



OMEGA upgrade schematic

During FY90, the U.S. Department of Energy (DOE) carried out two independent reviews of the LLE inertial fusion program. The first was a technical review of the OMEGA Upgrade Preliminary Design (Title 1) on 7 November 1989. This review resulted in the approval of the conceptual design of the OMEGA Upgrade. The second review was conducted by the management and DOE's administration office (MA-22) and validated the cost of the project. In the subsequent year, the detailed design of the system commenced, long-lead items were procured, and the technology demonstration was continued in order to develop the power amplifiers for the upgrade.

The detailed design for the upgraded OMEGA system commenced in October 1990. Construction was expected to take four years.

R. S. Craxton, ed., OMEGA Upgrade Preliminary Design, Laboratory for Laser Energetics, University of Rochester, Rochester NY, LLE Document No. DOE/DP 40200-101 (1989).

FPAC Final Report



Fusion Policy Advisory Committee (FPAC) Final Report

The FPAC review panel was formed by the U.S. Secretary of Energy to take a broad look at DOE's fusion program. In September 1990, they submitted their final report, which endorsed both the magnetic and inertial approaches to fusion energy. It recommended a policy focused on a demonstration power plant to operate by 2025 and a commercial power plant by 2040. FPAC endorsed the construction of a Nova Upgrade, pending completion of the Precision Nova milestones. To further evaluate direct drive, FPAC endorsed the construction of the OMEGA Upgrade. The FPAC report emphasized the participation of universities in fusion science and technology and noted, "With the exception of the University of Rochester, universities have played a minor role in inertial fusion..."

SSD Phase-Modulator Development



Andrea Huberty

Andrea Huberty, undergraduate student, is shown making adjustments to transmission line feeding microwave power to 10-GHz electro-optic phase modulator used to generate controlled laser bandwidths for beam smoothing with spectral dispersion (SSD).

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Single-Segment Amplifier



Prototype single-segment amplifier (SSA) firing (donated to and on display at the Corning Museum of Glass)

LLE developed a 20-cm-diam disk amplifier as the final amplifier for the 60-beam upgrade of OMEGA. The prototype amplifier (shown here during testing) incorporated the best aspects of the highest-quality glass amplifiers built to date. The design emphasized superior wavefront and polarization characteristics, gain over efficiency, and minimum maintenance with a projected lifetime of over 20,000 shots.

LLE Computing Facility Augmented



Cray Research Inc. CRAY-YMP2E/232 computer

LLE's Laser Computing Facility (LCF) was significantly augmented this year with the installation of a new Cray Research Inc. CRAY-YMP2E/232 computer. This is a twocentral-processor system with 256 MB of central memory, a 6-ns cycle time, and vector capability. In addition to central memory, eight disk spindles provide approximately 15 GB of secondary storage.



