Base Station Creation for Powder Valley Nature Center Copperhead Snake Tracking

Joint Project Team

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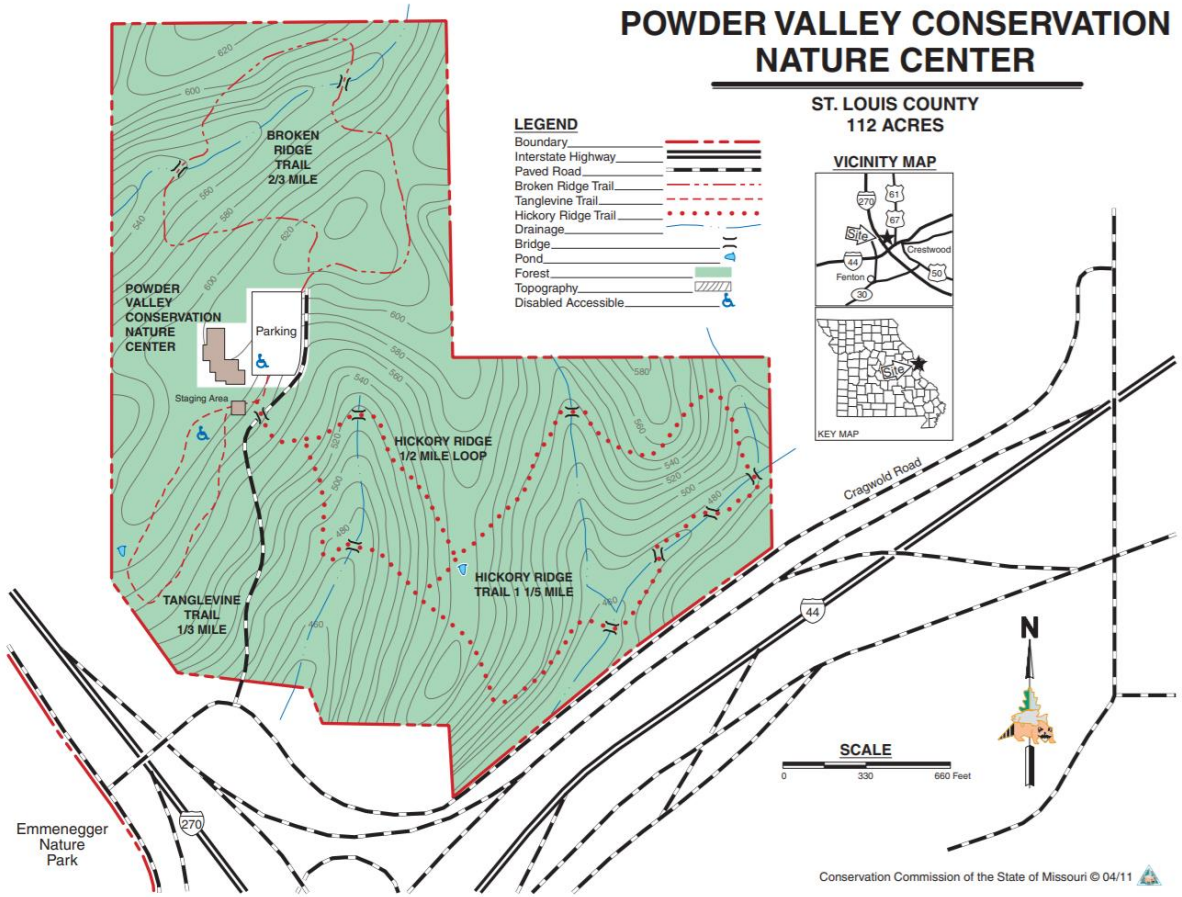
Students: Josh Peck, Dan Rosenburg and Abbie Wolfe

