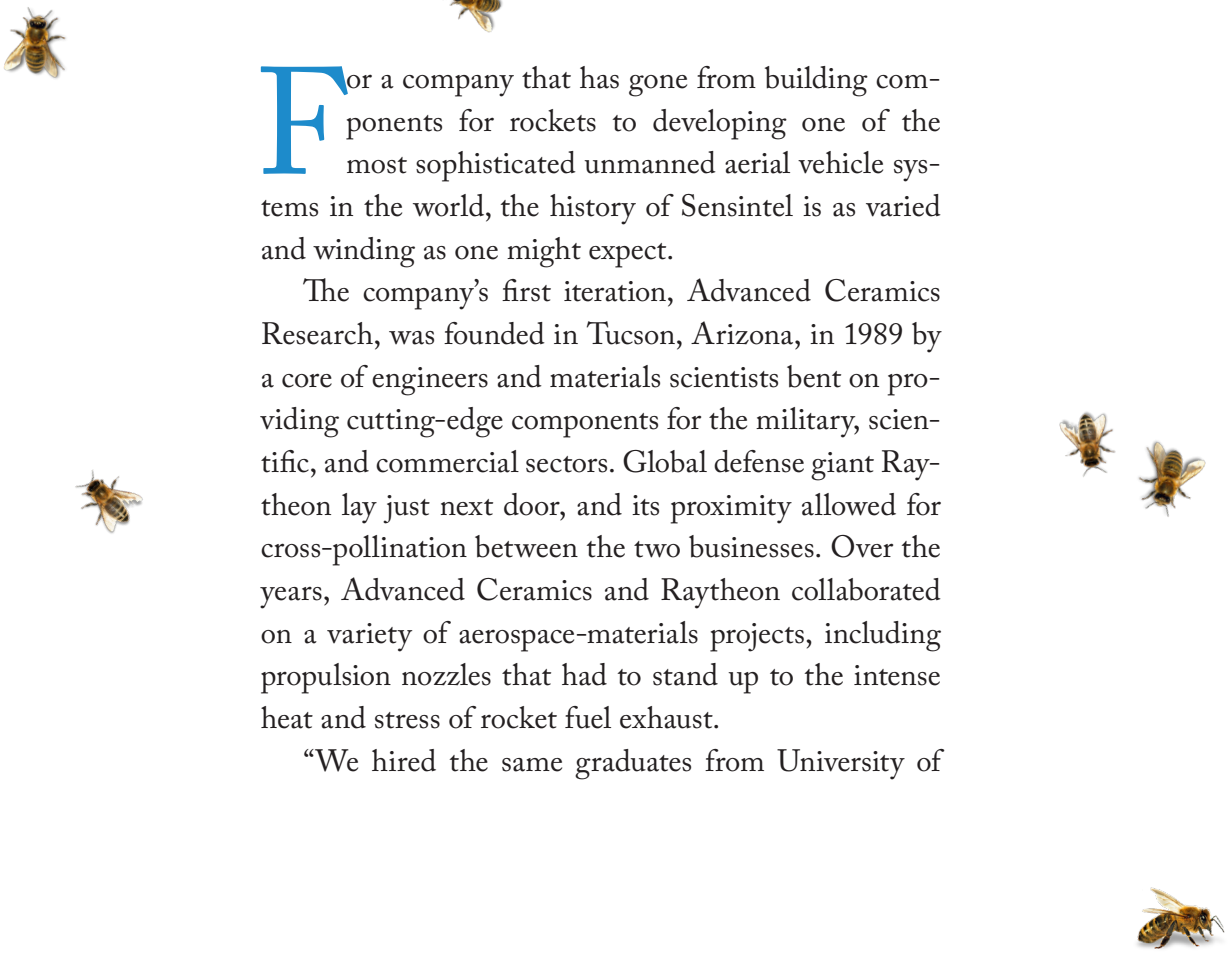
CALM BEFORE THE SWARM

A Tucson-based UAV company develops state-of-the-art autonomous fleet system



For a company that has gone from building components for rockets to developing one of the most sophisticated unmanned aerial vehicle systems in the world, the history of Sensintel is as varied and winding as one might expect.

The company's first iteration, Advanced Ceramics Research, was founded in Tucson, Arizona, in 1989 by a core of engineers and materials scientists bent on providing cutting-edge components for the military, scientific, and commercial sectors. Global defense giant Raytheon lay just next door, and its proximity allowed for cross-pollination between the two businesses. Over the years, Advanced Ceramics and Raytheon collaborated on a variety of aerospace-materials projects, including propulsion nozzles that had to stand up to the intense heat and stress of rocket fuel exhaust.

