

**Written Testimony of Stephen Gorevan
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Subcommittee on Agriculture, Energy, and Trade
House Committee on Small Business

“Ready for Liftoff: The Importance of Small Businesses in the NASA Supply Chain”
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Mr. Chairman and Members of the House Subcommittee on Agriculture, Energy, and Trade:

Thank you for the opportunity to share our perspective as a small business contractor to NASA. We believe that NASA and small businesses have a strong and mutually beneficial relationship. Organizations such as ours play an important role in creating enabling technologies for NASA while doing our part to keep American innovation the envy of the world.

I co-founded Honeybee Robotics in 1983, and my company has worked as a small business contractor to NASA for 30 years. Our headquarters is in New York, and we maintain satellite offices in Longmont, Colorado and Pasadena, California. Our specialty is in building robotic and electromechanical systems that operate reliably in the toughest environments, such as planetary exploration and spacecraft systems. Over the years we have worked with the majority of NASA’s research and space flight centers, winning contracts for pioneering early-stage development as well as flight missions that range from planetary exploration to the Orion spacecraft.

We have been fortunate to contribute flight hardware to all the spacecraft that NASA has landed on Mars since 2000, and in the process Honeybee has achieved a succession of firsts on Mars. Our Rock Abrasion Tools on the 2003 Mars Exploration Rovers *Spirit* and *Opportunity* were the first tools to access the inside of rocks on Mars. The Rock Abrasion Tool on *Opportunity* is operating in its thirteenth year, some fifty times its original mission life. Our Phoenix scoop for the 2007 Phoenix Mars Lander was the first tool to sample water on Mars. Our Sample Manipulation System for the 2011 Mars Science Laboratory acts as a robotic laboratory assistant, moving samples to the rover’s instruments so it can detect even traces of molecules associated with life. We designed and built all these systems in our New York headquarters—and as a lifelong New Yorker, I would venture that our facility’s clean room was the most pristine place in all of New York City.

Flagship manned space programs such as the Space Shuttle and Orion are certainly important in providing opportunities for the small business community, but NASA has set up a robust system for technology development outside these high-profile programs. From our perspective, the opportunities for small businesses outside these flagship programs—in areas such as Earth

Science, Planetary Science, and Exploration Research and Development—are more numerous and in some ways more important for the sustained attention necessary for technology development. As a result, I would encourage the members to consider the effects of all NASA’s programs, not only its highest-profile human space missions, in considering how small business can support NASA’s mission.

The Small Business Innovation Research (SBIR) program is an excellent mechanism by which small businesses are encouraged to deliver relevant technologies to NASA in a competitive manner. NASA also supports many other specific funding mechanisms that allow small businesses to grow and commercialize new technologies. The funding in these contracts is almost always spent quickly by the contracting company on skilled domestic labor, materials, and direct expenses. We believe this is an effective use of public resources to spur economic activity and innovation.

Honeybee Robotics is a testament to the mutually beneficial relationship between NASA and the small business community. But, there are areas for improvement that will serve three purposes: to deliver better technologies to NASA; to strengthen the growth and commercial prospects for innovative small businesses; and to maintain the technology and economic leadership of the United States into the next generation and beyond.

In preparing this testimony, Honeybee consulted several of our friends and business associates in the small business community. The statements to follow affect many of us, and reflect a shared perspective of ways that NASA could enhance the ways it engages small businesses. The goal is to level the playing field such that small businesses can compete with larger companies on technology and cost-effectiveness so that NASA can be as successful in its mission as possible.

First, the ability for small businesses to develop and deliver relevant, cost-effective technology is highly dependent on long-term mission clarity. As resource-constrained organizations, we are sensitive to the prospect of developing technologies for missions that are cancelled in the next political cycle. The preparation and execution of mission requirements can take a decade or longer. It is exceptionally difficult to develop a technology to flight readiness.

Unfortunately, when a small business does manage to get its technology selected for a flight program, the uncertainty, delays, and outright cancellation of funding remains a very real risk. Sometimes these delays are a result of Congressional budgeting, such as continuing resolutions that delay funding. Sometimes funding is at risk due to reductions in directed expenditures, the effects of which can flow through prime contractors and lead to small businesses losing subcontracts. And sometimes interruptions are a result of inconsistency in program development roadmaps, which can lead to long breaks between program stages that cause small businesses to lose talent and momentum while they wait months or years for the next phase to take effect. The net effect of uncertainty is that too often the small business contractors for NASA bear the risk and pay the price when Congress or the Executive branch changes the priorities it directs NASA to focus on.