Partnering with: Sethin Burrier and Sierra Wang

Client:
Dr. Benjamin Jellen,
St. Louis College of Pharmacy

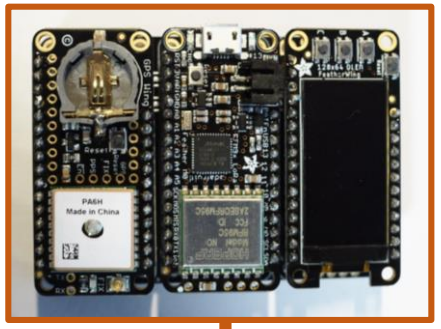
Dr. Jellen's Research and Purpose for Tracking Snakes



Past Senior Design Projects

Initial Project: Established Radio Connection

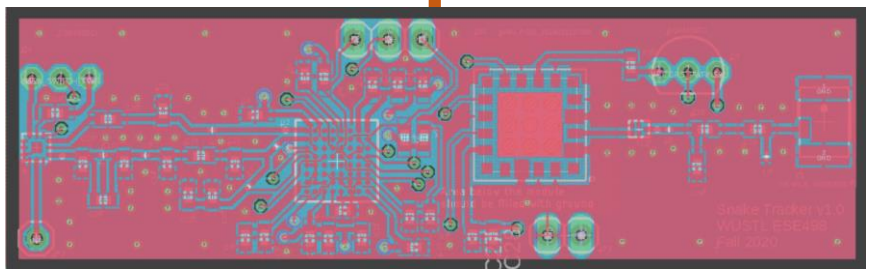
Continuation of Project: Design PCB and decrease implant size



