MISSISSIPPI RIVER OPEN SCHOOL

The cover image is courtesy of Michelle Garvey from her article in this issue.

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TEACHING AND PRACTICE

NETWORKING A NETWORK
By Jen Liu and Monique Verdin

Beginning in May 2023, we started building an emergency communication network to connect an existing network of mutual aid distribution hubs across Bvlbancha (New Orleans).

Bvlbancha Liberation Radio began hosting meetings for mutual aid networks to gather and connect following Hurricane Ida, a powerful storm that swept through southeastern Louisiana
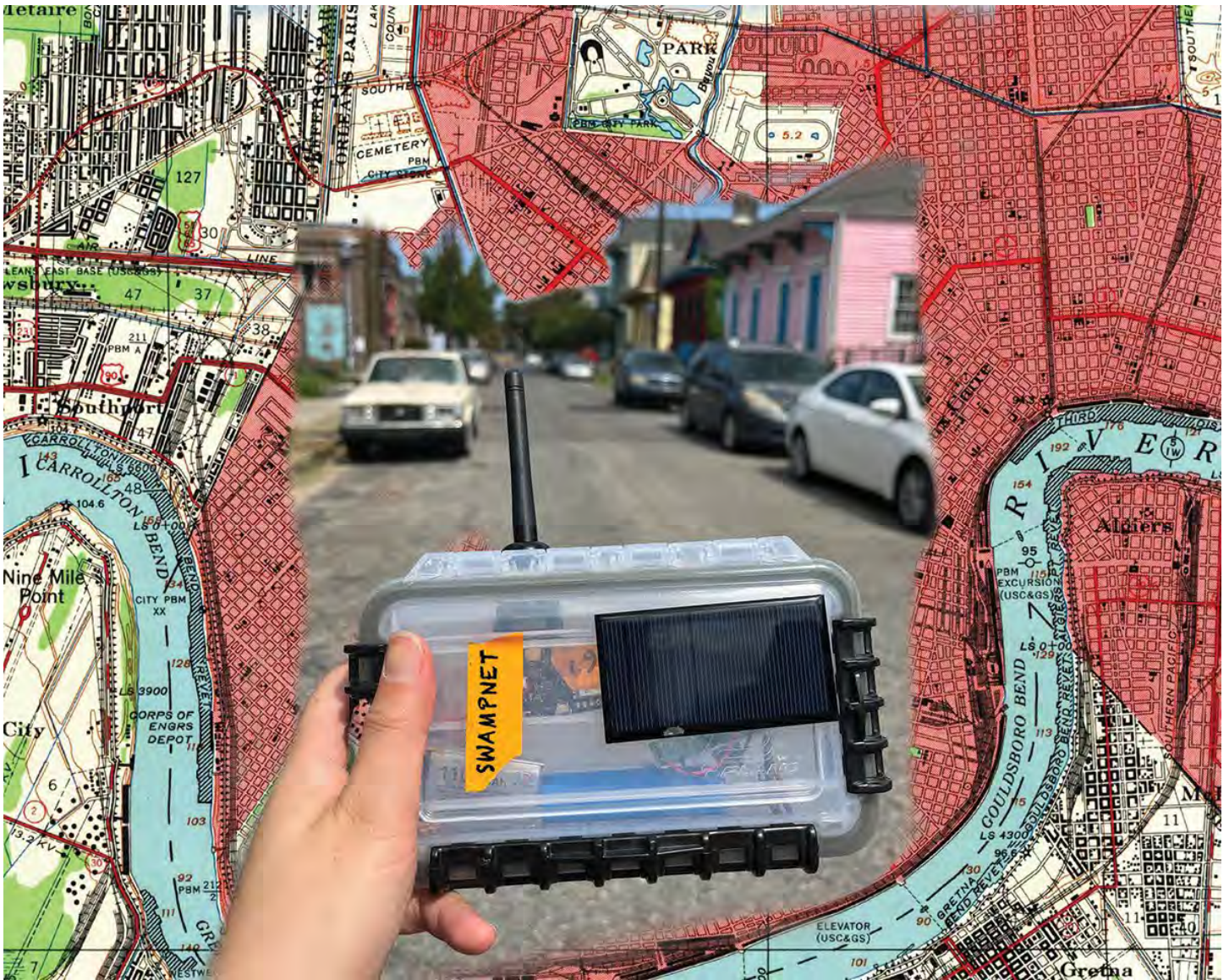
Alternative communication proof of concept using radio-enabled microcontrollers, Meshtastic software, and LoRa technology to create a 3.5-mile network in Bvlbancha | New Orleans in the summer of 2023. Photograph taken by Jen Liu, digital assemblage by Monique Verdin, USGS Map New Orleans East, Louisiana, 1951. Image courtesy of the authors.

in 2021. With wind speeds measuring up to 150 miles per hour, Ida caused extensive damage to the electricity and communications infrastructure, leaving millions of people in the dark. Despite these conditions, community members organized to distribute food, water, medicine, and other supplies to their neighbors. Community spaces were transformed into hubs that also provided power charging stations for electronic devices and places to cool off in the sweltering late-summer heat. During these mutual aid network meetings, people shared best practices in running their hubs and strategized around how to prepare for future emergencies. However, as mutual aid community members often noted, the lack of communications hampered these relief efforts. Without electricity there was no Internet to access shared documents, while text messages sent over cell networks came in scrambled and delayed, if they were ever delivered. In these meetings, we began to ask: How can communication networks be built to support existing mutual aid networks?

