

Monitoring Oregon Tide Gates

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TIDE GATES AND ESTUARIES

TOP HINGE "FLAPPER" GATE



SIDE HINGE GATE



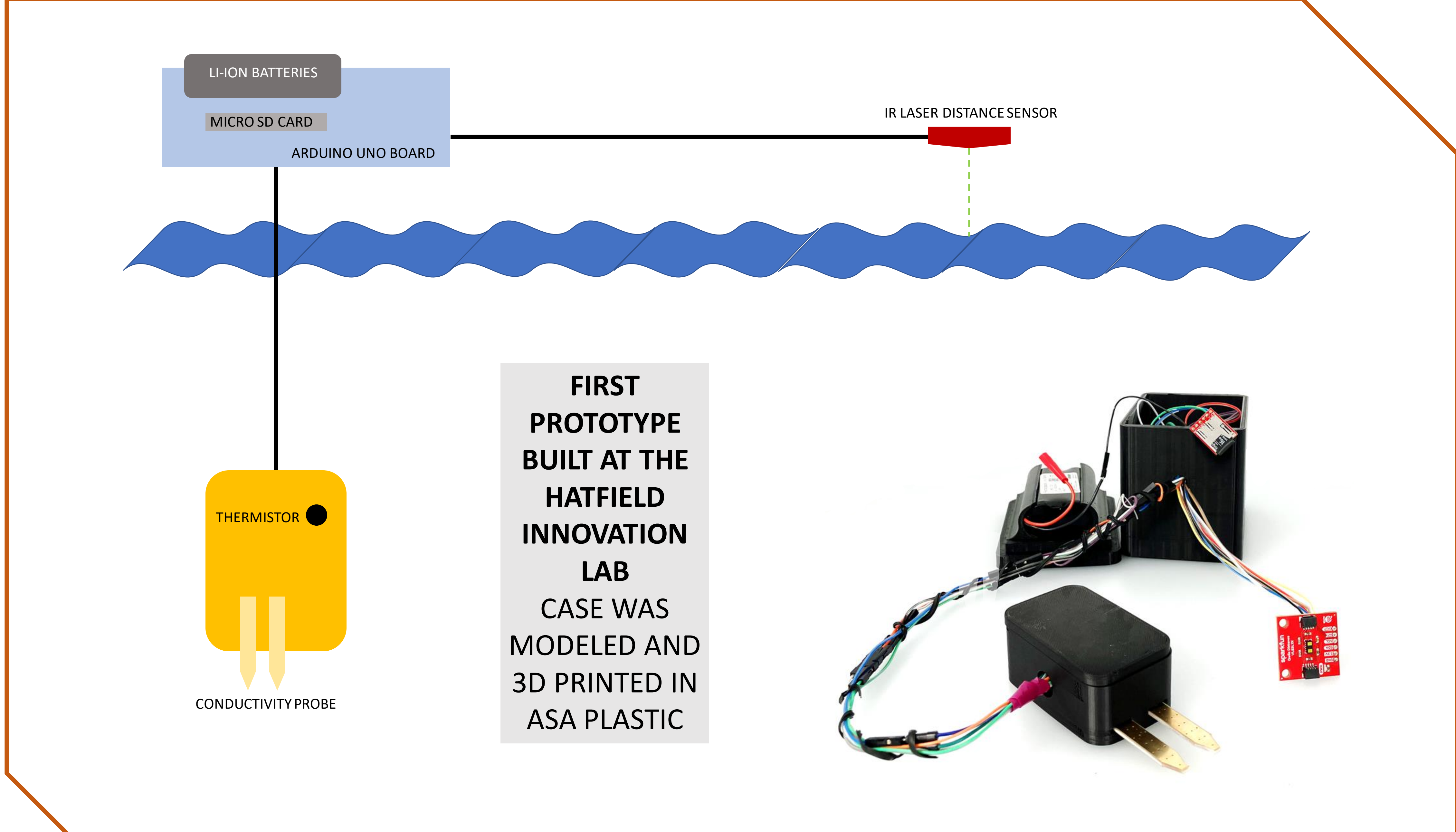
- ❖ Prevents seawater from entering estuaries to protect farmland and towns built there
- ❖ Limits tidal exchange, a process of estuarine ecosystems
- ❖ Can block migratory fish passage into streams
- ❖ Older designs controlled by water pressure holding the gate closed, preventing tidal exchange entirely
- ❖ Newer designs use floats to hold the gate open for longer so limited tidal exchange can still be facilitated
- ❖ Monitoring these different designs is essential in assessing their impacts on estuaries

CONSTRAINTS:

- ❖ DATA RELIABILITY: Necessary data must be consistently collected from a field location
- ❖ COST: The overall package must cost significantly less to build and install than CTD installations currently available
- ❖ CONSISTENCY: The package must be made using parts, code, and 3D models that can be used to make more of the same packages

