PiRail - Agile Charter

Stakeholders:

Development team members:

- Logan White - Information Technology (Front End Design, HTML, CSS)
- Adam Elsner – Information Technology (Front End Design, HTML, CSS)
- Genesis Soebagyo – Information Technology (Front End Design, HTML, CSS)
- David Scarborough – Computer Science (Backend, Data Visualization)
- Dartagnan Birnie – Computer Science (Front End, HTML, JavaScript, CSS)

Product Owner:

- Jonathan Miner

Scrum Master:

- Lisa Henry

Problem statement:

- Railroads face the challenge of inspecting and maintaining miles of track, historically involving time-consuming manual inspection. There is not an easy way to use a testbed simulator or easily interact with the program while it is live. This technology would greatly benefit the Federal Railroad Association.

Product vision:

- PiRail is budget friendly, performing data collection using single-board computers, low cost sensors, and open-source software. The primary goal is to promote research and innovation. Our vision is to create a testbed simulator to facilitate the implementation of a more interactive GUI so you don't have to test the project live every time.

MOV:

- This project aims to improve the efficiency and safety of railroad track inspections by developing a user-friendly interface and robust simulation tools for real-time data analysis and testing. Success will be achieved with a 75% user interface / experience approval rating via user-testing, which takes ease-of-use, look, and feel into account. The application will provide value by enabling cost-effective, reliable railroad maintenance that meets stakeholder needs and goals completed by April of 2025.

Deliverables/Product Goals

- **Investigation**
    - Review prior research and design
        - Write small study on GIS data sources
        - Create current summary of usability issues
    - Construct necessary hardware parts list
- **Usability / Simulator CONOPS**
    - Update existing functionality to use PiRail Packet API interface
    - Improve website usability
    - Create data simulator to allow for easy UI testing and improvement
- **New UI / replay mode**
    - Build map UI that updates with live data
    - Develop "replay mode", allowing the simulator to playback pre-recorded data streams
    - Establish a Usability Test Plan, possibly use User Testing?
- **Testing / Improvements**
    - Convert Simulator to control new Map UI
    - Instantiate PiRail data to show up as Map Overlays
    - Usability Testing and report creation
    - Improvements based on test data

MVP

Develop a working mobile user interface that collects and simulates data, displays a railway map, and displays the user's location in real time. At its current and future state,

PiRail is a not-for-profit product and is delivered to the consumer through a publicly available GitLab repository.

Work:

In Scope

- Development of a new user interface with a substantially more modern look and feel, real-time alert / map display functionality, and the ability to report and display points of interest.
- Designing an in-app simulator so we can more conveniently test our user interface without the need to be physically located on a train. This will allow for both replay of existing datasets and generating data-streams.
- Update of pre-existing APIs that pull analytical data from the PiRail unit (GPS, Lidar sensors).

Out of Scope

- Development of a ground penetrating radar (GPR) to monitor the integrity of railways. This was going to be an extension project between multiple different departments at UNH, but will not be happening for the duration of this year's project.

Roadmap: