

# ICARUS

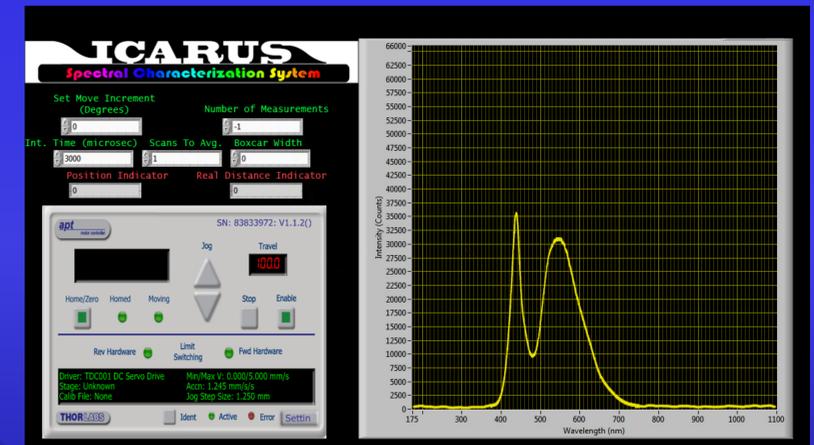
## Spectral Characterization System

### Abstract

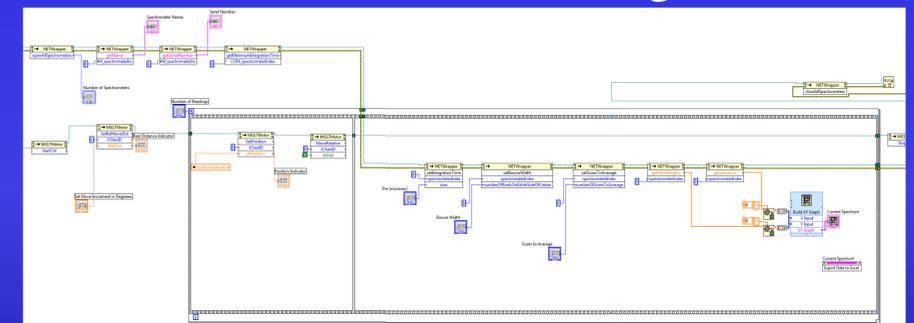
The Icarus spectral characterization system is a novel device for collecting and presenting angularly resolved spectral power density measurements of light emitting diodes. Unlike incandescent bulbs, LEDs do not emit light in a full 360° radiation pattern. Instead, they emit light in a more concentrated beam with undesirable changes in the spectrum across the arc of emission. Icarus measures these shifts in the spectrum through a fiber optic spectrometer that is connected to a robotic arm which rotates around the light source. By integrating state of the art spectroscopy, precision mechanical tools, and an intuitive user interface, Icarus provides its users with information that is quintessential to the research and development of LEDs.



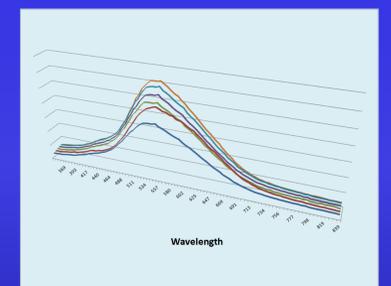
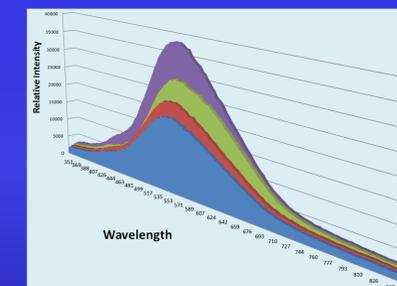
### LabVIEW UI



### LabVIEW Block Diagram



### Sample Excel Visualizations



### Specifications

- Highly portable system can be run with a power outlet and laptop via USB
- Easily adjustable parameters to balance speed and precision
  - Spectrometer integration time as low as 1ms
  - Angular resolution of <math><1^\circ</math>
- Optical resolution of 1.5 nm (FWHM)
- Adjustable distance between fiber and light source
- Quickly measures 180° across one axis in as little as one minute
- Implementation with LabVIEW allows a multitude of possibilities for future developments and additions



As LEDs move to dominance in the lighting market, it is imperative that the industry is supported by innovation in the methods of characterization to promote further development. Icarus provides a distinct advantage to our industry partners by creating a new and crucial tool for research and design in the evolving world of lighting.



Icarus uses two perpendicular axes of rotation, which allow the user to measure a hemisphere around the light source. The arm is also connected to a three dimensional translation stage to adjust the device for pinpoint accuracy.



The ability to export to Excel allows users to easily save their data and also create their own ways to display the information. Just as the parameters for measurement can be customized, users do not have to use the visualizations found in the LabVIEW user interface.

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