Spring 2020

Fall 2020

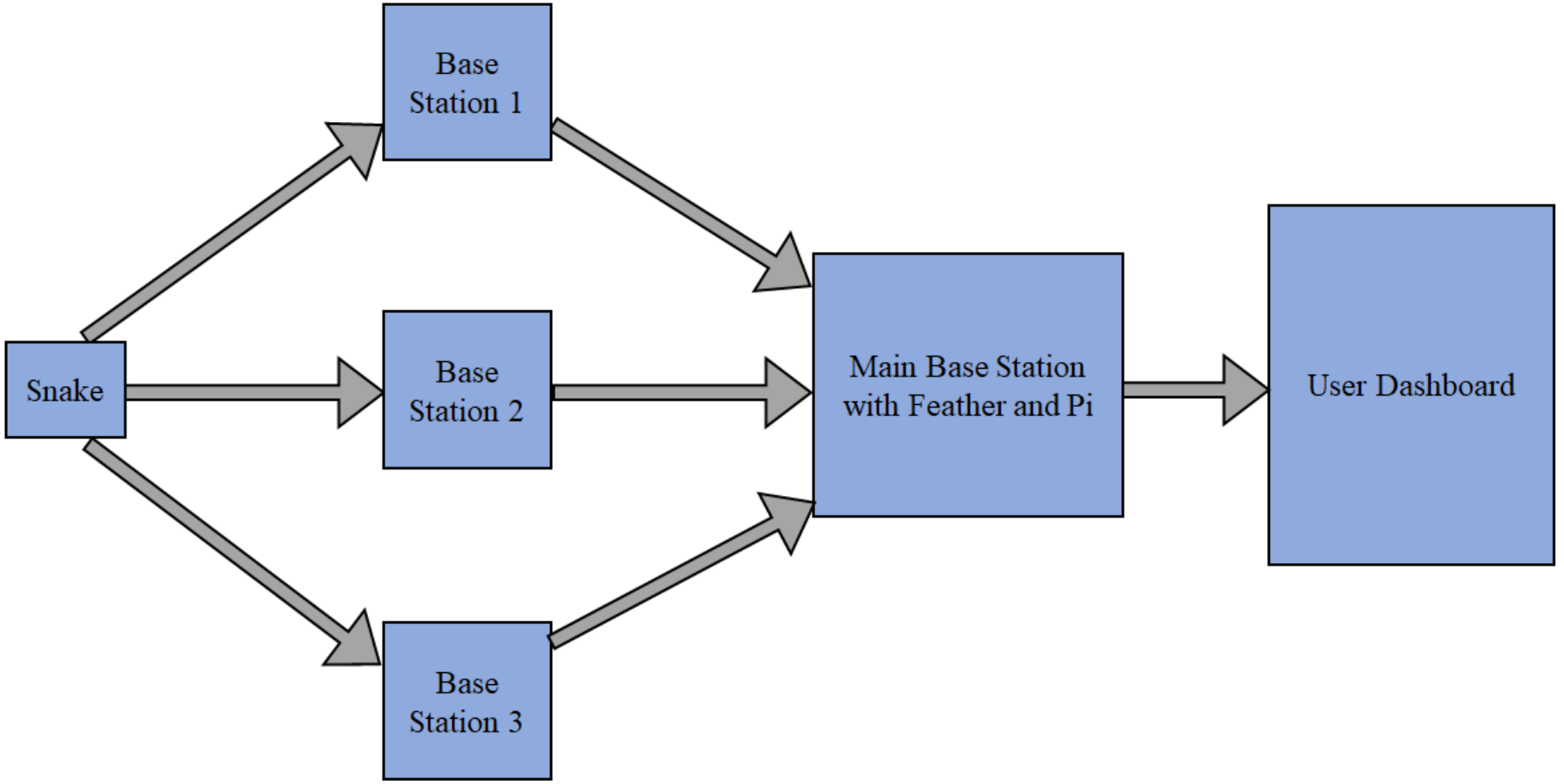
Spring 2021



Our Goal: To design and implement base stations and a user interface that allows for the implants to be smaller with a low power consumption

