

Section 1

LASER SYSTEM REPORT

1.A GDL Facility Report

The glass development laser (GDL) continued in its role as a UV interaction facility, supporting various programs such as damage testing of optical coatings, several interaction experiments for graduate students, x-ray biophysics and photolithography experiments, holographic beam characterization experiments, and active mirror characterization experiments. Operations personnel from GDL participated in engineering activities on the 25th-beam project — in particular, the Kuizenga oscillator development and active mirrors. Also, operations personnel became involved for the first time in the short-pulse UV probe project.

A summary of GDL operations this quarter follows:

Interaction Shots	87
X-Ray Target Shots	42
Damage-Testing Shots	303
Pointing, Calorimetry Shots	<u>103</u>
TOTAL	535

ACKNOWLEDGMENT

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1.B OMEGA Facility Report

OMEGA operations for this quarter consisted of work in four areas:

- support for several planned experimental campaigns,
- continued manufacturing engineering for the approaching up-conversion of six more OMEGA beamlines,
- procurement activities for the conversion of six additional beams to the UV, scheduled for late fall, and
- engineering support for the 25th-beam project.

Among the experimental campaigns carried out during this quarter were a continuing effort on the uniformity campaign in which equivalent-target-plane photographs were taken to observe the effects of deliberately imposed amplitude modulation of the beams; the thermal-transport studies program; coronal physics; implosion studies, including implosions on very high-aspect-ratio targets; diagnostic development; and two successful NLUF campaigns for users from the U.S. Naval Research Laboratory and the University of Hawaii.

Approximately half of the operations group has been participating in engineering efforts to provide the necessary assemblies to up-convert the second set of six OMEGA beams to the UV. As the quarter neared completion, most of the mechanical assemblies had been prepared for insertion into the laser system when the experimental campaigns are completed in July 1984. Optics for the next six beams are due in July or August, with cell assembly completion scheduled for September. Activation of the next six beams is planned for September, with 12-beam implosions slated to begin in October.

The procurement activities for the next set of six beams have begun during this quarter. Near the end of the quarter the components for the next set will be ordered.

Engineering activities of the group have been centered on the 25th-beam project. The development of Kuizenga oscillators for both OMEGA and GDL continued this quarter with activation of the pre-driver amplifier, activation of the second, active mode-locked, Q-switched oscillator, and redesign of the electronic control packages. The design has been completed for the upgraded OMEGA driver line with activation slated to occur in November. Other areas of engineering activity by the operations group include support of the active-mirror project with the first test-firings occurring this quarter; installation of the active mirrors in GDL is scheduled for the next quarter. A major software engineering project was completed this quarter involving simultaneous acquisition and reduction of data from four streak cameras with optical multi-channel analyzers.

Laser performance has improved as a result of concentrated efforts to improve beam balance and continued efforts to improve measurement accuracy of the calorimetry system. Furthermore,

replacement of the original turning mirrors has improved transport of the UV beams to the target. We were able to consistently place well over 300 J on target, with a high of 388.8 J (for 441 J out of the laser). Beam balance has been particularly impressive, well under the 5% that has been routinely achieved. Our best beam balance this quarter was 2.2% (with 364 J on target), and the average beam balance has been in the vicinity of 4%.

A summary of system activities this quarter follows:

Target Shots	272
System Test	102
Driver Test and Alignment	90
Beamline Testing, etc.	<u>31</u>
TOTAL	495

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