



With the NASA SBIR/STTR program, Area-I developed Uncrewed Aerial Systems that enabled low-risk, flight-based evaluation of high-risk technologies

Uncrewed Aerial Vehicles and Systems Support Safer Aeronautics Research

Challenge

As an agency focused on advancing aeronautics for Earth as well as space, NASA actively seeks innovative concepts from commercial partners to improve efficiency and maintain safety in the aviation industry. NASA's Small Business Innovation Research and Small Business Technology Transfer (SBIR/STTR) program seeks to fund technologies that support advanced aeronautics research, including Uncrewed Aircraft Systems (UASs). These systems—comprised of vehicles, their ground-based controllers, and the systems linking them—can be remotely operated for aerodynamics experiments that would be too dangerous for piloted aircraft to perform, or when wind tunnel trials are insufficient for testing predicted scenarios. For example, UASs can be used to measure the increased efficiency of a new aircraft configuration or wing design compared to a baseline version. The lessons learned from UAS experiments can contribute to improving air transportation for NASA and the general public on Earth.

Solution

Founded in 2009, Area-I, based in Marietta, Georgia, tested and conducted research on multiple UAS initiatives with the NASA SBIR/STTR program. Prior to working with NASA, the company had SBIR/STTR experience developing and testing UASs with the Air Force and Navy. In 2011, Area-I received two NASA SBIR Phase I contracts to evaluate and advance its Prototype-Technology Evaluator and

Project

Prototype-Technology Evaluator and Research Aircraft (PTERA)

Mission Directorate

Aeronautics Research

Follow-on Success

Acquired by Anduril Industries, a \$4.6 billion defense technology company

Snapshot

Area-I partnered with the NASA SBIR/STTR program to develop Uncrewed Aircraft Systems (UASs) that supported advanced aeronautics research. The company's developments with NASA culminated in the Prototype-Technology Evaluator and Research Aircraft (PTERA), a versatile UAS enabling low-risk flight experiments that are safer than piloted tests and more dynamic than wind tunnel testing. From the initial seed funding from NASA, Area-I continued to hone its abilities in UAS development, finding success with the Department of Defense and leading to the company's acquisition by Anduril Industries—a \$4.6 billion defense technology company—in 2021.

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Research Aircraft (PTERA), a versatile and low-cost UAS that bridges the gap between wind tunnel testing and piloted flight testing by enabling low-risk, flight-based evaluation of high-risk technologies. While wind tunnels test new concepts using adjustable air densities and speeds, they can only test performance at one condition at a time. UASs, on the other hand, can test concepts in “real world” scenarios through normal aircraft cycles, such as take-off, climb, cruise descent, and landing. In addition, UAS flight tests can capture dynamic information such as turbulence and wind effects in different weather. As a research UAS, PTERA performed a series of flights with the NASA Armstrong Flight Research Center to analyze new wing technologies in a dynamic testing environment.

While making developments with NASA, Area-I also received SBIR funding from the Air Force to begin developing another UAS system, known as the Agile-Launched, Tactically-Integrated Unmanned System (ALTIUS). As the company worked with the different agencies on the related technologies, Area-I’s CEO and founder Dr. Nicholas Alley noted that the lessons learned from PTERA enhanced the development of ALTIUS: “We intentionally grew a very complementary SBIR portfolio. For example, one of our first SBIRs provided the framework for the mission computer that we flew on PTERA. PTERA then helped vet the framework for the autopilot we flew on ALTIUS. In short, ALTIUS is standing on the shoulders of those early SBIRs.” The original ALTIUS has since expanded into a family of aircraft of varying sizes and has achieved success with the Department of Defense (DOD), having launched from a wide array of fixed- and rotary-wing motherships as well as from ground- and sea-based vehicles.

Business Impact

Due to the promising performance of its UAS technology and its credible reputation within the DOD, Area-I was



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– Dr. Nicholas Alley
CEO and Founder of Area-I



Area-I’s ALTIUS technology is derived from NASA SBIR/STTR developments and has since expanded into a family of aircraft of varying sizes

acquired in 2021 by Anduril Industries, a \$4.6 billion defense technology company based in Irvine, California. Area-I operates as a wholly owned subsidiary under its original brand, acting as an independent research branch for Anduril, according to Alley. Being a subsidiary of Anduril while continuing under the Area-I brand enables the company to maintain its core values: pursuing interesting and creative projects they are passionate about.

Alley notes that the NASA SBIR/STTR solicitation also appealed to Area-I’s core values because certain subtopics were open-ended rather than calling for a specific technology, which gave the company freedom to experiment and innovate. “That enabled a young, small company to find things we were passionate about,” said Alley, “and write proposals to utilize our ideas to be in line with those broad asks from NASA.” The projects with NASA not only helped Area-I grow its technology product offerings, but also allowed its employees to experiment with unique challenges and encouraged a culture of innovation. With its location close to Atlanta, the company often employs students and recent graduates from Georgia Tech University, supporting the Georgia aeronautics economy even with its parent company on the West Coast. From its roots in the SBIR/STTR program, Area-I has proven itself a pioneer in advancing aviation concepts that make testing safer and more accurate for researchers and that expand the applications of UAS technology.