"We hired the same graduates from University of

Shutterstock.com / Daniel Prudek

Arizona, we worked with the same professors, we made high temperature materials, they used high temperature materials, we were neighbors around town," former CEO Matt Pobloske said. "It was natural for us to say, 'Let's work with Raytheon and make materials for them.'"

While the partnership with Raytheon continued, the company was also hard at work developing new tech with the help of the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs, connecting with John Williams, then head of the Navy's SBIR/STTR program and currently with the U.S. Small Business Administration. Around 2000, Advanced Ceramics won two SBIR contracts with the Navy for applying high-temperature, wear resistant ceramics to small displacement engines in unmanned aerial vehicles (UAVs).

"Those two were the bridge from our materials business to UAVs. Because of the DoDs focus on the global war on terrorism, the funding for the materials science work took a backseat to the UAVs," Pobloske said, "'Soon after we had an opportunity to make the wings for it. It's typical in a small business to have these tangential opportunities pop up and then next thing you know, we're building the whole damn airplane."

That flexibility is key to the success of small businesses, Pobloske added, but also represents why the SBIR/STTR program has been turnkey in developing critical technologies over the years.

"One thing we could do as a small business is react quickly," he said. "We're problem solvers. You had this industry that was growing around you. But we grew by continuing to solve customers' problems. And 99 percent of the growth was facilitated through the SBIR world, allowing us as a little company to stick our nose where perhaps the large aerospace prime contractors didn't want us.

"In the end, the program enabled us to continue to push and make our product better," he concluded.

Pobloske cites the company's state-of-the-art UAV engine and fuel injection system (later sold to Honeywell for one of their UAVs), as well as its integration of a sensor system used to locate enemy combatants—also an industry-first—as examples of Advanced Ceramics' ability to cater to a field that was changing rapidly.

"It ain't rocket science, it's all about application engineering and developing the right technology to fill a capability gap," he said.

Around the same time, the company also won an SBIR contract that allowed them to develop what was called SWARM (Smart War fighter Array of Reconfigurable Modules), the concept was to create a single-use set of UAVs that could be easily reconfigured for a variety of applications in the field. The original intent for SWARM was to build a low-cost, computer-controlled autonomous fleet of UAVs. One application the Navy was interested in also led to an STTR contract for the detection and monitoring of marine mammals in the ocean where the Navy wanted to perform underwater or above-water missions.

"The beauty of the SBIR program is that it seeds opportunities and fuels product development..."

Matt Pobloske

In 2003, with the invasion of Iraq looming, the military saw an even greater potential in the system.

"It was quickly recognized that military applications for this SWARM technology extended beyond the Navy whale watching operations to multiple mission applications throughout all the military services," wrote Anthony C. Mulligan, former CEO of Advanced Ceramics. "These include Navy Special Boat Unit 1, San Diego, to support patrol boats and the Army Aviation Applied Technology Directorate

Photo Courtesy, Matt Pobloske

The coyote unmanned aircraft system is used by the National Oceanographic and Atmospheric Administration for hurricane tracking.

(AATD) to support helicopters."

In addition, the Air Force and Navy were interested in using SWARM to find downed fighter pilots.

What began as one in a series of projects developed by Advanced Ceramics under the SBIR/STTR program has grown into a groundbreaking technology, currently deployed by NOAA, the Navy, U.S. Marine Corps, and the U.S. Air Force, among others.

The company's success didn't go unnoticed. BAE Systems purchased Advanced Ceramics in 2009 before selling the company back to Pobloske in 2013. The CEO rebranded the 50-employee firm as Sensintel and, in 2015, sold it to Raytheon. He subsequently left Raytheon but continues to work in the aerospace and sensor sector and, yes, is still working on several SBIRs.

"Sensintel's expertise in unmanned aircraft systems solutions makes it a natural fit with Raytheon's Advanced Missile Systems product line," said Taylor W. Lawrence, Raytheon Missile Systems president. "The acquisition of Sensintel enhances the growth prospects of our UAS business and the advanced capabilities we can offer our customers."

From a small startup in Tucson to an operating arm of one of the world's largest companies, the company has morphed greatly over the past 30 years. But for Pobloske, its success can be traced, at least in part, to the assistance and guidance of the SBIR program.

"The beauty of the SBIR program is that it seeds opportunities and fuels product development, and if you're adaptive enough, you can focus the money on something that is going to pay off," he said. "Like us, you just have to be relentless."

Sensintel, Inc. (Advanced Ceramic Research)
Modernization Priority: Autonomy
Tucson, AZ • STTR contract: N00014-02-C-0181 • Agency: Navy • Topic: N01-T002, Marine Mammal Detection and Mitigation