



Small Business Innovation Research for Phase I, Phase II, and Post-Phase II Opportunity Assessments for Glenn Research Center for 2015

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October 2016

Level of Review: This material has been technically reviewed by technical management.

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Abstract

This report outlines the 2015 Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Phase I, Phase II, and Post-Phase II opportunity contract award results associated with NASA's Aeronautics Research Mission Directorate (ARMD), Human Exploration and Operations Mission Directorate (HEOMD), Science Mission Directorate (SMD), and Space Technology Mission Directorate (STMD) for NASA Glenn Research Center. The report also highlights the number of Phase I, Phase II, and Post-Phase II contracts awarded by mission directorate. The 2015 Phase I contract awards to companies in Ohio and their corresponding technologies are also discussed.

Introduction

NASA's Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) program has instituted three matching fund initiatives—the Phase II Enhancement (Phase II–E), Phase II eXpanded (Phase II–X), and the recently implemented Commercialization Readiness Program (CRP) initiatives as shown in Figure 1. The post-Phase II portion is essential in bridging the gap between stages 2 and 4 and in providing incentives to program managers to adopt SBIR technology. Because these initiatives provide matching funds, most program managers are eager to partner with small businesses. Initiatives typically last between 6 and 36 months and create more opportunities to mature technologies and therefore reduce the associated risks. In turn, this increases the likelihood of incorporating technologies into mission directorate or other Government or commercial programs. These options shown in Figure 2 are summarized as follows (Ref. 1).

- **Phase II–E:** This option advances Phase II innovations by extending existing Phase II contracts. Under Phase II–E extensions, NASA SBIR will match investments in technology development that small businesses secure from eligible non-NASA SBIR third parties on a dollar-for-dollar basis. The minimum matching investment is \$25,000 and the maximum is \$150,000, extending projects by 6 to 12 months.
- **Phase II–X:** This option establishes a strong and direct partnership between the SBIR program and NASA programs and projects undertaking new technology development. Under Phase II–X expansions, NASA SBIR will double the funding that small businesses secure from non-SBIR NASA programs or projects. The minimum investment that NASA SBIR will double is \$75,000 and the maximum is \$250,000. Expanded projects last between 12 and 24 months.
- **CRP:** This program accelerates transition of SBIR-developed technologies into NASA applications. Projects that request SBIR funding under the CRP option must (1) involve a technology that entered into either a Phase I or Phase II contract and (2) identify how more SBIR funding would accelerate development in response to NASA program or project needs. The minimum matching investment is \$100,000 and the maximum is \$1.5 million, extending projects by 24 to 36 months.

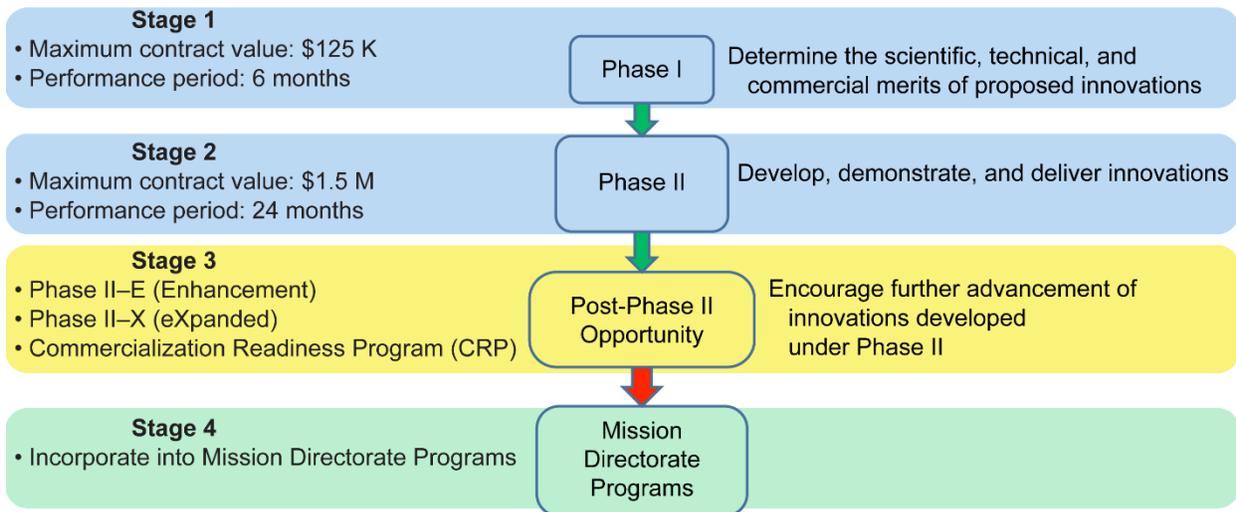


Figure 1.—Small Business Innovation Research development stages.

