



Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Program Update

Jason L. Kessler, Program Executive | May 16, 2023

NASA SBIR/STTR Program

sbir.nasa.gov

An orange circular icon containing a white outline of a document with a pencil, representing an agenda or list.

AGENDA

- Program Overview
- FY22: Awards and Impact
- FY23: Where We Are So Far
- Success Stories



Program Overview

What is the SBIR/STTR Program?



- Highly competitive program that encourages domestic small businesses to engage in Federal Research/Research and Development (R/R&D) with the potential for commercialization
- **Small Business Innovation Research (SBIR)**
 - Has been around since 1980s
 - NASA is 1 of 11 participating agencies
 - Must be a Small Business Concern (SBC) with 500 employees or less and legally established in the U.S.
- **Small Business Technology Transfer (STTR)**
 - Established in the 1990s; created to facilitate cooperative R&D between small businesses and U.S. research institutions (RIs)
 - NASA is 1 of 6 participating agencies
 - The partnering research institution must be in the U.S. and be a nonprofit college or university, domestic nonprofit research organization, or a federally funded R&D Center (FFRDC)

Approximately \$3 billion invested per year by participating agencies

SBIR + STTR Programs



Department of Defense (DOD)



Department of Health and Human Services (HHS)



Department of Energy (DOE)



National Aeronautics and Space Administration (NASA)



National Science Foundation (NSF)



Department of Agriculture (USDA)

SBIR Program Only



Department of Education (ED)



Department of Transportation (DOT)



Environmental Protection Agency (EPA)



Department of Homeland Security (DHS)



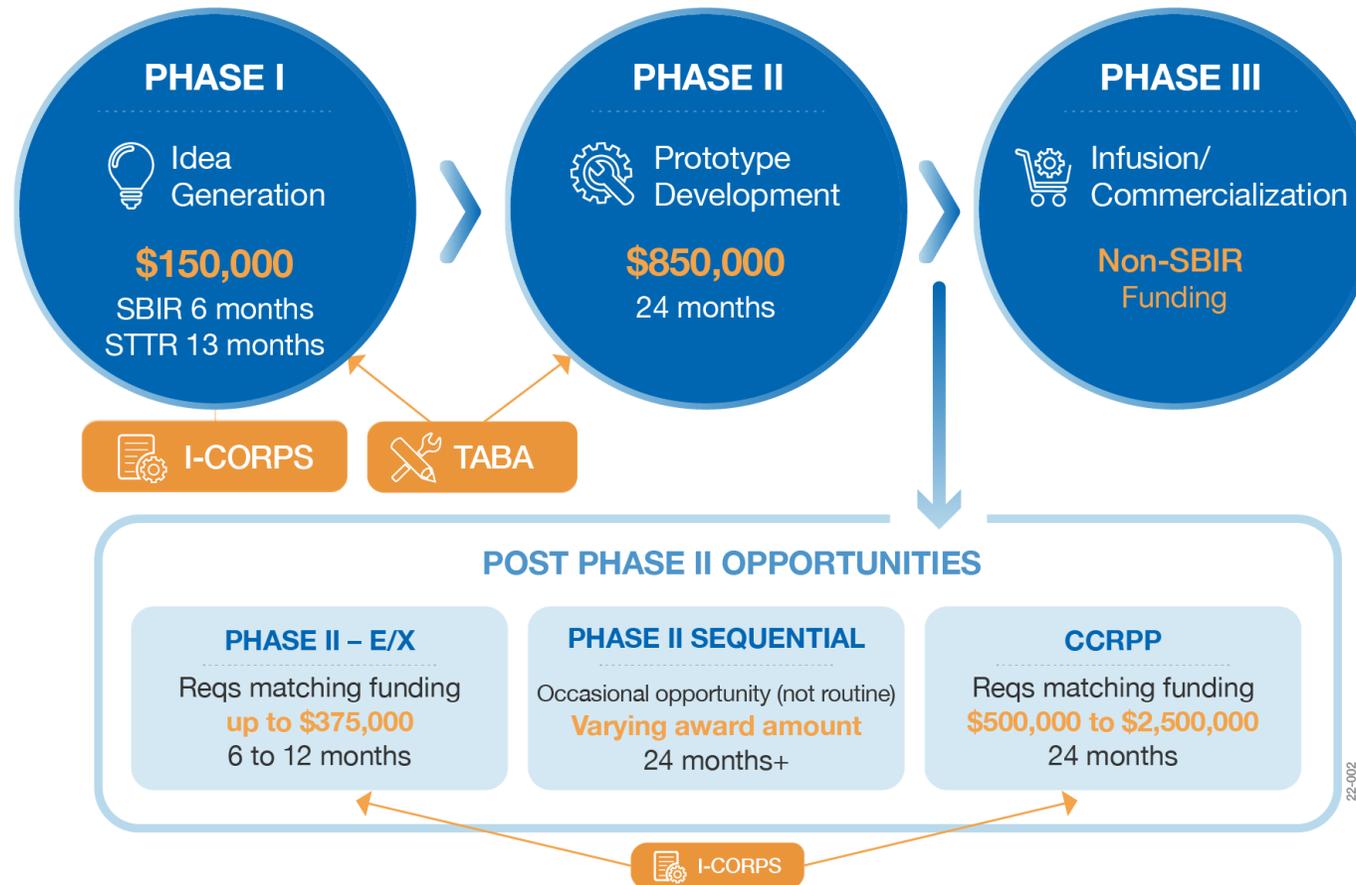
Department of Commerce (DOC)

