Winter 2005-2006
news@TMC™
Technical Manufacturing Corporation

A focused petawatt laser is 2.5 times brighter than the sun if focused through a perfect lens the size of our moon (10^{21} w/cm ^{2}).

TMC's CleanTop® Optical Table System Supports a Texas-sized Laser

Photos courtesy of the University of Texas

Construction of the high-intensity petawatt laser nears completion at the University of Texas at Austin

The University of Texas-Austin is constructing an ultra-powerful laser which will facilitate a number of basic research projects. Research to be carried out will include the interaction of high-energy lasers with matter, response of materials to high pressure shock waves, and the creation of exploding plasmas. The petawatt laser, when completed, will be the most powerful university-based laser in the world. The U.S. Department of Energy is funding the project with $10 million over five years through the National Nuclear Security Administration (NNSA). The laser is being built in cooperation with the Lawrence Livermore National Laboratory (LLNL).

The laser is 2,000 times more powerful than the entire power output of the nation's electric grid

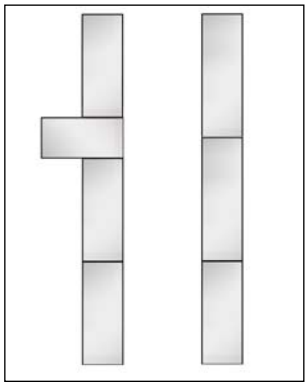
Petawatt Laser nears completion... continued on next page.

INSIDE: TMC introduces Mag-NetX™ – A magnetic field cancellation system

Petawatt laser nears completion at UTexas (Continued from Page 1)

The system includes 150 tons of concrete for shielding X-rays and neutrons.

For a schematic of the optical system, see www.ph.utexas.edu/~utlasers/petawatt_files/petawatt.htm



The optical table system consists of a four-piece and a three-piece, coupled CleanTop® Optical Top.

Photos courtesy of the University of Texas

TMC was chosen to provide the project with a complex optical table system consisting of a four-piece and a three-piece, coupled CleanTop® Optical Top system in a unique geometry. Each coupled top system is supported on a set of TMC's System 1 Rigid Supports and a combination of 8, 10, and 12-foot long tops joined together. The table system provides the ultra-stiff, damped, flat, stable working surface for much of the laser's optical path. TMC was chosen for this project due, in part, to our successful completion of several massive optical table projects for the National Ignition Facility (NIF) at LLNL.

The petawatt laser will produce an ultrashort burst of laser light 2,000 times the combined power output of the national electric grid (0.5 terrawatts vs. 1,000 terrawatts). The laser

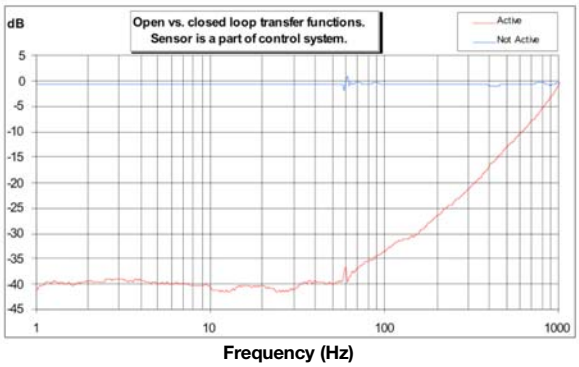
Couple with TMC vibration isolation systems for a complete s

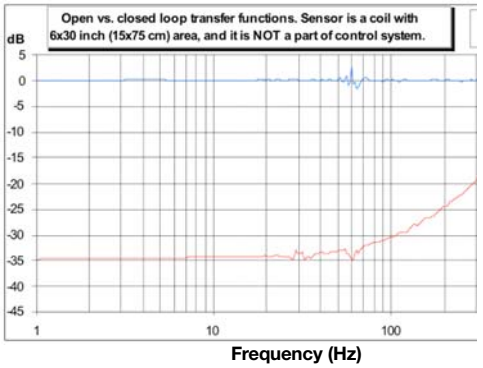
Building on our expertise as the leading designer and manufacturer of active vibration isolation systems that actively sense and cancel building floor vibrations, TMC has developed Mag-NetX™ to actively compensate for magnetic field fluctuations caused by the Earth's magnetic field, nearby machinery, elevators, power lines and other external sources.

Designed for both point-of-use and OEM applications, Mag-NetX is ideal for scanning and transmission electron microscopes, electron beam lithography systems, ion beam instruments, and any tools that incorporate a charged beam.

