**Introduction**

- Analyzed through the use of statistics - mean and variance of intensity
- 630 nm, He-Ne Laser, with a power of approximately 2 mW, spatial light modulator
- GOAL: Reduce the variation of light fluctuations on the target and reduce intensity losses on the target
- Will propagate Gaussian and Bessel Beams
- Target will be a light intensity sensor, a CCD camera
- Ran the experiment on 13 different occasions for a total of 108 runs (6 screens *3 screen sets* 2 Types (Gauss and Bessel)) *3 distances = 108 trials

**Methods**

- Scintillation refers to the degree and quantity of dark and light spots on the target, as displayed in the above figure.
- The correlation width is 16.
- The correlation width is 128.
- The sets of quads are from the top left to bottom right. Pixel Variance, Pixel Intensity, Frame Variance, Frame Intensity.
- For Gaussian set 1, the results are from top to bottom: variance of intensity for a pixel and then frame, intensity for pixel and then frame.

**Results**

**Conclusion**

- The research needs to be continued to expand on what was learned from this project in order to maintain intensity while still reducing variance.
- Analyzing information for pixels is unreliable and unnecessary compared to analyzing information from each frame.
- From the research, using different screens with the same statistical representation of wave wander.

**Acknowledgements**

- Professor Svetlana Avramov-Zamurovic, Weapons/Systems Engineering Department
- Analysis of Laser Light Propagation in a Maritime Environment
- Midshipman 1/C Daniel Joseph Whitsett
- Professor S. Avramov-Zamurovic, Weapons/Systems Engineering Department

**References**

- Andrew; Phillips; Hopen “Laser Beam Scintillation with Applications” pp.2, pp. 5-7, pp.8-11, pp. 29, pp. 34, pp. 37
- Hongyan; Zhen, “Study on the wander for laser beam propagation in the slant atmospheric turbulence” pp4
- Meadem, Optical Frequency Comb, The Measurement of Optical Frequencies