

Multidisciplinary Engineering Capstone Project: Fall 2023 - Spring 2024

Hybrid GPS- and Signal-based Optical Device Alignment

GOAL:

Enable the fast and correct alignment of over-the-air (fiber launching) optical communication devices.

BACKGROUND:

Hansen Photonics Incorporated is a local startup company created by an UI alumnus. Hansen Photonics engineers and manufactures devices for over-the-air optical communications (called fiber launching).

The Hansen Photonics Axon device enables the copying, multiplexing, and demultiplexing of optical signals at light speed and low cost.

One problem to be addressed during installation of this infrastructure is the alignment of the optical devices.

Last academic year a UI capstone team created software, (Python simulator and device Arduino code, that enabled the signal-based alignment of the optical devices.

OBJECTIVES:

Design, implement, and test embedded software to drive a robotic arm for optical beam alignment.

Improve arm design and implementation as needed. The objective is that the devices needed alignment should communicate with each other about location and attitude and use that to focus a laser signal to each other and align such signal to maximum strength.

HARDWARE and SOFTWARE ENVIRONMENTS:

Laser emitter, laser sensor, optical alignment arms, Arduinos, Raspberry Pis, GPS hats, Wireless hats. Students would need to work with the hardware and a laptop or workstation for programming using Arduino IDE or other embedded software IDE. We plan on using GitHub and MS Teams for collaboration.

CUSTOMER:

JP Hansen, Hansen Photonics, Inc.

Coordinator for UI: Daniel Conte de Leon, University of Idaho.

EXPECTED TEAM:

Computer Science and/or Computer Engineering students.

