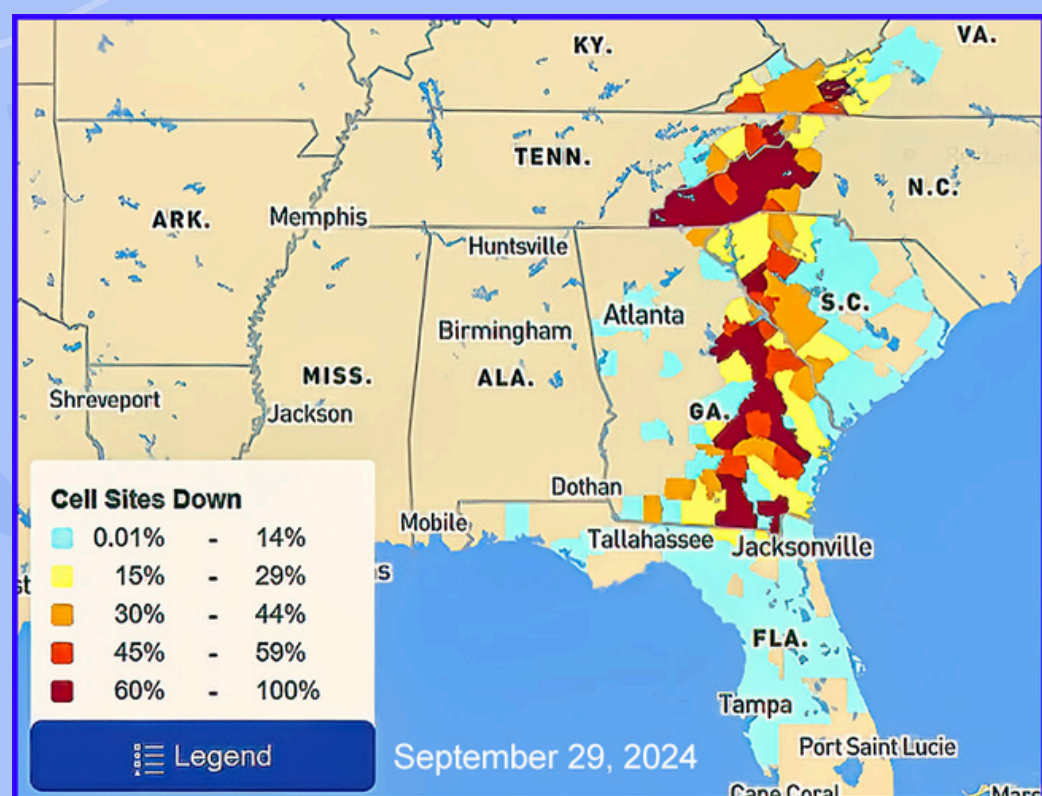




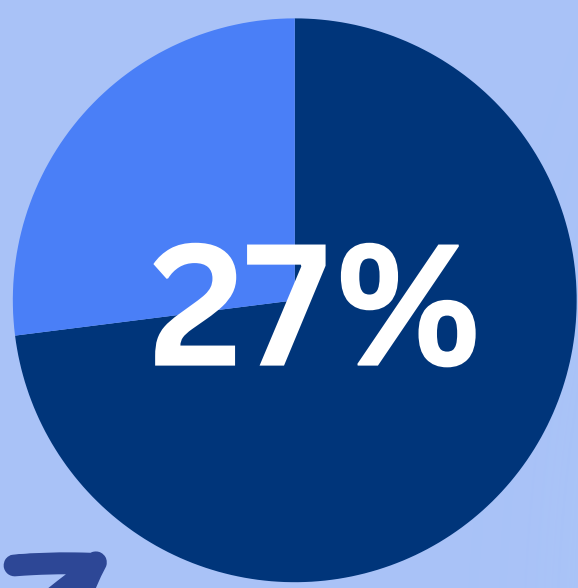
Elena Zhang, Joshlin Hill, Brianna Yoskin

