

# FY00 Laser Facility Report

The three primary priorities on OMEGA in FY00 in addition to executing target shots (see Table 84.VI) were (1) activate and test the full suite of Cryogenic Target Handling System (CTHS) equipment, (2) improve single-beam uniformity by activating the first terahertz (THz)-bandwidth-capable SSD system, and (3) improve overall on-target uniformity by balancing the beam-to-beam power fluctuations.

The following system improvements and modifications were realized during FY00:

- Demonstration of all Cryogenic Target Handling System (CTHS) subsystems and integrated testing including shooting cryogenic DD test shots; demonstrated capability of up to three cryogenic target shots per week.
- Installation of 1-THz smoothing by spectral dispersion (SSD), characterization of improved beam smoothing, and utilization of THz SSD on many experimental campaigns.
- Installation of 60 modified frequency-conversion-crystal (FCC) assemblies for broad-bandwidth (THz) capability as well as refurbished and environmentally protected optical surfaces (three KDP crystals per beamline). This project virtually eliminated a scatter loss of up to 20% at the end of the beamlines.
- Installation of 60 distributed polarization rotators (DPR's) on the full-aperture UV system for time instantaneous beam smoothing on target.
- Consistent 3% rms energy balance achieved on-target by balancing gain stages to compensate for small-signal-gain variations.
- Installation of a P510 streak camera, which increased system coverage from 20 beams to 50 beams. In addition, the new cameras have higher dynamic range and better frequency response than the original two cameras.
- Improved beamline laser transport by fixing spatial-filter-lens coating degradation. Sequentially removed, repaired, and replaced 231 lenses in the laser chain. By replacing all sol-gel antireflective coatings with hard oxide coatings, the long-term transmission of the lenses will remain high.
- The OMEGA wavefront sensor was relocated to a new platform on top of the south-end mirror structure of the Target Bay and re-engineered for multiplexed diagnostic functions as well as the capability to capture any of five OMEGA beamlines.
- In March 2000 the pulse shaping system was replaced by integrated, electronically synchronized hardware. This aperture-coupled-stripline (ACSL) system has improved performance and increased reliability over the previous pulse shaping system.

Table 84.VI: The OMEGA shot summary for FY00.

LLE-ISE	320
LLE-RTI	195
LLE-LPI	43
LLE-other	24
LLNL	284
LANL	131
NLUF	124
CEA	21
SNL	11
Total	1153