Department of the Navy SBIR/STTR Transition Program

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NAVAIR 2020-717

Topic # N121-059
High Power Ultra-Short Pulse Bulk Laser Amplifier at Eye Safer Wavelengths
Aqwest

WHO

SYSCOM: NAVAIR

Sponsoring Program: PMA-264 Airborne ASW Sensors

Transition Target: Airborne subsurface detection systems

TPOC:
(301)342-2034

Other transition opportunities: Underwater communication, seabed-to-space communication

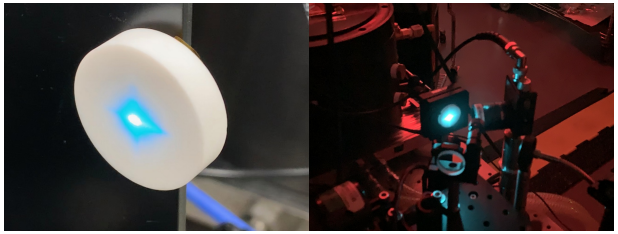

Image courtesy of Aqwest, LLC. 2020

Notes: Blue laser transceiver payload for detecting a submerged threat.

WHAT

Operational Need and Improvement: The Navy has expressed a desire to develop an efficient, compact, lightweight blue laser transmitter to increase the capability to detect submerged objects from airborne platforms.

Specifications Required: Pulse lengths of < 20ns. A scaling path to achieve pulse energies > 25mJ at blue wavelengths is required. An initial repetition rate of 100's of Hz and a clear path for repetition rates exceeding 1 kHz or greater are also desired.

Technology Developed: Aqwest's innovative next generation blue laser sensors feature 2x more efficient laser crystals, and significant improvement in sensor signal-to-noise-ratio (SNR) - enabling development of smaller, lighter, and less costly (low SWAP-C) sensors with reduced power draw from host platforms.

Warfighter Value: Efficient, high pulse energy blue lasers can sense objects at greater depths utilizing smaller, lighter, and less costly payload sensors with reduced power draw from host platforms. Smaller/lighter payloads enable the use of multiple classes of UAVs as host platforms - increasing operational capability and flexibility. The technology is also a pathway to future space-based sensors.

WHEN

Contract Number: N68335-19-C-0491 **Ending on:** July 16, 2022

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Phase II Proof-of-principle demo	N/A	Blue light at low pulse energy	3	December 2019
Phase II Breadboard assembly validation	Med	Blue laser output meets requirements at Aqwest lab	4	March 2021
Phase II Brassboard assembly validation	Low	Hdwe configuration traceable to flight meets efficiency targets at NAVAIR lab	4	March 2021
Phase II Flight unit design	Low	Preliminary design completed	4	July 2022
Phase IIA Flight unit completed	Low	Flight unit passes test in simulated environment	5	March 2023

HOW

Projected Business Model: Aqwest intends to license the Blue Laser technology to a prime contractor who would build multiple payloads for the Navy incorporating a blue laser transmitter. The company also intends to provide consulting services to the prime to convey essential technical know-how and know-why.

Company Objectives: Aqwest's goal for FST program participation is to identify other military organizations who have a need for a Blue Laser or closely related variations on the underlying laser technology as well as meet potential primes, such as General Atomics and Fibertek.

Potential Commercial Applications: Non-military applications for the blue laser and related variants include earth science missions for NASA and commercial LIDAR for aquatic science, littoral water subsurface survey, atmospheric science, and meteorology applications.

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