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College of Applied Science & Technology

Open Source Antenna Pattern Measurement System

Weber State University-Engineering, Applied Science and Technology

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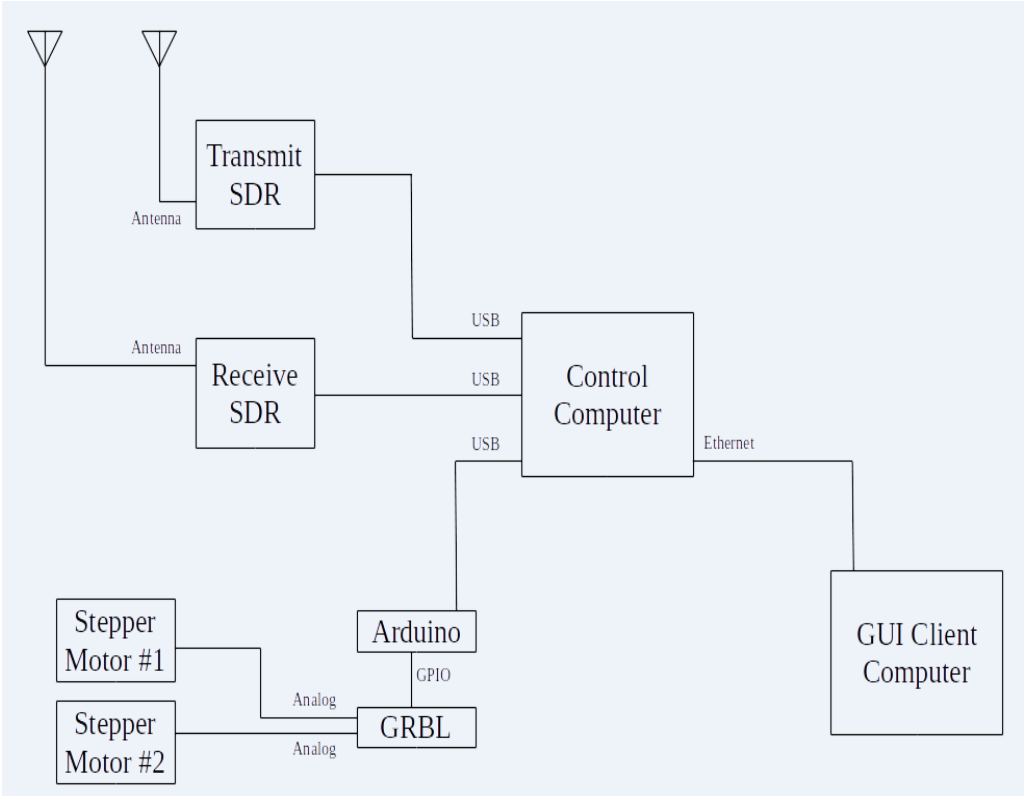
- Shelby Chatlin - BSMET, Dustin Birch – MET faculty

OBJECTIVES

WSU Applied Engineering Project to increase Radio Frequency (RF) measurement capability for student laboratories and senior projects.

Integrate a software-defined-radio (SDR) to a portable, motor-controlled antenna positioning system.

DATA ACQUISITION SYSTEM



System Block Diagram: Linux-based computer control of Software-Defined Radio (SDR) Transmit/Receive GRBL Arduino-control of stepper-motors.

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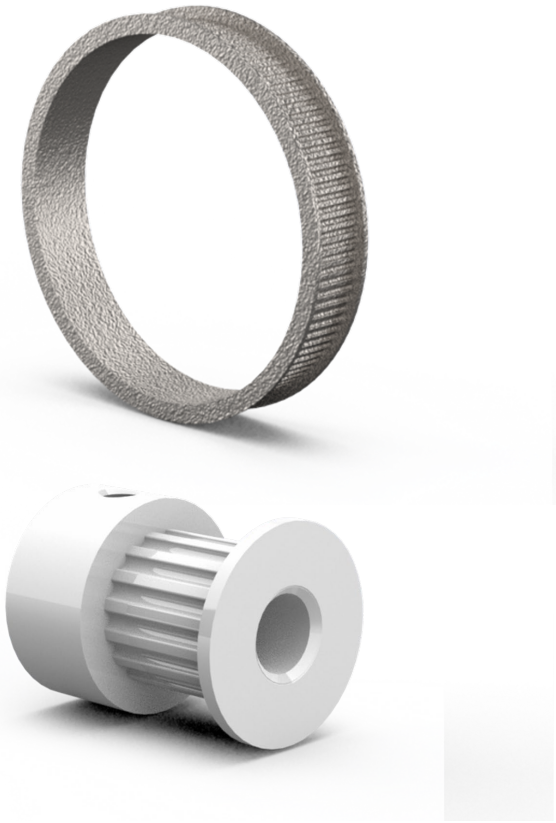
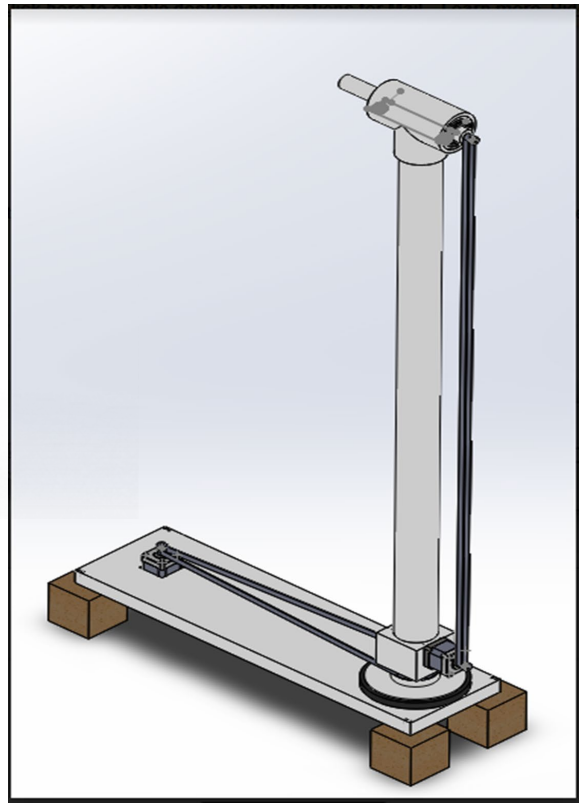
MECHANICAL DESIGN

