

Rideshare for UAVs

AN SBIR HELPS DEVELOP STATE-OF-THE-ART, HANDHELD
UAV CONTROL FOR TROOPS ON THE GROUND

After spending days deep in a remote environment and running low on essentials, a group of U.S. Army soldiers radio for a resupply.

The base sends in an unmanned aerial vehicle (UAV) loaded with the blood, bullets, and beans needed to continue the fight. Due to enemy activity, the original resupply location changed while the UAV was en route to their original landing zone (LZ). Soldiers on the ground decide the safest way to ensure the supplies reach them is to control the drones themselves. Using a now patented technology, the soldiers communicate directly with the drones as if they were piloted by humans, successfully and safely receiving the supplies they need.

The software making all this possible? Dial-A-Drone



(DAD)—a revolutionary and patented system developed by Kutta Technologies, Inc. with help from the Small Business Innovation Research program.

In 2003, the Phoenix, Arizona-based company was awarded an SBIR contract through the Army for work on a cell-phone sized UAV control system. At the time, according to Douglas Limbaugh, COO of Kutta—now a wholly-owned subsidiary of Sierra Nevada Corporation—the

military was using large, Humvee-size ground control stations to control UAV flights.

“So the 2003 contract effort was mainly focused on the need to establish a unified interface across UAS classes as well as reduce the size, weight and power of their systems and make it simple so that they can train someone easily, as opposed to needing six months or

more on each different type of UAS,” Limbaugh said.

It was the company’s first foray into the world of unmanned vehicles, but its experience with Artificial Intelligence applied in innovative ways played a critical role in developing what would end up being the Unified Ground Control Station (UGCS) technology, and resulted in Kutta developing the unmanned control software throughout the DoD.

“Kutta’s advantage was that we had so much automation and artificial intelligence software on the back end to assist the soldier,” Limbaugh said. “One of the other major challenges that we overcame is we were the first company ever to successfully apply the same level of design assurance that the Army required for manned aircraft to unmanned aircraft—a process referred to as RTCA DO-178C. That was the first step that led the Army to push ahead with us.”

After multiple Phase II and Phase III contracts, the company arrived at a cutting-edge software system capable of interfacing with multiple unmanned aerial systems platforms. The system can be tailored to unique vehicle specifications and delivered in a variety of hardware platforms based on customer needs.

For example, the system—which can run on equipment as small as a book—allows a Marine in the field to request needed supplies and then specify the precise drop locations. Once the request is made, it is routed through the system, and the software autonomously generates a safe route to the landing zones. The safe route takes into account terrain, the airspace allocated to the mission, and other mission-specific parameters to ensure a successful resupply.

“Instead of having a person figure out where to lay down waypoints, set the altitude and air-speed and monitor the flight—they just basically point on the screen and say I want the air vehicle



to fly here and all of our systems figure out how to safely do that and stay in the right air space and at the right altitude and avoid terrain and all of that and much more,” Limbaugh said.

“I call it the rideshare app of UAVs,” he added, “because troops can go out to the battlefield and say ‘Show me the UAVs that are in my airspace that I can link up to.’ And it basically gives them a list, and they can say ‘Oh, I want that UAV and for this level of control,’ that way they are able to control it for what they need.”

The success of the system has led the company to work with the Navy as well as DARPA. And Kutta is leveraging the technology to develop the Army’s next-generation

Common Controller with a scalable control interface that controls all classes of UAV systems deployed by the U.S. military. The company is also constantly looking to improve upon the design of its technologies.

“Our open, modular, plug-and-play software architecture is a very good foundation to build from,” Limbaugh said.

The opportunity to break into the military sphere through the SBIR program led to growth and stability no one at Kutta could have predicted, he added.

“I really believe that the SBIR program is great,” Limbaugh said. “But I don’t think we envisioned how far-reaching it would be—that our work would have this type of impact on the DoD unmanned system space. I’ve been in the aviation industry for over 20 years now, and it takes so long in aviation and the unmanned industries for new innovations to take hold. You have to

come to the table with game-changing technology and have the tenacity to stick with it, and we did. We have a really, really great product and our soldiers and nation are safer because of the SBIR program.” 🌟

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Kutta Technologies, Inc. (Sierra Nevada Corp.)

Modernization Priorities: Autonomy, Artificial Intelligence

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