Transfuron

English 210
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Introduction

Problem

-Blood transportation most complicated process of transfusion

-Transfusion definition

-Blood bags not delivered on time.

-Finding a solution

Blood Transportation Conditions

- Blood bags temperature should be around ±4°C ± 2°C.
- Container contains Blood bags, gel ice packs.
- Different sizes of blood bags are available (Single, double, triple, quadruple).
- According to WHO specifications a container carrying 4 liters of blood weighs around 6 Kg.
- We can not use dry ice for transportation because of its temperature.

Potential Users and Stakeholders

Rumailah Hospital

Hamad General Hospital

Women's Wellness and Research Center

Interviews

1. Hamda Al-Naimi
2. Dr. Yasser Al-Hamid
3. A Medical Student

Interview #1 Hamda Al-Naimi

- Texas A&M at Qatar Graduate, Class 2018.

  - Bachelor degree in Electrical and Computer Engineering.

- Working at Qatargas as Control Automation Engineer II.

Emergency Drone

Emergency Drone

Interview questions

1- What inspired you to make the drone?

2- What went wrong/ obstacles and difficulties and how did you handle them ?

3- How was your experience?

4- We know that you were contacted by the Ministry of Transportation and communications regarding your medical drone. How will that help the drone delivery services in Qatar?

5- Future recommendations.

Interview #2 Dr. Yasser Al-Hamidi

- We interviewed Dr. Yasser Al-Hamidi from TAMUQ's Mechanical engineering department.
- The interview was focused on the drone design and the feasibility of the project.
- Helped us narrow our scope and make an informed decision on the type of drone we are going to use in our project

What we learned and integrated in our project based on the interview

- General information on the different drone types that helped us consider the design.
- Aerodynamic design of the container
- Feasibility of the original project.
  - The short flight time of modern drones carrying heavy loads
  - The level of preservation needed for organs to stay in optimal condition
  - Suggested we look into alternative methods of cooling

Interview #3 Medical Student

- We interviewed a medical students in weil cornell.
- The interview was focused on the viability and the best way to transfer blood
- Helped us narrow our scope and make an informed decision on the way we are going to transport blood and what medium it should be in.

What we learned from this interview

1. Blood has two ways of storage:
   a) Glycerol-freezing method
   b) Storing at 4 degrees celsius medium

2. All methods of storage don’t vary when occurring at a short period of time. This aids our idea of having the drone delivery faster and at a short time.

3. It is advised for the best platelet survival to have the platelets in a plasma medium.

Design Constraints

- Drone Models
- Flying Authorization

Risk Factors

- Climate
- Security
- Bird Strikes
- Design

Model Comparison

Multirotor

Fixed- Wing

Single Rotor

Fixed-Wing Hybrid

Types	Pros	Cons	Uses	Price	Speed/ Payload	Flight Time (At full charge)
Multirotor (Figure.1)	-Easily accessible -Ease of use -Good camera control -Can operate in a closed area	-Short flight -Small payload capacity	-Aerial photography and video aerial inspection	5k-65k	50 km/h / Up to 4kg	~25-30 min
Fixed Wing (Figure.2)	-Long endurance -Large area coverage -Fast flight speed	-Launch and recovery needs a lot of space. -No VTOL -Harder to fly -Expensive	-Used for commercial purposes such as aerial mapping	25k-120k	80 km/h / 2.3kg	~30-40 min
Single Rotor (Figure.3)	-Long endurance -Large payload capability -VTOL	-More dangerous -Harder to fly -Expensive	-Research, surveying	25k-300k	200 km/h / NA	~30-50 min
Fixed-Wing Hybrid (Figure.4)	-VTOL and long endurance flight	-Not perfect at either hovering or forward flight -Still in development	-Drone delivery	5k-25k	50 km/h / ~6kg	~30-40 min

