



U.S. Department of Commerce
National Institute of Standards and
Technology

Laser Safety Program Development

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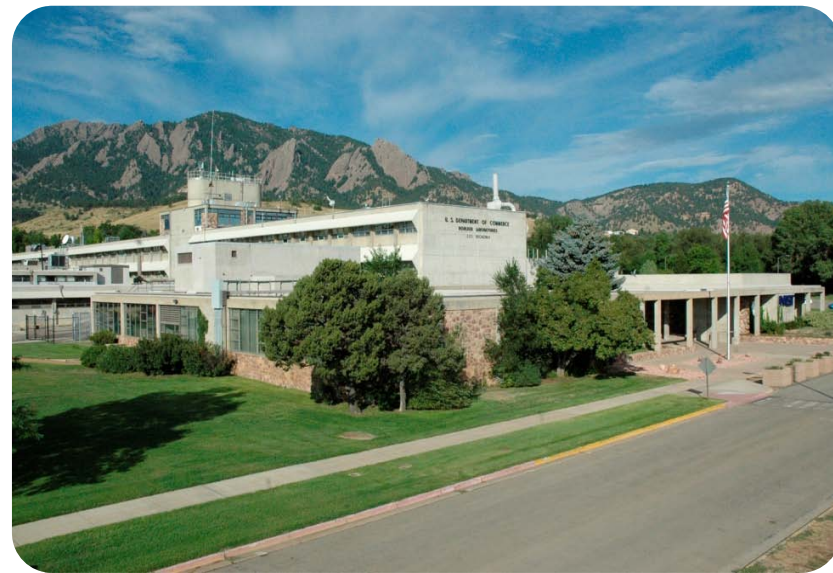
Physicist / LSO

Laser Safety Officer Workshop – 2011

Massachusetts Institute of Technology, Cambridge, MA

August 2-4 2011

NIST: Overview



Courtesy HDR Architecture, Inc./Steve Hall © Hedrich Blessing

Two main locations:

