CHSAvalanchers
David Chavez

Many people around the world lose their lives to avalanches yearly because we do not have the right devices to directly locate them. The purpose of our project is to see how we can use antennas to detect people under snow after an avalanche to lower the overall death toll of this issue. Currently we are experimenting with single frequency antennas to see which one will benefit the project the most. We plan to use ground penetrating radar (GPR) as our reference for how we will carry this out. We currently have two prototypes which include a single frequency two antenna S21 reflective SFTA and a wideband two antenna S21 reflective WBTA. We are doing this at 885MHz which refers to the analog TV channel 83 in North America. This decision was made to limit the overall cost of the project while still staying within the range of 900MHz. The idea behind having two antennas will allow us to use one antenna to transmit the signal and one to receive; ultimately showing us when it detects a person underneath snow.

We started researching this topic more thoroughly to understand how the snow may affect the signal. We learned that radio waves are unaffected by dry snow. This means our project can only work in particular conditions. Furthermore, we looked into the different ways that GPR is used and found that the most logical way for us to carry this out was to put this on a sled and drag it through the snow. In conclusion, we hope to make a device that we can drag through dry snow after an avalanche to help recover the people who got stuck.

Zhang, M., Wang, Y., Hu, Q., Zhao, S., Liang, L., Chen, Y., Lei, Y., Qiu, C., Jia, P., Song, Y., Qin, L., & Wang, L. (2023, April 25). *Phase-modulated continuous-wave coherent ranging method and anti-interference evaluation*. MDPI. https://www.mdpi.com/2076-3417/13/9/5356#:~:text=The%20PhMCW%20ranging%20method%20is,%2C%20pressure%2C%20and%20humidity%20sensors

Dukowitz, Z. (2025, May 6). *Ground penetrating radar (GPR): An in-depth guide*. MFE Inspection Solutions. https://mfe-is.com/ground-penetrating-radar/

Pietrelli, A. (2017). Gpradar. https://gpradar.eu/onewebmedia/TU1208_GPRforeducationaluse_November2017_FerraraChizhPietrelli.pdf?bcsi_scan_fd86d3dd427d821e=0&=&=&bcsi_scan_filename=TU1208_GPRforeducationaluse_November2017_FerraraChizhPietrelli.pdf

Avalanche problems. Bridgeport Avalanche Center. (2022, August 25). https://bridgeportavalanchecenter.org/avalanche-problems/

Technology. Recco. (2025, November 4). https://recco.com/technology/