The Problem

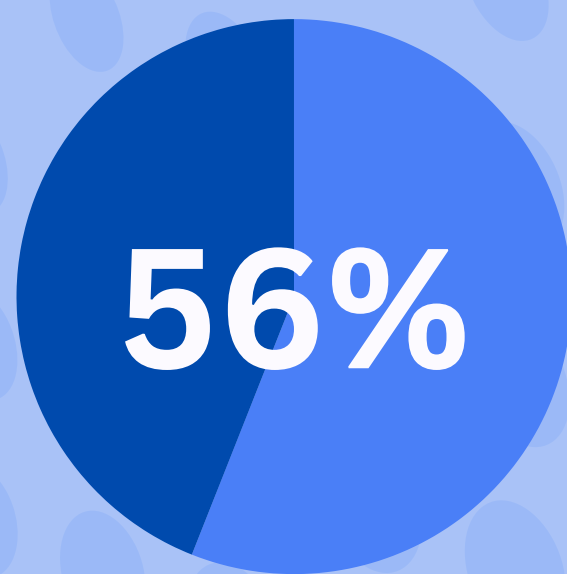
- Cellular service often down in extreme weather
- Communities experience disconnection when they most want to help and support
- Asleep/incapacitated people are unable to initiate calls with existing traditional radios



Hurricane Helene Cellular Outages



27% of cell towers in Florida out of service when Hurricane Irma initially hit



56% of cell service not restored within 8 days of Hurricane Irma on the US Virgin Islands

Experimentation

- Will the **range** of these specific devices (LillyGo T-Deck) be sufficient?
- Is the device **user-friendly**?
 - Will people be **able to use** the device?
- Are people **willing to help** their neighbors?

Survey

Would you be willing to **assist** neighbors in a flooding event?

"Anything they needed assistance with. Once I and my family are safe, my **priority is to assist others**"

"No one was ever in danger with my experience with flooding, but **people definitely come together** in a disaster."