Program Phases



Up to \$1 million for Phase I and II and nearly \$3 million or more for Post Phase II opportunities!

NASA SBIR/STTR PHASES



Updated Program Strategy



MISSION

Empowering all small business communities to imagine, build, and utilize revolutionary technologies to drive NASA and the national economy to reach new heights



VISION

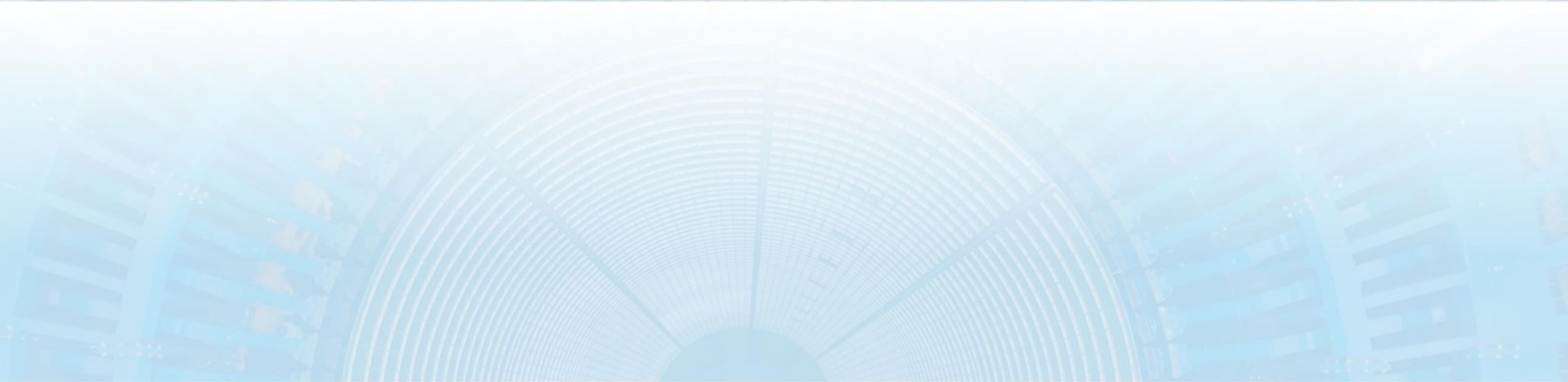
A world where any entrepreneur can benefit humanity

Goal 1		Positive Return on Investment	Demonstrable positive ROI for all SBIR/STTR investment vehicles supporting scientific & technological innovation.
Goal 2		Equitable Access & Diverse Representation	Equitable access for all relevant innovators through increasing diverse representation to create richer SBIR & STTR portfolios.
Goal 3		Exemplary Service for Awardees	An exemplary service providing access to the critical non-monetary support that every awardee needs to successfully progress/transition technology into use.

