First RF has delivered 20 phased array antenna systems to the U.S. Marines this year for use on flight systems. The antennas will ultimately enable live video feed to be sent down to ground crews.
IMAGE COURTESY | **U.S.NAVY**

FIRST RF CORPORATION

Although having enjoyed monumental success in the area of commercializing in-demand antenna technologies for the U.S. Army, First RF Corporation continues to turn to the Department of Defense (DOD) Small Business Innovation Research (SBIR) program in order to turn ideas into reality. Current work focuses on the company's Ku- and Ka-band phased array technology and with the delivery of 20 systems to the U.S. Marines this year, it is set to follow in the footsteps of other big money technologies for this Boulder, Colorado-based small business.

PHASE III SUCCESS
New $8.5 million contract for phased array antenna technology with the Marines; sales from original DOD SBIR-funded technology of antennas total $300 million.

AGENCIES
DOD

SNAPSHOT
Colorado-based First RF has a long history of selling antennas to the U.S. Army but is now embarking on the commercialization of its Ku- and Ka-band phased arrays, also funded by the DOD SBIR program.

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A phased array is a type of antenna, comprised of various radiating elements that each contain a phase shifter. Beams are formed by shifting the phase of the signal emitted from each radiating element, to provide constructive/destructive interference that steers the beams in the desired direction.

The original DOD need for phased arrays sought the implementation of satellite communications antennas on the back of fighting vehicles. By maturing the technology readiness level (TRL) through several programs including SBIRs, First RF was able to use phased array technology in its new contract with the Marines to set up flight systems that broadcast video down to troops or send to other ships and crew. The applicability of the technology extends to industry customers as well, and First RF always has its eye on commercialization.

"There are several commercial customers that we are talking to right now since the government and industry share spectrums and often overlap," says David Massey, Director of Business Development for First RF. "This is very much a dual use technology, and talks are in the works now to use this for future generations of aircraft internet service."

First RF has a long history of providing antenna solutions to the DOD. The largest antenna production program in the agency's history began as an SBIR Phase I in the early 2000s with First RF and since then, over 150,000 antennas have been produced that support ultra-wideband electronic warfare against radio Improvised Explosive Device (IED) threats in the Middle East.

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First RF developed and delivered tactical vehicular antenna systems to the U.S. Army for use within Iraq and Afghanistan. The multi-decade antenna technology became the first antenna designated as the Army "common antenna" and was capable of performing multiple communications critical in the global war on terror.

Massey is a true believer in the SBIR program, and wants to continue to reap the benefits while developing critical technology that can be used by both industry and government alike.

"There are two main benefits for us through the SBIR program," says Massey. "Data rights that you get from an SBIR contract are a really great deal for small businesses. You may have a small contract, but having protection of your data rights is a priceless tool for a business to have. Second, SBIRs are very competitive, so having young engineers take a chance on a proposal lets us find who the strongest candidates are. Who are the best engineers in the country? We use that to assess our engineering capability, and it happens much quicker than on the normal DOD procurement program. It's basically an accelerated life cycle testing of your staff."

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DAVID MASSEY
DIRECTOR OF BUSINESS DEVELOPMENT

This is a fitting ideology, considering First RF has amassed 152 SBIR awards, and employs 115 people throughout its Colorado headquarters. Today, one third of First RF's sales are in phased arrays. The rest is split between communications and radars.

The company's newest Phase II award with the DOD is seeding the development of an atmospheric ice detection and avoidance system for fixed and rotary wing aircraft. A robust 2-D scanning antenna by First RF is being combined with a ruggedized radiometer system by Radiometrics Corporation, which will allow the system to rapidly create a 3-D mapping of ice in an aircraft's vicinity. This technology is expected to be implemented on Navy and Marine Corps aircraft systems, but once again has applicability far beyond the military.

"There are a lot of similarities in how we build the antennas for radar or communications – the technology is essentially the same," adds Massey. "And a lot of the original work on these came out of our SBIR contracts."

First RF is also working on phased arrays for general atomics, and specifically, a weather radar that can detect tornados and catastrophic weather events.

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