Progress Report: Week 1

LASER Mapping Team

25 October 2013

1 Project Block Diagram

The project naturally splits along the hardware-software divide. There are further natural subdivisions on both the hardware and software components (Figure 1). The hardware is split into three components — the analog laser modulation / phase measurement circuit, the Inertial Measurement Unit (IMU) and its support circuitry, and the microcontroller that aggregates the information and transmits it to the PC. The software can be structured as a pipeline:

1. decode the ranging and position integration information coming from the hardware,

2. transform the measurements from the hardware's egocentric frame to a common world frame,

3. visualize the measurements in the common world frame, and

4. (possibly) lift a representation of the scanned object from the common world frame.

2 Member Assignments

- Hardware

  - Laser Modulation / Phase Measurement: Jeff Terrel, John Boyd, Doug Maunder
  - IMU: Ashton Jackson, Sam Carey
  - Microprocessor: Clayton Crawford, Sam Carey, Taahir Ahmed

- Software

  - Pose Transform: Clayton Crawford
  - Visualization: Tengyan Wang

3 Four-Week Timeline

1. *1 November 2013:* All hardware schematics finished. PCB layouts finished. First PCB revision produced. Software pose transformation and simple visualization working on test fixture data.

2. *8 November 2013:* Hardware subunits debugged, second board revision layed out and in production. Tentative microcontroller control of the board. Pose transformation and visualization working on test data produced on the microcontroller. Progress on model lifting.

3. *15 November 2013:* Full microcontroller control of the board, data passing through the full pipeline. Planar scanning assembly produced and integrated. Model lifting working.

4. *22 November 2013:* Schedule slack.

Figure 1: Block representation of the project.