Los Alamos National Laboratory
Request for Proposals
Trident Laser System (TLS) Redeployment and Life Extension
October 14 – November 15, 2016

Los Alamos National Security, LLC ("LANS") is the manager and operator of Los Alamos National Laboratory ("LANL") for the U.S. Department of Energy's ("DOE's") National Nuclear Security Administration under contract DE-AC52-06NA25396. LANS is a mission-centric Federally Funded Research and Development Center focused on solving the most critical national security challenges through science and engineering for both government and industry sectors.

This is not a procurement. LANS is seeking proposals from interested parties to undertake redeployment of the Trident Laser System to a new operating location, where its life as a scientific research instrument may be extended and potentially upgraded with new capability, purposed for independent research as well as for collaboration with Los Alamos scientists. LANS intends to pay for inventory, packing, crating, and shipping costs. The receiving institution is expected to pay for all installation, upgrade, calibration, operations, and maintenance costs.

Institutions considered most suitable for TLS redeployment include academic and/or government research laboratories located in the United States. The expectation is that redeployment will commence upon conclusion of a property transfer agreement with a Federal site, or else a mission move or a joint use agreement with an academic site. LANS is open to negotiating other mechanisms, too, such as CRADAs, MOUs, etc. At the end of the agreement period (e.g. after 10 years) the TLS will either be returned to the Laboratory or committed to salvage at the Laboratory's discretion. Of course there will be no return expected in the case of a property transfer.

The TLS will be readied for physical transfer by summer 2017. LANS prefers to award redeployment of the entire TLS, however alternative solutions for redeployment of an operating subset of TLS will receive serious consideration. An important aspect of redeployment is that LANS scientists retain occasional access to TLS for continuing research. A mandatory proposal requirement in this solicitation is for an outline of the access process by which Laboratory scientists may perform experiments on the redeployed TLS. The Laboratory would like to understand how designs for experiment time on the system will be evaluated, prioritized, etc.

RFP Organization and Contact Information.

Solicitation Background, the TLS Technical Description, and Proposal Format instructions are each outlined below. Proposals must be received at TLS2016@lanl.gov no later than 5:00 pm Mountain Time on Tuesday, November 15, 2016. During the solicitation period, clarification questions may be sent to TLS2016@lanl.gov. During the solicitation period, questions will be reviewed and answers will be posted on the TLS RFP webpage as they are received (http://www.lanl.gov/projects/feynman-center/deploying-innovation/intellectual-property/technology-opportunities/trident-laser-system.php).

LANS desires to make its selection and to notify the selected party before the 2016 winter holiday. This timing will afford the selected party the opportunity to attend live experiments in early CY 2017, so they may familiarize themselves with TLS while it is still operational at Los Alamos.

LANS reserves the right to cancel this Solicitation in whole or in part at any time without incurring any liability/damages associated with such cancellation. Additionally, LANS reserves the right to withdraw part of the equipment identified in this Solicitation in the event, LANS discovers any potential safety or security issues associated with relocating all or part of the TLS.

BACKGROUND

In May 2016, LANS announced that the Trident Laser Facility would cease operating effective September 15, 2016. That date was subsequently extended. The current plan is to operate for an additional, limited period in early CY 2017, and to leverage that activity to provide a training opportunity to the party that will redeploy the TLS. The TLS will then be disassembled and packaged for shipping to the new site, where it may be reconstituted and continue to be used by the physics research community.

It is LANS' intent that Trident will be sited with an organization that will supply its own funding for TLS installation, calibration, and lifecycle operation. Ideally, the receiving party will plan to upgrade TLS with new capability. The equipment to be transferred includes the laser, its power supply, target station and chamber, and a suite of diagnostic instrumentation. Under a mission move or a joint use agreement it is anticipated that all equipment will remain property of the Laboratory and subject to on-site configuration verification.

TECHNOLOGY DESCRIPTION

The Trident Laser System at Los Alamos National Laboratory is an extremely versatile neodymium-glass laser system dedicated to high energy density physics research and fundamental laser-matter interactions.

The laser system consists of three high-energy beams that can be delivered into two independent target experimental areas. The target areas are equipped with an extensive suite of diagnostics for research in ultra-intense laser matter interactions, dynamic material properties, and laser-plasma instabilities. The laser system diagnostics will be included in the transfer. The target area diagnostics will remain at LANL, though may be available for specific, collaborative experiments in the relocated facility. The attached inventory list includes the laser diagnostics that would be included in the transfer.

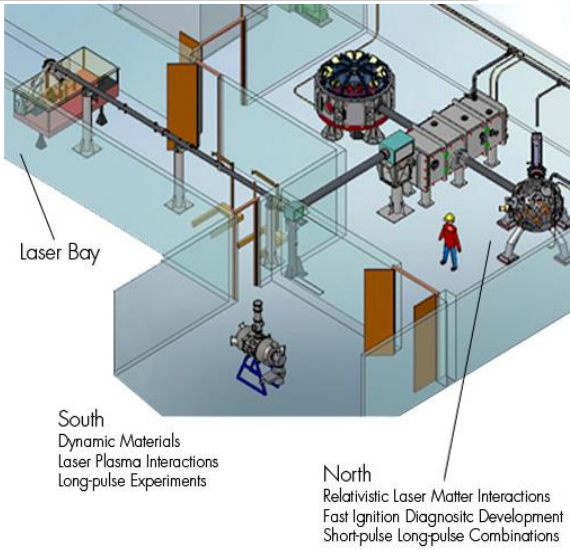


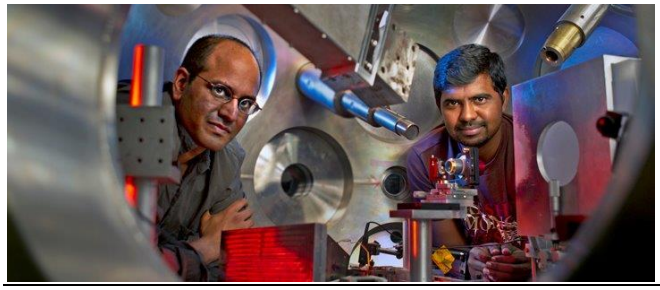
Figure 1. Target areas

Discoveries made at the Trident facility include

- laser-accelerated MeV mono-energetic ions
- nonlinear kinetic plasma waves
- transition between kinetic and fluid nonlinear behavior for plasma waves
- other fundamental laser-matter interaction processes

Trident has achieved world records in many aspects of laser-accelerated ion research, including

- beam emittance
- conversion efficiency
- proton and ion energies



Sasi Palaniyappan, right, and Rahul Shah left inside a target chamber where the TRIDENT short pulse laser is aimed at a very thin diamond- foil target, a fraction of a micrometer thick. The laser delivers a power on target of 150 Terawatts focused into a 7 micrometer spot, yielding laser brilliance over 100 times more intense than needed to make the target electrons fully relativistic.

LASER CAPABILITIES

- 2 long-pulse beams
  - 250 J each at 527nm, 100ps - 5ns
  - 1 kJ each at 1054nm, 100ps - 10µs
- 1 short-pulse CPA laser beam
  - Up to 120 J, 500 fs, 250 TW
- Simultaneous long-pulse and short-pulse beams on target
- Intensity > 10^{20} W/cm^2 for short-pulse laser-matter research
- Low pre-pulse for short-pulse laser-matter research
- Diffraction-limited focusing for fundamental laser-plasma research
- Raman cell amplifier for unique pump-probe laser-plasma experiments
- 45 minute shot cycle
- 1000 shots/year

Invisible infrared light from the 200-trillion watt Trident Laser enters from the bottom to interact with a one-micrometer thick foil target in the center of the photo.

DIAGNOSTIC SUITE

Multiple diagnostics enable health and status monitoring of the system.

LANS TLS INTELLECTUAL PROPERTY INCLUDED

Patent Applications:
None

Copyrights:
None

PROPOSAL FORMAT AND CONTENT EXPECTATIONS

Los Alamos invites proposals of no more than 8 pages, single-spaced, 1-inch margins all around, and using 12-point font. Supplementary material may be appended, with no page limit.