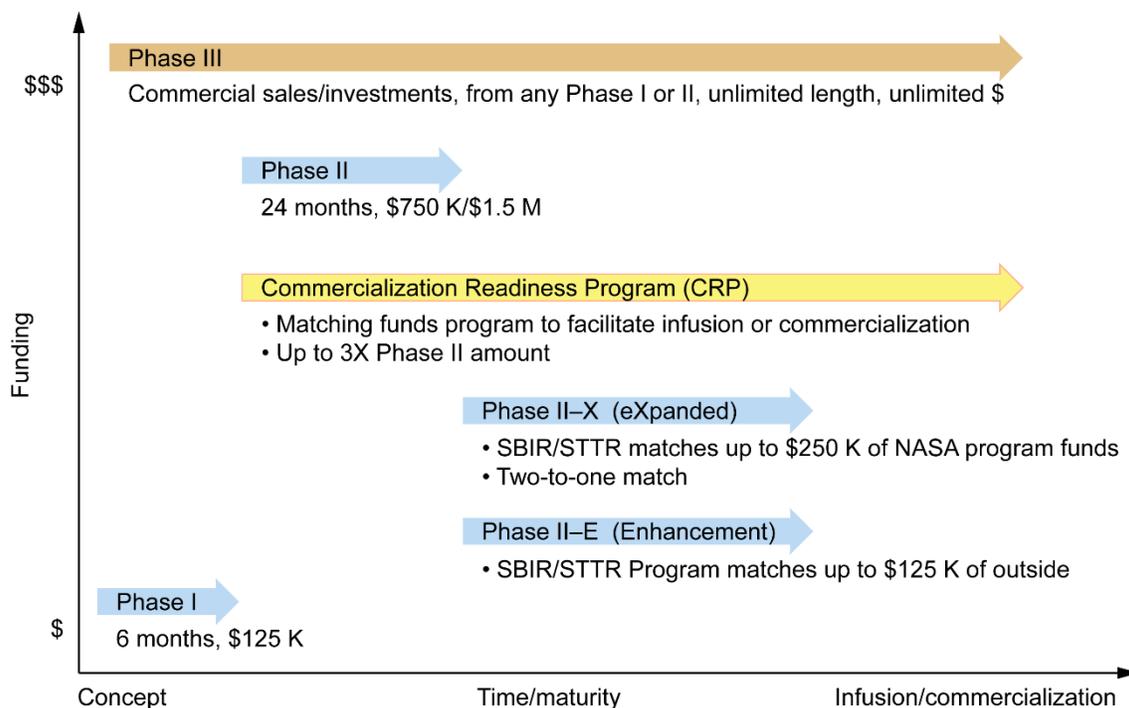


Figure 2.—Small Business Innovation Research/Small Business Technology Transfer integrated portfolio.

Quantitative Evaluation of Post-Phase II Contract Awards

During 2015, the SBIR Program Solicitation topics and subtopics are developed by the NASA mission directorates and centers in coordination with the NASA SBIR/STTR programs. There are four mission directorates: Aeronautics Research, Human Exploration and Operations, and Science Space Technology, which are summarized as follows (Ref. 2):

NASA's Aeronautics Research Mission Directorate (ARMD) expands the boundaries of aeronautical knowledge for the benefit of the Nation and the broad aeronautics community, which includes the Agency's partners in academia, industry, and other Government agencies. ARMD is conducting high-quality, cutting-edge research at the fundamental level and integrated systems level to support current and emerging applications as well as revolutionary concepts and technologies that could one day enable radical change to both the airspace system and the aircraft that fly within it, facilitating a safer, more environmentally friendly, and more efficient air transportation system.

