Position Sensing and Imitation
Milestone Presentation

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Goal Statement

- **Goal:** Mimic position and motion of a plate

- **Sensing:** 3-axis MEMS attitude sensor embedded in a plate
- **Communicating:** Implement industrial bus, likely ModBus
- **Actuating:** Rotate a plate using motors

Overview

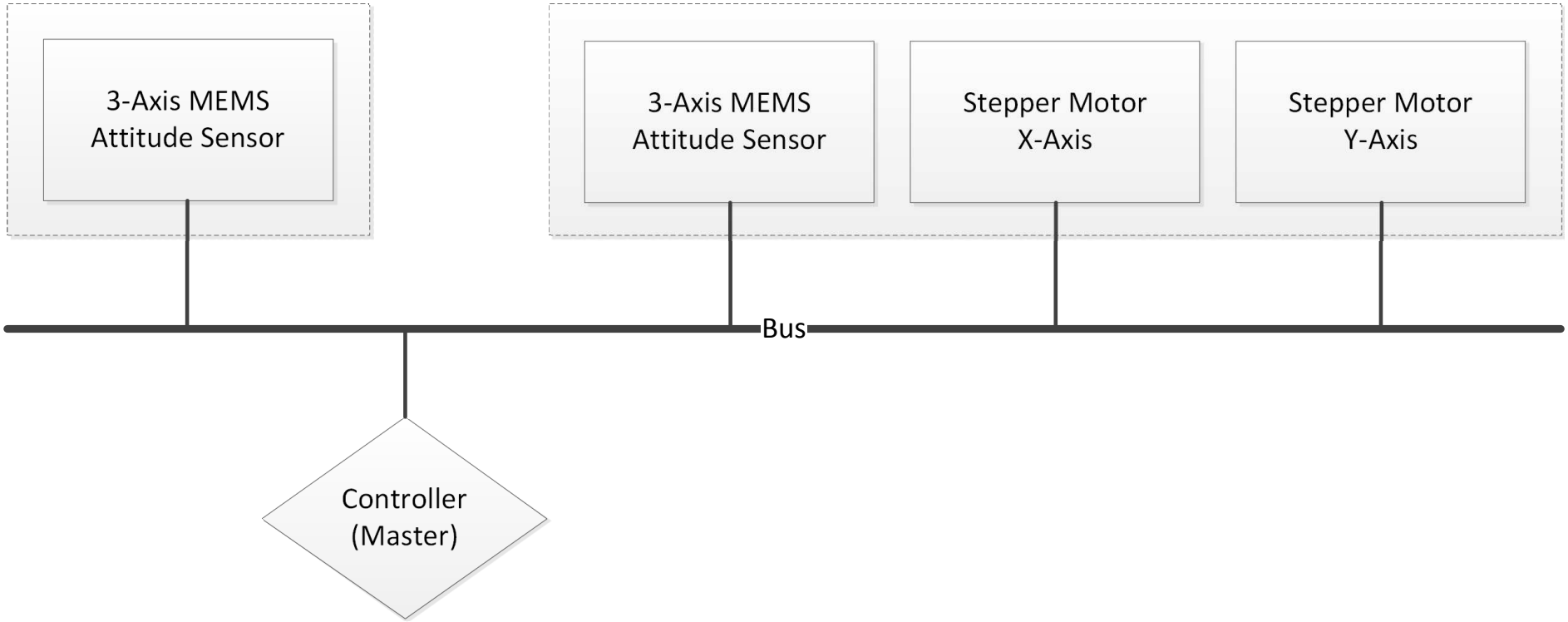

Figure: Diagram of the Functional Specification

Sensing

- **Sensor:** LSM303DLH 3D Compass and Accelerometer
- **Controller:** Arduino Pro Micro
- **Communication:** TTL to RS-485 Module
- Attitude in 3 dimensions is sensed and communicated via bus

Computation & Communication

- **Controller:** Beagle Bone Black
- **Communication:** TTL to RS-485 Module
- **Bus Protocol:** Industrial bus with open implementation, likely ModBus
- Controller receives sensor data & computes desired motor movement

Actuation

- **Motor:** NEMA 11 Stepper
- **Controller:** Arduino Pro Micro, Pololu A4988 Motor Driver
- **Communication:** TTL to RS-485 Module
- Motor is rotated the desired amount

Hardware Components

- 2x LSM303DLH MEMS Sensors, 10 Euro each
- 3x Arduino Pro Micro, 5 Euro each
- 2x A4988 Motor Driver, 3 Euro each
- 2x NEMA11 Stepper Motors, 25 Euro each
- 4x TTL to RS-485 Modules, <1 Euro each
- Beagle Bone Black

Major Milestones

- **Sensing:** Read and process MEMS data on Arduino
  Konstantin Koslowski
- **Actuation:** Control stepper motors
  Mathis Schmieder, Konstantin Koslowski
- **Mechanics:** Construct movable plate
  Mathis Schmieder
- **Communication:** Implement industrial bus
  Moksha Birk
- **Controller:** Bus master, main computational unit
  Moksha Birk