Proposals should be submitted that at a minimum use the following organizational rubric:

- Executive Summary and Strategic Intentions
- Mandatory Requirements
- Desirable Qualities
- Redeployment and Operations Calendar
- Points of Contact
- Supplemental Materials

1. Executive Summary and Strategic Intentions (1-2 pages recommended)
    a. Provide a summary of the plans to take physical control and redeploy the Trident Laser System, including identification of its new location and a schedule for operation. Outline how TLS will be made functional and accessible for users, what roles it will perform in the host institution's suite of capabilities, and what sort of physical facility it will be housed in. Will the entire TLS be redeployed or just an operational subset? If just a subset, what is the rationale behind it?
    b. Outline the process by which Los Alamos scientists may plan to continue to have access to the redeployed TLS. Discuss the overall user community that is expected to use the redeployed TLS as well, and discuss what other US government sponsors (if any) will be likely to make use of it.
    c. Summarize any upgrade plans. Comment on how the TLS will play a role in the advancement US and global sciences, how it may continue to benefit national security science, and how it will be leveraged to graduate students into science careers.

2. Mandatory Requirements (1-3 pages recommended)
    a. Plans to redeploy into operation – What steps will be taken to schedule shipment, take delivery, perform site preparations, execute reassembly, and recalibrate and requalify for operation? Will it be redeployed in whole or in part? Who will be the key staff during redeployment? During operation?
    b. Collaboration concepts – What is the institution's process for granting access to Los Alamos scientists to perform experiments? What is the institution's process for joint publications with Los Alamos scientists? Will preferential weight be given to Los Alamos and/or other national security laboratories' requests for time on TLS?
    c. Lifecycle support – What assurance can be given regarding availability for experiments for all users (e.g. how many days per month)? What will be the sustainable source(s) of funding for staffing? Power? Maintenance and service? Will the Laboratory be consulted and kept abreast of configuration changes, upgrade plans, usage and availability, etc.? How will the equipment be insured?
    d. Access controls – How will physical security be imposed, balanced with the need to keep the system readily accessible for its user communities? What plans will there be for virtual security, such that nominal considerations (e.g. user authentication, data integrity, intellectual property, export control, etc.) are addressed?
    e. Safety controls – The laser is extremely powerful, and potently destructive if not aligned and calibrated correctly. Who will act in a safety office role? What safety

procedures will be followed? How will a culture of safety awareness be created and maintained? What user and operator training will be required? What provisions and procedures will be made for emergencies?

f. Configuration controls – If the proposal concept is that the Laboratory retains formal ownership of the TLS, how will the relocation host ensure control over the subcomponents, knowing that some may be replaced during the system's extended lifetime, either through normal wear and tear or through upgrades?

3. Desirable Qualities (1-2 pages recommended)
    a. Upgrade concepts – What are they? When would they be integrated into TLS? What new capability would they deliver?
    b. If awarded, will the institution's staff members attend live experiments at Los Alamos in the Jan-Feb 2017 timeframe to take advantage of live familiarization prior to system decommissioning?
4. Redeployment and Operations Calendar (1 page recommended)
    a. Using a Gantt chart format (or some other visual aid), summarize the schedule of phases, tasks and milestones for delivery, standup, calibration, entry into operation, user periods, maintenance periods, etc. Identify who will be responsible for which functions.
5. Points of Contact (1 page or less recommended)
    a. Proposal handling (e.g. requests for clarification) and award notification
    b. Agreements negotiation (e.g. contract administration, legal counsel)
    c. Technical leadership (please provide a CV as supplemental material)
    d. Technical operations team (please provide CVs as supplemental material)
    e. Controls personnel or offices; i.e. safety, access, and configuration

WHAT WE ARE REQUESTING

If you are interested in exploring this redeployment opportunity, please submit a Trident Laser System Redeployment and Life Extension Proposal on or before ***5:00pm Mountain Time, Tuesday, November 15, 2016.*** Your Proposal should include, at a minimum, the items listed above; however, you are welcome to include any supplemental information regarding your concepts or your institution (brochures, research whitepapers, etc.) that may help us to evaluate your interest and suitability as a redeployment site. ***Note: Please properly mark any information that your institution considers proprietary or business-sensitive. LANS will supply a Non-Disclosure Agreement (NDA) to entities that require such protection.***

LANL Business Development Contact – Richard P. Feynman Center for Innovation:

Steven F. Stringer
Los Alamos National Laboratory
P.O. Box 1663, MS C333
Los Alamos, NM 87545
Tel:505/660-2177
Email: TLS2016@lanl.gov

Attachment(s):

1. TLS Equipment Inventory Preview: A list and photographs of TLS configuration components available for redeployment. It is a general overview and is not to be treated as an exact inventory. The exact inventory will be developed subsequent to award and in consultation with the receiving institution(s).

Trident Laser and Associated parts

Room 125 Control Room
Phase plates & beam forming optics

8 mm focus IR holographic beam shaper
2-2mm hex random phase plates for 527 nm
2-6mm hex random phase plates for 527 nm
8" diameter phase zone plate for 527 nm
Kineform phase plate for 1mm square focus, 527 nm
5mm square random phase plate for 527 nm
12 mm hex random phase plate for 527 nm
multple tent wedges and windows

Room 125 Control Room
misc small optics & filters
camera lenses and microscope objectives

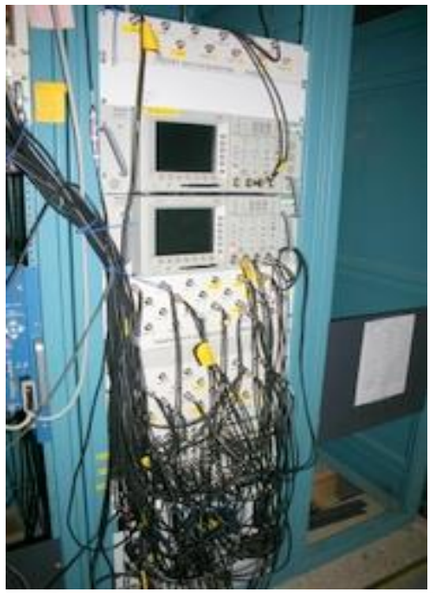
Room 125A Control Room
Vacuum gauge panel (8 vacuum gauges)
3 screen panel LCD video monitors
3 screen panel CRT video monitors
Fiber video link panel
Interlock control panel
2 CRT video monitors
1 National instruments GPIB 110 bus extender
Home built fiber optic network controller
2 National instruments fiber optic bus extenders

Room 125A Control Room
Laser Control computer (on left)
Dell, bc 1162961

Data acquisition system on right
only software will be included

Room 125B Screen Room
LANL built fiber optic to electrical pulse converter
National Instruments GPIB-110 bus extender
2 Stanford Research Systems (SRS), Inc, DG535 delay generators
LANL built fast faraday interlock circuit
1 rack of electrical to fiberoptic pulse converters

Room 125B Screen Room
SRS DG535 delay generator
2 Keithley system 199 multimeters
LANL built signal distribution panel
Lecroy Model 8025 instrument mainframe
PR612 output module
6010 magic controller



Room 125B Screen Room
3 LANL built signal distribution panels
2 Tektronix 3034B oscilloscopes
1 National Instruments (NI) PXI-1042 controller
6 NI PXI-6115 input modules
1 NI PXI-6030E digitizer
7 NI BNC-2090 distribution panels

Room 127A Optics Storage Room

Approximately 200, 4" - 12" Optical spares

Windows
Mirrors
Lenses

Room 127 Front end room
Crate 3
LeCroy model 8025 instrument mainframe
Lecroy model 6010 magic controller
Bira model 3224 digitizer
Kinetic Systems model 3110 DAC
Kinetic Systems model 3523 ADC
2-Bira model 2324 input register
2-Bira model 4224 BCI
2-Isolation amplifier
Kinetic systems display module
2 LANL built digital isolation units
KMS, inc isolation interface
PXI inc, model 1565 HV power supply
remote 110 V relay
optical to electrical pulse converter box

Room 127 Front end room
Continuum control system
PU 610 A
4-PU 610 G
Signal distribution panel

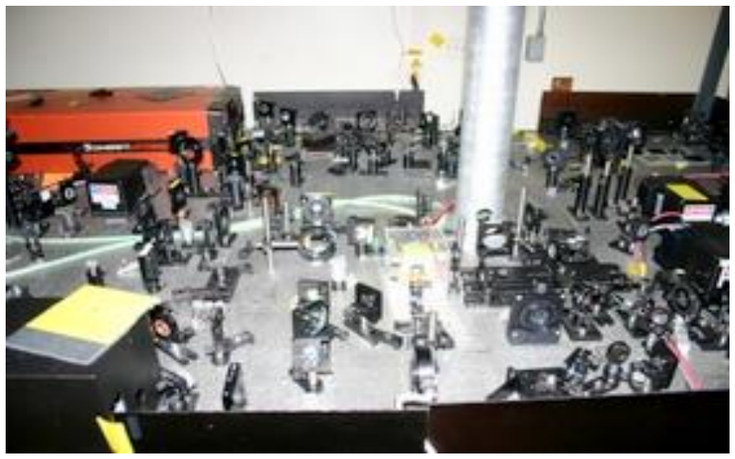
Room 127 Front end room
Pragmatic model 2416A arbitrary waveform generator
NP photonics fiber laser source
Kentek model AWG-10 programmable inpulse synthesizer
LANL built interlock panel
high bandwidth electro-optic fiber modulator

