

SUCCESS STORY

TOPIC NUMBER:
N142-102

SBIR INVESTMENT:
\$2,329,162.03

PHASE III FUNDING:
\$48,557,595.75



MICRO IDENTIFICATION FRIEND OR FOE (IFF)

R Cubed Engineering, LLC (R3E) developed a transponder with a micro identification friend or foe (IFF) system and an end cryptographic unit (ECU) to provide positive cooperative combat identification in air spaces.

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THE CHALLENGE

In today's complex battlespace, ensuring friendly forces can quickly and securely identify each other is paramount. The Navy needed a miniaturized identification friend or foe (IFF) system, consisting of a transponder and end cryptographic unit (ECU), with drastically reduced size, weight, and power (SWaP) demands for smaller unmanned aircraft systems (UAS) and other air platforms. This technology is crucial not only for preventing fratricide, but also for enabling safe UAS integration into controlled airspace, supporting coalition operations, and strengthening counter-UAS capabilities.

THE TECHNOLOGY

To address the military's need for reliable identification of unmanned aircraft systems (UAS) in both national and international airspace, R-Cubed Engineering, LLC (R3E), with sponsorship from Naval Air Traffic Management Systems Program Office (PMA-213), developed a game-changing solution: the Micro IFF transponder. Paired with a miniature ECU, this system is compatible with small UAS. This Microtransponder confirms the identity of friendly aircraft and vehicles, transmitting this information securely. The unit's compliance with AIMS 17-1000, a critical standard for Mode 5 IFF systems, ensures interoperability with existing platforms while fulfilling the urgent need for secure identification in smaller agile platforms.

THE TRANSITION

In 2021, the Naval Air Warfare Center Aircraft Division (NAWCAD) awarded R3E an initial Phase III contract to continue research and development. Under this Phase III, R3E replaced a Mode A/C transponder with an upgraded transponder and miniaturized ECU. Through DoD-AIMS 1102 (platform testing) and DoD-AIMS 1103 (flight testing), the platform was certified to use the system.

In 2022, NAWCAD, sponsored by PMA-213, awarded R3E a Phase III basic ordering agreement (BOA), to continue Micro IFF development and streamline procurement. An initial delivery order (DO) launched production of the Micro IFF ECU and transponder; several systems were installed in Naval aircraft vertical stabilizers. In 2024, a cost-plus-fixed-fee DO was awarded for 1,200 ECUs, aligning the system with the latest Mode 5 DoD and NATO transponder requirements for positive cooperative combat identification.

THE NAVAL BENEFIT

R3E's IFF leverages its reduced SWaP for seamless integration with small UAS. Its design and software facilitate easy updates, ensuring it remains at the cutting edge of IFF technology. The ECU is on track to meet emerging cryptographic modernization requirements, further bolstering its security. The Micro IFF enables UAS to safely and precisely delivery of assets between platforms in the battlespace, reducing risk to warfighters by shifting these critical tasks to unmanned systems.

THE FUTURE

R3E, with sponsorship from PMA-213, remains committed to advancing secure identification technology. Future efforts will focus on Mode 5 enhancements and achieving full ECU CM2 certification. These advancements will be integrated across various platforms, including manned aircraft, ships, and UAS, ensuring secure and reliable identification across the battlespace, strengthening operational effectiveness for the Navy and its allies.