



# SonicAire Industrial Fan



School of Engineering + Technology

## Problem Statement

SonicAire, located in Winston-Salem, NC, is committed to helping their clients tackle combustible dust in their facilities by offering variety of fan choices. However, now they are seeking a new solution that will include:

- **Independent motors controlling the rotation and oscillation of the fan**
- **Remote user interface**
- **Wireless customization of oscillation and rotation patterns**

## Requirements

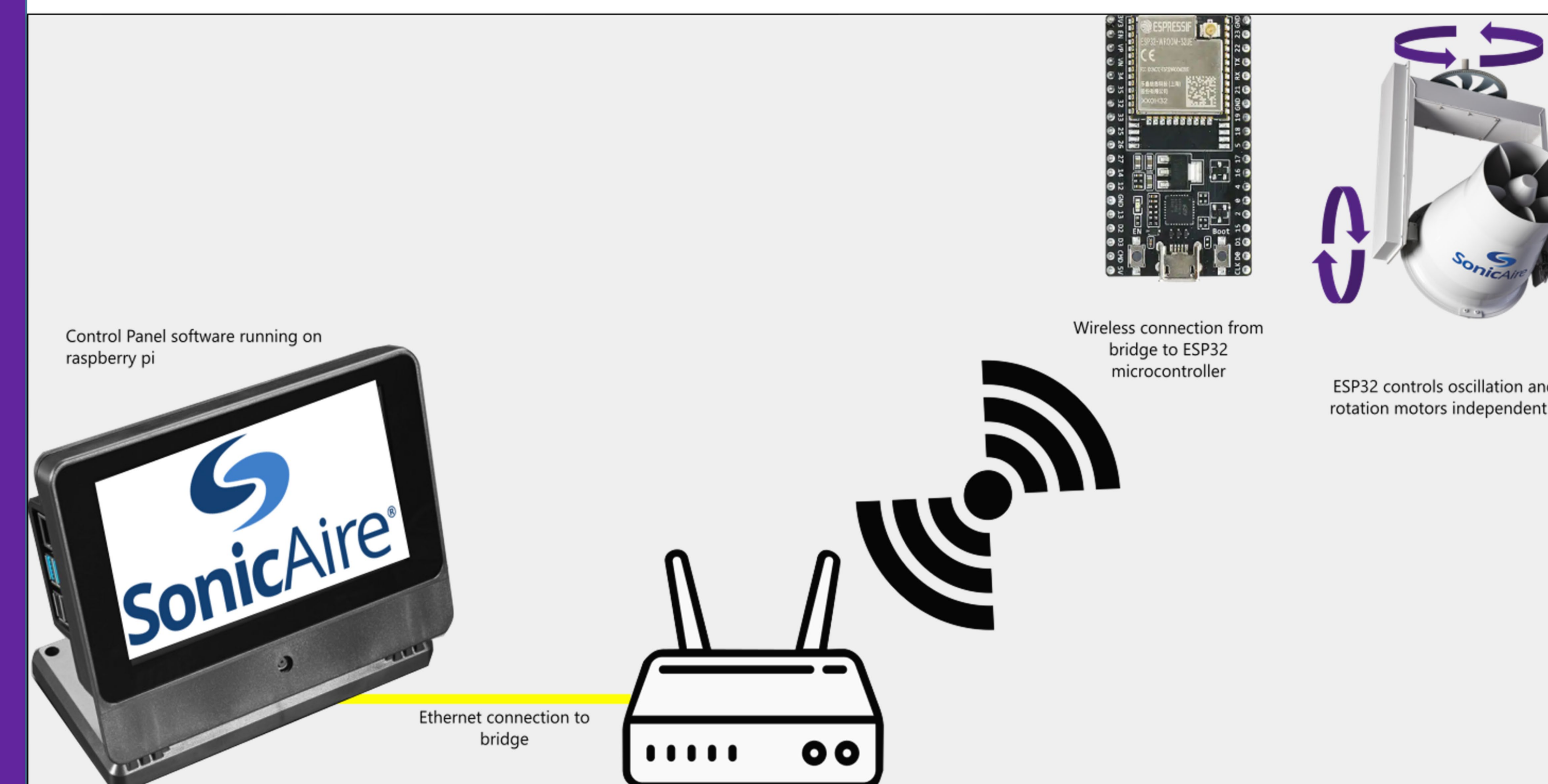
- Ability to oscillate between 0-120 degrees
- Ability to rotate between 0-360 degrees
- Must be able to operate in high temperature (up to 85 C)
- Must be able to operate with limited interactions from user
- Must be capable of sending data up to 150 ft
- Design must be controlled remotely

