- *Meshtastic*. (n.d.). https://meshtastic.org/

This source was where I learned about the project; it's where it all began. This is the basis of our entire project. Meshtastic is an entirely open-source software that enables ESP32-enabled LoRa boards to be used on the Meshtastic "network." This system takes already open source boards and allows an individual to take it to the next level with a powerful and open source software. Meshtastic uses these devices to create a "mesh network" using these nodes for communication on a 915mhz frequency. This allows a person to create a completely isolated network to communicate with text and location.

- Nardi, T. (2025, October 10). *Meshtastic: A tale of two cities*. Hackaday. Meshtastic: A Tale Of Two Cities | Hackaday

The author of this blog post wrote about his reasoning and final execution of his own meshtastic project. His original testing showed that with the correct setup on flat land in the middle of nowhere, with zero RF interference using patch antennas, he was able to get two devices to communicate with one another over 100 miles away. Unfortunately, when he brought his setup back to his city in New Jersey, he was unable to get it to communicate effectively. This was due to the various changes in geography, and due to how densely populated the area was there was too much RF interference. Although two devices were not effective, he was able to highlight the key advantage of a mesh network, such as Meshtastic. The benefit of the mesh system is that he was able to add multiple devices that were able to communicate with each other and ultimately

reach the target device by relaying information. Basically playing whisper down the lane but with 0ne and zeros.

- *Home*. (n.d.). Philly Mesh. https://phillymesh.net/

Philly Mesh is a group in our city that is trying to build out a more extensive mesh network. The whole purpose of a mesh network is to create a The structure where devices communicate into one another and the devices themselves don't necessarily have to have incredibly good range and with the mesh system you were able to have fall out and back up some redundancies even if one or two devices go offline so it creates the super redundant and reliable system that allows one to one device communication as well as a mass communication Network So within Philly Nash they're building out Central hubs that allow mobile devices to communicate to one another even when they don't have the range and these stationary devices are basically the backbone of Philly mesh's system and this is where we started taking inspiration for our base nodes whether it be in the vehicles or on the top of the ski lifts.

- "SenseCAP Card Tracker T1000-E | Meshtastic," n.d. https://meshtastic.org/docs/hardware/devices/seeed-studio/sensecap/card-tracker/. This device the car tracker is basically what we want our final product to be it's something that's small as a good battery life durable and you can clip onto a bag or

person without bothering them the device itself is priced competitively to what our final product would cost we are looking for Inspirations product as well as things we would improve ourselves about it so it is natively a Tracker and communication device but we want to add some emergency features to it so the ability to have an emergency SOS button or the ability to then communicate with First Responders on a separate Network and the interesting part about this device is that if someone wanted to use the system the system that we're building out they would be able to take this device just buy it off the shelf without having to build anything and it would just work with our system.

- Chrismetcalf, Lagomorph9, Calmconviction, and Bulky-Law-9191. “Tips for Creating a Tracker With Meshtastic?” *R/Meshtastic*, 1AD. https://www.reddit.com/r/meshtastic/comments/1jwj8jt/tips_for_creating_a_tracker_with_meshtastic/.

This was a personal project done by a redditor and he documented his process of how he created a mesh system for one of his children or pets and animals that could be used to track them off grid but he talked about making sure they were redundant and durable and waterproof so that you were trying to track valuable assets so it's important that they work nine times out of 10 that one time it doesn't work is when you lose the valuable or property or asset so it's creating that redundant system over and over again and really like engraving that not only does the hardware work but the software is 100%

- “LoRa + Meshtastic Tracker – MattCurry.Com,” n.d.

  https://www.mattcurry.com/projects-2/lora-meshtastic-tracker/.

  This was a project on by a blogger where he got really in-depth on the GPS aspect of the tracker as opposed to the lora side of itHe focused on both StoryBots and in-house components so comparing the prices of something you could buy off the shelf with the GPS built in versus buying a cheap board and out of the GPS yourself and then how could you make one cost effectively he's tracking less important assets so it's more so like maybe a vehicle you just want to know like you know where it's parked in like the neighborhood group chat or potentially like Garden like equipment something like that it's more so just knowing like having a little asset tag on it so it's not really as focused on the reliability of the devices but more so how cheaply can we make these and how does the integration work with multiple users.

- Doscher, Jay. “Building for Simplicity - My Take on a Meshtastic Enclosure.”

  doscher.com, July 27, 2024.

  https://www.doscher.com/building-for-simplicity-my-take-on-a-meshtastic-enclosure/.

One of the problems we're facing after we got all the components is where do we put them at first we were looking at Altoids tins or maybe they enclosures they came with we started with 3D printed cases from just thingiverse and they work but they're kind of bulky and not exactly what we wanted with the antennas we have so this project was just building a basic enclosure for a heltec V3 they talked about just fitting the components into something and optimizing space so later in our design process we're planning on making a basically bulletproof case for any condition because we're looking for that redundancy and reliability for the products so having something that's both waterproof and can be you know run over without damaging the internal

components as well as housing the antennas that we need without it being too large so this project is just kind of helped give us inspiration for that.

- Gong, Liyan. “Meshtastic Projects: Real-Life Use Cases and How to Get Started.” *Seeedstudio*, 12AD. https://www.seeedstudio.com/blog/2025/03/14/meshtastic-projects.

  This project is from one of the studios that makes my shastic devices and it talks about their design process for making cases and how they get to a final iteration of the device so taking in form factor and form files function also looking at the engineering design process.They look at how their product is going to be used and how they can improve upon it As well as how they can effectively minimize cost on the device while maintaining that function

- Adrelien. “Meshtastic VS PMR Walkie Talkies.” Adrelien | Meshtastic, IoT & Off-Grid Tech Guides, June 9, 2024. https://adrelien.com/meshtastic-vs-pmr-walkie-talkies/?srsltid=AfmBOoq5PyMGL_BcRDCG4f5XBELqPYiX3_VVxlDi2niWO2lJDqMjxJki.

  This project demonstrates the usability and feasibility of our project so it compares the use of a real walkie-talkie versus our mesh system and how a walkie-talkie is good for mass communication but if one device is out of range it doesn't work however on the flip

side with our device if one device is out of range it just relies on another device to get it within range which make sure you have that redundancy and ability to communicate even if you are out of range and the terrain doesn't allow for that direct line of sight there are downsides to it we can't communicate with voice we have to use text and location however we can sacrifice some information for reliability.

- “MeshMap - Meshtastic Node Map,” n.d. https://meshmap.net/.

Last but not least the meshtastic node map gives us a good sense of how our data will be viewed on a real map as well as showing us other nodes in the area that we can rely on and bounce data through so our project is going to be closed which means other devices that aren't on our network will not be able to communicate however anyone has the access to open our devices up and use them for extending the total mesh Network and we can also use other devices to extend the network so if we're in a disaster Zone we're able to take that mesh map and see where the other other devices are and position ourselves within range so that we can have the most effective coverage and this map also shows us okay how detailed is it and if we are in an emergency situation where someone is lost can we easily identify their positioning or do we need to improve the map on our end to get more geographic information such as height terrain and elevation.