Gaithersburg, MD

- 578 acre campus

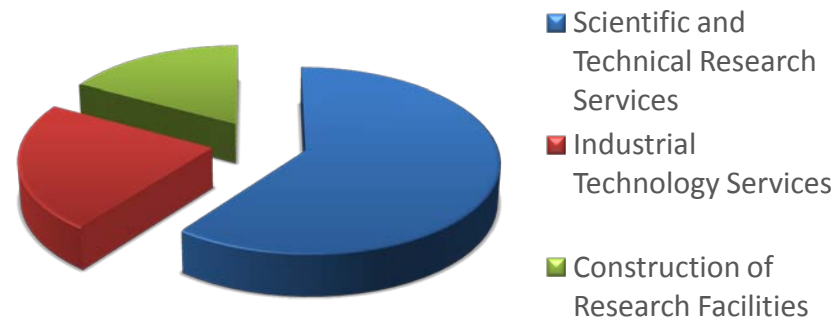
Boulder, CO

- 208 acre campus

NIST: Overview

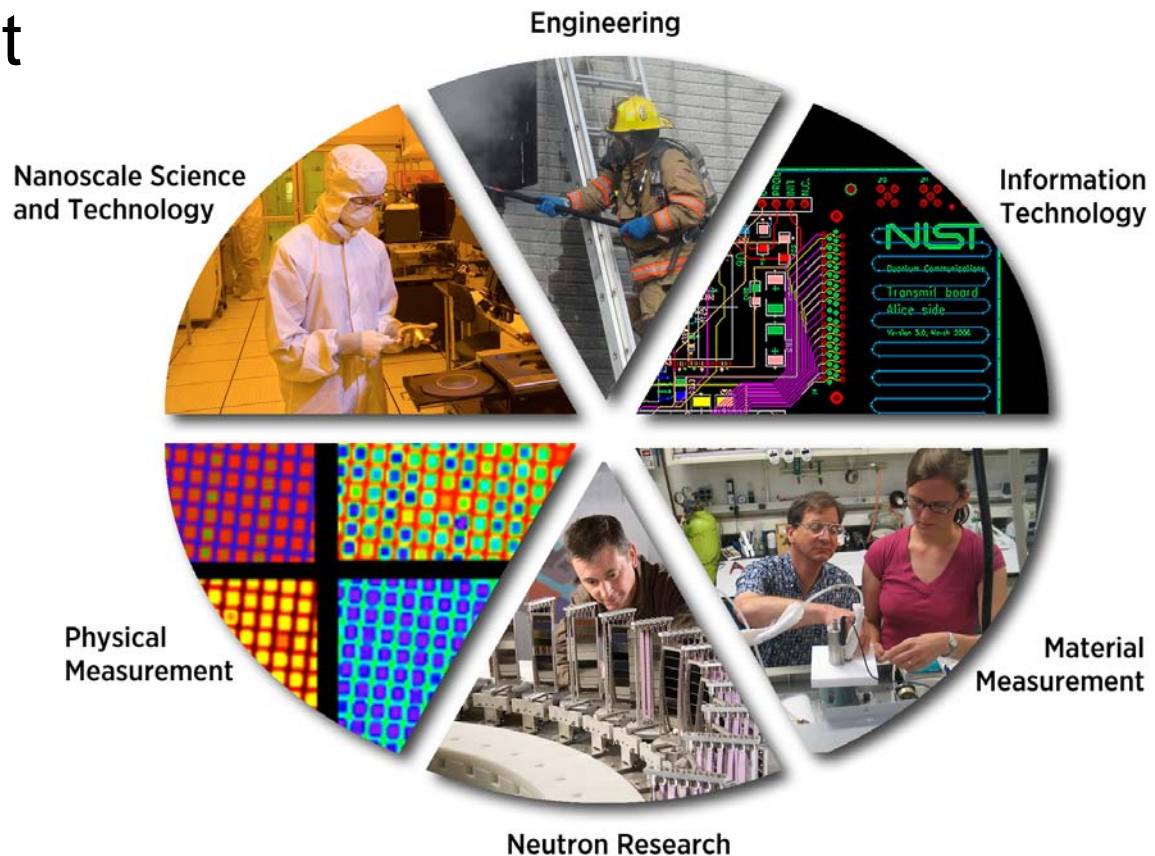
- ~ 3,000 employees
- ~ 2,800 associates and facilities users
- ~ 1,600 field staff in partner organizations (Manufacturing Extension Partnership)
- Four external collaborative institutes: basic physics, biotech, quantum, and marine

FY 2010 Appropriations \$862M



NIST: Overview

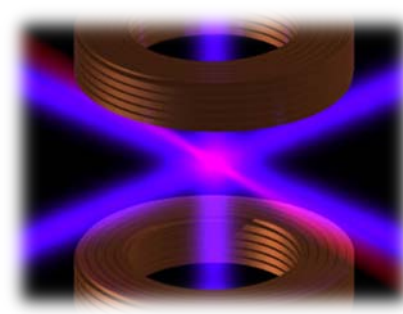
- 6 independent operating entities
- 37 uniquely different technical divisions



Laser Use at NIST

The very nature of the diverse research efforts at NIST results in widely varied lasers and laser applications

- * From VUV to THz
- * From single-photon studies to MW
- * From cw to GHz
- * From mHz line width, to multi-micron wide broadband sources



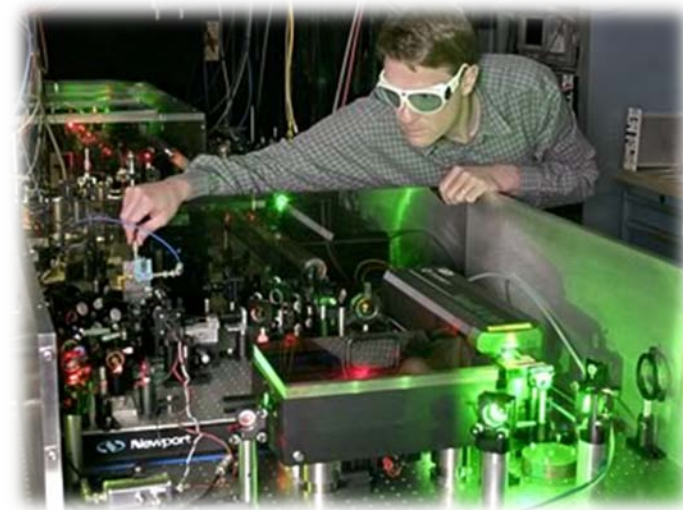
Credit: Burrus/NIST

Illustration credit: NIST

Laser Safety Needs at NIST

Goal:

“To educate laser operators of potential laser hazards and to outline the steps that must be implemented so that injuries are avoided.”



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Laser Safety Needs at NIST

Reality:

Establishing a balance between timely research needs and compliance with ANSI Z136.1 requires knowledge, careful attention, and prudent judgment.