The Human Exploration and Operations Mission Directorate (HEOMD) is chartered with the development of the core transportation elements, key systems, and enabling technologies required for beyond low Earth orbit (LEO) human exploration that will provide the foundation for the next half-century of American leadership in space exploration. This new deep space exploration era starts with increasingly challenging test missions in cis-lunar space, including flights to the Lagrange points, followed by human missions to near-Earth asteroids (NEAs), Earth's Moon, the moons of Mars, and Mars itself as part of a sustained journey of exploration in the inner solar system.

In science, NASA leads the Nation on a great journey of discovery, seeking new knowledge and understanding of our planet Earth, our Sun and solar system, and the universe out to its farthest reaches and back to its earliest moments of existence. NASA's Science Mission Directorate (SMD) and the Nation's science community use space observatories to conduct scientific studies of the Earth from space, to visit and return samples from other bodies in the solar system, and to peer out into our Galaxy and beyond.

The Space Technology Mission Directorate (STMD) enables a new class of missions by drawing on talent from the NASA workforce, academia, small businesses, and the broader space enterprise to deliver innovative solutions that dramatically improve technological capabilities for NASA and the Nation. The rapid development and infusion of new technologies and capabilities are critical components to advancing the Nation's future in space. These activities fuel an emerging aerospace economy and build upon the space technology needs of other Government agencies, as well as the overall aerospace enterprise. NASA supports these objectives and contributes to the demands of larger national technology goals by investing in space technology.

In 2015, Glenn Research Center received a total of 43 Phase I contracts as shown in Figure 3. Eight awards were under the ARMD, 18 under HEOMD, 15 under SMD, and 2 under STMD (Ref. 3). Figure 3 also highlights the number of awards by mission directorate and Table I lists the corresponding subtopics.

