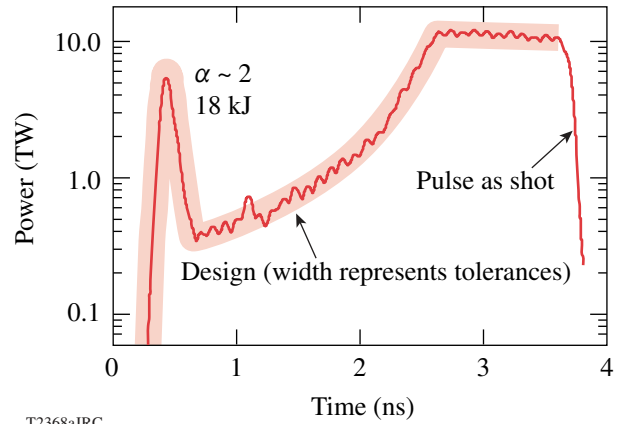


FY07 Laser Facility Report

The OMEGA Facility conducted 1514 target shots for a variety of users in FY07 (see Table 112.V). A total of 27 D₂ and 17 DT low-adiabat cryogenic target implosions that required high-contrast pulse shapes were performed. Such pulse shapes are typically characterized by a narrow picket pulse on top of a low-intensity foot pulse, followed by a high-intensity drive pulse (see Fig. 112.39). Substantial strides have been made with low-adiabat-drive pulse shapes and shock timing. Small picket timing and intensity changes have been demonstrated to effect cryogenic target areal-density measurements in agreement with theory. OMEGA Availability and Experimental Effectiveness averages for FY07 were 92.8% and 95.9%, respectively. Highlights of other achievements for FY07 include the following:

- An offline OMEGA frequency-conversion-crystal (FCC) tuning test bed was developed and activated to tune new OMEGA and OMEGA EP FCC's. This facility supports the ongoing refurbishment of OMEGA crystals and is used to precisely characterize the performance of OMEGA EP FCC's.
- More than 25 new or significantly modified target-diagnostic systems were qualified for use on the OMEGA Experimental



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Figure 112.39
OMEGA single-beam pulse shape from a low-adiabat cryogenic target implosion (shot 47206) using pulse shape HE363001p.

Facility in FY07. These diagnostics supported LLE, LLNL, LANL, AWE, and CEA experiments and all were supported by LLE and the cognizant laboratory. Diagnostic improvements in FY 2007 include

- integration of the LLNL/OMEGA high-resolution velocimeter (OHRV) diagnostic,

Table 112.V: The OMEGA target shot summary for FY07.

Laboratory	Planned Number of Target Shots	Actual Number of Target Shots	IDI NIC	DDI NIC	Total NIC	Non-NIC
LLE	629	698	174	502	676	22
LLNL	386	422	235	0	235	187
LANL	158	192	73	0	73	119
NLUF	117	121	0	0	0	121
CEA	40	40	0	0	0	40
AWE	20	26	0	0	0	26
SNL	11	15	15	0	15	0
Total	1361	1514	497	502	999	515

- upgrade of the active shock breakout (ASBO) diagnostic with a new long-pulse laser system, two ROSS streak cameras, and an off-axis telescope option,
 - integration of an electromagnetic interference (EMI) monitor system to provide baseline and operational data to support short-pulse operations,
 - activation of the magneto inertial fusion energy delivery system (MIFEDS), and
 - qualification of nine x-ray imaging and spectrometer diagnostics.
- The turning mirror structure and surrounding platform were extensively modified to accommodate the short-pulse beam tube (SPBT) and the off-axis parabola inserter/manipulator (OAPI/M); these modifications include replacing two segments of the personnel platform and the addition of a new two-level platform to provide personnel access.
 - The bore diameter of port H7 was increased to provide clearance for the off-axis parabola.
 - The SPBT connecting the OMEGA target chamber to the OMEGA EP grating compressor chamber (GCC) was installed.

Significant modifications were made to the OMEGA Laser Facility in FY07 to integrate the OMEGA EP short-pulse beam into the OMEGA target chamber. These modifications include the following:

- Ten-inch manipulator #2 was modified for near-vertical operation and moved from port H7 to port H3.
- The gated microchannel-plate x-ray imager (GMXI) was modified and moved from port H9 to port H12.