

SUCCESS STORY

TOPIC NUMBER: AF112-144

SBIR INVESTMENT: \$1,344,034

PHASE III FUNDING: \$51,294,993



ADVANCED RADAR CONCEPTS FOR SMALL (TIER I/II) REMOTELY PILOTED AIRCRAFT (RPA)

With the help of SBIR, IMSAR developed a type of synthetic aperture radar small enough to fly on a tactical unmanned aerial system (UAS), providing enhanced battlefield awareness to our warfighters.

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THE CHALLENGE

The Navy has interest in sensor platforms that allow synergistic synthetic aperture radar (SAR) and ground moving target indicators (GMTI) for the detection, tracking, localization and recognition all types of targets over a wide area. SAR and GMTI are critical components to battlefield awareness and helping our warfighters to locate the enemy on land and at sea. However, while these features are commonplace in larger advanced weapon system radars, a small size, weight & power (SWaP) radar system was desired that can operate on Group I/II remotely piloted aircraft.

THE TECHNOLOGY

IMSAR leveraged SBIR funding to develop a system named Split Aces—a SAR/GMTI radar payload system that provides high-resolution SAR imagery, coherent change detection, and ground moving target indication and its own investment to develop the world's smallest high performance SAR. The technology is housed in a pod with enclosed electronically scanned array antennas, and with its small size and weight, can be used on small tactical unmanned aerial systems for the first time. Split Aces uses the motion of the aircraft to take snippets of radar data along the track and combine them together to form a much larger radar than ever before without sacrificing performance.

THE TRANSITION

NAVAIR often works closely with other military branches in order to field the very best in technology, and this case was no exception. NAVAIR leveraged the Air Force's Phase I and II SBIR investments by pulling IMSAR's novel technology to the field via Phase III awards worth over \$46 million. These contracts fund the research, development, procurement and sustainment of the AN/DPY-2 Split Aces payload systems and communications relay package for the RQ-21A Blackjack UAS (operated by the U. S. Marine Corps). Other target platforms soon opened up, like V-BAT, due to Split Aces' versatility and small footprint.

THE NAVAL BENEFIT

Split Aces can be used over land for targets on the ground and in maritime modes for tracking ships and targets at sea. The ability to develop a SWaP radar system that combines both SAR and GMTI allows unmanned aerial systems capabilities never before realized. In addition, Split Aces aids in dismount detection and tracking, assisted target recognition of vehicles and objects, detection through foliage, building digital terrain models, small object and wire detection and tracking through "move-stop-move." All of these abilities enhance and improve the tactical commander's battlefield awareness.

THE FUTURE

The dual use of this technology has allowed IMSAR to sell the system to commercial clients (primes) under the name NSP-5. The NSP-5 is a multimode, SWaP radar system in a weatherized pod that requires only power and ethernet to operate. It can be easily attached to an aircraft for a variety of needs and applications. The high quality radar data generated by NSP-5 along with its advanced processing techniques, create a variety of data products enabling all weather Intelligence, Surveillance, and Reconnaissance (ISR) and surface search missions. Within NAVAIR, the Navy and Marine Small Tactical Unmanned Aircraft Systems program office (PMA-263) continues to work with IMSAR to find new applications and target platforms.

"By having access to small business solutions through the SBIR program, we're not locked into working with just the large primes; we can access different mindsets and new ways to approach complex problems. This solution, in particular, could never have been developed without SBIR funding."

David Allocca, PMA-263 Technical Director for Advanced ISR Payloads, Naval Air Warfare Center — Aircraft Division