

Rowing Canada Aviron Wireless Communication

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Background

Coaches use a number of performance metrics to improve athlete training quality.

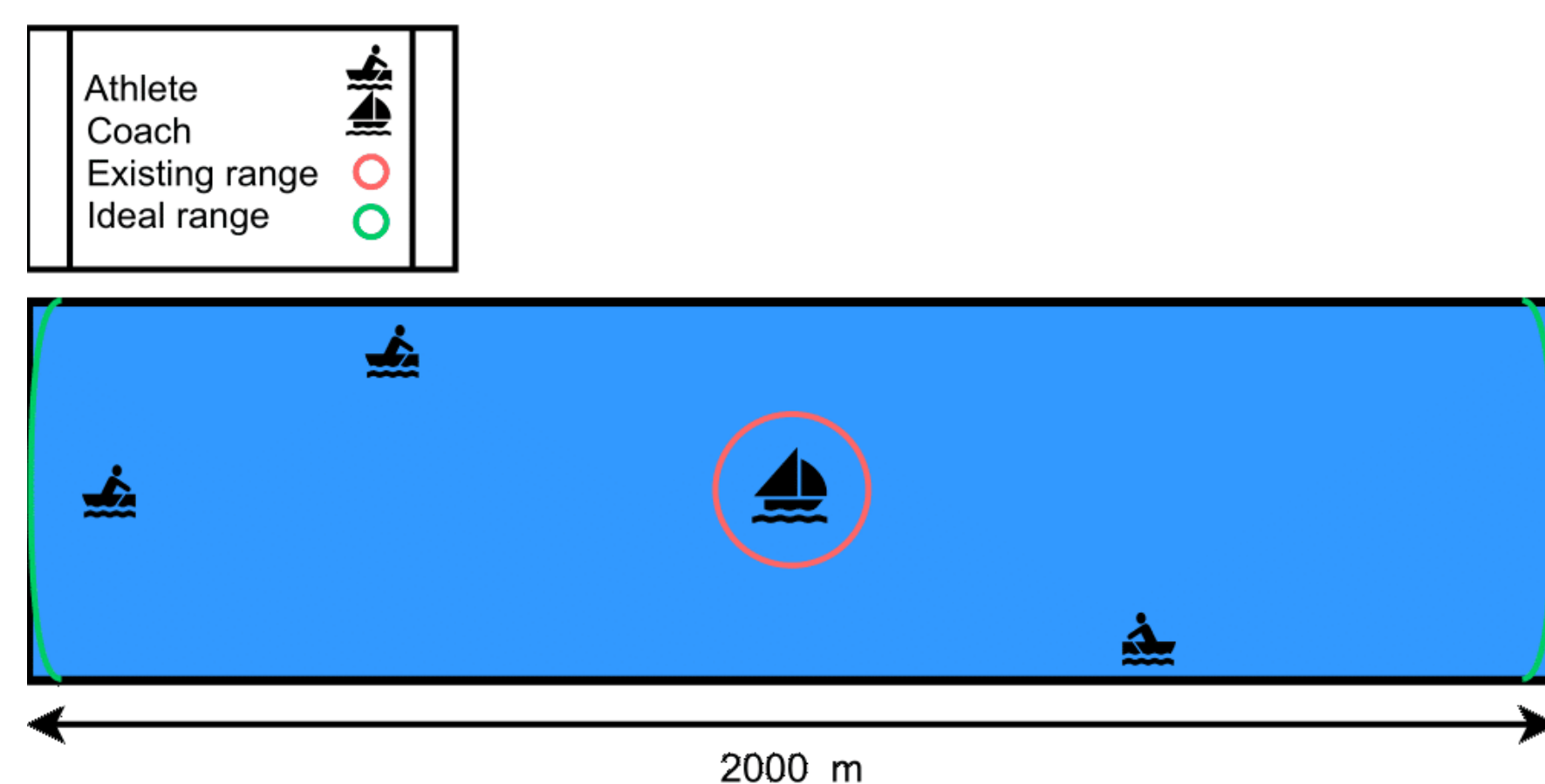
Ideally, coaches would receive this data in near real time to relay timely feedback to the athlete.

