ECE ILLINOIS

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Promoting Undergraduate Research in Engineering

# Magnetic Indoor Positioning Systems: Moto Mod Magnetometer

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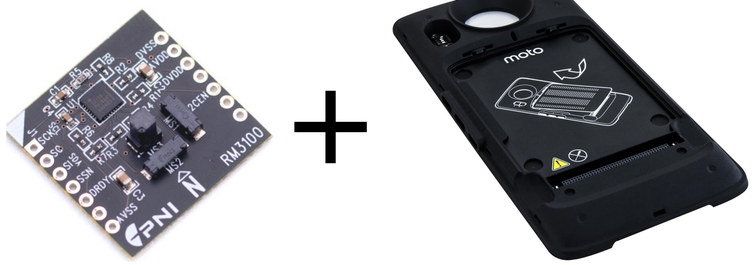
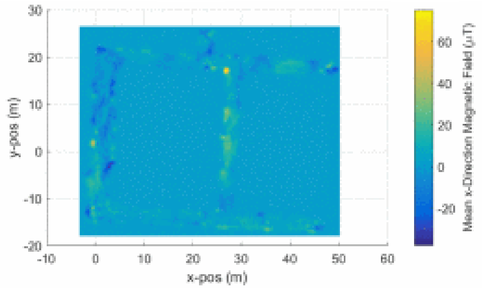
## Background

- Magnetic indoor positioning uses magnetometers and inertial measurement units to position pedestrians and robots indoors.
- Most modern buildings are made of ferromagnetic materials which create unique magnetic fields.

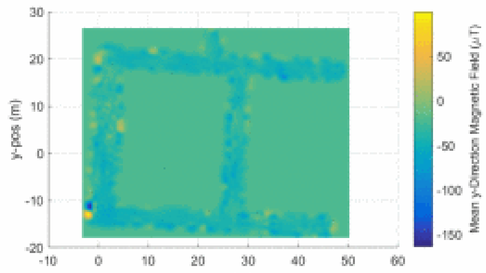
## Project Description

- Design a PCB that interfaces the RM3100 (magnetometer) with the Moto Mod.
- Expand the design to incorporate multiple RM3100 units.

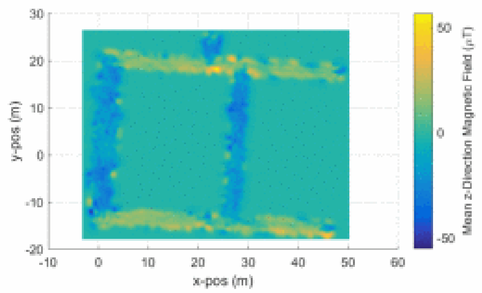


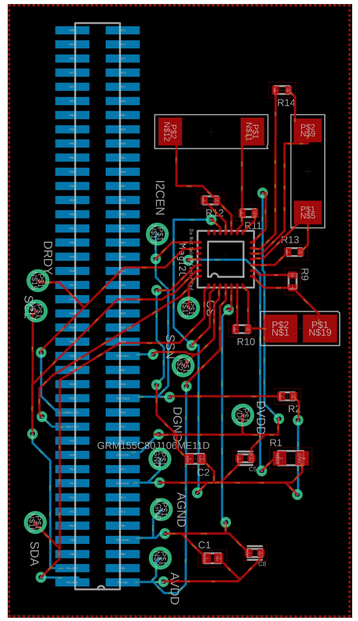

(a) x-Direction Field

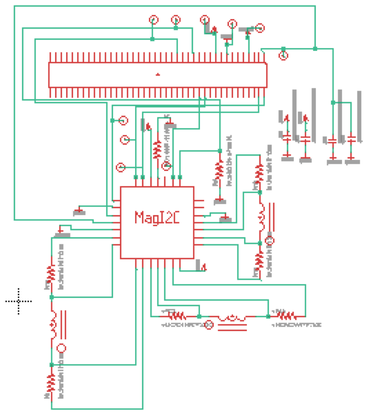



(b) y-Direction Field




(c) z-Direction Field




## Progress

- Created board and schematic for single RM3100.
- Board design is being manufactured and assembled by PCBWay.
- Developed a board testing plan.

## Skills Gained

- Making a PCB using the Autodesk Eagle.
- PCB Testing Process.
- Magnetometer Calibration.

## Future Goals

- Test the first board.
- Expand the design for 2 and 3 RM3100 units.

References:
[1] D. Hanley, A. B. Faustino, S.D. Zelman, D.A. Degenhardt, and T. Bretl, “MagPIE: A Dataset for Positioning with Magnetic Anomalies,” in *International Conference of Indoor Positioning and Indoor Navigation (IPIN)*, Sapporo, Japan, Sep. 2017.

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