

At a Glance

What is it?

- Multi-Mode Sensor Seeker (MMSS) is a FNC product that will develop and integrate a laser radar (LADAR) sensor with the off-the-shelf BRITE Star II® turret sensor system.

How does it work?

- MMSS will integrate visible, infrared and LADAR within a single sensor turret.
- MMSS will also develop Automatic Target Recognition (ATR) algorithms to process and analyze the sensor data before it is sent to the operator.

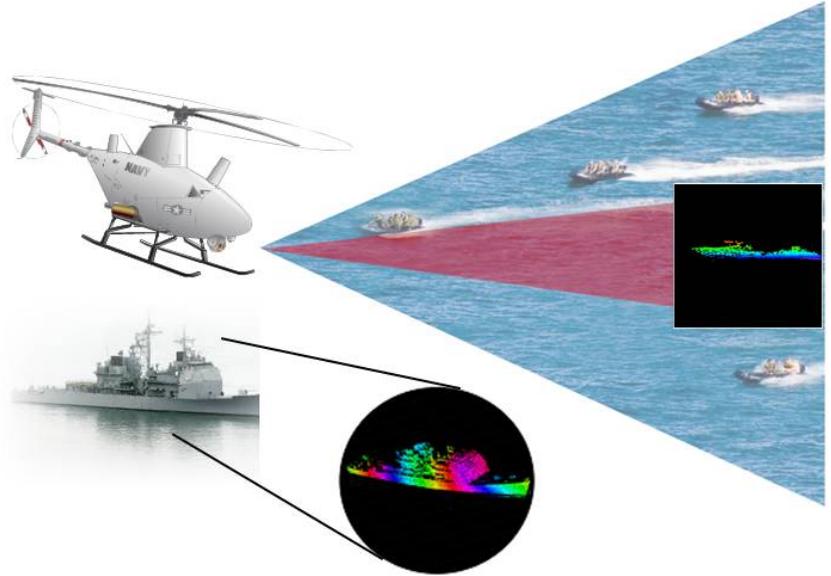
What will it accomplish?

- MMSS will demonstrate functionality for target detection, classification and identification against ships, boats, and shore facilities, including ground-based mobile targets.
- A hierarchy of sensor coverage will provide increased stand-off range for Fire Scout and future weapon systems.

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The Multi-Mode Sensor Seeker (MMSS) Future Naval Capability (FNC) Product is developing an eye-safe imaging laser radar (LADAR) sensor to be integrated with high definition (HD) visible and mid-wave infrared (MWIR) imaging sensors into a BRITE Star II® baseline turret. The resulting multi-mode sensor subsystem will be integrated with an Automatic Target Recognition (ATR) subsystem, implemented in commercial off-the-shelf (COTS) hardware, aboard a manned test-bed helicopter for demonstration of product viability. The combining of LADAR with the upgraded EO/IR sensors will enable generation of high-quality three-dimensional (3D) images that will feed ATR algorithms, which in turn will enable processing aboard the sensor platform.

One of the features of this FNC is the adaptation of the turret with a Coudé path, which allows the LADAR and existing laser designator to be taken off gimbal, meaning removed from the turret itself. By utilizing a Coudé path laser beams from both the LADAR transmitter and the designator are generated off gimbal and are transmitted to the turret aperture, thus removing a large heat source from within the turret assembly. Additionally, by removing the lasers from the turret, maintenance and periodic upgrades of the lasers are greatly simplified.

By incorporating the LADAR to generate high-quality 3D imaging, MMSS will provide increased maritime target identification capabilities in both clear and adverse weather. The increased probability of accurate target identification will reduce false alarm rates against friendly or neutral objects. Also, by integrating ATR algorithms with target identification capability and target location data, the workload of the sensor operator will be reduced.

The current transition path of MMSS is to the BRITE Star II® turret, which has been outfitted on several RQ-8A Fire Scout VTUAVs. MMSS is also investigating concepts for its incorporation into the Multi-Spectral Targeting System (MTS-A) system.

Research Challenges and Opportunities:

- Optimization of power generation in erbium-doped yttrium aluminum garnet (Er:YAG) lasers
- Integration of multiple advanced sensors (EO, IR, LADAR) utilizing common optical components
- Advanced ATR capabilities that accurately identify maritime targets at increased stand-off ranges
- High-sensitivity LADAR detector arrays

