

Testimony of
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Ready for Liftoff: The Importance of Small Businesses in the NASA Supply Chain

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Chairman Chabot, Ranking Member Velázquez and members of the Committee on Small Business, thank you for giving me the opportunity to speak to you on the importance of Small Businesses in the NASA Supply Chain.

Emergent Space Technologies is a 60-person aerospace engineering firm headquartered in Greenbelt, Maryland. With additional locations in Texas, New Mexico, Colorado, California and Virginia, we provide technical services and perform research and development for NASA, NOAA, the Air Force and DARPA. Our offerings include space mission design, development, and integration and test services, as well as flight and ground software technology development.

NASA is known for large, complex programs such as the Space Shuttle, the International Space Station, the Hubble Space Telescope and the Mars Science Laboratory, so one might think that only Large Businesses are capable of supporting its missions. In fact, Small Businesses form a vital part of NASA's contractor workforce. Simply look at today's engineering marvels: Orion Crew Vehicle, Space Launch System, James Webb Space Telescope and Mars 2020 rover, as well as dozens of smaller, lesser known programs. You will see that we are making unique contributions to NASA's most challenging missions.

Small Businesses typically start up around their founders' technical expertise. For Emergent, it was my background in spacecraft Guidance, Navigation and Control, or GN&C. GN&C is critical for any space mission, but especially for those that require, for example: precise pointing; rendezvous, proximity operations and docking; deep space navigation; and entry, descent and landing. NASA and its Large Businesses prime contractors once had a monopoly on GN&C expertise, but many of today's engineers, especially the younger ones, prefer smaller companies. This is also true for software engineering. When I started Emergent in 2001, I had taken a hiatus from the aerospace industry to work in the IT industry. It is there where I saw how modern software was developed. I wanted to combine it with expert GN&C algorithms to help NASA and the Air Force enable autonomous space missions. This takes great software, so you need great software developers, most of which are lured to Silicon Valley, rather than NASA.

Emergent responded to this "scarcity of talent" problem by developing a network that spans both industry and academia and leverages modern social media such as Facebook and LinkedIn. As a result, we have found a niche in the aerospace industry by finding top talent in both GN&C and in software development, often in the same person. These are a rare breed, so you have to be intentional about your search. In this manner, Emergent, and Small Businesses like us, play a vital role in recruiting new and necessary talent to NASA programs.

Small Businesses are also critical sources of innovation for NASA. Over the last 20 years, NASA's R&D budget has been drastically reduced. NASA's budget is largely driven but its missions, and missions largely do not pay for R&D. They pay for low-risk, flight-proven space technology, particularly when it comes to the spacecraft bus, the launch vehicle and the ground system. As a result, NASA has increasingly relied on Small Businesses to come up with innovative solutions to challenging problems through the Small Business Innovation Research (SBIR) / Small Business Technology Transfer (STTR) program. Emergent is an active participant in this program, generating roughly 15% of our revenue. The SBIR-STTR program helps pay for NASA research while also creating good, high-skilled jobs for our economy.

Despite our role in the NASA Supply Chain, Small Businesses face many challenges. Chief among them is the diminishing supply of adequate Small Business Set-Asides, especially for *Emerging* Small Businesses. This is often driven by contract bundling, in which smaller prime contracts are combined with, or bundled into, larger contracts that are acquired under full and open competitions that only Large Businesses can realistically prime. While it might seem more efficient for NASA to do so, it is our experience that economies of scale generally do not apply to government contracting. More importantly, it takes away opportunities to grow from the Small Businesses, especially new ones and those without the "disadvantaged" designation. A good way to look at this issue is through the federal government's use of NAICS codes.

The North American Industry Classification System, or NAICS, is the standard used by federal agencies in classifying businesses for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. economy. The Small Business Administration (SBA) has established Small Business Size Standards matched to the NAICS codes. The size standards are expressed in either millions of dollars or number of employees and specify how large a business can be and still qualify as a Small Business for federal government contracts. Engineering Services are assigned the NAICS code 541330, and the associated SBA standard limits the Small Businesses to \$38.5M in revenue when using the Military and Aerospace exception. Similarly, Custom Computer Programming Services are assigned NAICS code 541511 and this limits the Small Business to \$27.5M in revenue. These codes are roughly equivalent to 150-200 employee companies, or 2-4 times the size of Emergent. The more frequently used standard for small-business set-asides is NAICS code 541712, or Research and Development in the Physical, Engineering, and Life Sciences. As of February 2016, this standard limits Small Business at 1,000 or 1,250 employees, depending on the requirement. This is 8-10 times larger than the standard set by the 541330 and 541511 codes. According to the U.S. Census Bureau's 2013 Statistics of U.S. Businesses, 99% of the United States' 5,775,055 firms have less than 500 employees. This seems inconsistent with the Small Business size standard set by NAICS code 541712, which limits Small Businesses to 1,000 or 1,250 employees!