Mag-NetX™

Plot 1 *Transfer function at the exact sensor location. Excitation coil is not the part of cancellation system. Sensor is the magnetic flux gauge and it is part of cancellation system.*





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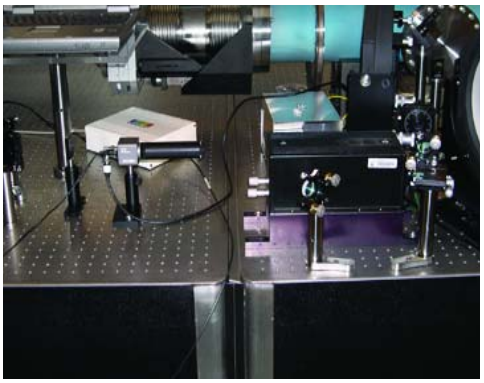
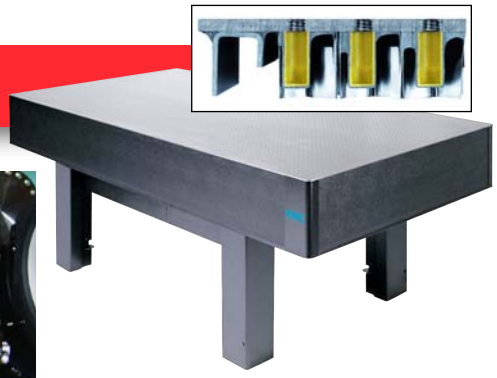




CleanTop® II Optical Tops exceed all current industry standards for structural stiffness and damping. Our honeycomb core is a closed-cell structure with basic cell size of 0.5 in.², giving a core density of 13-14 lbs/ft³, significantly greater than others on the market.

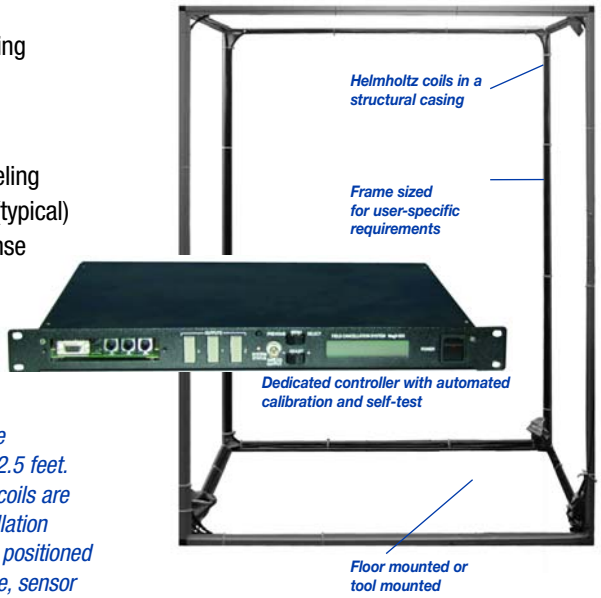
starts as a 100 femtosecond pulse generated by a commercial laser. It is stretched to a 2 nanosecond pulse, then amplified by 10^{11}. It is then compressed again to a 150 femtosecond pulse.

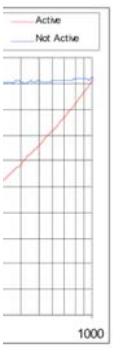
One of the project's goals is to maximize the neutron yield from a controlled fusion reaction to yield insights into the safe storage of the aging nuclear weapons stockpile and into the feasibility of controlled fusion.

For more information visit www.utexas.edu/opa/news/03newsreleases/nr_200309/nr_physics030902.html

solution to interference from environmental sources

- continuous field monitoring and canceling
- set and forget operation
- AC field canceling
- Wideband DC field canceling
- 50 x field improvement (typical)
- dynamic, 100 ms response
- interface for computer monitoring





Plot 2
Transfer function in the volume of 0.5 x 0.5 x 2.5 feet. Excitation and sensor coils are NOT the part of cancellation system. Excitation coil positioned outside Helmholtz cage, sensor coil is positioned near magnetic flux gauge and has dimensions of 0.5 x 2.5 feet.

For more information visit www.techmfg.com/products/magnetic/magnetx.htm

NEW SETUP GUIDE CD EASES INSTALLATION

Our new "Vibration Isolation Systems Setup Guide" addresses many of the issues our customers have when installing vibration isolation systems. The 155-page manual is full of useful information and illustrations help to simplify the task. An easy-to-navigate electronic version is now shipped with every order and is ***available as a downloadable pdf file on our web site at www.techmfg.com/pdf/SG0405.pdf.***

REQUEST OUR GENERAL CATALOG

It includes CleanTop® II optical tops, breadboards, and supports; laboratory tables and tabletop platforms; floor and sub-floor platforms and stands; state-of-the-art isolators; acoustic enclosures; accessories; and standard and custom configurations. The technical background section is a primer on precision floor vibration isolation.