All kinds of networks are made up of nodes and edges. Nodes are connection points, whether those are devices like smartphones or laptops, or places like distribution hubs stewarded by mutual aid groups. Edges are how nodes are connected. For devices, this could be through a cable or

Bvlbancha Liberation Radio, Community Tech NY, and Swampnet collaborator Jen Liu range tested a portable network kit on the Lafitte Greenway in Bvlbancha | New Orleans during hurricane season in the summer of 2024. Photograph + digital assemblage by Monique Verdin; USGS Map Breton Sound 1957; USGS Map Breton Sound 1957; USGS Map New Orleans 1945; USGS Map Mobile 1953; USGS Map Baton Rouge 1954. Image courtesy of Monique Verdin.

wirelessly via radio signals. For distribution hubs, edges are the relationships that people have with other mutual aid groups, built through working with each other.

One of our first steps was to determine how we wanted to build our communication network. Given time and budget constraints, we decided to use Meshtastic software, which runs on radio-enabled microcontrollers (little computers). Meshtastic is an open-source software (free and open to modifications) used to create off-grid and decentralized networks. The software works by connecting a device (e.g. phone, tablet, laptop) to a microcontroller updated with the Meshtastic firmware (computer code for electronic devices), using the Meshtastic app. This connection forms a node. Each node is then able to send and receive messages to one another over LoRa, a radio communication technique that can send signals over long distances. These nodes are portable and can be rearranged as necessary to create a network, an important factor when considering uncertainties following a hurricane: some hubs may be damaged or inaccessible, while new locations for hubs may emerge.

We also made cases for each node to house and protect all the components (microcontroller, antenna, battery). Based on feedback from mutual aid community members on how to make the nodes more self-sufficient, we also added equipment allowing the node to be run on solar if needed. This equipment included a solar panel, charge controller, and battery that were harvested from solar-powered surveillance lights.

Our next step was to test our network. Over the course of the summer of 2023, we conducted a series of range tests. Range testing is a way to understand the signal strength of a network from a specific location. After setting up an antenna at a distribution hub, we would test to see from how far away we would be able to send and receive a message. These range tests served as opportunities to teach people how to set up and use the equipment, build relationships with interested hubs, and understand how our network should be arranged across the city. We also learned how certain factors such as buildings, trees, and weather impacted our signals. Over the course of five range tests, we determined a number of locations where nodes could be set up to send a message to three distribution hubs located in different neighborhoods, resulting in a network spanning a 3.5-mile distance.

What Are Our Next Steps?

For the past few years, the hurricane season has been quiet in southeast Louisiana. Seeing Hurricane Helene hit the southern Appalachian region was a reminder that no place is completely safe from disasters. Since building this initial emergency communication system, we have continued to grow our networks in other ways. This growth includes building our redundancy and learning how to work with different technologies to build multiple forms of connections. This desire led us to work with Community Tech New York and learn how to build their Portable Network Kits, which can extend existing Internet connections and also work offline to provide a local wireless network. We have been sharing our work with others at public events, such as our Sunday Signals event held in August 2024, where we hosted a public range testing from Nanih Bvlbancha on the Lafitte Greenway. We also facilitated a Propagation Workshop where we invited members of community-based organizations to learn, experiment, and imagine with networking technologies. Workshop topics included understanding basic networking concepts,

setting up and operating a portable network, and discussing communication strategies for emergencies. We have also been experimenting with our equipment in the rural prairies and bayous of south Louisiana, thinking about other terrains where we can seed and plant our network.

As our network grows, so do our questions: How can we think about the relations between data, place, and memory? How should we steward our own data? How do we consider ways of working with technology beyond capitalistic and extractive conditions?

For more information about our work, including tutorials and zines, please visit swampnet.info.

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About the Authors

Jen Liu is a researcher who studies the ecological, social, and political implications of computing technologies and infrastructures. She is currently a PhD candidate in Information Science at Cornell University. Her work employs ethnographic and design methods to understand these challenges and build alternatives for livable and equitable futures.

Monique Verdin is an artist, citizen of the Houma Nation and Bvlbancha Liberation Radio collaborator. She supports the Okla Hina Ikhish Holo, network of Indigenous gardeners, as the WECAN Gulf South food sovereignty coordinator. Monique is the primary steward of the Land Memory Bank & Seed Exchange, facilitating community-built record-making, experiential education, research, and site activations celebrating the diversity of coastal communities and native ecologies present in the wetlands, swamps, and prairies of south Louisiana. Monique co-stewards the Nanih Bvlbancha (2024) earthen mound in New Orleans, she is a Gulf South Open School (2023) collaborator, experimenting with autonomous and alternative communication systems with the mutual aid SwampNet project.