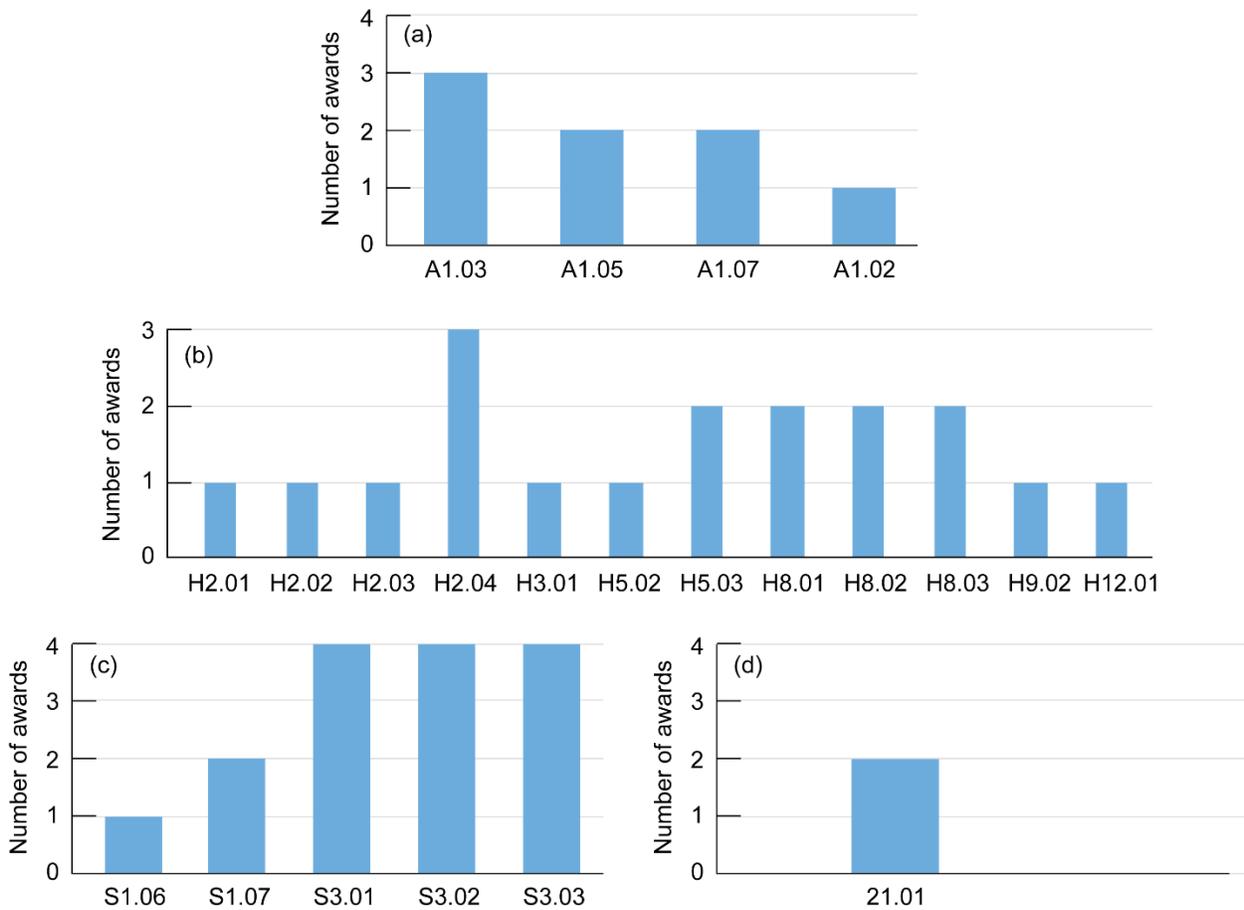


Figure 3.—2015 Phase I contract awards associated with (a) Aeronautics Research Mission Directorate. (b) Human Exploration and Operations Mission Directorate. (c) Science Mission Directorate. (d) Space Technology Mission Directorate.

TABLE I.—SUBTOPIC TITLES BY MISSION DIRECTORATE^a

Subtopic	Mission Directorate
Aeronautics Research Mission Directorate (ARMD)	
A1.03	Low Emissions Propulsion and Power
A1.05	Physics-Based Conceptual Aeronautics Design Tools
A1.07	Efficient Propulsion and Power
A2.02	Unmanned Aircraft Systems Technology
Human Explorations and Operations Mission Directorate (HEOMD)	
H2.01	In-Space Chemical Propulsion
H2.02	Nuclear Thermal Propulsion
H2.03	High Power Electric Propulsion
H2.04	Cryogenic Fluid Management for In-Space Transportation
H3.01	Environmental Monitoring for Spacecraft Cabins
H5.02	Extreme Temperature Structures
H5.03	Multifunctional Materials and Structures
H8.01	Space Nuclear Power Systems
H8.02	Solid Oxide Fuel Cells and Electrolyzers
H8.03	Advanced Photovoltaic Systems
H9.02	Intelligent Communication Systems
H12.01	Measurements of Net Ocular Blood Flow
Science Mission Directorate (SMD)	
S1.06	In-Situ Sensors and Sensor Systems for Lunar and Planetary Science
S1.07	Airborne Measurement Systems
S3.01	Power Generation and Conversion
S3.02	Propulsion Systems for Robotic Science Missions
S3.03	Power Electronics and Management, and Energy Storage
Space Technology Mission Directorate (STMD)	
Z1.01	Modeling and Measurements for Propulsion and Power

^aDirectorate names were added after 2012.

Figure 4 shows the number of Phase I and Phase II contracts awarded by mission directorate for solicitation year 2014. ARMD awarded 15 contracts for Phase I and 7 for Phase II. HEOMD awarded for 22 contracts for Phase I and 11 for Phase II. SMD awarded 22 contracts for Phase I and 7 for Phase II. STMD awarded 15 contracts for Phase I and 5 for Phase II.

Glenn received a total of 11 Phase II–E contract awards for 2011. Two contracts were awarded to aeronautics research, five to exploration systems, three to science, and one to space operations as shown in Figure 5.

Regarding the geographical distribution of Phase 1 of 2015, 13 Ohio-based companies received 13 awards out of a total of 382 contracts awarded, or 3.4 percent of all awards. Funding decisions are often based on a number of variables such as the scientific and technical merit, availability of funds, relevance of the proposed project to mission directorate priorities, and potential commercialization. Figure 6 shows a number of awards associated with the cities in Ohio. The technologies provided by those companies are listed in Table II.