Second, I want to highlight the headwind small businesses face when they seek to develop flight technologies or commercialize systems through contracts that require private matching

investment. I would recommend such investment be eliminated for small businesses due to the chilling effect it places on technology development and the inherent advantages more highly capitalized businesses have in this situation.

As an example, NASA's 2016 Next Space Technologies for Exploration Partnerships (NextSTEP) is a public-private partnership model that seeks commercial development of space exploration capabilities for human missions beyond low-Earth orbit. This Broad Agency Announcement solicitation requires a minimum cost sharing threshold, i.e. private company investment, for businesses to be eligible. The details of this requirement pose problems. The solicitations often restrict the eligible in-kind investment to resources spent within the last year, so investments from years prior are not considered. They also require that a portion of the actual contract contain a matching investment (such as 50% of the investment must be made during execution of the contract). As a result, NASA is limited in the size of the award it can grant to a small business with relatively little capital to invest, independent of the value that NASA would get from the technology.

Some form of private investment requirements can make sense for a device or technology that can be utilized in other industries, where a small business can make a ROI calculation. But in practical terms, much of the technology for space exploration does not have immediate commercial application. The effect of the cost-sharing model is to box out small businesses in favor of more highly capitalized large businesses that have more significant R&D budgets, even if those businesses do not make as efficient use of NASA funds for technology development.

I would suggest that Congress consider the benefits of making small businesses exempt from the "in-kind" contribution requirement that now discourages and limits small, innovative companies from participating in projects that NASA has identified as important to its mission. To further enhance the extent that small businesses can participate, I would also suggest that the amount of money a large company contracts to a small business be directly deducted from the large company's contribution requirement. The effect of this change will be that large companies gain an incentive to work with small, innovative companies. Another option would be to include any money NASA has invested in SBIRs as deductible from a small business's private contributions, which is consistent with the spirit of the SBIR program and NASA's charter to encourage industry and innovation.

Finally, with regard to the SBIR program, I would make two recommendations to strengthen this program that has proven critical to both small businesses and NASA alike. Neither requires new appropriations for Federal research and development budgets.

First, the SBIR program is budget-neutral, but a critical source of funding for small business innovation. I recommend that Congress increase the share of funding that Federal agencies allocate to SBIR from the current sub-3% up to 5%, with increases enacted gradually over the next decade. The most effective use of these funds would be to direct most of the increase to maturing technology after the initial Phase II program. Small businesses such as Honeybee face what's known as a "valley of death" between Phase II, when we have a functional prototype, and commercialization or flight readiness. It is rare for us to find an immediate need at NASA where our SBIR-funded technology satisfies a specific problem. Instead, often the technology waits for

a mission, or requires more investment to prove viability in a commercial or NASA application. Enabling a transition to greater technology development after Phase II, rather than straight to commercialization, would help small businesses contribute more to flagship projects.

Second, the SBIR program's success depends on the ability to match NASA's needs with the capabilities of small businesses across the country. Unfortunately, it can be challenging for small businesses to understand the details of a technology request that NASA issues based solely on the written solicitation. NASA currently institutes a communication ban between companies and the Contracting Officer's Technical Representative once it issues the solicitation of SBIR and STTR topics. Our understanding is that the intent is to prevent one organization from gaining an unfair advantage with information not available to the larger community.

On the other hand, organizations such as the Department of Defense have found a way to share information with a pre-release of SBIR topics. During the pre-release, small businesses have one month to ask questions about the technology and how it fits into larger programs before the communication blackout takes effect. This enables the small business to better match its technology with the goals of the organization and present higher-quality development plans. We recommend NASA follow suit by opening communications on SBIR topics for a reasonable period before instituting a ban on contact outside the formal proposal response channels.

In light of my suggestions above, I want to emphasize that for small businesses, NASA remains one of the Federal government's most supportive organizations. I believe NASA understands the ways in which the small business community can help it succeed with its mission, and it takes seriously its mandate to provide opportunities for small businesses such as Honeybee Robotics to thrive. We are excited for what the future holds and, along with our small business colleagues, look forward to the exciting and important missions ahead.