Room 127 Front end room
Tektronix 3054B oscilloscope
Dell computer monitor

Room 127 Front end room
Coherent model 7600 modelocker driver
Cutting Edge Optronics (CEO) model 2800 laser controller
SRS DG535 delay generator
Tektronix SCD 5000 oscilloscope

Room 127 Front end room
3- Thermo-Scientific Merlin M-25 water chillers

Room 127 Front end room
East end of oscillator table
Modified Coherent Antares oscillator
with diode pumped gain module
Regenerative amplifiers
2 CEO model RBA-30 gain modules BC's 1233779, 1233780
2 Continuum, Inc, pockels cells
1 Medox pockels cell, BC 971980
1 Hamamatsu model R1328U-01 fast photodiode
misc small optics and mounts



Room 127 Front end room
Middle of oscillator table
1 CEO model RBA-30 gain module, BC1233778
misc small optics and mounts
5' x 10' optical table

Room 127 Front end room
West end of oscillator table
3-medox HV 5 ns pockels cells
Long pulse ring oscillator
CEO model RB-30 CW gain module
Acousto-optic modulator
Electro-Optics Technology(EOT) 4 mm aperture faraday isolator
External EOT faraday isolator
misc small optics and mounts

Room 127 Front end room
Left Rack

Medox Pockels cell driver
NEOS Acousto-optic modulator driver
Power isolation unit
ENI model 310L RF amplifier

Righ rack

SRS DG645 delay generator
2-SRS DG535 delay generators

Room 127 Front end room
Left Rack

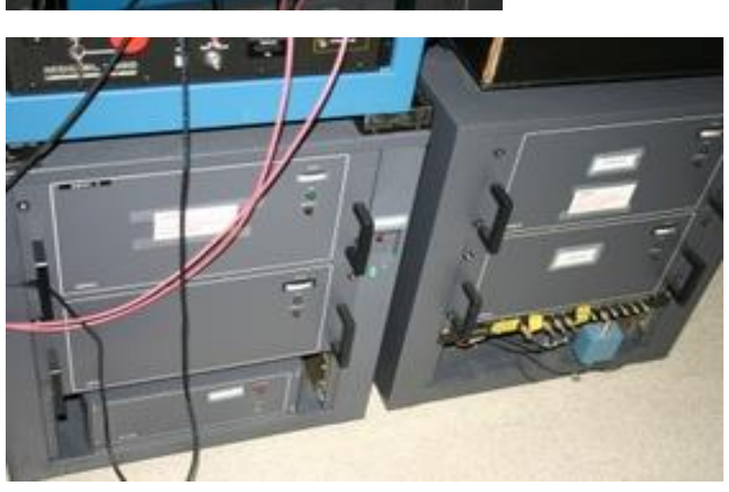
Continuum model CB302 capacitor bank

Right rack

Medox pockels cell driver

Room 127 Front end room
top of first table cover

3-CEO E-drive diode pumped amplfier drivers
3-XPD 120-4.5 DC power supplies
Uniblitz model SD10 shutter controller
(Computer shown not for transfer)



Room 127 Front end room
SRS DG535 delay generator
2-Medox pockels cell drivers
Lasermetrics model 8025RS pockels cell driver
CEO model 2800 CW diode pump amplifier power supply

Room 127 Front end room
4-Contiuum CB302 capacitor banks
SI 1000 pockels cell power supply

Room 127 Front end room
East end of first rod amplifier table

Continuum 25 mm glass rod amplifer module
EOT 25 mm permanent magnet faraday isolator
Continuum 20 mm to 40 mm beam expanding spatial filter

Room 127 Front end room
Center of first rod amplifier table

Continuum 16 mm glass rod amplifier module
Continuum 10 mm to 20 mm beam expanding spatial filter
misc optics and mounts
5' x 12' optical table

Room 127 Front end room
West end of first rod amplifier table

Continuum 45 mm glass rod amplifier module
EOT 16 mm permanent magnet faraday isolator

Room 127 Front end room
4-Continuum CB303 capacitor banks

Room 127 Front end room
misc optics and mounting hardware

Room 127 Front end room
more misc optics and mounting hardware

Room 127 Front end room
New focus 25 Ghz fiber optic coupled photodiode
Tektronix model 7603 oscilloscope with 7S12 sampling module

Room 127 Front end room
misc spare equipment

16 mm amplifier rod
25 mm amplifier rod
45 mm amplifier rod
64 mm amplifier rod
72 mm Cleveland Crystals pockels cell
approx 50 rod amplifier flashlamps
25 Continuum Powerlite flashlamps
misc spare electronic circuit boards
water filters
power meters

Room 127 Front end room
misc rod amplifier parts
Antares laser parts
obsolete Nd:YLF laser rods
misc electrical cables and tie wraps

Room 129 West Bay
Optical stand
2'x2' optical breadboard
3" HR mirror and mount

Room 129 West Bay
Continuum 40 mm to 60 mm beam expanding spatial filter
Precision Applied Science 60 mm to 92 mm beam expanding spatial filter
2'x12' optical table

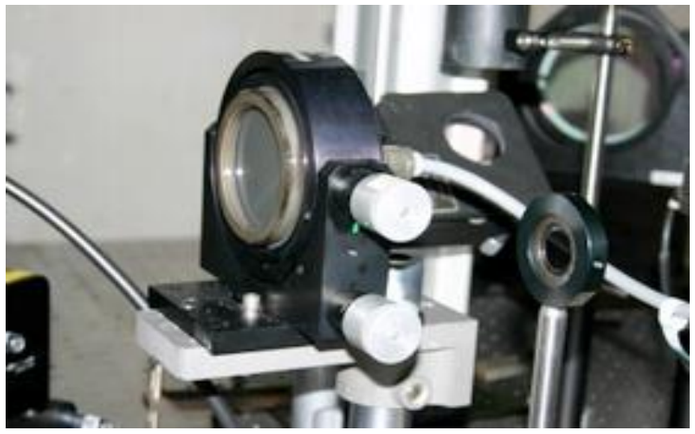
Room 129 West Bay
Continuum 64 mm glass rod amplifier
5.5"x10.5" polarizer and mount

Room 129 West Bay
8-Continuum modle CB303 capacitor banks

Room 129 West Bay
Night-N, inc, deformable mirror controller
(computer not included)

Room 129 West Bay
3-Bournlea model 3150 HV pockels cell drivers
SRS DG535 delay generator
Tektronix TDS 3054B oscilloscope

Room 129 West Bay
3-Cleveland Crystals model TX7595 pockels cells
4-5"x10" polarizers
2-6" dielectric mirrors
4-4" dielectric mirrors
4" diameter scientech caloimeter
4'x8' optical table



Room 129 West Bay
3" diameter Night-N deformable mirror

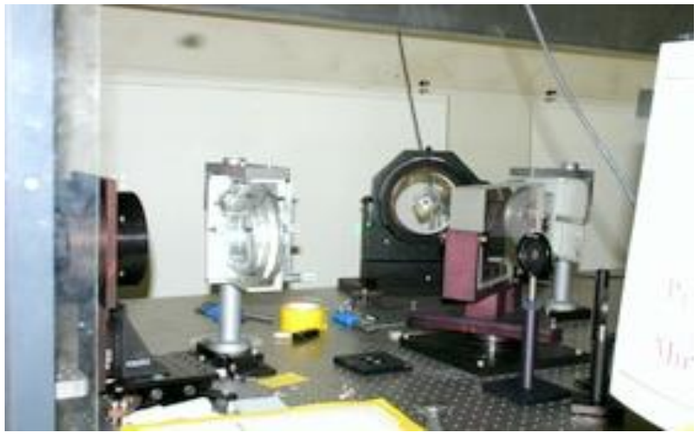
Room 129 West Bay
SF4 spatial filter assembley
2-lenses
2-windows
vacuum vessel
suport structures

Room 129 West Bay
7-GE 10 cm glass disk amplifiers

Room 129 West Bay
SF5 spatial filter assembly
2-lenses
2-windows
vacuum vessel
support structure

