The need for laser detection is critical for today’s military. On axis detection is the easiest method of detection, but is impractical in a combat environment. Instead, since lasers scatter due to particles in the atmosphere, a method of off-axis detection is preferred. This project experimented with a method to detect lasers from an off-axis position, and to map its trajectory in various environments.

Background
Lasers can spread in several different methods. Diffraction occurs from the natural spreading of the laser as it propagates farther distances from the source. Scattering occurs when laser light hits particles in the atmosphere and reflects off of them. This project focused on using the principles of scattering to detect laser beams.

The code imported 3 images from a DCU223M CCD camera from Thorlabs to calculate the slope and direction of laser propagation.

The initial experiments were conducted in a water tank.

The camera distance from the laser was then increased and the lateral difference between images was decreased. Slopes were used to determine 2 dimensions, and similar angles were used for 3rd dimension of travel.

Errors extrapolated to 1 km: 100 m and 83.33 m

Analysis at 1.6 m
Analysis at 1.8 m

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