Program Reauthorization



- The SBIR and STTR programs were established in 1982 and 1992, respectively.
- Congress has consistently passed Reauthorization extensions, most recently in late September 2022, as the programs were set to expire on September 30, 2022.
- The SBIR and STTR Extension Act authorized the programs through September 30, 2025.
 - The bill requires agencies with an SBIR or STTR program to assess the security risks presented by applicants with financial ties or obligations to certain foreign countries. The programs may not make awards to businesses with certain connections to foreign entities.
 - Specifically, assessing the **cybersecurity practices, patent analysis, employee analysis, and foreign ownership** of a small business concern seeking an award.
 - Not later than 270 days after the date of enactment of this Act (27 June 2023), each Federal agency with an SBIR or STTR program must take a risk based approach as appropriate in implementing a due diligence program



FY22: Awards and Impact

FY22 Program Awards

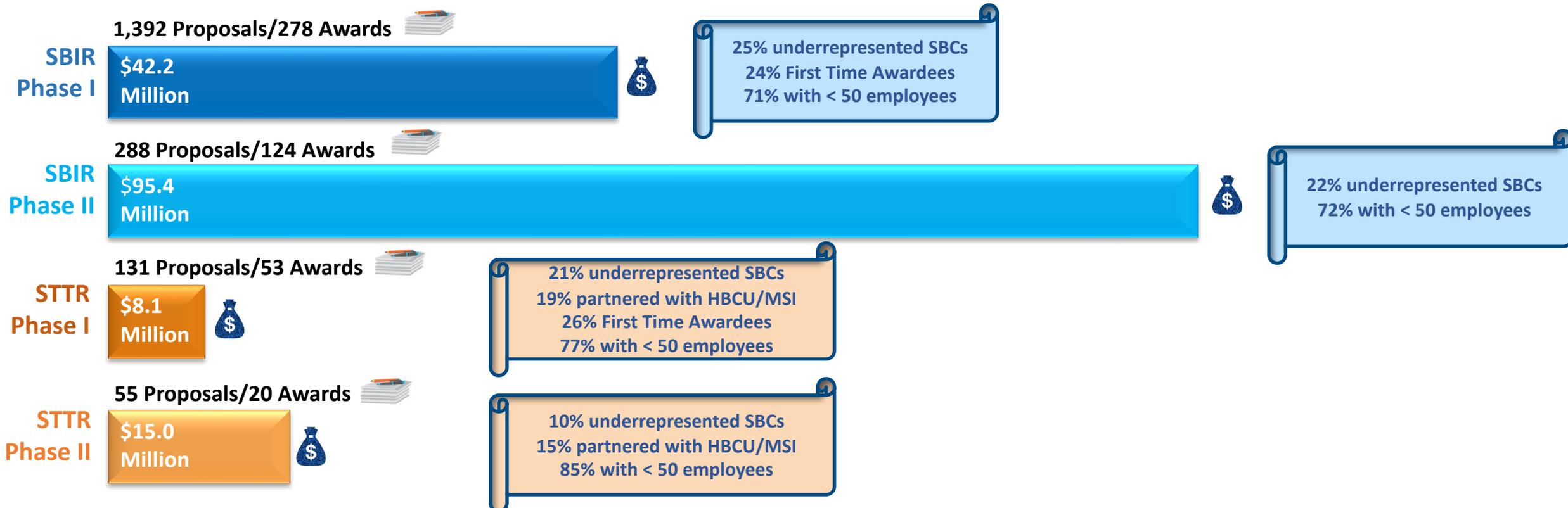


Program	# of Awards	\$ Value of Awards	Investor Funds
SBIR Phase I	278	\$42,160,686	\$0
SBIR Phase II	124	\$95,443,491	\$0
STTR Phase I	53	\$8,101,656	\$0
STTR Phase II	20	\$15,043,314	\$0
SBIR Phase II-E	44	\$11,146,181	\$11,831,885
STTR Phase II-E	7	\$1,839,438	\$1,995,330
CCRPP	6	\$8,025,433	\$8,879,301
Sequentials	7	\$29,339,400	\$0
SBIR Phase III	66	\$0	\$22,319,624
STTR Phase III	8	\$0	\$2,720,460
Totals		\$211,099,599	\$47,746,600

2022 Phase I & II SBIR/STTR Awards



- Separated the SBIR and STTR solicitations to make the difference between programs and different proposal requirements clearer
- Separated Phase I and Phase II solicitations to allow for adjustment of requirements before Phase II, if needed
- Increased Phase I and Phase II funding



