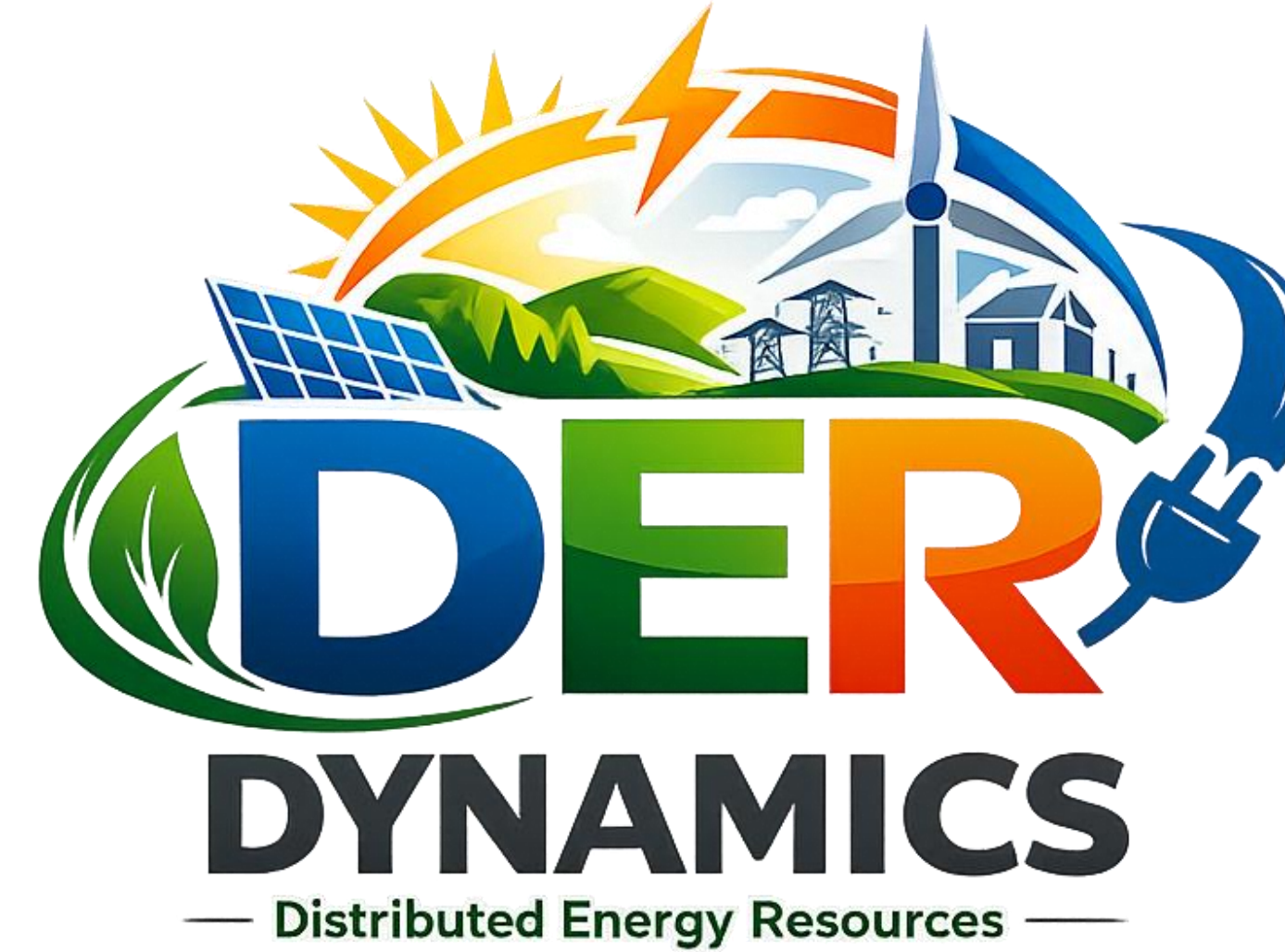


# Microgrid Integration Management Unit ( MIMU)

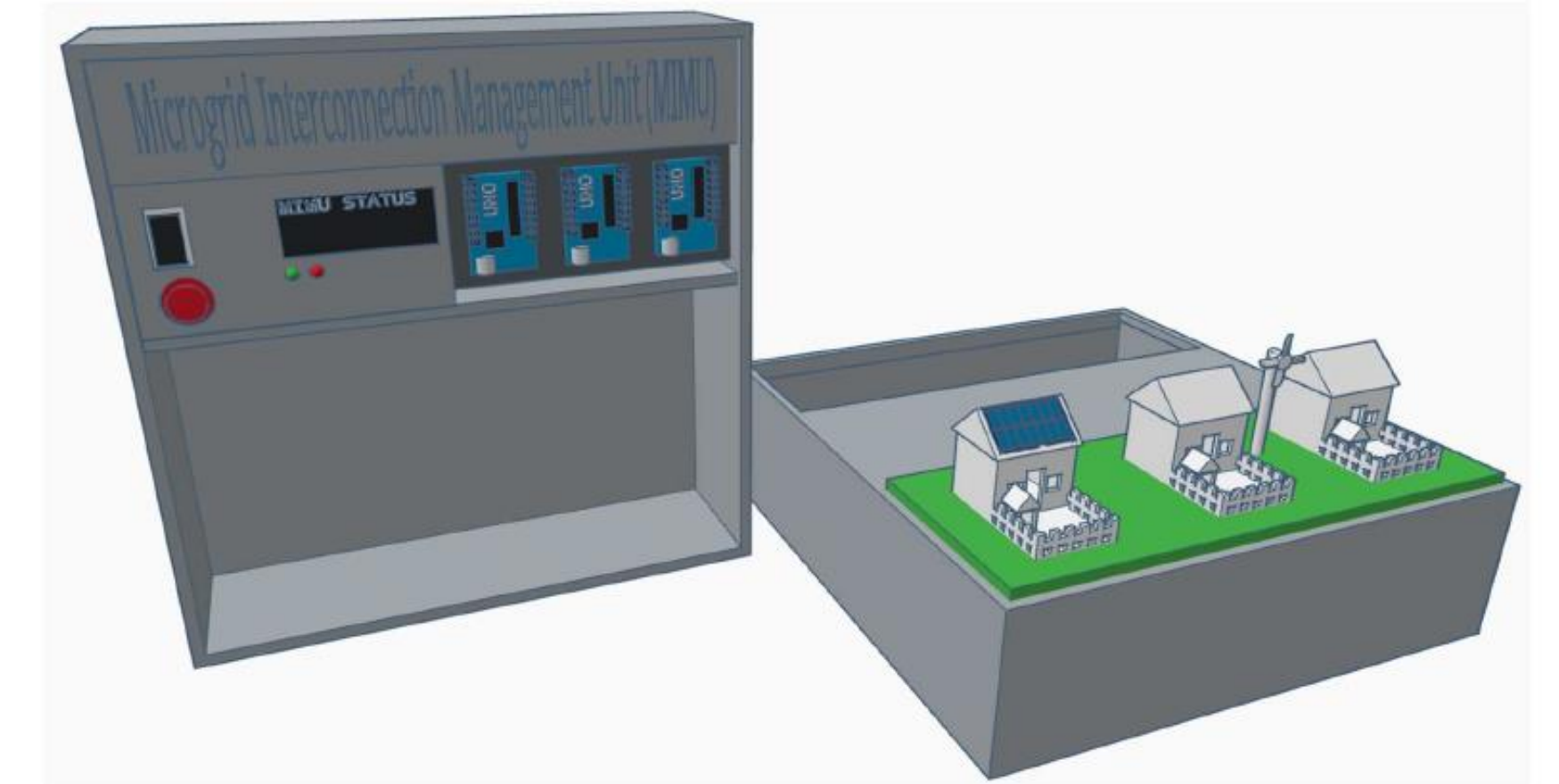
## Group 53 The DER Dynamics Team

Project Lead – Ryan Solomon  
Application Lead – Gary Schumann  
Technical Lead – Mikael Burdette  
Cross-Discipline Support – Jonathon Santos

Project Mentor – Dr. Kory Hedman Ph.D.