Similar market solutions have a transmission range around 100m.

Longer races are up to 2000m in length.

Available solutions were lacking in range, data quality, or require cell service.

Ideally coach can monitor all athletes without moving regardless of position.



Methods

Long range radio required. Identified candidates were LoRa and Nb-iot.

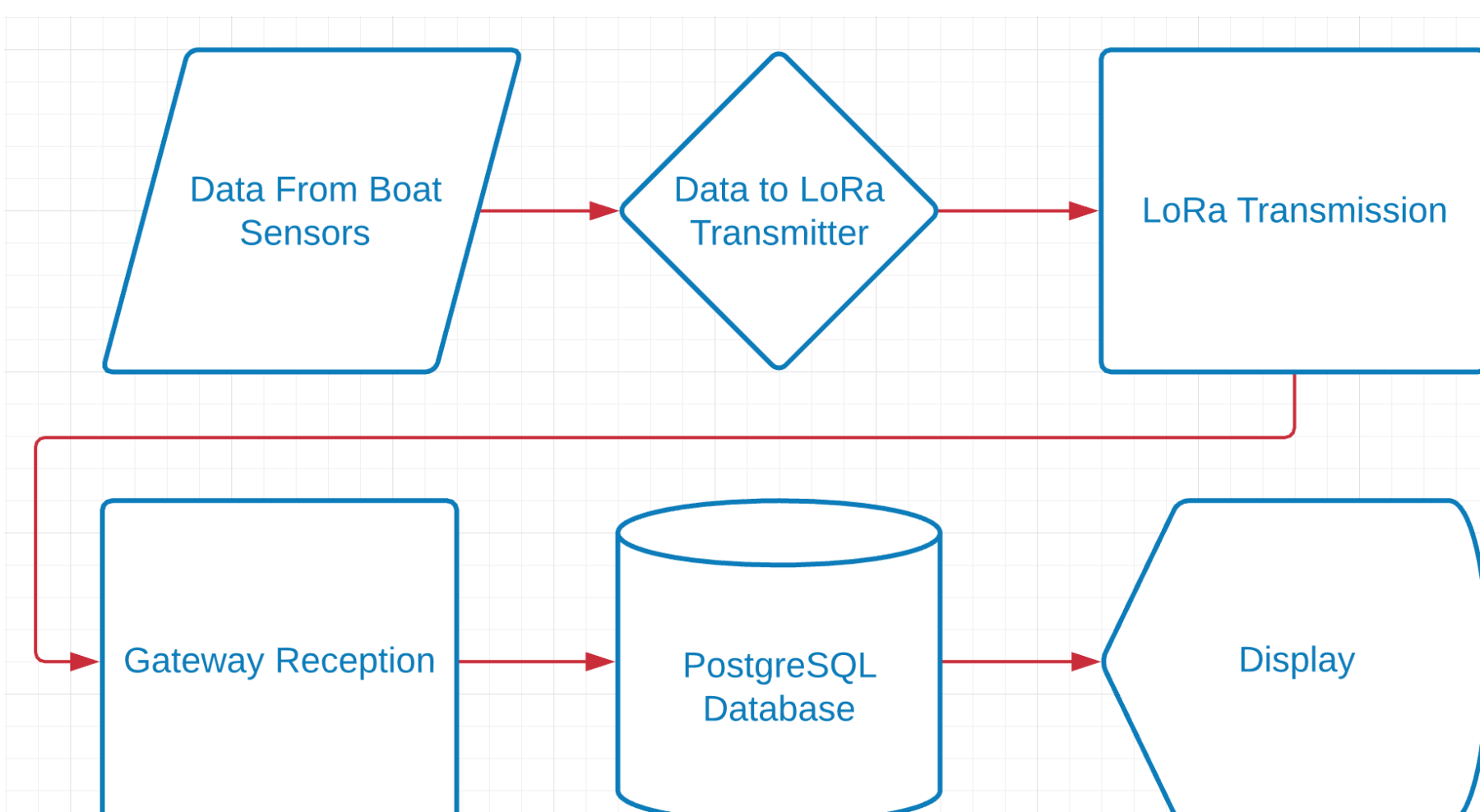
LoRa was selected due to higher range and lower cost.

