



# Smart Integration of Climatic Chamber Operation (SICCO)

Senior Design Team 508

VDR 1

28-Sep-18

# Team Introduction



**Cassie Roby**  
Team Leader



**Daniel Lane**  
Lead Design Engineer



**Sara Steele**  
Communication and  
Documentation Manager



**Danny Carlos**  
Web Designer and  
Design Engineer



**Kyle Barber**  
Financial Planner and  
Project Manager

## Sponsor



**Vinayak Hegde**, Danfoss Turbocor  
Compressors, Inc.

Background: Energy efficient technologies empower smart communities and industries to create healthier.

## Advisor



**Neda Yaghoobian, Ph.D.**

Background: Computational fluid dynamics, urban microclimate, and energy efficiency.

# Objective

The objective of this project is to design a smart integration network and an observation system with remote accessibility for climatic chamber tests.

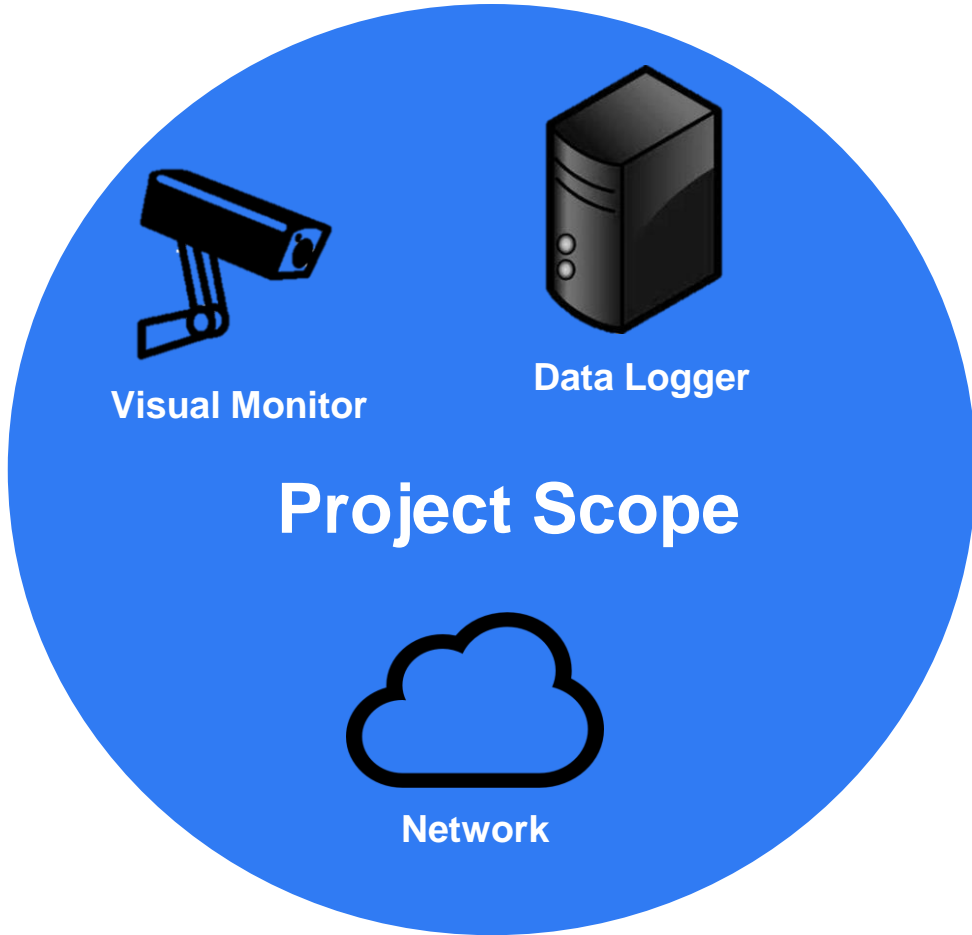


**Thermatron Climatic Chamber**



**Cincinnati Sub-Zero**

# Out of Scope



**Humidity Levels**



**Data Recording**



**Temperature Levels**



**Vibration Levels**

# Project Background

- **Climatic Chamber**
  - Test various equipment for temperature, humidity, and vibration requirements.
- **Data Logger**
  - Records multiple channels of voltage, temperature, resistance, humidity and pulse signals.