I recently studied the NASA prime contracts whose primary requirements are science-, engineering- or software-related *and* are strategically aligned with our business capabilities and interests. There are roughly 50 such contracts. Of these, 60% are Small Business Set-Asides. That is the good news. The bad news is that over half are set aside with the 541712 NAICS code. Only 4 are set-aside using 541330 and 3 are set-aside using 541511, and these numbers appear to be dwindling over time. For example, a contract at NASA Kennedy Space Center was recently changed from a small business set-aside under 541330 to full and open competition. This contract has been successfully managed by Small Businesses for more than a decade, but was for some reason changed despite there being more than adequate competition.

The standards set by the NAICS codes and the way they are used by NASA to establish prime contracting opportunities for Small Businesses is important. In federal contracting, size does matter. The bigger you are, the lower your rates, which makes you more competitive in cost-driven competitions. Moreover, the bigger you are, the more personnel you can afford to develop your business opportunity pipeline and

write proposals, which is the lifeblood of our industry. It is extremely difficult for companies of our size to compete with those that are 8-10 times larger, especially when you have so few chances to develop past performance experience.

Emergent and other Small Businesses like us have had to adapt to shrinking opportunities for prime contracting within by focusing more on subcontracting and also by looking to Department of Defense opportunities. For many companies, the latter is just not practical or even feasible. The downside to being just a subcontractor is that we have to work multiple proposals, usually simultaneously, just to increase the statistical likelihood that we maintain, not grow, our revenue. Losing contracts and therefore personnel can put you out of business.

Two changes that NASA could make to help us out are to (1) expand its use of small business set-aside under the 541330 and 541511 NAICS codes, and (2) use the size standard for *Emerging* Small Business, which is 50 percent of the NAICS standard. This would give more opportunities for companies like Emergent to gain experience as a prime contractor and grow our base so that we can eventually pursue the larger set-asides that use the 541712 NAICS code. It comes down to risk versus reward. I can spend a tremendous amount of time and money trying to beat out a 1,000-person company for a prime contract, assuming I can assemble a credible team for the broad scope typically associated with these large contracts, or I can try to get on multiple prime contractor teams as a subcontractor teammate and hope we win one or more of the opportunities being pursued. In the latter case, I have little to no control over the destiny of my company.

Another challenge Small Businesses face in supporting NASA is the long-term stability of the SBIR-STTR program. Many U.S. Small Businesses rely on the SBIR/STTR program for seed funding in developing a unique product. Others, like Emergent, rely on it to perform strategic R&D for NASA, Air Force and DARPA. Ultimately this funding translates into jobs, both now and in the future. As Albert Einstein once said, “if we knew what we were doing, we would not call it research.” Congress can help Small Businesses by continuing its strong support of the SBIR-STTR program, especially when it comes to reauthorization in FY2020. Any delay or disruption in this vital program could result in the loss of thousands of job across the country. Specifically, for NASA, I would like to see the well-known “valley of death” problem addressed. As you may know, a Phase 1 SBIR contract is 6 months in duration and results in a proof-of-concept demonstration. A Phase 2 SBIR contract is 24 months in duration and results in a prototype. While the Phase 1 contract is being executed, however, the performing firm has to write and submit its Phase 2 proposal. The time it takes to evaluate and award the Phase 2 proposal takes months, causing a funding gap which in turn causes the Small Business to redeploy its personnel, or worse, lay them off. The Department of Defense SBIR/STTR program addresses this funding chasm by requiring the Small Business proposers to also bid a 4-month Option Period as part of their Phase 1 proposal. If awarded Phase 2, the Option Period contract provides continuity until the Phase 2 contract can be executed. This would prevent loss of revenue and valuable personnel, which as I have previously stated is not easy to find.

In closing, I would again like to thank Chairman Chabot, Ranking Member Velázquez and members of the Committee for giving me the opportunity to testify on the importance of Small Businesses to NASA’s Supply Chain. Working on NASA projects is a dream come true for me and my employees. It’s why we get up in the morning and go to work: to play a role, even a small one, in advancing our nation’s knowledge of the universe and in exploring our solar system. I have touched on some of the challenges in being a part of the NASA Supply Chain, and there is more that I could discuss that my brief time will not allow. I would therefore be happy to follow-up with you and your staff at your convenience. In the meantime, please continue to give NASA your legislative support.