

## Project Management/Tracking Procedures

- Waterfall project management would fit our project the best because the tasks we are completing don't require incremental steps. Our project follows a linear path of development with some hard deadlines for demonstration. Our team is using Jira to track issues and progress throughout the project. We also plan on using Gitlab for any software repositories we have.

## Task Decomposition

- Design an enclosure to hold multiple SDR's and Intel NUC. (User Equipment aka UE)
- Modify srsRAN code to support enclosures of multiple ranges.
- Deploy UE's across Ames
- Perform testing on the UE's (enclosures) to verify proper functionality.
- Experiment with open source 5G-and-beyond solutions on the network.

## Project Proposed milestones, metrics, and evaluation criteria

- October 29<sup>th</sup>: Design an enclosure that will contain the Intel NUC, an amplifier, and 4 SDRs; B210, N320, X410, and Skylark mMIMO.
- November 29<sup>th</sup>: Test the UE in the lab for reliability and stability
- December 14<sup>th</sup>: Demo the UE enclosure to the National Science Foundation
- February 15<sup>th</sup>: Deploy UE's across Ames and ISU and get measurements or reliability
- March 15<sup>th</sup>: Experiment with 5G-and-beyond software platforms
- April 1<sup>st</sup>: Conduct performance measurement
- April 29<sup>th</sup>: Demonstration/Report

## Project timeline/Schedule

\* August - September 2021: Study basics of the ARA project (<https://arawireless.org>) and related 5G-and-beyond hardware and software platforms

\* October – November 2021: Develop hardware integration and manufacturing strategies for ARA user equipment; deployment ARA base station equipment; perform initial testing;

\* December 2021: Deploy ARA user equipment across City of Ames and ISU Research and Teaching Farms and conduct performance measurement;

\* January - February 2022: Participate in the preparation of the ARA deployment around the ISU Curtiss Farm as well as Agronomy and Ag Engineering Farm; Experiment with open-source 5G-and-beyond software platforms using ARA;

\* March – April 2022: Experiment with novel 5G-and-beyond solutions and conduct performance measurement; demonstration and report.

## Risks and risk management/mitigation

- Equipment breaks: 0.01
- 3D printing errors: .15

## Personnel effort requirements

Task	Man-hours
3D model an enclosure	30 hours
Modifying the srsRAN codebase for each UE	60 hours
Deploying the UE	5 hours
Testing UE in the lab and in the field	30 hours

## Other resource requirements

- CAD access to design enclosure
- 3D printing materials to print enclosure
- Computers to modify srsRAN code
- The SDRs needed for this project
- Intel NUCs and amplifiers for the box.