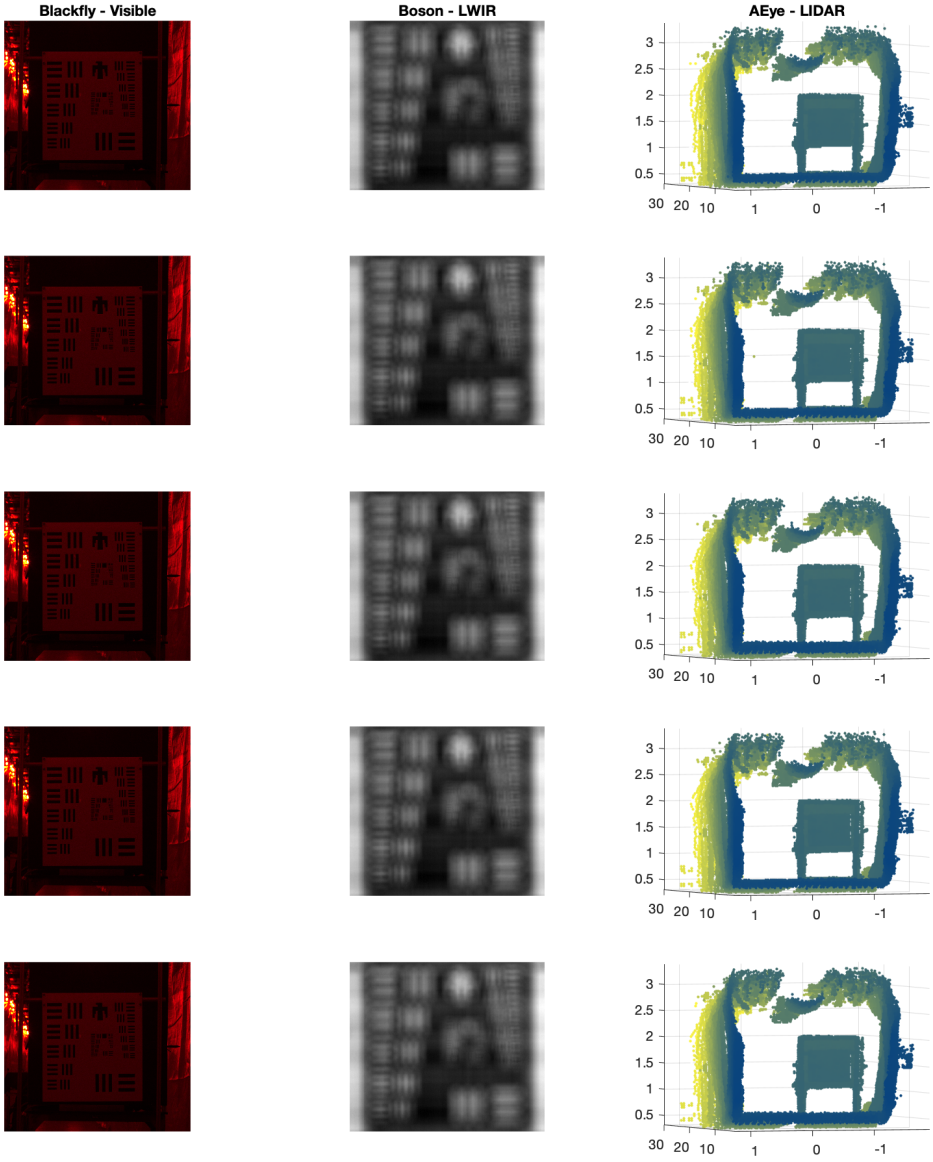
Perception Testbed Fog Chamber Data Documentation
November 1, 2021

Experiment Name: baseline02
Start Time: 11-May-2021 10:50:04.854
Duration: 00:01:11.301
Target: USAF-1951
Target Distance: 6.5532 meters
Target Temperature: 37 C
Environment Notes: No fog present during baseline tests.
No environmental data available.

File Information:
Visible Spectrum: 647 Images
Longwave Infrared: 714 Images
LIDAR: 72 Data & Images

1 Data Snapshot: baseline02

The following images describe the variation in data during the experiment.



2 Experiment Setup and Equipment Specifications

2.1 Perception Testbed Hardware

A novel testbed, featuring a visible spectrum camera, a longwave infrared camera, and a lidar was built and transported to the Fog Chamber at Sandia National Laboratories for fog chamber testing. The perception testbed features the following equipment:

- FLIR BlackFly - Visible Range Camera
- FLIR Boson – Long wave infrared thermal camera
- AEye Intelligent LIDAR

2.2 Environment Montioring Equipment

During fog experiments, the following equipment was used for characterization of the fog and light scattering resulting from the fog:

- Malvern Spraytec instrument with inhalation cell accessory - produces a measurement of fog particle sizes, this information is useful in understanding light scattering.
- Transmissometer – used in measuring the Meterological Optical Range (MOR) a light emitting diode and camera are used under a static distance to measure the optical effects of the fog.

3 Useful References

The following documents may be useful in understanding the scope and context of the experiments.

Shish, Kimberlee H., et al. "Survey of Capabilities and Gaps in External Perception Sensors for Autonomous Urban Air Mobility Applications." AIAA Scitech 2021 Forum. 2021.

Redman, Brian J., et al. "Measuring resolution degradation of long-wavelength infrared imagery in fog." Optical Engineering 58.5 (2019): 051806.

Wright, Jeremy B., et al. "Optical characterization of the Sandia fog facility." Degraded Environments: Sensing, Processing, and Display 2017. Vol. 10197. International Society for Optics and Photonics, 2017.