

ManTech for Military Lasers Manufacturing Technology Objective

PROBLEM / OBJECTIVE

Low cost, high reliability laser diodes and laser diode arrays for pumping solid-state lasers are important components of many Army systems. The cost of these diodes and diode arrays is the biggest limiting factor to large-scale production and usage in Army systems.

There were no established suppliers for reliable, low-cost laser diode arrays that meet Army requirements. (SDL Inc., the previous supplier for diode arrays has stopped production.) The manufacturing processes that are used suffer from a variety of problems, which result in low yields and high-cost for acceptable laser diode arrays.

The objective of this manufacturing technology objective is to implement improvements to the manufacturing processes that drive the cost of the lasers in order to greatly reduce the cost of these systems.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

This project involved three separate tasks:

- Task 1 – Development of high brightness (4W power) laser diodes at 930nm wavelength;
- Task 2 – Increase yield and reduce cost of 60-100W laser diode bars at 807nm;
- Task 3 – Assemble arrays of 8 or more diode bars from task 2 to meet US Army requirements.

The program demonstrated the technology, process and cost improvements

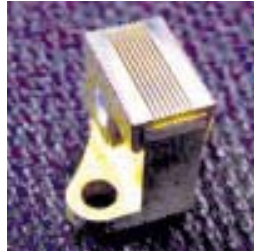
Implementation and Technology Transfer:

There are four identified users for the technology developed under this program: The Apache Laser Rangefinder/Designator, XM25 Objective Individual Combat Weapon (OICW), Advanced Crew Served Weapon (ACSW), and the Heat Capacity Laser.

The largest user is the Apache Laser Rangefinder/Designator with an anticipated requirement for over 124,000 laser diode bars between FY06 and FY17. This technology will transition to the Program Manager of Individual Weapons for XM25 (OICW) in FY06. The XM25 will require over 25,000 laser diode bars between FY05 and FY17. The capabilities developed for OICW will then become available for use by ACSW.

The ACSW will require almost 12,000 laser diode bars between through FY16. This technology again transitions to the Program Manager of Soldier for Lightweight Laser Rangefinder Designator (LLDR) upgrade.

Additionally, the Heat Capacity Laser program may require 3,000 diode bars and Space and Missile Defense Command may require an additional 20,000 diode bars.



930 nm laser diode



Objective Individual Combat Weapon (OICW)

Expected Benefits/Warfighter Impact:

This program achieved the following benefits:

- Total cost before manufacturing technology was \$32.8M; Total cost avoidance is \$16.4M for future laser rangefinders, designators and laser radar systems.
- Laser diode arrays will enable lightweight, reliable, low life-cycle solid-state laser systems relative to flashlamp pumped lasers.
- Technology enables lighter weight systems that are required for the individual soldier and (UAV) platforms.

TIME LINE / MILESTONE

Start Date: May 2003
End Date: September 2005

FUNDING

Army ManTech: \$2.6M

PARTICIPANTS

U.S. Army CERDEC
Axcel Photonics
Coherent, Inc.
Kollsman
IPR