Room 129 West Bay
C beam turning optics

2-7" HR mirrors
1-8" AR/uncoated splitter
1-6" HR mirror
mounts & support structures



Room 131 North Laser Bay
A beam turning optics

2-4" diameter quartz 1/2 waveplates
1-7"x14" polarizer
1-7" HR mirror
various mounts
4'x10' optical table

Room 131 North Laser Bay
B beam turning optic

1-7" HR mirror and mount

Room 131 North Laser Bay
4-10 cm diameter GE glass laser disk amplifiers

Room 131 North Laser Bay
3- vacuum spatial filters - SF6, SF7, SFC2
2 windows each
2 lenses each
vacuum vessels
support structures

Room 131 North Laser Bay
FR100 A & B pulsed faraday isolators
2 polarizers
2-4" diameter 1/2 wave plates
1-8" Scientech calorimeter
2-3'x5' optical breadboards
supporting structures

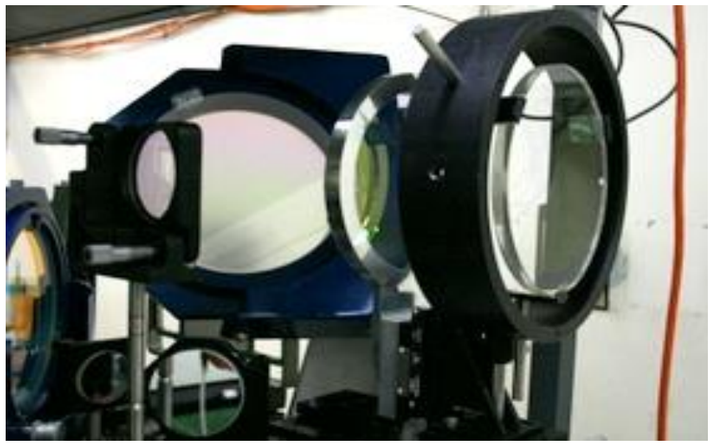
Room 131 North Laser Bay
2-10 cm glass disk amplifiers
Spatial filters SF8, SF9
2 windows each
2 lenses each
vacuum vessels
support structures

Room 131 North Laser Bay
4-14 cm glass disk amplifiers

Room 131 North Laser Bay
North bay storage shelves
2-spare Medox pockels cells
1-Medox pockels cell driver
misc electronics
spare rod amplifier cables

Room 131 North Laser Bay
Frequency conversion & alignment table -- southeast side

2-8" 22.5 degree HR mirrors
2-7.5" AR/unc splitters
1-9" diameter, 1.5 cm thick KDP frquency doubling crystal
1-9" 45 degree HR 527nm mirror
2-Scientech model 380801, 8" diameter calorimeters
5'x10' optical table

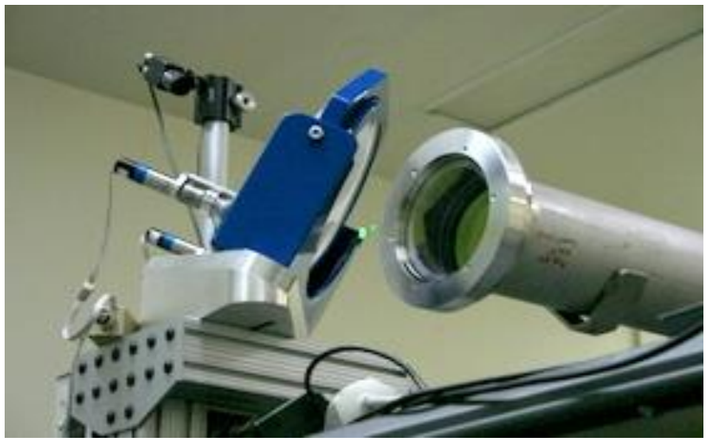


Room 131 North Laser Bay
lower C beam periscope optics

9" diameter HR mirror
SFC2 output lens
7.5" Ar/uncoated splitter
misc mounts

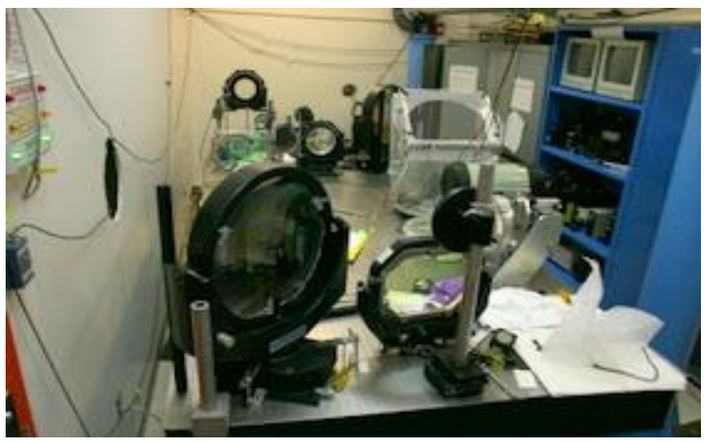
Room 131 North Laser Bay
B beam & alignment beam optics

9" diameter HR mirror & mount
2-6" diameter collimating lenses
misc mounts
Lasermate 527 nm diode pumped alignment laser

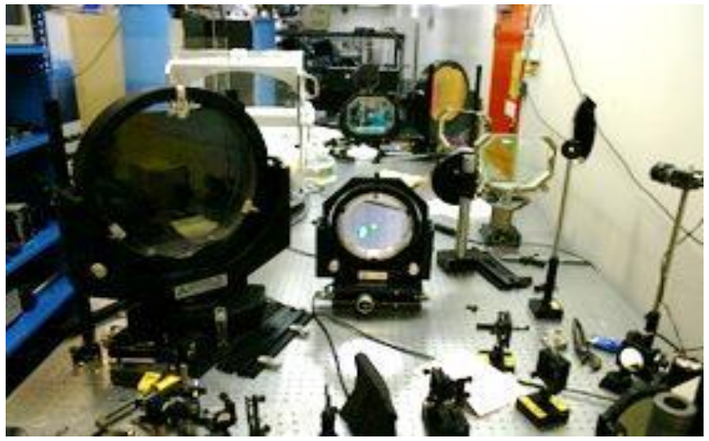


Room 131 North Laser Bay
C beam periscope upper optics
- 9" diameter HR turning mirror & mount
- Input to C beam relay pipe
- support structures

Room 131 North Laser Bay
C beam relay pipe
- vacuum tube
- 2 lenses
- 3 support pedestels



Room 131 North Laser Bay
Probe beam compressor table (from west)
- 2-16" diameter gold gratings & mounts
- Roof mirror assembly
  - 2-12"x18" HR mirrors
  - roof mirror mount
- 3-8"x11" octagonal HR mirrors
- 2-7" diameter HR mirrors
- 1-8" diameter mirror
- 1-8" diameter lens
- misc small diagnostic optics

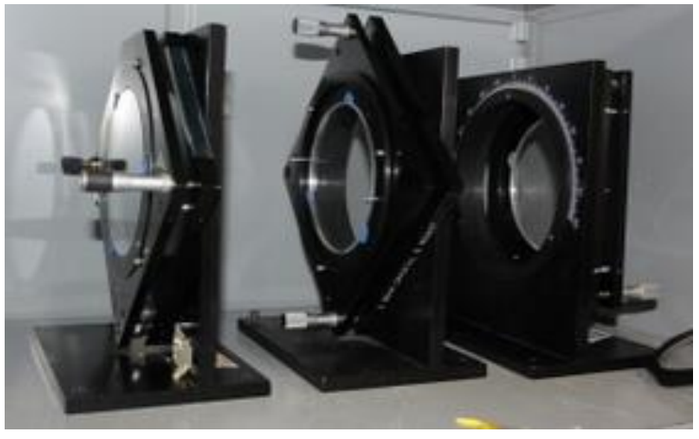


Room 131 North Laser Bay
Probe beam compressor table (from east)

Room 131 North Laser Bay
"purple pipe" storage cabinet 1
8" diameter mirror
3"x4" grating
misc video equipment

Room 131 North Laser Bay

small diameter flashlamp pumped rod amplifiers
video equipment
1'x2' optical breadboard
energy meters



