Boeing Searching Unmanned Aerial Vehicle

Overview
Searching and rescue missions are time sensitive and labor intensive. The goal of the project is to design and develop a search and rescue UAV that can help to minimize the number of casualties by quickly scanning large areas while being remotely controlled.

Objectives
The UAV needs to have heat source detection, obstacle avoidance, and FPV live video stream in order to complete the searching and rescue missions.

Approach
- The customer needs were evaluated after meeting the sponsors and understanding their expectations from the product.
- After weeks of research, the team generated a few ideas for the system and chose one using AHP matrix.
- FLIR Lepton 2.5 thermal camera was chosen for heat detection. A python program was created on Jetson TK1 for detecting warm bodies. The program marked the warm bodies in the frame red.
- Intel Realsense camera was chosen to stream first person view (FPV) video and do collision avoidance since it had two cameras and capability to determine object distance from the camera.
- For testing, thermal camera and FPV video were wirelessly streamed and checked for lag and signal loss with distance. These tests concluded video could be streamed over 50 ft with a lag of 20-40 ms.

Outcomes
- The quadcopter was able to stream FPV video wirelessly over wifi.
- The thermal camera streamed video wirelessly. All the objects in the frame with temperatures higher than the median temperature of the frame were marked red and the rest were blacked out.
- The system distinguished an active hand warmer from an inactive one by marking the active ones red.
- The collision avoidance sensors weren’t able to integrate with the Pixhawk flight controller.
- The project’s final expenditure amounted to $749.65, well within the prescribed budget of $1000.