Device Testing

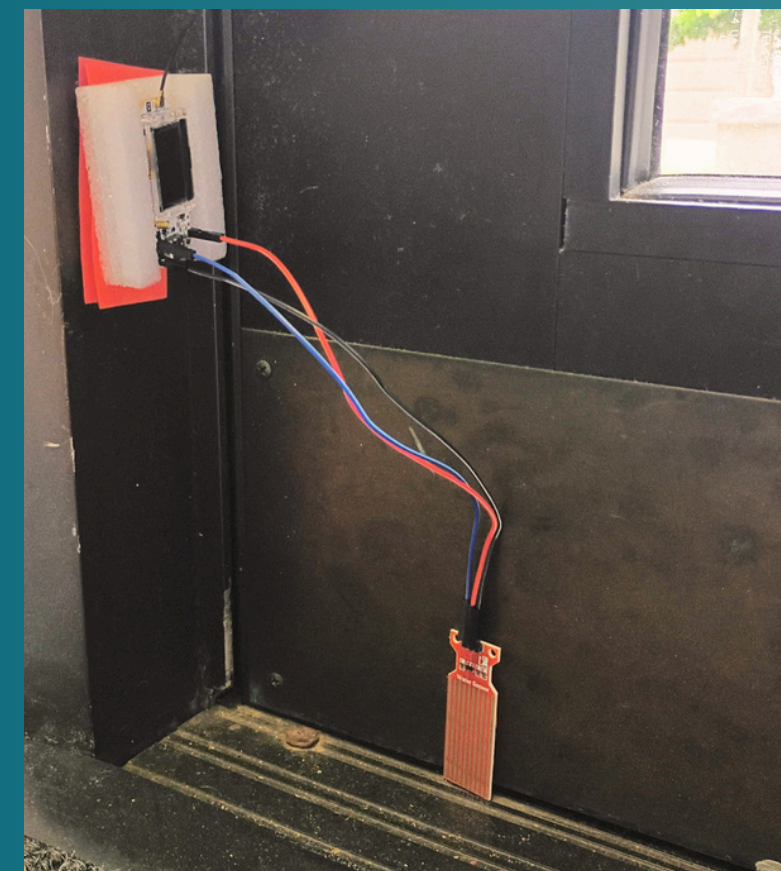
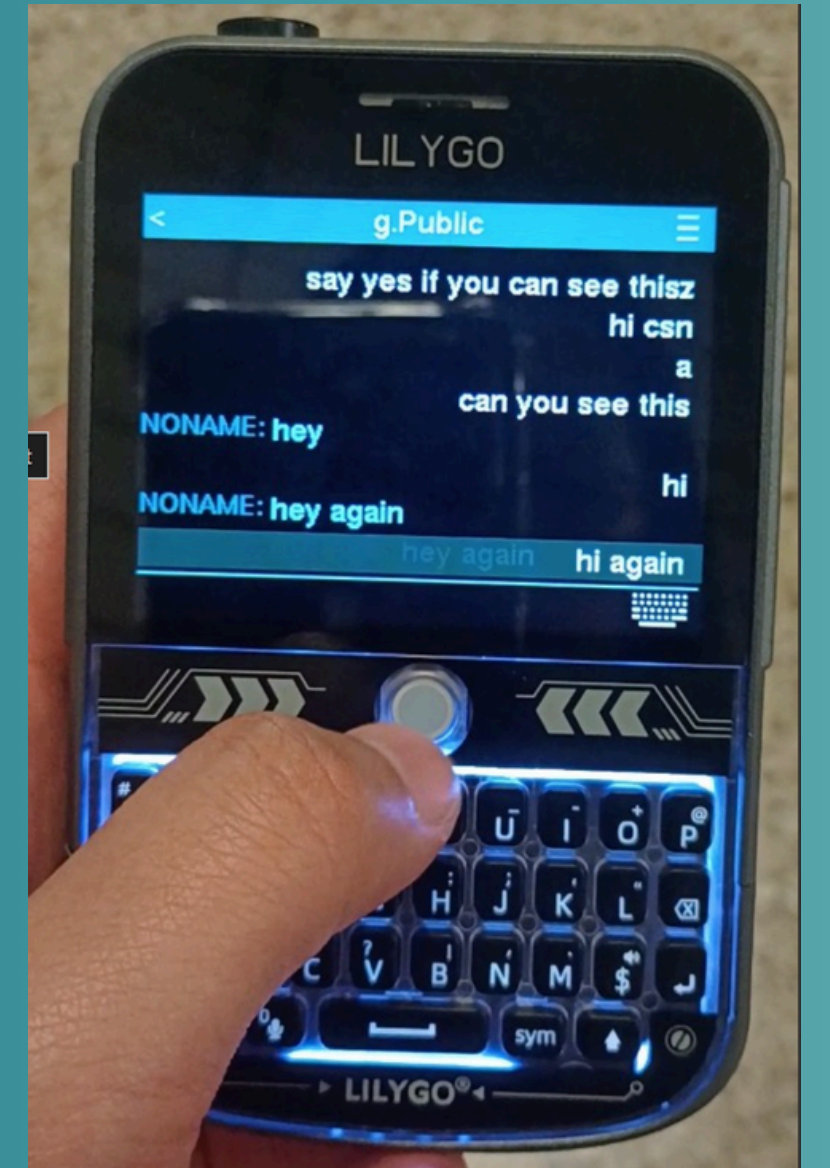


Furthest **successful transmissions**:

- Through 3 brick walls
- Ground floor to 6th floor of Crosland Tower
- At least 0.5 miles

Our Solution

Without cell service and external power, LoRa radio can be used to **send texts** to update neighbors (e.g. "I am safe" or "I need sandbags to block off floodwaters")



Water sensor continually sends **water level readings** to the LoRa ESP-32 board → **Automatically** sends a message if **flooding is detected** and user does not manually send 'OK' through the LoRa radio

The devices act as **repeaters** forming a network, increasing overall range with each user

Unique Value Proposition

- Unique integration of **automatic** and **manual** alerts with flood sensing
- **Seasonal**, NGO-managed **rental** model

Scalability

- Household kits are distributed via **mail** OR to a **community pick-up location** with the option of **setup assistance** by volunteers
- Kits can be **distributed between neighborhoods** with flooding as needed
- \$50 raw cost, \$70 to purchase, \$10 to rent
- Next steps: custom **proprietary firmware**, **reach out to HOAs**

Early adopters: residents living in apartment buildings on islands where cell service restoration is likely slow