Room 131 North Laser Bay

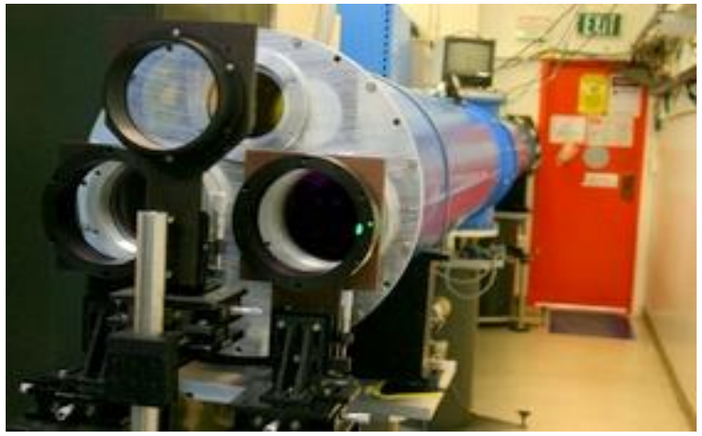
"purple pipe" storage cabinet 3 shelf 1

3-6"diameter KDP frequency doubling crystals

Room 131 North Laser Bay
"purple pipe" storage cabinet 3 shelf 2
7-1" calorimeters
2-2" calorimeters
9-4" calorimeters
4-8" calorimeters

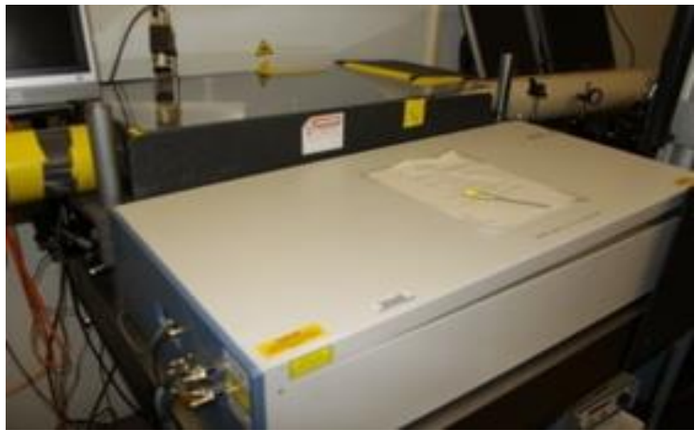
Room 131 North Laser Bay
"purple pipe" storage cabinet 4 shelf 1
Omega frequency tripling crystal assembly
8" diameter frequency doubling crystal
12-6"x6" ND filters
Liconix model 4200PS HeCd laser

Room 131 North Laser Bay
"purple pipe" storage cabinet 4 shelf 2
2-Coherent pockels cell & timing controllers



Room 131 North Laser Bay
Final AB vacuum spatial filter

- 2-7" windows
- 2-7" lenses
- 1-6" window
- 1-6" lens
- vacuum vessel
- support structure



Room 117 Short Pulse Front End
Oscillator and first stretcher table

- Time Bandwidth Products GLX-200 oscillator
- Pulse stretcher with 6"x12" gold grating
- misc small optics
- 4'x10' optical table

Room 117 Short Pulse Front End

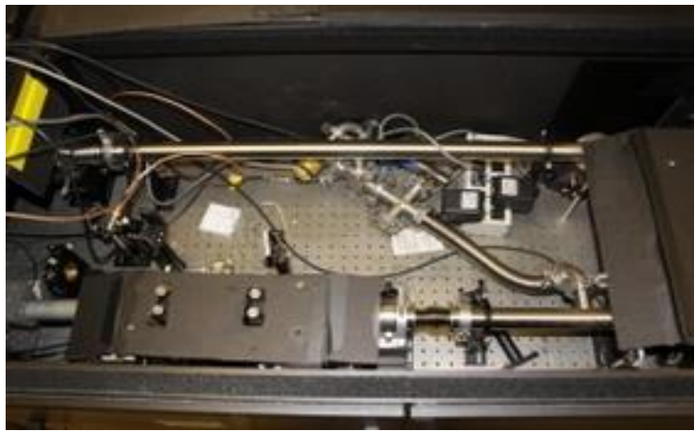
4-beam periscope structures

Room 117 Short Pulse Front End
CLX-1100 pulse synchronizer
GLX-200 power supply

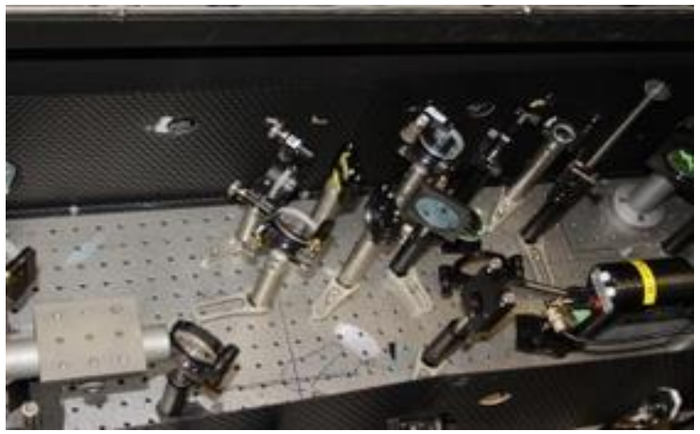
Room 117 Short Pulse Front End
Continuum Powerlite laser bc 1232786

Room 117 Short Pulse Front End
Continuum fiber optic seed laser

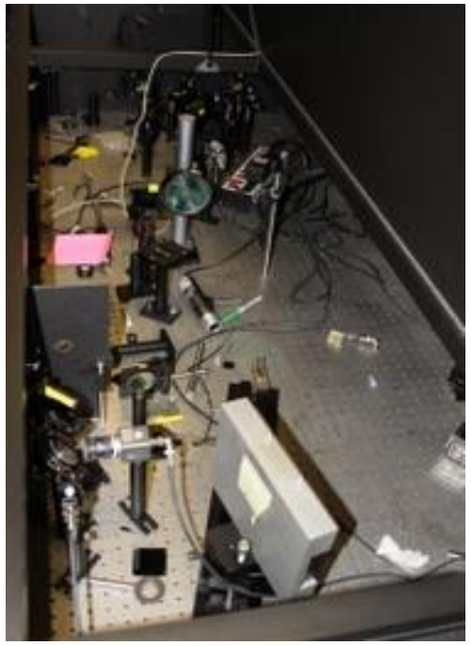
Room 117 Short Pulse Front End
Pfeifer vacuum pump station



Room 117 Short Pulse Front End
first stage OPA's and spatial filters
misc optics

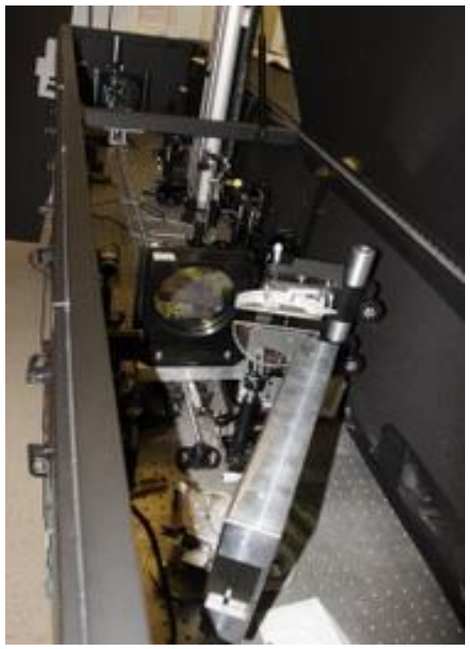


Room 117 Short Pulse Front End
2nd stage OPA's
misc optics
1" calorimeter
video camera



Room 117 Short Pulse Front End
Pulse cleaning table

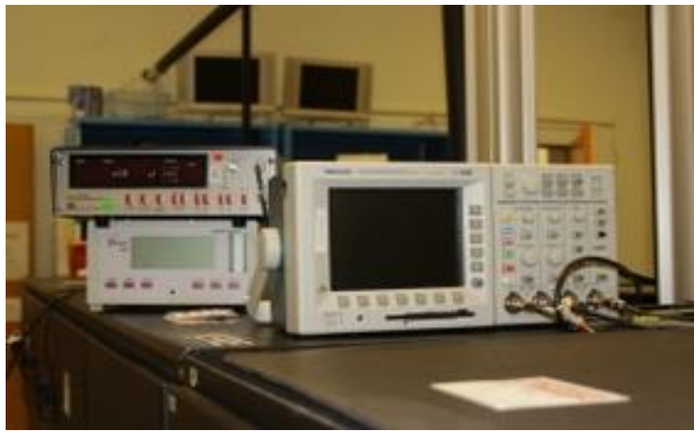
6.5"x8.5" gold coated grating
40mm x 60 mm gold coated grating
4'x10' optical table
pulse cleaning crystals
misc optics