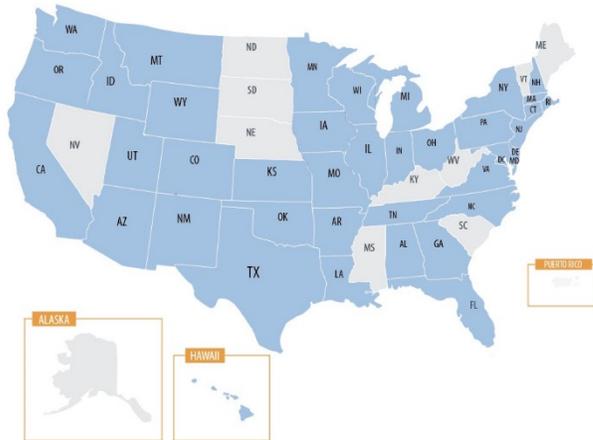
Spotlight: 2022 Phase I Awardees



NASA Provides \$50 Million Boost to U.S. Small Businesses



257 small businesses and 41 research institutions across 39 states and Washington, D.C. were selected to receive funding that supports technology development for NASA missions



80% of awarded small businesses have less than 50 employees



53 STTR awards helping to advance ideas from 41 research institution labs to market



Diversity Drives Innovation

“When NASA opens doors to talent previously left untapped, the universe is the limit.”
– NASA Administrator Bill Nelson



24% of the research institutions partnering with small businesses for STTR are classified as Minority Serving Institutions



25% of the awarded small businesses are from underrepresented groups, including minority- and women-owned businesses

78

companies selected for their first SBIR/STTR award

179

returning small business awardees



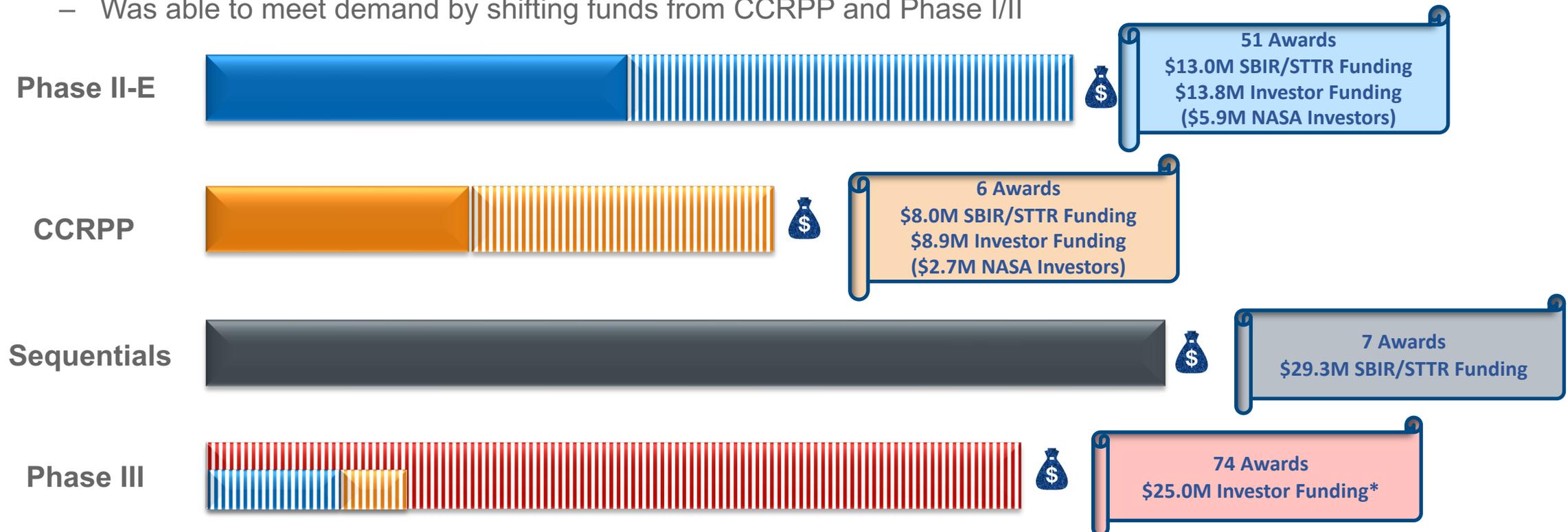
333 proposals selected for Phase I funding

280 SBIR & 53 STTR proposals selected

2022 Post Phase II Highlights



- Developed a **Sequential Technical Need Area (TNA)** in partnership with SMD focused on the Administrator's priority around climate change
- **Interest in Phase II-E** for both SBIR and STTR exceeded planned budget
 - Demonstrates strong interest in furthering the development of SBIR/STTR-Funded technologies
 - Was able to meet demand by shifting funds from CCRPP and Phase I/II