Technical Approach

Figure 1: System Block Diagram



Base Stations

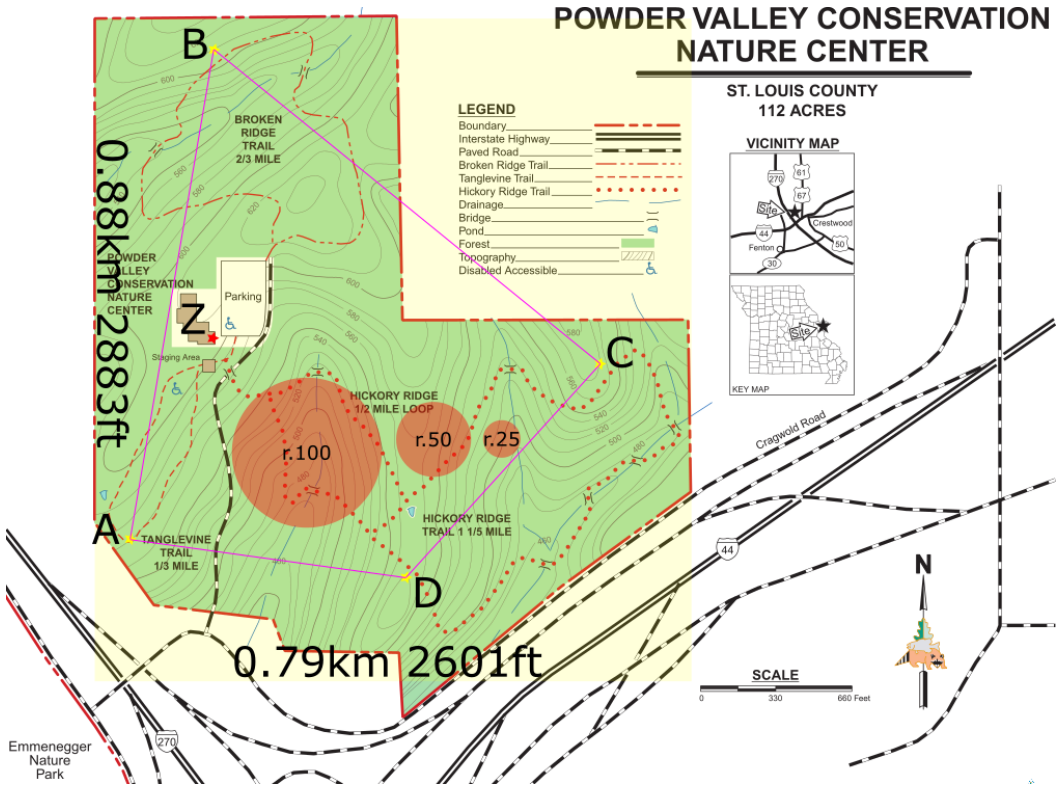
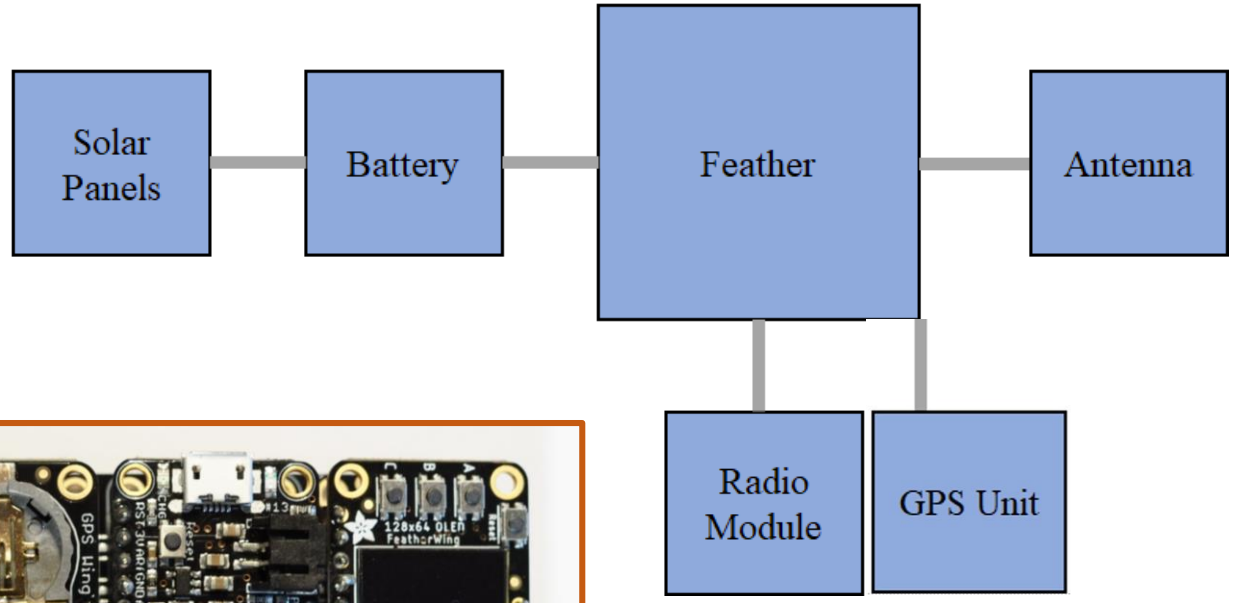
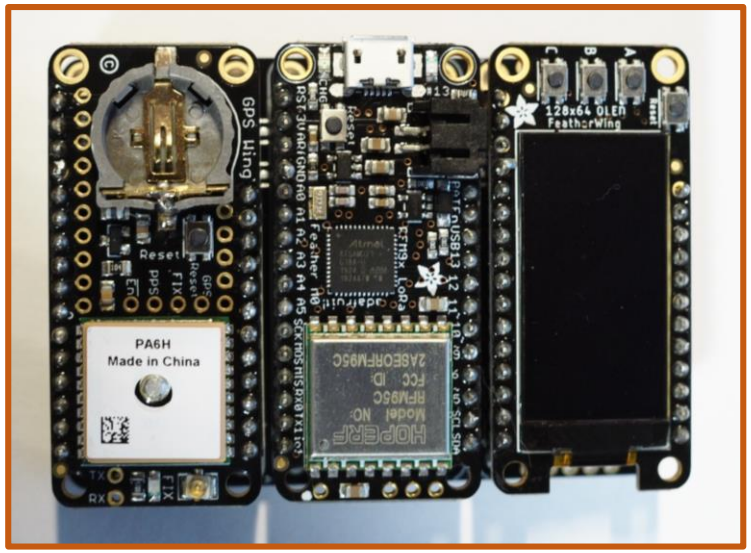