## Concept Selection

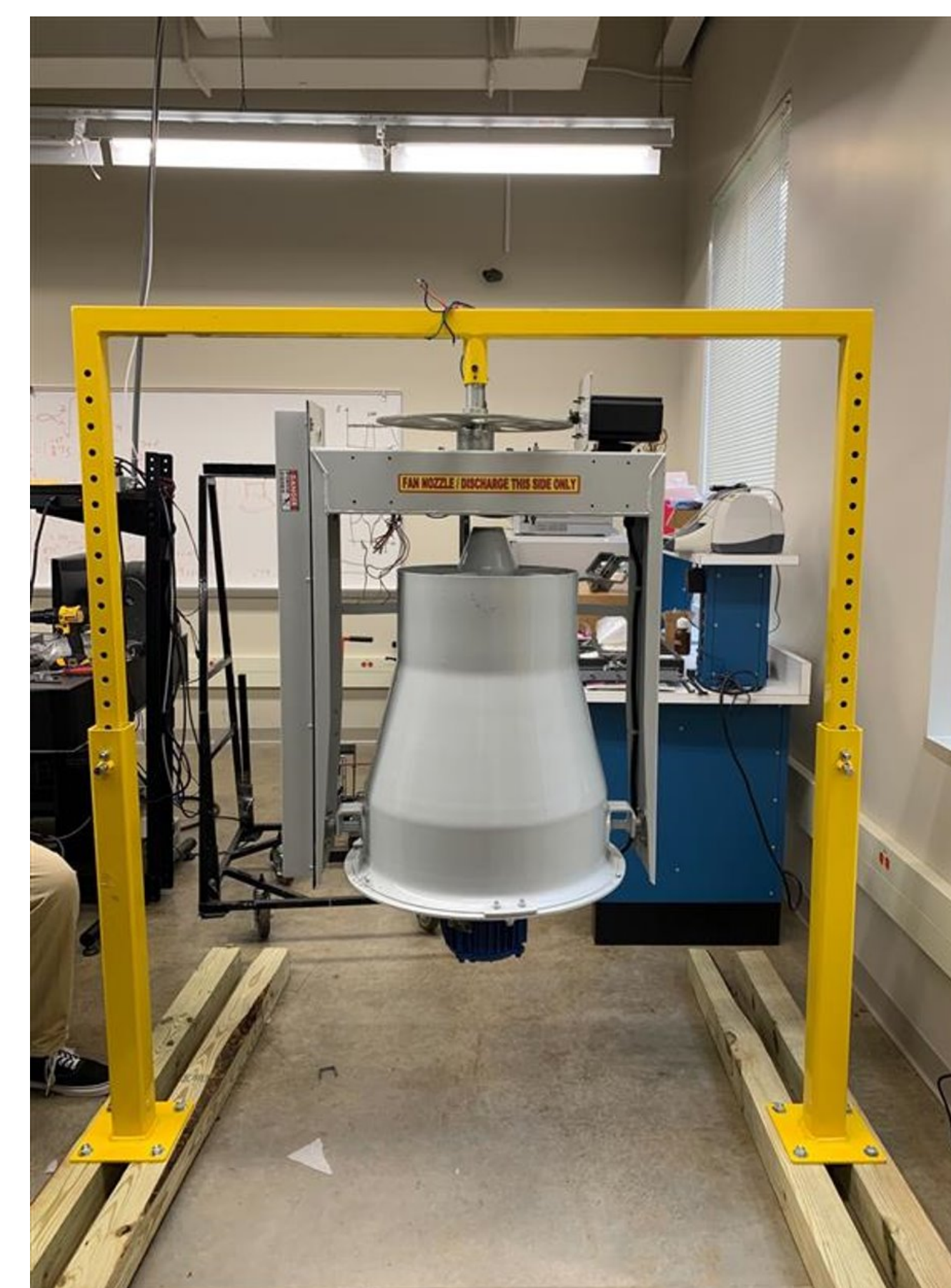
- **Wireless**
  - This concept utilized a mobile device to communicate directly to the fan via WIFI direct
- **Hybrid Wireless**
  - This concept would use a control panel that it wired to a router. From the router, the instructions from control panel would be sent over WIFI.
- **Wired**
  - This concept involved a data slip ring and all communication to fan controller would be sent through a wired connection.

The design team ultimately selected the hybrid design. This design would allow the most efficient multi-fan control, while also not depending on a user's mobile device. The data slip ring would be costly and was not efficient. The hybrid design allows for dependable data transfer and a low-cost product.

## Final Design



Design Implementation Diagram



Fan in testing setup



## Results

- To test the design, a continuous operation test was performed. The fan successfully operated without user intervention 24 hours a day. Each day new instructions were given, and the fan was left to operate.
- To test data communication, the receiver and transmitter were placed 150 ft apart and data was sent.

## Summary

This design successfully operates within the design requirements. The user can specify certain degree ranges for both oscillation and rotation, and the fan will execute both independently. All data is sent remotely and can be sent from a range up to 150 ft. The design is a breakthrough innovation that drastically simplifies the users experience while also controlling combustible dust efficiently.

## Team & Acknowledgements

### Industry Sponsor

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