



# Non-Lethal Laser Technologies

Non-Lethal Weapons Research and Technology Development

Industry Day

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<http://jnlwp.defense.gov>



# Background

- Lasers have counter-personnel (CP) and potentially counter-materiel (CM) applications.
- The JNLWP has previously invested in a variety of laser systems for several applications:
  - Low power green, red, and ultraviolet
  - Mid power infrared
  - High energy infrared
  - Short pulsed and ultrashort pulsed





# Technical Objectives

- Develop and demonstrate new laser systems, combined effects platforms, and enabling technologies (such as eye safety controls) to address CP and CM applications

Examples:

- Long Range Ocular Interruption (e.g., dazzling lasers), > 500m
  - Laser Induced Plasma System for CP or CM applications
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- Laser bioeffects research including animal and human subjects
    - Safety and efficacy experiments
    - Modeling laser effects on humans



# Relevant Work

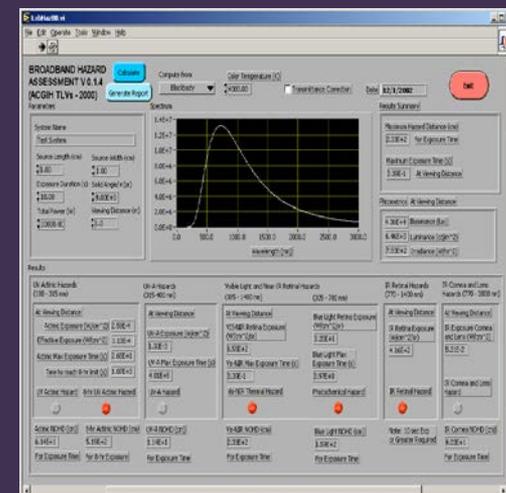
- **Distributed Sound and Light Array**
  - The DSLA integrates an acoustic array, bright white lights, and a multi-watt green laser
  - Penn State University, NSWC-Dahlgren
- **Non-Lethal Thermal Laser**
  - Prototyping and bioeffects effort focused on using an infrared laser to cause a heating sensation similar in effect to Active Denial Technology
  - Air Force Research Laboratory, NP Photonics, Colorado State University
- **Laser Induced Plasma Effects**
  - Effort focused on demonstrating and characterizing the non-lethal weapons application of laser induced plasmas in air and on material surfaces
  - NSWC-Dahlgren, PM&AM Research, and Stellar Photonics





# Relevant Work

- Optical Effects Modeling and Simulation
  - Bioeffects and M&S effort to build suite of models to predict risk of injury and probability of effect for a given laser exposure
  - Air Force Research Lab
- Veiling Glare
  - Bioeffect effort investigating the application of ultraviolet or near-ultraviolet lasers to cause glare effect
  - Air Force Research Lab, Penn State University





# Research & Development Tasks

General types of tasks that may be required for Non-Lethal Laser Weapon Research and Development:

- Counter-personnel and counter-materiel prototype system development, non-lethal weapons effects testing, and demonstration
- Laser bioeffects research to include animal and human subject research
- Modeling and simulation to predict atmospheric propagation, target effects at range (including bioeffects), etc.
- Systems engineering and technology integration



# Capabilities

General capabilities and expertise that may be required to execute planned R&D non-lethal laser technology tasks:

- Engineers/Scientists with expertise in laser optics, femto/nano-second laser pulses, electronic instrumentation, and systems engineering
- Facilities and equipment to build and test prototype systems
- Biomedical researchers with expertise in laser bioeffects and effectiveness
- Accredited institutional controls for bioeffects research:
  - Institutional Review Board (IRB)
  - Institutional Animal Care and Use Committee (IACUC)
- Computational scientists and engineers to build/improve computer based propagation and bioeffects models and run simulations



# Questions?

Please submit questions by 29 June 2012:

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