agreements*, NASA PARTNERSHIPS (Jennifer Harbaugh ed., 2017), <https://www.nasa.gov/partnerships/about.html> (last visited Nov 4, 2017).

14 Office of General Counsel, NPD 1050,1I AUTHORITY TO ENTER INTO SPACE ACT AGREEMENTS, <https://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPD&c=1050&s=1I> (last visited Nov 4, 2017).

15 NAI 1050-1B, *NASA Advisory Implementing Instructions*, SPACE ACT AGREEMENTS GUIDE, B-11, (2011).

expectation that the Partner will reimburse NASA. For NASA to provide resources under a reimbursable agreement, the activity must “(1) be consistent with NASA’s mission and (2) involve goods, services, facilities, or equipment not reasonably available on the U.S. commercial market from another source.”¹⁶ While the first requirement ensures that the money is spent wisely, the second requirement prevents NASA from competing with the commercial market. The main benefit to NASA is that this process allows NASA to outsource research and development by paying a partner to develop the technology using NASA resources, and in return NASA is granted a license to use the product.

The third type of Space Act Agreement is the international agreement. This type of agreement is between NASA and a non-U.S. entity.¹⁷ These agreements can be either reimbursable or nonreimbursable. International agreements allow NASA to work with foreign partners on the types of projects that U.S. partners typically work on. This type of agreement provides NASA with increased flexibility to further the goals and missions without having to rely on exclusively U.S.-based companies and people.

The fourth type of Space Act Agreement is the funded agreement. Funded agreements are “[a]greements under which appropriated funds are transferred to a domestic partner to accomplish an Agency mission.”¹⁸ These types of agreements, which are limited to domestic partners, can only be used if NASA cannot use a procurement contract, grant, or cooperative agreement to accomplish one of NASA’s stated goals.¹⁹ Because NASA does not get reimbursed under a Funded Agreement, they are most often used for projects that are vital to NASA’s missions. Funded Agreements have been used over the past decade to help NASA transition away from providing launch and resupply services for satellites and the International Space Station to focus on more specific missions, while simultaneously growing the commercial space industry.

The main benefit that Space Act Agreements have over the FAR procedures is that the Space Act Agreements can be written with a flexibility that allows NASA to enter into arrangements with private companies that are not possible under the FAR procedure.

16 *Id.* at B-12.

17 *Id.* at B-15.

18 Office of General Counsel, NPD 1050,11 AUTHORITY TO ENTER INTO SPACE ACT AGREEMENTS, Attachment A, A.3, <https://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPD&c=1050&s=11> (last visited Nov 4, 2017).

19 NAI 1050-1B, at B-16.

IV. Issues with the Current Procurement Processes

The FAR procurement process that NASA uses for most of its acquisitions has certain issues that limit its usefulness in growing the commercial space industry.

The first issue is the regulatory burden that the FAR procurement process places on NASA and its partners. The time and money spent to comply with these regulations saps needed funds from start-ups – something that is contrary to NASA’s stated goal of supporting and growing the U.S. commercial space industry.

The last issue is that the traditional procurement process is more process-oriented than result-oriented. Although achieving the desired result is important in any procurement, because the traditional procurement process has so many procedural steps to follow, it is not as effective as a process that focuses on achieving a desired result. In contrast, Space Act Agreements are result-oriented. Space Act Agreements are result oriented because of the way that Space Act Agreements are entered into, with companies and NASA coming together to achieve a specific goal.

Although using Space Act Agreements solves many of the issues with the FAR process, Space Act Agreements have their own set of issues that must be addressed. In 2014, the Office of Inspector General audited NASA’s use of Space Act Agreements and wrote a report that identified six issues with the current process:²⁰

1. NASA could do more to ensure potentially interested parties are aware of Space Act Agreement opportunities.
2. NASA cannot identify costs associated with or benefits derived from nonreimbursable Space Act Agreements.
3. Interpretation of “mission requirement” for Space Act Agreements varies among NASA centers.
4. NASA cannot readily identify amounts billed or collected from reimbursable Space Act Agreements.
5. NASA provided limited information about agency objectives and safety requirements in commercial crew funded Space Act Agreements.
6. Management approach for administering funded Space Act Agreements is not governed by NASA policy.