Accelerometer and location data is collected by the on boat datalogger.

Collected data is broadcast to the coach's unit.

Coach's unit displays real-time data onto a screen that will display individual velocity and stroke rate plots as well as distance covered, split and absolute GMS % for various GMS standards.

Data is broadcast following LoRaWAN specification – the license-free ISM 915 MHz band in North America

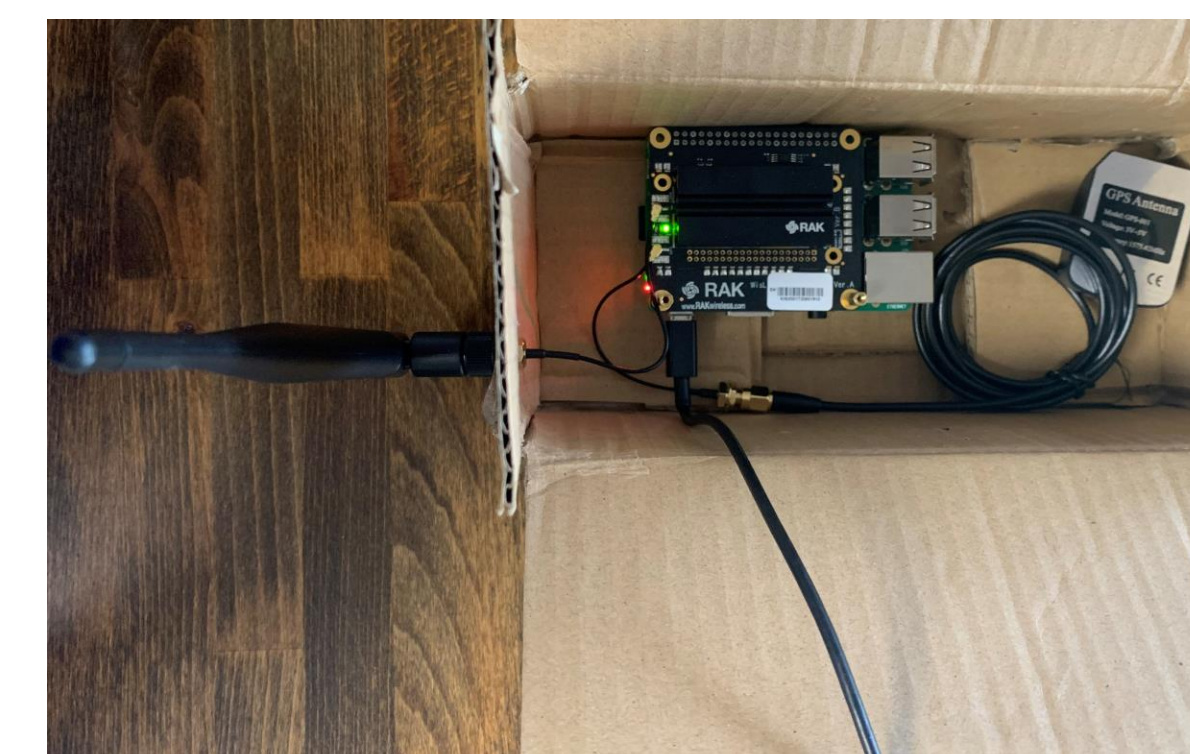


Results

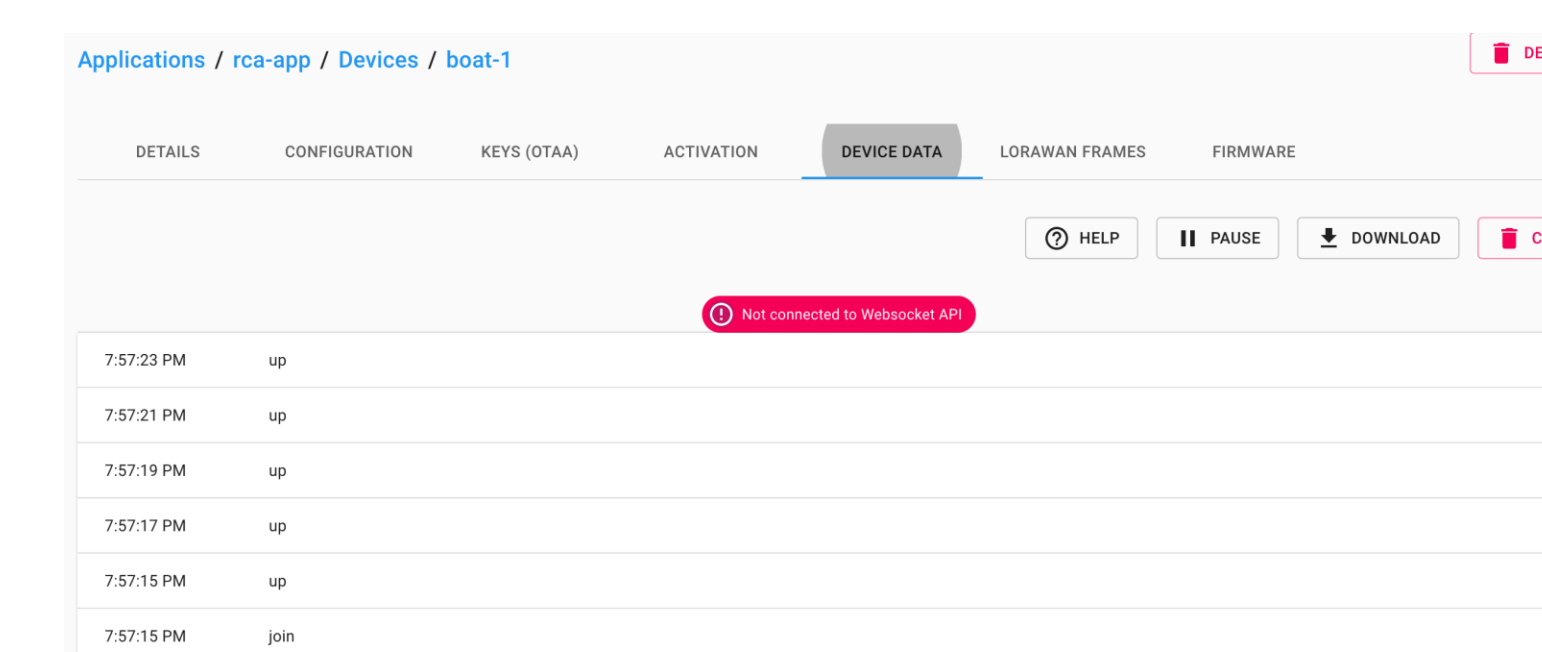
Rower's device prototype developed using an Adafruit Feather M0 with RFM95.



Coach's device prototype developed using Raspberry Pi and RAK 2245 LoRaWAN gateway.

