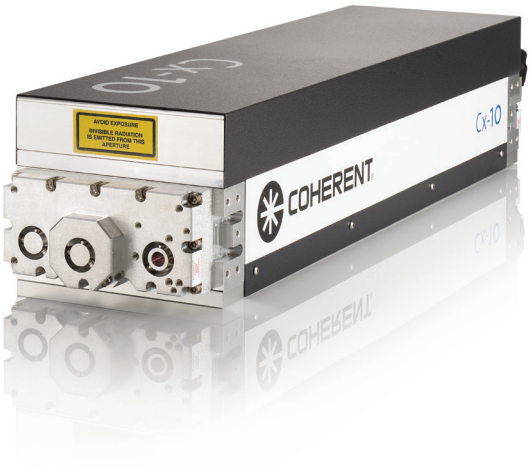
LASER-GUIDED INNOVATION

Laser technology supported by SBIR benefit industry and Warfighters alike

DeMaria ElectroOptics Systems (DEOS) was founded in 1994 by Dr. Anthony DeMaria and four colleagues. Based in Connecticut, their goal was to manufacture lasers and associated electronics. The founders quickly built DEOS into a leading manufacturer of small, rugged, efficient, state-of-the-art carbon dioxide (CO_2) lasers.

In 2000, DEOS responded to a Small Business Innovation Research (SBIR) call for the development of a long wavelength infrared (LWIR) laser. The U.S. Navy had a need for it in the context of electronic warfare (EW) applications. DEOS had been working on lasers for other military applications, including target scanning and acquisition, so developing, refining, and deploying a low power LWIR source for a specific surface EW application seemed like an appropriate next step.

Not long after being awarded the SBIR, DEOS was acquired by Coherent, Inc.—a publicly traded lasers and photonics company based in California. Coherent immediately began manufacturing and marketing a line of DEOS lasers that had been advanced with SBIR funding.



Coherent produces many sealed CO2 lasers based on waveguide laser technology, among them the DIAMOND C-Series, CX-Series, and the DIAMOND GEM-100.

Photos courtesy DEOS

During the first phase of the SBIR, DEOS designed a laser consistent with the long wavelength requirements for the EW application. Laser components include a gain medium, a pump energy source, and an optical cavity. "The military needed a gain cell with an electro-optical modulator (EOM) to generate high peak power pulses to do a nonlinear optics conversion of specific wavelengths," said Dr. Leon Newman, Coherent's Director of New Product Development in the Connecticut Business Unit, and project director for the LWIR laser source. "They wanted wavelengths through a part of the electromagnetic spectrum that would be able to be broadcast through the atmosphere with low absorption. We took our laser source, ran the optics, and generated four wavelengths, one of which (8.0 μm) had not existed before. That wavelength turned out to be very important for ship defense."

Newman went on to add, "This SBIR was really important to us. Not only did it help us by bringing in income and keeping the lights on, it also provided some funding to develop an in-house RF [radio frequency] power supply for our lasers. Before the SBIR, we purchased RF-power supplies. They were both costly and unreliable. The SBIR allowed us to initiate an internal RF power supply development effort and as a result, we developed a world-class RF design capability. Today, we have three full-time RF engineers on staff. We view this area as a core competency on the same level of our laser engineering competency."

Coherent now produces many sealed CO2 lasers based on SBIR-supported technology, among them the DIAMOND C-Series, CX-Series, and the DIAMOND GEM-100. "Our gain cell concept, which was instrumental in the research conducted for the SBIR, has been used all these years in other commercially available products, like the CX-10. There are parts of the CX-10 that are like the gain cell used in the Navy SBIR," said Newman.

Coherent CO2 lasers are used in a variety of applications and products, including laser marking/encoding, cutting, scribing, engraving, film cutting and processing, rapid prototyping, material processing (for acrylics, cardboard, ceramics, glass, polymer films, leather, paper, textiles, wood, and PCBs), desktop publishing, remote sensing, and an array of medical systems.

DeMaria ElectroOptics Systems, Inc. (Coherent, Inc.)

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