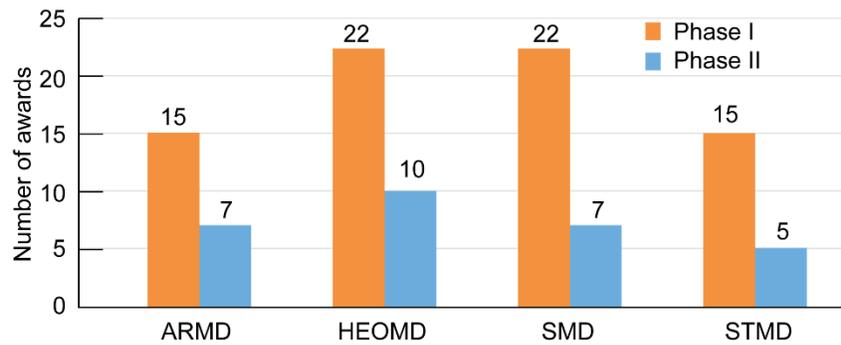


Figure 4.—Phase I and II contract awards for 2014.

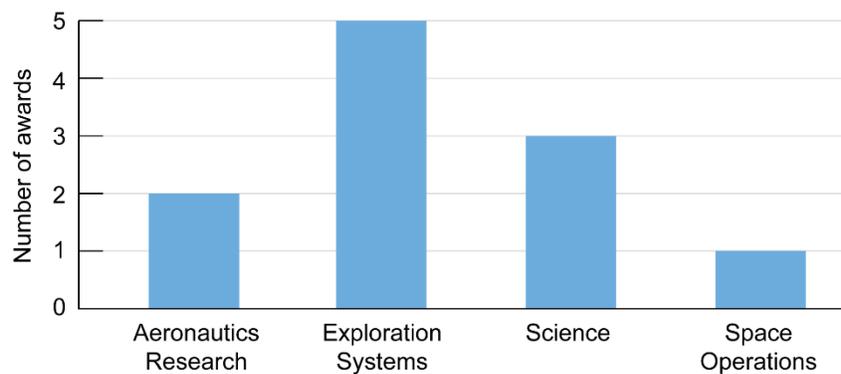


Figure 5.—Post-Phase II contract awards by directorate for 2011.

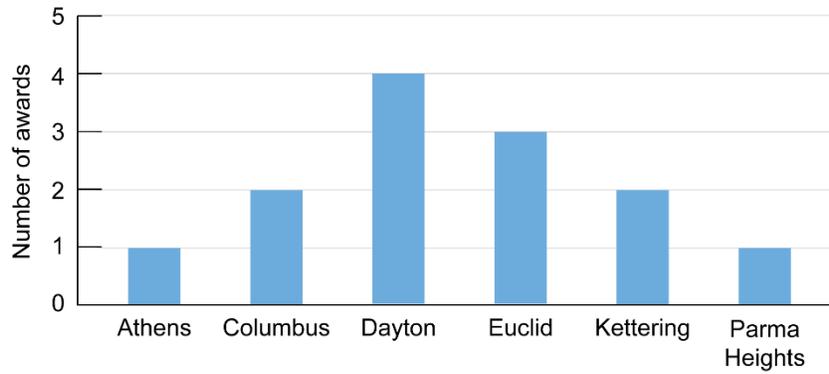


Figure 6.—Solicitation year 2015 Phase I contract awards by Ohio cities.

TABLE II.—CONTRACT AWARDS BY CITY IN OHIO AND SOLICITATION TOPIC OR SUBTOPIC

Athens	Power Generation and Conversion
Columbus	Low Emissions Propulsion and Power International Space Station (ISS) Utilization
Dayton	Structural Efficiency-Hybrid Nanocomposites Aerodynamic Efficiency Drag Reduction Technology Ground Testing and Measurement Technologies Recycling/Reclamation of 3-D Printer Plastic Including Transformation of Launch Package Solutions into 3-D Printed Parts
Euclid	Extreme Temperature Structures Power Electronics and Management, and Energy Storage Affordable Nano/Micro Launch Propulsion Stages
Kettering	Experimental and Analytical Technologies for Additive Manufacturing
Parma Heights	Physics-Based Conceptual Aeronautics Design Tools

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