Figure 2: Base Station Block Diagram





Primary Base Station (Algorithm Processing Unit)

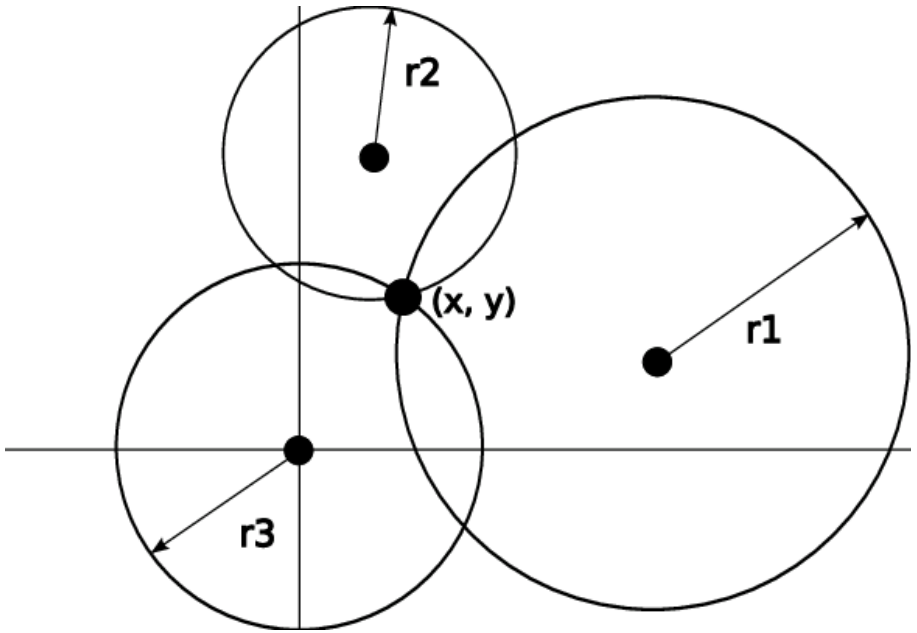
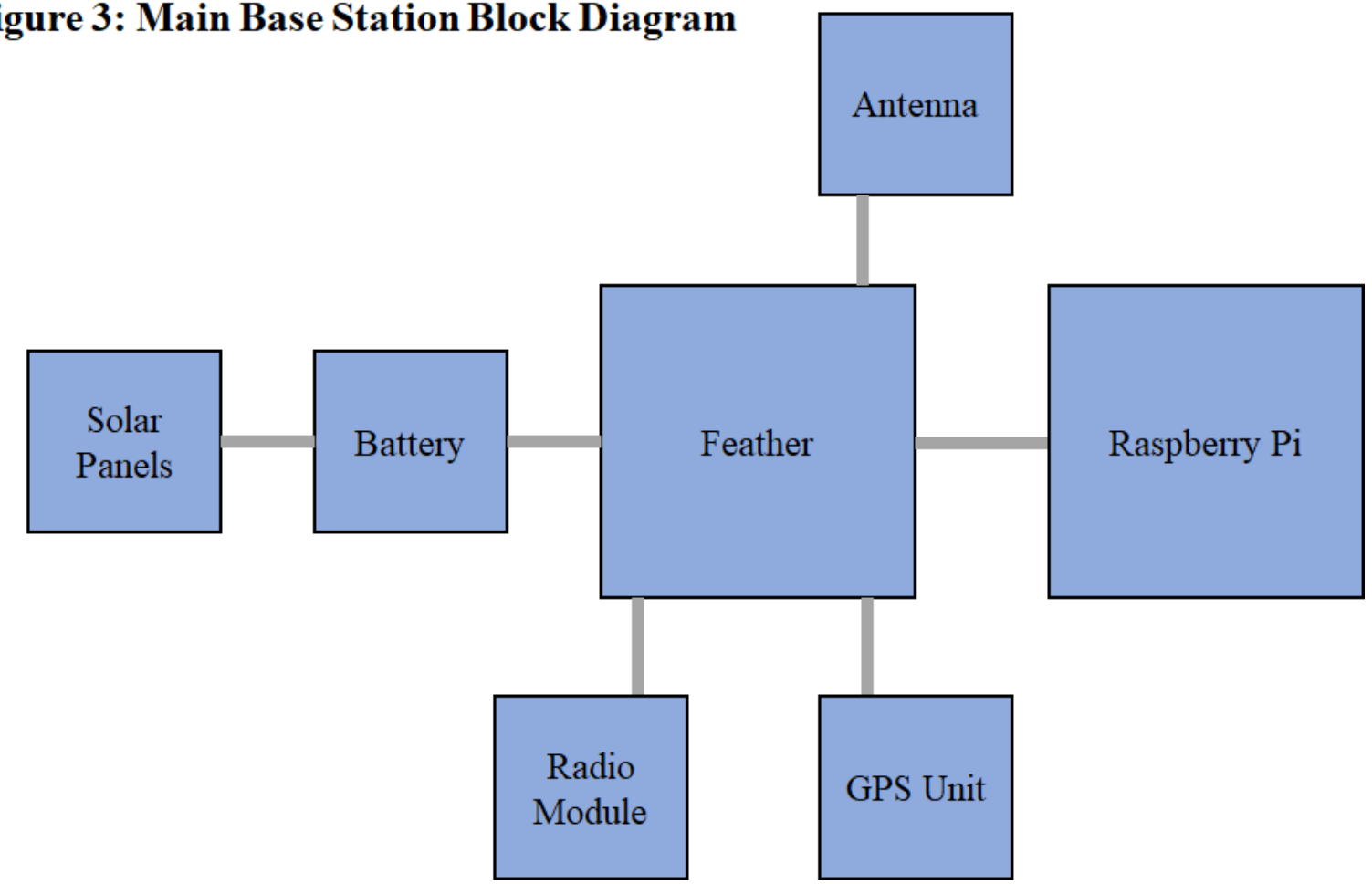
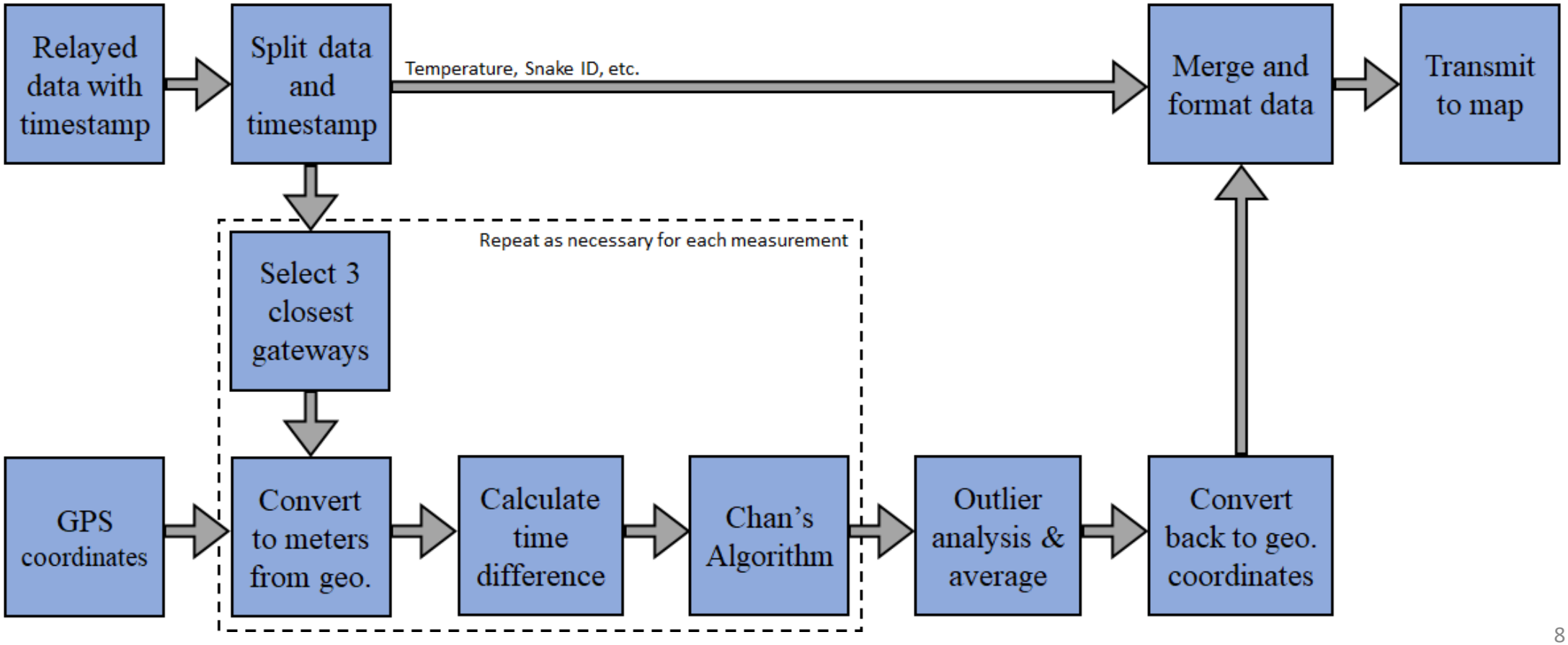