Room 117 Short Pulse Front End
Final Pulse stretcher

8"x13" gold coated grating
6" diameter super polished mirror
misc optics and support structure
4'x10' optical table

Room 117 Short Pulse Front End
Tektronix TDS 684C oscilloscope
Dell computer monitor
Laser Precision RJ 7200 laser energy meter



Room 117 Short Pulse Front End
Tektronix TDS 3054B oscilloscope bc 1162021
Laser Precision RJ 7200 energy meter
Scientech Vector S310 power meter

not shown: 2 cabinets of small optics, mounts, & crystals

Room 115 Optics Clean Room
6-Omega frequency tripling assemblies
1-40cm x 80 cm dielectric coated grating slightly damaged

Room 115 Optics Clean Room
6-14cm Amplifier disks
8-10cm amplifier disks
3-10 cm amplifier disks damaged
12 large diameter KDP crystals
4-Nd:YLF rods for diode pumped amplifiers
1-spare 1/2 inch rod for Powerlite laser
1 Time-Bandwidth diode power supply

Room 115 Optics Clean Room
4-refurbished 8"diameter KDP crystals
1-calcium fluoride chamber window
EOT 4mm faraday isolator
CEO RB30 cw gain module
Fastlite Dazzler
Conoptics electro-optic modulator model 360-80
CEO diode pumped amplifier parts
3-9"x10" target chamber turning mirrors
2-99.5% reflective final compressor turning mirrors
3mm thick, 8"diameter KDP 1/4 waveplate
several mid-sized gratings
2-9"x12" HR mirrors

Room 115 Optics Clean Room
Disk amplifier refurbishment hardware

Room 115 Optics Clean Room
2-alternate spatial filter C1 output tubes

Target areas & storage Rooms 108, 120, 133

West Target Chamber
Roughing Pump Station

Dry Pump	1	1143775
TUTHILL SDV120		
Roots Blower	1	
AU251		
Controller	1	
Vac Gauge & Display	1	

West Target Chamber

Cryo Compressor		
CTI8500	2	
H2O Circulation Pump	1	NA

West Target Chamber

Vacuum vessel	1	1238364
CIT10" Cryo Pump	1	
Optical Bench	1	
CTI 10" Backup	1	

West Target Chamber

CT Temperature gauge	2
Vacuum gauge	2
CTI 8" Cryo Pump	1

West Target Chamber

Vac.Contorller(home m	1

Pulse Compressor

9" windows	3
Gatevalve	2
Gratings 40x80 cm	2

Grating Backup	1
Optical table	
98.5% PR	1
12" HR	1
Alignment Camera	2
vacuum vessel	1

****3 Gratings: LLNL Made 40x80cm Dielectiric, $250K each**

Pulse Compressor

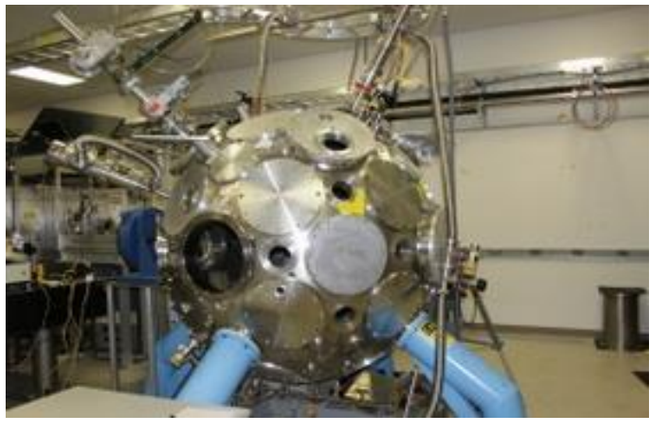
Cryo Pump CTI 8"	2
Temp. Display	2

Pulse Compressor

DG535	2
DG645	1
Video Display	1

Short Pulse Diag BOX

Shack Hartman Sensor	1
Tek Scope TDS5054B	1
Camera	5
Spectograph	1
Photo Diode	3

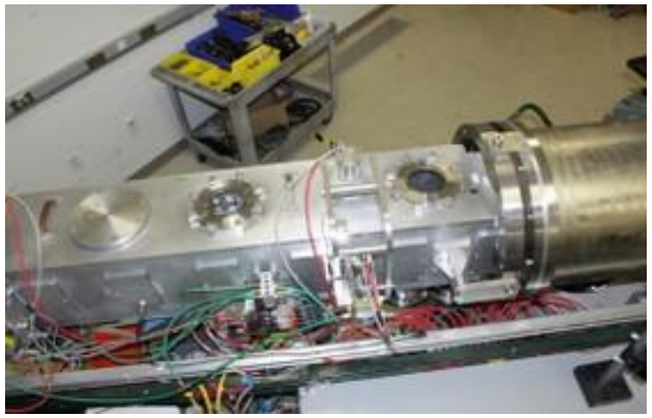


North Target Chamber

493782
846830

North Target Chamber

Cryo Pump CTI 8"-F	1



TIM 1

TIM

Tim Controller	1
Turobo pump	1
Controller NT150/360	1
Chiller RM6	1

C-Beam Line

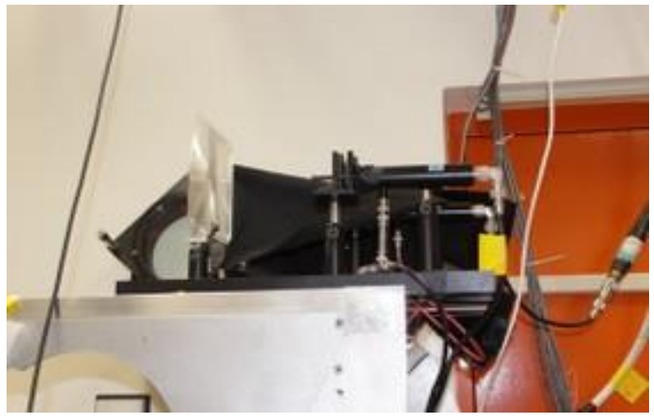
Turninng Mirror Stand	
6x9" 45deg HR	
camera	1
	1

C-Beam Line

Final Periscope	
9" lens	1
35deg 12" HR	2
camera	1

STC Diagonstics

lens 2w, 12"	2
Telecope	2
9" Beam Splitter	2
8" KG3	2
8" Energy meter	



STF Diagnostics

	2
fresnel lens	
6GHz Photo Diode 2'	2
Hamamatsu R1328-U2	

STF

3w,4w Conversion Station

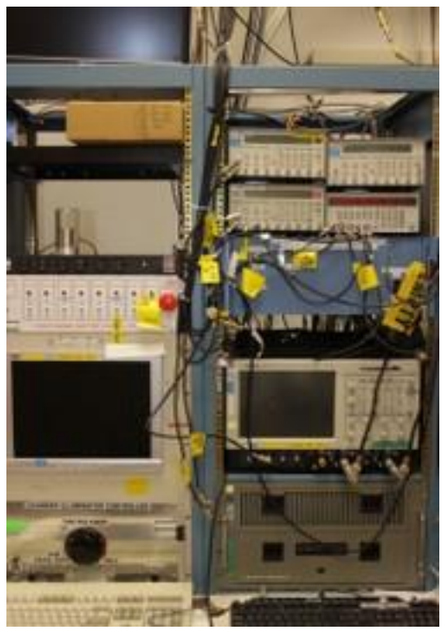
STF

STC Optical Bench	1
lens (1w,2w)	few
lens mount	few
mirros (1w, 2w)	few
mirror mount	few

STF

STC Controll Lack	1

(No SCOPE)



STF

STC Controll Rack	2
DG535	1
DG645	
	1
Laser Interlock	2
Video Monitor	

(No SCOPE)

NTF
NTC/Compresssor Vac. Contorll #1

NTF

NTC Vacuum Controll #2

NTF

NTF Laser Interlock Controll

Miscellaneous Flanges mostly/NTC #1
at NTA

Miscellaneous Flanges mostly /NTC #2
at NTA

Miscellaneous Flanges mostly/NTC #3
at Storage Area
12" 14" dia.

