

Lightweight Laser Designator Modules

PROBLEM / OBJECTIVE

Current laser designator modules and associated electronics, fabricated using legacy designs and manufacturing processes, are too heavy, bulky and costly. The purpose of program was to improve manufacturing process to produce affordable lightweight laser designator modules for small UAV & UGV platforms and portable Soldier systems. Specific objectives was to develop a laser module for a 1 lb/30 mJ laser designator for UAV and < 4 lb laser designator for the Soldier.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

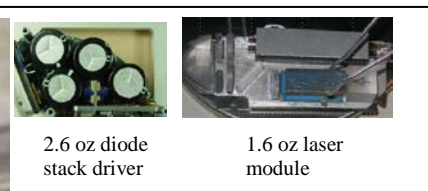
A simplified laser structure and assembly process making use of a semi-monolithic construction was successfully implemented. The technique relies on directly bonding all of the laser resonator components directly on a stable and thermally matched composite metal base. Elimination of numerous parts and mechanical components resulted in much lighter and smaller laser modules than previously available. The following performance goals were achieved:

- Ultra-light (2.5 oz), low cost pump laser diode stack driver using commercial aluminum electrolytic capacitors.
- 1.6 oz/40 mJ actively Q-switched laser module for Class I UAS.

The diode stack driver was approximately 4x lighter than previously available component was successfully fabricated and tested for operation from -40°C to +75°C. Its cost was approximately 5x lower than previous devices due to significantly smaller cost of high charge storage aluminum electrolytic capacitors used. The laser weight is several time smaller than previously available structures and enabled construction of a fully packaged hand-held or rifle mounted designator/marker that was approximately 2x lighter than previous devices.

Implementation and Technology Transfer:

The technology developed under the program has transitioned to Small Laser Marker (SLM) program, and is in process of transitioning to Joint Engagement Targeting System (JETS), and Laser Target Locator Module (LTLM) for LLDR P3I.



Reduced Laser Size, Weight, Volume, and Cost enables reductions in laser systems SWAP and cost

Expected Benefits and Warfighter Impact:

The program directly impacted the Warfighter. As a result of this program, much lighter and more compact laser designators and long-range markers will be available. The smaller weight and size allows hand-held or rifle mounted long range designator/marker devices, adding a previously unavailable capability for the Warfighter. The drastic weight reduction also enables integration of laser designation marking capability into a Class I UAS for the first time.

The reduced laser module and diode stack driver cost will allow approximately 2x cost reduction of compact laser designators/markers. Estimated production cost of these laser modules is \$10k.

TIME LINE / MILESTONE

Start Date	Jan 2008
End Date	Jan 2011

FUNDING

U.S. Army ManTech	\$4.0 M
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PARTICIPANTS

- SMC, Bozeman, Mt.
- BAE, Nashua, NH
- Insight Technologies, Manchester, NH
- Optiswitch Inc., Sand Diego, CA
- Night Vision and Electronic Sensors Directorate (NVESD), Aberdeen, MD

Approved for Public Release