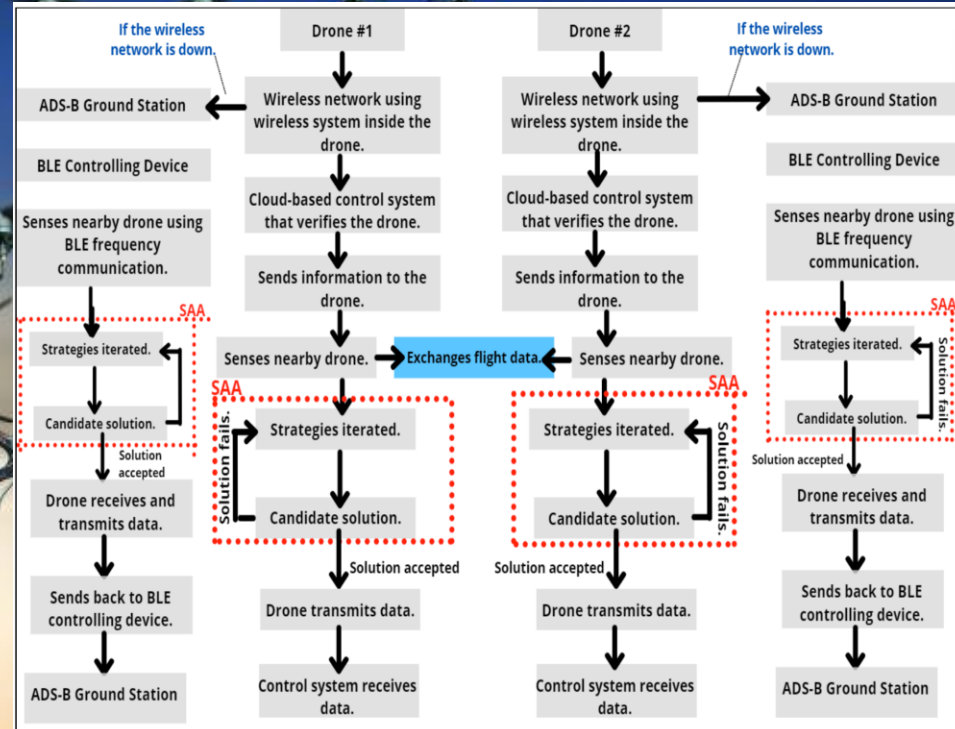


## Objective and Description of Effort:

- ❖ (UAS) communication and collision avoidance system
- ❖ BLE systems assisting ADS-B to help when wireless systems go down
- ❖ Drone-to-drone, drone-to-taxi, taxi-to-taxi communications
- ❖ Integration of real time flight monitoring, communication, and visualization
- ❖ Implementation in healthcare, transportation, logistics, infrastructure, economy, security, and the environment.
- ❖ Technology can provide disaster relief resources, monitor critical infrastructure, deliver medical supplies, hard-to-reach places accessibility, increase in job placement, aerial surveillance capabilities



Risk	Description	Impact of Risk	Level of Risk	Mitigation Strategy
Cost	- Transitional costs from shifting to a cloud-based control system. [2]	No risk to human life or infrastructure.	Low	Apply for grants; Obtain sponsorships through partnerships.
Range	- In cloud-based systems, data communication can be disconnected due to possible network issues. Unpredictable computational lag can also affect system performance. In addition, increased server space usage can lead to slower performance. [2]	Could lead to risk to human life and infrastructure if this occurred during operation times.	High	Frequent network maintenance; Incorporate higher capacity servers.
	- BLE operates at 2.4 GHz and can be affected by surrounding obstacles. The orientation and design of the BLE device can also affect the performance. [3]	May lead to risk to human life and infrastructure if this occurred during operation times.	Medium	Limit surrounding obstacles; Ensure that the orientation of the device on the UAS is correct.
	- ADS-B depends on on-board navigation devices and on-board broadcast transmission systems to provide surveillance information. [4]	No risk to human life or infrastructure.	Low	Cloud-based communication will mainly be used except in the case that the wireless network is down.
Data Throughput	- The data rate at which BLE transmits data can be 1 Mbps for Bluetooth 4.2 and earlier versions. For Bluetooth 5 and later versions, the data rate can either be 1 Mbps or 2 Mbps. [3]	No risk to human life or infrastructure.	Low	Utilize Bluetooth 5 for higher data transmission speed.
	- For ADS-B, the aircraft/vehicle transmitting the broadcast may or may not have the knowledge that the users (ground-based or aircraft) receiving the broadcast have. [4]	May lead to risk to human life and infrastructure if this occurred during operation times.	Medium	Ensure that all systems involved are supplied with the necessary information for efficient flight.

## Risk Assessment/ Constraints

- ❖ Cost, range, data throughput, security constraints
- ❖ Assessment completed through the guidance of SafetyCulture and the Managers Resource Handbook by MHX Global LLP

## SUMMARY

Unmanned aerial systems can be used to support firefighting and search and rescue operations, to monitor and assess critical infrastructure, to provide disaster relief by transporting emergency medical supplies to remote locations, and to aid efforts to secure borders. Other applications of this technology include healthcare, transportation and logistics, infrastructure, economy, security, and the environment