Mechanical Improvements

- 3-D Printer fabricated parts (Plastic Printed)
- Plastic Pipes (Commercial PVC)
- Synchronous Belts (Commercial off-the-shelf hardware: 3-D Printer Parts)
- Open-source software controlled stepper motors for position control



Rapid Prototyped Synchronous Gears



Antenna Pattern Measurement System CAD Assembly

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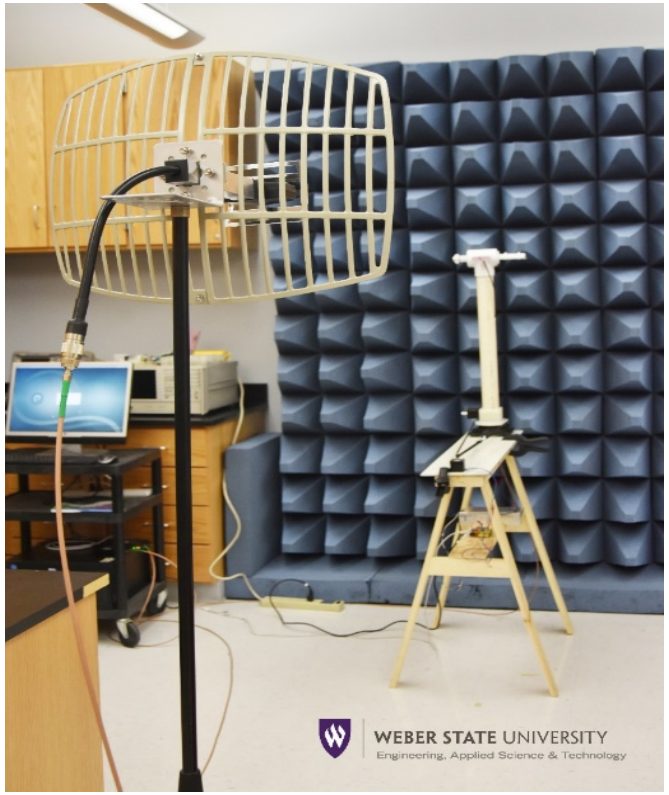
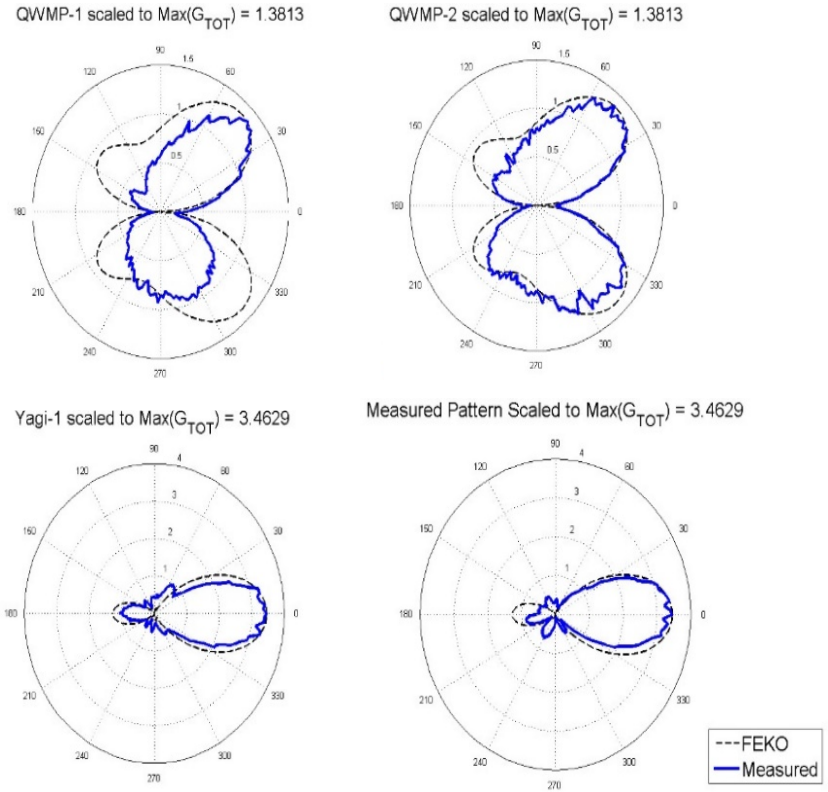
CURRENT RESULTS



Full-up Data Acquisition Using the Test Apparatus



Simulated versus Measured Radiation patterns. Simulations performed using FEKO software. Two omnidirectional (monopole), and two directional (Yagi) antennas are shown for comparison.

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- MOOG Aircraft Group

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QUESTIONS? COMMENTS?

THANK YOU