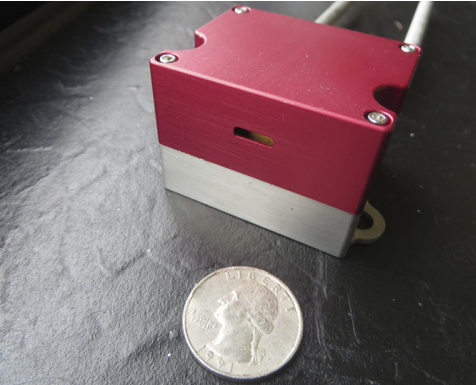


WHO

SYSCOM: NAVAIR
Sponsoring Program: PMA 272 Tactical Aircraft Protection Systems
Transition Target: Infrared Countermeasures (IRCM)
TPOC: (760) 608-3370



Other Transition Opportunities: Mid-wave and long-wave infrared (MWIR, LWIR) lasers coupled to imaging systems for military, law enforcement, and civilian applications including; target illumination, situational awareness (infrared scene illumination), industrial process control, remote sensing, obstacle avoidance, and selective etching, cutting, and marking of materials.

Notes: Our high power Quantum Cascade Lasers enable you to direct the power you need to fulfill the most demanding requirements. Key advances include high efficiency and irradiance, low M2, scalable beam-combined laser array technology, multi-watt output, and a compact form factor.

WHAT

Operational Need and Improvement: Pendar Technology LLC develops reliable, rugged, high brightness mid-infrared semiconductor laser sources for Infrared Countermeasure (IRCM) systems, that protects aircraft and other vehicles from threats such as shoulder-fired heat-seeking missiles. Our high brightness mid-infrared quantum cascade laser (QCL) systems combine established semiconductor technology with innovative new concepts to improve device reliability and yield, with the goal to significantly reduce cost of the devices.

Specifications Required: The goal of this program is to reduce the cost of current high-power mid-infrared lasers through innovative manufacturing strategies by addressing the 3 key process steps that add significant costs to QCL manufacturing: wafer epitaxy, regrowth, and assembly.

- Technology Developed:**
- Scalable and high yield wafer epitaxy
 - Innovative fabrication processes to improve manufacturing yield
 - Low-cost and scalable packaging solutions

- Warfighter Value:**
- High-power MWIR QCL emitter enable effective infrared countermeasure systems in a low SWaP package.
 - Narrow BH QCLs have inherently stable and excellent beam quality without beamsteering, enabling long distance propagation.
 - Innovative manufacturing strategies and device designs resulting in improved reliability and enabling low-cost fabrication, testing and burn-in, resulting in significant reduction of overall acquisition cost.
 - Affordable, high power MWIR QCL sources are a game changer for many military applications.

WHEN

Contract Number: N68936-21-C-0034 **Ending on:** Mar 28, 2023

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Watt-level single emitters demonstrated.	N/A	Prototypes tested	4	2nd QTR FY22
Laser fabrication and packaging for improved yield developed.	N/A	Prototypes tested	4	2nd QTR FY22
Automated test stations developed.	Low	Setup in use	4	2nd QTR FY23
Verification of high yield fabrication process	Medium	Delivery of high performance prototypes	4	2nd QTR FY23

HOW

Projected Business Model: There are aspects of the countermeasures technology chain that drive Pendar toward collaborative supply relationship with one or more Primes. Pendar alone cannot furnish a fully integrated IRCM system, including all steering and electronics. Pendar is actively pursuing opportunities to transition laser prototypes emerging from this and other SBIR/STTRs into next generation systems. Additionally, advances made in this program will more broadly benefit the commercialization of Pendar's IR platform, including spectroscopic instrumentation.

- Company Objectives:** To address the different markets in need for affordable, compact mid-infrared sources, Pendar has developed several infrared platforms which all share and leverage our proprietary QCL designs, beam-combining solutions, and system innovations:
1. Broadly tunable single-mode laser array as general spectroscopy tool.
 2. Compact, high performance IR spectrometers and sensors..
 3. Reliable high-power lasers and laser bars for IRCM, and other DoD applications.

Potential Commercial Applications: Pendar has developed several proprietary mid-infrared QCL platforms, which have unique features such as broadband spectral coverage, arrays with high optical power through power scaling, excellent beam-quality through rugged wavelength beam-combining, low laser noise, fast tuning speed, and low SWaP due to monolithic nature of laser source. These advantages enable a host of applications in IRCM, spectroscopy, medical device, pharma, laser processing, and scientific applications.