8" mirror mount
6" mirror mount

Miscellaneous Optics
7" 8" 9" windows

6" lens

10"mirros

Mirros
12" 45deg,22.5deg 1w HR

12" 45deg,22.5deg 2w HR

10" windows

CAP BAY

Le Croy Crate 8025	1
Laser Isolation Interface	7
Connection Box	4
buckup interface	2

CAP BAY

High Voltage Power supply
10 KV out , 220V,3Phase

#1 10-1,2,3	1	846814
#3 10-10,11,12	1	846834
#6 10-4,5,6	1	846831
#2 10-7,8,9	1	846833
#5 14-1,2, 10-13	1	846835
#6 14-3,4	1	846832
Total	6	
Backup PS	2	HighBay Cage

CAP BAY

Charge & Dump Box	17
Ross Relay	
High Power Resistors	
Voltage Pickup	

CAP BAY

Disk Amp Capacitor Bank	
(PFN)	
10 cm Disk Bank	
100uF Cap X20	13
14cm Disk Bank	
100uF Capx24	4
Long Shorting Stick	4
Short Shoting Stick	4
Replacement cap.	few

CAP BAY

CAP BAY

Faraday Controller

FR3/FR4
High Voltage P.S.

Glassman	1	818190
	1	841973
Triggering Box	2	

CAP BAY

Farady Controller

FR5		
High Voltage P.S.		
Glassman	1	818191
Triggering Box	1	
Optical Trigger Box	1	
Isolation Transformer	1	
Backup HVPS	1	

CAP BAY

FR3,FR4,FR5 Cap Bank

FR3/FR4 10kV 3uF	2
FR5 10kV 1uF	1

CAP BAY

Disk Amp cooling water controll

Flow pump	1
Interlock Controll	1
Deionzer/Particle Filter	1
Water Tank	1
Vacuum Spatial filter Valve controll	1

CAP BAY

Spatial Filter Vacuum Pump Station

Rotary pump LH D65B		
Roots Blower LH VAU251		844719
Gauge & Controller	1	

CAP BAY

Power Light (Nd:YAG) Chiller		
Neslab M100	1	95002

CAP BAY

Geni Lift
400 lb capacity

Bdlg 86 & 125 storage areas

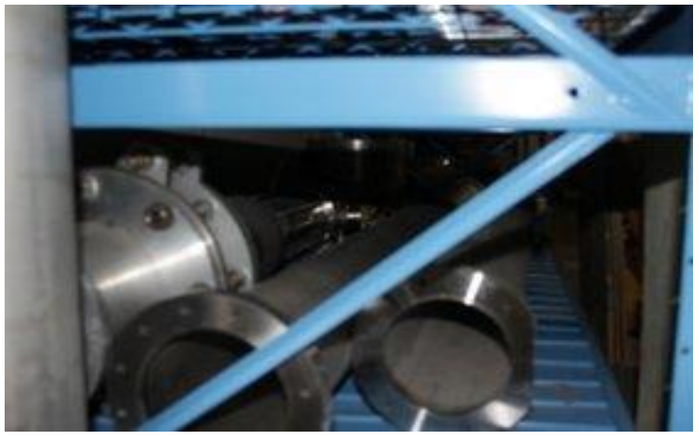
2- 5 KVA Charging power supplies

Bdlg 86 & 125 storage areas
32-HV capacitors

Bdlg 86 & 125 storage areas
Spare vacuum pump station

Roots blower vacuum pump bc 942167

Bdlg 86 & 125 storage areas
misc vacuum tubes for beam delivery, 5' to 10' length



Bdlg 86 & 125 storage areas
more tubes

Bdlg 86 & 125 storage areas
20-12" diameter mirrors from the Omega Laser Facility

Bdlg 86 & 125 storage areas
Rotary vacuum pump

Bdlg 86 & 125 storage areas
misc 12" mirrors from KMS Fusion, inc

Bdlg 86 & 125 storage areas
misc large optics and polarizers from KMS Fusion, Inc.

Bdlg 86 & 125 storage areas
6- 10"x16" octagonal mirror mounts (from Omega)

Bdlg 86 & 125 storage areas
alignment telescopes

Bdlg 86 & 125 storage areas
59 replacement flashlamps for Disk amplifiers

Bdlg 86 & 125 storage areas
misc 1" & 2" optics

Bdlg 86 & 125 storage areas
4" diameter calorimeters

Bdlg 86 & 125 storage areas
spare 14 cm glass disk amplfier assembly with power distribution box

Los Alamos National Laboratory
Request for Proposals
Trident Laser System (TLS) Redeployment and Life Extension
October 14 – November 15, 2016

Los Alamos National Security, LLC ("LANS") is the manager and operator of Los Alamos National Laboratory ("LANL") for the U.S. Department of Energy's ("DOE's") National Nuclear Security Administration under contract DE-AC52-06NA25396. LANS is a mission-centric Federally Funded Research and Development Center focused on solving the most critical national security challenges through science and engineering for both government and industry sectors.

This is not a procurement. LANS is seeking proposals from interested parties to undertake redeployment of the Trident Laser System to a new operating location, where its life as a scientific research instrument may be extended and potentially upgraded with new capability, purposed for independent research as well as for collaboration with Los Alamos scientists. LANS intends to pay for inventory, packing, crating, and shipping costs. The receiving institution is expected to pay for all installation, upgrade, calibration, operations, and maintenance costs.

Institutions considered most suitable for TLS redeployment include academic and/or government research laboratories located in the United States. The expectation is that redeployment will commence upon conclusion of a property transfer agreement with a Federal site, or else a mission move or a joint use agreement with an academic site. LANS is open to negotiating other mechanisms, too, such as CRADAs, MOUs, etc. At the end of the agreement period (e.g. after 10 years) the TLS will either be returned to the Laboratory or committed to salvage at the Laboratory's discretion. Of course there will be no return expected in the case of a property transfer.

The TLS will be readied for physical transfer by summer 2017. LANS prefers to award redeployment of the entire TLS, however alternative solutions for redeployment of an operating subset of TLS will receive serious consideration. An important aspect of redeployment is that LANS scientists retain occasional access to TLS for continuing research. A mandatory proposal requirement in this solicitation is for an outline of the access process by which Laboratory scientists may perform experiments on the redeployed TLS. The Laboratory would like to understand how designs for experiment time on the system will be evaluated, prioritized, etc.

RFP Organization and Contact Information.

Solicitation Background, the TLS Technical Description, and Proposal Format instructions are each outlined below. Proposals must be received at TLS2016@lanl.gov no later than 5:00 pm Mountain Time on Tuesday, November 15, 2016. During the solicitation period, clarification questions may be sent to TLS2016@lanl.gov. During the solicitation period, questions will be reviewed and answers will be posted on the TLS RFP webpage as they are received (http://www.lanl.gov/projects/feynman-center/deploying-innovation/intellectual-property/technology-opportunities/trident-laser-system.php).

LANS desires to make its selection and to notify the selected party before the 2016 winter holiday. This timing will afford the selected party the opportunity to attend live experiments in early CY 2017, so they may familiarize themselves with TLS while it is still operational at Los Alamos.

LANS reserves the right to cancel this Solicitation in whole or in part at any time without incurring any liability/damages associated with such cancellation. Additionally, LANS reserves the right to withdraw part of the equipment identified in this Solicitation in the event, LANS discovers any potential safety or security issues associated with relocating all or part of the TLS.

BACKGROUND

In May 2016, LANS announced that the Trident Laser Facility would cease operating effective September 15, 2016. That date was subsequently extended. The current plan is to operate for an additional, limited period in early CY 2017, and to leverage that activity to provide a training opportunity to the party that will redeploy the TLS. The TLS will then be disassembled and packaged for shipping to the new site, where it may be reconstituted and continue to be used by the physics research community.

It is LANS' intent that Trident will be sited with an organization that will supply its own funding for TLS installation, calibration, and lifecycle operation. Ideally, the receiving party will plan to upgrade TLS with new capability. The equipment to be transferred includes the laser, its power supply, target station and chamber, and a suite of diagnostic instrumentation. Under a mission move or a joint use agreement it is anticipated that all equipment will remain property of the Laboratory and subject to on-site configuration verification.

TECHNOLOGY DESCRIPTION

The Trident Laser System at Los Alamos National Laboratory is an extremely versatile neodymium-glass laser system dedicated to high energy density physics research and fundamental laser-matter interactions.

The laser system consists of three high-energy beams that can be delivered into two independent target experimental areas. The target areas are equipped with an extensive suite of diagnostics for research in ultra-intense laser matter interactions, dynamic material properties, and laser-plasma instabilities. The laser system diagnostics will be included in the transfer. The target area diagnostics will remain at LANL, though may be available for specific, collaborative experiments in the relocated facility. The attached inventory list includes the laser diagnostics that would be included in the transfer.