Visit www.techmfg.com/company/catalog_request.html.

SEE US AT THESE UPCOMING SHOWS

- ***Lab Automation, Palm Springs***
  January 22-24
- ***Photonics West, San Jose***
  January 24-26
- ***Biophysics, Salt Lake City***
  February 18-22
- ***Pittcon, Orlando***
  March 13-16
- ***CLEO, Long Beach***
  May 23-25
- ***EIPBN, Baltimore***
  May 30 - June 2
- ***SEMICON West. San Francisco***
  July 10-14
- ***M&M, Chicago***
  July 30 - August 3
- ***Neuroscience, Atlanta***
  October 14-18
- ***SEMICON Japan***

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Quiet work surfaces for precision research and manufacturing

TMC IS THE WORLD'S LEADING MANUFACTURER OF PRECISION VIBRATION ISOLATION SYSTEMS FOR LOW-AMPLITUDE BUILDING FLOOR VIBRATION.

www.techmfg.com

Invar CleanTop® Breadboards aid in identification of biological, chemical, radiological, and nuclear threats.

ITT Industries of Albuquerque, NM is developing a field reconnaissance system to detect biological, chemical, radiological, and nuclear surface contamination in support of the Joint Contaminated Surface Detector Program. The system will use a non-surface contacting detection technology called UV Raman Surface Detection. This technology illuminates surfaces with a laser source and compares backscatter to a library of Raman spectra. It was developed to shorten detection times (compared to mass spectrometers) to enable faster response. Detection systems can be mounted in All-Terrain Vehicles and measurements and detection can be accomplished while vehicles are traveling at maximum velocity.

Success depended in part upon finding a stable spine for the optical system that provided the required stiffness, damping, and flatness to achieve a stable optical system. The added requirement that this platform have a very high level of thermal stability in extreme temperature environments necessitated that it be made from Invar, an alloy of stainless steel with a coefficient of thermal expansion near zero.

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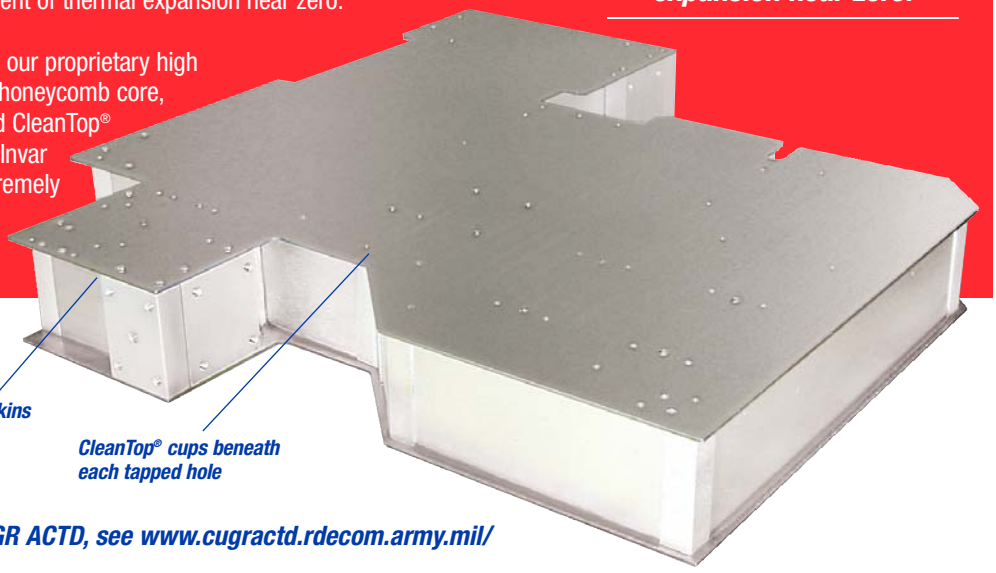
TMC was able to incorporate our proprietary high density, small cell-size steel honeycomb core, dry-damping techniques, and CleanTop® sealed-hole technology with Invar alloy skins to achieve an extremely dynamically and thermally stable breadboard.



For more information on CUGR ACTD, see www.cugractd.rdecom.army.mil/