**II-E Match = 21 awards/\$3.7M and CCRPP Match = 4 awards/\$1.9M*



FY23: Where We Are So Far



FY23 Program Award Status

- 2022 M-STTR Awards | 10/25/22
 - Highlights: Total of nearly \$600,000 to 10 MSIs
- 2022 NASA SBIR Ignite | 11/16/22
 - Highlights: Total of nearly \$2 million to 12 small businesses
- 2022 SBIR Phase II | 4/11/23
 - Highlights: Total of about \$98 million to 112 proposals/92 unique small businesses
- 2023 SBIR/STTR Phase I | Scheduled for June 2023
- 2023 Sequentials | Scheduled for July 2023
- *(FY24) 2022 STTR Phase II | Scheduled for November 2023*

“Firsts” for the Program in FY23

- Made first NASA SBIR Ignite awards; the 2023 NASA SBIR Ignite solicitation will be open August – September 2023, with awards being made early in FY24*
- Participated in inaugural MPLAN awards (the evolution of M-STTR awards offered in FY21 and FY22)*

**See following slides for more information on both*



Highlights

- Launched in FY22, first awards made in FY23
- Encourages participation from **product-driven companies** not looking at NASA as their primary customer
- Places a heavy emphasis on **commercial viability** during review and scoring
- **Streamlines the application process** by shortening the solicitation and the proposal requirements
- **Features the same three phases and funding levels** as the main NASA SBIR/STTR solicitations

Key Differences from our Mainline Solicitation

- **Commercialization:** Seeks tech that will stimulate the market and for which NASA is not the primary customer.
- **Engagement:** Includes direct engagement with a panel of experts for down-selected companies.
- **Topics:** Features a select few topics relevant to emerging commercial markets in aerospace.
- **Less Prescriptive Solicitation:** Encourages companies to maintain their go-to-market strategies
- **Shorter Proposal:** Requires a short proposal and a slide deck in response to the solicitation
- **Accelerated Award Schedule:** Phase II proposal due earlier in the Phase I period, allowing Phase II awards to be made faster



- The **Minority University Research and Education Project Partnership Annual Notification (MPLAN)** connects is designed to connect Minority Serving Institutions (MSIs) with NASA Mission Directorates and promotes research collaboration.
 - This is the first year MPLAN awards are being offered.
- MPLAN features topic areas from three NASA Mission Directorates; STMD's MPLAN opportunity is the evolution of previous years' M-STTR planning grants (offered in FY21 and FY22).
- MPLAN awards **provide up to \$50,000** in funding (to be shared with a small business) and NASA guidance to MSIs in preparation for larger funding opportunities like the NASA STTR solicitation.
- The 2023 NASA MPLAN solicitation is open now through May 30, 2023.

Due Diligence Plan Overview



Collect new SBA approved disclosures:

- Completed as part of their proposal submission
- May request additional information within forms that facilitate assessment process

In parallel to technical review, conduct Risk Assessment based on risk threshold:



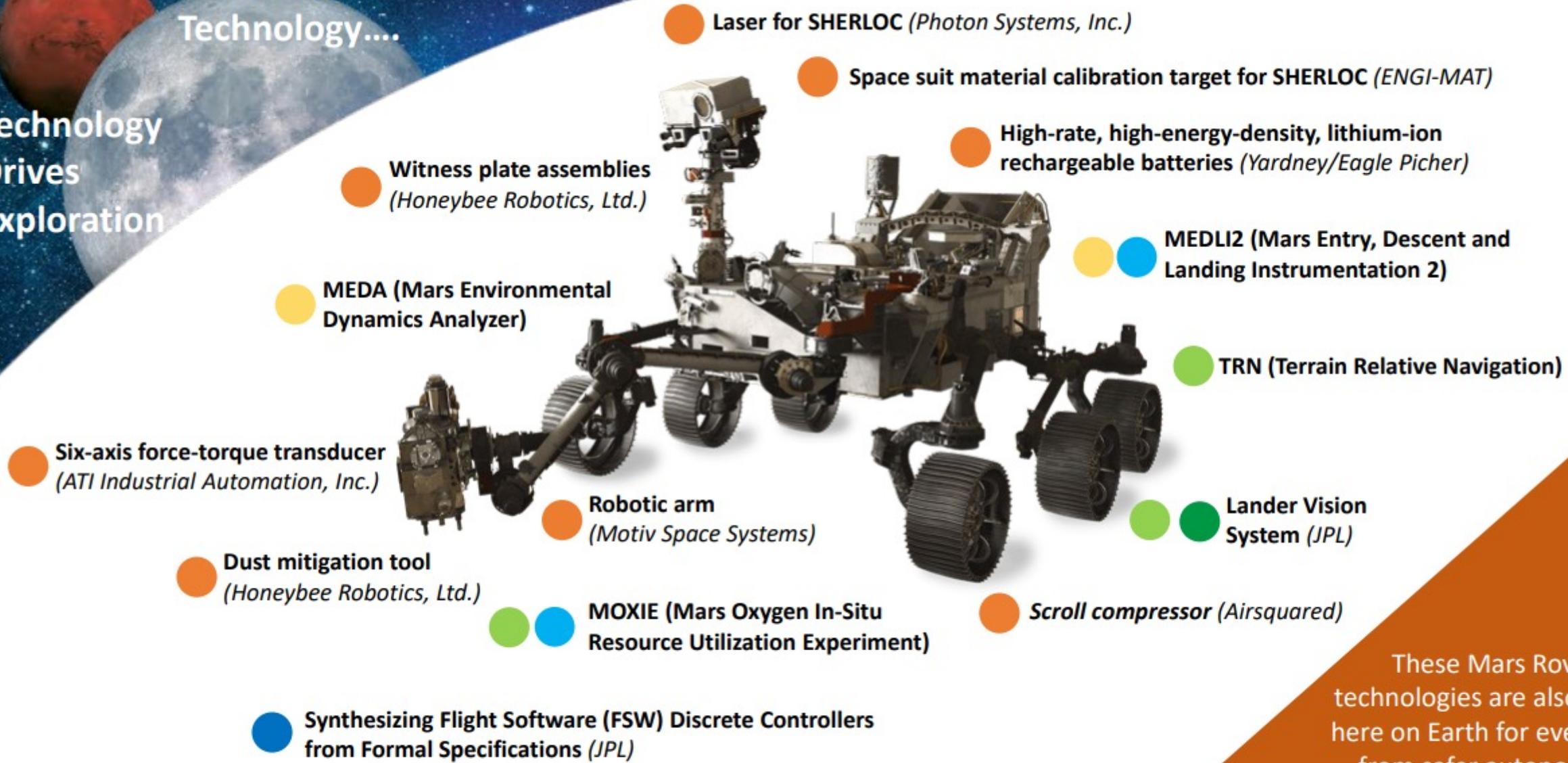
- Review of disclosures
- Utilize customized tool(s) to search commercially available sources of information for:
 - Ownership or Investment
 - Personnel
 - Cybersecurity concerns
 - Patent analysis
 - Are the technologies critical to national security?



Success Stories: Infusion & Commercialization

Innovation Drives Technology....

Technology Drives Exploration



● Laser for SHERLOC (*Photon Systems, Inc.*)

● Space suit material calibration target for SHERLOC (*ENGI-MAT*)

● High-rate, high-energy-density, lithium-ion rechargeable batteries (*Yardney/Eagle Picher*)

● Witness plate assemblies (*Honeybee Robotics, Ltd.*)

● MEDLI2 (Mars Entry, Descent and Landing Instrumentation 2)

● MEDA (Mars Environmental Dynamics Analyzer)

● TRN (Terrain Relative Navigation)

● Six-axis force-torque transducer (*ATI Industrial Automation, Inc.*)

● Robotic arm (*Motiv Space Systems*)

● Lander Vision System (*JPL*)

● Dust mitigation tool (*Honeybee Robotics, Ltd.*)

● MOXIE (Mars Oxygen In-Situ Resource Utilization Experiment)

● Scroll compressor (*Airsquared*)

● Synthesizing Flight Software (FSW) Discrete Controllers from Formal Specifications (*JPL*)

- CIF
- STRG
- SBIR/STTR
- GCD
- TDM
- Flight Opportunities

These Mars Rover technologies are also useful here on Earth for everything from safer autonomous vehicles to helper robots in hospitals. To learn more, visit spinoff.nasa.gov.