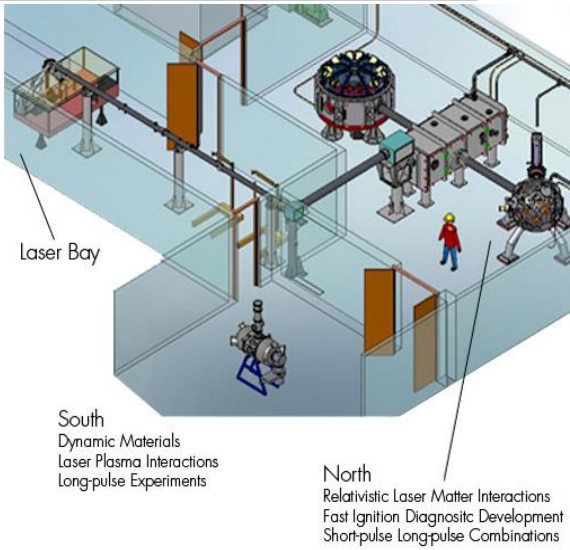


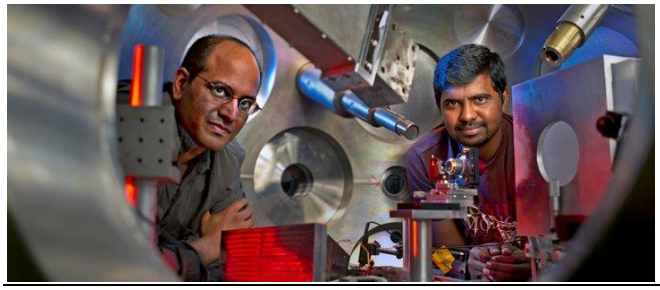
Figure 1. Target areas

Discoveries made at the Trident facility include

- laser-accelerated MeV mono-energetic ions
- nonlinear kinetic plasma waves
- transition between kinetic and fluid nonlinear behavior for plasma waves
- other fundamental laser-matter interaction processes

Trident has achieved world records in many aspects of laser-accelerated ion research, including

- beam emittance
- conversion efficiency
- proton and ion energies



Sasi Palaniyappan, right, and Rahul Shah left inside a target chamber where the TRIDENT short pulse laser is aimed at a very thin diamond- foil target, a fraction of a micrometer thick. The laser delivers a power on target of 150 Terawatts focused into a 7 micrometer spot, yielding laser brilliance over 100 times more intense than needed to make the target electrons fully relativistic.

LASER CAPABILITIES

- 2 long-pulse beams
  - 250 J each at 527nm, 100ps - 5ns
  - 1 kJ each at 1054nm, 100ps - 10µs
- 1 short-pulse CPA laser beam
  - Up to 120 J, 500 fs, 250 TW
- Simultaneous long-pulse and short-pulse beams on target
- Intensity > 10^{20} W/cm^2 for short-pulse laser-matter research
- Low pre-pulse for short-pulse laser-matter research
- Diffraction-limited focusing for fundamental laser-plasma research
- Raman cell amplifier for unique pump-probe laser-plasma experiments
- 45 minute shot cycle
- 1000 shots/year

Invisible infrared light from the 200-trillion watt Trident Laser enters from the bottom to interact with a one-micrometer thick foil target in the center of the photo.

DIAGNOSTIC SUITE

Multiple diagnostics enable health and status monitoring of the system.

LANS TLS INTELLECTUAL PROPERTY INCLUDED

Patent Applications:
None

Copyrights:
None

PROPOSAL FORMAT AND CONTENT EXPECTATIONS

Los Alamos invites proposals of no more than 8 pages, single-spaced, 1-inch margins all around, and using 12-point font. Supplementary material may be appended, with no page limit.

Proposals should be submitted that at a minimum use the following organizational rubric:

- Executive Summary and Strategic Intentions
- Mandatory Requirements
- Desirable Qualities
- Redeployment and Operations Calendar
- Points of Contact
- Supplemental Materials

1. Executive Summary and Strategic Intentions (1-2 pages recommended)
    a. Provide a summary of the plans to take physical control and redeploy the Trident Laser System, including identification of its new location and a schedule for operation. Outline how TLS will be made functional and accessible for users, what roles it will perform in the host institution's suite of capabilities, and what sort of physical facility it will be housed in. Will the entire TLS be redeployed or just an operational subset? If just a subset, what is the rationale behind it?
    b. Outline the process by which Los Alamos scientists may plan to continue to have access to the redeployed TLS. Discuss the overall user community that is expected to use the redeployed TLS as well, and discuss what other US government sponsors (if any) will be likely to make use of it.
    c. Summarize any upgrade plans. Comment on how the TLS will play a role in the advancement US and global sciences, how it may continue to benefit national security science, and how it will be leveraged to graduate students into science careers.

2. Mandatory Requirements (1-3 pages recommended)
    a. Plans to redeploy into operation – What steps will be taken to schedule shipment, take delivery, perform site preparations, execute reassembly, and recalibrate and requalify for operation? Will it be redeployed in whole or in part? Who will be the key staff during redeployment? During operation?
    b. Collaboration concepts – What is the institution's process for granting access to Los Alamos scientists to perform experiments? What is the institution's process for joint publications with Los Alamos scientists? Will preferential weight be given to Los Alamos and/or other national security laboratories' requests for time on TLS?
    c. Lifecycle support – What assurance can be given regarding availability for experiments for all users (e.g. how many days per month)? What will be the sustainable source(s) of funding for staffing? Power? Maintenance and service? Will the Laboratory be consulted and kept abreast of configuration changes, upgrade plans, usage and availability, etc.? How will the equipment be insured?
    d. Access controls – How will physical security be imposed, balanced with the need to keep the system readily accessible for its user communities? What plans will there be for virtual security, such that nominal considerations (e.g. user authentication, data integrity, intellectual property, export control, etc.) are addressed?
    e. Safety controls – The laser is extremely powerful, and potently destructive if not aligned and calibrated correctly. Who will act in a safety office role? What safety

procedures will be followed? How will a culture of safety awareness be created and maintained? What user and operator training will be required? What provisions and procedures will be made for emergencies?

   f. Configuration controls – If the proposal concept is that the Laboratory retains formal ownership of the TLS, how will the relocation host ensure control over the subcomponents, knowing that some may be replaced during the system's extended lifetime, either through normal wear and tear or through upgrades?

3. Desirable Qualities (1-2 pages recommended)
   a. Upgrade concepts – What are they? When would they be integrated into TLS? What new capability would they deliver?
   b. If awarded, will the institution's staff members attend live experiments at Los Alamos in the Jan-Feb 2017 timeframe to take advantage of live familiarization prior to system decommissioning?
4. Redeployment and Operations Calendar (1 page recommended)
   a. Using a Gantt chart format (or some other visual aid), summarize the schedule of phases, tasks and milestones for delivery, standup, calibration, entry into operation, user periods, maintenance periods, etc. Identify who will be responsible for which functions.
5. Points of Contact (1 page or less recommended)
   a. Proposal handling (e.g. requests for clarification) and award notification
   b. Agreements negotiation (e.g. contract administration, legal counsel)
   c. Technical leadership (please provide a CV as supplemental material)
   d. Technical operations team (please provide CVs as supplemental material)
   e. Controls personnel or offices; i.e. safety, access, and configuration

WHAT WE ARE REQUESTING

If you are interested in exploring this redeployment opportunity, please submit a Trident Laser System Redeployment and Life Extension Proposal on or before ***5:00pm Mountain Time, Tuesday, November 15, 2016.*** Your Proposal should include, at a minimum, the items listed above; however, you are welcome to include any supplemental information regarding your concepts or your institution (brochures, research whitepapers, etc.) that may help us to evaluate your interest and suitability as a redeployment site. ***Note: Please properly mark any information that your institution considers proprietary or business-sensitive. LANS will supply a Non-Disclosure Agreement (NDA) to entities that require such protection.***

LANL Business Development Contact – Richard P. Feynman Center for Innovation:

Steven F. Stringer
Los Alamos National Laboratory
P.O. Box 1663, MS C333
Los Alamos, NM 87545
Tel:505/660-2177
Email: TLS2016@lanl.gov

Attachment(s):

1. TLS Equipment Inventory Preview: A list and photographs of TLS configuration components available for redeployment. It is a general overview and is not to be treated as an exact inventory. The exact inventory will be developed subsequent to award and in consultation with the receiving institution(s).