Design Review 4
Team 3: Self-Powered Wireless Sensor

02/20/18

Public Use

Agenda

Summary of Fall 2017

Current Progress

Future Plan of Action

Summary of Fall 2017

Project Scope

Design, build, and demonstrate a way to power a sensor that will transmit data of a specific variable wirelessly to the Engine Control Module (ECM) in a Cummins' diesel engine.

Preliminary Design and Selected Components

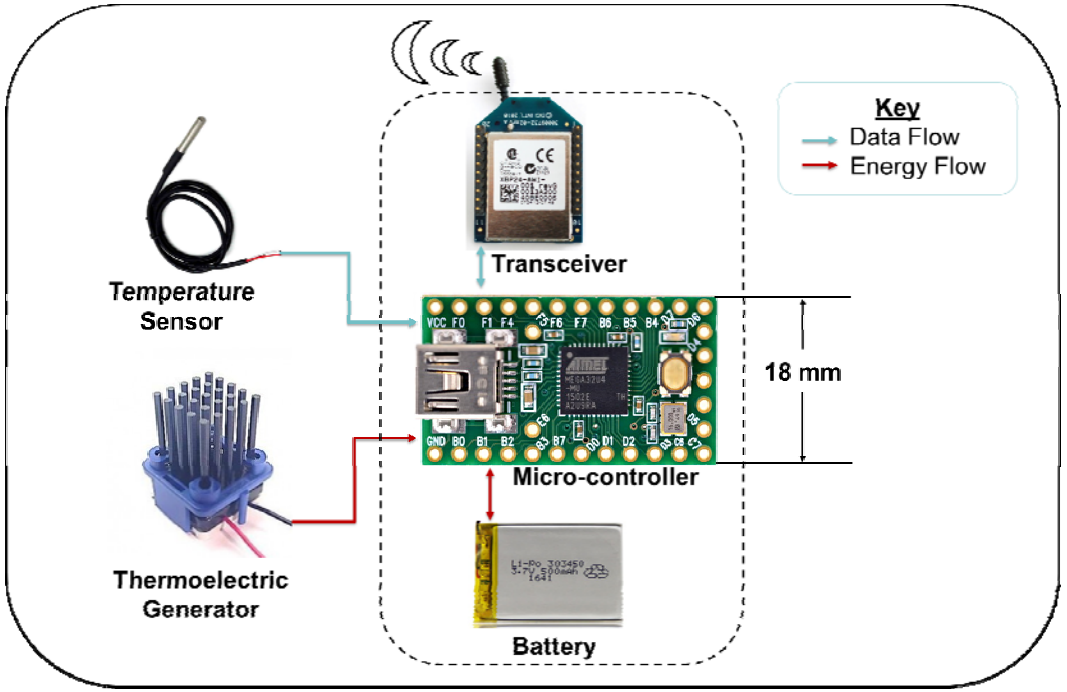
Sensor
- Thermocouple

Wireless Communication
- Bluetooth Low Energy

Microcontroller
- Adafruit Feather Bluefruit LE

Energy Harvester
- Thermoelectric Generator

Energy Storage
- Lithium Polymer Battery



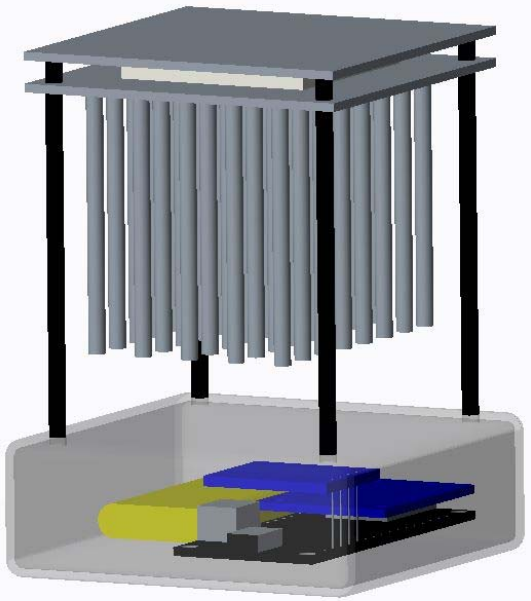
Current Progress