Flying Authorization

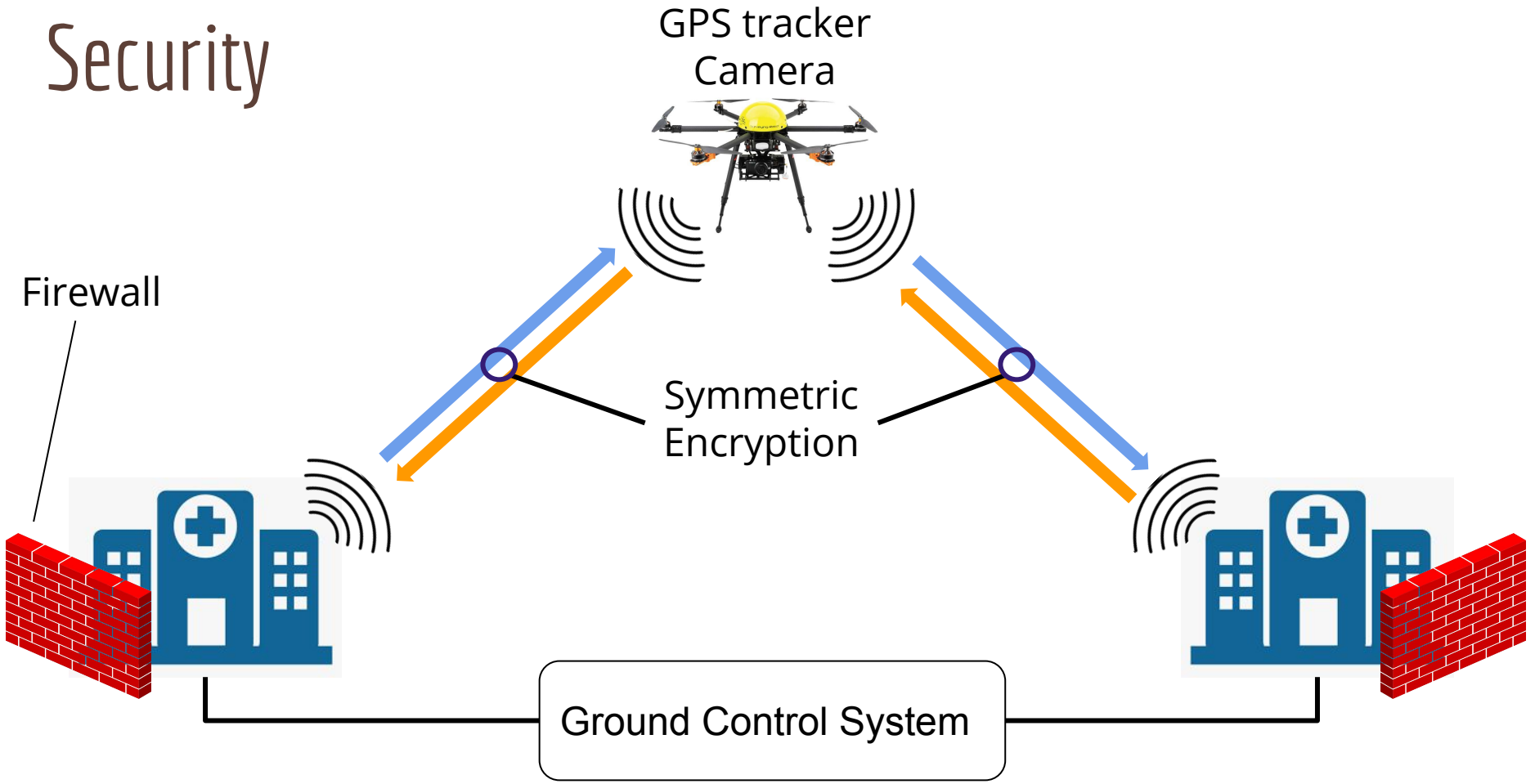
- Drones can fly only under 400 feet.
- Hold load between 2.3 Kg to 6Kg.
- Not allowed to fly over certain locations.
- Needed to be registered in CAA system.

الهيئة العامة للطيران المدني
CIVIL AVIATION AUTHORITY

Climate

- **Flying drones in fog, snow, or even drizzle is not advised.**
- **In addition to any physical effects on the aircraft, there is a danger that the electronics will be impaired and contact between the controller and the drone may be disrupted if any precipitation happens in the air.**

Security


GPS tracker
Camera
Firewall
Symmetric
Encryption
Ground Control System

Bird Strikes

- Imbalancement
- Camera Sensor
- Audible Noise

Design

Conclusion

- The purpose of our project is to design a prototype for a drone that aims to transport blood bags from one hospital to another hospital.
- We aim to have the drone system connected to all hospital systems.
- Providing the best healthcare services is not easy.
- There are many drones in Qatar, not many are used for medical purposes.

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