Low-Cost Imaging Terminal Seeker

ONR Program Code O3T

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At a Glance

What is it?

- The Low-Cost Imaging Terminal Seeker (LCITS) is a low-cost guidance capability that will greatly improve the tactical viability of the unguided 2.75-inch rocket by providing it with an inertial and imaging infrared guidance subsystem.

How does it work?

- Targeting data from launch aircraft sensors are transmitted via a digital smart launcher to the weapon. Rocket fly-out occurs under mid-course guidance provided by an IMU, and upon arrival in a search basket, transitions to identification and tracking of the target with an imaging infrared seeker as it closes for the kill.

What will it accomplish?

- LCITS will provide a tactically effective and cost effective means to combat the real asymmetric threat to U.S. and coalition naval forces posed by an adversary's use of small boat swarm tactics. It will provide increased engagement capability, launch envelope, and probability of kill, while reducing exposure of the war fighter.

Point of Contact

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The Low-Cost Imaging Terminal Seeker is a Future Naval Capabilities product intended to equip the existing unguided Hydra-70, 2.75-inch rocket with a low-cost guidance capability. The weapon system will provide the warfighter with an effective means to combat the small boat swarm threat, also known as the fast attack craft/fast inshore attack craft (FAC/FIAC) threat.

The LCITS FNC technology was developed as a system that included the Low-cost Guided Imaging Rocket (LOGIR), a prototype digital smart launcher and an interface to a helicopter's forward-looking infrared (FLIR) sensor. The concept of operation is that once a target is designated by the helicopter's FLIR, targeting data (position, size, velocity, contrast, etc.) are passed through the digital smart launcher to the guided rocket. Calculating an inertial guidance point, the rocket flies to where it will acquire the target with its imaging infrared seeker. This seeker is not a hot-spot detector, but rather a low-cost focal plane array that feeds an image to on-board algorithms that segment the target from the background. The infrared seeker then guides the rocket to hone in on the center of the target, even as it attempts evasive maneuvers.

LCITS provides a fire-and-forget capability that will potentially reduce the target engagement timeline to less than 15 seconds. The weapon's off-boresight capability of more than 45 degrees of a half angle and increased range will greatly enhance the performance and tactical application of the existing Hydra rocket. Lastly, the launch and leave aspect of LCITS eliminates the need for multisecond dwell time that is required of aircrews using laser designated weapons.

A successful final demonstration of the LCITS technology occurred on May 1, 2010. Test-fired from an AH-1 Cobra helicopter, LCITS scored a direct hit on a moving, maritime target representing the small boat threat. The LCITS technology will initially transition to the Medusa Joint Capability Technology Demonstration for further testing and evaluation. The intended plan after Medusa is for LCITS to transition to a Naval acquisition program of record.

Research Challenges and Opportunities:

- Low-cost strap-down imaging infrared seeker design
- Advanced fixed and moving target signal processing technologies
- Low-cost 2.75" guidance and control technology