# ARIANNA Neutrino Array: WiFi Mesh Communications

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Project Summary

Our project pertains to the establishment of a WiFi Mesh Communications system, the fundamental goal of which is to enable transmission and reception of data over extended distances in a mesh-connected network while still maintaining data integrity. to serve as a proof of concept which will be applied to the NSF-sponsored ARIANNA project.
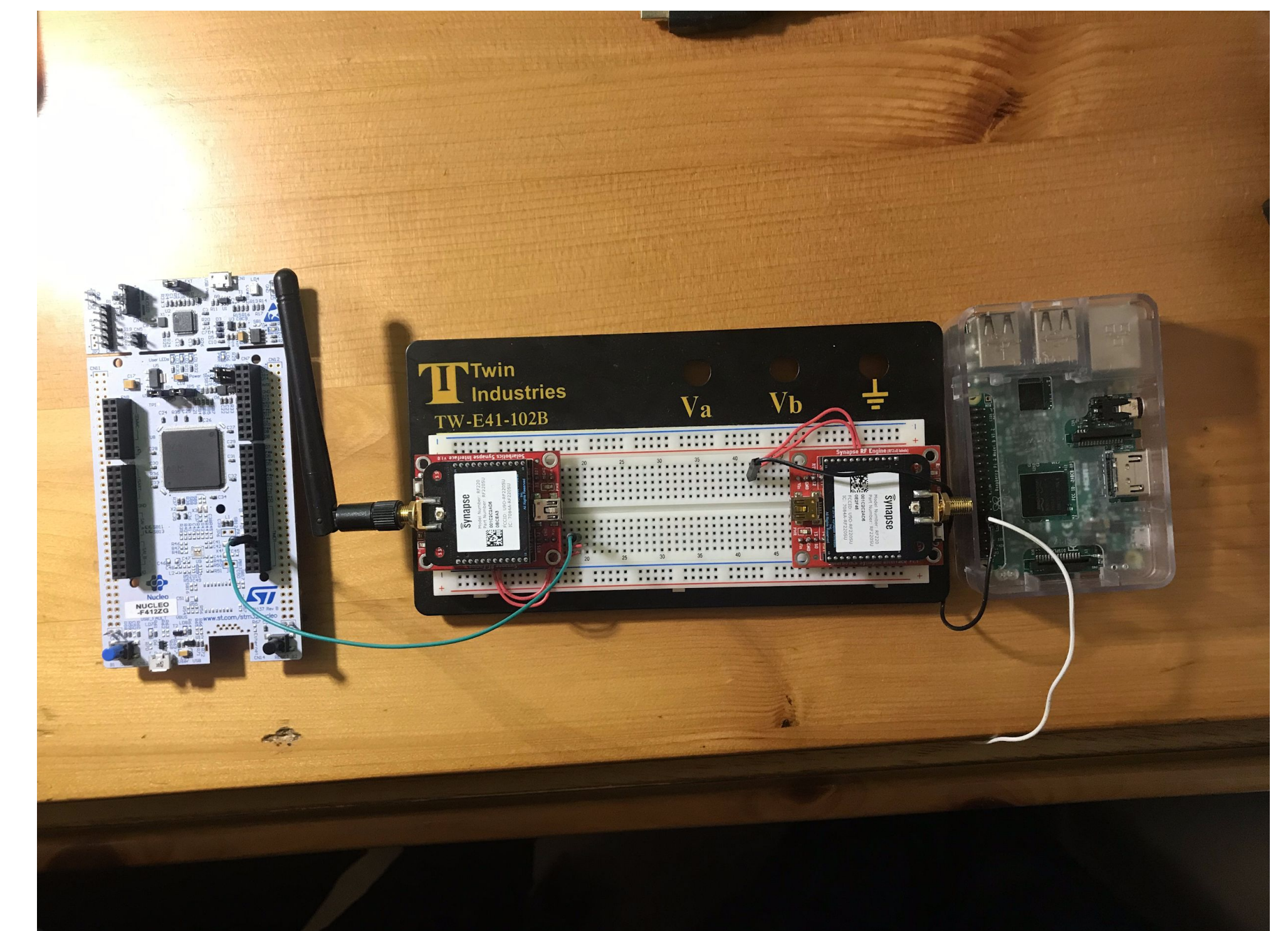
Diagram
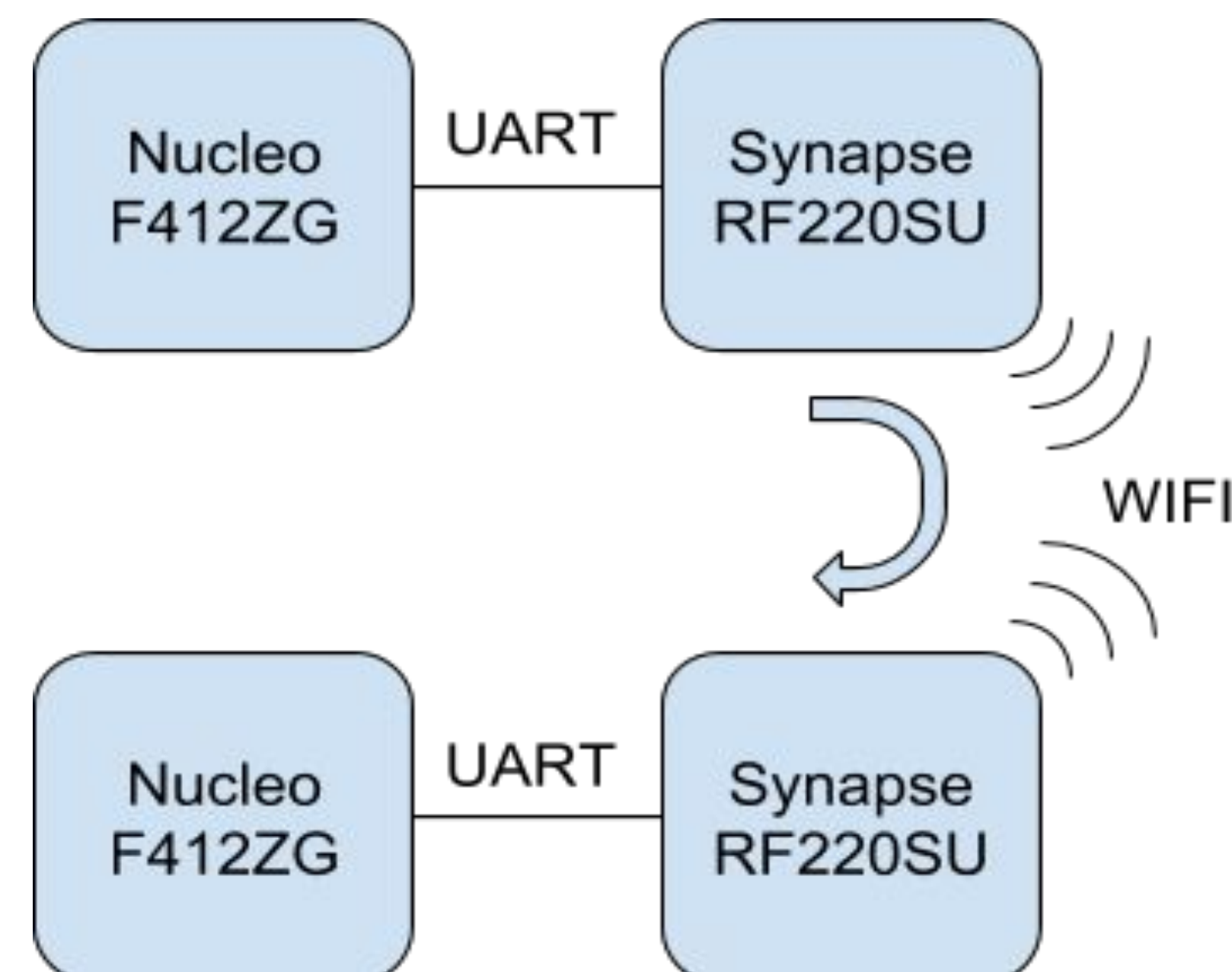
Achievements

Throughout our two quarters of development, we have:

- Developed a functional system to transmit and receive data wirelessly.
  - STM32 NUCLEO board implements UART serial protocol to transmit the data through via RF 220SU module used as a wireless transceiver.
  - Transmitted data is received by an identical module and processed by a microcontroller.
- Data transmitted in 32-bit packets, but capable of transmitting/receiving up to 128-bit packets with appropriate microcontroller.
- Data integrity and structure maintained throughout transmission and reception processes.

Limitations and Setbacks

- Throughput analysis in singular and mesh-connected configuration
- Functionality of system as a function of range >1km

Hardware Configuration

Ray-Moreno, Carlos, et al. "Experiences, Challenges and Lessons from Rolling out a Rural WiFi Mesh Network." *ACM Digital Library*, ACM, 11 Jan. 2013, dl.acm.org/citation.cfm?id=2442897.
"The Science of ARIANNA." *ARIANNA*, 12 Jan. 2016, arianna.ps.uci.edu/science.

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