National Aeronautics and Space Administration



CAPSTONE

Cislunar Autonomous Positioning System Technology Operations and Navigation Experiment

CAPSTONE is charting a new path for NASA's Moon-orbiting space station Gateway. The pathfinding mission will test an orbit around the Moon that has never been flown before. CAPSTONE will also demonstrate a novel spacecraft-to-spacecraft navigation and communications system with another spacecraft in orbit around the Moon, NASA's Lunar Reconnaissance Orbiter.

The mission represents an innovative collaboration between NASA's Space Technology Mission Directorate and industry to provide rapid results and feedback to inform future exploration and science missions.

CAPSTONE is commercially owned and operated by Advanced Space in Westminster, Colorado. Other commercial partners include:

- Terran Orbital Corporation in Irvine, California
- Rocket Lab in Long Beach, California
- Stellar Exploration, Inc. in San Luis Obispo, California

www.nasa.gov/spacetech



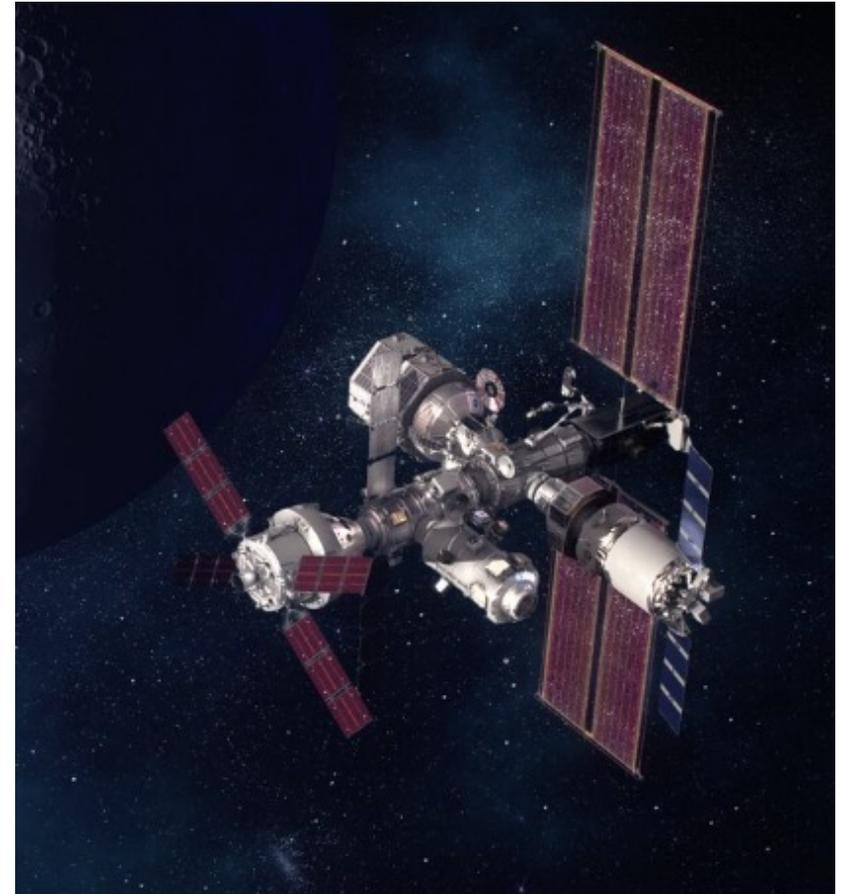
SBIR Sequential Phase II: Technology for Gateway



Robust System Health Management for Deep Space Missions - Qualtech Systems, Inc. (QSI)

The firm has been awarded a “follow-on” Phase III contract for \$350,000 to implement its technology in support of NASA Gateway. The Phase III project will complete work to infuse the fault management technology developed under this Lunar Sequential SBIR project into the Gateway Vehicle System Manager (VSM) flight software that will be launched into Lunar orbit in 2025. The project will collaborate with the Gateway Program to assist with flight software integration, test, verification and certification of the product as a part of the on-board safety-critical software. The project will provide rapid response issue resolution for any problems that may arise during test and integration, provide expertise in best use of the technology, and develop any new or improved features required by NASA that are identified during Gateway autonomous fault management software development.

It was determined by Gateway to fund this Phase III before the Sequential effort was complete such that this would be an immediate follow-on to the Sequential effort to support Gateway, a critical asset in NASA’s Artemis Program. This will also serve to certify and demonstrate this capability which may then have a wide range of applications to other NASA missions and assets.