**Data Logger LR8400 Series**



**Climatic Chamber EZT-570i**

# Primary Market

- Danfoss Turbocor Compressors, Inc.
- FAMU-FSU College of Engineering
  - Shayne McConomy, Ph.D.
  - Neda Yaghoobian, Ph.D.

# Secondary Market

- SICCO Team Members
- Climate Chamber Manufacturers
  - Cincinnati Sub-Zero
  - Thermatron

Customer Statements	Customer Needs
Remotely Integrate the Data into Danfoss Server	More efficient way to remotely transport data from climate control chamber to user computer
Monitoring System Inside the Climatic Chamber	A real time visual system that monitors the test and saves the data
Project Risk Matrix	Risk assessment of the overall system to define the level of risk
Max Budget: \$4500	Prototype is not to exceed \$4500



# Key Goals

## Phase I

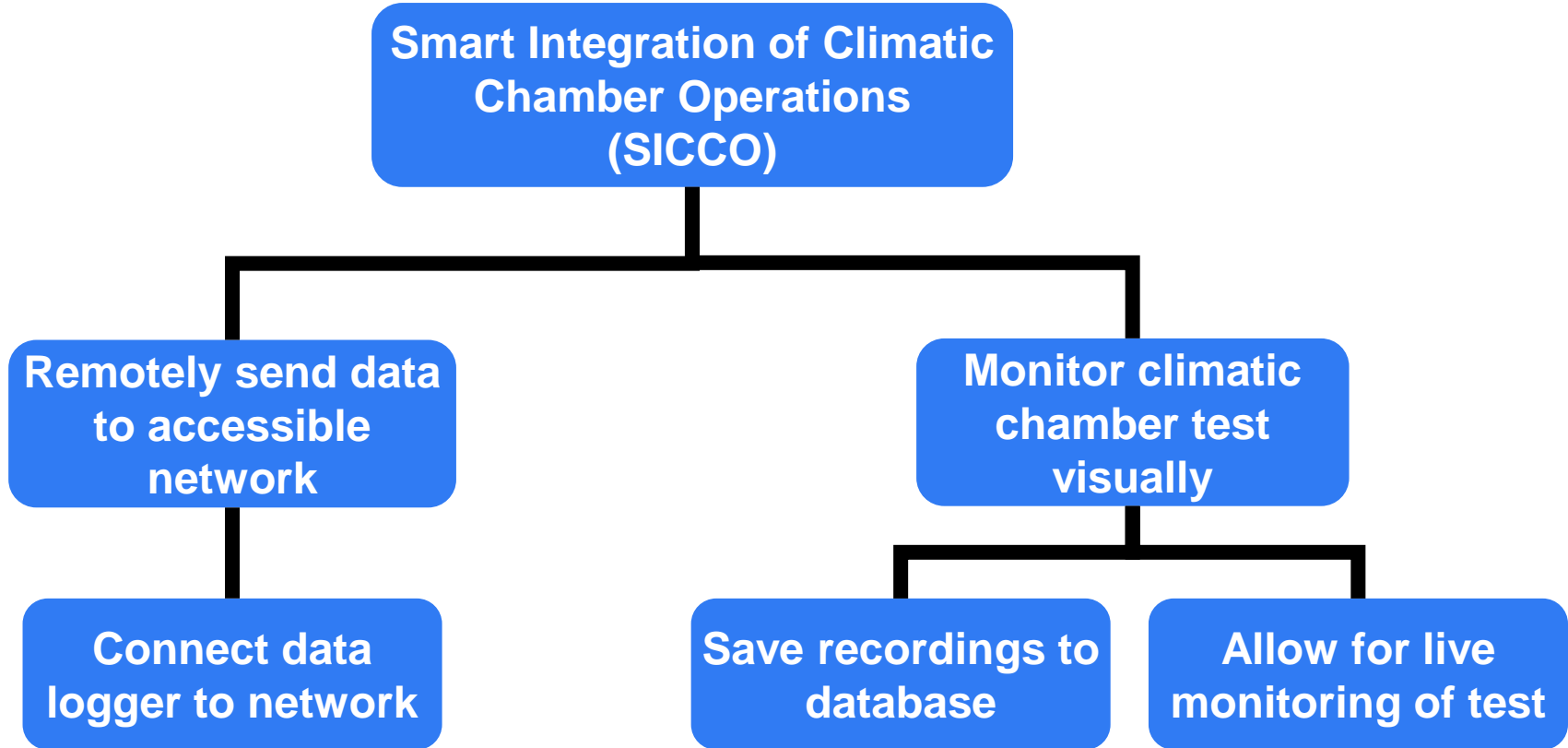
- System architect / Networking diagram
- Concept and specifications
- Understand the requirements
- Risk matrix