Figure 3: Main Base Station Block Diagram

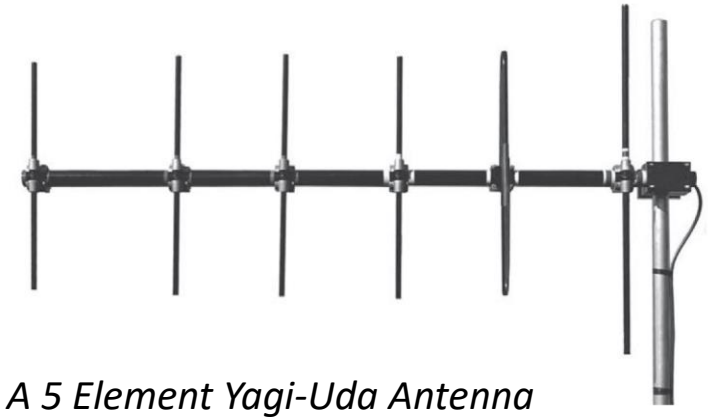


Time Difference of Arrival (TDoA) Algorithm

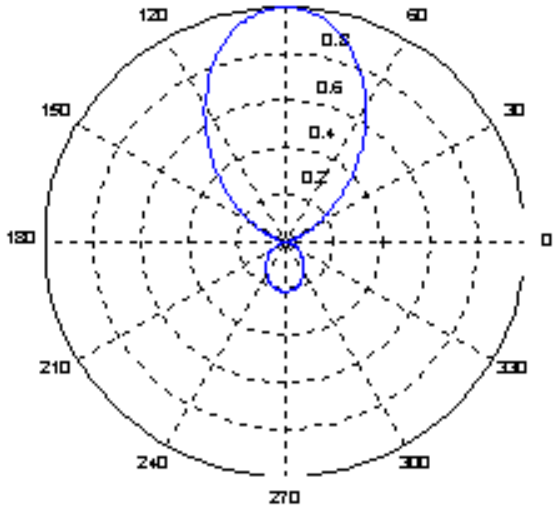
Figure 4: Algorithm Block Diagram



Portable Locating Unit "Dowsing Rod"

