Team B - Updated Spring Validation Demo

The Spring Validation Demonstration (SVD) is to test the drone's capability in a simulated lite version of the DARPA Triage Challenge, with mounts designed for all NDAA compliant components. The capabilities to be demonstrated focus on geofence mapping, patient detection and location, path search planner, pose estimation and reID detection with EO and EStop.The demonstration will be conducted at **Mill19 or Hockins,** and follow 8-sequence of events below and will last for **25 minutes**:

1. At the test site, we set up a non-enclosed environment with **3** test dummies/actors scattered in the field.
2. Launch all ground systems, and commence autonomous takeoff of the drone. [start timer]
3. Drone will begin in mapping mode, surveying the entire area within the designated geofence.
4. The approximate GPS locations of detected casualties on first-pass will be streamed back to the ground operator. Drone will begin to return. [< 2min]
5. Upon drone return, perform a battery swap. Reboot systems quickly, and prepare the drone for flight.
6. Redeploy drone in waypoint mode. Go to the first patient, and localize them. Display published GPS coordinates.
7. Perform an orbital pass around the patient in step 6. Begin onboard algorithms. Camera locks on the patient with gimbal control algorithms. Detect reID of patients, and perform pose estimation with EO.
8. Stream algorithm data back to the viewing gallery.
9. Repeat procedure for the other two test dummies/actors. Autonomously return to land at completion.

In summary, the drone should be able to fly safely and detect all 3 dummy casualties, triage the first patient it detected with 6~10 meters of standoff distance within 25 minutes. The drone should successfully execute the full behavior tree stack. While following the survey course, the GPS waypoint deviation shall be less than **5%**. The drone should estimate patients' GPS position within **5 meters** of the ground truth. In addition, the drone should respond to **8** commands including *arm, disarm, takeoff, cancel, Estop, land, autoland,* and *geofence mapping* from Foxglove within **1.5 seconds**. Onboard EO and IR videos shall be recorded at **30 FPS**, and the drone should maintain active transmission with **less than 3000 ms** latency, alongside with bounding box information transmitted to Foxglove with a packet loss rate of less than **1%**. The onboard PX4 log should be retrievable after every flight.When E-stop hits, the drone should start hovering within **0.5 seconds**, hover when communication is lost, and return to home base when battery level hits to **10%**.