Using RAIN (RFID) to Locate a Lost Person

Impinj Mentors: John Faith, Trey Anderson, and Paula Tomlinson
Faculty Adviser: Jacques "Chris" Rudell
Students: Marcus Deichman, Ben Nguyen, Megan Swanson

Problem Statement

In a contained setting like an amusement park, people can get lost from their parents or friends. When a missing person becomes an emergency, what is a fast, technological solution for locating this person?

The Solution

- Wearable RFID tags
- Stationary Readers at various locations in park
- PC Application with central database
- Programmable Drone
- Mobile Reader mounted to drone
- Software on drone to fly missions and read tags w/ mobile reader

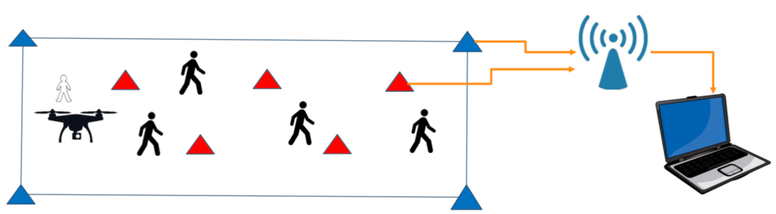
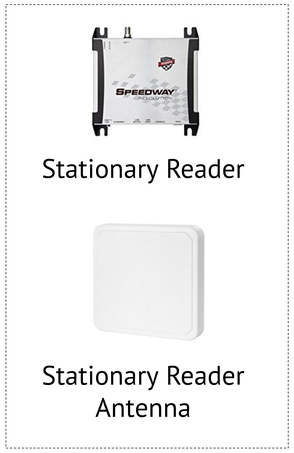


Figure 1: Overview of RFID system on-site

Hardware

Drone Model: Intel Aero Ready to Fly Drone

Stationary Reader Setup



Software

Tag Tracker:
- Impinj's Octane SDK, Google Protobufs
- Client connects to Server
- Sends missing EPC tag and GPS location of the last known location
- Displays GPS location of the tag, if found

Drone Control:
- DroneCore, Google Protobufs
- Server listens for connection
- Receives missing EPC tag and start signal to begin search algorithm
- Alerts PC Application when tag is found

RS500 Control:
- ITK for RS500 reader
- Continually reads surrounding tags and alerts Drone Control when missing tag is found

User Interface

Tag Tracker:
- Maintains inventory of RFID tags read at the last known location
- Displays information about TCP connectivity and drone communications
- Commands the drone to start or abort mission

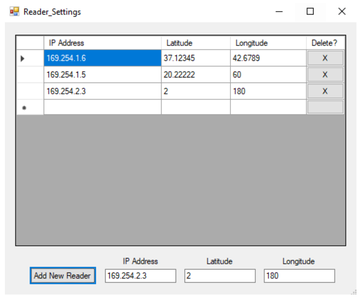


Figure 2: Adding Multiple Readers

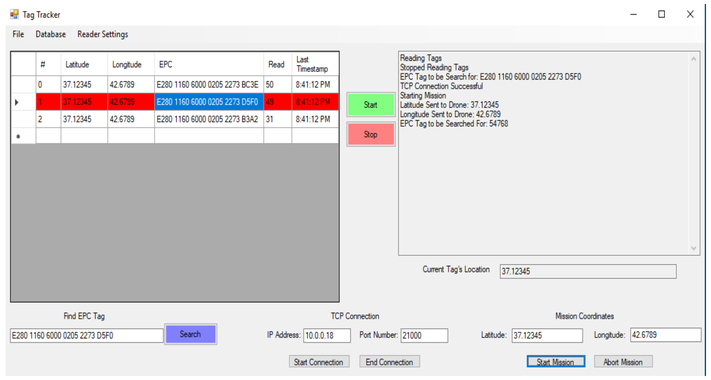


Figure 3: Establishing TCP connection and Starting Mission

Results / Future Work

Results:
- Could not physically implement our RFID solution due to GPS malfunction
- Successfully implemented our RFID solution using a simulator called Gazebo
- Gazebo shows that our RFID solution would have been successful if the GPS on the drone did not malfunction.

Future Work:
- Battery Life Display
- Collision Avoidance
- More Advanced Search Algorithm
- Video Stream