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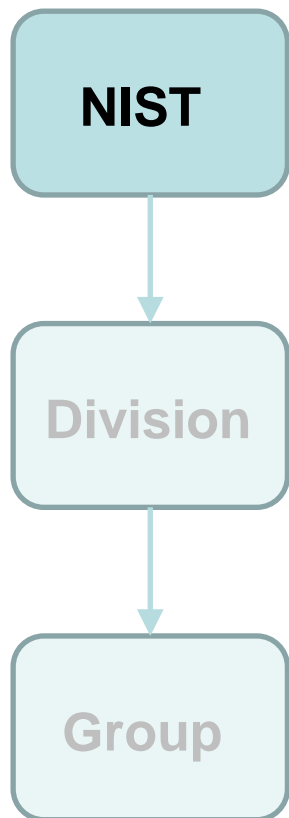
NIST Laser Safety Program

- Original NIST level program was developed as a “Health and Safety Instruction”
 - Static
 - Relatively unsupported
- Now a managed program, with a single point of contact as the Program Manager (LSO)
 - Dynamic
 - Actively supported by multiple personnel

NIST Laser Safety Program

- Current program first developed within a single division at NIST
 - A flexible, yet thorough approach was needed
 - Had to be compliant with ANSI Z136.1
- Evolved to encompass all NIST operations
 - Grew from a divisional program, to the parent operating unit, to the organization as a whole over the course of many years

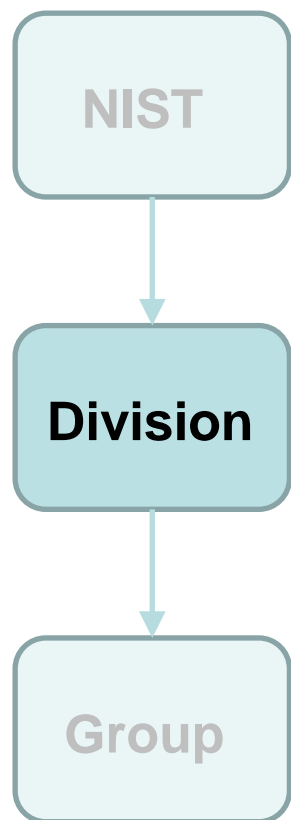
NIST Laser Safety Program



Function:

- At the NIST level
 - Chief Safety Officer designates the Laser Safety Officer
 - LSO and Deputy LSO cover both main campuses
 - Members of the safety office
 - Laser Safety Committee maintains representatives from all 6 technical operating entities

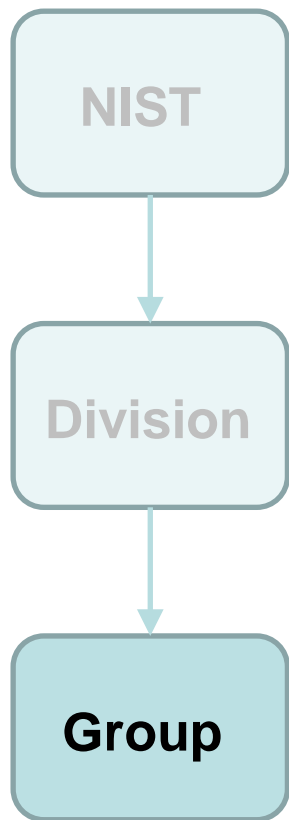
NIST Laser Safety Program



Function:

- At the Divisional level
 - Division Chief assigns Division Laser Safety Representative
 - Division Chief and Group Leader (immediate line management) are responsible for signing off on all hazard reviews within their management authority
 - LSO, DLSO, and DLSR when present, are as advisors only, and do not have authority to approve hazard reviews

NIST Laser Safety Program



Function:

- At the Group level
 - Lab Safety Contact ensures that all proper safety training is taken by staff in the given lab
 - Principal Investigator supervises new staff until deemed competent
 - PI notifies Group Leader of satisfactory level of knowledge (via On the Job Training).
 - Group Leader authorizes laser users for operation in a given lab following appropriate training

NIST Laser Safety Program

Laser Safety Officer
Deputy Laser Safety Officer
and Division Laser Safety Representatives



NOT THE “LASER COPS”



Available as a resource to everyone

NIST Laser Safety Program

A typical hazard review

- PI notifies Group Leader of new or altered laser install/process & provides SOP for process
- Division Chief, DLSR, Division Safety Representative, and the safety office notified
- Formal SOP review by above personnel
- Corrections/revision submitted for approval subsequent to initial review
- Revisions accepted, Division Chief and Group Leader sign off on the hazard review, accepting responsibility for the operation

NIST Laser Safety Program

Provide education and guidance

- Communicate to the staff the advisory role of the safety office and personnel
- Ensure that the resources for laser safety are available, both material and personal
- Train research staff affected by Class 3B or Class 4 laser operations
- DLSR's are further trained in hazard analysis in accordance with ANSI Z136.1

NIST Laser Safety Program

Continually involve the most directly affected personnel –
the users

- Keep research staff involved in continuous improvement of the program (Laser Safety Committee)
- Accept feedback from users on effectiveness of the program

NIST Laser Safety Program

The Ultimate Goal:

A self-sustaining and continuously improving laser safety program and culture at NIST.