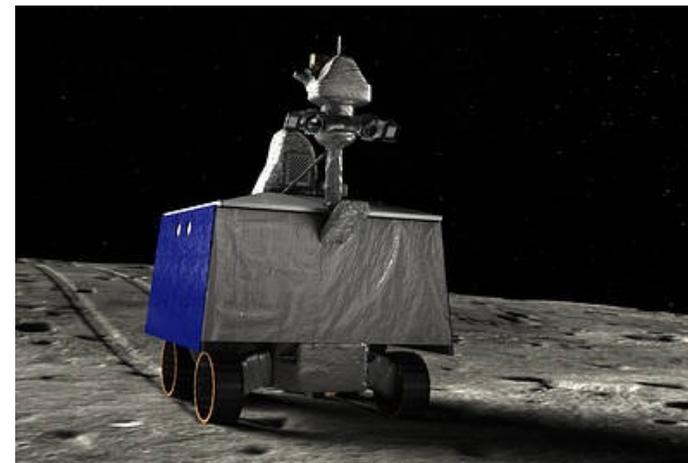
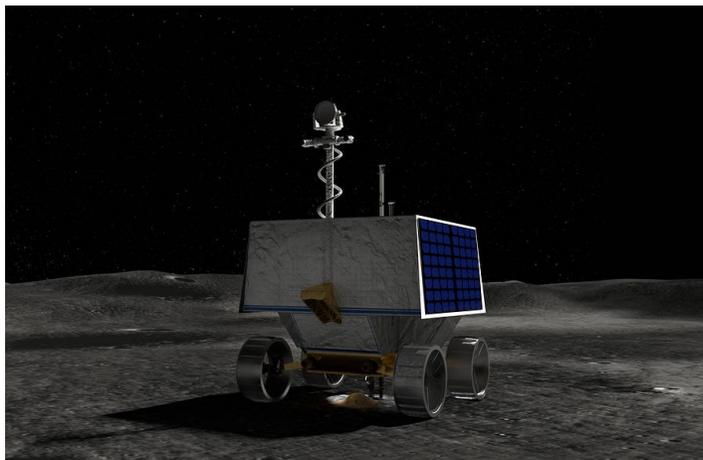
SBIR Sequential Phase II: Technology for VIPER



Rover Slip Estimation and Traction Control for Optimal Mobility in Lunar Environments - Protoinnovations, LLC

The firm has been awarded a “follow-on” Phase III contract for \$775,000 to implement its technology on the NASA VIPER mission. This Phase III contract will focus on extending and adapting SBIR innovations developed by ProtoInnovations to support the NASA Volatiles Investigating Polar Exploration Rover (VIPER) mission. These technologies are needed by VIPER to improve the mission’s rover locomotion performance, particularly for traversing terrain with uncertain terramechanical properties and hazards. VIPER is a lunar rover mission that will prospect for water ice near the South Pole of the Moon. VIPER represents the first resource mapping mission on another celestial body and is scheduled to launch in late 2023.

Due to the development status of VIPER and the progress of this Sequential award, it was determined that this technology was at a state where it could address a risk that VIPER had been carrying. **This accelerated development advanced the technology to a state where it could be infused into VIPER (whose development had been ongoing) in a timely manner to support the mission.** Note that it was determined to make this Phase III award and begin the infusion of the technology even before the completion of the Sequential Phase II effort! The potential impact on the VIPER mission and the progress to date was deemed significant enough to warrant that infusion.



We Promote Commercialization in the Marketplace



A microbe found in Yellowstone National Park during NASA-funded research is now the basis of a fungal protein from which Chicago-based Nature's Fynd produces meat-alternative breakfast patties and non-dairy cream cheese. The protein is also growing on the International Space Station as potential astronaut food, and the company believes it could one day help ensure sustainable nutrition globally.

- Nature's Fynd partnered with Montana State University on STTR Phase I & II contracts to further develop a system that cultivates a unique fungus to form a dense, edible protein. As a result of the STTR work, they received additional NASA funding to test the protein on the ISS.
- The small business has secured **more than \$500M in external investments**, including from a fund established by Bill Gates to help stop climate change as well as a sustainable investment firm co-founded by Al Gore.
- In 2021, they **launched their meatless and dairy-free foods** in retailers.

Questions?

Visit our website:
www.sbir.nasa.gov

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