Cummins

Design

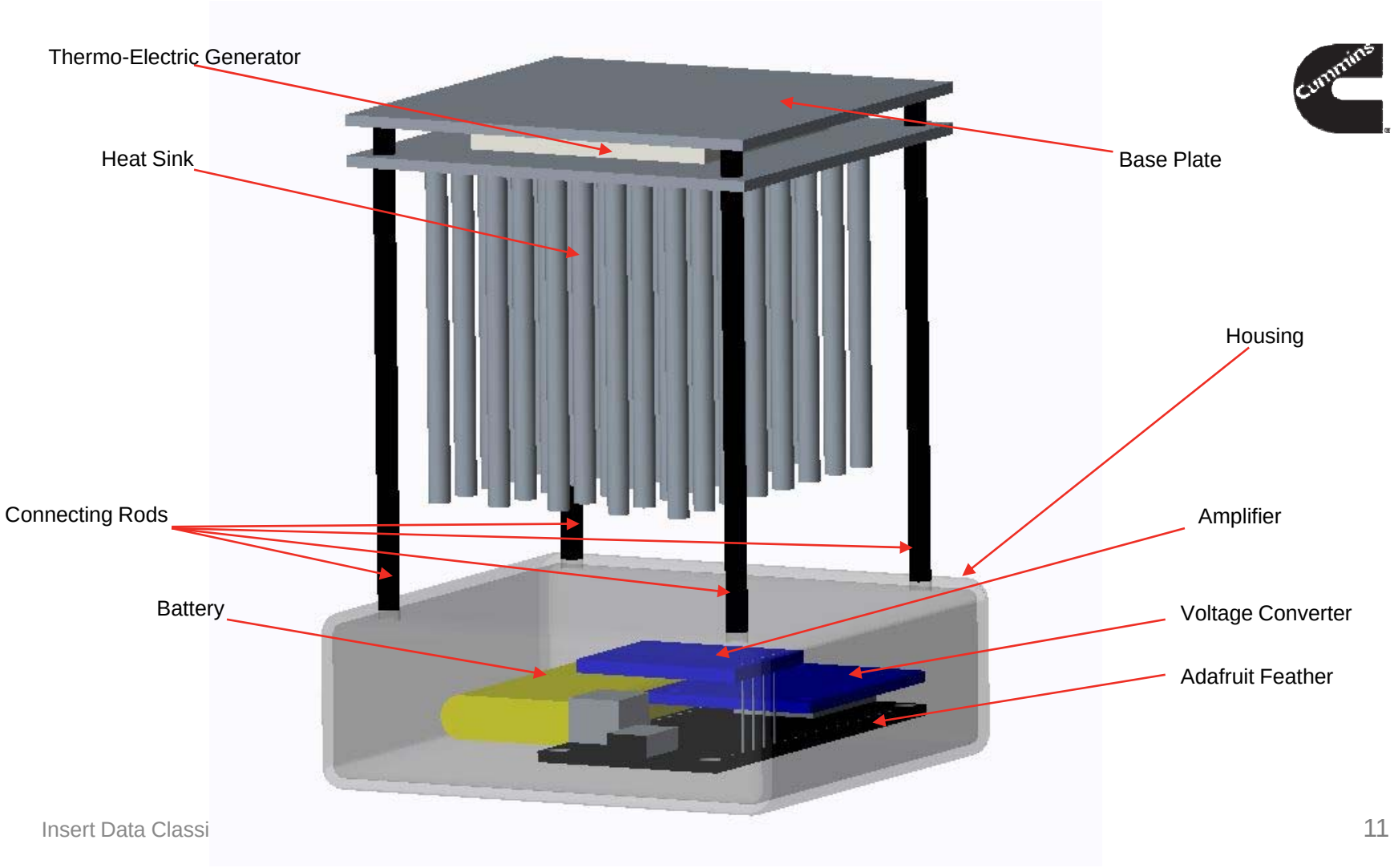
Housing

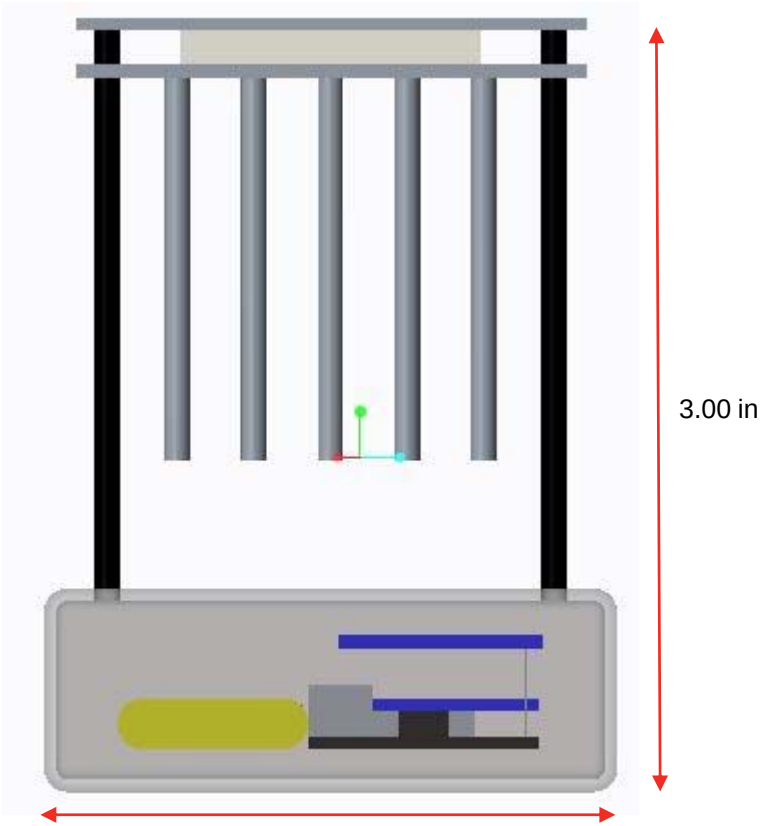
- Contains board, voltage converter, battery, and amplifier.
- Dimensions of 2.25 in x 2.25 in
- Height of 0.8 in
- Material to be made of Aluminum 2024
- Antenna will stick out of housing for transmitting data



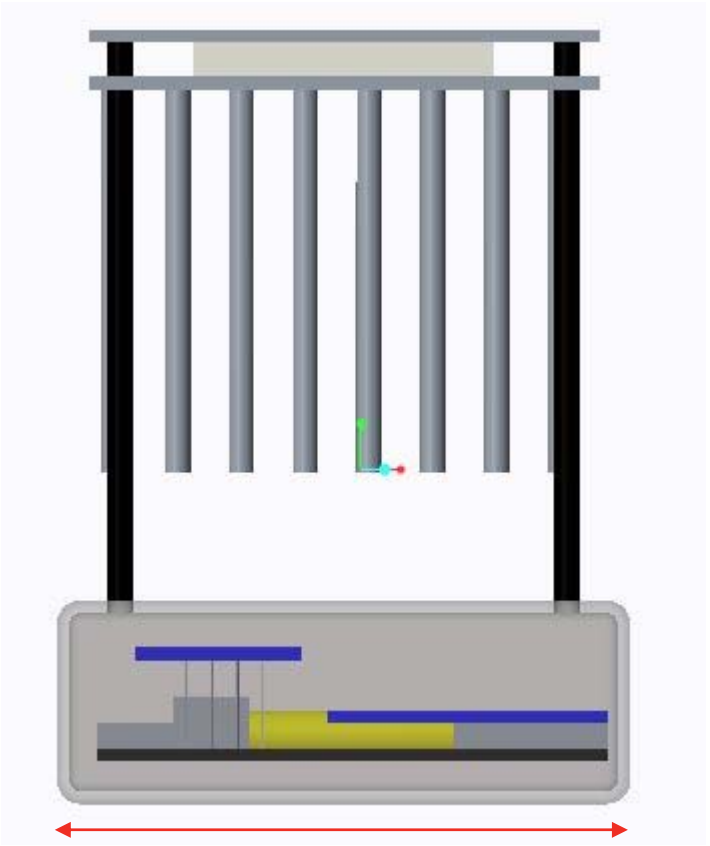
Base

- Contains Aluminum base plate, thermo-electric generator, heat sink, and connecting rods.
- Heat sink to be made of Aluminum 2024
- Threaded rods will connect the base plate with the housing through the heat sink.


Thermo-Electric Generator
Heat Sink
Base Plate
Housing
Connecting Rods
Amplifier
Battery
Voltage Converter
Adafruit Feather



Front View



Side View

Potential Issues

- Possible attachment issues to oil pan.
- Possible corrosion issues due to environment.
- Possible road debris impact.
- Possible transceiver issues due to housing interference.
- Possible overheating inside housing case.

Solutions to Possible Issues

- Attachment could be solved with either an epoxy or could be bolted into place.
- Non-corrosive materials will be used where possible.
- Aluminum plated bottom for the casing to stop debris.
- Utilizing a cage design for the casing will help limit transceiver interference and will help limit overheating the from components inside the casing.

Future Plan of Action

Questions?

Appendix A: Concept Parameters