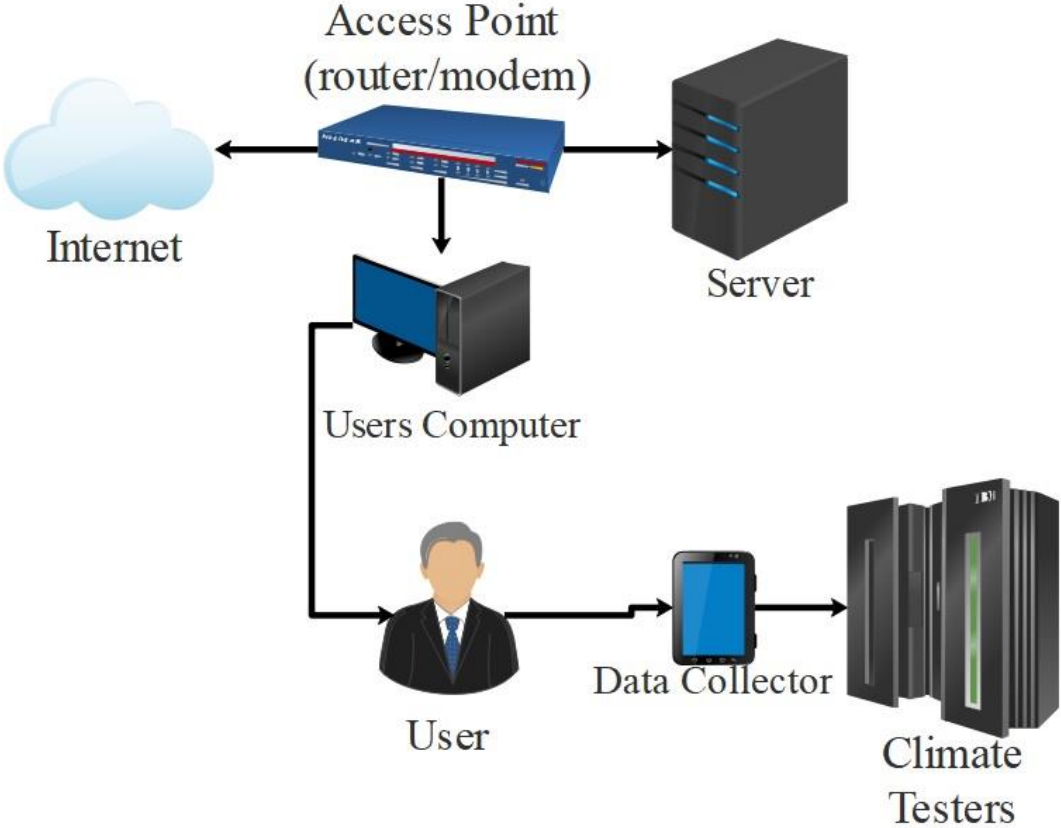
## Phase II

- Validate SICCO requirements
- Verify SICCO requirements
- Final project report

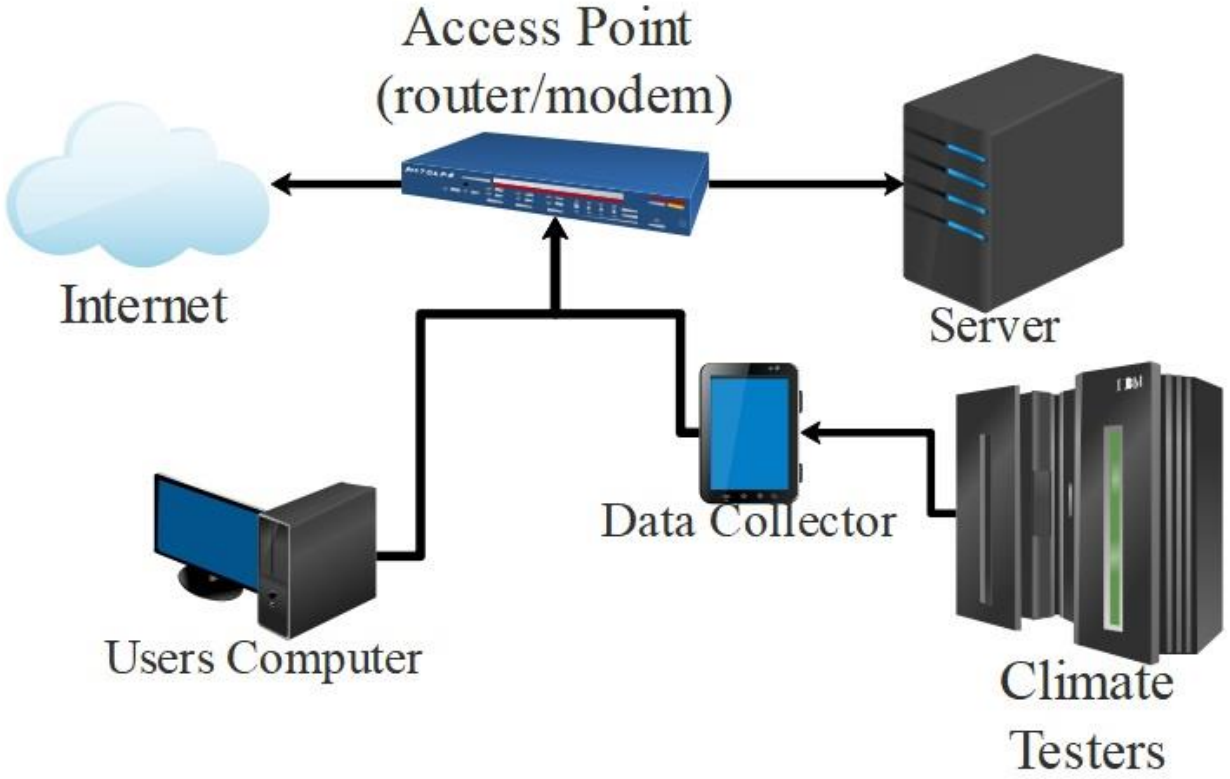
# Functional Decomposition



# Network Diagram - Current Setup



# Network Diagram - SICCO Design



# Moving Forward

Task Name	Tue 10/9	Sat 10/13	Wed 10/17	Sun 10/21	Thu 10/25	Mon 10/29	Fri 11/2	Tue 11/6	Sat 11/10
	6   7   8	9   10	11   12	1   2   3	4   5   6	7   8	9   10   11	12   1   2	3
<b>Peer Evaluation 1</b>	█								
<b>Targets</b>	█								
<b>Generate Concepts</b>	█								
<b>Advisor Meeting 2</b>					█				
<b>Select concept</b>				█					
<b>Bill of Materials</b>							█		

Task Name	Fri 11/2	Tue 11/6	Sat 11/10	Wed 11/14	Sun 11/18	Thu 11/22	Mon 11/26	Fri 11/30	Tue 12/4
	9   10   11	12   1   2	3   4	5   6   7	8   9	10   11   12	1   2   3	4   5	6   7   8
<b>VDR2</b>		█							
<b>Risk Assessment</b>	█								
<b>Thanksgiving Break</b>				█					
<b>Spring Project Plan</b>				█					

# References

Cincinnati Sub-Zero.Environmental.(2017).Environmental Chamber Controller: User Manual. Sharonville, OH.GENTHERM

Thermotron.(2009).Environmental Chamber: Instruction Manual.Holland,MI.Thermotron

Multi-channel Data Logger LR8400, LR8401, LR8402. (n.d.). Retrieved from [https://www.hioki.com/en/products/detail/?product\\_key=5613](https://www.hioki.com/en/products/detail/?product_key=5613)



Questions?