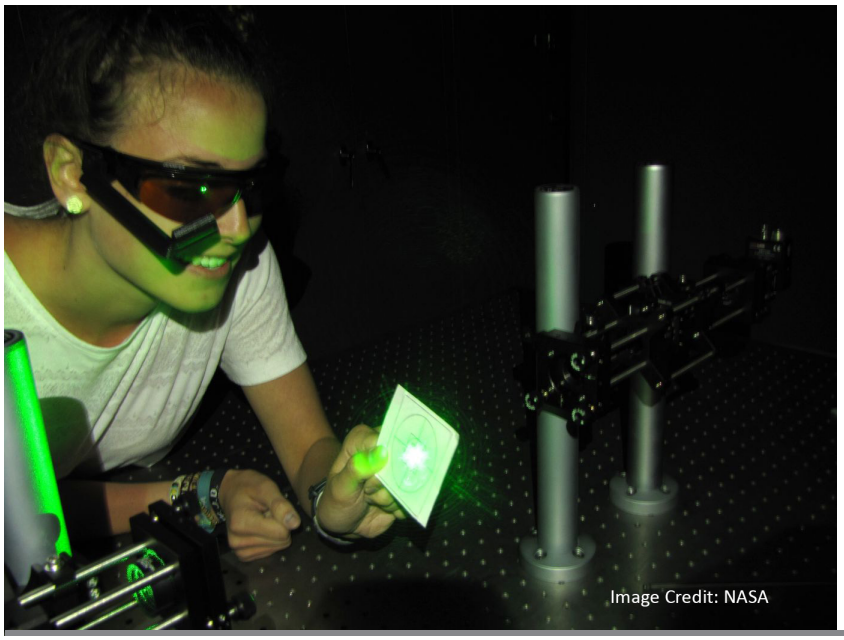

National Aeronautics and Space Administration

NASA

TECHNOLOGY SOLUTION

Optics

Optical Head-Mounted Display System for Laser Safety Eyewear

Allows an operator to safely view, in real-time, a hazardous laser beam

NASA's Langley Research Center has created a new system that allows a laser operator to safely view a laser beam while using a high-powered laser. Currently, viewing an otherwise invisible laser beam requires cumbersome equipment such as laser viewing cards and video cameras. This system uses an optical head-mounted display integrated with laser safety eyewear to allow an operator to safely see a laser beam in real-time while also providing freedom of movement. The display provides a picture-in-picture, augmented reality, which can include additional information and provide multiple viewing options.

BENEFITS

- System can be used with existing laser eyewear and optical head-mounted displays
- Digital zoom, image stabilization, real-time image enhancement and processing, line-fitting to visualize the laser beams path, curve-fitting, image and video capture modes, and overlays from other lab equipment including power meters and oscilloscopes
- The software can be controlled either through voice commands or through a smartphone or computer user interface
- System allows for hands-free operation

THE TECHNOLOGY

The system combines laser goggles with an optical head-mounted display that displays a real-time video camera image of a laser beam. Users are able to visualize the laser beam while his/her eyes are protected. The system also allows for numerous additional features in the optical head mounted display such as digital zoom, overlays of additional information such as power meter data, Bluetooth wireless interface, digital overlays of beam location and others. The system is built on readily available components and can be used with existing laser eyewear. The software converts the color being observed to another color that transmits through the goggles. For example, if a red laser is being used and red-blocking glasses are worn, the software can convert red to blue, which is readily transmitted through the laser eyewear. Similarly, color video can be converted to black-and-white to transmit through the eyewear.

View of otherwise invisible laser as seen through invention.

APPLICATIONS

The technology has several potential applications:

- Aerospace. Alignment of airborne and ground-based laser measurement systems
- Defense. Alignment of laser-based or laser guided weapons
- Manufacturing. Alignment of laser-based manufacturing systems
- Medical. Control of surgical lasers
- Telecommunications. Line-of-sight laser communications
- Any application where laser beam alignment is needed

PUBLICATIONS

Patent No: 10,690,918

technology.nasa.gov

NASA's Technology Transfer Program pursues the widest possible applications of agency technology to benefit US citizens. Through partnerships and licensing agreements with industry, the program ensures that NASA's investments in pioneering research find secondary uses that benefit the economy, create jobs, and improve quality of life.

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More Information

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