

WHO

SYSKOM: ONR

Sponsoring Program: ONR Code 33

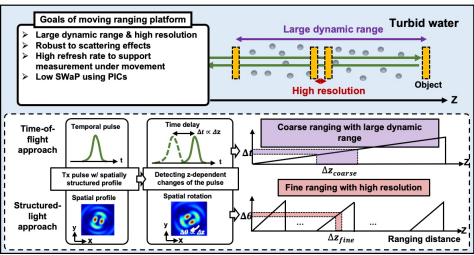
Transition Target: Autonomous UUVs that require Aided/Automated Target Recognition (Ai/ATR) of underwater objects for a wide range of applications, including anti-submarine warfare (ASW) and mine countermeasures, and in particular unmanned systems under development to sweep, detect, and neutralize underwater explosives.

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Other Transition Opportunities: UUV manufacturers.

Notes: R-DEX Systems (R-DEX) is teaming with the University of Southern California to develop techniques to enable high resolution optical ranging in underwater environments that rely on the encoding and decoding of the optical phase and/or the temporal signature of a blue-green laser source while providing accurate range measurements of underwater objects.

R-DEX Systems was formed in 2014 to transition innovative technologies to government and commercial customers. R-DEX is actively engaged in multiple federally funded projects to develop and deploy cutting edge AI, robotics, and advanced sensor solutions for mission critical systems for a wide range of applications in Aided/Automatic Target Recognition (Ai/ATR), Electronic Warfare (EW), Signals Intelligence (SIGINT), radar, and wireless communications.



Phase II Goals and Approach

WHAT

Operational Need and Improvement: Autonomous Unmanned underwater vehicles (UUVs) are currently employed in a variety of missions. The accomplishment of these missions depends on sensors that provide accurate range measurements with processing speeds that are compatible with mobile UUV platforms. The challenge is to develop solutions that provide accurate range measurements with processing speeds that are compatible with a moving underwater platform. This optical sensor technology could be employed by Autonomous UUVs to conduct undersea weapons sensing for a variety of missions to include Anti-Submarine Warfare (ASW), Anti-Surface Warfare (ASuW) and Mine Countermeasures (MCM).

Specifications Required: Large dynamic range and high resolution. Robust to scattering effects. High refresh rate to support measurement during motion. Low SWaP using PICs.

Technology Developed: Laser-based optical ranging techniques offer the potential to enable high resolution optical ranging in challenging underwater environments. Our innovative optical ranging platform utilizes both the temporal and spatial information of spatially structured pulses to achieve both large range and high resolution in challenging underwater environments by combining coarse and fine ranging.

Warfighter Value: This sensor technology could be employed by Autonomous UUVs to improve effectiveness of remote and covert undersea sensing missions in a variety of applications. Optical sensing has the potential to provide improved identification of underwater objects while conducting ASW, ASuW and MCM missions.

WHEN

Contract Number: N68335-23-C-0735

Ending on: Sep 29, 2025

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Phase II	Low	Achieve range and resolution requirements / reduce SWaP of system	4	4th QTR FY25
Phase II Option	Medium	Increased range and resolution.	5	4th QTR FY26

HOW

Projected Business Model: R-DEX plans to team with UUV suppliers to incorporate our Laser optical ranging sensor on UUVs tasked with a variety of undersea missions. R-DEX's long term goal is to grow a predictable and scalable business for both military and commercial applications. To achieve this, R-DEX will begin with bespoke solutions and grow its product and customer base by identifying clients and applications that will enable R-DEX to sell products with minimal additional effort. This will decrease the cost per user and expand the user base. R-DEX will consider direct sales as well as distribution partners. R-DEX will minimize the need for outside investment by continuing development on SBIRs while also leveraging R-DEX IRAD budgets. In addition, R-DEX plans to work with its strategic partners to build commercial revenue streams

Company Objectives: Work with the Government to transition the prototype hardware to a specific platform meeting that platform's size, weight, and power limitations. Dual use opportunities include and automotive light detection and ranging (LIDAR).

Potential Commercial Applications: Seabed mapping and pipeline/cabling inspection.