



# WDAQ: Problem and Users

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# Project Overview

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Project: Wireless Data Acquisition (wDAQ) system to capture/transmit high-frequency analog signals to a device in real time using Wi-Fi technology

The DAQ will amplify a 1 mV analog input signal to approximately 1-2 V before digitizing it

- ADC will have a 12-bit resolution

Wi-Fi will be used to wirelessly transmit signals to a computer

- Bluetooth can be used for signal transmission, but has a significantly lower data transfer rate than Wi-Fi

The DAQ will be fabricated on a small PCB with surface-mount components

A graphical user interface (GUI), written in LabVIEW, will be used to analyze data

# Problem Statement

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Most oscilloscopes and data acquisition systems require BNC cables to analyze circuits & signals, as well as a built-in display and buttons to adjust waveforms and display settings, which take up space and increase the size of the device. The scopes also require another cord for system power.

Going wireless potentially eliminates the BNC probe cable and power cable. Integrating analysis features into user software also makes physical buttons less necessary.

- **Task:** Create a wireless data acquisition system that enables mobile real-time data communication and is compact enough to fit in about a 1"x5" space within a photoacoustic tomography system. Alongside the DAQ, create a graphical user interface in LabVIEW that enables users to view and analyze data.

# User Personas

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## **Jane:**

- Medical imaging technician
- Increase mobility around lab
- Maintaining accuracy and quick transmission of data

## **Lenny:**

- Lab assistant
- Little technical experience
- Needs easy-to-use lab equipment

## **Big Al:**

- Business owner
- Reduce costs
- Reduce training time

# Conclusions

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Our system will need to cater to a variety of users at different levels of skill and experience.

We will need to be conscious of the size of the circuit to ensure the components will fit in the footprint of the PCB we use.

We will want to have a high-speed amplifier with wide bandwidth and low signal noise while still having a very high gain.

We will need to follow IEEE 802.11 (Wi-Fi) protocols for signal transmission & reception, as well as IEEE 1118.1-1990 for microcontroller programming standards throughout the project.

# Sources

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- [1] iKA by ikalogic. "iKascope: Portable Oscilloscope." ikalogic, <https://www.ikalogic.com/ikascope-portable-oscilloscope/>. [Accessed: February 23, 2024].