

FY99 Laser Facility Report

FY99 was a productive year on OMEGA; 1207 shots on target were shared by LLE, LLNL, LANL, and NLUF users (see Table 80.VII). Shot operations were conducted on a 12 h/day, 3 day/week schedule; for many campaigns the standard 1-h cycle time for OMEGA was achieved. Uninterrupted 12-h shot sequences resulted in improved efficiency and effectiveness in completing experimental goals.

The following major system modifications were implemented during FY99:

- Upgrade of 2-D SSD to 0.3-THz bandwidth at three color cycles
- Installation of the majority of the hardware necessary to conduct cryogenic target shots
- Installation of the LLNL Active Shock Breakout (ASBO) diagnostic
- Migration to Oracle™ database systems
- Implementation of second tripler frequency-conversion crystals on beams used for planar experiments
- Installation of two full-aperture backscatter stations
- Replacement of the target chamber roughing systems with dry pumps to support incorporation of a tritium-removal system

Improved individual-beam uniformity resulting from an upgrade of the 2-D SSD system is discussed in the article beginning on p. 197. The modification included removing the first-generation 2-D SSD system from OMEGA and replacing it with a pre-assembled modular unit that included high-frequency, multipass electro-optic modulators. Activation of the new 2-D SSD system went smoothly, and its reliability has been exceptional. Notable features include the flexibility to easily migrate to a full 1.0-THz bandwidth (planned for early

FY00), an integrated diagnostic suite, and improved LLE-fabricated holographic optics.

Coincident with the installation of the THz-capable SSD system, second tripler frequency-conversion crystal assemblies were added to 13 of 60 beams. These additional frequency-tripling crystals will provide efficient frequency conversion for laser bandwidths up to the 1-THz level and represent the first stage of a project to modify all 60 beams. With this subset of crystals the planar-foil imprint and Rayleigh–Taylor growth investigations will be extended to higher-uniformity regimes.

The upper and lower pylons of the cryogenic target-handling system (CTHS) were installed on OMEGA. The lower pylon installed on the bottom of the target chamber supports the insertion of targets using the moving cryostat. The upper pylon installed on the target chamber’s north pole supports the cryogenic shroud retraction system. The CTHS will be fully activated in FY00.

Table 80.VII: The OMEGA shot summary for FY99.

LLE-RTI	337
LLE-ISE	243
LLE-LSP	62
LLE diagnostic development	85
NLUF	144
LLNL	173
LANL	163
Total	1207