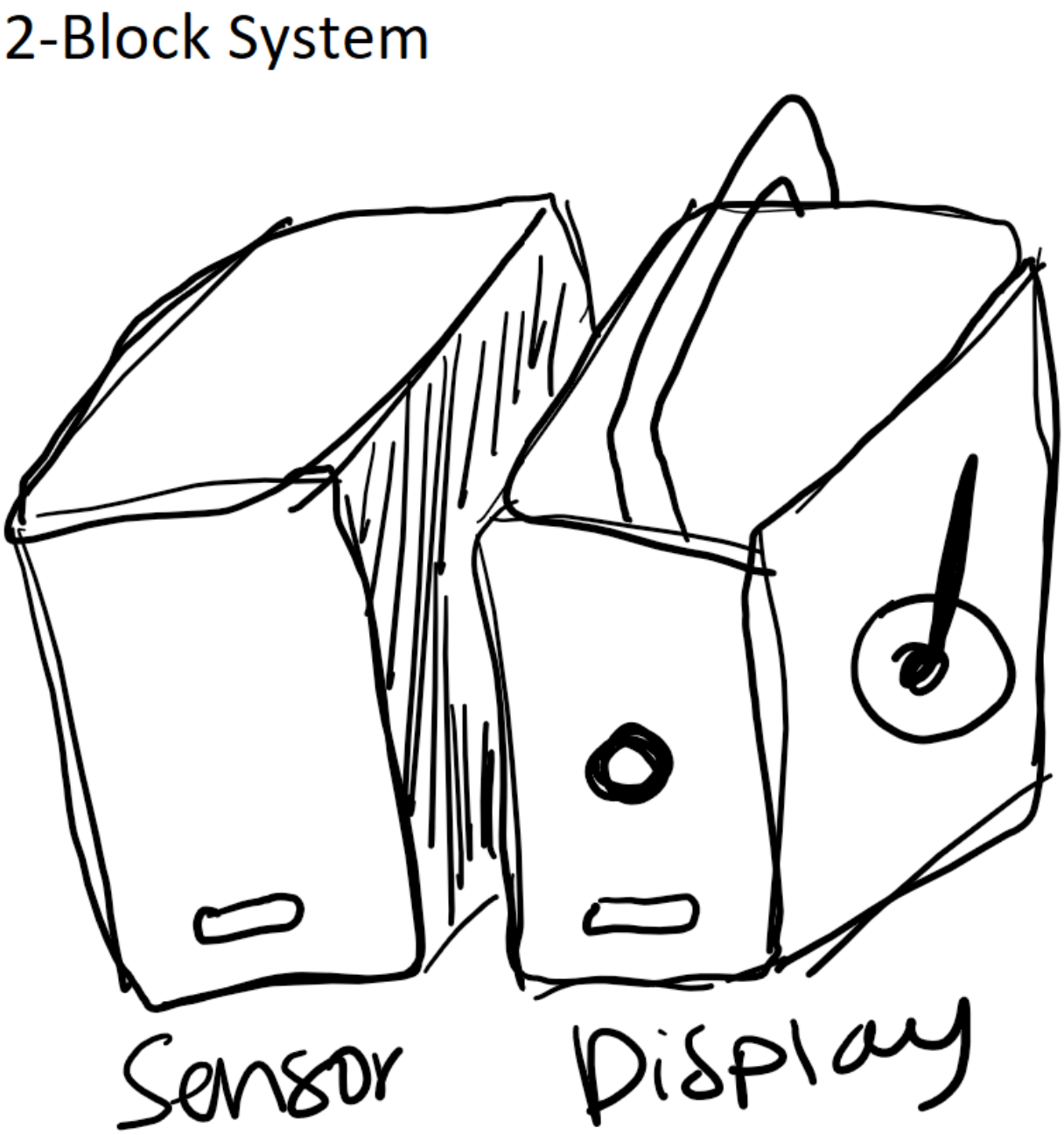
System Architecture with Diagram

Wireless Tapemeasurer

System Overview

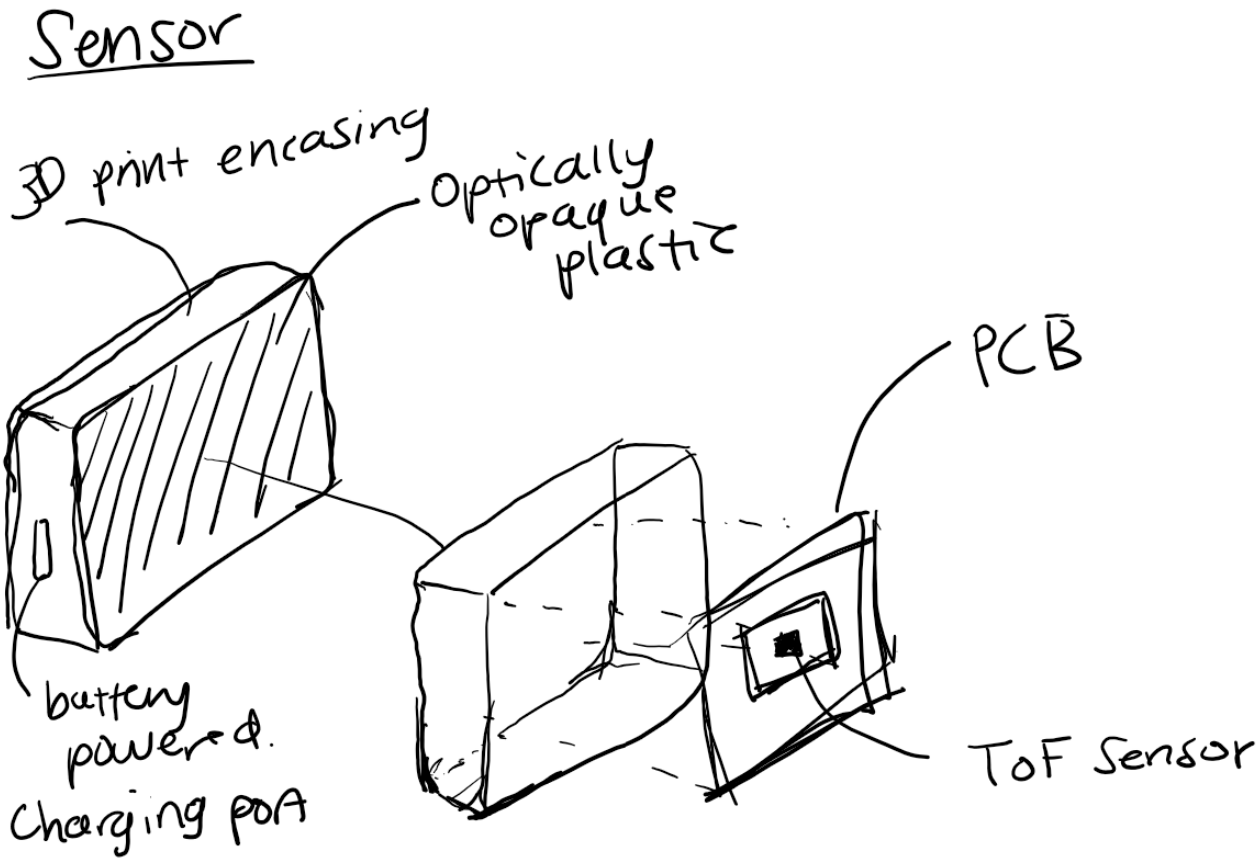
A two-piece set of blocks set apart to measure the space in between them. Essentially measuring a distance from point A to point B. One block is a stationary reference point while the other provides a measurement reading for the user.



Plastic film cover encasing the sensor and physical visual with needle gauge, handle for ergonomics

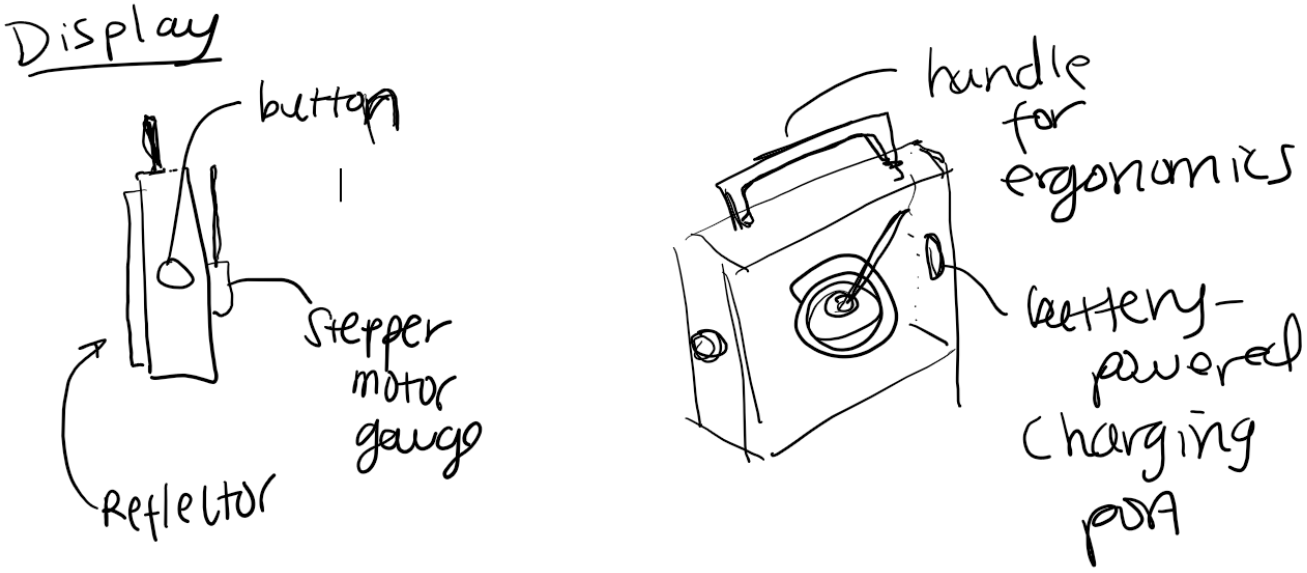
Sensor Device - Sensor Block

The sensor will be the piece to sit stationary via battery powered. It uses a Time of Flight laser distance sensor (VL53L4CX) to detect how long it takes for the light to reflect back to the sensor from the display device. Online research suggests the Kalman Filter to remove "jitter" from laser data-- implement via process noise and measurement noise parameters.



Display Device - Device Block

The display device via battery powered, has a reflector that the sensors' light emitter will bounce off of. A button has two actions- one-click to start the measurement and one-click to "tare" or hold the reading. The stepper maps the distance to a range (0m to a max of 6m), turning the sensors measurements into physical dial gauge readings.



LED will be included (not shown) used to indicate if measurement is on process

Key Parts

- MCU: ESP32C3
- Sensor: VL53L4CX
- Display: Stepper-motor physical display (given in class, datasheet unkown)
- Push Button
- LED
- Battery (voltage to be determined) x 2

Communication & System Diagram

The Sensor Block is stationary. The Device Block gets moved to desired location ensuring sufficient visibility between sensor and reflector. Device block triggers measurement sequence, sensor emits pulse of laser light, light bounces off reflector and comes back to sensor, calculation for "time of flight" processes and sent back to Display Block.

Communication and Diagram

Scenario: measuring table length 'L'