Life Saving Locating: Developing Autonomous Avalanche Rescue, Part Two

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Research shows that avalanche victims buried longer than 15 minutes have an exponentially decreasing chance of survival, therefore minimizing rescue time is critical. Imagine a portable rescue drone quickly flying over difficult avalanche debris fields to locate a buried victim, allowing rescuers to coordinate extraction efforts faster. Phase I of this project successfully developed a ground-based rover able to locate an avalanche beacon. The goal of this phase is to develop an autonomous aerial drone capable of navigating to a transmitting avalanche beacon. The Avalanche Rescue Drone System is comprised of three critical devices: an avalanche transceiver (BCA Tracker 3), the flight guidance platform (Raspberry Pi), and the drone (Parrot AR Drone 2.0). The transceiver detects and accurately determines the direction and distance to the transmitting beacon. LED's on the face of the unit illuminate to communicate this information to a human rescuer. The signal from these display LED's are captured by leads soldered to the respective display chip pins and transmitted through a ribbon cable to GPIO inputs on the Raspberry Pi (RPi). The RPi reads the state (on/off) of each LED and interprets this information which is then used in the system's program logic to navigate the drone. Currently, the engineering goal has not been entirely accomplished. The Avalanche Rescue Drone System can successfully interpret distance and direction to a transmitting beacon and make navigation decisions. The RPi is able to directly control the AR Drone using Python script, but the entire system has not yet been verified in the field due to the limited lift capacity of the drone.

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