

JP Innovations, LLC

CZMIL Laser System

JP Innovations has teamed with Optech International, Inc. to develop the laser for the Coastal Zone Mapping and Imaging Lidar system (CZMIL) for airborne hydrographic and coastal mapping applications. This system will improve measurement accuracy in shallow waters along coastal zones without compromise of performance in deeper waters. The CZMIL system's design leverages Optech's traditional strength in building scanned, pulsed Lidar systems, takes advantage of JP Innovation's custom laser development capability, and utilizes recent advancements in electronics and computer technology to create a high throughput, coastal mapping Lidar system which is fiscally affordable.

Optech's CZMIL system uses a single laser for both the hydrographic and topographic measurements, which will be performed seamlessly and simultaneously with no need for operator input. Nominal laser parameters were determined to allow the required combination of spot density, area coverage, depth penetration and flight parameters. A laser with the required performance did not exist and therefore Optech asked JP Innovations to develop a new laser system to meet the demands for pulse energy, pulse frequency, pulse duration and beam stability in a rugged and compact package that is suitable for deployment in a small aircraft. The CZMIL operational envelope requires very high frequency data collection (as high as 70KHz) utilizing a hybrid flash-point lidar approach, which places high demands on the transmitted laser beam, namely high pulse energy with short pulse duration and very high fidelity beam characteristics. Because CZMIL will employ a segmented detector approach to realize the requirement for simultaneous topographic and bathymetric imaging, the transmitted laser beam is required to be Gaussian or nearly so.

To meet the stringent CZMIL laser requirements, including operation in an airborne environment, JP Innovations has developed a novel laser design. The CZMIL application requires pulse duration of approximately 2 ns FWHM at a 10 kHz repetition rate. Both 1064 nm and 532 nm beams are needed for the application, with emphasis on the performance of the 532 nm beam. The output pulse energy requirement at 532 nm is 3.0 mJ.

The CZMIL laser system consists of the following components:

- An oscillator / amplifier laser system at 1064 nm
- Diode pump modules
- Second harmonic conversion stage
- Diode driver and Q-switch driver electronics package
- Water cooler unit for the diodes and laser

The CZMIL System delivers a beam that penetrates coastal water and offers a viable solution for many water related applications. This laser system improves the performance compared to prior generations of lasers and helps to make the CZMIL system practical.

JP Innovations, LLC designs and delivers solid state diode pumped lasers (DPSS), eye safe lasers, compact high pulse energy lasers, high peak power 2 ns lasers, optical parametric oscillators, and other non-linear optical systems that can be used for LIBS, LIDAR, medical, bathymetry, designator, illuminator, and other industrial or military applications. If your application requires a custom laser solution, JP Innovations will build it for you!