20 *NASA’s Use of Space Act Agreements Audit Report*, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION OFFICE OF INSPECTOR GENERAL, IG-14-020 (2014).

V. Lessons Learned

In closing, I would like to draw some broader lessons to be learned from the U.S. history of procurement policies. The most important lesson for growing the domestic space industry is for the government to create a market for industry by becoming the industry's customer. Governmental space agencies must resist the temptation to build, launch, and operate spacecraft entirely in-house. Especially in a nascent space industry, it is critical that the government fund the growth of industry by taking on the role of customer. Beyond that, space agencies should strive to expand the opportunities for companies by creating a broad variety of partnership models (whether funded or not). The partnership may involve any number of scenarios (beyond the typical purchase of goods and services), such as simply licensing of government technology to a private company that can then experiment with commercializing the technology (Bigelow Aerospace's licensing of NASA's expandable habitat technology is an example). By offering a wide variety of private/public partnership models, governments can engage a larger number of private entities, which leads to competition among multiple companies and, in turn, redundancy in the government supply chain.

Separate from creating partnership opportunities for private industry, governments need to create a streamlined and efficient legal regime (whether speaking of the procurement process or the licensing of private space activity) that will allow private companies to operate without the burden of a complex bureaucracy.

As a final point, the successful future of a private space industry can be further assured through educational and scientific grant programs. Such programs prepare the ground for the emergence of companies and service providers that will become the future of the space industry.

References

- Agreement Governing Activities of States on the Moon and Other Celestial Bodies, Dec. 18, 1979, 1363 U.N.T.S. 3.
- Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Space, April 22, 1968, 672 U.N.T.S. 119.
- Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 961 U.N.T.S. 187.
- Convention on Registration of Objects Launched into Outer Space, Jan. 14, 1975, 1023 U.N.T.S. 15.
- Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, Dec. 13, 1963, G.A. Res. 1962, 1280th plen. mtg., U.N. Doc. A/RES/1962.

- European Space Agency, *The History of Ariane* (December 18, 2009). Retrieved from www.esa.int/About_Us/Welcome_to_ESA/ESA_history/the_origins_of_Ariane
- Federal Aviation Administration Office of Commercial Space Transportation. (n.d.) *Origins of the Commercial Space Agency*. Retrieved from www.faa.gov/about/history/milestones/media/Commercial_Space_Industry.pdf.
- Presidential Directive on National Space Policy (1988, February 11). Retrieved from www.hq.nasa.gov/office/pao/History/policy88.html.
- Proposals, amendments and other documents relating to assistance to and return of astronauts and space vehicles, July 14, 1967, U.N. Doc. A/AC.105/37 Annex I at 10. Retrieved from http://www.unoosa.org/pdf/reports/ac105/AC105_037E-lc.pdf.
- The Hague Space Resources Governance Working Group. (n.d.). Retrieved from <http://law.leiden.edu/organisation/publiclaw/iiasl/working-group/the-hague-space-resources-governance-working-group.html>.
- Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 610 U.N.T.S. 205.
- United Nations Office of Outer Space Affairs, *List of Reported Space Objects Discovered by Member States*. (n.d.). Retrieved from www.unoosa.org/oosa/en/treatyimplementation/arra-art-v/unlfd.html.
- United States Space Launch Strategy, NSDD 254 (1986, December 27). Retrieved from <https://fas.org/irp/offdocs/nsdd/nsdd-254.htm>.
- U.S. Commercial Space Launch Competitiveness Act of 2015, Pub. L. No. 114-90114, §108 (2015).