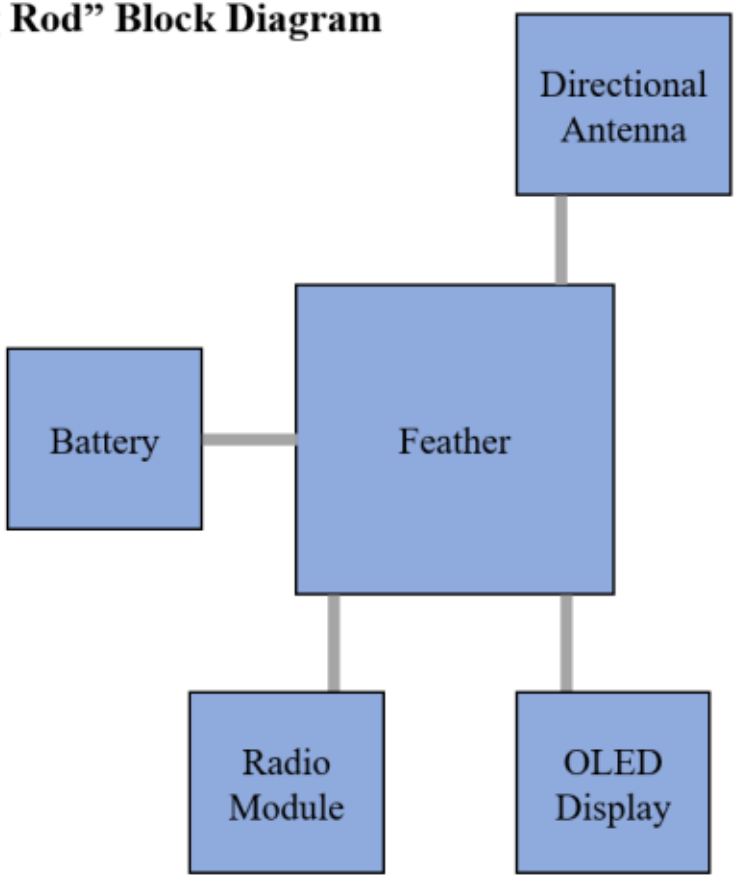


A 5 Element Yagi-Uda Antenna



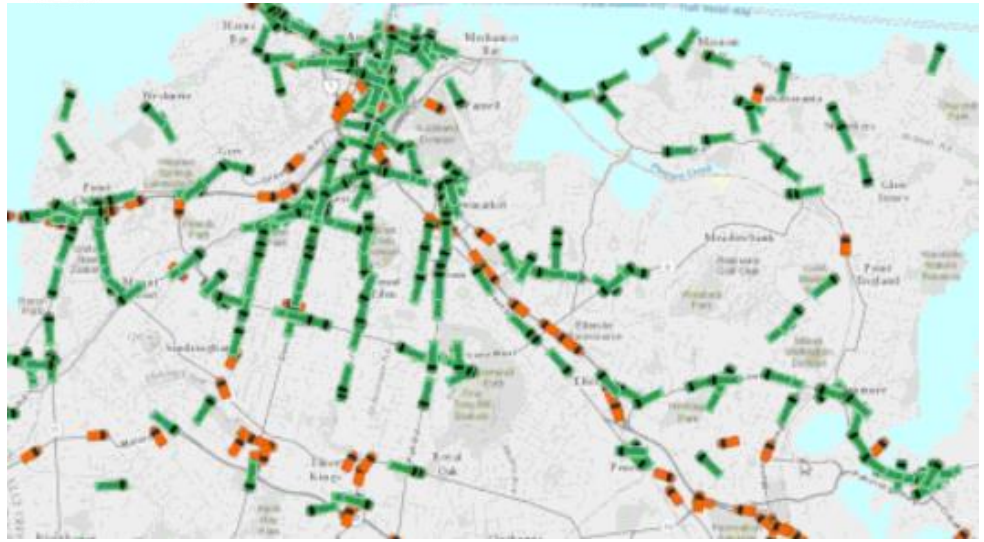
Yagi-Uda Radiation Pattern

Figure 5: "Dowsing Rod" Block Diagram



User Dashboard

- Online, autonomously updating last reported location
  - Download raw data/time history
- Control Panel:
  - Location Update Frequency
  - Enable Active Tracking
  - Monitor Base Station Status



Concept for Tracking Dashboard

Next Steps

Finish Physical Construction of Base Stations and Portable Units

Test combination of proven subsystems

Field testing of solution

Deliverables

1 Main Base Station

3 Peripheral Base Stations

Trilateration TDoA Algorithm

User Dashboard

Portable Locating Unit

Questions

References

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