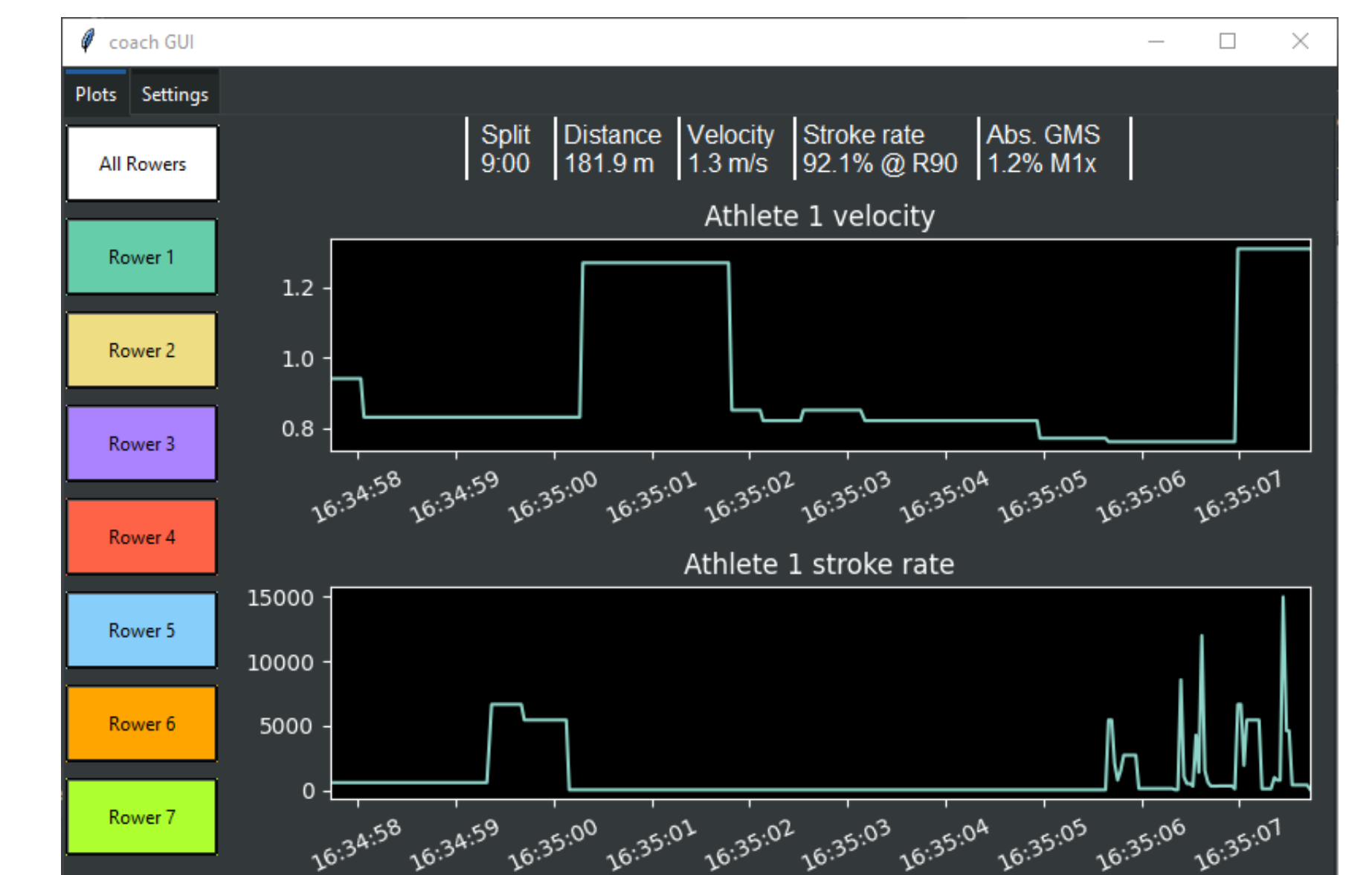


Able to transmit at a range of 2 km.



At 4.5 km, the connection was successful but no data was received.

GUI was built with a longstanding UI interface toolkit, tkinter, along with matplotlib to plot the live graphs.



Conclusions

The end result is:

- Longer range
- Lower price point

Interface is configurable to monitor key performance metrics.

Compatibility issues with the LoRa Gateway's out-of-box non-GUI compatible Raspbian OS prevented GUI from operating on same Raspberry Pi.

LoRa transmission library requires further development for continuous, real-time transmission