Laser Countermeasures

Finding the Beam from Scattering in the Environment

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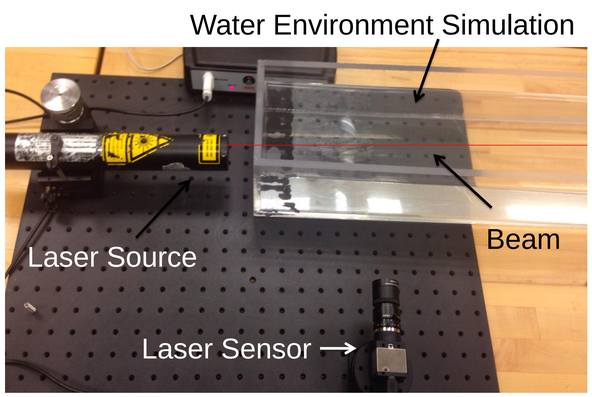
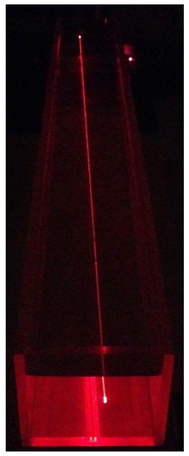
Motivation

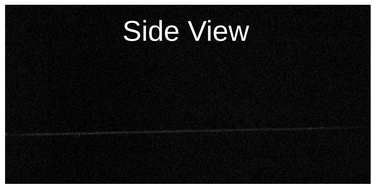
The first step in taking action against a laser weapon is locating it. This experiment was designed to find the beam in laboratory conditions. It is the first step to studying a beam in turbulent air caused by a helicopter.

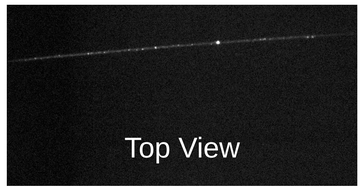
Proof of Concept

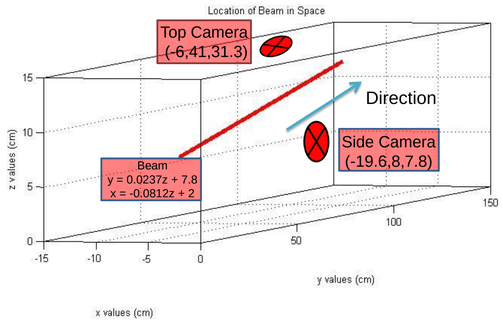




Results



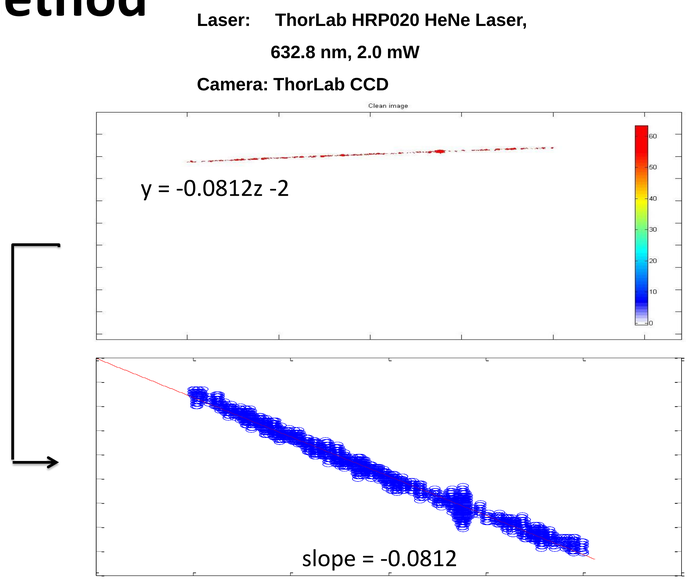




Test Bed

New laser chamber design is shown. Various environments can be used to test different methods of finding the beam (fog, smoke, smog, etc.) Turbulent effects (propeller) are also added.

Method



Images taken from the top view using a camera. From these photos, the slopes of the two lines were calculated using MATLAB and plotted in a 3D space to find the path of the beam. The direction was found by analyzing the beam's average intensity along its path.

Connections

By finding the direction and path of a beam, we can locate its source and target

The next step is to find the power of the beam. This can have many strategic applications such as firing lasers from helicopters and locating enemy laser users.

Future Work

More realistic scenarios will be tested to find the beam and study its properties. Turbulence will be introduced to the environment using helicopter blades.

References

Andrews and Phillips. *Laser Beam Propagation through Random Media*. (Second ed.). Bellingham: SPIE. 2005.

Ricklin and Davidson. 'Atmospheric turbulence effects on a partially coherent Gaussian beam', from J. Opt. Soc. Am. A, Vol. 19, No. 9. Sept. 2002.

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