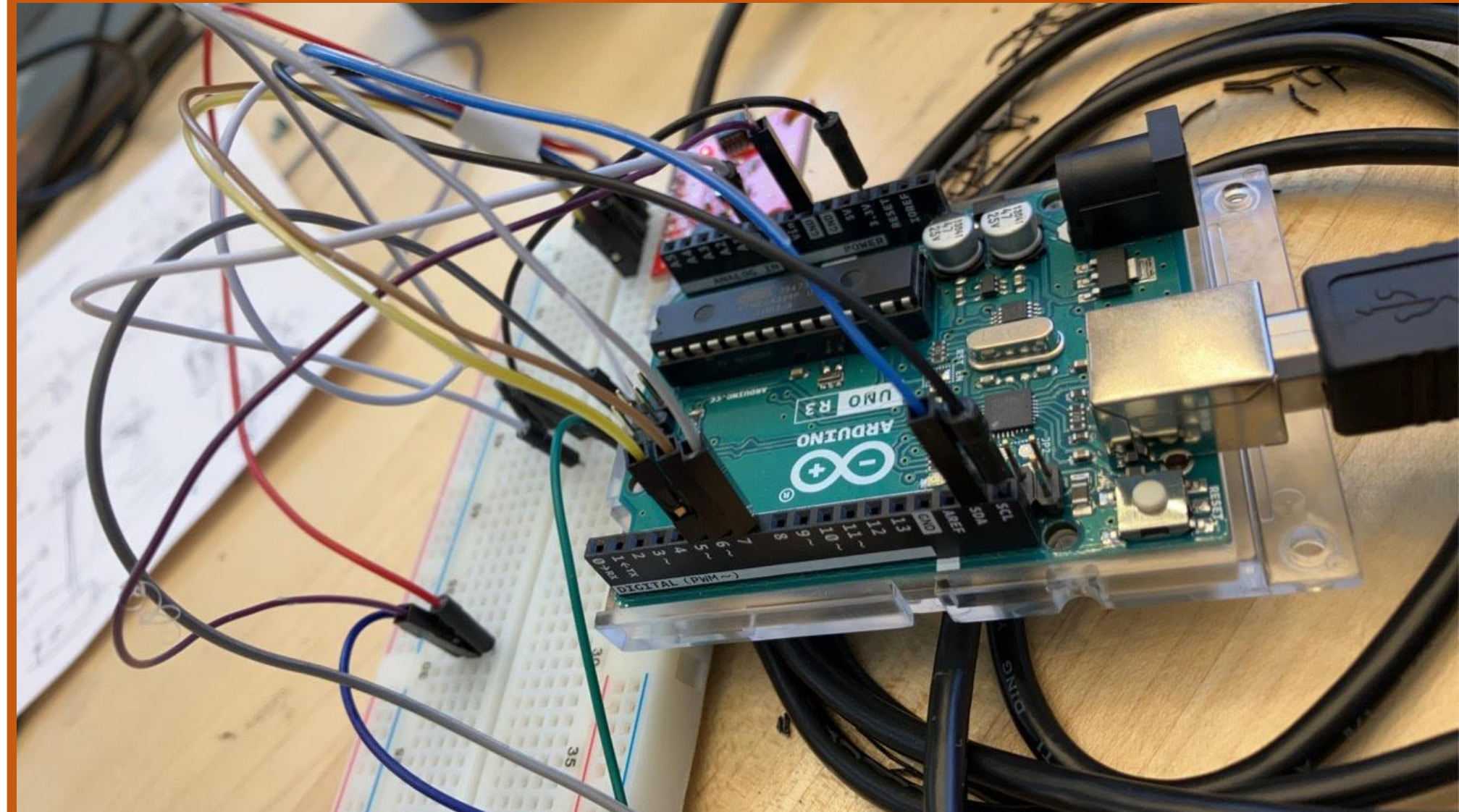
COMPONENTS:

- ❖ TEMPERATURE SENSOR: TMP-36 Adafruit thermistor
- ❖ CONDUCTIVITY / SALINITY SENSOR: Sparkfun soil moisture sensor
 - ❖ Measures voltage between two terminals using water as a resistor
- ❖ DEPTH SENSOR: Sparkfun VL53L1X IR Laser distance sensor
 - ❖ Measures distance from sensor to water, from which depth can be calculated based on the distance from the sensor to the bottom of the shallow channel
- ❖ CIRCUIT BOARD: Arduino UNO
- ❖ POWER SOURCE: Li-Ion battery pack
 - ❖ Low voltage, sensors run off 3.3V or lower Arduino pins
- ❖ DATA STORAGE: Sparkfun MicroSD breakout
- ❖ HOUSING: Designed using SolidWorks and 3D printed using ASA plastic on a Prusa 3D printer



DESIGN AND PROTOTYPING

GOALS FOR PROJECT CONTINUING THROUGH 2022-2023:
 Flowmeter using DC motor and 3D printed anemometer device
 Cell connection using SIM card for live data flow
 Tide gate site selection, waterproofing, and field testing



DESIGN IN PROGRESS