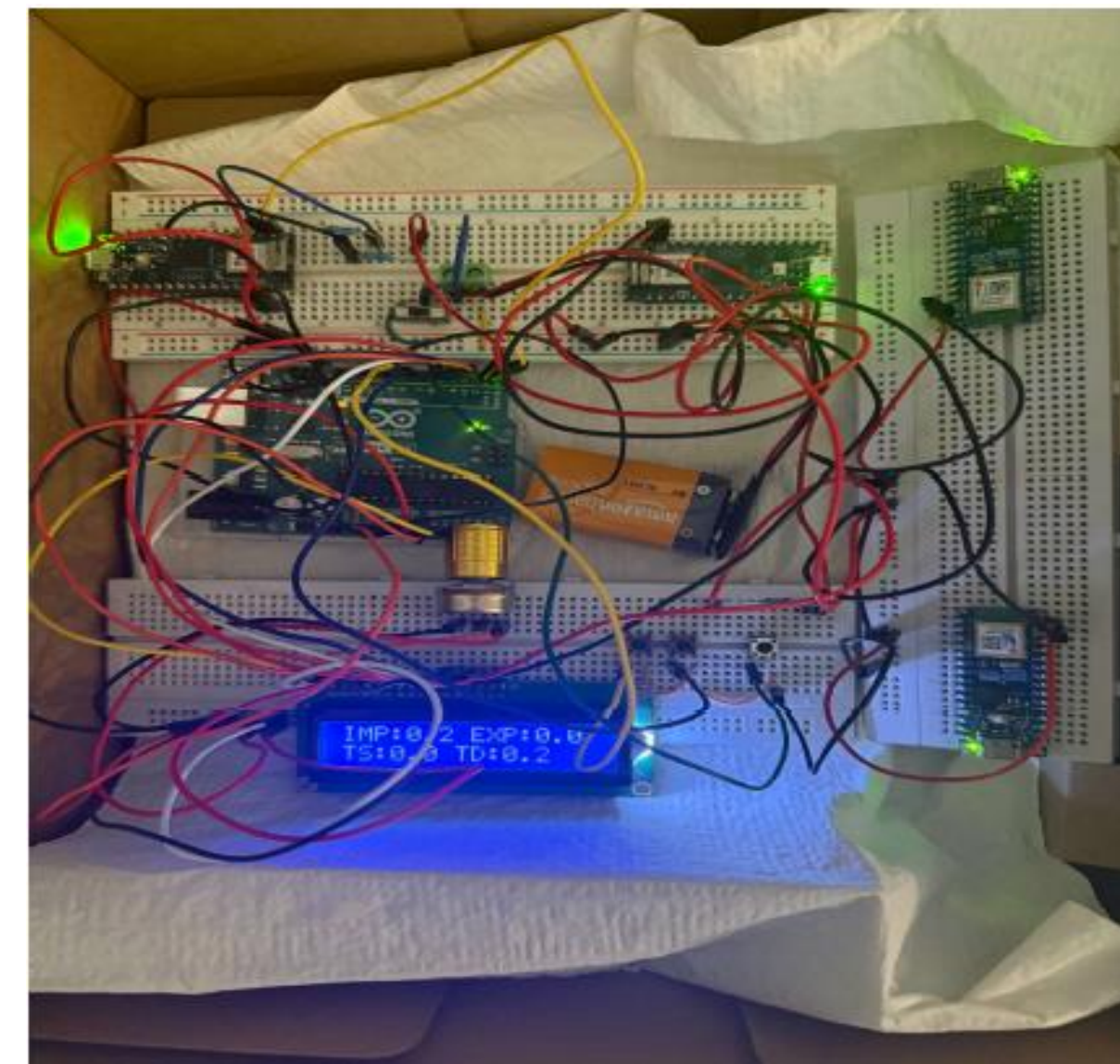
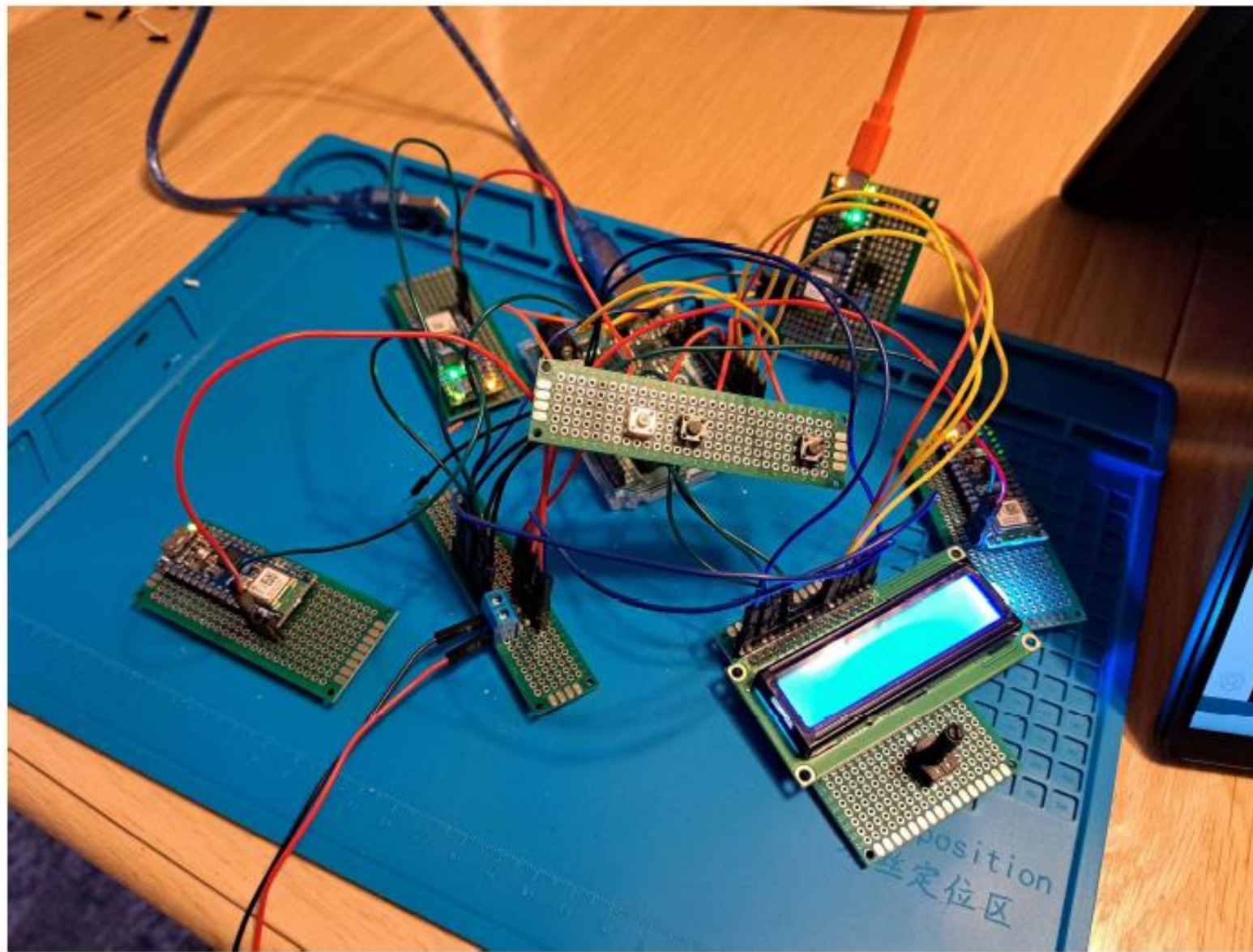


## Customer Experience



The housing for the unit was designed with TinkerCAD, to visually demonstrate a small American neighborhood. I will consist of 3 houses and a master board to contain the control buttons and system status display screen.

## Prototyping & Testing



To demonstrate microgrid optimization and sandboxed peer-to-peer trading, the MIMU uses low-cost Arduino Nanos for sensing/control at each node, and a programmed Arduino Uno for optimization, market logic, database and user interface. Three physical nodes will be used to demonstrate the system's ability to manage diverse loading conditions, and each node will have an Arduino Nano measuring current and voltage at each physical node/house for reading sensors (CT clamp & voltage divider). The Arduino controls a relay to emulate charger or disconnect loads. The Nanos and the Uno should be capable of sending trip, close, and block-close signals out to a test contact to represent a port for connecting with the developer's equipment. Each Arduino will send power flow measurements to a main control unit (once every 1–15 seconds).

## Logic Flow

The workflow diagram outlines the MIMU's logic and shows a typical node-to-main trade negotiation. This diagram only shows the system under nominal load conditions. There are certain exceptions, like power quality and grid capability that are not part of this diagram. Instead, the diagram aims to show the MIMU's higher level operation and internodal communications.

